Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: **1000750**
Date: 14 April 2010

VENDOR Redacted Exemption 4

SHIP TO **Bryn Davis**
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
Redacted Exemption 4				

1. Please send two copies of your invoice.
2. Enter this order in accordance with the prices, terms, delivery method, and specifications listed above.
3. Please notify us immediately if you are unable to ship as specified.
4. Send all correspondence to:
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Authorized by 04/14/10 *Date*

Redacted Exemption 4 ("Supplier") agrees to maintain in strictest confidence all information Sapphire Energy, Inc. ("Company") provides in connection with this Purchase Order, including but not limited to Company's information pertaining to its products, financial condition, business plans, construction plans, designs, customer identities, partner identities, collaborator identities, vendor identities, technical information, and similar information, and to hold in trust and use such information only as needed to fulfill Supplier's obligations for Company's sole benefit. Supplier shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Company, and shall carefully restrict access to such information to those of its employees who clearly require it in order for Supplier to fulfill its obligations under this Purchase Order and who have executed confidentiality agreements consistent with Supplier's obligations under this agreement. On termination of Supplier's obligations under this Purchase Order, Supplier shall return to Company all copies of all information provided by Company to Supplier, including partial copies and derivative works of such information, except that Supplier may retain one copy of this Purchase Order for archival purposes. Supplier may disclose Company information if required by court order.

Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number:1000784
Date: 20 April 2010

VENDOR Redacted Exemption 4

SHIP TO Bryn Davis
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
	Redacted Exemption 4 (Freight will be billed at actual cost including fuel surcharges current at the time of shipment)	

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
Redacted Exemption 4				

1. Please send two copies of your invoice.
2. Enter this order in accordance with the prices, terms, delivery method, and specifications listed above.
3. Please notify us immediately if you are unable to ship as specified.
4. Send all correspondence to:
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Jaime E. Moreno 4/21/10
Authorized by *Date*

Redacted Exemption 4 ("Supplier") agrees to maintain in strictest confidence all information Sapphire Energy, Inc. ("Company") provides in connection with this Purchase Order, including but not limited to Company's information pertaining to its products, financial condition, business plans, construction plans, designs, customer identities, partner identities, collaborator identities, vendor identities, technical information, and similar information, and to hold in trust and use such information only as needed to fulfill Supplier's obligations for Company's sole benefit. Supplier shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Company, and shall carefully restrict access to such information to those of its employees who clearly require it in order for Supplier to fulfill its obligations under this Purchase Order and who have executed confidentiality agreements consistent with Supplier's obligations under this agreement. On termination of Supplier's obligations under this Purchase Order, Supplier shall return to Company all copies of all information provided by Company to Supplier, including partial copies and derivative works of such information, except that Supplier may retain one copy of this Purchase Order for archival purposes. Supplier may disclose Company information if required by court order.

Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001428
Date: 2 July 2010

VENDOR Redacted Exemption 4

SHIP TO **Bryn Davis**
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
		Redacted Exemption 4		

1. Please mail two copies of your invoice.
2. Enter this order in accordance with the prices, terms, delivery method, and specifications listed above.
3. Please notify us immediately if you are unable to ship as specified.
4. **Send all correspondence to:**
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Authorized by 7/2/2010 *Date*

Redacted Exemption 4 ("Supplier") agrees to maintain in strictest confidence all information Sapphire Energy, Inc. ("Company") provides in connection with this Purchase Order, including but not limited to Company's information pertaining to its products, financial condition, business plans, construction plans, designs, customer identities, partner identities, collaborator identities, vendor identities, technical information, and similar information, and to hold in trust and use such information only as needed to fulfill Supplier's obligations for Company's sole benefit. Supplier shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Company, and shall carefully restrict access to such information to those of its employees who clearly require it in order for Supplier to fulfill its obligations under this Purchase Order and who have executed confidentiality agreements consistent with Supplier's obligations under this agreement. On termination of Supplier's obligations under this Purchase Order, Supplier shall return to Company all copies of all information provided by Company to Supplier, including partial copies and derivative works of such information, except that Supplier may retain one copy of this Purchase Order for archival purposes. Supplier may disclose Company information if required by court order.

Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number:1000930
Date: 5 May 2010

VENDOR Redacted Exemption 4

SHIP TO **Bryn Davis**
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference PO

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
Redacted Exemption 4				

Redacted Exemption 4 ("Supplier") agrees to maintain in strictest confidence all information Sapphire Energy, Inc. ("Company") provides in connection with this Purchase Order, including but not limited to Company's information pertaining to its products, financial condition, business plans, construction plans, designs, customer identities, partner identities, collaborator identities, vendor identities, technical information, and similar information, and to hold in trust and use such information only as needed to fulfill Supplier's obligations for Company's sole benefit. Supplier shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Company, and shall carefully restrict access to such information to those of its employees who clearly require it in order for Supplier to fulfill its obligations under this Purchase Order and who have executed confidentiality agreements consistent with Supplier's obligations under this agreement. On termination of Supplier's obligations under this Purchase Order, Supplier shall return to Company all copies of all information provided by Company to Supplier, including partial copies and derivative works of such information, except that Supplier may retain one copy of this Purchase Order for archival purposes. Supplier may disclose Company information if required by court order.

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
		Redacted Exemption 4		

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4. Send all correspondence to:
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Jaime G. Moreno — 5/04/2010

Authorized by — *Date*

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Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001335
Date: 21 June 2010

VENDOR Redacted Exemption 4

SHIP TO
Bryn Davis
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL

Redacted Exemption 4

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Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001335
Date: 21 June 2010

VENDOR Redacted Exemption 4

SHIP TO
Bryn Davis
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
		Redacted Exemption 4		

1. Please mail two copies of your invoice.
2. Enter this order in accordance with the prices, terms, delivery method, and specifications listed above.
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4. **Send all correspondence to:**
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Jaime G. Moreno — 6/21/2010

Authorized by — *Date*

Redacted Exemption 4 ("Supplier") agrees to maintain in strictest confidence all information Sapphire Energy, Inc. ("Company") provides in connection with this Purchase Order, including but not limited to Company's information pertaining to its products, financial condition, business plans, construction plans, designs, customer identities, partner identities, collaborator identities, vendor identities, technical information, and similar information, and to hold in trust and use such information only as needed to fulfill Supplier's obligations for Company's sole benefit. Supplier shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Company, and shall carefully restrict access to such information to those of its employees who clearly require it in order for Supplier to fulfill its obligations under this Purchase Order and who have executed confidentiality agreements consistent with Supplier's obligations under this agreement. On termination of Supplier's obligations under this Purchase Order, Supplier shall return to Company all copies of all information provided by Company to Supplier, including partial copies and derivative works of such information, except that Supplier may retain one copy of this Purchase Order for archival purposes. Supplier may disclose Company information if required by court order.

Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001014
Date: 13 May 2010

VENDOR Redacted Exemption 4

SHIP TO
Bryn Davis
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL

Redacted Exemption 4

1. Please mail two copies of your invoice.
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4. Send all correspondence to:
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Authorized by *Date* 5/04/2010

Redacted
Ex. 4

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Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number:1001015
Date: 13 May 2010

VENDOR Redacted Exemption 4

SHIP TO **Bryn Davis**
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL

Redacted Exemption 4

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4. Send all correspondence to:
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Authorized by

5/13/2010
Date

Redacted Exemption 4 ("Supplier") agrees to maintain in strictest confidence all information Sapphire Energy, Inc. ("Company") provides in connection with this Purchase Order, including but not limited to Company's information pertaining to its products, financial condition, business plans, construction plans, designs, customer identities, partner identities, collaborator identities, vendor identities, technical information, and similar information, and to hold in trust and use such information only as needed to fulfill Supplier's obligations for Company's sole benefit. Supplier shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Company, and shall carefully restrict access to such information to those of its employees who clearly require it in order for Supplier to fulfill its obligations under this Purchase Order and who have executed confidentiality agreements consistent with Supplier's obligations under this agreement. On termination of Supplier's obligations under this Purchase Order, Supplier shall return to Company all copies of all information provided by Company to Supplier, including partial copies and derivative works of such information, except that Supplier may retain one copy of this Purchase Order for archival purposes. Supplier may disclose Company information if required by court order.

Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001622
Date: 30 July 2010

VENDOR Redacted Exemption 4

SHIP TO **Bryn Davis**
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL

Redacted Exemption 4

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Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001622
Date: 30 July 2010

VENDOR Redacted Exemption 4

SHIP TO **Bryn Davis**
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL

1. Please mail two copies of your invoice.
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3. Please notify us immediately if you are unable to ship as specified.
4. **Send all correspondence to:**
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Janine E. Moreno 7/30/2010

Authorized by *Date*

Redacted Exemption 4 ("Supplier") agrees to maintain in strictest confidence all information Sapphire Energy, Inc. ("Company") provides in connection with this Purchase Order, including but not limited to Company's information pertaining to its products, financial condition, business plans, construction plans, designs, customer identities, partner identities, collaborator identities, vendor identities, technical information, and similar information, and to hold in trust and use such information only as needed to fulfill Supplier's obligations for Company's sole benefit. Supplier shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Company, and shall carefully restrict access to such information to those of its employees who clearly require it in order for Supplier to fulfill its obligations under this Purchase Order and who have executed confidentiality agreements consistent with Supplier's obligations under this agreement. On termination of Supplier's obligations under this Purchase Order, Supplier shall return to Company all copies of all information provided by Company to Supplier, including partial copies and derivative works of such information, except that Supplier may retain one copy of this Purchase Order for archival purposes. Supplier may disclose Company information if required by court order.

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number:1001030
Date: 14 May 2010

VENDOR Redacted Exemption 4

SHIP TO **Bryn Davis**
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88001
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL

Redacted Exemption 4

Redacted Exemption 4 ("Supplier") agrees to maintain in strictest confidence all information Sapphire Energy, Inc. ("Company") provides in connection with this Purchase Order, including but not limited to Company's information pertaining to its products, financial condition, business plans, construction plans, designs, customer identities, partner identities, collaborator identities, vendor identities, technical information, and similar information, and to hold in trust and use such information only as needed to fulfill Supplier's obligations for Company's sole benefit. Supplier shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Company, and shall carefully restrict access to such information to those of its employees who clearly require it in order for Supplier to fulfill its obligations under this Purchase Order and who have executed confidentiality agreements consistent with Supplier's obligations under this agreement. On termination of Supplier's obligations under this Purchase Order, Supplier shall return to Company all copies of all information provided by Company to Supplier, including partial copies and derivative works of such information, except that Supplier may retain one copy of this Purchase Order for archival purposes. Supplier may disclose Company information if required by court order.

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL

1. Please send two copies of your invoice.
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4. Send all correspondence to:
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

5/14/2010

Authorized by *Date*

Redacted
Exemption 4

("Supplier") agrees to maintain in strictest confidence all information Sapphire Energy, Inc. ("Company") provides in connection with this Purchase Order, including but not limited to Company's information pertaining to its products, financial condition, business plans, construction plans, designs, customer identities, partner identities, collaborator identities, vendor identities, technical information, and similar information, and to hold in trust and use such information only as needed to fulfill Supplier's obligations for Company's sole benefit. Supplier shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Company, and shall carefully restrict access to such information to those of its employees who clearly require it in order for Supplier to fulfill its obligations under this Purchase Order and who have executed confidentiality agreements consistent with Supplier's obligations under this agreement. On termination of Supplier's obligations under this Purchase Order, Supplier shall return to Company all copies of all information provided by Company to Supplier, including partial copies and derivative works of such information, except that Supplier may retain one copy of this Purchase Order for archival purposes. Supplier may disclose Company information if required by court order.

Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001160
Date: 1 June 2010

VENDOR Redacted Exemption 4

SHIP TO
Bryn Davis
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
Redacted Exemption 4				

1. Please mail two copies of your invoice.
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4. Send all correspondence to:
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

6/1/2010
Authorized by *Date*

Redacted Exemption 4 ("Supplier") agrees to maintain in strictest confidence all information Sapphire Energy, Inc. ("Company") provides in connection with this Purchase Order, including but not limited to Company's information pertaining to its products, financial condition, business plans, construction plans, designs, customer identities, partner identities, collaborator identities, vendor identities, technical information, and similar information, and to hold in trust and use such information only as needed to fulfill Supplier's obligations for Company's sole benefit. Supplier shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Company, and shall carefully restrict access to such information to those of its employees who clearly require it in order for Supplier to fulfill its obligations under this Purchase Order and who have executed confidentiality agreements consistent with Supplier's obligations under this agreement. On termination of Supplier's obligations under this Purchase Order, Supplier shall return to Company all copies of all information provided by Company to Supplier, including partial copies and derivative works of such information, except that Supplier may retain one copy of this Purchase Order for archival purposes. Supplier may disclose Company information if required by court order.

Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001050
Date: 14 May 2010

VENDOR Redacted Exemption 4

SHIP TO **Bryn Davis**
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88001
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
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QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL

Redacted Exemption 4

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   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Jaime G. Moreno 5/14/2010

Authorized by *Date*

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Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001053
Date: 19 May 2010

VENDOR Redacted Exemption 4

SHIP TO Redacted Exemption 4

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
Redacted Exemption 4				

1. Please mail two copies of your invoice.
2. Enter this order in accordance with the prices, terms, delivery method, and specifications listed above.
3. Please notify us immediately if you are unable to ship as specified.
4. Send all correspondence to:
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Authorized by — Date: 5/19/2010

Redacted Exemption 4 ("Supplier") agrees to maintain in strictest confidence all information Sapphire Energy, Inc. ("Company") provides in connection with this Purchase Order, including but not limited to Company's information pertaining to its products, financial condition, business plans, construction plans, designs, customer identities, partner identities, collaborator identities, vendor identities, technical information, and similar information, and to hold in trust and use such information only as needed to fulfill Supplier's obligations for Company's sole benefit. Supplier shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Company, and shall carefully restrict access to such information to those of its employees who clearly require it in order for Supplier to fulfill its obligations under this Purchase Order and who have executed confidentiality agreements consistent with Supplier's obligations under this agreement. On termination of Supplier's obligations under this Purchase Order, Supplier shall return to Company all copies of all information provided by Company to Supplier, including partial copies and derivative works of such information, except that Supplier may retain one copy of this Purchase Order for archival purposes. Supplier may disclose Company information if required by court order.

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001031
Date: 17 May 2010

VENDOR Redacted Exemption 4

SHIP TO **Bryn Davis**
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
Redacted Exemption 4				

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   Jaime Moreno
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   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Authorized by 5/17/2010 *Date*

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Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001069
Date: 19 May 2010

VENDOR Redacted Exemption 4

SHIP TO Redacted Exemption 4

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
Redacted Exemption 4				

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   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

5/19/2010

Authorized by *Date*

Redacted
Exemption 4

) agrees to maintain in strictest confidence all information Sapphire Energy, Inc. ("Company") provides in connection with this Purchase Order, including but not limited to Company's information pertaining to its products, financial condition, business plans, construction plans, designs, customer identities, partner identities, collaborator identities, vendor identities, technical information, and similar information, and to hold in trust and use such information only as needed to fulfill Supplier's obligations for Company's sole benefit. Supplier shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others for their benefit or to the detriment of Company, and shall carefully restrict access to such information to those of its employees who clearly require it in order for Supplier to fulfill its obligations under this Purchase Order and who have executed confidentiality agreements consistent with Supplier's obligations under this agreement. On termination of Supplier's obligations under this Purchase Order, Supplier shall return to Company all copies of all information provided by Company to Supplier, including partial copies and derivative works of such information, except that Supplier may retain one copy of this Purchase Order for archival purposes. Supplier may disclose Company information if required by court order.

Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001055
Date: 19 May 2010

VENDOR Redacted Exemption 4

SHIP TO
Bryn Davis
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
Redacted Exemption 4				

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4. Send all correspondence to:
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Authorized by *Date* 5/19/2010

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Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001290
Date: 15 June 2010

VENDOR Redacted Exemption 4

SHIP TO **Bryn Davis**
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
		Redacted Exemption 4		

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4. Send all correspondence to:
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Authorized by 6/15/2010 *Date*

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Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001337
Date: 21 June 2010

VENDOR Redacted Exemption 4

SHIP TO **Bryn Davis**
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL

Redacted Exemption 4

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Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number: 1001337
Date: 21 June 2010

VENDOR Redacted Exemption 4

SHIP TO **Bryn Davis**
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
		Redacted Exemption 4		

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4. **Send all correspondence to:**
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Jaime G. Moreno — 6/21/2010

Authorized by — *Date*

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Sapphire Energy

PURCHASE ORDER

3115 Merryfield Row, San Diego, CA 92121
Phone 858-768-4708 Fax 888-501-8353
nick.herrera@sapphireenergy.com

PO Number:1001680
Date: 9 August 2010

VENDOR Redacted Exemption 4

SHIP TO
Bryn Davis
Sapphire Energy, Inc.
9035 Advancement Ave.
West Mesa Industrial Park
Las Cruces, NM 88007
Bryn.davis@sapphireenergy.com

SHIPPING METHOD	SHIPPING TERMS	DELIVERY DATE
Best Way	FOB Ship Point	Per Reference Quote

QTY	ITEM #	DESCRIPTION	UNIT PRICE	LINE TOTAL
Redacted Exemption 4				

1. Please mail two copies of your invoice.
2. Enter this order in accordance with the prices, terms, delivery method, and specifications listed above.
3. Please notify us immediately if you are unable to ship as specified.
4. **Send all correspondence to:**
   Jaime Moreno
   27101 Puerta Real, Suite 280
   Mission Viejo, CA 92691-8009
   Phone 949-202-4702 Fax 949-367-0650

Authorized by 8/9/2010 *Date*

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FY12 Project Management Plan

A. Project Information

OBP WBS	5.11.1.1	Title	Integrated Algal Biorefinery					
Contact Information	Name		Phone	Email	Program Element/Area	_5_Integrated_Biorefineries	CID or Laboratory Designation	EE0002884
DOE HQ Technology	Neil Rossmeissl		NR 202 586 8668	neil.rossmeissl@ee.doe.gov	Project Initiated (dd/mm/yy)	1-Jan-10	CPS Agreement #	WBS5.11.1.1
DOE GO Project Officer	Christy Sterner		CSS (303)275 4720	christy.sterner@go.doe.gov	Planned Project Completion Date (dd/mm/yyyy)	30-Sep-14	Program Value (B&R) Code	1004173
PMC Project Monitor	Christine English		ce 720-356-1324	christine.english@go.doe.gov	Date of Last Gate, Project or Peer Review (dd/mm/yy)		Insert Text File (Word) of Full SOW ►►	O:_DOE\05 BP-1 Augment Applicatio
Company Contact or Lab Relationship Manager	Dave Marsh		949-202-4700	dave.marsh@sapphireenergy.com	Project Location Zip Code		Insert Gantt Chart (or equivalent) ►►	O:_DOE\05 BP-1 Augment Applicatio
Principal Investigator	Jaime E. Moreno		949-202-4700	jaime.moreno@sapphireenergy.com	Performing Organization (Only Prime Recipient)	Sapphire Energy, Inc.	Project Technology Readiness Level (TRL)	
Co-Principal Investigator (if applicable)					Funding Partner(s) [Any partner or subcontractor who provides cost share]	None.	Subject to Stage Gate Review?	

Project Description (non-proprietary)	The Integrated Algal Biorefinery (IABR) will be built in Luna County, near Columbus, New Mexico. The algae will fix approximately 56 metric tons of CO2 per day and produce, on average, 100 barrels of green crude oil per day, or approximately 1 million gallons per year of finished fuel product. The successful project will demonstrate the technical and economic feasibility of the algae to green fuels process that will form the basis for a series of commercial scale biorefineries.
Summary of Project Objectives & Tasks (at the A, B, C, etc.level from Section C of PMP, non-proprietary)	1. The design and construction of: all required infrastructure, including equipment, design and control methods, for the production of algal oil for green jet fuel and green diesel. 2. The shakedown and testing of: material and energy flows for all processes inputs and product flows and comparison of different process operating conditions, product flow rates and yields from different commercial algal strains against model projections. 3. The establishment of: steady state operations including material and energy balances; plant process design, including operating conditions, cash flow and capital requirements for a full-scale commercial plant capable of producing greater than 150 million gallons of algae oil per year (10,000 bpd). A. Phase 0 - Origination
Annual Work Plan FY2012 (typically 1-4 paragraph lengths of text or about 1/2 to 3/4 page of text)	Redacted Exemption 4
Summary of Work to date (typically 2-6 paragraphs or about 1-2 pages of text)	

Section B. Financial Description of Project

Prime Recipient Name	Location (zipcode)	Total DOE Funds Obligated to date	Carryover of DOE funding into FY12 (if applicable)	FY12 DOE Obligations Planned	Requested DOE FY Obligation (if applicable) FY13	FY14	FY15	FY16	Current Approved DOE Total	Comments/Issues
Sapphire Energy, Inc.		$49,725,000.00							$50,000,000.00	
Subcontractors or Lab Partners										

Funding by task number at the major task level (A,B,C,D, etc.) as specified in section C below (columns E-H)	Percent Recipient Cost Share	Total Project Funds Spent to date	FY12 Total Spend plan (DOE & Cost Share)	Fiscal Year Estimated Spending Plan (if applicable, including Cost Share) FY13	FY14	FY15	FY16	Current Approved Spend Plan Total	Comments/Issues
A									
B									
C									
D									
E									
F									
G									
H									
I									
								$ -	
								$ -	
								$ -	
								$ -	
								$ -	
								$ -	
								$ -	
								$ -	
								$ -	
								$ -	
								$ -	
								$ -	

Redacted Exemption 4

B C D E F G H I J K L M N O P Q R S T U V W X Y Z AA … BH BI BJ

56	$	-
57	$	-
58	$	-
59	$	-
60	$	-
61	$	-
62	$	-
63	$	-
64	$	-
65	$	-
66	$	-
67	$	-
68	$	-
69	$	-
70	$	-
71	$	-

72 **C. Project Plan with tasks, subtasks, milestones, deliverables, Go No/Go decision points and including performance requirements and metrics**

73/74	Project WBS Number	Number of Task, Subtask, Milestone, Deliverable and Go No/Go Decision Points	Title - Tasks, Subtasks, Milestones, Deliverables including Go No/Go Decision Pts	*For milestones provide type*	Performer(s)	Program Pathway C Milestones Link	Start Date (Tasks, Subtasks Only)	Planned Completion Date (Tasks, Subtasks and Milestones)	TRL Starting Level	TRL Finishing Level	Barriers Addressed	Milestone & Decision Point Completion Criteria & Metrics	Task, subtask or Milestone Decription	Mark as proprietary or confidential
75	5.11.1.1	A			Sapphire Energy,						It-B			
76	5.11.1.1	A.1			Sapphire Energy,									
77	5.11.1.1	A.1.ML.1		E - Project	Sapphire Energy,							1 Yes/No		
78	5.11.1.1	A.1.ML.2	Redacted	E - Project	Sapphire Energy,		Redacted					1 Yes/No		
79	5.11.1.1	A.1.ML.3	Exemption 4	E - Project	Sapphire Energy,		Exemption 4					1 Yes/No		
80	5.11.1.1	A.1.ML.4		E - Project	Sapphire Energy,							1 Yes/No		
81	5.11.1.1	A.1.ML.5		E - Project	Sapphire Energy,							1 Yes/No		
82	5.11.1.1	A.1.ML.6		E - Project	Sapphire Energy,							1 Yes/No		
83	5.11.1.1	A.2			Sapphire Energy,									
84	5.11.1.1	A.2.ML.1		E - Project	Sapphire Energy,							1 Yes/No		
85	5.11.1.1	A.2.ML.2		E - Project	Sapphire Energy,							1 Yes/No		
86	5.11.1.1	A.3			Sapphire Energy,									
87	5.11.1.1	A.3.ML.1		E - Project	Sapphire Energy,							Yes/No		
88	5.11.1.1	A.4			Sapphire Energy,									
89	5.11.1.1	A.4.GN.1		GN - Go	Sapphire Energy,							1 Yes/No		
90	5.11.1.1	B			Sapphire Energy,						It-B			
91	5.11.1.1	B.1			Sapphire Energy,									
92	5.11.1.1	B.1.ML.1		E - Project	Sapphire Energy,							1 Yes/No		
93	5.11.1.1	B.2			Sapphire Energy,									
94	5.11.1.1	B.2.ML.1		E - Project	Sapphire Energy,							1 Yes/No		
95	5.11.1.1	B.3			Sapphire Energy,									
96	5.11.1.1	B.3.ML.1		E - Project	Sapphire Energy,							1 Yes/No		
99	5.11.1.1	B.4			Sapphire Energy,									
100	5.11.1.1	B.4.ML.1		E - Project	Sapphire Energy,							1 Yes/No		
101	5.11.1.1	B.5			Sapphire Energy,							1 Yes/No		
102	5.11.1.1	B.6			Sapphire Energy,									
103	5.11.1.1	B.6.GN.1		GN - Go	Sapphire Energy,							1 Yes/No		
104	5.11.1.1	C			Sapphire Energy,						It-B			
105	5.11.1.1	C.1			Sapphire Energy,									
106	5.11.1.1	C.1.ML.1		E - Project	Sapphire Energy,							1 Yes/No		
107	5.11.1.1	C.1.ML.2		E - Project	Sapphire Energy,							1 Yes/No		
108	5.11.1.1	C.1.ML.3		E - Project	Sapphire Energy,							1 Yes/No		
109	5.11.1.1	C.1.ML.4		E - Project	Sapphire Energy,							1 Yes/No		
110	5.11.1.1	C.1.ML.5		E - Project	Sapphire Energy,							1 Yes/No		
111	5.11.1.1	C.1.ML.6		E - Project	Sapphire Energy,							1 Yes/No		
112	5.11.1.1	C.1.ML.7		E - Project	Sapphire Energy,							1 Yes/No		
113	5.11.1.1	C.1.ML.8		E - Project	Sapphire Energy,							1 Yes/No		
114	5.11.1.1	C.1.ML.9		E - Project	Sapphire Energy,							1 Yes/No		
115	5.11.1.1	C.1.ML.10		E - Project	Sapphire Energy,							1 Yes/No		

	B C D	E F G H	I J K L M N O P	Q R S	T U V W	X Y Z	AA …						BJ
116	5.11.1.1	C.2	Redacted Exemption 4		Sapphire Energy,		Redacted Exemption 4						
117	5.11.1.1	C.3			Sapphire Energy,								
118	5.11.1.1	C.4			Sapphire Energy,								
119	5.11.1.1	C.5			Sapphire Energy,								
120	5.11.1.1	C.6			Sapphire Energy,								
121	5.11.1.1	D			Sapphire Energy,					It-B			
122	5.11.1.1	D.1			Sapphire Energy,								
123	5.11.1.1	D.1.ML.1		E - Project	Sapphire Energy,						1 Yes/No		
124	5.11.1.1	D.1.ML.2		E - Project	Sapphire Energy,						1 Yes/No		
125	5.11.1.1	D.1.ML.3		E - Project	Sapphire Energy,						1 Yes/No		
126	5.11.1.1	D.1.ML.4		E - Project	Sapphire Energy,						1 Yes/No		
127	5.11.1.1	D.1.ML.5		E - Project	Sapphire Energy,						1 Yes/No		
128	5.11.1.1	D.2			Sapphire Energy,								
129	5.11.1.1	D.2.GN.1		GN - Go	Sapphire Energy,						1 Yes/No		
130	5.11.1.1	D.3			Sapphire Energy,								
131	5.11.1.1	D.3.GN.1		GN - Go	Sapphire Energy,						1 Yes/No		
132	5.11.1.1	D.4			Sapphire Energy,								
133	5.11.1.1	D.4.GN.1		GN - Go	Sapphire Energy,						1 Yes/No		
134	5.11.1.1	D.5			Sapphire Energy,								
135	5.11.1.1	D.6			Sapphire Energy,								
136	5.11.1.1	D.7			Sapphire Energy,								
137	5.11.1.1	D.7.GN.1		GN - Go	Sapphire Energy,						1 Yes/No		
138	5.11.1.1	D.7.ML.4		E - Project	Sapphire Energy,						1 Yes/No		
139	5.11.1.1	E			Sapphire Energy,					It-B			
140	5.11.1.1	E.1			Sapphire Energy,								
141	5.11.1.1	E.2			Sapphire Energy,								
142													
1042													

Program Barriers Addressed

Feedstock Integration

Ft-A Feedstock Availability and Cost: The lack of credible data on price, location, environmental sustainability, quality, and quantity of available biomass feedstocks creates uncertainty for investors and developers of emerging biorefinery technologies. Estimates of c
Ft-B Sustainable Production: Existing data on the productivity and environmental effects of biomass feedstock production systems and residue collection are not adequate to support lifecycle analysis of biorefinery systems. A number of sustainability questions (suc
Ft-C Feedstock Genetics and Development: The productivity and robustness of algae and other feedstocks used for biofuel production could be improved by selection, screening, breeding and/or genetic engineering. This will require extensive ecological, genetic, a
Ft-D Sustainable Harvesting: Current crop harvesting machinery is unable to selectively harvest desired components of cellulosic biomass and address the soil carbon and erosion sustainability constraints. Biomass variability places high demand and functional rec
Ft-G Feedstock Quality and Monitoring: Physical, chemical, microbiological, and post-harvest physiological variations in feedstocks arising from differences in variety, geographical location, and harvest methods are not well understood. In addition, feedstock proces
Ft-H Biomass Storage Systems: Characterization and analysis of different storage methods and strategies are needed to better define storage requirements. Storage elements need to be understood as a function of feedstock source, biomass moisture, climate, st
Ft-J Biomass Material Properties: Data on biomass quality and physical property characteristics for optimum conversion are limited. Methods and instruments for measuring physical and biomechanical properties of biomass are lacking. Information on moisture effe
Ft-K Biomass Physical State Alteration: The initial sizing and grinding of cellulosic biomass affects efficiencies and quality of all the downstream operations, yet little information exists on these operations with respect to the multiplicity of cellulosic biomass resource
Ft-L Biomass Material Handling and Transportation: The capital and operating costs for the existing package-based equipment and facilities for handling cellulosic biomass are not cost-effective. The low density and fibrous nature of cellulosic biomass make it difficu
Ft-M Overall Integration and Scale-Up: Existing biomass harvesting, collection, storage, handling, and transport systems are not designed for the large-scale needs of integrated biorefineries. Feedstock logistics infrastructure has not been defined for various locatic
Ft-N Algal Feedstock Processing: After cultivation and harvesting of algal feedstocks, algal biomass may require processing or fractionation into lipids, carbohydrates, and/or proteins before these individual components can be converted or further processed into th

Biochemical Conversion

Bt-A Biomass Fractionation: Fractionation can be used to increase the value of the individual components in biomass prior to their subsequent conversion to products. Currently, the interactions between chemical, biological, solvation (ability to go into solution), and
Bt-B Biomass Variability: The characteristics of biomass feedstock materials can vary widely in terms of physical and chemical composition, size, shape, moisture content, and bulk density. These variations can make it difficult (or costly) to supply biorefineries with
Bt-C Biomass Recalcitrance: Lignocellulosic biomass feedstocks are naturally resistant to chemical and/or biological degradation. The fundamental role of biomass structure and composition and the critical physical and chemical properties that determine the susce
Bt-D Pretreatment Chemistry: Prehydrolysis of biomass, typically referred to as pretreatment, is required to break down the structure of biomass and increase its susceptibility to subsequent enzymatic hydrolysis by cellulase enzymes. There is a lack of understandi
Bt-E Pretreatment Costs: Pretreatment reactors typically require expensive construction materials to resist acid or alkali attack at elevated temperatures. In addition, the impact of reaction configuration and reactor design on chemical cellulose prehydrolysis is not w
Bt-F Cellulase Enzyme Production Cost: Cellulase enzymes remain a significant portion of the projected production cost of sugars from cellulosic biomass. Cost-effective enzyme production technologies are not currently available, although significant progress has
Bt-G Cellulase Enzyme Loading: Reducing the cost of enzymatic hydrolysis depends on identifying more efficient enzyme preparations and enzyme hydrolysis regimes that permit more cost-effective and lower ratios of enzyme to substrate to be used. Currently ava
Bt-I Cleanup/Separation: Sugar solutions resulting from pretreatment and hydrolysis are impure, containing a mixture of sugars and a variety of non-sugar components. Potential impurities include acetic acid liberated upon hydrolysis of hemicellulose, lignin-derived
Bt-J Catalyst Development: There is a need for biological or chemical catalysts that can convert the sugar mixture and inhibitors in the hydrolysate broth derived from biomass pretreatment and hydrolysis for the production of advanced biofuels, bioproducts, and fue
Bt-K Biological Process Integration: Process integration remains a key technical barrier hindering development and deployment of biochemical conversion technologies. Biochemical conversion technologies currently present large scale-up risks given the lack of hig
Bt-L Biochemical/Thermochemical Interface: Integration of the entire biorefinery is the final conversion barrier and overcoming it will require successful integration at the interfaces between the biochemical and thermochemical processes. Without planned and man

Thermochemical Conversion

Tt-A Feeding Dry Biomass: In the near term, there are no significant barriers to feeding and handling dry wood or dry energy crop resources in atmospheric systems, provided they are of a relatively uniform particle size and chemical composition. In the longer term,
Tt-B Feeding or Drying Wet Biomass: There is a need to understand the costs and trade-off for drying or feeding wet biomass feedstocks such as green biomass or wet lignin-rich fermentation residues. Innovative dryer designs capable of utilizing low-value proces
Tt-C Gasification of Biomass: There is a need to understand the chemistry and physical handling properties of biomass feedstocks, minor byproducts and co-products, and biorefinery residual solids. This includes developing an understanding of gasification options
Tt-E Pyrolysis of Biomass and Bio-Oil Stabilization: The pyrolysis of biomass has been studied for some time, however, the resulting bio-oil is unstable and highly reactive. Improvements in pyrolytic processing—with or without catalysts—are needed to yield higher
Tt-G Fuel Synthesis and Upgrading: Gasification Route – The commercial success of mixed alcohol synthesis or hydrocarbon liquids has been limited by poor selectivity and low product yields. More robust catalysts with increased productivity and selectivity with a
Tt-H Validation of Syngas Quality: Syngas quality specifications for production of liquid fuel products like methanol/dimethyl ether, methylal, mixed alcohols and hydrocarbon liquids are reasonably well known. However, validation that syngas from biomass can meet
Tt-I Sensors and Controls: Effective process control will be needed to maintain plant performance and regulate emissions at target levels with varying load, fuel properties, and atmospheric conditions. Commercial control systems need to be developed and tested f
Tt-K Thermochemical Process Integration: Thermochemical conversion technologies process integration currently presents large scale-up risks because of lack of high quality controlled process data on integrated systems over extended periods of time that would
Tt.- . Syngas Cleanup and Conditioning: There is a near-term need for gas cleaning and conditioning catalysts and technology that can cost-effectively remove contaminants such as tars, particulates, alkali, and sulfur. The interactions between the catalysts used for

Integrated Biorefineries

Im-A Inadequate Supply Chain Infrastructure: The lack of commoditized feedstocks and feedstock infrastructure increases the uncertainty associated with a sustainable feedstock supply chain. Variable composition, geographical diversity, and diverse physical cha
Im-B Agricultural Sector-Wide Paradigm Shift: Energy production from biomass on a scale sufficient to meet EISA RFS goals, or those of a future Renewable Portfolio Standard (RPS), will require a series of major system changes that will take time to implement. C
Im-C Lack of Understanding of Environmental/Energy Tradeoffs: A systematic evaluation of expanded biofuels production impact on the environment and food supply for humans and animals is insufficient. Sufficient data needs to be generated from various operat
Im-D High Risk of Large Capital Investments: Once emerging biomass technologies have been developed and tested, they must be commercially deployed. Financial barriers are the most challenging aspect of technology deployment. Capital costs for commercially
Im-E Lack of Industry Standards and Regulations: The lack of local, state, and federal regulations and inconsistency among existing regulations constrain development of the biomass industry. The long lead times associated with developing and understanding new
Im-F Cost of Production: An overarching market barrier for biomass technologies is the inability to compete, in most applications, with fossil energy supplies and their established supporting facilities and infrastructure. Uncertainties in fossil energy price and supply c
Im-G Off-take Agreements: Production costs and hence selling price and profits of commodity fuels and chemicals based on crude oil are dependent on a fluctuating market. The fact that petroleum companies and ethanol producers still return a profit in the face o
It-A End-to-End Process Integration: Successful deployment of the biorefinery business model is dependent on advances in biochemical and thermochemical biomass conversion process technologies. The biorefinery concept encompasses a wide range of technic
It-B Demonstration-Scale Facilities: As with all new process technologies, demonstrating sustained integrated performance that meets technical, environmental, and safety requirements at sufficiently large scale is an essential step toward commercialization. Demo
It-C Risk of First-of-a-kind Technology: The first biorefineries will incorporate a variety of new technologies. The number and complexity of new process steps implemented in pilot- and demonstration-scale projects has been shown to be a strong predictor of future c
It-E Engineering Modeling Tools: The current level of understanding regarding fuels chemistry is insufficient for optimization, scale-up, and commercialization. In order to better understand how fuel chemistry affects commercial viability, rigorous computational fluid c

Biofuels Distribution and End Use

Dm-A Availability of Biofuels Distribution Infrastructure: The infrastructure required to distribute and dispense large volumes of ethanol does not currently exist, which puts this biofuel at a disadvantage compared to conventional liquid transportation fuels that already
Dm-B Availability of Biofuel-Compatible Vehicles: Out of roughly 254 million passenger vehicles registered in the United States, only 8 million are E85-compatible FFVs, with many FFV owners not even aware that their vehicles are E85-compatible. Vehicle manufac
Dm-C Market Uncertainty: There is uncertainty regarding the pace of development and commercialization of new biofuels technology. This uncertainty surrounding which biofuels will succeed in the short and long term adds risk to investment in biofuels infrastructure
Dm-D Higher Biofuel Delivery Costs: Ethanol's incompatibility with the existing petroleum fuel infrastructure, combined with the lower energy density of ethanol compared to petroleum fuels, results in higher delivery costs on per unit energy basis than for petroleum
Dt-A Biofuels Pipeline Compatibility: Pipelines are generally the most efficient and cost-effective way to transport liquid fuels over long distances, but technical and logistical issues have prevented biofuels from being transported in the existing pipeline network. Et
Dt-B Codes, Standards and Approval for Use: New biofuels and biofuel blends must comply with federal, state, and regional regulations before introduction to the market. The U.S. Environmental Protection Agency (EPA) plays a central role in approving new fuels

BioPower

Pm-A Cost of Biopower Production: Generating electricity from biomass is more expensive than generating from coal. This is especially true compared to coal used for baseload generation, which biomass could potentially directly replace more easily than other ren
Pm-B Need for Consistent Policy Drivers and Regulations: The lack of federal policy supporting renewable energy, such as renewable portfolio standards (RPS), proposed EPA maximum available control technology (MACT) rules and GHG emissions control such
Pt-A Cofiring Challenges: Technical challenges for utilizing boilers designed for coal include: fuel sizing, fuel handling and injection, increased mass flow rates, carbon conversion, and emissions control issues, especially particulate and catalyst controls for NOX an

Pt-B Need for Understanding of Environmental Tradeoffs: Electric utilities need clarification that cofiring for power generation will be deemed environmentally acceptable. Understanding the overall changes in emissions from biomass cofiring will be critical to the ac
Pt-C Lack of Experience and Understanding of Impacts of Using Biomass and Engineered Biomass as Fuels: Utilities and Independent Power Producers (IPP) in the U.S. have limited knowledge and experience regarding the performance, characteristics, and impa
Pt-D Generating Upgraded Biomass for Power Plant Compatibility: Raw biomass feedstocks are not as dry, energy dense, or consistent a fuel source as coal. They are often incompatible with existing plant storage, handling, milling, and fuel feed systems. Many ha
Pt-E Advanced Conversion Challenges: Advanced conversion systems (combined cycles, advanced gas turbines, reciprocating engines, and fuels cells) could be used for biopower if the fuel could be converted to a form and composition compatible with those tech
Pt-F End-to-End Process Integration: Successful demonstration of large-scale biopower is dependent on advances in pretreatment and thermochemical conversion process technologies and their subsequent integration into advanced power systems. The demonst

Sustainability & Analysis

St-A Scientific Consensus on Bioenergy Sustainability: While there is agreement on the general definition of sustainability, there is no consensus on its specific definition or ways to quantify how bioenergy sustainability should be measured (such as definitions, app
St-B Consistent, Defensible Message on Bioenergy Sustainability: The prevalence of misrepresentations of the effects of bioenergy – including assumptions, scenarios, and model projections that lack empirical underpinnings – creates confusion about the benefits
St-C Sustainability Data across the Supply Chain: A fundamental hurdle is the lack of data to evaluate sustainability along the supply chain and to compare effects of one pathway with another. The lack of adequate and accessible temporal and spatial data for mea
St-D Indicators and Methodology for Evaluating Sustainability: There is little agreement about operationally practical and effective methods to develop metrics, define baselines, set targets, and conduct lifecycle assessments to determine the impacts of bioenergy
St-E Best Practices for Sustainable Bioenergy Production: Because bioenergy production is relatively new, few "best practices" are defined for all components of the bioenergy supply chain.
St-F Systems Approach to Bioenergy Sustainability: The sustainability of the entire supply chain is not considered in current assessments of technical feasibility and economic optimization. No tools exist to allow researchers to consider the potential interactions a
St-G Representation of Land Use: The inability of existing data sources to capture the actual state of the landscape, a poor understanding of the processes that drive land-use change (LUC), and the lack of knowledge about the environmental and social conseque
At-A Lack of comparable, transparent and reproducible analysis: Analysis results are strongly influenced by the datasets employed, as well as by the assumptions and guidelines established to frame the analysis. The lack of standardized datasets, assumptions,
At-B Limitations of analytical tools and capabilities for system-level analysis: Current analysis tools and models are not sufficient in their current state to enable understanding of broader bioenergy supply-chain-wide systems, linkages, and dependencies. Models
At-C Inaccessibility and unavailability of data: To fully understand the biomass-to-bioenergy supply chain and its economic, environmental, and other impacts requires complete and comparable data. Current data are difficult to find, access, compile, and analyze.

Market Transformation

Mm-A Level of Industry and Consumer Acceptance and Awareness: To be successful in the marketplace, biomass-derived fuels and chemical products must perform as well or better than comparable petroleum- and fossil-based products. Industry partners and co
Mm-B Inconsistent or Competing Policies and Drivers to Facilitate Multi-Sector Shifts: Expanding biofuels production to meet federal goals will require managing and responding to different market and policy drivers and considerable federal, state, and local investm
Mm-C Insufficient or Inconsistent Regulations and Standards: Certain local, state, and federal regulations are not yet fully developed or are inconsistent with existing regulations, which constrains the development of the bioenergy industry. Long lead times associat

Algae

Al-B. Algal Fuel Production

:urrent and potential feedstock resources are limited in scope and do not consider how major advances in production technologies will impact future biomass availability. Established feedstock production history is required to assure investors/funding sources that the
:h as water and fertilizer inputs, establishment and harvesting impacts on soil, etc.) have not been comprehensively addressed. New production technologies for feedstock systems such as algae are also required to address cost, productivity, and sustainability issue
and biochemical information, which is currently lacking for most algal species.
quirements on biomass harvesting equipment. Current systems cannot meet the capacity, efficiency, or delivered price requirements of large cellulosic biorefineries, nor can they effectively deal with the large biomass yields per acre of potential new biomass feedsto
ssing standards and specifications for feedstocks are not currently available. The quality characteristics of new cellulosic biomass feedstocks are less consistent than for grain, which have known quantity and highly consistent attributes. Grain-fed biorefineries rely or
orage time, and cost. Stored biomass that is or becomes wet is susceptible to spoilage, rotting, spontaneous combustion, and odor problems, therefore, the impact of these post-harvest physiological processes must be controlled to the benefit of biorefining processe
:cts on quality and physical properties of biomass as affected by feedstock variability and climatic conditions is incomplete.
:s and biomass format requirements for biorefining. New technologies and equipment are required to process biomass between the field and conversion facilities. The harvest season for most crop-based cellulosic biomass is short, especially in northern climates, th
ult and costly to collect, handle, and transport. For algal biomass, there is a need for characterization and analysis of collection, handling, and transportation systems.
)ns, climates, feedstocks, storage methods, etc. The lack of experience with integrating time-sensitive collection, storage, and delivery operations to ensure year-round supply of large amounts of consistent, quality biomass feedstock is a barrier to widespread impler
ne desired fuel or product. Current technologies for algal fractionation and product extraction are not cost-competitive, scalable, or sustainable. Options to circumvent or improve these processes exist, for example by conversion of whole algal biomass, or secretion

mechanical processes that ultimately allow biomass to be more efficiently fractionated into high purity components prior to conversion are insufficiently understood or simply too costly to implement commercially.
feedstocks of consistent, acceptable quality year-round. Additionally, this feedstock variability affects overall conversion rate and product yield of biomass conversion processes.
:ptibility of cellulosic substrates to hydrolysis are not well understood. This lack of understanding of the root causes of the recalcitrance of biomass limits the ability to direct efforts to improve the cost-effectiveness and efficiency of pretreatment and other fractionation
ng of critical physical and chemical properties that determine the susceptibility of cellulosic substrates to hydrolysis and the role that lignin and other pretreatment products play in impeding access to cellulose on a molecular level. Continued cost reductions in pretrea
vell understood. Developing lower-cost pretreatment depends on the ability to process the biomass in reactors designed for maximum solid levels and fabricated from cost-effective materials.
been made through concerted efforts both within the Program and with industrial enzyme producers.
ailable enzymes are not sufficiently thermotolerent and suffer from substantial resistance to sugar end-product inhibition. Developing enzymes that enable low-cost enzymatic hydrolysis technology requires more understanding of the fundamental mechanisms underl
phenolics solubilized during pretreatment, inorganic acids or alkalis or other compounds introduced during pretreatment, various salts, and hexose and pentose sugar degradation or transglycosylation products. The presence of some of the non-sugar components c
:l intermediates. Improvement in the robustness of catalysts, e.g. bacterial, fungal, algal, or chemical, and their ability to perform in hydrolysate broths can lead to significantly lower capital costs.
gh-quality performance data on integrated processes carried out at the high solids conditions required for industrial operations. The effect of feed and process variations throughout the process must be understood to ensure robust, efficient biorefineries. Process inte
aged integration, the complete picture of biomass conversion to fuels and chemicals will not be clear enough to attract potential developers as the risks of commercialization will be too high for financiers. As conversion technologies mature, higher levels of integratio

, there is a need for improvements in the processing and feeding of dry biomass including densification, logistics of handling, development of specifications, and removal of problematic chemical contaminants. Demonstrating reliable feeding of dry biomass into press
s heat will be important to the integrated biorefinery.
s and their chemistries for materials including wood, energy crops, sorted municipal solid waste, agricultural residues high in minerals and lignin, and high-moisture organic residues.
quality bio-oil that will lower subsequent upgrading costs and allow for greater commercial viability. New methods and catalysts to clean and stabilize the bio-oil are needed to ensure the product is less reactive and stable for at least of six months; these advances ir
biomass feedstock together with extended lifetimes are required to enable viable capital and operating costs. Pyrolysis Route – There is a need for hydrotreating and hydrocracking catalysts that are highly selective to the desired end product, robust with respect to t
t the rigorous quality specifications needed for the production of liquid fuels via catalytic synthesis is still needed.
or thermochemical processes and systems.
be required of industrial operations. The effect of feed and process variations throughout the process must be understood to ensure robust and efficient operation of biorefineries. Process integration work is essential for characterizing the complex interactions that ex
r gas cleanup and conditioning, and the gasification conditions and feedstock are not well understood. These interactions require careful attention to trace contaminants and are important for efficient cleanup and conditioning of syngas in conjunction with optimal lifeti

racteristics increase the radius of collection and therefore, the delivered cost of feedstock. Once demand is established, the infrastructure is expected to grow accordingly. Producing and delivering commoditized feedstock in sufficient volume to support a commercia
:urrent harvesting, storage, and transportation systems are inadequate for processing and distributing biomass on the scale needed to support dramatically larger volumes of biofuels production.
:ional facility designs to provide valid sustainability benchmarks for the nascent industry. Analytical tools are needed to facilitate consistent evaluation of energy benefits and greenhouse gas emissions (GHG) impacts of all potential advanced biofuel feedstock and pr
y viable facilities are relatively high, and securing capital for an unproven technology is extremely difficult. Lenders are hesitant to provide debt financing for first-of-a-kind commercial facilities, where the process performance cannot be adequately guaranteed. For pr
and revised regulations for technology can delay or stifle commercialization and deployment. Consistent standards and sampling methods are lacking for feedstock supply and infrastructure, as well as for biofuel products and the associated distribution infrastructure
continue to exert upward pressure on the price of petroleum-derived fuels and products. Nevertheless, reductions in production costs along the entire biomass supply chain, including feedstock supply, conversion processes, and product distribution, are needed to m
f these fluctuating markets indicates that off-take agreements or contracts have been formulated to address such issues. Generally these companies offer products on contract basis, but also sell on the spot market to generate the greatest return on investment. Off-
al issues related to collecting, storing, transporting, and processing diverse feedstocks, as well as the complexity of integrating new and unproven process steps. The demonstration and validation of total process integration from feedstock production to end product
nstration-scale facilities that are capable of validating new integrated process technologies and generating the process performance parameters and equipment specifications for commercial-scale plant design are critical to successful commercial deployment. Additi
commercial performance shortfalls. Heat and mass balances, and their implications, are not likely to be well understood with regard to new technologies. In addition, the unanticipated buildup of impurities in process recycle streams can result in degradation of chemi
dynamic models are needed. Engineering modeling tools are also needed to address heat integration issues.

/ have mature infrastructure. Ethanol is currently transported predominantly by rail and truck. Without large capital investments, these transport modes are expected to encounter significant congestion issues over the coming decades, especially in the Midwest. High
ctures are reluctant to invest in the production of additional FFVs until the dispensing infrastructure is in place.
e. Other factors, such as the price of oil, the pace of economic recovery, climate legislation and other policy measures also complicates investment decisions.
-based fuels. Compatible renewable hydrocarbon biofuels are expected to utilize existing petroleum delivery infrastructure.
hanol blends have not been transported through the existing pipeline network in the United States due to materials compatibility concerns and operational issues. Biodiesel has not been pipelined due to concerns surrounding contamination of jet fuel. Other biofuels v
s for use; technical codes and standards are developed by organizations including ASTM International, American Petroleum Institute (API), and Underwriters Laboratory (UL); and safety, health, and environmental standards are developed by the Occupational Safety

ewable resources. Numerous handling, processing, and logistical steps in delivering the feedstock adds to the cost of using biomass. Reductions in production costs along the entire biopower supply chain, including feedstock supply, transport, pretreatment and con
as a carbon cap, impede the development of biomass for power generation. Many states have enacted their own RPS legislation, yielding an inconsistent mix of renewable energy implementation requirements and timetables. These programs have been important
d potentially CO2. Torrefying biomass minimizes the need for separate grinding operations from that of coal resulting in additional cost savings. Cofiring poses numerous challenges to boiler operations stemming from differing fuel properties of biomass and coal wh

:ceptance of biopower as a sustainable renewable energy source.
ıcts upon existing emissions equipment and the fly ash content resulting from using large quantities of upgraded biomass. The variable composition of different feedstocks, and the lack of complete standardized specifications of upgraded biomass and best practices
ındling operations are required to make the biomass suitable for use. The challenge is to make raw feedstocks into a more cost-effective power source requiring fewer infrastructure modifications. The development and demonstration of raw feedstock pretreatment a
ınologies. Issues such as integrating biomass at high temperatures and pressures and designing new and better fuel feed systems must be addressed. Feedstock conversion systems must be proven and scaled up to provide the necessary upgraded fuel forms req
ration, optimization, and validation of integrated processes, from feedstock production through biomass conversion to power distribution, are required to prove the economic and operational viability of biopower technologies and encourage their adoption by industry.

roaches, system boundaries, and time horizons).
s of bioenergy production and leaves the industry vulnerable to criticism.
asuring sustainability hinders other critical activities such as establishing baselines, determining targets for improvement, recommending best practices, and evaluating tradeoffs.
relative to other energy alternatives.

nd trade-offs among different goals (energy security, biodiversity protection, low-cost commodities) and different bioenergy scenarios.
ences of LUC associated with bioenergy production, have undermined efforts to assess the environmental and social effects of bioenergy.
and guidelines makes results difficult to compare and integrate with the results of other analyses.
s need to be developed to understand these issues and their interactions. Improvements in component models and in linkages are necessary to make them more useful and consistent.
Some data that are required to understand all relevant dimensions of bioenergy production and use are unavailable or nonexistent.

nsumers must believe in the quality, value, sustainability, and safety of biomass-derived products and their benefits relative to the risks and uncertainties that widespread changes will likely bring. Compared to other renewable technologies, consumer acceptance ar
ıents. Proper alignment and careful choice of policy tools across several different sectors is crucial. Legislation may ultimately determine the future portfolio mix for bioenergy production and use.
ed with developing and implementing new and revised regulations for technology can delay or stifle commercialization and deployment. In addition, several organizations are in the process of developing voluntary certification schemes and standards processes for s

e feedstock supply risk is sufficiently low. Reliable, consistent feedstock supply is needed to reduce financial, technical, and operational risk to a biorefinery.
es.

ck crops. In addition, feedstock specifications and standards against which to engineer harvest equipment, technologies, and methods, do not currently exist. Specifically in the case of algal biomass, current harvesting and dewatering technologies are costly and ene
consistent feedstock to achieve design production rates, however new cellulosic crops have much higher variation depending on age, storage time, growing conditions, etc.
es and ensure consistent, high-quality feedstock supply.

us requiring preprocessing systems that facilitate stable biomass storage, densification, and blending for year-round feedstock delivery to the biorefinery.

mentation of sustainable biorefineries. Securing feedstock within these constraints is critical to reducing feedstock supply risk, therein reducing technical and operational risks of the biorefinery. The lack of understanding of variability of biomass resources and how thi
or direct production of the desired fuel or product in culture, but little data exists on the cost, sustainability, and efficiency of these processes.

processes.
atment technologies via improved sugar yields and quality require developing a better understanding of pretreatment process chemistries, including the kinetics of hemicellulose and cellulose hydrolysis.

ying the biochemistry of enzymatic cellulose hydrolysis, including the impact of biomass structure on enzymatic cellulose decrystallization. Additional efforts aimed at understanding the interaction of cellulases with cellulose and the necessary process environment a
can inhibit microbial fermentation or biocatalysis or can poison chemical catalysts. Low-cost purification technologies need to be developed that can remove impurities from hydrolysates and provide concentrated, clean sugar feedstocks to manufacture biofuels and b

gration work is essential for characterizing the complex interactions that exist between many of the processing steps, identifying unrecognized separation requirements, addressing bottlenecks and knowledge gaps, and generating the integrated performance data ne
n will be feasible and second generation biorefineries are envisioned that will closely couple biochemical / thermochemical facilities, enabling the most efficient use of a wide range of feedstocks.

urized systems is also needed.

nclude improved catalysts for deoxygenation and techniques for removal of solids from bio-oil.
he bio-oil (pyrolysis oil) impurities, and have high conversion rates and long lifetimes. The development of robust catalysts for upgrading and hydrotreating bio-oils to produce liquid transportation fuels is vital for the success of these processes. Bio-oils may be upgr

ist between many of the processing steps; identifying impacts of trace components on catalytic and thermal systems; and enabling the generation of predictive engineering models that can guide process optimization and scale up.
imes of the catalyst(s).

l advanced biofuels industry will require incentive programs to stimulate the large capital investments needed for production, pre-processing, storage, and transport to commodity markets.

oduction processes. EISA 2007 requires that all biofuels be evaluated for their reduction in greenhouse gas emissions in order to qualify under the RFS. Cellulosic biofuels, a subset of “advanced biofuels,” must achieve at least 60% reduction in GHG emissions rela
rivate investors to have the confidence to invest equity in biomass technology applications, the technology must be fully demonstrated and validated at commercial scale. Government assistance to validate proof of performance at the pilot, demonstration, and first-of
e.
ake advanced biofuels and bioproducts competitive with petroleum-derived analogs.
take agreements can often take the form of fixed price contracts for 1-2 years followed by contracts fixed to a specific index such as the Chicago Board of Trade pricing. The producer then must adjust their pro forma accounting and variable cost structure to accoun
distribution is crucial as it impacts both performance and profitability.
onally, increased understanding of the performance of integrated systems at demonstration scale will result in the optimization of process design configurations for commercial-scale facilities.
ical performance, abrasion and corrosion of plant equipment, and deactivation of process catalysts.

her level ethanol blends, such as E85 (and other less compatible biofuels), require separate storage tanks and dispensers, and may require other material modifications at refueling stations. Most refueling stations are privately owned with relatively thin profit margins

will likely need to overcome technical and logistical challenges as well.
y and Health Administration, U.S. Department of Homeland Security, and others. Codes and standards are adopted by state and local jurisdictions to ensure product safety and reliability, and reduce liability. Limited data and technical information can delay approval f

version processes, and power generation, are needed to make biopower competitive with coal-based power.
drivers for considering biopower in meeting their renewable generation mandates. The need for clear policy guidance is critical to the advancement of biomass use in utility-scale power.
hen combusted.

s regarding their use will impede their consideration. The long lead times associated with developing and understanding new feedstock forms for existing coal plants will delay commercialization and deployment.
and conversion processes, that can produce solid, liquid or gaseous fuels on a cost-competitive basis, are needed to improve performance of cofired power plants and advanced cycle systems. The barriers to creating bio-oil via pyrolysis and syngas via gasification
quired. Improvements in technology to economically produce these solid, liquid, or gaseous biomass-derived fuels and integrating them into advanced conversion systems will be critical. This will allow the industry to leverage the considerable research done by other

nd awareness of biofuels and bioenergy technologies are varied. Impartial, reliable information regarding the economic and environmental benefits and impacts of increased bioenergy use is not always widely available.

sustainable bioenergy; however, their implementation timeframes may align well with new technology commercialization and deployment timelines.

ergy- and resource-intensive.

is variability affects shelf life and processing yields are further barriers. Integration of one or more aspects of the feedstock supply system—either alone or in combination with biorefinery operations—may lead to ov

t a molecular level are needed to achieve the specific activity improvements which can further reduce cellulase cost.
biobased products.

ecessary to develop predictive mathematical models that can guide process optimization and scale-up.

raded to different levels, allowing several entry points to a petroleum refinery.

ative to a 2005 baseline of the petroleum displaced, including indirect land use change. Advanced biofuels must achieve at least 50% reduction in GHG emissions. EPA has established the methodology for evaluating
f-a-kind commercial scales is critical to successful deployment.

nt for such market fluctuations.

, and owners have been reluctant to invest in new infrastructure until the market is more fully developed. Further, some refueling stations may not have enough space available to add dispensers and new storage tanks. T

or use and development of technical codes and standards for biofuels and related infrastructure components including pipelines, storage tanks, and dispensers. The approval process can take years and cost millions of d

are discussed in depth in Thermochemical Conversion R&D Section 2.2.2.3.
rs to develop and improve the power conversion technologies.

1. Wet Mill Improvements Pathway	
Milestone #	**Milestone Title**
M.1	***Complete systems level demonstration and validation of technologies to improve corn wet mill facilities using corn grain feedstock***
M.1.1	Demonstrate and validate economical residual starch conversion in a wet mill
M.1.1.1	Convert residual starch in fiber stream to EtOH
M.1.1.2	Evaluate new feed product
M.1.1.3	Validate integrated process at pilot scale
M.1.1.4	Validate new process in wet mill
M.1.2	Demonstrate and validate economical fiber conversion to C5 and/or mixed C5/C6 sugars in a wet mill (residual starch also expected to be converted during fiber processing)
M.1.2.1	Solubilize hemicellulose in fiber to C5 sugars
M.1.2.2	Hydrolyze cellulose to C6 Sugar
M.1.2.3	Validate integrated process at pilot scale
M.1.2.4	Evaluate new feed product
M.1.2.5	Validate new process in wet mill
M.1.3	Demonstrate and validate economical conversion of mixed sugars to ethanol in a wet mill
M.1.3.1	Convert released sugars to ethanol
M.1.3.2	Validate integrated process at pilot scale
M.1.3.3	Validate new process in wet mill
M.1.4	Demonstrate and validate economical new products from C5 or mixed C5/C6 sugars in a wet mill
M.1.4.1	Convert released C5 sugars to products
M.1.4.2	Convert C5 sugars to building block chemicals
M.1.4.3	Convert mixed sugars to products
M.1.4.4	Convert mixed sugars to building block chemicals
M.1.4.5	Convert building block chemicals to products
M.1.4.6	Demonstrate product separation and recovery specification
M.1.4.10	Validate integrated process at pilot scale
M.1.4.11	Validate new process in wet mill
M.1.5	Demonstrate and validate economical new products from C6 sugars in a wet mill
M.1.5.1	Convert C6 sugars to products
M.1.5.2	Convert C6 sugars to building block chemicals
M.1.5.3	Convert building block chemicals to products
M.1.5.4	Demonstrate product separation and recovery specification
M.1.5.5	Validate integrated process at pilot scale
M.1.5.6	Validate new process in wet mill
M.1.6	Demonstrate and validate economical new products from corn-derived oils in a wet mill
M.1.6.1	Convert corn derived oils to products
M.1.6.2	Demonstrate product separation and recovery specification
M.1.6.3	Validate integrated process at pilot scale
M.1.6.4	Validate new process in wet mill
2. Dry Mill Improvements Pathway	
Milestone #	**Milestone Title**
M.2	***Complete systems level demonstration and validation of technologies to improve corn dry mill facilities using corn (or other) grain feedstock***
M.2.1	Demonstrate and validate economical residual starch conversion in a dry mill
M.2.1.1	Conversion of residual starch to glucose
M.2.1.2	Evaluate new feed product
M.2.1.3	Conversion of converted glucose to ethanol
M.2.1.4	Validate integrated process in a dry mill
M.2.2	Demonstrate and validate economical fiber conversion in a dry mill (residual starch also expected to be converted during fiber processing)
M.2.2.1	Convert fiber to monomer sugars
M.2.2.2	Evaluate new feed product
M.2.2.3	Validate integrated process at pilot scale
M.2.2.4	Validate new process in dry mill
M.2.3	Demonstrate and validate economical conversion of mixed sugars to ethanol in a dry mill
M.2.3.2	Convert released sugars to ethanol
M.2.3.4	Validate integrated process at pilot scale
M.2.3.5	Validate new process in dry mill
MI.1	Demonstrate and validate economical corn fiber-to-ethanol in a dry mill.
M.2.4	Demonstrate and validate economical conversion of mixed sugars to products in a dry mill
M.2.4.1	Conversion targets from C6 sugars to building blocks
M.2.4.2	Conversion targets from building blocks to products
M.2.4.3	Demonstrate product separation and recovery specification
M.2.4.4	Validate integrated process at pilot scale
M.2.4.5	Validate new process in dry mill
M.2.5	Demonstrate and validate economical new products from C6 sugars in a dry mill
M.2.5.1	Conversion targets from C6 sugars to building blocks
M.2.5.2	Conversion targets from building blocks to products
M.2.5.3	Product separation specification
M.2.5.4	Validate integrated process at pilot scale
M.2.5.5	Validate new process in dry mill
M.2.6	Demonstrate and validate economical front end fractionation processes in a dry mill
M.2.6.1	Derive additional value added products from front end fractionation
M.2.6.2	Evaluate new feed coproducts
M.2.6.3	Validate integrated process at pilot scale
M.2.6.4	Validate new process in dry mill
M.2.7	Investigate alternate sources for dry mill heat and power
M.2.7.1	Thermochemical processing of fiber stream to heat, power
M.2.7.2	Thermochemical processing of residues (i.e. corn stover) to heat, power

M.2.7.3	Validate integrated process at pilot scale
M.2.7.4	Validate new process in dry mill
3. Oil Mill Improvements Pathway	
Milestone #	**Milestone Title**
M.3	***Complete systems level demonstration and validation of technologies to improve oil processing mill facilities***
M.3.1	Demonstrate and validate economical and sustainable new oil crop production for production of biodiesel and other renewable diesel alternatives
M.3.1.1	Demonstrate sustainable agronomic practices
M.3.1.2	Demonstrate oil crop harvesting
M.3.1.3	Demonstrate oil crop storage
M.3.1.4	Demonstrate oil crop transportation
M.3.1.5	Demonstrate quality and quantity of oil crop available
M.3.1.6	Validate integrated oil crop logistics at pilot scale
M.3.1.7	Validate integrated oil crop logistics at demonstration scale
M.3.2	Demonstrate and validate economical new products from glycerol in a natural oil processing facility
M.3.2.1	Convert glycerol to products
M.3.2.2	Recover new products
M.3.2.3	Validate integrated process at pilot scale
M.3.2.4	Validate integrated process in natural oil processing facility
M.3.3	Demonstrate and validate economical new fuels from oils in natural oil processing facility
M.3.3.1	Convert oil to fuels
M.3.3.2	Recover fuels
M.3.3.3	Validate integrated process at pilot scale
M.3.3.4	Validate integrated process in natural oil processing facility
M.3.4	Demonstrate and validate economical new products from oils in natural oil processing facility
M.3.4.1	Convert oil to products
M.3.4.2	Convert oils to building block chemicals
M.3.4.3	Convert building block chemicals to products
M.3.4.4	Recover new products
M.3.4.5	Validate integrated process at pilot scale
M.3.4.6	Validate integrated process in natural oil processing facility
M.3.5	Demonstrate and validate economical cleanup of waste fats and greases for fuel production
M.3.5.1	Validate cleanup performance
M.3.5.2	Validate integrated cleanup at pilot scale
M.3.5.3	Validate integrated process in natural oil processing facility
4. Agricultural Residue Processing Pathway	
Milestone #	**Milestone Title**
M.4	***Complete systems level demonstration and validation of ~~all~~ key technologies to utilize agricultural residue feedstocks in existing or new facilities***
M.4.1	Demonstrate and validate integrated corn stover harvesting logistics
M.4.1.1	Demonstrate sustainable corn agronomic practices that account for corn stover harvesting
M.4.1.2	Demonstrate wet and dry corn stover harvesting
M.4.1.3	Demonstrate wet and dry corn stover storage
M.4.1.4	Demonstrate wet and dry corn stover transportation
M.4.1.5	Demonstrate wet and dry quality and quantity of corn stover available
M.4.1.6	Demonstrate corn stover preprocessing benefits
M.4.1.7	Validate integrated corn stover logistics in prototype equipment
M.4.1.8	Validate integrated corn stover logistics at demonstration scale
M.4.2	Demonstrate and validate integrated wheat straw harvesting logistics
M.4.2.1	Demonstrate sustainable wheat agronomic practices that account for wheat straw harvesting
M.4.2.2	Demonstrate wet and dry wheat straw harvesting
M.4.2.3	Demonstrate wet and dry wheat straw storage
M.4.2.4	Demonstrate wet and dry wheat straw transportation
M.4.2.5	Demonstrate wet and dry quality and quantity of wheat straw available
M.4.2.6	Demonstrate wheat straw preprocessing benefits
M.4.2.7	Validate integrated wheat straw logistics in prototype equipment
M.4.2.8	Validate integrated wheat straw logistics at demonstration scale
M.4.3	Demonsrate and validate integrated rice straw harvesting logistics
M.4.3.1	Demonstrate sustainable rice agronomic practices that account for rice straw harvesting
M.4.3.2	Demonstrate wet and dry rice straw harvesting
M.4.3.3	Demonstrate wet and dry rice straw storage
M.4.3.4	Demonstrate wet and dry rice straw transportation
M.4.3.5	Demonstrate wet and dry quality and quantity of rice straw available
M.4.3.6	Demonstrate rice straw preprocessing benefits
M.4.3.7	Validate integrated rice straw logistics in prototype equipment
M.4.3.8	Validate integrated rice straw logistics at demonstration scale
M.4.4	Feedstock FlexIbility and Availability via Blending Depot or Elevator
M.4.4.1	To be determined
M.4.5	Demonstrate and validate ag residue fractionation to produce mixed, dilute biomass sugars
M.4.5.1	Validate cellulase enzyme cost
M.4.5.2	Validate pretreatment technology cost
M.4.5.3	Demonstrate ability to economically satisfy internal heat and power demands
M.4.5.4	Validate capital cost
M.4.5.5	Validate integrated pretreatment and enzymatic hydrolysis at pilot scale
M.4.5.6	Validate integrated pretreatment and enzymatic hydrolysis at demonstration scale
M.4.5.7	Validate feed flexibility in integrated system
M.4.6	Demonstrate and validate ethanol from 5 biomass sugars
M.4.6.1	Validate fermentation of all 5 sugars to produce ethanol
M.4.6.2	Optimize ethanol separation

M.4.6.3	Optimize integrated production of ethanol from sugars at pilot scale
M.4.6.4	Optimize integrated production of ethanol from sugars at demonstration scale
M.4.7	Demonstrate and validate chemical building blocks, chemicals or materials from 5 biomass sugars
M.4.7.1	Optimize chemical building blocks production
M.4.7.2	Optimize high value chemical production
M.4.7.3	Optimize product separation
M.4.7.4	Optimize integrated production of product(s) from sugars at pilot scale
M.4.7.5	Optimize integrated production of product(s)from sugars at demonstration scale
M.4.8	Demonstrate and validate high value chemical and material products from lignin intermediates
M.4.8.1	Demonstrate high value chemical/material production from lignin
M.4.8.2	Validate product separation
M.4.8.3	Validate integrated production of product(s)from lignin at pilot scale
M.4.8.4	Validate integrated production of product(s)from lignin at demonstration scale
M.4.9	Demonstrate and validate fuel products from lignin intermediates
M.4.9.1	Demonstrate direct fuel production from lignin
M.4.9.2	Validate fuel product separation
M.4.9.3	Validate integrated production of fuel(s)from lignin at pilot scale
M.4.9.4	Validate integrated production of fuels(s)from lignin at demonstration scale
M.4.10	Demonstrate and validate combined heat and power from lignin intermediates/residues
M.4.10.1	Demonstrate combined heat and power production from lignin
M.4.10.2	Validate integrated production of heat and power from lignin at pilot scale
M.4.10.3	Validate integrated production of heat and power from lignin at demonstration scale
M.4.11	Demonstrate and validate lignin gasification to produce syngas
M.4.11.1	Validate feeder system performance
M.4.11.2	Validate gasification performance
M.4.11.3	Validate gas cleanup performance
M.4.11.4	Validate capital costs
M.4.11.5	Validate integrated gasification and gas cleanup at pilot scale
M.4.11.6	Validate integrated gasification and gas cleanupat demonstration scale
M.4.12	Demonstrate and validate biomass gasification to produce syngas
M.4.12.1	Validate feeder systems to reliably feed solid biomass to high pressure (30 bar) systems
M.4.12.2	Validate gasification performance
M.4.12.3	Validate gas cleanup performance
M.4.12.4	Validate capital costs
M.4.12.5	Validate integrated gasification and gas cleanup at pilot scale
M.4.12.6	Validate integrated gasification and gas cleanupat demonstration scale
M.4.12.7	Validate feed flexibility in integrated system
M.4.13	Demonstrate and validate ethanol from mixed alcohols using lignin or biomass derived syngas
M.4.13.1	Demonstrate ethanol production from mixed alcohols
M.4.13.2	Validate ethanol separation
M.4.13.3	Validate integrated production of ethanol from syngas at pilot scale
M.4.13.4	Validate integrated production of ethanol from syngas at demonstration scale
MT.19	Validate integrated corn stover/wheat straw-to-ethanol (via gasification) pilot operation.
M.4.14	Demonstrate and validate hydrogen production from lignin or biomass derived syngas
M.4.14.1	Demonstrate optimized hydrogen production from syngas
M.4.14.2	Validate hydrogen separation/recovery
M.4.14.3	Validate integrated production of hydrogen from syngas at pilot scale
M.4.14.4	Validate integrated production of hydrogen from syngas at demonstration scale
M.4.15	Demonstrate and validate combined heat and power production from lignin or biomass derived syngas
M.4.15.1	Demonstrate combined heat and power production from syngas
M.4.15.2	Validate integrated production of heat and power from syngas at pilot scale
M.4.15.3	Validate integrated production of heat and power from syngas at demonstration scale
M.4.16	Demonstrate and validate non-ethanol fuels from lignin or biomass derived syngas
M.4.16.1	Demonstrate non-ethanol fuel production from lignin or biomass-derived syngas
M.4.16.2	Validate non-ethanol fuel separation
M.4.16.3	Validate integrated production of non-ethanol fuels from syngas at pilot scale
M.4.16.4	Validate integrated production of non-ethanol fuels from syngas at demonstration scale
M.4.17	Demonstrate and validate product(s) from lignin or biomass derived syngas
M.4.17.1	Demonstrate high value chemical/material production (C3-C5 alcohols) from syngas
M.4.17.2	Validate product(s) separation
M.4.17.3	Validate integrated production of product(s) from syngas at pilot scale
M.4.17.4	Validate integrated production of product(s) from syngas at demonstration scale
M.4.18	Demonstrate and validate non-ethanol fuels from 5 biomass sugars that are econonomically viable
M.4.18.1	Validate fermentation of all 5 sugars to produce non-ethanol fuels
M.4.18.2	Optimize non-ethanol fuel separation
M.4.18.3	Optimize integrated production of non-ethanol fuels from sugars at pilot scale
M.4.18.4	Optimize integrated production of non-ethanol fuel from sugars at demonstration scale
M.4.19	Demonstrate and validate biomass pyrolysis to produce pyrolysis oil intermediate
M.4.19.1	Validate feeder systems to reliably feed solid biomass to pyrolysis reactor high pressure (30 bar) systems
M.4.19.2	Validate pyrolysis performance
M.4.19.3	Validate pyrolysis oil cleanup performance
M.4.19.4	Validate capital costs - ROI hurdle rate versus cost magnitude hurdle amount
M.4.19.5	Validate integrated pyrolysis and pyrolysis oil cleanup at pilot scale
M.4.19.6	Validate integrated pyrolysis and pyrolysis oil cleanup at demonstration scale
M.4.19.7	Validate feed flexibility in integrated system
M.4.20	Demonstrate and validate fuels from pyrolysis oil intermediate
M.4.20.1	Demonstrate fuel production from pyrolysis oil intermediate
M.4.20.2	Validate fuel separation
M.4.20.3	Validate integrated production of fuels from pyrolysis oil at pilot scale

M.4.20.4	Validate integrated production of fuels from pyrolysis oil at demonstration scale
M.4.21	Demonstrate and validate high value chemical and material products from pyrolysis oil intermediates
M.4.21.1	Demonstrate high value chemical/material production from pyrolysis oil
M.4.21.2	Validate product separation
M.4.21.3	Validate integrated production of product(s)from pyrolysis oil at pilot scale
M.4.21.4	Validate integrated production of product(s)from pyrolysis oil at demonstration scale
5. Perennial Crop Processing Pathway Milestones	
Milestone #	**Milestone Title**
M.5	***Complete systems level demonstration and validation of ~~all~~ key technologies to utilize perennial crops in existing or new facilities***
M.5.1	Demonstrate and validate integrated switchgrass production and harvesting logistics
M.5.1.1	Demonstrate sustainable switchgrass agronomic practices
M.5.1.2	Demonstrate wet and dry switchgrass harvesting
M.5.1.3	Demonstrate wet and dry switchgrass storage
M.5.1.4	Demonstrate wet and dry switchgrass transportation
M.5.1.5	Demonstrate quality and quantity of switchgrass available
M.5.1.6	Demonstrate switchgrass prepprocessing benefits
M.5.1.7	Validate integrated switchgrass logistics in prototype equipment
M.5.1.8	Validate integrated switchgrass logistics at demonstration scale
M.5.2	Demonstrate and validate integrated woody crop harvesting logistics
M.5.2.1	Demonstrate sustainable woody crop agronomic practices
M.5.2.2	Demonstrate woody crop harvesting
M.5.2.3	Demonstrate woody crop storage
M.5.2.4	Demonstrate woody crop transportation
M.5.2.5	Demonstrate quality and quantity of woody crops available
M.5.2.6	Demonstrate woody crop preprocessing benefits
M.5.2.7	Validate integrated woody crop logistics in prototype equipment
M.5.2.8	Validate integrated woody crop logistics at demonstration scale
M.5.3	Feedstock FlexIbility and Availability via Blending Depot or Elevator
M.5.3.1	To be determined
M.5.4	Demonstrate and validate switchgrass fractionation to produce mixed biomass sugars
M.5.4.1	Validate cellulase enzyme cost
M.5.4.2	Validate pretreatment technology cost
M.5.4.3	Demonstrate ability to economically satisfy internal heat and power demands
M.5.4.4	Validate capital cost
M.5.4.5	Validate integrated pretreatment and enzymatic hydrolysis at pilot scale
M.5.4.6	Validate integrated pretreatment and enzymatic hydrolysis at demonstration scale
M.5.4.7	Validate feed flexibility in integrated system
M.5.5	Demonstrate and validate woody crop fractionation to produce mixed, dilute biomass sugars
M.5.5.1	Validate cellulase enzyme cost
M.5.5.2	Validate pretreatment technology cost
M.5.5.3	Demonstrate ability to economically satisfy internal heat and power demands
M.5.5.4	Valicate capital cost
M.5.5.5	Validate integrated pretreatment and enzymatic hydrolysis at pilot scale
M.5.5.6	Validate integrated pretreatment and enzymatic hydrolysis at demonstration scale
M.5.5.7	Validate feed flexibility in integrated system
M.5.6	Demonstrate and validate ethanol from 5 biomass sugars
M.5.6.1	Validate ethanol production
M.5.6.2	Validate ethanol separation/recovery
M.5.6.3	Validate integrated production of product(s)from sugars at pilot scale
M.5.6.4	Validate integrated production of product(s)from sugars at demonstration scale
M.5.7	Demonstrate and validate products from 5 biomass sugars
M.5.7.1	Validate chemical building blocks production
M.5.7.2	Validate high value chemical production
M.5.7.3	Validate product separation
M.5.7.4	Validate integrated production of product(s)from sugars at pilot scale
M.5.7.5	Validate integrated production of product(s)from sugars at demonstration scale
M.5.8	Demonstrate and validate high value chemical and material products from lignin intermediates
M.5.8.1	Demonstrate high value chemical/material production from lignin
M.5.8.2	Validate product separation
M.5.8.3	Validate integrated production of product(s)from lignin at pilot scale
M.5.8.4	Validate integrated production of product(s)from lignin at demonstration scale
M.5.9	Demonstrate and validate fuel products from lignin intermediates
M.5.9.1	Demonstrate direct fuel production from lignin
M.5.9.2	Validate fuel product separation
M.5.9.3	Validate integrated production of fuel(s)from lignin at pilot scale
M.5.9.4	Validate integrated production of fuels(s)from lignin at demonstration scale
M.5.10	Demonstrate and validate combined heat and power from lignin intermediates/residues
M.5.10.1	Demonstrate combined heat and power production from lignin
M.5.10.2	Validate integrated production of heat and power from lignin at pilot scale
M.5.10.3	Validate integrated production of heat and power from lignin at demonstration scale
M.5.11	Demonstrate and validate lignin gasification to produce syngas
M.5.11.1	Validate feeder system performance
M.5.11.2	Validate gasification performance
M.5.11.3	Validate gas cleanup performance
M.5.11.4	Validate capital costs - ROI hurdle rate versus cost magnitude hurdle amount
M.5.11.5	Validate integrated gasification and gas cleanup at pilot scale
M.5.11.6	Validate integrated gasification and gas cleanup at demonstration scale
M.5.12	Demonstrate and validate biomass gasification to produce syngas
M.5.12.1	Validate feeder systems to reliably feed solid biomass to high pressure (30 bar) systems

M.5.12.2	Validate gasification performance
M.5.12.3	Validate gas cleanup performance
M.5.12.4	Validate capital costs
M.5.12.5	Validate integrated gasification and gas cleanup at pilot scale
M.5.12.6	Validate integrated gasification and gas cleanupat demonstration scale
M.5.12.7	Validate feed flexibility in integrated system
M.5.13	Demonstrate and validate ethanol from mixed alcohols using lignin or biomass derived syngas
M.5.13.1	Demonstrate ethanol production from mixed alcohols
M.5.13.2	Validate ethanol separation
M.5.13.3	Validate integrated production of ethanol from syngas at pilot scale
M.5.13.4	Validate integrated production of ethanol from syngas at demonstration scale
M.5.14	Demonstrate and validate hydrogen production from lignin or biomass derived syngas
M.5.14.1	Demonstrate optimized hydrogen production from syngas
M.5.14.2	Validate hydrogen separation/recovery
M.5.14.3	Validate integrated production of hydrogen from syngas at pilot scale
M.5.14.4	Validate integrated production of hydrogen from syngas at demonstration scale
M.5.15	Demonstrate and validate combined heat and power production from lignin or biomass derived syngas
M.5.15.1	Demonstrate combined heat and power production from syngas
M.5.15.2	Validate integrated production of heat and power from syngas at pilot scale
M.5.15.3	Validate integrated production of heat and power from syngas at demonstration scale
M.5.16	Demonstrate and validate non-ethanol fuels from lignin or biomass derived syngas
M.5.16.1	Demonstrate non-ethanol fuel production from lignin or biomass-derived syngas
M.5.16.2	Validate non-ethanol fuel separation
M.5.16.3	Validate integrated production of non-ethanol fuels from syngas at pilot scale
M.5.16.4	Validate integrated production of non-ethanol fuels from syngas at demonstration scale
M.5.17	Demonstrate and validate product(s) from lignin or biomass derived syngas
M.5.17.1	Demonstrate high value chemical/material production (C3-C5 alcohols) from syngas
M.5.17.2	Validate product(s) separation
M.5.17.3	Validate integrated production of product(s) from syngas at pilot scale
M.5.17.4	Validate integrated production of product(s) from syngas at demonstration scale
M.5.18	Demonstrate and validate non-ethanol fuels from 5 biomass sugars that are econonomically viable
M.5.18.1	Validate fermentation of all 5 sugars to produce non-ethanol fuels
M.5.18.2	Optimize non-ethanol fuel separation
M.5.18.3	Optimize integrated production of non-ethanol fuels from sugars at pilot scale
M.5.18.4	Optimize integrated production of non-ethanol fuel from sugars at demonstration scale
M.5.19	Demonstrate and validate biomass pyrolysis to produce pyrolysis oil intermediate
M.5.19.1	Validate feeder systems to reliably feed solid biomass to pyrolysis reactor high pressure (30 bar) systems
M.5.19.2	Validate pyrolysis performance
M.5.19.3	Validate pyrolysis oil cleanup performance
M.5.19.4	Validate capital costs - ROI hurdle rate versus cost magnitude hurdle amount
M.5.19.5	Validate integrated pyrolysis and pyrolysis oil cleanup at pilot scale
M.5.19.6	Validate integrated pyrolysis and pyrolysis oil cleanup at demonstration scale
M.5.19.7	Validate feed flexibility in integrated system
M.5.20	Demonstrate and validate fuels from pyrolysis oil intermediate
M.5.20.1	Demonstrate fuel production from pyrolysis oil intermediate
M.5.20.2	Validate fuel separation
M.5.20.3	Validate integrated production of fuels from pyrolysis oil at pilot scale
M.5.20.4	Validate integrated production of fuels from pyrolysis oil at demonstration scale
M.5.21	Demonstrate and validate high value chemical and material products from pyrolysis oil intermediates
M.5.21.1	Demonstrate high value chemical/material production from pyrolysis oil
M.5.21.2	Validate product separation
M.5.21.3	Validate integrated production of product(s)from pyrolysis oil at pilot scale
M.5.21.4	Validate integrated production of product(s)from pyrolysis oil at demonstration scale
6. Forest Resources Processing	
Milestone #	**Milestone Title**
M.6	***Complete systems level demonstration and validation of technologies to improve pulp and paper mill facilities and/or produce additional products (fuels, chemicals and /or power) from wood feedstock in a pulp and paper mill environment***
M.6.1	Demonstrate and validate integrated logging residue and forest thinnings collection and logistics
M.6.1.1	Demonstrate sustainable logging practices
M.6.1.2	Demonstrate logging residue collection
M.6.1.3	Demonstrate forest thinnings collection
M.6.1.4	Demonstrate logging residue and forest thinnings transportation
M.6.1.5	Demonstrate quality and quantity of logging residue and forest thinnings available
M.6.1.6	Demonstrate logging residue and forest thinnings preprocessing benefits
M.6.1.7	Validate integrated logging residue and forest thinnings logistics in prototype equipment
M.6.1.8	Validate integrated logging residue and forest thinnings logistics at demonstration scale
M.6.2	Demonstrate and validate integrated fuel treatment biomass collection and logistics
M.6.2.1	Demonstrate fuel treatment biomass collection
M.6.2.2	Demonstrate fuel treatment biomass storage
M.6.2.3	Demonstrate fuel treatment biomass transportation
M.6.2.4	Demonstrate fuel treatment biomass quality and quantity of available
M.6.2.5	Demonstrate fuel treatment biomass preprocessing benefits
M.6.2.6	Validate integrated fuel treatment biomass logistics in prototype equipment
M.6.2.7	Validate integrated fuel treatment biomass logistics at demonstration scale
M.6.3	Demonstrate and validate forest resources fractionation to produce mixed, dilute biomass sugars
M.6.3.1	Validate cellulase enzyme cost
M.6.3.2	Validate pretreatment technology cost
M.6.3.3	Demonstrate ability to economically satisfy internal heat and power demands
M.6.3.4	Validate capital cost

M.6.3.5	Validate integrated pretreatment and enzymatic hydrolysis at pilot scale
M.6.3.6	Validate integrated pretreatment and enzymatic hydrolysis at demonstration scale
M.6.3.7	Validate feed flexibility in integrated system
M.6.4	Demonstrate and validate ethanol from 5 biomass sugars
M.6.4.1	Validate fermentation of all 5 sugars to produce ethanol
M.6.4.2	Optimize ethanol separation
M.6.4.3	Optimize integrated production of ethanol from sugars at pilot scale
M.6.4.4	Optimize integrated production of ethanol from sugars at demonstration scale
M.6.5	Demonstrate and validate non-ethanol fuels from 5 biomass sugars
M.6.5.1	Validate fermentation of all 5 sugars to produce non-ethanol fuels
M.6.5.2	Optimize fuel separation
M.6.5.3	Optimize integrated production of non-ethanol fuels from sugars at pilot scale
M.6.5.4	Optimize integrated production of non-ethanol fuels from sugars at demonstration scale
M.6.6	Demonstrate and validate chemical building blocks, chemicals or materials from 5 biomass sugars
M.6.6.1	Optimize chemical building blocks production
M.6.6.2	Optimize high value chemical production
M.6.6.3	Optimize product separation
M.6.6.4	Optimize integrated production of product(s) from sugars at pilot scale
M.6.6.5	Optimize integrated production of product(s) from sugars at demonstration scale
M.6.7	Demonstrate and validate fuel products from lignin intermediates
M.6.7.1	Demonstrate direct fuel production from lignin
M.6.7.2	Validate fuel product separation
M.6.7.3	Validate integrated production of fuel(s) from lignin at pilot scale
M.6.7.4	Validate integrated production of fuels(s) from lignin at demonstration scale
M.6.8	Demonstrate and validate high value chemical and material products from lignin intermediates
M.6.8.1	Demonstrate high value chemical/material production from lignin
M.6.8.2	Validate product separation
M.6.8.3	Validate integrated production of product(s) from lignin at pilot scale
M.6.8.4	Validate integrated production of product(s) from lignin at demonstration scale
M.6.9	Demonstrate and validate combined heat and power from lignin intermediates/residues
M 6.9.1	Demonstrate combined heat and power production from lignin
M 6.9.2	Validate integrated production of heat and power from lignin at pilot scale
M 6.9.3	Validate integrated production of heat and power from lignin at demonstration scale
M 6.10	Demonstrate and validate lignin gasification to produce syngas
M 6.10.1	Validate feeder system performance
M 6.10.2	Validate gasification performance
M 6.10.3	Validate gas cleanup performance
M 6.10.4	Validate capital cost
M 6.10.5	Validate integrated gasification and gas cleanup at pilot scale
M 6.10.6	Validate integrated gasification and gas cleanup at demonstration scale
M 6.11	Demonstrate and validate cost-effective biomass gasification of wood, forest residues and other process residues and synthesis gas cleanup in a forest resources mill environment
M 6.11.1	Develop cost effective gasification designs for syngas production at appropriate scale
M 6.11.2	Validate feeder system performance to reliably feed solids to high pressure (30 bar) systems)
M 6.11.3	Validate gasification performance
M 6.11.4	Validate cost-effective gas cleanup performance
M 6.11.5	Validate integrated biomass gasification and syngas cleanup process at pilot scale
M 6.11.6	Validate integrated biomass gasification and syngas cleanup process in a forest resources mill environment
	Validate feed flexibility in integrated system
M 6.12	Demonstrate and validate production of ethanol from syngas in a forest resources mill environment
M 6.12.1	Produce mixed alcohols from syngas
M 6.12.2	Recover ethanol fuel product
M 6.12.3	Validate integrated process at pilot scale
M 6.12.4	Validate new process in a forest resources mill environment
M 6.13	Demonstrate and validate production of non-ethanol fuels from syngas in a forest resources mill environment
M 6.13.1	Produce non-ethanol fuel from biomass syngas
M 6.13.2	Recover fuel product
M 6.13.3	Validate integrated process at pilot scale
M 6.13.4	Validate new process in a forest resources mill environment
M 6.14	Demonstrate and validate hydrogen production from lignin or biomass derived syngas forest resources mill environment
M 6.14.1	Demonstrate optimized hydrogen production from syngas
M 6.14.2	Validate hydrogen separation/recovery
M 6.14.3	Validate integrated production of hydrogen from syngas at pilot scale
M 6.14.4	Validate integrated production of hydrogen from syngas at demonstration scale
M 6.15	Demonstrate and validate product(s) from lignin or biomass derived syngas forest resources mill environment
M 6.15.1	Demonstrate high value chemical/material productionfrom syngas
M 6.15.2	Validate product(s) separation
M 6.15.3	Validate integrated production of product(s) from syngas at pilot scale
M 6.15.4	Validate integrated production of product(s) from syngas at demonstration scale
M 6.16	Demonstrate and validate syngas utilization for combined heat and power in a forest resources mill environment
M 6.16.1	Verify fuel gas quality to levels necessary for CHP or clean cold gas consuming equipment
M 6.16.2	Validate CHP from syngas and/or direct use of sygas in process equipment
M 6.16.3	Validate integrated process at pilot scale
M 6.16.4	Validate new process in a forest resources mill environment
M 6.17	Demonstrate and validate bio-oil production to a stable intermediate forest resources mill environment
M 6.17.1	Validate bio-oil production
M 6.17.2	Validate bio-oil inermediate recovery
M 6.17.3	Validate integrated process for producing bio-oil at pilot scale
M 6.17.4	Demonstrate and validate new process in a forest resources mill environment

M 6.17.5	Validate feed flexibility in integrated system
M 6.18.	Achieve cost-effective conversion bio-oil intermediate into product(s) in a forest resources mill environment
M 6.18.1	Validate production of products from bio-oil
M 6.18.2	Validate bio-oil product(s) recovery
M 6.18.3	Validate integrated process for producing bio-oil product at pilot scale
M 6.18.4	Validate integrated process in a forest resources mill environment
M 6.19.	Achieve cost-effective conversion bio-oil intermediate into product(s) in a forest resources mill environment
M 6.19.1	Validate production of products from bio-oil
M 6.19.2	Validate bio-oil product(s) recovery
M 6.19.3	Validate integrated process for producing bio-oil product at pilot scale
M 6.19.4	Validate integrated process in a forest resources mill environment
M 6.20	Demonstrate and validate cost-effective extraction of C5 and C6 sugars from hemicellulose upstream of the pulp digestor in a pulp mill without negatively impacting paper quality
M 6.20.1	Meet yield target for C5 and C6 sugars without negatively impacting paper quality
M 6.20.2	Meet sugar upgrading requirements
M 6.20.3	Meet targets for recovery of other intermediates
M 6.20.4	Validate integrated sugar extraction process at pilot scale
M 6.20.5	Validate sugar extraction process in pulp and paper mill
M 6.21	Demonstrate and validate reliable and economic gasification of spent pulping liquor, recycle liquor causticization, chemical recovery and gas cleanup in a pulp mill
M 6.21.1	Validate reliable and economic performance of gasification of spent pulping liquor
M 6.21.2	Validate cost effective causticization and return Na based pulping chemicals
M 6.21.3	Validate advantages of co-gasification of spent pulping liquors and other forms of biomass (woody, recycle paper streams, and bio-oil)
M 6.21.4	Validate process chemical recovery from spent pulping liquor syngas
M 6.21.5	Validategas cleanup technologies on spent pulping liquor syngas
M 6.21.6	Validate integrated black liquor gasification, causticization, chemical recovery and gas cleanup process at pilot scale
M 6.21.7	Validate integrated black liquor gasification, causticization, chemical recovery and gas cleanup process in pulp and paper mill
7. Waste Processing Pathway	
Milestone #	**Milestone Title**
M.7	***Complete systems level demonstration and validation of technologies to process waste biomass streams to produce fuels, chemicals and /or power.***
M.7.1	Demonstrate and validate fractionation of carbohydrate rich waste streams to produce mixed, dilute biomass sugars
M.7.1.1	Validate cellulase enzyme cost
M.7.1.2	Validate pretreatment technology cost
M.7.1.3	Demonstrate ability to economically satisfy internal heat and power demands
M.7.1.4	Validate capital cost
M.7.1.5	Validate integrated pretreatment and enzymatic hydrolysis at pilot scale
M.7.1.6	Validate integrated pretreatment and enzymatic hydrolysis at demonstration scale
M.7.1.7	Validate feed flexibility in integrated system
M.7.2	Demonstrate and validate ethanol from 5 biomass sugars
M.7.2.1	Validate fermentation of all 5 sugars to produce ethanol
M.7.2.2	Optimize ethanol separation
M.7.2.3	Optimize integrated production of ethanol from sugars at pilot scale
M.7.2.4	Optimize integrated production of ethanol from sugars at demonstration scale
M.7.3	Demonstrate and validate non-ethanol fuels from 5 biomass sugars
M.7.3.1	Validate fermentation of all 5 sugars to produce non-ethanol fuels
M.7.3.2	Optimize non-ethanol fuel separation
M.7.3.3	Optimize integrated production of non-ethanol fuels from sugars at pilot scale
M.7.3.4	Optimize integrated production of non-ethanol fuel from sugars at demonstration scale
M.7.4	Demonstrate and validate chemical building blocks, chemicals or materials from 5 biomass sugars
M.7.4.1	Optimize chemical building blocks production
M.7.4.2	Optimize high value chemical production
M.7.4.3	Optimize product separation
M.7.4.4	Optimize integrated production of product(s)from sugars at pilot scale
M.7.4.5	Optimize integrated production of product(s)from sugars at demonstration scale
M.7.6	Demonstrate and validate high value chemical and material products from lignin intermediates
M.7.6.1	Demonstrate high value chemical/material production from lignin
M.7.6.2	Validate product separation
M.7.6.3	Validate integrated production of product(s)from lignin at pilot scale
M.7.6.4	Validate integrated production of product(s)from lignin at demonstration scale
M.7.5	Demonstrate and validate fuel products from lignin intermediates
M.7.5.1	Demonstrate direct fuel production from lignin
M.7.5.2	Validate fuel product separation
M.7.5.3	Validate integrated production of fuel(s)from lignin at pilot scale
M.7.5.4	Validate integrated production of fuels(s)from lignin at demonstration scale
M.7.7	Demonstrate and validate combined heat and power from lignin intermediates/residues
M.7.7.1	Demonstrate combined heat and power production from lignin
M.7.7.2	Validate integrated production of heat and power from lignin at pilot scale
M.7.7.3	Validate integrated production of heat and power from lignin at demonstration scale
M.7.8	Demonstrate and validate lignin gasification to produce syngas
M.7.8.1	Validate feeder system performance
M.7.8.2	Validate gasification performance
M.7.8.3	Validate gas cleanup performance
M.7.8.4	Validate capital costs
M.7.8.5	Validate integrated gasification and gas cleanup at pilot scale
M.7.8.6	Validate integrated gasification and gas cleanupat demonstration scale
M.7.9	Demonstrate and validate waste biomass gasification to produce syngas
M.7.9.1	Validate feeder systems to reliably feed solid biomass to high pressure (30 bar) systems
M.7.9.2	Validate gasification performance

M.7.9.3	Validate gas cleanup performance
M.7.9.4	Validate capital costs
M.7.9.5	Validate integrated gasification and gas cleanup at pilot scale
M.7.9.6	Validate integrated gasification and gas cleanupat demonstration scale
M.7.9.7	Validate feed flexibility in integrated system
M.7.10	Demonstrate and validate ethanol from mixed alcohols using lignin or waste biomass derived syngas
M.7.10.1	Demonstrate ethanol production from mixed alcohols
M.7.10.2	Validate ethanol separation
M.7.10.3	Validate integrated production of ethanol from syngas at pilot scale
M.7.10.4	Validate integrated production of ethanol from syngas at demonstration scale
M.7.11	Demonstrate and validate non-ethanol fuels from lignin or waste biomass derived syngas
M.7.11.1	Demonstrate non-ethanol fuel production from lignin or biomass-derived syngas
M.7.11.2	Validate non-ethanol fuel separation
M.7.11.3	Validate integrated production of non-ethanol fuels from syngas at pilot scale
M.7.11.4	Validate integrated production of non-ethanol fuels from syngas at demonstration scale
M.7.12	Demonstrate and validate hydrogen production from lignin or waste biomass derived syngas
M.7.12.1	Demonstrate optimized hydrogen production from syngas
M.7.12.2	Validate hydrogen separation/recovery
M.7.12.3	Validate integrated production of hydrogen from syngas at pilot scale
M.7.12.4	Validate integrated production of hydrogen from syngas at demonstration scale
M.7.13	Demonstrate and validate product(s) from lignin or waste biomass derived syngas
M.7.13.1	Demonstrate high value chemical/material production from syngas
M.7.13.2	Validate product(s) separation
M.7.13.3	Validate integrated production of product(s) from syngas at pilot scale
M.7.13.4	Validate integrated production of product(s) from syngas at demonstration scale
M.7.14	Demonstrate and validate combined heat and power production from lignin or waste biomass derived syngas
M.7.14.1	Demonstrate combined heat and power production from syngas
M.7.14.2	Validate integrated production of heat and power from syngas at pilot scale
M.7.14.3	Validate integrated production of heat and power from syngas at demonstration scale
M.7.15	Demonstrate and validate waste biomass pyrolysis to produce pyrolysis oil intermediate
M.7.15.1	Validate feeder systems to reliably feed solid biomass to pyrolysis reactor high pressure (30 bar) systems
M.7.15.2	Validate pyrolysis performance
M.7.15.3	Validate pyrolysis oil cleanup performance
M.7.15.4	Validate capital costs
M.7.15.5	Validate integrated pyrolysis and pyrolysis oil cleanup at pilot scale
M.7.15.6	Validate integrated pyrolysis and pyrolysis oil cleanup at demonstration scale
M.7.15.7	Validate feed flexibility in integrated system
M.7.16	Demonstrate and validate fuels from pyrolysis oil intermediate
M.7.16.1	Demonstrate fuel production from pyrolysis oil intermediate
M.7.16.2	Validate fuel separation
M.7.16.3	Validate integrated production of fuels from pyrolysis oil at pilot scale
M.7.16.4	Validate integrated production of fuels from pyrolysis oil at demonstration scale
M.7.17	Demonstrate and validate high value chemical and material products from pyrolysis oil intermediates
M.7.17.1	Demonstrate high value chemical/material production from pyrolysis oil
M.7.17.2	Validate product separation
M.7.17.3	Validate integrated production of product(s)from pyrolysis oil at pilot scale
M.7.17.4	Validate integrated production of product(s)from pyrolysis oil at demonstration scale
8. Algae Pathway	
M.8	
M.8.1	Algal feedstock production
M.8.1.1	Development of technically viable, sustainable and cost effective algae production
M.8.2	Algal conversion technologies
M.8.2.1	Development of technically viable, sustainable and cost effective fuel production from algae
9. Infrastructure and Fuels Utilization Pathway	
M.9	
M.9.1	Alcohol Biofuels Utilization
M.9.1.1	Determination of the technical feasibility, economic viability and environmental impacts of alcohol biofuels in infrastructure and end-use applications
M.9.2	Non-alcohol Biofuels Utilization
M.9.2.1	Determination of the technical feasibility, economic viability and environmental impacts of non-alcohol biofuels in infrastructure and end-use applications

Technology Readiness Levels

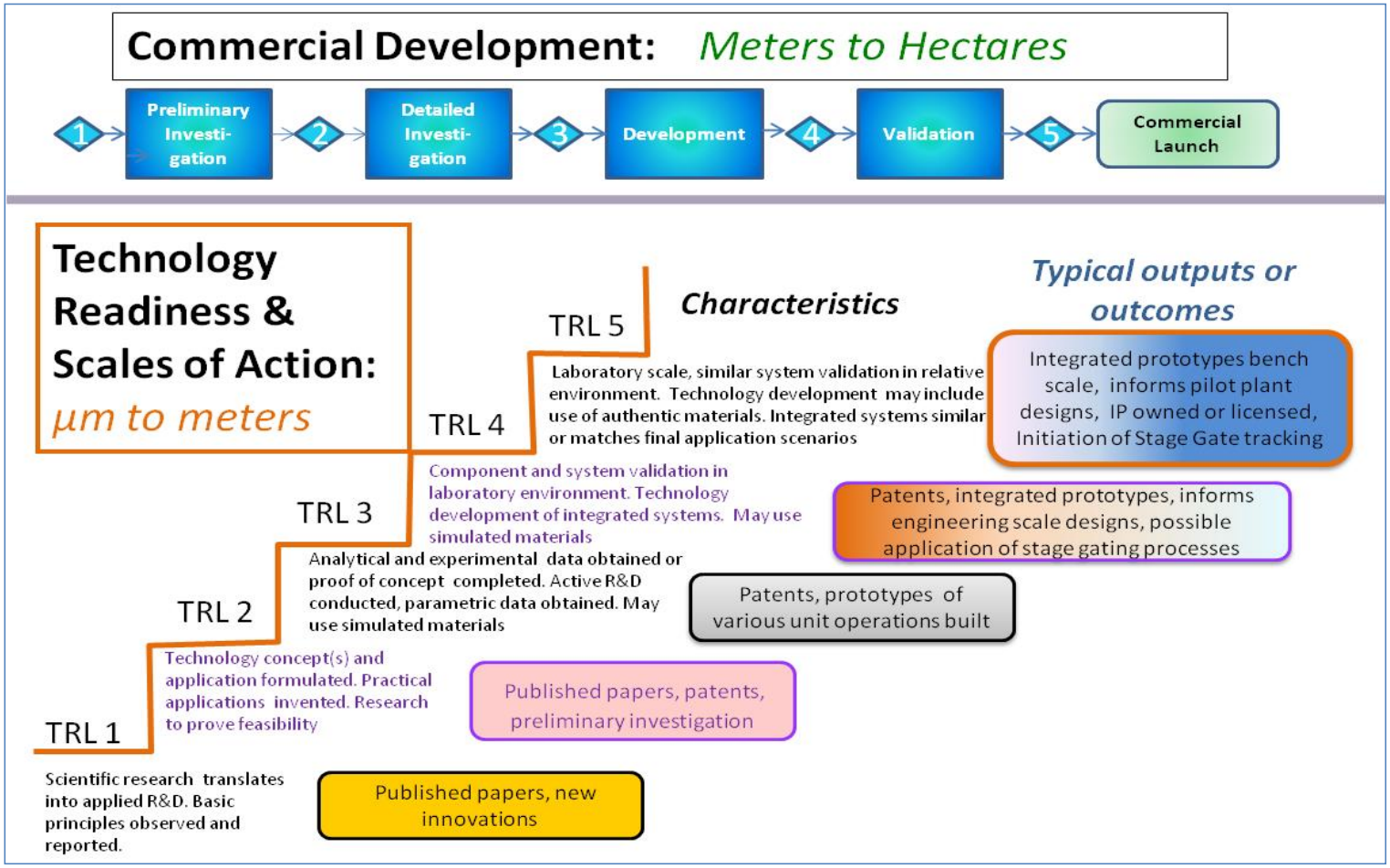
Identifier	*Description*	*Example*	*Output*
TRL-1	**Basic principles observed and reported:** This is lowest level of technology readiness. Scientific research begins with a systematic study directed toward greater knowledge or understanding of the fundamental aspects of phenomena and of observable facts without specific applications or products in mind. The knowledge or understanding will later be translated into applied research and development.	An example might include studies of a technology's basic properties.	Published papers, new innovations
TRL-2	**Technology concept and/or application formulated:** Invention begins. Once basic principles are observed, practical applications can be invented. Applications are speculative and there may be no proof or detailed analysis to support the assumptions. Practical application invented. Research to improve feasibility.	Examples are still limited to analytical studies.	Published papers, patents, preliminary investigation
TRL-3	**Analytical and experimental critical function and/or characteristic proof of concept:** Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology.	Examples include components that are not yet integrated or representative.	Patents, prototypes of various unit operations built
TRL-4	**Component and/or breadboard validation in laboratory environment:** Basic technological components are integrated to establish that they will work together. This is relatively "low fidelity" compared to the eventual system.	Examples include integration of "ad hoc" hardware in the laboratory.	Patents, integrated prototypes, informs engineering scale designs, possible application of Stage Gate Processing.
TRL-5	**Component and/or breadboard validation in relevant environment:** Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so it can be tested in a simulated environment.	Examples include "high fidelity" laboratory integration of components.	Integrated prototypes at bench scale, informs pilot plant designs, IP owned or licensed, initiation of Stage Gate Process/tracking.
TRL-6	**System/subsystem model or prototype demonstration in a relevant environment:** Representative model or prototype system, which is well beyond that of TRL-5, is tested in a relevant environment. This represents a major step up in a technology's demonstrated readiness.	Examples include testing a prototype in a high-fidelity laboratory environment or in simulated operational environment.	Integrated prototypes at pilot scale, informs demonstration scale designs. Progress through the Stage Gate Process.
TRL-7	**System prototype demonstration in a operational environment:** This represents a major step up from TRL-6. It requires the demonstration of an actual system prototype in an operational environment, such as in a light duty vehicle on the road.	Examples include testing at demonstration scale in simulated operational environment.	Integrated prototypes at the demonstration scale, informs commercial scale designs.
TRL-8	**Actual system completed and qualified through test and Demonstration:** Technology has been proven to work in its final form and under expected conditions. In almost all cases, this RL-8 represents the end of true system development.	Examples include developmental test and evaluation of the system in its intended parent system to determine if it meets design specifications.	
TRL-9	**Actual system proven through successful mission operations:** The technology is applied and operated in its final form and under real life conditions, such as those encountered in operational test and evaluation. In almost all cases, this is the end of the last "bug fixing" aspects of true system development.	Examples include using the system under various real life conditions.	Integrated prototypes at the commercial scale. Operational procedures that are nearly complete.

Definitions:

BREADBOARD: Integrated components that provide a representation of a system/subsystem and that can be used to determine concept feasibility and to develop technical data. These tools are typically configured for laboratory use to demonstrate technical principles of immediate interest. These may resemble final system/subsystem in function only.
"HIGH FIDELITY": Addresses form, fit and function. High-fidelity laboratory environment would involve testing with equipment that can simulate and validate all system specifications within a laboratory setting.
"LOW FIDELITY": A representative of the component or system that has limited ability to provide anything but first order information about the end product. Low fidelity assessments are used to provide trend analysis.

MODEL: A functional form of a system generally reduced in scale, near or at operational specification. Models will be sufficiently developed to allow demonstration of the technical and operational capabilities required of the final system.

OPERATIONAL ENVIRONMENT: Environment that addresses all of the operational requirements and specifications required of the final system to include platform/packaging.
PROTOTYPE: The first early representation of the system that offers the expected functionality and performance expected of the final implementation. Prototypes will be sufficiently developed to allow demonstration of the technical and operational capabilities required of the final system.
RELEVANT ENVIRONMENT: Testing environment that simulates the key aspects of the operational environment.
SIMULATED OPERATIONAL ENVIRONMENTAL: Either 1) a real environment that can simulate all of the operational requirements and specifications required of the final system, or 2) a simulated environment that allows for testing of a virtual prototype; used in either case to determine whether a developmental system meets the operational requirements and specifications of the final system.



Sapphire Energy IABR Program - Master Program Schedule

Sapphire Energy

Project ID	Project Name	2009				2010				2011				2012				2013				2014				2015
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1

Redacted Exemption 4

All EPS Elements All Projects Summary

CONFIDENTIAL

SCOPE OF WORK

Sapphire Energy, Inc.
Integrated Algal Biorefinery

Project Narrative

IABR Project Task Descriptions

A. Process Design – Task A

Work prior to Process Design was completed by Sapphire prior to this award.

A brief summary of prior work follows:

Concept development activities addressed the most fundamental issue: there was no blueprint for a successful, demonstration-scale algal oil facility because one has never been built. Using information from R&D activities and business modeling exercises, Sapphire determined that commercial algal oil facilities are technically and economically feasible, provided that a demonstration scale algae facility met specific technical and economic milestones. R&D activities identified and solved problems throughout the production value chain, including Redacted Exemption 4 These R&D activities were prioritized to ensure that the most difficult barriers to commercialization were addressed first and fully. The Sapphire business model also went through rigorous concept development, including Redacted Exemption 4 . Sapphire chose preliminary IABR site locations based on the results of this model.

With concept development complete, Sapphire planned the IABR project in detail, resulting in the PMP and the WBS included in this application.

Genesis work focused on an initial analysis of the fully developed concept; this step has been completed. The deliverables included Redacted Exemption 4 . Sapphire conducted these preliminary engineering activities in conjunction with best-in-class partners such as the Harris Group. Additional, highly targeted R&D activities such as Redacted Exemption 4 .

Task A work included detailed process engineering, site selection, and site acquisition. Process flow design from prior work has been expanded, tested, and

Redacted Exemption 4

Redacted Exemption 4 . Based on these data, legal and environmental due diligence, and property negotiations, Sapphire chose among candidate locations and placed the land to be used for the IABR project into escrow. Additional site acquisition activities will be completed prior to construction.

B. Front End Engineering Design – Task B

Using the deliverables from FEL 2, front-end engineering activities, formal permitting activities, and the NEPA process were initiated.

At the beginning of Budget Period 1, engineering activities will commence to develop specifications for the IABR equipment, processes, and materials. Using the experience of its staff and input from industry expert consortium partners Harris Group and AMEC, Sapphire will create a set of standards to ensure compliance with established industry practices, regulations, environmental requirements, and safety. These standards will drive

Redacted Exemption 4

, ensuring that the IABR project has passed all the goals of the stage gate and is ready to proceed with construction.

Task B includes the final steps in the permitting process, including stakeholder input leading to local, state, and federal permitting. The design data from Task C will provide the data necessary to complete the permitting applications and assessments. Sapphire will also complete the NEPA process before entering into activities in Budget Period 2, ensuring that the DOE has full NEPA compliance information in 2010.

C. Implementation – Task C

With the specifications and permits completed in Task B, final design of the entire IABR process will be completed. This design will

. Redacted Exemption 4

With the completion of detailed engineering, Sapphire will meet with the DOE and make the decision to proceed into Budget Period 2

The construction period is planned

Redacted Exemption 4

D. Process Demonstration and Evaluation – Task D

During the final months of construction, Sapphire will

Redacted Exemption 4

. An independent engineer's

report, auditing the production capacity of the facility, will be presented to the DOE in as part of the project evaluation for each stage.

E. Research and Development Partners – Task F

To further improve the techno-economics of the IABR, research and development partners NMSU and SNL will be engaged to study algae ponds. NMSU Pond Liner Research and Sandia National Laboratories Pond Modeling will provide data to improve the IABR pond designs at commercial scale.

TASKS TO BE PERFORMED (in WBS format)

A	**Process Design**	
A.1	**Award 1 Preparation**	
A.1.ML.1	**Risk mitigation plan validation completed - Award 1 (DOE Core)**	E - Project Internal Tracking
A.1.ML.2	**Submission of Award 1 application (DOE Core)**	E - Project Internal Tracking
A.1.ML.3	**Acceptance of Award 1 application (DOE Core)**	E - Project Internal Tracking
A.1.ML.4	**CD-2 Approve Performance Baseline (DOE Core)**	E - Project Internal Tracking
A.1.ML.5	**Release of Award 1 funds (DOE Core)**	E - Project Internal Tracking
A.1.ML.6	**BP-1 Start**	E - Project Internal Tracking
A.2	**Process Definition (FEL-2)** Engineering, planning and estimation work to refine process diagrams, energy balances, capital and operating expense estimates, equipment list and site general arrangement. Estimation to Class 25 Level.	
A.2.ML.1	**FEL-2 Complete** Front End Loaded-2 Engineering work complete internal tracking milestone.	E - Project Internal Tracking
A.2.ML.2	**30% Design Complete** Milestone indicating project design has reached 30% design level. Information and design basis supplied to permitting activities to proceed with final permitting activities.	E - Project Internal Tracking
A.3	**Site Planning** Site selection, screening and evaluation of potential locations. Completion of required site due-diligence efforts. Completion of regulatory and permitting requirements review and scope.	

A.3.ML.1	**Land Purchase Option Executed** Project site real property secured.	E - Project Internal Tracking
A.4	**Task A Stage Gate Evaluation**	
A.4.GN.1	**Task A Stage Gate Evaluation** Project Stage Gate evaluation.	GN - Go No/Go Decision
B	**Front End Engineering**	
B.1	**Front End Engineering Design (FEL-3)**	
B.1.ML.1	**FEL-3 Complete** Front End Loaded-3 Engineering work complete internal tracking milestone.	E - Project Internal Tracking
B.2	**Permitting**	
B.2.ML.1	**Permitting Complete** Permits required to start construction secured.	E - Project Internal Tracking
B.3	**NEPA**	
B.3.ML.1	**NEPA Finding Issued** NEPA process complete and agency NEPA determination issued.	E - Project Internal Tracking
B.4	**Detailed Engineering** Final engineering and planning activities to issue project engineering and bid packages for procurement and construction.	
B.4.ML.1	**Completed Facility Design** Issued for Bid Package delivered to Construction Management.	E - Project Internal Tracking
B.5	**Staging**	E - Project Internal Tracking
B.6	**Task B Stage Gate Evaluation**	
B.6.GN.1	**Task B Stage Gate Evaluation** Project Stage Gate evaluation.	GN - Go No/Go Decision
C	**Implementation**	
C.1	**Award 2 Preparation**	
C.1.ML.1	**Risk mitigation plan validation completed - Award 2 (DOE Core)**	E - Project Internal Tracking
C.1.ML.2	**NEPA approval to proceed (DOE Core)**	E - Project Internal Tracking
C.1.ML.3	**EPC contract finalized and signed (DOE Core)**	E - Project Internal Tracking

C.1.ML.4	**Financial Closing (DOE Core)**	E - Project Internal Tracking
C.1.ML.5	**Define commissioning criteria (DOE Core)**	E - Project Internal Tracking
C.1.ML.6	**Submission of Award 2 application (DOE Core)**	E - Project Internal Tracking
C.1.ML.7	**Acceptance of Award 2 application (DOE Core)**	E - Project Internal Tracking
C.1.ML.8	**CD-3 Approve Start of Construction (DOE Core)**	E - Project Internal Tracking
C.1.ML.9	**Release of Award 2 funds (DOE Core)**	E - Project Internal Tracking
C.1.ML.10	**BP-2 Start**	E - Project Internal Tracking
C.2	**Construction 1 - Technology Deployment 1** Construction and commissioning of Deployment 1	
C.3	**Engineering 2 - Technology Deployment 2** Planning and Engineering of Deployment 2	
C.4	**Construction 2 - Technology Deployment 2** Construction and commissioning of Deployment 2	
C.5	**Engineering 3 - Technology Deployment 3** Planning and Engineering of Deployment 3	
C.6	**Construction 3 - Technology Deployment 3** Construction and commissioning of Deployment 3	
D	**Process Demonstration and Evaluation**	
D.1	**Award 3 Preparation**	
D.1.ML.1	**CD-4: Start of Operation Approval - Initiate Shakedown (DOE Core)**	E - Project Internal Tracking
D.1.ML.2	**Shakedown complete (DOE Core)**	E - Project Internal Tracking
D.1.ML.3	**Commissioning - Start of commercial operation (DOE Core)**	E - Project Internal

D.1.ML.4	**Completion of Commissioning Criteria (DOE Core)**	Tracking E - Project Internal Tracking
D.1.ML.5	**BP-3 Start**	Tracking E - Project Internal Tracking
D.2	**Process Demonstration 1 - Deployment 1**	
D.2.GN.1	**Stage Gate Evaluation** Project Stage Gate evaluation.	GN - Go No/Go Decision
D.3	**Process Demonstration 2 - Deployment 2**	
D.3.GN.1	**Stage Gate Evaluation** Project Stage Gate evaluation.	GN - Go No/Go Decision
D.4	**Process Demonstration 3 - Deployment 3**	
D.4.GN.1	**Stage Gate Evaluation** Project Stage Gate evaluation.	GN - Go No/Go Decision
D.5	**Operational Data Reporting** Collection of facility data for process reporting and analysis.	
D.6	**Financial Data Reporting** Collection of facility data for economic reporting and analysis.	
D.7	**Task D Stage Gate Evaluation**	
D.7.GN.1	**Task D Stage Gate Evaluation** Project Close-Out Stage Gate evaluation.	GN - Go No/Go Decision
D.7.ML.4	**BP-3 End**	E - Project Internal Tracking
E	**Research and Development Partners**	
E.1	**NMSU - Pond Liner Research** Technology development to advance pond liner design and economics.	
E.2	**SNL - Pond Modeling** Technology development to reduce pond construction and operation costs.	

Stage Gate Criteria (major decision points)

Key Decision Points – Go/No-go Criteria

The project Quality Assurance Program is based on the Stage Gate process which establishes critical milestones throughout the program. As part of the overall strategy for success, the methodology for assuring quality will establish the key deliverables for each stage and will evaluate them against the overall program goals. At each Stage Gate, the requirements established by the preceding Stage Gate review are evaluated against their specific performance requirements such as cost, efficiency and productivity. The Stage Gate is a critical go/no-go decision point that determines if the project is able to move forward or requires an alternative approach before proceeding. Stage Gate criterion evaluation will be conducted by Senior Sapphire Staff and independent industry professionals. The deliverables framework for each Stage Gate is outlined in the Project Management Plan. The key go/no go criteria are summarized below.

The stage gate process is a structured approach to the decision making and approval process to ensure that the effort expended to make decisions about the viability of a project are minimized and, upon the decision to proceed with the project, controls are in place to ensure a successful project. The IABR stage gate process includes the following phases. These Phases are identified in the WBS and Project Schedule. Elements of these phases have already commenced in some areas.

A. Process Design – Task A

In this phase (FEL-2), the alternatives are analyzed and one of the alternatives with a preliminary scope is selected for further development. The following items are considered:

- Definition of preliminary scope, critical issues, and key drivers for alternatives
- Definition and investigation of major risks and assumptions
- In-depth review of all viable alternatives
- Economic and risk analysis
- Set basis of design expectations for quality, operability, and reliability)

The following activities are included in the analysis:

- Preliminary scope definition and economic/risk analysis for each alternative
- Project charter for detail design and construction
- Updated PFDs, plot plan, GAs, equipment list, utility summary, and one-lines for alternatives
- List of key risks, assumptions, and drivers with responsibilities assigned for alternatives
- Define quality and reliability expectations
- Updated Preliminary Project Execution Plan & Schedule
- Updated Risk Assessment
- FEL2 Scope and estimate (+/- 30%) of selected options

- Recommended Phase 3 alternative
- Analysis for review with any funding requirements for Phase 3 development

A positive review of this phase results in approval to proceed with the Phase 3 preliminary engineering and full scope development of the selected alternative.

B. Front End Engineering Design – Task B

In this phase (FEL-3), the preliminary engineering is completed to produce a fully defined scope and a detailed capital cost estimate for approval of project funding. The following items are considered:

- Complete project scope definition and review with key stakeholders
- Finalize cost estimate, business case, financial & risk analysis.
- Submit funding request for approval
- Complete safety design review
- Revisit project economics and risk analysis
- Prepare detailed marketing assessment and manufacturing plan
- Define Execution Plan
- Submit environmental permits

The following activities are included in the analysis:

- Final PFD and Heat and Material Balance
- Fully defined, signed-off, frozen project scope & preliminary schedule
- Final funding version of all critical scope documents, including P&IDs, plot plan, GAs, utility flow diagrams / summaries, and electrical classification drawings
- Major equipment fully specified and ready for purchase
- Complete Project Execution Plan including Project Controls, Procurement Strategy, and Cost Tracking
- Permits
- FEL3 Detailed scope and cost estimate (+/- 10%) with work breakdown schedule
- Investment proposal with risk-adjusted economics, assumptions & key drivers

A positive review at this point results in approval to implement the project.

C. Implementation – Task C

This phase of the project includes the engineering and construction of the facility. The following items are considered:

- Purchase equipment and spare parts
- Establish Project Controls
- Develop Detail Construction Plans
- Negotiate major construction contracts

- Develop operating procedures and training plans
- Commission Plan
- Complete engineering – “Issue for Construction Drawings”
- Install equipment safely with the optimal balance of cost, schedule, and quality
- Complete training Program
- Perform pre check-out & startup activities

The following activities are included:

- All major or long lead-time equipment ordered
- Acquire necessary construction /environmental permits
- Detailed project schedules
- Risk assessment
- “Issued for Construction” work packages
- Construction contracts
- Project audit preparation file
- Construction measurements and schedule tracking Reports
- Operators and Maintenance Training
- Commissioning Plan
- Spare parts on site
- O&M Manuals
- Mechanically complete

D. Process Demonstration and Evaluation – Task D

Following mechanical completion of the project, the equipment and processes are checked out to confirm readiness to startup, then the start up of the facility proceeds. The following items are considered:

- Perform final inspections and systems checkout
- Pre-startup safety review
- Compile and complete pre-startup Punchlist
- Perform operability tests
- Compile data for post-audit preparation

The final phase of the project completes the project documentation and provides an assessment that documents that the project has met the project goals. The following items are considered.

- Schedule & perform Performance Guarantee test of all pertinent unit operations
- Resolve any contract issues
- Compare final outcomes to project objectives
- Update pertinent drawings to Record status
- Close out project

Major Partners

Sapphire Energy, Inc. is solely responsible for the IABR project. No partnerships are associated with the IABR Project.

ASSISTANCE AGREEMENT

1. Award No.	2. Modification No.	3. Effective Date	4. CFDA No.
DE-EE0002884	006	12/29/2009	81.087

5. Awarded To	6. Sponsoring Office	7. Period of Performance
SAPPHIRE ENERGY, INC. Attn: DAVID BUTTARO SAPPHIRE ENERGY 3115 MERRYFIELD ROW SAN DIEGO CA 921211125	Golden Field Office U.S. Department of Energy Golden Field Office 1617 Cole Blvd. Golden CO 80401	12/29/2009 through 12/31/2011

8. Type of Agreement	9. Authority	10. Purchase Request or Funding Document No.
☐ Grant ☒ Cooperative Agreement ☐ Other	109-58, Energy Policy Act 2005 111-5, Recovery Act 2009	11EE006791

11. Remittance Address	12. Total Amount	13. Funds Obligated
SAPPHIRE ENERGY, INC. Attn: DAVID BUTTARO SAPPHIRE ENERGY 3115 MERRYFIELD ROW SAN DIEGO CA 921211125	Govt. Share: $49,725,000.00 Cost Share : $Redacted Ex. 4 Total : $Redacted Ex. 4	This action: $0.00 Total : $49,725,000.00

14. Principal Investigator	15. Program Manager	16. Administrator
Jamie E. Moreno Phone: 949-202-4700	Carol Christine Sterner Phone: 720-356-1788	Golden Field Office U.S. Department of Energy Golden Field Office 1617 Cole Blvd. Golden CO 80401-3393

17. Submit Payment Requests To	18. Paying Office	19. Submit Reports To
OR for Golden U.S. Department of Energy Oak Ridge Financial Service Center P.O. Box 4517 Oak Ridge TN 37831	OR for Golden U.S. Department of Energy Oak Ridge Financial Service Center P.O. Box 4517 Oak Ridge TN 37831	

20. Accounting and Appropriation Data

See Schedule

21. Research Title and/or Description of Project

RECOVERY ACT - SAPPHIRE INTEGRATED ALGAL BIOREFINERY (IABR)

For the Recipient		For the United States of America	
22. Signature of Person Authorized to Sign		25. Signature of Grants/Agreements Officer Signature on File	
23. Name and Title	24. Date Signed	26. Name of Officer Molly Hames	27. Date Signed 09/16/2011

NAME OF OFFEROR OR CONTRACTOR
SAPPHIRE ENERGY, INC.

ITEM NO. (A)	SUPPLIES/SERVICES (B)	QUANTITY (C)	UNIT (D)	UNIT PRICE (E)	AMOUNT (F)
	DUNS Number: 798830688 The purpose of this modification is to delete and replace the Special Terms and Conditions, specifically, deleting and replacing Provision 21, "Title and Disposition of Property". All other terms and conditions remain unchanged. In Block 7 of the Assistance Agreement, the Period of Performance reflects the beginning of the Project Period through the end of the current Budget Period, shown as 12/29/2009 through 12/31/2011. For multiple Budget Periods, see Special Terms and Conditions, Provision 4, "Award Project Period and Budget Periods." The total amounts reflected in Blocks 12 and 13 of the Assistance Agreement do not include the Federally Funded Research and Development Center (FFRDC) funding amount of $275,000, which will be funded directly. DOE Award Administrator: Molly Hames E-mail: molly.hames@go.doe.gov Phone: 720-356-1552 DOE Project Officer: Christy Sterner E-mail: christy.sterner@go.doe.gov Phone: 720-356-1788 Recipient Business Officer: Jamie E. Moreno E-mail: jaime.moreno@sapphireenergy.com Phone: 949-202-4700 Recipient Principal Investigator: Jamie E. Moreno E-mail: jaime.moreno@sapphireenergy.com Phone: 949-202-4700 "Electronic signature or signatures as used in this document means a method of signing an electronic message that-- (A) Identifies and authenticates a particular person as the source of the electronic message; (B) Indicates such person's approval of the information contained in the electronic message; and, (C) Submission via FedConnect constitutes electronically signed documents." ASAP: NO Extent Competed: COMPETED Davis-Bacon Act: YES				

SPECIAL TERMS AND CONDITIONS

Table of Contents

1. RESOLUTION OF CONFLICTING CONDITIONS

Any apparent inconsistency between Federal statutes and regulations and the terms and conditions contained in this award must be referred to the DOE Award Administrator for guidance.

2. AWARD AGREEMENT TERMS AND CONDITIONS

This award/agreement consists of the Assistance Agreement, plus the following:

a. Special Terms and Conditions.
b. Attachments:

Attachment Number	Title
1.	Intellectual Property Provisions
2.	Statement of Project Objectives
3.	Federal Assistance Reporting Checklist and Instructions
4.	Budget Pages (SF 424A)
5.	Requirements for Contingency Funds for Integrated Biorefinery Projects

c. Applicable program regulations.
d. DOE Assistance Regulations, 10 CFR Part 600 at http://ecfr.gpoaccess.gov.
e. Application/proposal as approved by DOE.
f. National Policy Assurances to be incorporated as award terms in effect on date of award at http://management.energy.gov/business_doe/1374.htm.

3. ELECTRONIC AUTHORIZATION OF AWARD DOCUMENTS

Acknowledgement of award documents by the Recipient's authorized representative through electronic systems used by the Department of Energy, specifically FedConnect, constitutes the Recipient's acceptance of the terms and conditions of the award. Acknowledgement via FedConnect by the Recipient's authorized representative constitutes the Recipient's electronic signature.

4. AWARD PROJECT PERIOD AND BUDGET PERIODS

The Project Period for this award is 12/29/2009 through 09/30/2014, consisting of the following Budget Periods:

Budget Period	Start Date	End Date
1	12/29/2009	12/31/2011
2	01/01/2012	09/30/2014

5. PAYMENT PROCEDURES - REIMBURSEMENT THROUGH THE AUTOMATED CLEARING HOUSE (ACH) VENDER INQUIRY PAYMENT ELECTRONIC REPORTING SYSTEM (VIPERS)

a. Method of Payment. Payment will be made by reimbursement through ACH.

b. Requesting Reimbursement. Requests for reimbursements must be made electronically through Department of Energy's Oak Ridge Financial Service Center (ORFSC) VIPERS. To access and use VIPERS, you must enroll at https://finweb.oro.doe.gov/vipers.htm. Detailed instructions on how to enroll are provided on the web site.

For non-construction awards, you must submit a Standard Form (SF) 270, "Request for Advance or Reimbursement," at https://finweb.oro.doe.gov/vipers.htm and attach a file containing appropriate supporting documentation. The file attachment must show the total Federal share claimed on the SF 270, the non-Federal share claimed for the billing period if cost sharing is required, and cumulative expenditures to date (both Federal and non-Federal) for each of the following categories: salaries/wages and fringe benefits; equipment; travel; participant/training support costs, if any; other direct costs, including subawards/contracts; and indirect costs. For construction awards, you must submit a SF 271, "Outlay Report and Request for Reimbursement for Construction Programs," through VIPERS.

c. Timing of submittals. Submittal of the SF 270 or SF 271 should coincide with your normal billing pattern, but not more frequently than every two weeks. Requests for reimbursement must be limited to the amount of disbursements made during the billing period for the Federal share of direct project costs and the proportionate share of any allowable indirect costs incurred during that billing period.

d. Adjusting payment requests for available cash. You must disburse any funds that are available from repayments to and interest earned on a revolving fund, program income, rebates, refunds, contract settlements, audit recoveries, credits, discounts, and interest earned on any of those funds before requesting additional cash payments from DOE.

e. Payments. The DOE approving official will approve the invoice as soon as practical, but not later than 30 days after your request is received, unless the billing is improper. Upon receipt of an invoice payment authorization from the DOE approving official, the ORFSC will disburse payment to you. You may check the status of payments at the VIPER web site. All payments are made by electronic funds transfer to the bank account identified on the ACH Vendor/Miscellaneous Payment Enrollment Form (SF 3881) that you filed.

6. COST SHARING

a. Total Estimated Project Cost is the sum of the Federal Government share, including Federally Funded Research and Development Center (FFRDC) contractor costs, and Recipient share of the estimated project costs. The DOE FFRDC contractor cost is not included in the total approved budget for this award, because DOE will pay the DOE FFRDC contractor portion of the effort under an existing DOE contract. The Recipient is not responsible for reporting on that portion of the total estimated cost that is paid directly to the DOE FFRDC contractor.

The Recipient's cost share must come from non-Federal sources unless otherwise allowed by law. By accepting Federal funds under this award, you agree that you are liable for your percentage share of allowable project costs, on a budget period basis, even if the project is terminated early or is not funded to its completion. This cost is shared as follows:

Budget Period	DOE Cost Share, including FFRDC Costs		Recipient Cost Share $ / %	Total Estimated Costs
	DOE $ / %	FFRDC $ / %		
1	$9,970,000 /	$275,000 /	Redacted Exemption 4	
2	$39,480,000 / Ex. 4	$0 / 0%		
Total Project	$49,450,000 /	$275,000 /		

b. If you discover that you may be unable to provide cost sharing of at least the amount identified in paragraph a of this Article, you should immediately provide written notification to the DOE Award Administrator, indicating whether you will continue the project or phase out the project. If you plan to continue the project, the notification must describe how replacement cost sharing will be secured.

c. You must maintain records of all project costs you claim as cost sharing, including in-kind costs, as well as records of costs to be paid by DOE. Such records are subject to audit.

d. Failure to provide the cost share required by this Article may result in the subsequent recovery by DOE of some or all the funds provided under the award.

7. REBUDGETING AND RECOVERY OF INDIRECT COSTS

a. If actual allowable indirect costs are less than those budgeted and funded under the award, you may use the difference to pay additional allowable direct costs during the project period. If at the completion of the award the Government's share of total allowable costs (i.e., direct and indirect), is less than the total costs reimbursed, you must refund the difference.

b. Recipients are expected to manage their indirect costs. DOE will not amend an award solely to provide additional funds for changes in indirect cost rates. DOE recognizes that the inability to obtain full reimbursement for indirect costs means the Recipient must absorb the underrecovery. Such underrecovery may be allocated as part of the organization's required cost sharing**.**

8. FINAL INCURRED COST AUDIT

In accordance with 10 CFR 600, DOE reserves the right to initiate a final incurred cost audit on this award. If the audit has not been performed or completed prior to the closeout of the award, DOE retains the right to recover an appropriate amount after fully considering the recommendations on disallowed costs resulting from the final audit.

9. STATEMENT OF FEDERAL STEWARDSHIP

DOE will exercise normal Federal stewardship in overseeing the project activities performed under this award. Stewardship activities include, but are not limited to, conducting site visits; reviewing performance and financial reports; providing technical assistance and/or temporary intervention in unusual circumstances to correct deficiencies which develop during the project; assuring compliance with terms and conditions; and reviewing technical performance after project completion to ensure that the award objectives have been accomplished.

10. STATEMENT OF SUBSTANTIAL INVOLVEMENT

1. Government Insight

   In order to adequately monitor project progress and provide technical direction and/or redirection to the Recipient, DOE must be provided an adequate level of insight into various Recipient activities. Government Insight activities by DOE include attendance at Recipient meetings, reviews and tests, as well as access for DOE's consultants to perform independent evaluations of Recipient's plans and processes. Recipient shall notify the DOE Project Officer of meetings, reviews, and tests in sufficient time to permit DOE participation, and provide all appropriate documentation for DOE review.

2. Specific activities to be conducted by DOE:

   a. Risk Evaluation – DOE will review the Recipient's initial Risk Mitigation Plan (RMP) for quality and completeness. DOE will also monitor updates to the RMP and actions taken by the Recipient during the performance of its award to mitigate risks and improve the probability of successful execution of the integrated Biorefinery project. At DOE's discretion, additional independent risk analyses of the project by DOE consultants may be requested.

b. Independent Engineering Assessments – DOE will engage a private, independent engineering (IE) firm to assist in assessing the progress of the project and provide timely and accurate reports to DOE. The Recipient will ensure that the IE has access to any and all relevant documentation sufficient to allow the IE to provide independent evaluations to DOE on the progress of the project. Such documentation includes but is not limited to the following:

- Drawings and specifications
- Construction and Execution plans
- Resource loaded schedules
- Design functions and requirements for the site final design review
- Risk management plans
- Value management and engineering studies and/or plans
- Acquisition strategies
- Project execution plans
- Project controls including earned value management systems
- Qualifications of the integrated project team.
- Financial strategy for funding the construction project
- Updated marketing and business plan
- Invoices submitted to DOE

DOE will evaluate the quality and completeness of information and documentation provided by the Recipient to DOE and its consultants in order to allow DOE to provide technical direction and/or redirection to the Recipient about how best to achieve the purposes of the award. Consultants to DOE may not provide technical direction and/or redirection to the Recipient.

11. SITE VISITS

DOE's authorized representatives have the right to make site visits at reasonable times to review project accomplishments and management control systems and to provide technical assistance, if required. You must provide, and must require your subawardees to provide, reasonable access to facilities, office space, resources, and assistance for the safety and convenience of the government representatives in the performance of their duties. All site visits and evaluations must be performed in a manner that does not unduly interfere with or delay the work.

12. REPORTING REQUIREMENTS

a. Requirements. The reporting requirements for this award are identified on the Federal Assistance Reporting Checklist, DOE F 4600.2, attached to this award. Failure to comply with these reporting requirements is considered a material noncompliance with the terms of the award. Noncompliance may result in withholding of future payments, suspension or termination of the current award, and withholding of future awards. A willful failure to perform, a history of failure to perform, or unsatisfactory performance of this and/or other financial assistance awards, may also result in a debarment action to preclude future awards by Federal agencies.

b. Dissemination of scientific/technical reports. Scientific/technical reports submitted under this award will be disseminated on the Internet via the DOE Information Bridge (www.osti.gov/bridge), unless the report contains patentable material, protected data or SBIR/STTR data. Citations for journal articles produced under the award will appear on the DOE Energy Citations Database (www.osti.gov/energycitations).

c. Restrictions. Reports submitted to the DOE Information Bridge must not contain any Protected Personal Identifiable Information (PII), limited rights data (proprietary data), classified information, information subject to export control classification, or other information not subject to release.

13. PUBLICATIONS

a. You are encouraged to publish or otherwise make publicly available the results of the work conducted under the award.

b. An acknowledgment of DOE support and a disclaimer must appear in the publication of any material, whether copyrighted or not, based on or developed under this project, as follows:

> *Acknowledgment*: "This material is based upon work supported by the Department of Energy [National Nuclear Security Administration] [add name(s) of other agencies, if applicable] under Award Number(s) [enter the award number(s)]."
>
> *Disclaimer*: "This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof."

14. FEDERAL, STATE, AND MUNICIPAL REQUIREMENTS

You must obtain any required permits and comply with applicable federal, state, and municipal laws, codes, and regulations for work performed under this award.

15. INTELLECTUAL PROPERTY PROVISIONS AND CONTACT INFORMATION

a. The intellectual property provisions applicable to this award are provided as an attachment to this award or are referenced in the Agreement Cover Page.

b. Questions regarding intellectual property matters should be referred to the DOE Award Administrator identified and the Patent Counsel designated as the service provider for the DOE office that issued the award.

Patent Counsel for the Golden Field Office is Julia Moody, who may be reached at julia.moody@go.doe.gov or 303-275-4867.

16. NATIONAL SECURITY: CLASSIFIABLE RESULTS ORIGINATING UNDER AN AWARD

a. This award is intended for unclassified, publicly releasable research. You will not be granted access to classified information. DOE does not expect that the results of the research project will involve classified information. Under certain circumstances, however, a classification review of information originated under the award may be required. The Department may review research work generated under this award at any time to determine if it requires classification.

b. Executive Order 12958 (60 Fed. Reg. 19,825 (1995)) states that basic scientific research information not clearly related to the national security shall not be classified. Nevertheless, some information concerning (among other things) scientific, technological, or economic matters relating to national security or cryptology may require classification. If you originate information during the course of this award that you believe requires classification, you must promptly:

1. Notify the DOE Project Officer and the DOE Award Administrator;

2. Submit the information by registered mail directly to the Director, Office of Classification and Information Control, SO-10.2; U.S. Department of Energy; P.O. Box A; Germantown, MD 20875-0963, for classification review.

3. Restrict access to the information to the maximum extent possible until you are informed that the information is not classified, but no longer than 30 days after receipt by the Director, Office of Classification and Information Control

c. If you originate information concerning the production or utilization of special nuclear material (i.e., plutonium, uranium enriched in the isotope 233 or 235, and any other material so determined under section 51 of the Atomic Energy Act) or nuclear energy, you must:

   1. Notify the DOE Project Officer and the DOE Award Administrator;

   2. Submit the information by registered mail directly to the Director, Office of Classification and Information Control, SO-10.2; U.S. Department of Energy; P. O. Box A; Germantown, MD 20875-0963 for classification review within 180 days of the date the Recipient first discovers or first has reason to believe that the information is useful in such production or utilization; and

   3. Restrict access to the information to the maximum extent possible until you are informed that the information is not classified, but no longer than 90 days after receipt by the Director, Office of Classification and Information Control.

d. If DOE determines any of the information requires classification, you agree that the Government may terminate the award by mutual agreement in accordance with 10 CFR 600.25(d). All material deemed to be classified must be forwarded to DOE, in a manner specified by DOE.

e. If DOE does not respond within the specified time periods, you are under no further obligation to restrict access to the information.

17. CONTINUATION APPLICATION AND FUNDING

a. Continuation Application. A continuation application is a non-competitive application for an additional budget period within a previously approved project period. At least 60 days before the end of each budget period, your continuation application must be submitted to the DOE Project Officer and the DOE Award Administrator identified in the Assistance Agreement, to be eligible to receive a continuation award for the next budget period. The continuation application must include the following information:

   1. Application for Federal Assistance, SF-424.

   2. A continuation report, which must provide a summary of the progress towards meeting the objectives of the award, including any significant findings, conclusions, or developments, a comparison of actual accomplishment with the objectives established for the reporting period (milestones, deliverables, decision point criteria and stage gates), reasons for slippage if goals were not met, an estimate of any unobligated balances remaining at the end of the budget period, and when applicable an explanation of cost overruns or underruns. A description of your plans for the award during the upcoming budget period and any variance from the DOE approved objectives needs to be included in the continuation application package.

3. A detailed budget and supporting justification for the upcoming budget period with the supporting documentation below, including an estimate of DOE funds expected to be remaining at the end of the current budget period:

   a) Budget Information – Non Construction Programs, SF-424A.

   b) Cost Reasonableness Determination, PMC 123.1 (Excel Version).

4. Environmental Checklist, EF1, (This form should be completed on-line at https://www.eere-pmc.energy.gov/).

5. Commitment Letters from Third Parties Contributing to Cost Sharing, if applicable.

6. Statement of Project Objectives (SOPO), if revision is required.

b. Continuation Funding. Continuation funding is contingent on: (1) availability of funds; (2) meeting the objectives, milestones, deliverables, decision point criteria and stage gates of your award and obtaining approval from DOE to continue work on the project (DOE authorizing either Pass or Redirect through a stage-gate review); (3) submittal of required reports; or (4) compliance with the terms and conditions of the award.

18. LOBBYING RESTRICTIONS

By accepting funds under this award, you agree that none of the funds obligated on the award shall be expended, directly or indirectly, to influence congressional action on any legislation or appropriation matters pending before Congress, other than to communicate to Members of Congress as described in 18 U.S.C. 1913. This restriction is in addition to those prescribed elsewhere in statute and regulation.

19. NOTICE REGARDING THE PURCHASE OF AMERICAN-MADE EQUIPMENT AND PRODUCTS -- SENSE OF CONGRESS

It is the sense of the Congress that, to the greatest extent practicable, all equipment and products purchased with funds made available under this award should be American-made.

20. FUNDING OF BUDGET PERIODS

DOE has obligated $50,000,000 ($49,725,000 + $275,000 to FFRDC) for completion of the project authorized by this agreement; however, only $10,245,000 ($9,970,000 + $275,000 to FFRDC) is available for work performed by the Recipient during Budget Period 1 of the project. For Budget Period 2, the remainder or $39,755,000 will be available contingent upon the submission by the Recipient of a continuation application and written approval of the continuation application by the DOE Contracting Officer.

In the event that the Recipient does not submit a continuation application for subsequent Budget Periods, or DOE disapproves a continuation application for subsequent Budget Periods, the maximum DOE liability to the Recipient is the funds that are available for the current approved Budget Period. In such event, DOE reserves the right to deobligate any remaining funds.

21. TITLE AND DISPOSITION OF PROPERTY

a. Title. Title to Property acquired by the Recipient in whole or in part with funds received under this Award shall vest in the Recipient subject to the conditions of this Paragraph and 10 CFR § 600.321, unless otherwise provided. For purposes of this Paragraph, the term "Property" does not include "Intellectual Property," as defined in 10 CFR § 600.325, the terms of which are addressed in Paragraph 16 and Attachment 1 of this Award.

b. Encumbrance. At no time shall Recipient encumber the Property acquired under this Award (includes Property acquired with DOE funds and recipient cost share), in whole or in part, without the prior written agreement of the DOE Contracting Officer. Recipient may request, however, that DOE permit an encumbrance on or subordination of DOE's property interest hereunder. In response to such request, the DOE Contracting Officer, in his or her sole and absolute discretion, will require the Recipient to submit appropriate supporting documentation.

c. Subordination. Based on the Recipient's representations and the documents submitted in support of its request for DOE to subordinate its property interest in favor of Redacted Ex. 4 (Lender of Record), the DOE Contracting Officer has agreed to subordinate DOE's property interest and authorized Recipient to encumber the Property (with such term again not including Intellectual Property, the terms of which are addressed in Paragraph 16 and Attachment 1 of this Award), subject to the following requirements and/or conditions:

(i) Recipient may only encumber DOE's property interest in favor of Redacted Ex. 4 , as Lender of Record for an approximately $ Ex. 4 loan to be made to Recipient and guaranteed in part by the United States Department of Agriculture, on behalf of Redacted Ex. 4 and any participants in or assignees or guarantors of such loan. Except as provided in paragraph (vi) below, Recipient is prohibited from further encumbering or authorizing any other party, including the Lender of Record, to further encumber the Property acquired under the award, including in connection with any loan or other indebtedness other than the loan described in the preceding sentence;

(ii) Upon encumbering the Property acquired under the award in favor of the Lender of Record, Recipient must send DOE an acknowledgement of the encumbrance within five (5) business days;

(iii) DOE's property interest must align immediately behind the above referenced Lender of Record;

(iv) The Lender of Record's priority lien must extinguish upon debt satisfaction (the financing terms must include a mechanism to implement the proceedings to discharge the lien against the property upon fulfillment of Recipient's obligations to the Lender of Record and any participants in or assignees or guarantors of the loan described in paragraph (i) above);

(v) Recipient may not sell all or a substantial part (representing 50% or more in book value) of the Project titled "Recovery Act - Sapphire Integrated Algal Biorefinery (IABR)" funded under DOE award number DE-EE0002884 in the ordinary course of business without the prior written consent of DOE; any such sale that is in connection with an exercise of remedies by the Lender of Record or otherwise outside of the ordinary course of business will not require the consent of DOE. DOE will not unreasonably withhold such approval; and

(vi) Notwithstanding anything to the contrary contained in the foregoing paragraphs (i) through (v), DOE acknowledges that Recipient, Redacted Ex. 4 and the other participants in and guarantors of the loan described in paragraph (i) above may agree to increase the principal amount of such loan in order to complete the project being financed by such loan and/or to advance the business interests of Recipient (and, therefore, to support the purpose of the Award) and, in such event, DOE will continue to permit the encumbrance of its property interest as described herein, but only to the extent that the principal amount of such loan is increased to an aggregate amount not greater than $ Redacted Ex. 4

d. Use. Unless otherwise provided in this paragraph, real property and equipment acquired by the Recipient shall be subject to the rules set forth in 10 CFR 600.130-137, 10 CFR 600.231-233, or 10 CFR 600.320-324, as applicable. Consistent with the goals and objectives of this project, the Recipient may continue to use Recipient acquired property beyond the Period of Performance, without obligation, during the period of such use, to extinguish DOE's conditional title to such property as described in 10 CFR 600.132-135, 10 CFR 600.231-233, or 600.321-324, subject to the following:

(a) the Recipient continues to utilize such property for the objectives of the project as set forth in the Statement of Project Objectives;

(b) DOE retains the right to periodically ask for, and the Recipient agrees to provide, reasonable information concerning the use and condition of the property; and

(c) the Recipient follows the property disposition rules set forth in the applicable sections of 10 CFR Part 600, if the property is no longer used by the Recipient for the objectives of the project, and the fair market value of property exceeds $5,000.

Once the per unit fair market value of the property is less than $5,000, pursuant to the applicable sections of 10 CFR Part 600, DOE's residual interest in the property shall be

extinguished and the Recipient shall have no further obligation to the DOE with respect to the property.

The regulations as set forth in 10 CFR Part 600 and the requirements of this article shall also apply to property in the possession of any team member, sub-recipient or other entity where such property was acquired in whole or in part with funds provided by DOE under this award or where such property was counted as cost-sharing under the award.

e. Disposition. At such time as the property is no longer needed for its authorized purposes, and prior to the Recipient's intended sale, transfer, conversion or assignment, the Recipient must contact the DOE Contracting Officer for disposition instructions. The following disposition methods and approaches may be considered:

Conversion. In the event the Recipient seeks to utilize property for any purpose other than the authorized purpose, the Recipient must notify the Contracting Officer. The DOE Contracting Officer, in his or her sole and absolute discretion, may require the Recipient to reimburse DOE that portion of the Federal share attributable to the current fair market value of the Property so converted. The parties should attempt to agree in good faith on the current fair market value of any property so converted. In the event that the parties cannot agree on the current market value of any property so converted, the parties will mutually agree on the selection of an independent assessor to conduct an independent assessment, at Recipient's expense, of the current fair market value.

Abandonment. In the event the Recipient abandons the project, DOE, at its option, may take title to property equal to DOE's pro rata share of the current fair market value of all property, subject to the terms and conditions of any encumbrance with DOE has previously authorized. Nothing in this provision intends to grant the right of abandonment to the Recipient.

Sale. DOE's interest in the property survives any sale or transfer of the Recipient and/or the property acquired under a DOE award subject to the terms of any encumbrance relating to the property that the DOE has approved. The Recipient shall consult with, and seek the approval of, DOE prior to any such sale or transfer. DOE will not unreasonably withhold approval. It shall be a condition of any sale or transfer of the project or any portion thereof which includes property acquired in whole or in part under a DOE financial assistance award that the transferee or purchaser agrees to be bound by the provisions of the Recipient's award. For purposes of this provision, "sale or transfer of the Recipient" means a sale of more than 50% of the outstanding voting securities of the Recipient, sale of substantially of all of the assets of the Recipient, or merger or similar transaction or series of transactions involving the Recipient.

22. DECONTAMINATION AND/OR DECOMMISSIONING (D&D) COSTS

Notwithstanding any other provisions of this Agreement, the Government shall not be responsible for or have any obligation to the Recipient for (i) Decontamination and/or Decommissioning (D&D) of any of the Recipient's facilities, or (ii) any costs which may be incurred by the Recipient in connection with the D&D of any of its facilities due to the performance of the work under this Agreement, whether said work was performed prior to or subsequent to the effective date of the Agreement.

23. AT RISK FOR FINANCIAL CAPABILITY

You have been determined to be at risk for financial capability based on the Dun & Bradstreet (D&B) Business Information Report (BIR).

Based on this determination the following requirement has been incorporated into this award: Method of payment will be reimbursement through the Automated Clearing House (ACH) Vendor Inquiry Payment Electronic Reporting System (VIPERS).

You may report any change in circumstances that impact DOE's determination of your financial capability. If you feel that your circumstances have changed to this degree, you may request a re-evaluation at any time after 6 months from the initial determination. Please provide a written request and support to the DOE Award Administrator.

DOE will remove this provision by modification to the award if the conditions that prompted it have been corrected, as approved by the Contracting Officer.

24. INSOLVENCY, BANKRUPTCY OR RECEIVERSHIP

a. You shall immediately notify the DOE of the occurrence of any of the following events: (i) you or your parent's filing of a voluntary case seeking liquidation or reorganization under the Bankruptcy Act; (ii) your consent to the institution of an involuntary case under the Bankruptcy Act against you or your parent; (iii) the filing of any similar proceeding for or against you or your parent, or your consent to the dissolution, winding-up or readjustment of your debts, appointment of a receiver, conservator, trustee, or other officer with similar powers over you, under any other applicable state or federal law; or (iv) your insolvency due to its inability to pay debts generally as they become due.

b. Such notification shall be in writing and shall: (i) specifically set out the details of the occurrence of an event referenced in paragraph (a); (ii) provide the facts surrounding that event; and (iii) provide the impact such event will have on the project being funded by this award.

c. Upon the occurrence of any of the four events described in paragraph a. of this provision, DOE reserves the right to conduct a review of your award to determine your compliance with the required elements of the award (including such items as cost share, progress towards technical project objectives, and submission of required reports). If the DOE

review determines that there are significant deficiencies or concerns with your performance under the award, DOE reserves the right to impose additional requirements, as needed, including (i) change of payment method; or (ii) institute payment controls.

d. Failure of the Recipient to comply with this provision may be considered a material noncompliance of this financial assistance award by the Contracting Officer.

25. CENTRAL CONTRACTOR REGISTRATION AND UNIVERSAL IDENTIFIER REQUIREMENTS

A. Requirement for Central Contractor Registration (CCR)

Unless you are exempted from this requirement under 2 CFR 25.110, you as the recipient must maintain the currency of your information in the CCR until you submit the final financial report required under this award or receive the final payment, whichever is later. This requires that you review and update the information at least annually after the initial registration, and more frequently if required by changes in your information or another award term.

B. Requirement for Data Universal Numbering System (DUNS) Numbers

If you are authorized to make subawards under this award, you:

1. Must notify potential subrecipients that no entity (see definition in paragraph C of this award term) may receive a subaward from you unless the entity has provided its DUNS number to you.

2. May not make a subaward to an entity unless the entity has provided its DUNS number to you.

C. Definitions

For purposes of this award term:

1. Central Contractor Registration (CCR) means the Federal repository into which an entity must provide information required for the conduct of business as a recipient. Additional information about registration procedures may be found at the CCR Internet site (currently at http://www.ccr.gov).

2. Data Universal Numbering System (DUNS) number means the nine-digit number established and assigned by Dun and Bradstreet, Inc. (D&B) to uniquely identify business entities. A DUNS number may be obtained from D&B by telephone (currently 866-705-5711) or the Internet (currently at http://fedgov.dnb.com/webform).

3. Entity, as it is used in this award term, means all of the following, as defined at 2 CFR Part 25, subpart C:

a. A Governmental organization, which is a State, local government, or Indian Tribe;

b. A foreign public entity;

c. A domestic or foreign nonprofit organization;

d. A domestic or foreign for-profit organization; and

e. A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.

4. Subaward:

a. This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.

b. The term does not include your procurement of property and services needed to carry out the project or program (for further explanation, see Sec. __.210 of the attachment to OMB Circular A-133, Audits of States, Local Governments, and Non-Profit Organizations).

c. A subaward may be provided through any legal agreement, including an agreement that you consider a contract.

5. Subrecipient means an entity that:

a. Receives a subaward from you under this award; and

b. Is accountable to you for the use of the Federal funds provided by the subaward.

26. NATIONAL ENVIRONMENTAL POLICY ACT (NEPA) REQUIREMENTS

For this award, DOE has made a final NEPA determination for all activities under this award that are listed in the Statement of Project Objectives (SOPO) formally approved by DOE through incorporation into and attached to the award. You (Recipient) may proceed with the activities as described in the SOPO. This NEPA determination is specific to the project as described in the SOPO formally approved by DOE through incorporation into and attached to the award.

If you later add to or modify the activities in the above-referenced SOPO, you must submit the revised SOPO to the DOE Project Officer. Those additions or modifications are subject to review by the NEPA Compliance Officer and approval by the DOE's Contracting Officer. Recipients are restricted from taking any action using Federal funds, which would have an adverse effect on the environment or limit the choice of reasonable alternatives prior to DOE providing a final NEPA determination. Any new activities or modification of activities is subject to additional NEPA review and is not authorized for federal funding until DOE provides a NEPA determination on those additions or modifications. DOE may require the Recipient to submit additional information to support a revised NEPA determination. Should you move forward with activities that are not authorized for Federal funding by the DOE Contracting Officer in advance of the final NEPA determination, you are doing so at risk of not receiving Federal funding and such costs may not be recognized as allowable cost share.

Per the Finding of No Significant Impact (FONSI) you are required to:
1. Minimize the likelihood of adverse impacts to birds protected under the Migratory Bird Treaty Act by completing nesting bird surveys in areas to be disturbed. If nesting birds occupy the area to be disturbed, all ground disturbing activities should be avoided until nesting is complete.

2. Coordinate with USFWS and NMDFG in order to minimize potential impacts to any burrowing owls located on the site, if present, as outlined in the "Guidelines and Recommendations for Burrowing Owl Surveys and Mitigation" (July 2007)

Results of the nesting bird and burrowing owl surveys must be submitted to DOE for review and approval prior to DOE or cost share funds being applied to any ground disturbing activities.

27. INDEMNITY

The Recipient shall indemnify the Government and its officers, agents, or employees for any and all liability, including litigation expenses and attorneys' fees, arising from suits, actions, or claims of any character for death, bodily injury, or loss of or damage to property or to the environment, resulting from the project, except to the extent that such liability results from the direct fault or negligence of Government officers, agents or employees, or to the extent such liability may be covered by applicable allowable costs provisions.

28. SPECIAL PROVISIONS RELATING TO WORK FUNDED UNDER AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009 (May 2009)

Preamble

The American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, (Recovery Act) was enacted to preserve and create jobs and promote economic recovery, assist those most impacted by the recession, provide investments needed to increase economic efficiency by spurring technological advances in science and health, invest in transportation, environmental protection, and other infrastructure that will provide long-term economic benefits, stabilize State and local

government budgets, in order to minimize and avoid reductions in essential services and counterproductive State and local tax increases. Recipients shall use grant funds in a manner that maximizes job creation and economic benefit.

The Recipient shall comply with all terms and conditions in the Recovery Act relating generally to governance, accountability, transparency, data collection and resources as specified in Act itself and as discussed below.

Recipients should begin planning activities for their first tier subrecipients, including obtaining a DUNS number (or updating the existing DUNS record), and registering with the Central Contractor Registration (CCR).

Be advised that Recovery Act funds can be used in conjunction with other funding as necessary to complete projects, but tracking and reporting must be separate to meet the reporting requirements of the Recovery Act and related guidance. For projects funded by sources other than the Recovery Act, Contractors must keep separate records for Recovery Act funds and to ensure those records comply with the requirements of the Act.

The Government has not fully developed the implementing instructions of the Recovery Act, particularly concerning specific procedural requirements for the new reporting requirements. The Recipient will be provided these details as they become available. The Recipient must comply with all requirements of the Act. If the recipient believes there is any inconsistency between ARRA requirements and current award terms and conditions, the issues will be referred to the Contracting Officer for reconciliation.

Definitions

For purposes of this clause, Covered Funds means funds expended or obligated from appropriations under the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5. Covered Funds will have special accounting codes and will be identified as Recovery Act funds in the grant, cooperative agreement or TIA and/or modification using Recovery Act funds. Covered Funds must be reimbursed by September 30, 2015.

Non-Federal employer means any employer with respect to covered funds -- the contractor, subcontractor, grantee, or recipient, as the case may be, if the contractor, subcontractor, grantee, or recipient is an employer; and any professional membership organization, certification of other professional body, any agent or licensee of the Federal government, or any person acting directly or indirectly in the interest of an employer receiving covered funds; or with respect to covered funds received by a State or local government, the State or local government receiving the funds and any contractor or subcontractor receiving the funds and any contractor or subcontractor of the State or local government; and does not mean any department, agency, or other entity of the federal government.

Recipient means any entity that receives Recovery Act funds directly from the Federal government (including Recovery Act funds received through grant, loan, or contract) other than an individual and includes a State that receives Recovery Act Funds.

Special Provisions

A. Flow Down Requirement

Recipients must include these special terms and conditions in any subaward.

B. Segregation of Costs

Recipients must segregate the obligations and expenditures related to funding under the Recovery Act. Financial and accounting systems should be revised as necessary to segregate, track and maintain these funds apart and separate from other revenue streams. No part of the funds from the Recovery Act shall be commingled with any other funds or used for a purpose other than that of making payments for costs allowable for Recovery Act projects.

C. Prohibition on Use of Funds

None of the funds provided under this agreement derived from the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, may be used by any State or local government, or any private entity, for any casino or other gambling establishment, aquarium, zoo, golf course, or swimming pool.

D. Access to Records

With respect to each financial assistance agreement awarded utilizing at least some of the funds appropriated or otherwise made available by the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, any representative of an appropriate inspector general appointed under section 3 or 8G of the Inspector General Act of 1988 (5 U.S.C. App.) or of the Comptroller General is authorized --

(1) to examine any records of the contractor or grantee, any of its subcontractors or subgrantees, or any State or local agency administering such contract that pertain to, and involve transactions that relate to, the subcontract, subcontract, grant, or subgrant; and

(2) to interview any officer or employee of the contractor, grantee, subgrantee, or agency regarding such transactions.

E. Publication

An application may contain technical data and other data, including trade secrets and/or privileged or confidential information, which the applicant does not want disclosed to the public or used by the Government for any purpose other than the application. To protect such data, the applicant should specifically identify each page including each line or paragraph thereof containing the data to be protected and mark the cover sheet of the application with the following Notice as well as referring to the Notice on each page to which the Notice applies:

Notice of Restriction on Disclosure and Use of Data
The data contained in pages ---- of this application have been submitted in confidence and

contain trade secrets or proprietary information, and such data shall be used or disclosed only for evaluation purposes, provided that if this applicant receives an award as a result of or in connection with the submission of this application, DOE shall have the right to use or disclose the data here to the extent provided in the award. This restriction does not limit the Government's right to use or disclose data obtained without restriction from any source, including the applicant.

Information about this agreement will be published on the Internet and linked to the website www.recovery.gov, maintained by the Accountability and Transparency Board. The Board may exclude posting contractual or other information on the website on a case-by-case basis when necessary to protect national security or to protect information that is not subject to disclosure under sections 552 and 552a of title 5, United States Code.

F. Protecting State and Local Government and Contractor Whistleblowers.

The requirements of Section 1553 of the Act are summarized below. They include, but are not limited to:

Prohibition on Reprisals: An employee of any non-Federal employer receiving covered funds under the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, may not be discharged, demoted, or otherwise discriminated against as a reprisal for disclosing, including a disclosure made in the ordinary course of an employee's duties, to the Accountability and Transparency Board, an inspector general, the Comptroller General, a member of Congress, a State or Federal regulatory or law enforcement agency, a person with supervisory authority over the employee (or other person working for the employer who has the authority to investigate, discover or terminate misconduct), a court or grant jury, the head of a Federal agency, or their representatives information that the employee believes is evidence of:

- gross management of an agency contract or grant relating to covered funds;
- a gross waste of covered funds;
- a substantial and specific danger to public health or safety related to the implementation or use of covered funds;
- an abuse of authority related to the implementation or use of covered funds; or
- as violation of law, rule, or regulation related to an agency contract (including the competition for or negotiation of a contract) or grant, awarded or issued relating to covered funds.

Agency Action: Not later than 30 days after receiving an inspector general report of an alleged reprisal, the head of the agency shall determine whether there is sufficient basis to conclude that the non-Federal employer has subjected the employee to a prohibited reprisal. The agency shall either issue an order denying relief in whole or in part or shall take one or more of the following actions:

- Order the employer to take affirmative action to abate the reprisal.
- Order the employer to reinstate the person to the position that the person held before the reprisal, together with compensation including back pay, compensatory damages, employment benefits, and other terms and conditions of employment that would apply to the person in that position if the reprisal had not been taken.

- Order the employer to pay the employee an amount equal to the aggregate amount of all costs and expenses (including attorneys' fees and expert witnesses' fees) that were reasonably incurred by the employee for or in connection with, bringing the complaint regarding the reprisal, as determined by the head of a court of competent jurisdiction.

Nonenforceablity of Certain Provisions Waiving Rights and remedies or Requiring Arbitration: Except as provided in a collective bargaining agreement, the rights and remedies provided to aggrieved employees by this section may not be waived by any agreement, policy, form, or condition of employment, including any predispute arbitration agreement. No predispute arbitration agreement shall be valid or enforceable if it requires arbitration of a dispute arising out of this section.

Requirement to Post Notice of Rights and Remedies: Any employer receiving covered funds under the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, shall post notice of the rights and remedies as required therein. (Refer to section 1553 of the American Recovery and Reinvestment Act of 2009, Pub. L. 111-5, www.Recovery.gov, for specific requirements of this section and prescribed language for the notices.).

G. Request for Reimbursement

RESERVED

H. False Claims Act

Recipient and sub-recipients shall promptly refer to the DOE or other appropriate Inspector General any credible evidence that a principal, employee, agent, contractor, sub-grantee, subcontractor or other person has submitted a false claim under the False Claims Act or has committed a criminal or civil violation of laws pertaining to fraud, conflict of interest, bribery, gratuity or similar misconduct involving those funds.

I. Information in Support of Recovery Act Reporting

Recipient may be required to submit backup documentation for expenditures of funds under the Recovery Act including such items as timecards and invoices. Recipient shall provide copies of backup documentation at the request of the Contracting Officer or designee.

J. Availability of Funds

Funds appropriated under the Recovery Act and obligated to this award are available for reimbursement of costs until September 30, 2015.

29. REPORTING AND REGISTRATION REQUIREMENTS UNDER SECTION 1512 OF THE RECOVERY ACT

(a) This award requires the recipient to complete projects or activities which are funded under the American Recovery and Reinvestment Act of 2009 (Recovery Act) and to report on use of Recovery Act funds provided through this award. Information from these reports will be made available to the public.

(b) The reports are due no later than ten calendar days after each calendar quarter in which the Recipient receives the assistance award funded in whole or in part by the Recovery Act.

(c) Recipients and their first-tier subrecipients must maintain current registrations in the Central Contractor Registration (*http://www.ccr.gov*) at all times during which they have active federal awards funded with Recovery Act funds. A Dun and Bradstreet Data Universal Numbering System (DUNS) Number (*http://www.dnb.com*) is one of the requirements for registration in the Central Contractor Registration.

(d) The recipient shall report the information described in section 1512(c) of the Recovery Act using the reporting instructions and data elements that will be provided online at *http://www.FederalReporting.gov* and ensure that any information that is pre-filled is corrected or updated as needed.

30. REQUIRED USE OF AMERICAN IRON, STEEL, AND MANUFACTURED GOODS – SECTION 1605 OF THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009

If the Recipient determines at any time that any construction, alteration, or repair activity on a public building or public works will be performed during the course of the project, the Recipient shall notify the Contracting Officer prior to commencing such work and the following provisions shall apply.

(a) *Definitions.* As used in this award term and condition—

(1) *Manufactured good* means a good brought to the construction site for incorporation into the building or work that has been—

(i) Processed into a specific form and shape; or

(ii) Combined with other raw material to create a material that has different properties than the properties of the individual raw materials.

(2) *Public building and public work* means a public building of, and a public work of, a governmental entity (the United States; the District of Columbia; commonwealths, territories, and minor outlying islands of the United States; State and local governments; and multi-State, regional, or interstate entities which have governmental functions). These buildings and works may include, without limitation, bridges, dams, plants, highways, parkways, streets, subways,

tunnels, sewers, mains, power lines, pumping stations, heavy generators, railways, airports, terminals, docks, piers, wharves, ways, lighthouses, buoys, jetties, breakwaters, levees, and canals, and the construction, alteration, maintenance, or repair of such buildings and works.

(3) *Steel* means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements.

(b) *Domestic preference.* (1) This award term and condition implements Section 1605 of the American Recovery and Reinvestment Act of 2009 (Recovery Act) (Pub. L. 111–5), by requiring that all iron, steel, and manufactured goods used in the project are produced in the United States except as provided in paragraph (b)(3) of this section and condition.

(2) This requirement does not apply to the material listed by the Federal Government as follows:

None

(3) The award official may add other iron, steel, and/or manufactured goods to the list in paragraph (b)(2) of this section and condition if the Federal Government determines that—

(i) The cost of the domestic iron, steel, and/or manufactured goods would be unreasonable. The cost of domestic iron, steel, or manufactured goods used in the project is unreasonable when the cumulative cost of such material will increase the cost of the overall project by more than 25 percent;

(ii) The iron, steel, and/or manufactured good is not produced, or manufactured in the United States in sufficient and reasonably available quantities and of a satisfactory quality; or

(iii) The application of the restriction of section 1605 of the Recovery Act would be inconsistent with the public interest.

(c) *Request for determination of inapplicability of Section 1605 of the Recovery Act* . (1)(i) Any recipient request to use foreign iron, steel, and/or manufactured goods in accordance with paragraph (b)(3) of this section shall include adequate information for Federal Government evaluation of the request, including—

(A) A description of the foreign and domestic iron, steel, and/or manufactured goods;

(B) Unit of measure;

(C) Quantity;

(D) Cost;

(E) Time of delivery or availability;

(F) Location of the project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign iron, steel, and/or manufactured goods cited in accordance with paragraph (b)(3) of this section.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed cost comparison table in the format in paragraph (d) of this section.

(iii) The cost of iron, steel, and/or manufactured goods material shall include all delivery costs to the construction site and any applicable duty.

(iv) Any recipient request for a determination submitted after Recovery Act funds have been obligated for a project for construction, alteration, maintenance, or repair shall explain why the recipient could not reasonably foresee the need for such determination and could not have requested the determination before the funds were obligated. If the recipient does not submit a satisfactory explanation, the award official need not make a determination.

(2) If the Federal Government determines after funds have been obligated for a project for construction, alteration, maintenance, or repair that an exception to section 1605 of the Recovery Act applies, the award official will amend the award to allow use of the foreign iron, steel, and/or relevant manufactured goods. When the basis for the exception is nonavailability or public interest, the amended award shall reflect adjustment of the award amount, redistribution of budgeted funds, and/or other actions taken to cover costs associated with acquiring or using the foreign iron, steel, and/or relevant manufactured goods. When the basis for the exception is the unreasonable cost of the domestic iron, steel, or manufactured goods, the award official shall adjust the award amount or redistribute budgeted funds by at least the differential established in 2 CFR 176.110(a).

(3) Unless the Federal Government determines that an exception to section 1605 of the Recovery Act applies, use of foreign iron, steel, and/or manufactured goods is noncompliant with section 1605 of the American Recovery and Reinvestment Act.

(d) *Data.* To permit evaluation of requests under paragraph (b) of this section based on unreasonable cost, the Recipient shall include the following information and any applicable supporting data based on the survey of suppliers:

Foreign and Domestic Items Cost Comparison

Description	Unit of measure	Quantity	Cost (dollars)*
Item 1:			
Foreign steel, iron, or manufactured good	_____	_____	_____
Domestic steel, iron, or manufactured good	_____	_____	_____
Item 2:			
Foreign steel, iron, or manufactured good	_____	_____	_____
Domestic steel, iron, or manufactured good	_____	_____	_____

List name, address, telephone number, email address, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.

Include other applicable supporting information.

*Include all delivery costs to the construction site.

31. REQUIRED USE OF AMERICAN IRON, STEEL, AND MANUFACTURED GOODS (COVERED UNDER INTERNATIONAL AGREEMENTS) – SECTION 1605 OF THE AMERICAN RECOVERY AND REINVESTMENT ACT OF 2009

(a) *Definitions.* As used in this award term and condition—

Designated country — (1) A World Trade Organization Government Procurement Agreement country (Aruba, Austria, Belgium, Bulgaria, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea (Republic of), Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and United Kingdom;

(2) A Free Trade Agreement (FTA) country (Australia, Bahrain, Canada, Chile, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Israel, Mexico, Morocco, Nicaragua, Oman, Peru, or Singapore); or

(3) A United States-European Communities Exchange of Letters (May 15, 1995) country: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, and United Kingdom.

Designated country iron, steel, and/or manufactured goods — (1) Is wholly the growth, product, or manufacture of a designated country; or

(2) In the case of a manufactured good that consist in whole or in part of materials from another country, has been substantially transformed in a designated country into a new and different manufactured good distinct from the materials from which it was transformed.

Domestic iron, steel, and/or manufactured good — (1) Is wholly the growth, product, or manufacture of the United States; or

(2) In the case of a manufactured good that consists in whole or in part of materials from another country, has been substantially transformed in the United States into a new and different manufactured good distinct from the materials from which it was transformed. There is no requirement with regard to the origin of components or subcomponents in manufactured goods or products, as long as the manufacture of the goods occurs in the United States.

Foreign iron, steel, and/or manufactured good means iron, steel and/or manufactured good that is not domestic or designated country iron, steel, and/or manufactured good.

Manufactured good means a good brought to the construction site for incorporation into the building or work that has been—

(1) Processed into a specific form and shape; or

(2) Combined with other raw material to create a material that has different properties than the properties of the individual raw materials.

Public building and *public work* means a public building of, and a public work of, a governmental entity (the United States; the District of Columbia; commonwealths, territories, and minor outlying islands of the United States; State and local governments; and multi-State, regional, or interstate entities which have governmental functions). These buildings and works may include, without limitation, bridges, dams, plants, highways, parkways, streets, subways, tunnels, sewers, mains, power lines, pumping stations, heavy generators, railways, airports, terminals, docks, piers, wharves, ways, lighthouses, buoys, jetties, breakwaters, levees, and canals, and the construction, alteration, maintenance, or repair of such buildings and works.

Steel means an alloy that includes at least 50 percent iron, between .02 and 2 percent carbon, and may include other elements.

(b) *Iron, steel, and manufactured goods.* (1) The award term and condition described in this section implements—

(i) Section 1605(a) of the American Recovery and Reinvestment Act of 2009 (Pub. L. 111–5) (Recovery Act), by requiring that all iron, steel, and manufactured goods used in the project are produced in the United States; and

(ii) Section 1605(d), which requires application of the Buy American requirement in a manner consistent with U.S. obligations under international agreements. The restrictions of section 1605 of the Recovery Act do not apply to designated country iron, steel, and/or manufactured goods.

The Buy American requirement in section 1605 shall not be applied where the iron, steel or manufactured goods used in the project are from a Party to an international agreement that obligates the recipient to treat the goods and services of that Party the same as domestic goods and services. This obligation shall only apply to projects with an estimated value of $7,443,000 or more.

(2) The recipient shall use only domestic or designated country iron, steel, and manufactured goods in performing the work funded in whole or part with this award, except as provided in paragraphs (b)(3) and (b)(4) of this section.

(3) The requirement in paragraph (b)(2) of this section does not apply to the iron, steel, and manufactured goods listed by the Federal Government as follows:

None

(4) The award official may add other iron, steel, and manufactured goods to the list in paragraph (b)(3) of this section if the Federal Government determines that—

(i) The cost of domestic iron, steel, and/or manufactured goods would be unreasonable. The cost of domestic iron, steel, and/or manufactured goods used in the project is unreasonable when the cumulative cost of such material will increase the overall cost of the project by more than 25 percent;

(ii) The iron, steel, and/or manufactured good is not produced, or manufactured in the United States in sufficient and reasonably available commercial quantities of a satisfactory quality; or

(iii) The application of the restriction of section 1605 of the Recovery Act would be inconsistent with the public interest.

(c) *Request for determination of inapplicability of section 1605 of the Recovery Act or the Buy American Act.* (1)(i) Any recipient request to use foreign iron, steel, and/or manufactured goods in accordance with paragraph (b)(4) of this section shall include adequate information for Federal Government evaluation of the request, including—

(A) A description of the foreign and domestic iron, steel, and/or manufactured goods;

(B) Unit of measure;

(C) Quantity;

(D) Cost;

(E) Time of delivery or availability;

(F) Location of the project;

(G) Name and address of the proposed supplier; and

(H) A detailed justification of the reason for use of foreign iron, steel, and/or manufactured goods cited in accordance with paragraph (b)(4) of this section.

(ii) A request based on unreasonable cost shall include a reasonable survey of the market and a completed cost comparison table in the format in paragraph (d) of this section.

(iii) The cost of iron, steel, or manufactured goods shall include all delivery costs to the construction site and any applicable duty.

(iv) Any recipient request for a determination submitted after Recovery Act funds have been obligated for a project for construction, alteration, maintenance, or repair shall explain why the recipient could not reasonably foresee the need for such determination and could not have requested the determination before the funds were obligated. If the recipient does not submit a satisfactory explanation, the award official need not make a determination.

(2) If the Federal Government determines after funds have been obligated for a project for construction, alteration, maintenance, or repair that an exception to section 1605 of the Recovery Act applies, the award official will amend the award to allow use of the foreign iron, steel, and/or relevant manufactured goods. When the basis for the exception is nonavailability or public interest, the amended award shall reflect adjustment of the award amount, redistribution of budgeted funds, and/or other appropriate actions taken to cover costs associated with acquiring or using the foreign iron, steel, and/or relevant manufactured goods. When the basis for the exception is the unreasonable cost of the domestic iron, steel, or manufactured goods, the award official shall adjust the award amount or redistribute budgeted funds, as appropriate, by at least the differential established in 2 CFR 176.110(a).

(3) Unless the Federal Government determines that an exception to section 1605 of the Recovery Act applies, use of foreign iron, steel, and/or manufactured goods other than designated country iron, steel, and/or manufactured goods is noncompliant with the applicable Act.

(d) *Data.* To permit evaluation of requests under paragraph (b) of this section based on unreasonable cost, the applicant shall include the following information and any applicable supporting data based on the survey of suppliers:

Foreign and Domestic Items Cost Comparison

Description	Unit of measure	Quantity	Cost (dollars)*
Item 1:			
Foreign steel, iron, or manufactured good	_____	_____	_____
Domestic steel, iron, or manufactured good	_____	_____	_____
Item 2:			
Foreign steel, iron, or manufactured good	_____	_____	_____
Domestic steel, iron, or manufactured good	_____	_____	_____

List name, address, telephone number, email address, and contact for suppliers surveyed. Attach copy of response; if oral, attach summary.

Include other applicable supporting information.

*Include all delivery costs to the construction site.

32. RECOVERY ACT TRANSACTIONS LISTED IN SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS AND RECIPIENT RESPONSIBILITIES FOR INFORMING SUBRECIPIENTS

(a) To maximize the transparency and accountability of funds authorized under the American Recovery and Reinvestment Act of 2009 (Pub. L. 111–5) (Recovery Act) as required by Congress and in accordance with 2 CFR 215.21 "Uniform Administrative Requirements for Grants and Agreements" and OMB Circular A–102 Common Rules provisions, recipients agree to maintain records that identify adequately the source and application of Recovery Act funds. OMB Circular A–102 is available at *http://www.whitehouse.gov/omb/circulars/a102/a102.html.*

(b) For recipients covered by the Single Audit Act Amendments of 1996 and OMB Circular A–133, "Audits of States, Local Governments, and Non-Profit Organizations," recipients agree to separately identify the expenditures for Federal awards under the Recovery Act on the Schedule of Expenditures of Federal Awards (SEFA) and the Data Collection Form (SF–SAC) required by OMB Circular A–133. OMB Circular A–133 is available at *http://www.whitehouse.gov/omb/circulars/a133/a133.html.* This shall be accomplished by identifying expenditures for Federal awards made under the Recovery Act separately on the SEFA, and as separate rows under Item 9 of Part III on the SF–SAC by CFDA number, and inclusion of the prefix "ARRA-" in identifying the name of the Federal program on the SEFA and as the first characters in Item 9d of Part III on the SF–SAC.

(c) Recipients agree to separately identify to each subrecipient, and document at the time of subaward and at the time of disbursement of funds, the Federal award number, CFDA number, and amount of Recovery Act funds. When a recipient awards Recovery Act funds for an existing program, the information furnished to subrecipients shall distinguish the subawards of incremental Recovery Act funds from regular subawards under the existing program.

(d) Recipients agree to require their subrecipients to include on their SEFA information to specifically identify Recovery Act funding similar to the requirements for the recipient SEFA described above. This information is needed to allow the recipient to properly monitor subrecipient expenditure of ARRA funds as well as oversight by the Federal awarding agencies, Offices of Inspector General and the Government Accountability Office.

33. WAGE RATE REQUIREMENTS UNDER SECTION 1606 OF THE RECOVERY ACT

(a) Section 1606 of the Recovery Act requires that all laborers and mechanics employed by contractors and subcontractors on projects funded directly by or assisted in whole or in part by and through the Federal Government pursuant to the Recovery Act shall be paid wages at rates not less than those prevailing on projects of a character similar in the locality as determined by the Secretary of Labor in accordance with subchapter IV of chapter 31 of title 40, United States Code.

Pursuant to Reorganization Plan No. 14 and the Copeland Act, 40 U.S.C. 3145, the Department of Labor has issued regulations at 29 CFR parts 1, 3, and 5 to implement the Davis-Bacon and related Acts. Regulations in 29 CFR 5.5 instruct agencies concerning application of the standard Davis-Bacon contract clauses set forth in that section. Federal agencies providing grants, cooperative agreements, and loans under the Recovery Act shall ensure that the standard Davis-Bacon contract clauses found in 29 CFR 5.5(a) are incorporated in any resultant covered contracts that are in excess of $2,000 for construction, alteration or repair (including painting and decorating).

(b) For additional guidance on the wage rate requirements of section 1606, contact your awarding agency. Recipients of grants, cooperative agreements and loans should direct their initial inquiries concerning the application of Davis-Bacon requirements to a particular federally assisted project to the Federal agency funding the project. The Secretary of Labor retains final coverage authority under Reorganization Plan Number 14.

34. DAVIS BACON ACT AND CONTRACT WORK HOURS AND SAFETY STANDARDS ACT

If the Recipient determines at any time that any construction, alteration, or repair activity as defined by 29 CFR 5.2(j) (http://cfr.vlex.com/vid/5-2-definitions-19681309) will be performed during the course of the project, the Recipient shall notify the Contracting Officer prior to commencing such work and the following provisions shall apply. A modification to the award which incorporates the appropriate Davis-Bacon wage rate determination(s) will constitute the Contracting Officer's approval to proceed.

Definitions: For purposes of this provision, "Davis Bacon Act and Contract Work Hours and Safety Standards Act," the following definitions are applicable:

(1) "Award" means any grant, cooperative agreement or technology investment agreement made with Recovery Act funds by the Department of Energy (DOE) to a Recipient. Such Award must require compliance with the labor standards clauses and wage rate requirements of the Davis-Bacon Act (DBA) for work performed by all laborers and mechanics employed by Recipients (other than a unit of State or local government whose own employees perform the construction) Subrecipients, Contractors, and subcontractors.

(2) "Contractor" means an entity that enters into a Contract. For purposes of these clauses, Contractor shall include (as applicable) prime contractors, Recipients, Subrecipients, and Recipients' or Subrecipients' contractors, subcontractors, and lower-tier subcontractors. "Contractor" does not mean a unit of State or local government where construction is performed by its own employees."

(3) "Contract" means a contract executed by a Recipient, Subrecipient, prime contractor, or any tier subcontractor for construction, alteration, or repair. It may also mean (as applicable) (i) financial assistance instruments such as grants, cooperative agreements, technology investment agreements, and loans; and, (ii) Sub awards, contracts and subcontracts issued under financial assistance agreements. "Contract" does not mean a financial assistance instrument with a unit of State or local government where construction is performed by its own employees.

(4) "Contracting Officer" means the DOE official authorized to execute an Award on behalf of DOE and who is responsible for the business management and non-program aspects of the financial assistance process.

(5) "Recipient" means any entity other than an individual that receives an Award of Federal funds in the form of a grant, cooperative agreement, or technology investment agreement directly from the Federal Government and is financially accountable for the use of any DOE funds or property, and is legally responsible for carrying out the terms and conditions of the program and Award.

(6) “Subaward” means an award of financial assistance in the form of money, or property in lieu of money, made under an award by a Recipient to an eligible Subrecipient or by a Subrecipient to a lower-tier subrecipient. The term includes financial assistance when provided by any legal agreement, even if the agreement is called a contract, but does not include the Recipient’s procurement of goods and services to carry out the program nor does it include any form of assistance which is excluded from the definition of “Award” above.

(7) “Subrecipient” means a non-Federal entity that expends Federal funds received from a Recipient to carry out a Federal program, but does not include an individual that is a beneficiary of such a program.

(a) Davis Bacon Act

(1) Minimum wages.

(i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and, without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the Contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (a)(1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in § 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, *provided* that the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination (including any additional classification and wage rates conformed under paragraph (a)(1)(ii) of this section) and the Davis-Bacon poster (WH-1321) shall be posted at all times by the Contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)(A) The Contracting Officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the Contract shall be classified in conformance with the wage determination. The Contracting Officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination;

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the Contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the Contracting Officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the Contracting Officer to the Administrator of the Wage and Hour Division, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(C) In the event the Contractor, the laborers or mechanics to be employed in the classification or their representatives, and the Contracting Officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the Contracting Officer shall refer the questions, including the views of all interested parties and the recommendation of the Contracting Officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the Contracting Officer or will notify the Contracting Officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii)(B) or (C) of this section, shall be paid to all workers performing work in the classification under this Contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the Contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the Contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the Contractor does not make payments to a trustee or other third person, the Contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, *provided* that the Secretary of Labor has found, upon the written request of the Contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the Contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(2) Withholding. The Department of Energy or the Recipient or Subrecipient shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the Contractor under this Contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the Contractor or any subcontractor the full amount of wages required by the Contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the Contract, the Department of Energy, Recipient, or Subrecipient, may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records.

(i) Payrolls and basic records relating thereto shall be maintained by the Contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made, and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in

providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the Contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii) (A) The Contractor shall submit weekly for each week in which any Contract work is performed a copy of all payrolls to the Department of Energy if the agency is a party to the Contract, but if the agency is not such a party, the Contractor will submit the payrolls to the Recipient or Subrecipient (as applicable), applicant, sponsor, or owner, as the case may be, for transmission to the Department of Energy. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR 5.5(a)(3)(i), except that full social security numbers and home addresses shall not be included on weekly transmittals. Instead, the payrolls shall only need to include an individually identifying number for each employee (e.g., the last four digits of the employee's social security number). The required weekly payroll information may be submitted in any form desired. Optional Form WH-347 is available for this purpose from the Wage and Hour Division Web site at http://www.dol.gov/esa/whd/forms/wh347instr.htm or its successor site. The prime Contractor is responsible for the submission of copies of payrolls by all subcontractors. Contractors and subcontractors shall maintain the full social security number and current address of each covered worker, and shall provide them upon request to the Department of Energy if the agency is a party to the Contract, but if the agency is not such a party, the Contractor will submit them to the Recipient or Subrecipient (as applicable), applicant, sponsor, or owner, as the case may be, for transmission to the Department of Energy, the Contractor, or the Wage and Hour Division of the Department of Labor for purposes of an investigation or audit of compliance with prevailing wage requirements. It is not a violation of this section for a prime contractor to require a subcontractor to provide addresses and social security numbers to the prime contractor for its own records, without weekly submission to the sponsoring government agency (or the Recipient or Subrecipient (as applicable), applicant, sponsor, or owner).

(B) Each payroll submitted shall be accompanied by a “Statement of Compliance,” signed by the Contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the Contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be provided under § 5.5 (a)(3)(ii) of Regulations, 29 CFR part 5, the appropriate information is being maintained under § 5.5 (a)(3)(i) of Regulations, 29 CFR part 5, and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the Contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for the classification of work performed, as specified in the applicable wage determination incorporated into the Contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.

(D) The falsification of any of the above certifications may subject the Contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 3729 of title 31 of the United States Code.

(iii) The Contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the Department of Energy or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the Contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the Contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees—

(i) Apprentices. Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Office of Apprenticeship Training, Employer and Labor Services, or with a State

Apprenticeship Agency recognized by the Office, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Office of Apprenticeship Training, Employer and Labor Services or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the Contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a Contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the Contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Office of Apprenticeship Training, Employer and Labor Services, or a State Apprenticeship Agency recognized by the Office, withdraws approval of an apprenticeship program, the Contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees. Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the

Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the Contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity. The utilization of apprentices, trainees, and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended and 29 CFR part 30.

(5) Compliance with Copeland Act requirements. The Contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this Contract.

(6) Contracts and Subcontracts. The Recipient, Subrecipient, the Recipient's, and Subrecipient's contractors and subcontractor shall insert in any Contracts the clauses contained herein in(a)(1) through (10) and such other clauses as the Department of Energy may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The Recipient shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all of the paragraphs in this clause.

(7) Contract termination: debarment. A breach of the Contract clauses in 29 CFR 5.5 may be grounds for termination of the Contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements. All rulings and interpretations of the Davis-Bacon and Related Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this Contract.

(9) Disputes concerning labor standards. Disputes arising out of the labor standards provisions of this Contract shall not be subject to the general disputes clause of this Contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the Recipient, Subrecipient, the Contractor (or any of its subcontractors), and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility.

(i) By entering into this Contract, the Contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the Contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this Contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

(b) Contract Work Hours and Safety Standards Act. As used in this paragraph, the terms laborers and mechanics include watchmen and guards.

(1) Overtime requirements. No Contractor or subcontractor contracting for any part of the Contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages. In the event of any violation of the clause set forth in paragraph (b)(1) of this section, the Contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such Contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory), for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (b)(1) of this section, in the sum of $10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (b)(1) of this section.

(3) Withholding for unpaid wages and liquidated damages. The Department of Energy or the Recipient or Subrecipient shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the Contractor or subcontractor under any such contract or any other Federal contract with the same prime Contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such Contractor or

subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (b)(2) of this section.

(4) Contracts and Subcontracts. The Recipient, Subrecipient, and Recipient's and Subrecipient's contractor or subcontractor shall insert in any Contracts, the clauses set forth in paragraph (b)(1) through (4) of this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The Recipient shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in paragraphs (b)(1) through (4) of this section.

(5) The Contractor or subcontractor shall maintain payrolls and basic payroll records during the course of the work and shall preserve them for a period of three years from the completion of the Contract for all laborers and mechanics, including guards and watchmen, working on the Contract. Such records shall contain the name and address of each such employee, social security number, correct classifications, hourly rates of wages paid, daily and weekly number of hours worked, deductions made, and actual wages paid. The records to be maintained under this paragraph shall be made available by the Contractor or subcontractor for inspection, copying, or transcription by authorized representatives of the Department of Energy and the Department of Labor, and the Contractor or subcontractor will permit such representatives to interview employees during working hours on the job.

(c) Recipient Responsibilities for Davis Bacon Act

(1) On behalf of the Department of Energy (DOE), Recipient shall perform the following functions:

(i) Obtain, maintain, and monitor all Davis Bacon Act (DBA) certified payroll records submitted by the Subrecipients and Contractors at any tier under this Award;

(ii) Review all DBA certified payroll records for compliance with DBA requirements, including applicable DOL wage determinations;

(iii) Notify DOE of any non-compliance with DBA requirements by Subrecipients or Contractors at any tier, including any non-compliances identified as the result of reviews performed pursuant to paragraph (ii) above;

(iv) Address any Subrecipient and any Contractor DBA non-compliance issues; if DBA non-compliance issues cannot be resolved in a timely manner, forward complaints, summary of investigations and all relevant information to DOE;

(v) Provide DOE with detailed information regarding the resolution of any DBA non-compliance issues;

(vi) Perform services in support of DOE investigations of complaints filed regarding noncompliance by Subrecipients and Contractors with DBA requirements;

(vii) Perform audit services as necessary to ensure compliance by Subrecipients and Contractors with DBA requirements and as requested by the Contracting Officer; and

(viii) Provide copies of all records upon request by DOE or DOL in a timely manner.

(d) Rates of Wages

The minimum wages to be paid laborers and mechanics under this award involved in performance of work at the project site, as determined by the Secretary of Labor to be prevailing for the corresponding classes of laborers and mechanics employed on projects of a character similar to the contract work in the pertinent locality, are found at http://www.wdol.gov/, by clicking on "Selecting DBA WDs". The Wage Determination Number(s) and General Decision Number(s) specific to this award are found below. These wage rates are minimum rates and are not intended to represent the actual wage rates that the Contractor may have to pay.

CONSTRUCTION TYPE	WAGE DETERMINATION NUMBER	GENERAL DECISION NUMBER
Building; Heavy	NM1	NM100001 04/09/2010 NM1

35. CONTINGENCY

(a) Contingency Requirement. A minimum amount of Contingency is required for awards selected under Funding Opportunity Announcement DE-FOA-0000096. "Contingency" is defined in the Appendix as: "a provision in the Project Management Plan to mitigate cost and/or schedule risk." Contingency funds must be (a) liquid, (b) immediately available, and (c) unrestricted funds dedicated exclusively to the Project for the purpose of mitigating project performance baseline risk. Contingency funds may come from a variety of sources, as approved by the Contracting Officer on a case-by-case basis in accordance with the Appendix to these Terms and Conditions (Attachment 5).

(b) Minimum Amount of Contingency. Initial Contingency funds shall be not less than 25 percent of the Total Project Cost that begins with Budget Period 2, as more specifically described in Section B(2) of the Appendix to these Special Terms and Conditions (Attachment 5).

(c) Contingency Not Counted Toward Cost Share or DOE Reimbursement. Contingency is in addition to the Total Project Cost and cannot count toward cost share or result in reimbursement by DOE above the share approved in the award.

(d) Appendix. All of the terms and conditions set forth in this provision shall be further subject to the requirements and clarifications of Attachment 5.

Hames, Molly

From: Daniel Sachs [daniel.sachs@sapphireenergy.com]
Sent: Tuesday, September 06, 2011 1:12 PM
To: Anderson, Julie; Wise, Melissa
Cc: Sterner, Christy; Hames, Molly; Cash, James; Moody, Julia
Subject: Further information requests
Attachments: nofa E8-27201.pdf

Julie,

Please find the materials and commentary you have requested below.

Thanks,
Dan

- **Please provide more detail about the strategic reasons for switching from** Redacted Exemption 4 As previously discussed in more detail on our phone conversation of September 2, Sapphire changed its USDA-loan banking partner in July 2011 from Redacted Exemption 4 for strategic reasons. The USDA-loan banking partner will be an important partner to Sapphire for the 10-year tenor of the loan facility, and Sapphire believes that Ex.4 is best-positioned to support Sapphire as it grows over this period. Also, Ex. 4 has extensive experience working with the USDA and other U.S. government financing programs. It has participated in one previous financing under the BioRefinery guarantee program, and is working with the USDA as lead lender under three other conditional commitments.

- **USDA NOFA**: see attached

- **Citation for the regulations applicable the USDA loan guarantee program**: see NOFA

- **Sapphire's debt capacity**:
    - o

Redacted Exemption 4

    - o

Redacted Exemption 4

- **Appropriate balancing of commercial risk**:

Redacted Exemption 4

_____
Daniel Sachs | Sapphire Energy, Inc. | Business Development & Corporate Strategy | +1 (858) 768-4734 (office) | +1 (312) 576-4291 (mobile)

Hames, Molly

From: Redacted Exemption 4
Wednesday, September 14, 2011 10:11 PM
To: Hames, Molly; Redacted Ex. 4 Daniel Sachs; Redacted Exemption 4 Sterner, Christy; Anderson, Julie; Wise, Melissa; Jaime Moreno
Subject: RE: Call with Ex. 4 SEI, & DOE to discuss subordination

This is fine with Ex. 4 We appreciate everyone's time and consideration of our concerns.

-- Redacted Exemption 4

From: Hames, Molly [mailto:molly.hames@go.doe.gov]
Sent: Wednesday, September 14, 2011 8:26 PM
To: Redacted Exemption 4 ; Daniel Sachs; Redacted Exemption 4 Sterner, Christy; Anderson, Julie; Wise, Melissa; Jaime Moreno
Subject: RE: Call with Ex. 4 SEI, & DOE to discuss subordination

Hello,
Attached is the draft property language including the proposed changes we've discussed. The only substantial changes from DOE are in (v) under Subordination. Other than that we made a few formatting changes to the lettering, which you will see.

Please let me know if there are any concerns. I hope everyone has a good night.

Molly Hames
Grants Management Specialist
U.S. Department of Energy
Golden Field Office
1617 Cole Blvd. Golden, CO 80401
Phone: 720-356-1552 ** New Phone Number**
Fax: 720-356-1730

From: Redacted Exemption 4
Sent: Wednesday, September 14, 2011 6:02 PM
To: Redacted Ex. 4; Daniel Sachs; Redacted Exemption 4 Sterner, Christy; Anderson, Julie; Wise, Melissa; Jaime Moreno; Hames, Molly
Subject: RE: Call with Ex. 4 SEI, & DOE to discuss subordination

Ex. 4 would ask that the group consider the following language at the end of Ex. 4:

";

Redacted Exemption 4

Thanks.

-- Redacted Exemption 4

From: Redacted Exemption 4
Sent: Wednesday, September 14, 2011 7:35 PM
To: Redacted Ex. 4; Daniel Sachs; Redacted Exemption 4 Sterner, Christy; julie.anderson@go.doe.gov;

melissa.wise@go.doe.gov; Jaime Moreno; molly.hames@go.doe.gov
Subject: RE: Call with Ex. 4 SEI, & DOE to discuss subordination

Dear All:

I propose the following simple replacement clause (v):

(v) Redacted Exemption 4

I believe no other changes are necessary, since Redacted Exemption 4

Please review and share comments and suggested changes.

Many thanks, everyone, and

Best Regards

Redacted Exemption 4

vCard | Bio | Website

From: Redacted Exemption 4
Sent: Wednesday, September 14, 2011 2:36 AM
To: Daniel Sachs; Redacted Exemption 4 Sterner, Christy; julie.anderson@go.doe.gov; melissa.wise@go.doe.gov; Jaime Moreno; molly.hames@go.doe.gov
Subject: RE: Call with Ex.4 SEI, & DOE to discuss subordination

Sapphire and DOE teams,

Thanks for your time earlier today discussing the Sapphire subordination provisions. Please find attached a revised version of the provisions, marked against the version discussed and hopefully reflecting our conversation. Please let me know if you have any questions or concerns on the attached.

Best regards,

-- Redacted Exemption 4

-----Original Appointment-----
From: Daniel Sachs [mailto:daniel.sachs@sapphireenergy.com]
Sent: Monday, September 12, 2011 3:48 PM

To: Daniel Sachs; Redacted Exemption 4 Sterner, Christy; julie.anderson@go.doe.gov; melissa.wise@go.doe.gov; Jaime Moreno; molly.hames@go.doe.gov
Subject: Call with Ex.4 SEI, & DOE to discuss subordination
When: Tuesday, September 13, 2011 5:30 PM-6:00 PM (GMT-05:00) Eastern Time (US & Canada).
Where: Redacted Exemption 4

<< File: Sapphire DOE Grant Property Encumbrance_(PALIB2_5619911_1).docx >>

Hames, Molly

From: Sterner, Christy
Sent: Thursday, September 15, 2011 5:26 PM
To: Hames, Molly
Subject: FW: Status of Property Subordination Modification

Hi Molly,

I received the email below a few minutes ago. I spoke with Dan as well and they have no problems with the agreed upon provision, as noted in the email below.

Bes t regards,

Christy

From: Daniel Sachs [mailto:daniel.sachs@sapphireenergy.com]
Sent: Thursday, September 15, 2011 5:12 PM
To: Sterner, Christy
Subject: RE: Status of Property Subordination Modification

Christy,

Apologies for the delayed response. Today was a bit more busy than usual.

This provision and the language in general is satisfactory to Sapphire.

Thanks very much for your continued support.

-Dan

Daniel Sachs | Sapphire Energy, Inc. | *Business Development & Corporate Strategy* | +1 (858) 768-4734 (office) | +1 (312) 576-4291 (mobile)

From: Sterner, Christy [mailto:christy.sterner@go.doe.gov]
Sent: Thursday, September 15, 2011 1:17 PM
To: Daniel Sachs; Daniel Schoen Sachs
Subject: Status of Property Subordination Modification

Hi Dan,

I hope all is well with you. It's my understanding from the string of emails that

Redacted Exemption 4

Best regards,

Christy

Christy Sterner
Project Officer
U.S. Department of Energy
Golden Field Office
Phone: 303-275-4720
Fax: 303-275-4753
email: christy.sterner@go.doe.gov

Please note my new phone number, 720-356-1788, effective August 29.

Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3393

May 24, 2011

Mr. Daniel Sachs
Business Development and Corporate Strategy
Sapphire Energy, Inc.
3115 Merryfield Row
San Diego, CA 92121-1125

Re: Encumbrance and Subordination of the U. S. Department of Energy's Interest in Real Property and Equipment Acquired under Cooperative Agreement No. DE-EE0002884, "Sapphire Integrated Algal Biorefinery"

Dear Mr. Sachs:

In accordance with U. S. Department of Energy (DOE) property regulations, title to real property and equipment acquired in whole or in part with DOE financial assistance award funds vests in the recipient, subject to conditions imposed on its use and disposition that recognize a retained DOE interest in the property. More specifically, with respect to a for-profit entity such as Sapphire Energy, Inc. ("Sapphire"), the regulatory limitations provide:

> **§ 600.321 Real property and equipment**
>
> (b) Title. Unless a statute specifically authorizes and the award specifies that title to property vests unconditionally in the recipient, title to real property or equipment vests in the recipient subject to the conditions that the recipient:
>
> (1) Use the real property or equipment for the authorized purposes of the project until funding for the project ceases, or until the property is no longer needed for the purposes of the project;
>
> (2) Not encumber the property without approval of the contracting officer; and
>
> (3) Use and dispose of the property in accordance with paragraphs (d) and (e) of this section.

Paragraphs (d) and (e) of 10 CFR § 600.321 specify, among other things, how real property and equipment may be used during and after the DOE project period, and the means by which a recipient may elect to retain title, without further obligation to DOE, "by compensating the Federal Government for that percentage of the current fair market value of the real property or equipment that is attributable to the Federal participation in the project." § 600.321(f)(iii).

Because DOE recipients may face challenges in obtaining third-party financing when they do not hold unconditional title to real property or equipment, DOE has implemented a process by which a DOE Contracting Officer may consent to a recipient's granting of a priority encumbrance on property in favor of a lender as collateral security for the recipient's responsibilities to such lender. Such consent is at the Contracting Officer's sole discretion and is subject to detailed and pre-established terms and conditions for acceptable encumbrance and subordination. Based on information received to date from Sapphire,

DOE is advised that, without such encumbrance and subordination, Sapphire

Redacted Exemption 4

Subject to receipt of additional information and documentation, DOE is, therefore, willing to consider the encumbrance and subordination of its retained interest in real property and equipment acquired by Sapphire under its cooperative agreement.

Information and documentation necessary for DOE's consideration in making a determination regarding encumbrance and subordination of its property interest may include, but is not necessarily limited to, the following:

- A request from Sapphire discussing the need for DOE to subordinate its interest in real property and equipment including:
- Representation of the effort to secure outside funding;
- A detailed financing plan;
- Identification of the financing party(ies), noting any relation between Sapphire and the financing party(ies), for example, whether the transaction would be at 'arm's length,' whether the financing party is the parent of the recipient, or whether the recipient is an adequately financed subsidiary of the financing party;
- A commitment letter from the independent third-party lender providing for debt financing exclusively for the Project consistent with the financing plan;
- Representation from the third-party lender that the subordination of DOE's property interests is a condition of making the loan;
- Period of the private financing; and
- A representation from the third-party lender that there will be an automatic discharge of the priority lien upon debt satisfaction.

Following receipt of the foregoing, and to the extent the DOE Contracting Officer determines, in her sole discretion, to permit Sapphire to grant an encumbrance on the real property or equipment, DOE may agree (i) that its interest in the property may be encumbered, either *pari passu* or subordinate to such lender's interest in the property; and (ii) to execute and deliver, at Sapphire's expense, such documents and agreements as may be reasonably requested by recipient or such lender to evidence such arrangement, provided that such documents and agreements are reasonably acceptable to DOE.

If you have questions or require additional information, please contact me at 303-275-4907, or Christy Sterner at 303-275-4720.

Sincerely,

/Melissa Y. Wise

Melissa Y. Wise
Contracting Officer

Daniel Sachs

From: Hames, Molly [molly.hames@go.doe.gov]
Sent: Thursday, August 04, 2011 2:26 PM
To: Jaime Moreno; Daniel Sachs
Cc: Wise, Melissa; Sterner, Christy; Warneke, Daniel
Subject: DE-EE0002884 - Subordination of DOE Property Rights

Hello,
This is a reminder email to please submit the following documents regarding the subordination of DOE property rights. We are requesting that these documents be provided no later than Friday, August 12th. If received after this date we cannot guarantee that we will be able to move your project into BP2 by Sept. 30th.

Here is the list of required submissions:
1. A brief one page summary description of the financing strategy and how the proposed funding ties into the project

2. A financial flow chart (diagram)

3. Term Sheet for the Financing Plan

4. Steps Taken by Recipient to Secure Financing

5. Documentation to demonstrate that the Recipient cannot obtain financing for the project without agreement from DOE to subordinate its interest

6. Representation from the third-party lender(s) that the subordination of DOE's property right interests is a condition of making the loan

7. A detailed financing plan acceptable to DOE

8. A commitment letter from the independent third-party lender(s) providing for debt financing exclusively for the project consistent with the Recipient's financing plan

9. The length of the period of financing

10. The anticipated life of the project's capital assets

11. Proposal as to the priority ranking of the DOE's position vis-à-vis the financing parties; where in the line of creditors does the DOE fall in the financing plan

12. An affirmation from the third-party lender(s) that there will be a discharge of the priority lien(s) upon debt satisfaction

13. An explanation of the proposed priority lien, and the circumstances under which the private (third-party(ies)) financing has priority; e.g. loan default, bankruptcy, etc.

If you have questions feel free to contact either myself, Melissa Wise, or Christy Sterner.
Thank you,

Molly Hames
Grants Management Specialist
U.S. Department of Energy

Golden Field Office
1617 Cole Blvd. Golden, CO 80401
Phone: 303-275-4864
Fax: 303-275-4754

To: Mally Hames, Christy Sterner, Niel Rossmeissl
From: Daniel Sachs
Date: 8/10/11
Re: Sapphire Energy application for subordination of DOE Conditional Title

Please see below a list of responses to the information requests made in the email correspondence from Molly Hames (DOE) to Daniel Sachs (Sapphire Energy), dated 8/4/11, titled "DE-EE0002884 - Subordination of DOE Property Rights" and the previously received latter from Melissa Wise dated May 24, 2011. Both items of correspondence are attached herein as Appendix A (Pp. 4-5).

Many answers are contained herein as appendices. For your reference, I have also included the source file for each of these appendices in the cover email to this letter.

1. **A brief summary description of the financing strategy and how the proposed funding ties into the project:**

   Sapphire is funding an Integrated Algal BioRefinery Commercial Demonstration Facility (the "IABR," or "CDF") project with estimated total costs of $

   Redacted Exemption 4

   Sapphire will be funding its $ Redacted Exemption 4 with three primary sources:
   a) Redacted Exemption 4
   b) DOE grant funds: $50 million
   c) Redacted Exemption 4

   Redacted Ex. 4 : In 2010/2011, Sapphire raised over $ Redacted Exemption 4

   DOE Grant: In 2009, the DOE awarded Sapphire $50 million under its grant program.

   Redacted Exemption 4 : Sapphire is in the process of finalizing the closing of the $Ex. 4 project loan with Ex.4 This loan was conceived of in conjunction with the USDA, which will provide a guarantee for 80% of the loan principal under the 9003 BioRefinery Guarantee Program. The loan is Redacted Exemption 4

   Both the DOE grant funds and the Ex.4 may be drawn and are applicable to all $ Ex. 4 of eligible costs.

   The IABR was conceived of in conjunction with the input of both the DOE and the USDA, as part of their positions as Redacted Exemption 4 Over the past 12+ months, Sapphire has worked with both agencies to design and arrangine financing for the project that is accepteable to all parties.

2. **A financial flow chart (diagram):**

   Please see Appendix B: Financial Flow Chart (p. 7)

3. **Term Sheet for the Financing Plan:** Please see:
   - Appendix C: SEI-Ex.4Engagement Letter (Pp. 8-12)
   - Appendix D: SEI-Ex.4Termsheet (Pp. 13-20)

   For the full execution version of each of these, please refer to the attachments to the cover email.

4. **Steps Taken by Recipient to Secure Financing:** Sapphire Energy has taken extensive steps to secure financing for this project.
   - Redacted Exemption 4
   - **Grant**: Since 2009, Sapphire has also worked extensively with the DOE under DOE grant program.

- **Debt**: Sapphire has conducted

Redacted Exemption 4

5. **Documentation to demonstrate that the Recipient cannot obtain financing for the project without agreement from DOE to subordinate its interest:**

   Please see Appendix E: Letter fromEx.4 (p. 21)

6. **Representation from the third-party lender(s) that the subordination of DOE's property right interests is a condition of making the loan:**

   Please see Appendix E: Letter fromEx.4 (p. 21)

7. **A detailed financing plan acceptable to DOE:**

   Please see Appendix F: Sources and Uses Projections (p. 22)

8. **A commitment letter from the independent third-party lender(s) providing for debt financing exclusively for the project consistent with the Recipient's financing plan:**

   Please see Appendix E: Letter fromEx.4 (p. 21)

9. **The length of the period of financing:**

   The length of the period of financing will be Redacted Exemption 4

10. **The anticipated life of the project's capital assets:**

    The project will have an anticipated life of Ex. 4

11. **Proposal as to the priority ranking of the DOE's position vis-à-vis the financing parties; where in the line of creditors does the DOE fall in the financing plan:**

    The Department of Energy's Conditional Title will be

    Redacted Exemption 4

12. **An affirmation from the third-party lender(s) that there will be a discharge of the priority lien(s) upon debt satisfaction:**

    Please see Appendix E: Letter fromEx.4 (p. 21)

13. **An explanation of the proposed priority lien, and the circumstances under which the private (third-party(ies)) financing has priority; e.g. loan default, bankruptcy, etc.:**

    The loan is being made by

    Redacted Exemption 4

Should you have questions regarding any of the information provided please contact my office.

Daniel Sachs
Business Development and Corporate Strategy
Sapphire Energy
3115 Merryfield Row, San Diego, CA 92121
Phone: 858.768.4734
Email: Daniel.sachs@sapphireenergy.com

Appendix A: Correspondence titled: DE-EE0002884 - Subordination of DOE Property Rights

Daniel Sachs

From: Hames, Molly [molly.hames@go.doe.gov]
Sent: Thursday, August 04, 2011 2:26 PM
To: Jaime Moreno; Daniel Sachs
Cc: Wise, Melissa; Sterner, Christy; Warneke, Daniel
Subject: DE-EE0002884 - Subordination of DOE Property Rights

Hello,
This is a reminder email to please submit the following documents regarding the subordination of DOE property rights. We are requesting that these documents be provided no later than Friday, August 12th. If received after this date we cannot guarantee that we will be able to move your project into BP2 by Sept. 30th.

Here is the list of required submissions:
1. A brief one page summary description of the financing strategy and how the proposed funding ties into the project

2. A financial flow chart (diagram)

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6. Representation from the third-party lender(s) that the subordination of DOE's property right interests is a condition of making the loan

7. A detailed financing plan acceptable to DOE

8. A commitment letter from the independent third-party lender(s) providing for debt financing exclusively for the project consistent with the Recipient's financing plan

9. The length of the period of financing

10. The anticipated life of the project's capital assets

11. Proposal as to the priority ranking of the DOE's position vis-à-vis the financing parties; where in the line of creditors does the DOE fall in the financing plan

12. An affirmation from the third-party lender(s) that there will be a discharge of the priority lien(s) upon debt satisfaction

13. An explanation of the proposed priority lien, and the circumstances under which the private (third-party(ies)) financing has priority; e.g. loan default, bankruptcy, etc.

If you have questions feel free to contact either myself, Melissa Wise, or Christy Sterner.
Thank you,

Molly Hames
Grants Management Specialist
U.S. Department of Energy

1

Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3393

May 24, 2011

Mr. Daniel Sachs
Business Development and Corporate Strategy
Sapphire Energy, Inc.
3115 Merryfield Row
San Diego, CA 92121-1125

Re: Encumbrance and Subordination of the U. S. Department of Energy's Interest in Real Property and Equipment Acquired under Cooperative Agreement No. DE-EE0002884, "Sapphire Integrated Algal Biorefinery"

Dear Mr. Sachs:

In accordance with U. S. Department of Energy (DOE) property regulations, title to real property and equipment acquired in whole or in part with DOE financial assistance award funds vests in the recipient, subject to conditions imposed on its use and disposition that recognize a retained DOE interest in the property. More specifically, with respect to a for-profit entity such as Sapphire Energy, Inc. ("Sapphire"), the regulatory limitations provide:

> **§ 600.321 Real property and equipment**
>
> (b) Title. Unless a statute specifically authorizes and the award specifies that title to property vests unconditionally in the recipient, title to real property or equipment vests in the recipient subject to the conditions that the recipient:
>
> (1) Use the real property or equipment for the authorized purposes of the project until funding for the project ceases, or until the property is no longer needed for the purposes of the project;
>
> (2) Not encumber the property without approval of the contracting officer; and
>
> (3) Use and dispose of the property in accordance with paragraphs (d) and (e) of this section.

Paragraphs (d) and (e) of 10 CFR § 600.321 specify, among other things, how real property and equipment may be used during and after the DOE project period, and the means by which a recipient may elect to retain title, without further obligation to DOE, "by compensating the Federal Government for that percentage of the current fair market value of the real property or equipment that is attributable to the Federal participation in the project." § 600.321(f)(iii).

Because DOE recipients may face challenges in obtaining third-party financing when they do not hold unconditional title to real property or equipment, DOE has implemented a process by which a DOE Contracting Officer may consent to a recipient's granting of a priority encumbrance on property in favor of a lender as collateral security for the recipient's responsibilities to such lender. Such consent is at the Contracting Officer's sole discretion and is subject to detailed and pre-established terms and conditions for acceptable encumbrance and subordination. Based on information received to date from Sapphire,

DOE is advised that, without such encumbrance and subordination, Sapphire

Redacted Exemption 4

Subject to receipt of additional information and documentation, DOE is, therefore, willing to consider the encumbrance and subordination of its retained interest in real property and equipment acquired by Sapphire under its cooperative agreement.

Information and documentation necessary for DOE's consideration in making a determination regarding encumbrance and subordination of its property interest may include, but is not necessarily limited to, the following:

- A request from Sapphire discussing the need for DOE to subordinate its interest in real property and equipment including:
- Representation of the effort to secure outside funding;
- A detailed financing plan;
- Identification of the financing party(ies), noting any relation between Sapphire and the financing party(ies), for example, whether the transaction would be at 'arm's length,' whether the financing party is the parent of the recipient, or whether the recipient is an adequately financed subsidiary of the financing party;
- A commitment letter from the independent third-party lender providing for debt financing exclusively for the Project consistent with the financing plan;
- Representation from the third-party lender that the subordination of DOE's property interests is a condition of making the loan;
- Period of the private financing; and
- A representation from the third-party lender that there will be an automatic discharge of the priority lien upon debt satisfaction.

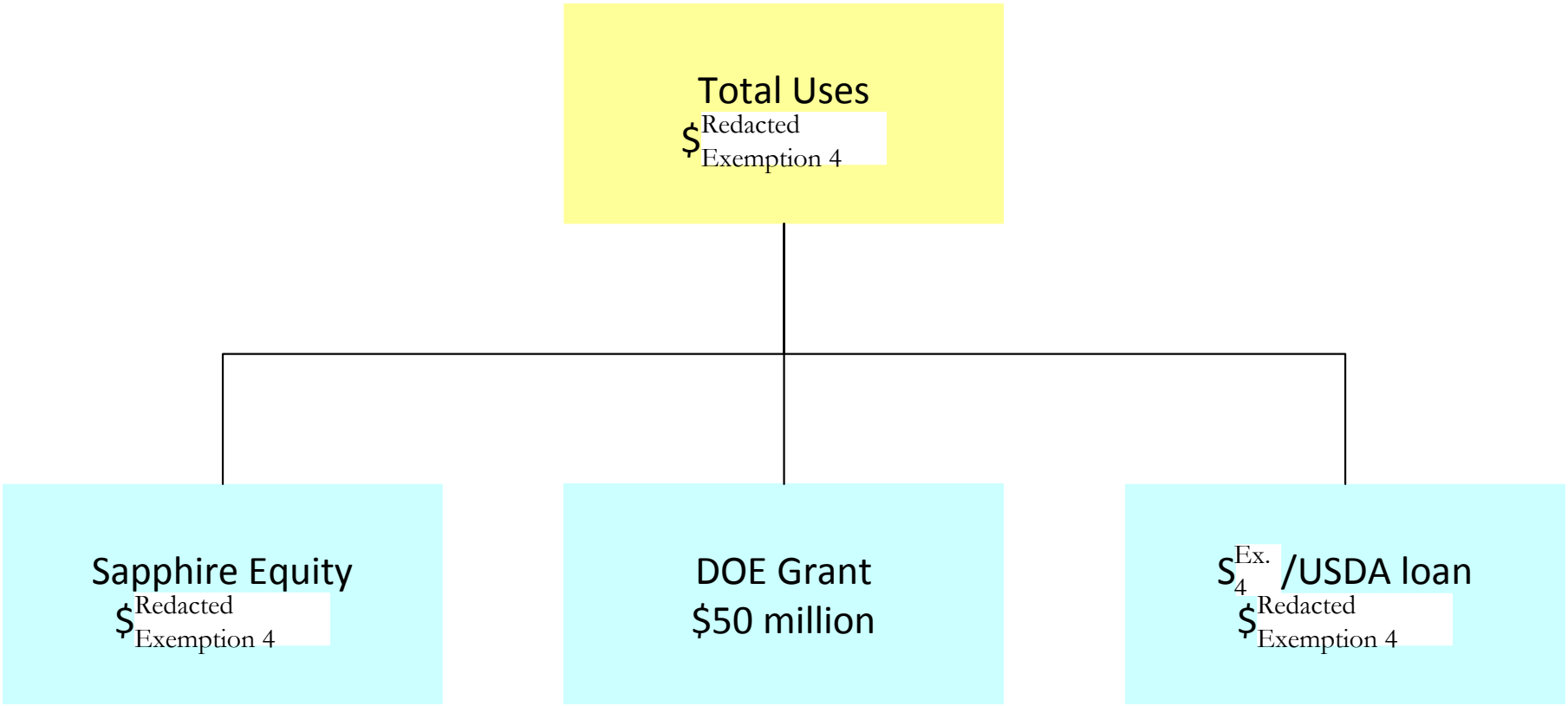
Following receipt of the foregoing, and to the extent the DOE Contracting Officer determines, in her sole discretion, to permit Sapphire to grant an encumbrance on the real property or equipment, DOE may agree (i) that its interest in the property may be encumbered, either *pari passu* or subordinate to such lender's interest in the property; and (ii) to execute and deliver, at Sapphire's expense, such documents and agreements as may be reasonably requested by recipient or such lender to evidence such arrangement, provided that such documents and agreements are reasonably acceptable to DOE.

If you have questions or require additional information, please contact me at 303-275-4907, or Christy Sterner at 303-275-4720.

Sincerely,

Melissa Y. Wise
Contracting Officer

Sapphire Energy Financing for IABR



Appendix C: SEI- Ex. 4 Engagement Letter

July 19, 2011

Sapphire Energy, Inc.
3115 Merryfield Row
San Diego, CA 92121
Attention: Chief Financial Officer

RE: SENIOR SECURED CREDIT FACILITY IN CONNECTION WITH SAPPHIRE ENERGY, INC.

Ladies and Gentlemen:

Redacted Exemption 4 is pleased to be engaged by Sapphire Energy, Inc (the "Company" or the "Borrower") to structure and underwrite an up to $ Ex.4 project financing (the "Facility") for the construction of an algae-based diesel biofuels plant in Columbus, New Mexico (the "Project").

Redacted Exemption 4

Facility Structure

Redacted Exemption 4

Scope of Services

Redacted Exemption 4

Compensation

Redacted Exemption 4

Reimbursement of Expenses

Redacted Exemption 4

Limitations on Role

Redacted Exemption 4

Indemnification

Redacted Exemption 4

Participation

Redacted Exemption 4

Confidentiality

Redacted Exemption 4

Redacted Exemption 4

Information

Redacted Exemption 4

Advertising

Redacted Exemption 4

Termination

Redacted Exemption 4

Survival

Redacted Exemption 4

Governing Law, Jurisdiction, etc.

Redacted Exemption 4

Redacted Exemption 4

Very truly yours,

Redacted Exemption 4

Appendix D: SEI- Ex.4 Termsheet

SENIOR SECURED CREDIT FACILITIES
DRAFT LOAN AGREEMENT SUMMARY OF TERMS AND CONDITIONS

The Draft Loan Agreement Terms and Conditions below are being provided by Redacted Exemption 4 *part of Sapphire Energy's application to the USDA to provide financing for its Integrated Algal Biorefinery ("IABR") under the 9003 BioRefinery Assistance Program. This draft constitutes only a general, non-binding expression on* Ex.4 *part and is subject to, but not limited to, due diligence and credit approval by* Ex.4 *in its sole discretion, including documentation acceptable to* Ex.4 *and its counsel. The final terms and conditions of any future commitment by* Ex.4 *are not limited to the terms and conditions set forth herein and this letter does not set forth* Ex.4 *full requirements as to the Borrower and the conditions to making the Loans.*

July 22, 2011

Senior Secured Credit Facilities
Draft Loan Agreement
Summary Terms and Conditions

Borrower: Sapphire Energy Inc. (variously referred to herein as "Sapphire Energy," the "Borrower" or the "Company").

Lender of Record:

Redacted Exemption 4

Credit Facilities:

USDA Guarantee:

USDA Fees:

Commitment & Arrangement Fee:

Redacted Exemption 4

Servicing Fee

Use of Proceeds:

Ranking:

Final Maturity:

Amortization:

Interest Rates:

Redacted Exemption 4

Closing Date:

Closing Conditions:

Participation:

Redacted Exemption 4

Placement Agent

Loan Disbursement:

Equity Commitments and Disbursement:

Prepayments:

Redacted Exemption 4

Security:

Financial and Business Information:

Redacted Exemption 4

Redacted Exemption 4

Financial Covenants:

Affirmative and Negative Covenants:

Expenses

Events of Default:

Subject to

Redacted Exemption 4

This letter is for discussion purposes only and does not represent a commitment of any nature by Ex.4 to provide financing to Sapphire Energy. It is provided to you solely for the purpose described herein, and may not be disclosed to or relied upon by any other party without Ex.4 prior written consent.
If the basic terms and conditions described above are acceptable, please so indicate by signing the enclosed copy of this summary of terms and conditions. Receipt by Ex.4 of this letter will constitute a) your instruction to Ex.4 to commence (at your expense) documentation which shall supersede this letter, b) your agreement to cooperate with Ex.4 and promptly submit any due diligence materials Ex.4 may require and c) your agreement to pay for all out-of-pocket expenses and charges expended by Ex.4 in connection with this proposed transaction (including the reasonable fees and expenses of Ex.4 outside counsel and other consultants). The

Redacted Exemption 4

The "Work Fee" is to compensate Ex.4 for its efforts pertaining to its credit due diligence and the preparation of its credit approval documentation and initial interactions with USDA, and to reimburse Ex.4 for any internal costs it may incur that are not recoverable pursuant to clause (c) of the preceding sentence. Notwithstanding the foregoing, the Work Fee will be Redacted Exemption 4

On behalf of Redacted Ex.4 we are delighted to make this proposal to you and look forward to developing a long term relationship with Sapphire Energy.

Redacted Exemption 4

Appendix E: SEI Redacted Ex. 4 Termsheet

Redacted Exemption 4

August 9, 2011

US Department of Energy
Attention: Neil Rossmeissl
CC: Christy Sterner, Molly Hames
US DOE HQ OBP Liaison
Washington, D.C.
(202) 586-8668
Neil.Rossmeissl@hq.doe.gov

Re: Sapphire Energy, Inc.

Dear Sir:

Redacted Exemption 4 is working with Sapphire Energy, Inc. ("Sapphire") on a project financing for their IABR commercial demonstration facility. This financing contemplates

Redacted Exemption 4

As part of this request, we hereby provide the following information and representations:

- A copy of the accepted Loan Agreement Summary of Terms and Conditions by and between Redacted Ex. 4 and Sapphire is attached. Please note the provisions referencing the required security position as well as those requiring that the use of funds pertain exclusively toward the project.
- Redacted Exemption 4
-
-

Please let us know if you have any questions or comments.

Redacted Exemption 4

Appendix F: Sources and Uses Projections

IABR sources and uses - quarterly projections 8/10/2011

	2010 Mar	2010 Jun	2010 Sep	2010 Dec	2011 Mar	2011 Jun	2011 Sep	2011 Dec	2012 Mar	2012 Jun	2012 Sep	2012 Dec	2013 Mar	2013 Jun	2013 Sep	2013 Dec	2014 Mar	2014 Jun	2014 Sep	2014 Dec
Uses																				
Real estate																				
Construction																				
Engineering & design																				
Operations																				
Total																				
cumulative																				
Sources																				
DOE Grant	-	-	1,983	2,373	585	1,562	11,722	4,279	5,071	1,611	1,154	2,448	1,785	2,256	5,492	3,655	1,392	796	1,561	-
Redacted Exemption 4																				
Total																				
cumulative																				
cumulative federal																				
federal %																				

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

July 20, 2011

Sapphire Energy, Inc.
3115 Merryfield Row
San Diego, CA 92121
Attention: Chief Financial Officer

RE: SENIOR SECURED CREDIT FACILITY IN CONNECTION WITH SAPPHIRE ENERGY, INC.

Ladies and Gentlemen:

Redacted Exemption 4 is pleased to be engaged by Sapphire Energy, Inc (the "Company" or the "Borrower") to structure and underwrite an up to $ Redacted Ex. 4 project financing (the "Facility") for the construction of an algae-based diesel biofuels plant in Columbus, New Mexico (the "Project").

Redacted Exemption 4

Facility Structure

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Scope of Services

Redacted Exemption 4

Compensation

Redacted Exemption 4

Reimbursement of Expenses

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Limitations on Role

Redacted Exemption 4

Indemnification

Redacted Exemption 4

Redacted Exemption 4

Participation

Redacted Exemption 4

Confidentiality

Redacted Exemption 4

Information

Redacted Exemption 4

Redacted Exemption 4

Advertising

Redacted Exemption 4

Termination

Redacted Exemption 4

Survival

Redacted Exemption 4

Governing Law, Jurisdiction, etc.

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Very truly yours,

Redacted Exemption 4

Agreed to and Accepted by (including the attached Term Sheet) as of the date hereof:

Sapphire Energy, Inc.

By: _____
Name: JAMES LAMBRIGHT
Title: CFO & PRES-DMTC.

Address for Notices:

Sapphire Energy, Inc.
3115 Merryfield Row
San Diego, CA 92121
Attention: Chief Financial Officer
Telephone: 858-768-4724
Facsimile:

Redacted Exemption 4

SENIOR SECURED CREDIT FACILITIES
DRAFT LOAN AGREEMENT SUMMARY OF TERMS AND CONDITIONS

The Draft Loan Agreement Terms and Conditions below are being provided by Redacted Exemption 4 Ex. 4 *as part of Sapphire Energy's application to the USDA to provide financing for its Integrated Algal Biorefinery ("IABR") under the 9003 BioRefinery Assistance Program. This draft constitutes only a general, non-binding expression on* Ex. 4 *part and is subject to, but not limited to, due diligence and credit approval by* Ex. 4 *in its sole discretion, including documentation acceptable to* Ex. 4 *and its counsel. The final terms and conditions of any future commitment by* Ex.4 *are not limited to the terms and conditions set forth herein and this letter does not set forth* Ex. 4 *full requirements as to the Borrower and the conditions to making the Loans.*

July 22, 2011

Senior Secured Credit Facilities
Draft Loan Agreement
Summary Terms and Conditions

Borrower:	Sapphire Energy Inc. (variously referred to herein as "Sapphire Energy," the "Borrower" or the "Company").
Lender of Record:	

Redacted Exemption 4

Credit Facilities:

USDA Guarantee:

USDA Fees:

Commitment & Arrangement Fee:

Redacted Exemption 4

Servicing Fee

Use of Proceeds:

Ranking:

Final Maturity:

Amortization:

Interest Rates:

Closing Date:

Closing Conditions:

Redacted Exemption 4

Participation:

Redacted Exemption 4

Placement Agent

Loan Disbursement:

Equity Commitments and Disbursement:

Prepayments:

Security:

Redacted Exemption 4

Financial and Business Information:

Redacted Exemption 4

Financial Covenants:

Affirmative and Negative Covenants:

Redacted Exemption 4

Expenses

Events of Default:

Subject to

This letter is for discussion purposes only and does not represent a commitment of any nature by Ex.4 to provide financing to Sapphire Energy. It is provided to you solely for the purpose described herein, and may not be disclosed to or relied upon by any other party without Ex. 4 prior written consent.

If the basic terms and conditions described above are acceptable, please so indicate by signing the enclosed copy of this summary of terms and conditions. Receipt by Ex. 4 of this letter will constitute a) your instruction to Ex. 4 to commence (at your expense) documentation which shall supersede this letter, b) your agreement to cooperate with Ex. 4 and promptly submit any due diligence materials Ex. 4 may require and c) your agreement to pay for all out-of-pocket expenses and charges expended by Ex. 4 in connection with this proposed transaction (including the reasonable fees and expenses of Ex. 4 outside counsel an other consultants). The "Work Fee" of $100,000 shall be earned and payment shall be required two (2) business days after the earlier of: a) Ex. 4 named as Lender of Record by the USDA; or b) 10 days after the date of acceptance of this summary of terms and conditions by Ex.4 and the Borrower and is payable regardless of whether financial closing occurs. The "Work Fee" is to compensate Ex. 4 for its efforts pertaining to its credit due diligence and the preparation of its credit approval documentation and initial interactions with USDA, and to reimburse Ex.4 for any internal costs it may incur that are not recoverable pursuant to clause (c) of the preceding sentence. Notwithstanding the foregoing, the Work Fee will be credited towards the payment of the Commitment and Arrangement Fee at closing.

On behalf of Ex. 4 , we are delighted to make this proposal to you and look forward to developing a long term relationship with Sapphire Energy.

Redacted Exemption 4

ACKNOWLEDGED AND AGREED TO:

Sapphire Energy

BY: _____

NAME: JAMES LAMBRIGHT

TITLE: CFO & PRES-INTL.

DATE: 7/25/11

August 9, 2011

US Department of Energy
Attention: Neil Rossmeissl
CC: Christy Sterner, Molly Hames
US DOE HQ OBP Liaison
Washington, D.C.
(202) 586-8668
Neil.Rossmeissl@hq.doe.gov

Re: Sapphire Energy, Inc.

Dear Sir:

Redacted Exemption 4 is working with Sapphire Energy, Inc. ("Sapphire") on a project financing for their IABR commercial demonstration facility. This financing contemplates

Redacted Exemption 4

As part of this request, we hereby provide the following information and representations:

- A copy of the accepted Loan Agreement Summary of Terms and Conditions by and between Redacted Ex. 4 and Sapphire is attached. Please note the provisions referencing the required security position as well as those requiring that the use of funds pertain exclusively toward the project.
- Redacted Exemption 4
-
-

Please let us know if you have any questions or comments.

Redacted Exemption 4

IABR sources and uses - quarterly projections

8/10/2011

	2010 Mar	2010 Jun	2010 Sep	2010 Dec	2011 Mar	2011 Jun	2011 Sep	2011 Dec	2012 Mar	2012 Jun	2012 Sep	2012 Dec	2013 Mar	2013 Jun	2013 Sep	2013 Dec	2014 Mar	2014 Jun	2014 Sep	2014 Dec
Uses																				
Real estate																				
Construction																				
Engineering & design																				
Operations																				
Total																				
cumulative																				
Sources																				
DOE Grant	-	-	1,983	2,373	585	1,562	11,722	4,279	5,071	1,611	1,154	2,448	1,785	2,256	5,492	3,655	1,392	796	1,561	-
SEI																				
Total																				
cumulative																				
cumulative federal																				
federal %																				

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Applicant Name: Sapphire Energy, Inc. Award Number: DE-EE0002884 / 007 Attachment 4

Budget Information - Non Construction Programs

OMB Approval No. 0348-0044

Section A - Budget Summary

Grant Program Function or Activity	Catalog of Federal Domestic	Estimated Unobligated Funds		New or Revised Budget		
		Federal	Non-Federal	Federal	Non-Federal	Total
(a)	(b)	(c)	(d)	(e)	(f)	(g)
1. IABR BP-1	81.087			$9,145,000	Redacted Exemption 4	
2. IABR BP-2	81.087			$39,019,162		
PHASE 1 BP-2 SUBTOTAL	81.087			$21,954,072		
PHASE 2 BP-2 SUBTOTAL	81.087			$7,107,744		
PHASE 3 BP-2 SUBTOTAL	81.087			$9,957,346		
3. IABR BP-3	81.087			$1,560,838		
4.						
5. Totals		$0	$0	$49,725,000		

Section B - Budget Categories

6. Object Class Categories	Grant Program, Function or Activity						Total (5)
	(1) IABR BP-1	(2) IABR BP-2			(3) IABR BP-3	(4)	
		PHASE 1	PHASE 2	PHASE 3			
a. Personnel	Redacted Exemption 4						
b. Fringe Benefits							
c. Travel							
d. Equipment							
e. Supplies							
f. Contractual							
g. Construction							
h. Other							
i. Total Direct Charges (sum of 6a-6h)							
j. Indirect Charges							
k. **Totals** (sum of 6i-6j)							
7. Program Income	$0	$0	$0	$0	$0		$0

Previous Edition Usable

SF-424A (Rev. 4-92)
Prescribed by OMB Circular A-102

PMC123.1 - Budget Justification for SF 424A Budget

Instructions and Summary

Award Number: DE-EE0002884
Award Recipient: Sapphire Energy, Inc.

Date of Submission: 8/5/2011
Form submitted by: Sapphire Energy, Inc.
(May be award recipient or

Please read the instructions on each page before starting.
If you have any questions, please ask your DOE contact. It will save you time!

On this form, provide detailed support for the estimated project costs identified on the SF-424A form (Budget).

- **The dollar amounts on this page must match the amounts on the associated SF-424A.**
- **The award recipient and each sub-recipient with estimated costs of $100,000 or more must complete this form and a SF-424A form.**
- **The total budget presented on this form and on the SF424A must include both Federal (DOE), and Non-Federal (cost share) portions, thereby reflecting TOTAL PROJECT COSTS proposed.**
- **For costs in each Object Class Category on the SF-424A, complete the corresponding worksheet on this form (tab at the bottom of the page).**
- **All costs incurred by the preparer's sub-recipients, vendors, contractors, consultants and Federal Research and Development Centers (FFRDCs), should be entered only in section f. Contractual. All other sections are for the costs of the preparer only.**

SUMMARY OF BUDGET CATEGORY COSTS PROPOSED

(Note: The values in this summary table are from entries made in each budget category sheet.)

CATEGORY	Budget Period 1 Costs	Budget Period 2 Costs PHASE I	PHASE II	PHASE III	Budget Period 3 Costs	Total Costs	Project Costs %	Comments (Add comments as needed)
a. Personnel	Redacted Exemption 4							
b. Fringe Benefits								
c. Travel								
d. Equipment								
e. Supplies								
f. Contractual								
Sub-recipient								
FFRDC								
Vendor								
Total Contractual								
g. Construction								
h. Other Direct Costs								
i. Indirect Charges								
Total Project Costs								

Additional Explanations/Comments (as necessary)

BP-2	Total	DOE Share	Sapphire Share
Phase I	Redacted	$21,954,072	$ Redacted
Phase II	Exemption 4	$7,107,744	$ Exemption 4
Phase III		$9,957,346	$
		$39,019,162	$

a. Personnel

PLEASE READ!!!

List costs solely for employees of the entity completing this form (award recipient or sub-recipient). All other personnel costs (of subrecipients or other contractual efforts of the entity preparing this) must be included under f., Contractual. This includes all consultants and FFRDCs.

Identify positions to be supported. Key personnel should be identified by title. All other personnel should be identified either by title or a group category. State the amounts of time (e.g., hours or % of time) to be expended, the composite base pay rate, total direct personnel compensation and identify the rate basis (e.g., actual salary, labor distribution report, technical estimate, state civil service rates, etc.).

Add rows as needed. Formulas/calculations will need to be entered by the preparer of this form. Please enter formulas as shown in the example.

Task # and Title	Position Title	Budget Period 1			Budget Period 2			Budget Period 3			Project Total Hours	Project Total Dollars	Rate Basis
		Time (Hours)	Pay Rate ($/Hr)	Total Budget Period 1	Total Phase I Budget	Total Phase II Budget	Total Phase III Budget	Time (Hours)	Pay Rate ($/Hr)	Total Budget Period 3			
Sapphire Project Management and Engineering													
	Redacted Exemption 4												
	Total Personnel Costs												

Additional Explanations/Comments (as necessary)

Budget Period 2 Detail	Bp-2 Pay Rate	Phase I Hrs	Phase II Hrs	Phase III Hrs	Total BP-2 Hrs	Total BP-2 Dollars
Redacted Exemption 4						
Subtotals						

b. Fringe Benefits

	Budget Period 1	Budget Period 2			Budget Period 3	Total
		Phase I	Phase II	Phase III		
Rate applied:	Redacted Exemption 4					
Total fringe requested:						

A federally approved fringe benefit rate agreement, or a proposed rate supported and agreed upon by DOE for estimating purposes is required if reimbursement for fringe benefits is requested. Please check (X) one of the options below and provide the requested information. Calculate the fringe rate and enter the total amount in Section B, line 6.b. ("Fringe Benefits") of form SF-424A.

____ **A fringe benefit rate has been negotiated with, or approved by, a federal government agency. A copy of the latest rate agreement is included with this application, and will be provided electronically to the Contracting Officer for this project.**
**In the area designated below, identify the full calculations used to derive the total fringe costs. See further information below.*

X **There is not a current, federally approved rate agreement negotiated and available.**
*When this option is checked, the entity preparing this form shall submit a rate proposal in the format provided at the following website, or a format that provides the same level of information and which will support the rates being proposed for use in performance of the proposed project. Go to https://www.eere-pmc.energy.gov/forms.aspx and select PMC 400.2 Sample Rate Proposal. * In the area designated below, identify the full calculations used to derive the total fringe costs. See further information below.*

Additional explanation/comments (as necessary)

*IMPORTANT: In the space provided below (or as an attachment) provide a complete explanation and the full calculations used to derive the total fringe costs. If the total fringe costs are a cumulative amount of more than one calculation or rate application, the explanation and calculations should identify all rates used, along with the base they were applied to (and how the base was derived), and a total for each (along with grand total). The rates and how they are applied should not be averaged to get one fringe cost percentage. NOTE: The fringe benefit rate should be applied to both the Federal Share and Recipient Cost Share.

		General Fringe	R&D Staff OH
BP-1 (2010)			Redacted Exemption 4
R&D Staff			
Non R&D Staff			

		General Fringe	R&D Staff OH
BP-1 (2011)			Redacted Exemption 4
R&D Staff			
Non R&D Staff			
BP-1 TOTAL	Redacted Exemption 4		

		General Fringe	R&D Staff OH
BP-2			Redacted Exemption 4
R&D Staff			
Non R&D Staff			
BP-2 TOTAL	Redacted Exemption 4		

c. Travel

PLEASE READ!!!

Provide travel detail as requested below, identifying total Foreign and Domestic Travel as separate items. Purpose of travel are items such as professional conference, DOE sponsored meeting, project management meeting, etc. The Basis for Estimating Costs are items such as past trips, current quotations, Federal Travel Regulations, etc.

All listed travel must be necessary for performance of the Statement of Project Objectives.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

Purpose of travel	No. of Travelers	Depart From (not required for domestic travel)	Destination (not required for domestic travel)	No. of Days	Cost per Traveler	Cost per Trip	Basis for Estimating Costs
Budget Period 1							
Domestic Travel							
Domestic Travel subtotal							
International Travel							
International Travel subtotal							
Budget Period 1 Total							
Budget Period 2							
Domestic Travel							
Domestic Travel subtotal							
PHASE I SUBTOTAL							
PHASE II SUBTOTAL							
PHASE III SUBTOTAL							
Budget Period 2 Total							
Budget Period 3							
Domestic Travel							
						$0	
Domestic Travel subtotal						$0	
International Travel							
						$0	
International Travel subtotal						$0	
Budget Period 3 Total						**$0**	
PROJECT TOTAL							

Redacted Exemption 4

Additional Explanations/Comments (as necessary)

d. Equipment

PLEASE READ!!!

Equipment is generally defined as an item with an acquisition cost greater than $5,000 and a useful life expectancy of more than one year. Further definitions can be found at 10 CFR 600 found on the PMC Recipient Resources Forms page at https://www.eere-pmc.energy.gov/Forms.aspx#regs .
List all proposed equipment below, providing a basis of cost such as vendor quotes, catalog prices, prior invoices, etc., and briefly justifying its need as it applies to the Statement of Project Objectives. If it is existing equipment, and the value of its contribution to the project budget is being shown as cost share, provide logical support for the estimated value shown. If it is new equipment which will retain a useful life upon completion of the project, provide logical support for the estimated value shown.

For equipment over $50,000 in price, also include a copy of the associated vendor quote or catalog price list.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

Equipment Item	Qty	Unit Cost	Total Cost	Basis of Cost	Justification of need
Budget Period 1					
Pretreatment Unit	Redacted Exemption 4				Key equipment to provide demonstration scale testing
Extraction Unit					Key equipment to provide demonstration scale testing
Budget Period 1 Total					
Budget Period 2					
			$0		
			$0		
			$0		
			$0		
Budget Period 2 Total			$0		
Budget Period 3					
			$0		
			$0		
			$0		
			$0		
Budget Period 3 Total			$0		
PROJECT TOTAL	Redacted Exemption 4				

Additional Explanations/Comments (as necessary)

e. Supplies

PLEASE READ!!!

Supplies are generally defined as an item with an acquisition cost of $5,000 or less and a useful life expectancy of less than one year. Supplies are generally consumed during the project performance. Further definitions can be found at 10 CFR 600 found on the PMC Recipient Resources Forms page at https://www.eere-pmc.energy.gov/Forms.aspx#regs.

List all proposed supplies below, providing a bases of cost such as vendor quotes, catalog prices, prior invoices, etc., and briefly justifying the need for the Supplies as they apply to the Statement of Project Objectives. Note that Supply items must be direct costs to the project at this budget category, and not duplicative of supply costs included in the indirect pool that is the basis of the indirect rate applied for this project.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

General Category of Supplies	Qty	Unit Cost	Total Cost	Basis of Cost	Justification of need
Budget Period 1					
			Redacted Exemption 4		
Budget Period 1 Total					
Budget Period 2					
			Redacted Exemption 4		
PHASE I SUBTOTAL					
PHASE II SUBTOTAL					
PHASE III SUBTOTAL					
Budget Period 2 Total					
Budget Period 3					
			$0		
			$0		
			$0		
			$0		
Budget Period 3 Total			$0		
PROJECT TOTAL			Redacted Exemption 4		

Additional Explanations/Comments (as necessary)

f. Contractual

PLEASE READ!!!

The entity completing this form must provide all costs related to sub-recipients, vendors, contractors, consultants and FFRDC partners in the applicable boxes below.

Sub-recipients (partners, sub-awardees):

For each sub-recipient with total project costs of $100,000 or more, a separate SF-424A budget and PMC123.1 budget justification form must be submitted. These sub-recipient forms may be completed by either the sub-recipients themselves or by the preparer of this form. The budget totals on the sub-recipient's forms must match the sub-recipient entries below.

The preparer of this form need only provide further support of the completed sub-recipient budget forms as they deem necessary. The support to justify the budgets of sub-recipients with estimated costs less than $100,000 may be in any format, and at a minimum should provide what Statement of Project Objectives task(s) are being performed, the purpose/need for the effort, and a basis of the estimated costs that is considered sufficient for DOE evaluation.

Vendors (includes contractors and consultants):

List all vendors, contractors and consultants supplying commercial supplies or services used to support the project. The support to justify vendor costs (in any amount) should provide the purpose for the products or services and a basis of the estimated costs that is considered sufficient for DOE evaluation.

Federal Research and Development Centers (FFRDCs):

For FFRDC partners, award recipient will provide a Field Work Proposal (if not already provided with the original application), along with the FFRDC labor mix and hours, by category and FFRDC major purchases greater than $25,000, including Quantity, Unit Cost, Basis of Cost, and Justification. The award recipient may allow the FFRDC to provide this information directly to DOE.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

Sub-Recipient Name/Organization	Purpose/Tasks in SOPO	Budget Period 1 Costs	Change	Budget Period 1 Revised Costs (to Date) (to Go)	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
NMSU	Pond Design Research	Redacted Exemption 4					
	Sub-total						

Vendor Name/Organization	Product or Service, Purpose/Need and Basis of Cost (Provide additional support at bottom of page as needed)	Budget Period 1 Costs	Change	Budget Period 1 Revised Costs (to Date) (to Go)	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
	Redacted Exemption 4						
Luna County Electrical Coop							
Harris Group							
Brown and Caldwell							
Geomatrix							
Geomatrix							

Sub-Recipient Name/Organization	Purpose/Tasks in SOPO	Budget Period 1 Costs	Change	Budget Period 1 Revised Costs (to Date)	(to Go)	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
	Redacted Exemption 4							
Autodesk								
Geomatrix								
Harris Group								
Brown and Caldwell								
Various								
Geomatrix								
Geomatrix								
Harris Group								
Brown and Caldwell								
AMEC plc								
AMEC plc								
Harris Group								
Brown and Caldwell								
Geomatrix								
Redacted Exemption 4								
AMEC plc								
Harris Group								
Brown and Caldwell								
Harris Group								
Brown and Caldwell								
Redacted Exemption 4								
AMEC plc								
Harris Group								
Brown and Caldwell								
Harris Group								
Brown and Caldwell								
Redacted Exemption 4								
AMEC plc								

Sub-Recipient Name/Organization	Purpose/Tasks in SOPO	Budget Period 1 Costs	Change	Budget Period 1 Revised Costs (to Date) (to Go)	Budget Period 2 Costs	Budget Period 3 Costs	Project Total
FFRDC Name/Organization	**Purpose**	**Budget Period 1 Costs**	**Change**	**Budget Period 1 Revised Costs (to Date) (to Go)**	**Budget Period 2 Costs**	**Budget Period 3 Costs**	**Project Total**
SNL	Pond Design Research	Redacted Exemption 4					
Total Contractual		Redacted Exemption 4					

Additional Explanations/Comments (as necessary)

BP-2 Subtotals	
Phase I (C.2)	
Phase II (C.3, C.4 & Sub-Recipient NMSU)	Redacted Exemption 4
Phase III (C.5 & C.6)	
BP-2 TOTAL	

g. Construction

PLEASE READ!!!

Construction, for the purpose of budgeting, is defined as all types of work done on a particular building, including erecting, altering, or remodeling. Construction conducted by the award recipient is entered on this page. Any construction work that is performed by a vendor or subrecipient to the award recipient should be entered under f. Contractual.

List all proposed construction below, providing a basis of cost such as engineering estimates, prior construction, etc., and briefly justify its need as it applies to the Statement of Project Objectives.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

Overall description of construction actiivities:

General Description	Cost	Basis of Cost	Justification of need
Budget Period 1			
Budget Period 1 Total	**$0**		
Budget Period 2			
Budget Period 2 Total	$0.00		
Budget Period 3			
Budget Period 3 Total	$0		
PROJECT TOTAL	**$0**		

Additional Explanations/Comments (as necessary)

h. Other Direct Costs

PLEASE READ!!!

Other direct costs are direct cost items required for the project which do not fit clearly into other categories, and are not included in the indirect pool for which the indirect rate is being applied to this project. Examples are meeting costs, postage, couriers or express mail, telephone/fax costs, printing costs, etc.

Basis of cost are items such as vendor quotes, prior purchases of similar or like items, published price list, etc.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

General description	Cost	Basis of Cost	Justification of need
Budget Period 1			
Budget Period 1 Total	$0		
Budget Period 2			
PHASE I	Redacted Exemption 4		Process Demonstration and Evaluation
PHASE II			Process Demonstration and Evaluation
PHASE III			Process Demonstration and Evaluation
Budget Period 2 Total			
Budget Period 3			
Balance of PHASE III	Redacted Exemption 4		Process Demonstration and Evaluation
Budget Period 3 Total			
PROJECT TOTAL			

Additional Explanations/Comments (as necessary)

General description	Cost	Basis of Cost	Justification of need

i. Indirect Costs

	Budget Period 1	Budget Period 2	Budget Period 3	Total
Rate applied:	Redacted Exemption 4			
Total indirect costs requested:				

A federally approved indirect rate agreement, or rate proposed supported and agreed upon by DOE for estimating purposes is required if reimbursement of fringe benfits is requested. Please check (X) one of the options below and provide the requested information if it has not already been provided as requested, or has changed. Calculate the indirect rate dollars and enter the total in the Section B., line 6.j. (Indirect Charges) of form SF 424A.

_____ **There is a federally approved indirect rate agreement. A copy is provided with this application and will be provided electronically to the Contracting Officer for this project.**
**In the area designated below, identify the full calculations used to derive the total indirect costs. See further information below.*

X **There is no current, federally-approved indirect rate agreement.**
*When this option is checked, the entity preparing this form shall submit an indirect cost rate proposal in the format provided at the following website, or in a format that provides the same level of information and which supports the rate(s) being proposed for use in estimating the project. Go to https://www.eere-pmc.energy.gov/forms.aspx and select PMC 400.2 Sample Rate Proposal. *In the area designated below,*

Additional Explanations/Comments (as necessary)

*IMPORTANT: In the space provided below (or as an attachment) provide a complete explanation and the full calculations used to derive the total indirect costs. If the total indirect costs are a cumulative amount of more than one calculation or rate application, the explanation and calculations should identify all rates used, along with the base they were applied to (and how the base was derived), and a total for each (along with grand total). The rates and how they are applied should not be averaged to get one indirect cost percentage. NOTE: The indirect rate should be applied to both the Federal Share and Recipient Cost Share.

BP-1 Detail

$ Redacted Ex. 4	Total Direct Charges
	Less proposed direct costs without indirects
$	Proposed direct costs for Indirect application

	Direct Costs	Indirect Rate	Indirect Subtotals
2010 Direct costs	Redacted Exemption 4		
2011 Direct costs			
$			Total Indirect Charges

Cost Share

PLEASE READ!!!

A detailed presentation of the cash or cash value of all cost share proposed for the project must be provided in the table below. Identify the source & amount of each item of cost share proposed by the award recipient and each sub-recipient or vendor. Letters of committment must be submitted for all third party cost share (other than award recipient).

Note that "cost-share" is not limited to cash investment. Other items that may be assigned value in a budget as incurred as part of the project budget and necessary to performance of the project, may be considered as cost share, such as: contribution of services or property; donated, purchased or existing equipment; buildings or land; donated, purchased or existing supplies; and/or unrecovered personnel, fringe benefits and indirect costs, etc. For each cost share contribution identified as other than cash, identify the item and describe how the value of the cost share contribution was calculated.

Funds from other Federal sources MAY NOT be counted as cost share. This prohibition includes FFRDC sub-recipients. Non-Federal sources include private, state or local Government, or any source not originally derived from Federal funds. Documentation of cost sharing commitments must be provided, if not already provided with the original application and they have not changed since its submission.

Fee or profit will not be paid to the award recipients or subrecipients of financial assistance awards. Additionally, foregone fee or profit by the applicant shall not be considered cost sharing under any resulting award. Reimbursement of actual costs will only include those costs that are allowable and allocable to the project as determined in accordance with the applicable cost principles prescribed in 10 CFR 600.127, 10 CFR 600.222 or 10 CFR 600.317. Also see 10 CFR 600.318 relative to profit or fee.

Add rows as needed. If rows are added, formulas/calculations may need to be adjusted by the preparer.

Organization/Source	Type (cash or other)	Cost Share Item	Budget Period 1 Cost Share	Budget Period 2 Cost Share	Budget Period 3 Cost Share	Total Project Cost Share
Sapphire Energy	Cash	Sapphire Cost Share	Redacted Exemption 4			
		Totals				

Total Project Cost: $ Redacted Exemption 4

Cost Share Percent of Award: Redacted Exemption 4

Additional Explanations/Comments (as necessary)

Integrated Algal BioRefinery
Commercial Demonstration Project

Total Project Summary:

Sapphire IABR Project

Category	TOTAL	Total Project Breakdown by Phases: Phase I	Phase II	Phase III	Total Project	Total Project Breakdown by Budget Periods: BP-1	BP-2	BP-3	Total Project
Personnel									
Fringe Benefits									
Travel									
Equipment									
Supplies									
Contractual									
Construction									
Land Purchase									
Indirect Charges									
Const & Engr Subtotals									
Process Demonstration									
Totals									

Redacted Exemption 4

BP-2 Summary:

BP-2 Incremental	FY2011	FY2012	FY2013	FY2014
DOE Cost Share				
Sapphire Cost Share				
Total				

Redacted Exemption 4

BP-2 Cumulative
DOE Cost Share
Sapphire Cost Share
Total

BP-2 Category	FY2011	FY2012	FY2013	FY2014	BP-2 TOTAL
a. Personnel					
b. Fringe Benefits					
c. Travel					
d. Equipment					
e. Supplies					
f. Contractual					
g. Construction					
h. Other					
TOTALS					

Redacted Exemption 4

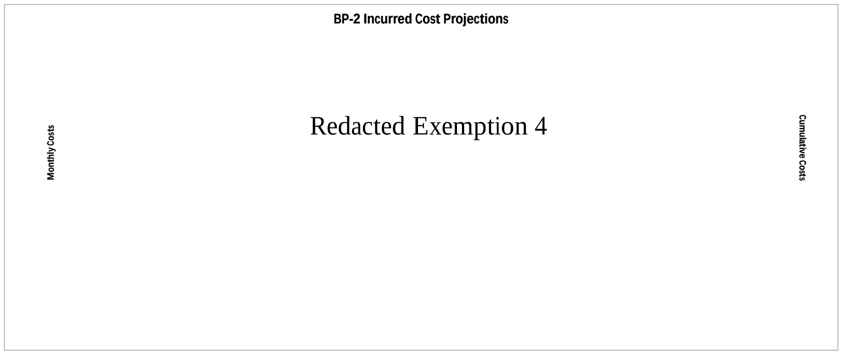
	BP-1	BP-2	BP-3
BP-1			
BP-2			
BP-3			
PROJECT (x$1,000)	Redacted Exemption 4		
Phase 1 Engineering			
Phase 1 Construction			
Phase 2 Construction and Engineering			
Phase 3 Construction and Engineering			
Year 1 Process Demonstration			
Year 2 Process Demonstration			
Year 3 Process Demonstration			
Total IABR			

COST SHARE DOLLARS

USDA Loan Cost Share	Redacted Exemption 4																																						-	-
DOE Cost Share	50,000,000	9,420,000	3,745,000	5,335,000	-	1,832,030	2,446,988	2,965,390	1,396,525	709,458	801,312	523,363	285,830	387,826	387,826	378,800	426,408	756,455	1,265,145	875,570	423,868	485,523	511,849	708,110	1,035,648	1,527,890	1,957,031	2,007,305	1,648,202	1,214,666	792,297	471,169	440,116	481,005	465,178	330,378	-	-	826,742	734,097
Sapphire Cost Share	Redacted Exemption 4																																							

PERCENTAGES

Monthly USDA Loan Cost Share	Redacted Exemption 4
Monthly DOE Cost Share	
Monthly Sapphire Cost Share	
Cumulative USDA Loan Cost Share	
Cumulative DOE Cost Share	
Cumulative Sapphire Cost Share	
Cumulative Total DOE/USDA Share	



Sapphire IABR Project

Total Project Breakdown by Phases

Category	TOTAL	Phase I	Phase II	Phase III
Personnel				
Fringe Benefits				
Travel				
Equipment				
Supplies				
Contractual				
Construction				
Land Purchase				
Indirect Charges				
Const & Engr Subtotals				
Process Demonstration				
Totals				

Redacted Exemption 4

Sapphire Energy

Risk Management Plan
Integrated Algal Bio-Refinery (IABR)
Columbus, New Mexico

July 2011

Risk Management Plan for the IABR

This plan serves as the framework and provides the general guidelines for identifying, assessing, and mitigating risks associated with the development and deployment of Sapphire Energy's Integrated Algal Biorefinery Project (IABR) located in Columbus, New Mexico.

Additionally, the plan outlines approaches and triggers for contingency planning and actions, assignment of responsibilities and management of the ongoing maintenance and communication of the plan and its associated risk register.

General Project Description and Purpose

Sapphire Energy Company (Sapphire) is currently constructing an Integrated Algal Bio-Refinery Facility (IABR) to produce oil from algae, ultimately refining the oil into various types of transportation fuel. Sapphire's IABR is located southwest of the community of Columbus in Luna County, New Mexico. (Figures 1 and 2)

Figure 1: Map of IABR Project Site and Surrounding Area

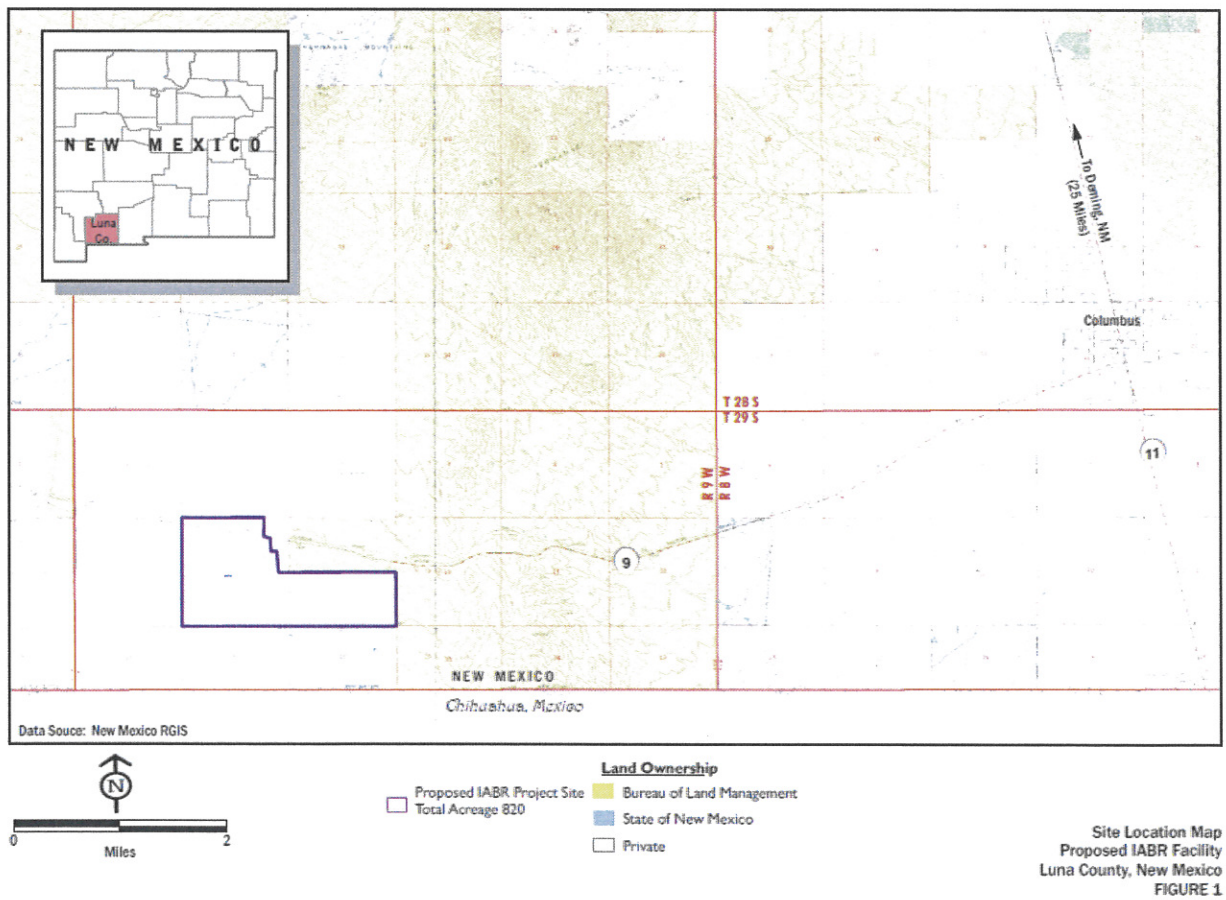
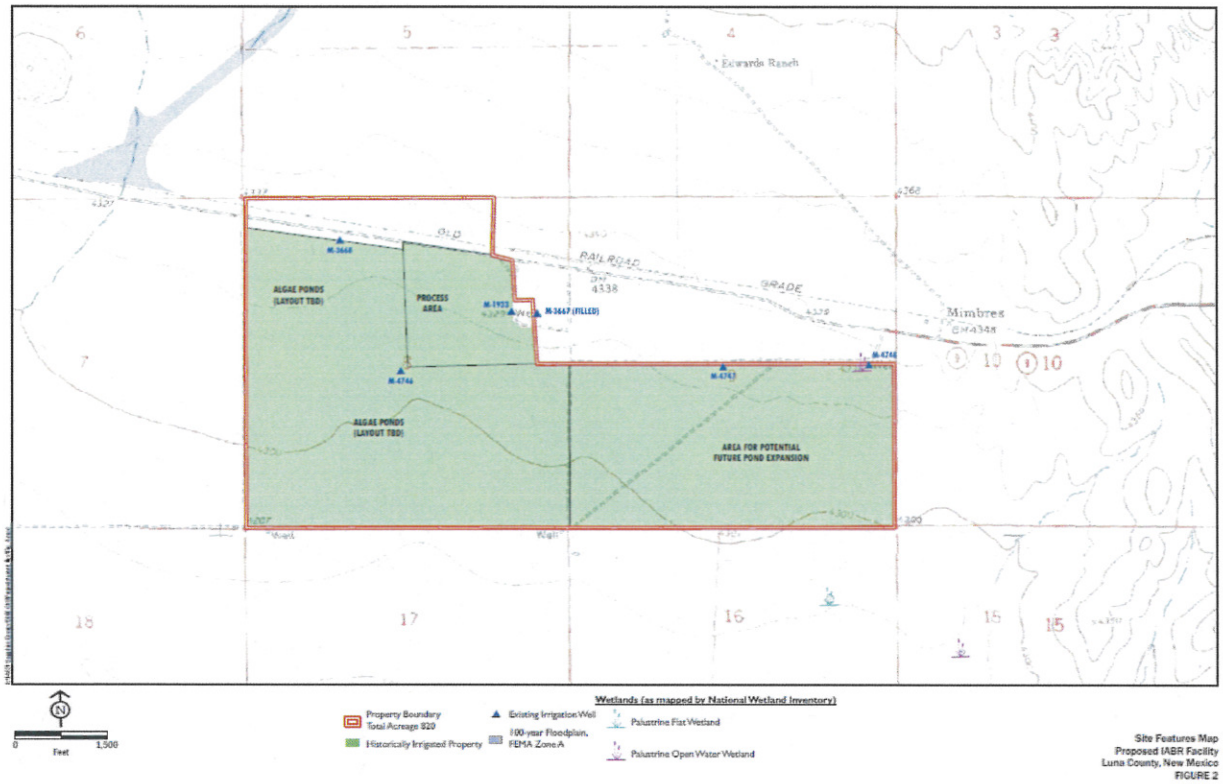


Figure 2: Detailed Map of Western Parcel for IABR Project



The purpose of the project is to construct and operate a demonstration-scale facility in the United States (US) that results in the ultimate production of transportation fuels, derived from renewable algae sources, effectively reducing our country's dependence on foreign oil and fossil fuels. The IABR facility will be constructed in phases and in full deployment will be capable of producing 100 barrels (bbl) of refined algal oil per day. The algae used in the proposed project do not meet the definition of "genetically modified organisms" as identified by the US Environmental Protection Agency and, thus, the project is not subject to review by the Animal and Health Inspection Service (APHIS) Biotechnology Regulatory Service.

Algal oil extracted from the biomass at the IABR will be refined at the existing Dynamic Fuels facility in Geismar, Louisiana. Dynamic Fuels is an independent company that operates its Louisiana facility under separate environmental and operating permits.

Risk Identification

General Description and Categories

The IABR project is a multidisciplinary undertaking that involves the aggregation of a wide range of specialties and technologies. These include the engineering and design and development of engineered unit operations; technology integration; process and stain development and optimization; project

execution and construction, start-up, monitoring and operations; and project schedule, financing, technical and performance goals.

Each of these general areas are in turn directly connected to all others and have direct effect on status and in the aggregate represent a whole spectrum of combinations that generate the project's overall risk profile.

A successful Risk Management Plan needs to be integrated into the larger project plan. In that manner it serves as a powerful tool to help gauge, guide, inform and disseminate important project details to all stakeholders and participants. The following are integrated processes that will be used in conjunction with and in support of the RMP.

Project Management for a Developing Technology

Effective project management is the key to the integration of the diverse elements needed for successful project delivery. At the highest level the overall management of the work must ensure that the project maintains its focus on its stated goals.

Given the first in kind nature of the IABR Project requires a flexible project management strategy that is interactive and responsive to feedback from the ongoing concurrent science programs, partner collaborations and the interest of other project stakeholders. Three areas of particular attention that serve to guide the decision and risk management process are discussed below:

Short and Long Term Drivers – Inherent in the development of the IABR project a careful balance is needed between short term and long term drivers. These can include technical, financial, policy, permitting, constructability and many other specific items. Risk management and project management discipline will be aligned to maintain these matters in service of the overall stated project goals.

Good Decision Making – An obvious requirement, but the specific need to remain disciplined and focused as project risks are diagnosed and corresponding decisions are made is an essential element for proper risk management. Decisions will be made to first seek and then reflect the best available information; process and introduce changes proactively; apply best practices to consult, decide and inform all stakeholders; identify and maintain the ability to mobilize needed resources; maintain and respect feedback and adjustment mechanisms; and work to earn the trust as responsible stewards of the project and committed resources.

Gaps – All projects can be expected to contain any matter of practical gaps between baseline plans and expectations. It is accepted that the nature of the IABR project will yield the consistent identification of gaps and the need for corresponding redress. As each gap is identified, the diagnosis and analysis of the inherent conflict between data, schedule and cost and the resulting project impacts becomes the key priority. These conditions require the mobilization of the needed experience and subject matter expertise; the development of clear priorities and a clear understanding of impact to other matters, followed by an ability to track outcomes and retain flexibility to make adjustments or apply further contingencies.

Categories

In addition to the formal and continued input from the Independent Engineer and IPA, a risk register will serve as a consolidation document for documenting and categorizing identified risks, their status, responsible parties and potential project impact. The risk register will contain the following general categories:

- IPA Recommendations
- Project Management and Engineering
- Technology
- Operations
- Financing
- Timeline

Risk Assessment

Once a risk is identified, accepted, and placed into the risk register, it is essential to establish the potential project impact(s) that can be expected to result. The following are used as summary descriptions that provide a general rating of the risk and its potential impact.

None – A risk that is understood to have little to no impact in terms of project performance, costs or schedule. Typically, this description is not applicable to an identified risk when it is originally entered into the risk register, rather a subsequent adjustment after analysis or corrective action has been implemented and results established; or after the risk has been fully mitigated and can be considered a closed item.

Low – A risk that is understood to have the potential to impact elements of project performance, costs or schedule but will not affect the project's overall timeline, budget and performance requirements.

Medium – A risk that is understood to have the potential to impact elements of project performance, costs or schedule and a subsequent consequential effect on any one of the project's key metrics; overall timeline, budget and performance requirements.

High – A risk that is understood to have the potential to impact elements of project performance, costs or schedule and a subsequent consequential effect on any two of the project's key metrics; overall timeline, budget and performance requirements.

Severe - A risk that is understood to have the potential to impact elements of project performance, costs or schedule and a subsequent consequential effect on all three of the project's key metrics; overall timeline, budget and performance requirements. This category is also applied to situations where the potential impact to any single key project metric is so serious as to potentially fail the overall project.

Methodologies and Diagnostic Tools

Risks will be assigned and reviewed and adjusted as appropriate by the IABR Project Team under the direction of the IABR Project Manager and the Responsible Party assigned custody of each risk item. The process by its very nature will, in part, need to rely on the subject matter expertise, judgment and experience of the individuals involved as well as the totaled project condition at the time of decision. The whole process will be complimented with the use of practical diagnostic tools and mechanisms at the team's disposal and will include an overall, task and logic linked project schedule; an overall project techno-economic model; and decision/impact methods like decision trees, extreme and exceedance analyses.

Risk Mitigation

A companion activity to the risk assessment is the development of the corresponding risk mitigation strategy and response. In general this process involves the appointment of a Responsible Party (RP) to serve as the leader in the development and implementation of the risk mitigation strategies.

The range and scale associated with these efforts will be very broad. It may be a straightforward and obvious plan forward, or for situations generally associated with higher risk profiles, require the development of several mitigation options and involve a decision process to include other project collaborators and stakeholders. For these conditions a formal RACI methodology may be applied. In general this approach assigns each interested or affected stakeholder with specific roles, each associated by task or subtask in the decision and implementation mechanisms associated with the mitigation strategy and response. The following summarizes the roles associate with the RACI methodology:

R = Responsible

A = Accountable

C = Consult (prior to decision)

I = Inform (promptly after decision is made)

Contingency Planning

Contingency planning is an important supplement to the risk management process. Contingency plans serve as the back-up response to mitigation measures that are not successful in addressing the identified risk.

Contingency planning can start as early as necessary in the risk mitigation process. For higher risk matters, where multiple mitigation options are developed, the options that are not selected as primary can often serve as, " in-hand" contingency plans. Additionally at the time an initial mitigation is selected, the decision methodologies and available diagnostic tools will purposefully indicate the likelihood for complete or partial success and ascertain the implications associated with partial or lack of success.

Project management, results tracking and overall mitigation execution will be closely monitored as a part of an interactive plan, implement, analyze and adjust cycle for each mitigation. In events where mitigation results are not as desired, modification and contingency options will be considered and implemented as appropriate.

Any resulting adjustments will be formally developed and resourced for incorporation into project planning with the needed due diligence and impact analysis required of any risk mitigation.

Responsibilities

As the individual with overall project responsibility, the Principal Investigator for the project has the duty to ensure that risks are properly identified, managed and resolved. The balance of the Sapphire

enterprise and project team are at the Principal Investigator's disposal to mobilize as needed to address project requirements in any manner needed.

The day to day project leaders; the Project Manager and Project Engineer are in close contact with all project detail, information and participants. They serve as the Principal Investigator's primary leads in project execution and reporting. Together with the Principal Investigator, the Project Manager and Project Engineer will serve as the working group that will organize the required risk assessments, mitigation planning, resource assignment and development of project tasks and formal RACI responsibilities.

Maintenance

Risk Mitigation is an ongoing project activity and is statused at weekly project review meetings and weekly project construction meetings. Supplemental maintenance and reviews are conducted as needed for each individual mitigation plan.

In addition to these specific reviews, the overall risk impacts as well as any individual risk impact to the overall IABR performance goals are reviewed at regularly scheduled project reviews internal to Sapphire as well as with other project stakeholders.

Plan to Date

Since the IABR project was originally proposed in June 2009, Sapphire has been very proactive in the management of risks that have focused as the progress of the project has advanced. The fundamental driver in Sapphire's approach has remained consistent in the stated requirement that the IABR must deliver on its original goals and remain focused on its overall purpose.

The original project execution plan for constructing and deploying a single phase 300 acre facility reliant on first generation designs and technology has been significantly de-risked and cost controlled by an overall mitigation strategy where the project will be phased. The phased approach allows for the incorporation of technology improvements, operational experience and a more purposeful deployment and commitment of project funds that provide a higher likelihood for overall project success.

Additionally, Sapphire has incorporated all of IPA's formal recommendations and will continue to be proactive, informed and engaged in risk mitigation for the project.

Risk Register

A copy of the project's risk register is attached.

Risk Register – IPA Recommendations

IPA Recommendations	Action	Status
Redacted Exemption 4		

Risk Register – Project Management and Engineering

Tracking Number		Project Area	Project Risk	RMP	RP	Status	Risk Probability	Potential Impact
PME.1	Redacted Exemption 4							
PME.2								
PME.3								
PME.4								
PME.5								
PME.6								
PME.7								
PME.8								
PME.9								
PME.10								
PME.11								
PME.12								
PME.13								
PME.14								
PME.15								
PME.16								
PME.17								
PME.18								
PME.19								
PME.20								
PME.21								

Risk Register - Technology

Tracking Number		Project Area	Project Risk	RMP	RP	Status	Risk Probability	Potential Impact
TECH.1	Redacted Exemption 4							
TECH.2								
TECH.3								
TECH.4								
TECH.5								
TECH.6								
TECH.7								
TECH.8								
TECH.9								
TECH.10								
TECH.11								
TECH.12								
TECH.13								
TECH.14								

Risk Register - Operations

Tracking Number		Project Area	Project Risk	RMP	RP	Status	Risk Probability	Potential Impact
OP.1	Redacted Exemption 4							
OP.2								
OP.3								
OP.4								

Risk Register - Financing

Tracking Number		Project Area	Project Risk	RMP	RP	Status	Risk Probability	Potential Impact
FIN.1	Redacted Exemption 4							
FIN.2								
FIN.3								
FIN.4								
FIN.5								
FIN.6								

Risk Register - Timeline

Tracking Number		Project Area	Project Risk	RMP	RP	Status	Risk Probability	Potential Impact
TL.1	Redacted Exemption 4							
TL.2								
TL.3								
TL.4								
TL.5								
TL.6								
TL.7								
TL.8								
TL.9								
TL.10								
TL.11								
TL.12								
TL.13								

Main Summary Sheet

AMEC

6/22/2011
12:42 PM

PROJECT: Integrated Algal Biorefinery Project
CUSTOMER: Sapphire Energy
LOCATION: Columbus, NM
SENIOR VP:

FOR REVIEW - Phase 1

DURATION MONTHS: 15.5
BID DATE: 20-Jun-11
BID TIME: 12:00 AM
ESTIMATE # : 0
ESTIMATING:

BID ITEM	DESCRIPTION	MH	LABOR	MATERIAL	EQUIPMENT	SUBCONTRACT	TOTAL
1	Div 1 - General Requirements						
2	Div 2 - Site Construction						
3	Div 3 - Concrete						
4	Div 4 - Masonry						
5	Div 5 - Metals						
6	Div 6 - Woods & Plastics						
7	Div 7 - Thermal & Moisture Protection						
8	Div 8 - Windows						
9	Div 9 - Finishes						
10	Div 10 - Specialties						
11	Div 11 - Equipment						
12	Div 12 - Furnishings						
13	Div 13 - Special Construction						
14	Div 14 - Conveying Systems						
15	Div 15 - Mechanical						
16	Div 16 - Electrical						
17	Div 17- Instrumentation						
18	ADJUSTMENT #1 (Well Systems)						
	TOTAL DIRECT COSTS:						
19.0	CONTRACTOR PROJECT INDIRECT COSTS		% OF SUBTOTAL				
20.0	CONSTRUCTION MANAGEMENT SERVICES						
	SUBTOTAL COST:						
21.0	BUILDERS RISK INSURANCE		% OF SUBTOTAL				
22.0	PERFORMANCE & PAYMENT BOND						
	SUBTOTAL COST:						
23.0	MARGIN		% OF SUBTOTAL				
	SUBTOTAL COST:						
24.0	GROSS RECEIPTS TAX ALLOWANCE		% OF SUBTOTAL				
	SUBTOTAL COST:						
25.0	Pretreatment Allowance		% OF SUBTOTAL				
26.0	Project Development Allowance						
	TOTAL CONSTRUCTION COST:						

Redacted Exemption 4

AGREEMENT FOR SECURITY SERVICES
WORK ORDER NO. 01

SAPPHIRE ENERGY PROJECT NO. PR.100035.000.05

LAS CRUCES SECURITY SERVICES, INC.

Las Cruces Security Services, Inc. is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Security Services previously executed between Las Cruces Security Services, Inc. ("Agent"), and Sapphire Energy, Inc. ("CLIENT") dated June 6, 2011.

CLIENT NAME: Sapphire Energy, Inc.

AGENT NAME: Las Cruces Security Services, Inc.

PROJECT NAME: Sapphire Energy IABR

PROJECT LOCATION: IABR Facility Location – Luna County, New Mexico
1500 HWY 9 SW, Deming, NM 88030

DESCRIP. OF WORK: As described in Agent's Agreement dated June 6, 2011 which is included as a part of this work order as **Attachment A.**

PERIOD OF SERVICE: June 6, 2011 through July 31, 2012

PAYMENT: Agent will perform the Scope of Work for this Work Order on a time basis not-to-exceed $ Ex. 4 **Attachment A** summarizes the cost rates associated with these services.

ADDITIONAL AUTHORIZATION: The balance of authorization needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between Agent and Client, dated June 6, 2011.

SAPPHIRE ENERGY, INC.

RCK By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: June 1, 2011

Send copies of communications and notices to Sapphire Energy: Attn: Jaime E. Moreno, P.E.

SAPPHIRE ENERGY DOCUMENT NO. 11.0106

ATTACHMENT A
Agreement for Services and Rate Summary

AGREEMENT

This agreement is entered into and made by and between the Sapphire Energy, hereafter called Client, and the Las Cruces Security Services, Inc., hereafter called Agent, on this 6th day of June 2011.

Client authorizes Agent to set in Client's name, place, and stead in the performance of it's duties as agreed upon between Client and Agent, during the existence of this contract. The Agent shall provide the Client only those services authorized by the New Mexico Private Investigators and Polygraph Act which specifically involve Security Guard Services and Security Guard Patrol Services.

Services: Agent agrees to provide the Client with armed uniformed security guards to conduct security services at the Client's facilities located approximately 9 miles East of Columbus, New Mexico off of New Mexico State Highway 9.

This stationary security guard will be placed at the location for the protection of the Client, Client's employees, Client's customers, and properties. This guard will also allow only individuals access to the property that are placed on an access list provided by the Client. The guard will be placed at these facilities 24 hours a day 7 days a week for the term of this agreement.

Cost: The Client agrees to pay the Agent $ Redacted Exemption 4
for overtime and holidays for this security guard. Holidays will be those recognized by the Federal Government. These costs are subject to NM GRT for the Las Cruces area.

Payment: The Client will be billed by invoice weekly and agrees to pay balance due within 15 days of receipt of the Agent's invoice.

Insurance: Agent agrees to maintain commercial liability insurance of at least
Redacted Exemption 4
compensation and name the Client as an also insured on all of its policies.

Independent Contractor: Agent will be an independent contractor for all performance of its services under this contract.

Termination: This agreement will terminate on July 31, 2012 unless renewed with the agreement of both parties. Either party may terminate the agreement prior to July 31, 2012 with cause and with 30 days notification to the other party.

By: Jaime Moreno

Signature: [redacted]

Title: Vice President Projects

Date: May 31, 2011

Redacted Exemption 4

Field Work Proposal

Type of Proposal:

☐ Budget

☒ Funding: Include Announcement#:

Ongoing Work or New Work? New Work

Proposal Title: Low cost pond liners using Redacted Exemption 4

Work Start Date: 2/1/2010 Work End Date: 2/1/2011

B&R Number:

Principal Investigator: Paola Bandini

Project Manager:

DOE/ HQ Program Manager: Tel:

NNSA /SSO Program Manager: Tel:

HQ Program Orgs (Select only one from a drop-down list): EE2E - Biomass Program
Or Select One From This List Only
Or Select One From This List Only

Budget:

Expenditure Categories	FY 2006 carryover	FY 2007	FY 2008	FY 2009	FY 2010	FY 2011	FY 2012	Totals
Total FTEs:					Redacted Exemption 4			
Operating Expenses (in K dollars)								
Expected Funding:								
Expected Costs:								
Capital Equipment (in K dollars)								
Expected Funding:								
Expected Costs:								

Types of Attachments to Submit with Proposal (Note: PDF format preferred):

- Facility Requirements
- Publications
- Purpose
- Background
- Approach
- Technical Progress
- Future Accomplishments
- Relationship to Other Projects
- NEPA Requirements
- Deliverables
- Performance Measures/ Expectations
- ES&H Considerations
- Human/ Animal Subjects
- Security Requirements
- Other (Specify)
- Milestones (must include a milestone for each budget/ funding year requested)

Abstract: (Limited to 270 words)
One of the major capital costs associated with the IABR are the materials and construciton of the cultivation ponds. Sapphire has developed a pond design that meets the performance metrics of the IABR. Nevertheless, the materials and treatment required to

Redacted Exemption 4

Milestones (You may include as an attachment, or list each one for each budget/ funding year requested):

1. Start Date: 2/1/2010 End Date: 2/1/2011 Task: Experimental design of Redacted Exemption 4 experiments.
2. Start Date: 2/1/2010 End Date: 6/1/2010 Task: Completion of field testing of Redacted Exemption 4
3. Start Date: End Date: Task:

	Avg/Rate	Weekly Hrs	Weekly Lbr	Weekly Exps	Start	Finish	Weeks	Total	**USE**
HGI	Redacted Exemption 4								
B&C									
Geomatrix									

Total Direct Costs Redacted Exemption 4

OpEx calculations

	2012 Cost	2013 Cost	2014 Cost
Operating expenses			
Cultivation			
Redacted Exemption 4			
Subtotal	Redacted Exemption 4		
Harvest			
Redacted Exemption 4			
Subtotal	Redacted Exemption 4		
Extraction			
Redacted Exemption 4			
Subtotal	Redacted Exemption 4		
Electricity			
Redacted Exemption 4			
Subtotal	Redacted Exemption 4		
S&M			
Redacted Exemption 4			
Subtotal	Redacted Exemption 4		
MTI			
Redacted Exemption 4			
Subtotal	Redacted Exemption 4		
Other			
Redacted Exemption 4			
Subtotal	Redacted Exemption 4		
TOTAL OpEx			
Total	Redacted Exemption 4		
$/bbl, as-if normalized			
Fixed			
Variable			

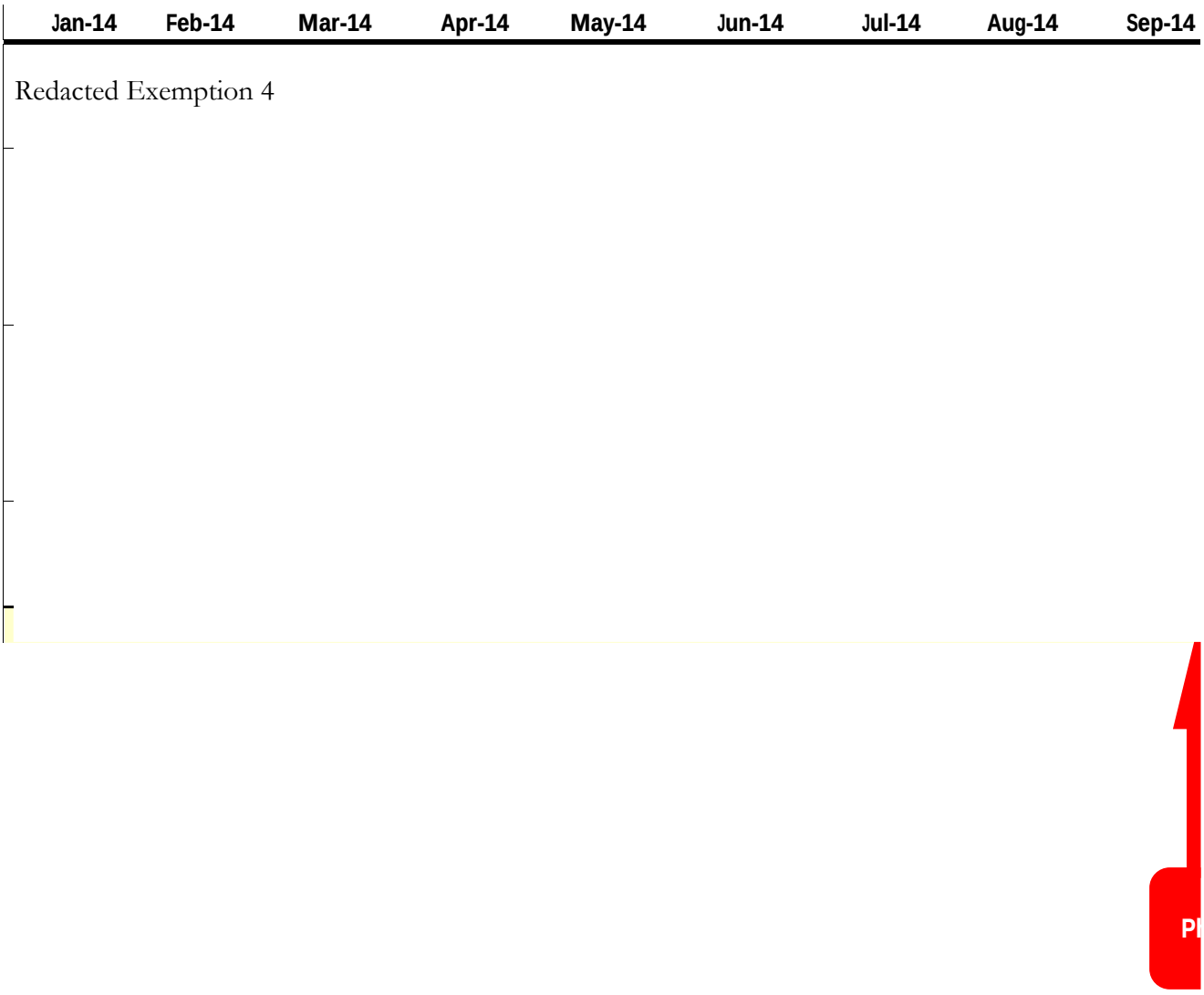
OpEx	Jan-12	Feb-12	Mar-12	Apr-12	May-12
	Redacted Exemption 4				
Fixed					
Variable					
CY 2012 operation					
Phase I					
Fixed					
Variable					
CY 2013 operation					
Phase II					
Fixed					
Variable					
CY 2014 operation					
Phase III					
TOTAL operations					

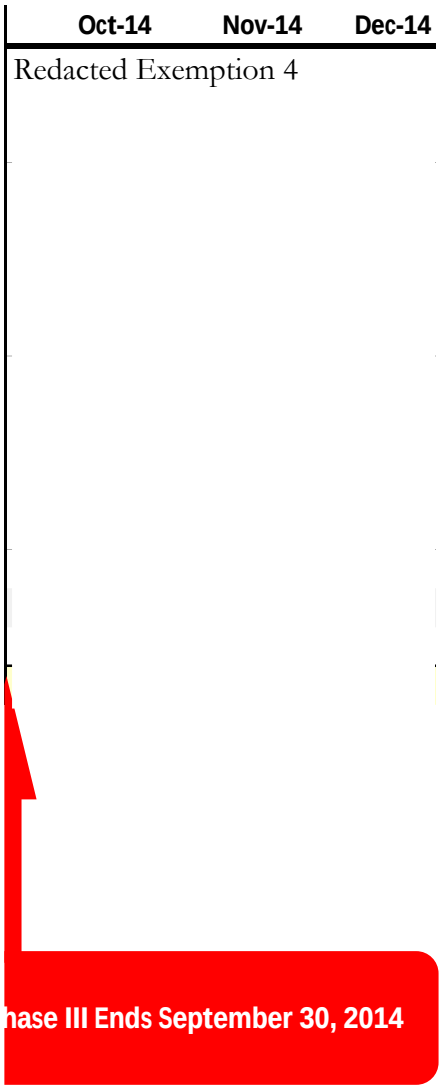
Jun-12	Jul-12	Aug-12	Sep-12	Oct-12	Nov-12	Dec-12	Jan-13	Feb-13	Mar-13

Redacted Exemption 4

Apr-13	May-13	Jun-13	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13

Redacted Exemption 4


Jan-14
Feb-14
Mar-14
Apr-14
May-14
Jun-14
Jul-14
Aug-14
Sep-14
Redacted Exemption 4


Oct-14
Nov-14
Dec-14
Redacted Exemption 4
hase III Ends September 30, 2014

Sapphire Energy IABR Project AMEC Project: 168423
LNTP 6wk - Breakdown of Contractor Estimate

Construct Temporary Water	Redacted Exemption 4
Mobilization/Temporary Facilities - Sitework Subcontractor	
Clear and Grub and demolition activity	Redacted Exemption 4
North Storm Water Ditch	
Prewet Existing Material	
Mass Earthwork	Redacted Exemption 4
Scarify/Recompact under	Redacted Exemption 4
Temporary Construction Water Wells	
Project Development	
Contractor Indirect Costs	
Construction Management Labor and Travel Expenses	
Bulders Risk Insurance	
Performance and Payment Bond	
Contractor Margin	
Gross Receipts Tax	
	$

TRANSMITTAL

TO	Sapphire Energy 27102 Puerta Real Suite 280 Mission Viejo, CA 92621-8009	DATE	September 22, 2011
		TRANSMITTAL NO.	DJG001
		PROJECT NO.	168423
		PROJECT TITLE	Sapphire IABR
ATTN:	Ron Kluwe	FILE NO.	
VIA	Email	REFERENCE NO.	

REASON FOR TRANSMITTAL:

☐ FOR INFORMATION	☐ FOR CONSTRUCTION	☐ FOR DESIGN	☐ FOR PURCHASE
☐ FOR YOUR APPROVAL	☐ FOR FABRICATION	☐ FOR DETAILING	X AS REQUESTED
☐ FOR YOUR REVIEW	☐ FOR COMMENT	☐ RETURNED FOR CORRECTIONS	X OTHER: Contract related materials

ACTION REQUIRED:

☐ APPROVAL/COMMENTS NEEDED BY _____	☐ RESUBMIT _____ COPIES	☐ NONE	X OTHER: For your use

ITEMS BEING TRANSMITTED:

☐ PRINTS OF DRAWINGS	☐ SHOP DRAWINGS	☐ SPECIFICATIONS	☐ COMPUTER DISKS
☐ ORIGINAL DRAWINGS	☐ CHANGE ORDER(S)	☐ CUT SHEETS	X OTHER: Contract Attachments

QTY	DOCUMENT NO.	REV.	TITLE	REMARKS
	Attachment D		Payment Schedule	
	Attachment E		Unit Rates for staff and Craft labor	
	Attachment F		Equipment Rental Rates	
	Attachment G		Small Tools	
	Attachment H3		Unconditional Lien Waiver	
	Attachment L		Insurance	
	Attachment Q1		Application for Mechanical Completion	
	Attachment R		Regulatory regimes - IABR	
	Attachment T		Form of Change Order	
	Attachment W		Certificate of Final Completion	

Other comments and Notes:
This Transmittal contains revised Attachments for Adde
cc: Tony Wedell/Minneapolis Operations Manager

AMEC E&C Services, Inc.
Midwest Plaza Building
800 Marquette Ave., Suite 1200
Minneapolis, MN 55402
Tel (612) 332-8326
Fax (612) 332-2423

AGREEMENT FOR CONSTRUCTION SERVICES
WORK ORDER NO. 01

SAPPHIRE ENERGY PROJECT NO. PR.110205.100

AMEC E&C SERVICES, INC. PROJECT NO. _____

AMEC E&C Services, Inc. is hereby authorized to perform the following work (the "Work") pursuant to the pending Construction Contract and Limited Notice to Proceed (LNTP) letter 11.0107.AM between AMEC E&C Services and ("AMEC"), and Sapphire Energy, Inc. ("CLIENT") dated June 1, 2011.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy IABR

PROJECT LOCATION: IABR Facility – Luna County, New Mexico
1500 HWY 9 SW, Deming, NM 88030

DESCRIP. OF WORK: Complete the Scope of Work as described in **Attachment A** to this Work Order

PERIOD OF SERVICE: June 1, 2011 through July 15, 2011

PAYMENT: AMEC will perform the Scope of Work for this Work Order in accordance with the LNTP with a value not-to-exceed $ Redacted Ex. 4

INITIAL AUTHORIZATION: The limit of authorized budget associated with this work order is $ Redacted Ex. 4 services for the first 45 days of construction. The balance of authorizations needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in the pending Construction Contract and Limited Notice to Proceed (LNTP) letter between Sapphire and AMEC dated June 1, 2011.

SAPPHIRE ENERGY, INC.

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: June 1, 2011

Send copies of communications and notices to Sapphire Energy: Attn: Jaime E. Moreno, P.E.

SAPPHIRE ENERGY DOCUMENT NO. 11.0108.AM

ATTACHMENT A
LNTP, Work Description, Schedule and Cost Summary

Sapphire Energy

June 1, 2011

11.0107.AM

Mr. David Gatto
Construction Manager
AMEC E&C Services, Inc.
800 Marquette, Suite 1200
Minneapolis, MN 55402

Limited Notice to Proceed for IABR Phase 1

Dear Mr. Gatto;

This letter is the Limited Notice to Proceed (LNTP) for Phase 1 of Sapphire Energy's IABR project at Columbus, New Mexico. You are authorized to begin mobilization of temporary facilities, construction staff, and sub-contractors as of June 1, 2011. You are also authorized to proceed with permanent installation work for the first 45 days of the project schedule (i.e., work through July 15, 2011) as per the attached scope of work and schedule. The payment plan for the work associated with the LNTP scope of work will be $ Redacted Exemption 4

Please note that this LNTP is contingent upon Sapphire Energy and AMEC E&C Services, Inc. signing a formal construction contract no later than June 15th, 2011 and that all contract attachments will be supplied to Sapphire Energy no later than July 15th, 2011.

If you have any questions about this matter, please do not hesitate to contact me.

Regards;

Ron Kluwe
Sr. Director Engineering Projects
Sapphire Energy

cc:
File
Dave Marsh
Jaime Moreno
CJ Warner

Attachments

AMEC Mobilization Schedule/Scope of Work – 45 Days (2 months)

Redacted Exemption 4

Trailer/Office Equipment

Redacted Exemption 4

Construction Utilities

Redacted Exemption 4

Redacted Exemption 4

AMEC Construction Schedule/Scope of Work – 45 Days (2 months)

Redacted Exemption 4

Specific Site Work SOW: See Ames Construction Schedule - Included

Redacted Exemption 4

ID	Task Name	Duration	Start	Finish	y 15, '11		Jun 05, '11			Jun 26, '11		Jul 17, '11			Aug 07, '1	
					T	F	S	S	M	T	W	T	F	S	S	M
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																

Redacted Exemption 4

Project: Sapphire Energy IABR LNTP
Date: Wed 06/01/11

Task		Rolled Up Task		External Tasks	
Critical Task		Rolled Up Critical Task		Project Summary	
Progress		Rolled Up Milestone	◇	Group By Summary	
Milestone	◆	Rolled Up Progress		Deadline	⇩
Summary		Split			

Main Summary Sheet

AMEC

6/1/2011
8:00 AM

PROJECT: Integrated Algal Biorefinery Project
CUSTOMER: Sapphire Energy
LOCATION: Columbus, NM
SENIOR VP:

FOR REVIEW - Limited Notice to Proceed (Total)

DURATION MONTHS: 14.2
BID DATE: 1-Jun-11
BID TIME: 12:00 AM
ESTIMATE # : 0
ESTIMATING:

BID ITEM	DESCRIPTION	MH	LABOR	MATERIAL	EQUIPMENT	SUBCONTRACT	TOTAL
1	Div 1 - General Requirements						
2	Div 2 - Site Construction						
3	Div 3 - Concrete						
4	Div 4 - Masonry						
5	Div 5 - Metals						
6	Div 6 - Woods & Plastics						
7	Div 7 - Thermal & Moisture Protection						
8	Div 8 - Windows						
9	Div 9 - Finishes						
10	Div 10 - Specialties						
11	Div 11 - Equipment						
12	Div 12 - Furnishings						
13	Div 13 - Special Construction						
14	Div 14 - Conveying Systems						
15	Div 15 - Mechanical						
16	Div 16 - Electrical						
17	Div 17- Instrumentation						
18	Permanent Well / Temporary Well Pump						
19	Project Development						
	TOTAL DIRECT COSTS:						
20.0	CONTRACTOR PROJECT INDIRECT COSTS		% OF SUBTOTAL				
21.0	CONSTRUCTION MANAGEMENT SERVICES						
	SUBTOTAL COST:						
22.0	BUILDERS RISK INSURANCE		% OF SUBTOTAL				
23.0	PERFORMANCE & PAYMENT BOND						
	SUBTOTAL COST:						
24.0	MARGIN		% OF SUBTOTAL				
	SUBTOTAL COST:						
25.0	GROSS RECEIPTS TAX		% OF SUBTOTAL				
	TOTAL CONSTRUCTION COST:						

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Sapphire Energy
IABR Project

Limited Notice to Proceed

This Limited Notice to Proceed (this "LNTP") is issued as June 1, 2011 (the "LNTP Effective Date") by Sapphire Energy ("Customer"), to AMEC E&C Services Inc ("Contractor"), subject to the terms and conditions set forth herein. Each of Customer and Contractor may be referred to herein individually as a "Party" and collectively as the "Parties").

WHEREAS, the Parties are negotiating a Construction Contract (the "Contract") pursuant to which Contractor will construct the IABR Facility (the "Facility") to be located in Columbus, NM. A copy of the current version of the Contract and Attachments is attached hereto as the Agreement For Construction Services Work Order No. 01, Sapphire Energy Project No. PR.110205.100. Capitalized terms used but not defined in this LNTP shall have the meanings ascribed to such terms in the Contract.

WHEREAS, in order to meet the project schedule and obtain necessary permits; certain Project Management, procurement and construction work must be completed.

WHEREAS, Customer desires to authorize Contractor to commence, project management, procurement and construction work (as further described below, the "Initial Work") for the IABR Facility in advance of the Parties' execution of the Contract.

WHEREAS, the Parties desire to set forth in this Limited Notice to Proceed their mutual agreement regarding the terms and conditions under which Contractor will perform the Initial Work.

NOW THEREFORE, in consideration of the foregoing premises and the mutual covenants herein contained and other good and valuable consideration, the Parties, intending to be legally bound, hereby agree as follows:

1. Initial Work Authorization. Contractor shall commence performance of the following Initial Work, but shall be under no obligation to complete the Initial Work under this LNTP, which is hereby authorized by Customer:

(a) Contractor shall perform the Initial Work as described in the Agreement For Construction Services Work Order No. 01, Sapphire Energy Project No. PR.110205.100 attached hereto and incorporated herein by reference.

2. Payments for Initial Work. As consideration for Contractor's performance of the Initial Work, Customer shall pay Contractor a mobilization fee of Redacted Exemption 4 in the aggregate. If the LNTP is terminated and customer does not proceed with the full Contract, Customer shall pay Contractor for the actual cost of Initial Work performed up to

the date of termination plus Redacted Exemption 4 adjusted for the mobilization fee already paid. Contractor shall submit an invoice for all Initial Work. Customer shall pay such invoice within thirty (30) days of the date first set forth above. All payments made by Customer pursuant to this Initial Work shall be credited toward payment of the Contract Price upon the Parties' execution of the contract.

3. Standard of Performance. Contractor shall perform the Initial Work in accordance with the specifications and standards of performance set forth in the Contract.

4. Termination for Convenience. Customer may terminate this LNTP for convenience in whole or in part by five (5) days written notice to Contractor. Upon receipt of any such notice, Contractor shall, unless the notice directs otherwise:

(a) Immediately discontinue the Initial Work on the date and to the extent specified in such notice; and

(b) Promptly deliver to customer all work product created by Contractor pursuant to the initial work.

Following any such termination for convenience by Customer, Contractor shall submit an invoice for all Initial Work performed by Contractor prior to such termination, and Customer shall pay Contractor for such Initial Work within thirty (30) days after Customer's receipt of such invoice.

5. Effect of Execution of Contract. The Parties agree to work with each other and cooperate in good faith to finalize the Contract the full Notice to Proceed, this LNTP shall be deemed terminated and superseded by terms of the Contract, and all Initial Work performed under this LNTP shall be deemed to be Work that was performed by Contractor under the executed Contract. Nothing set forth in this LNTP shall obligate Contractor to execute the Contract.

6. Limited of Liability. The total aggregate liability of Contractor for the Initial Work under this LNTP shall in no event exceed the amount of compensation received from the Customer for the Initial Work.

7. Waiver of Consequential Damages. Notwithstanding any other provision of this LNTP, in no event, whether as a result of breach of contract, tort liability (including negligence), strict liability or any other cause of action shall either Party be liable to the other Party for special, indirect, exemplary or consequential damages.

IN WITNESS WHEREOF, and intending to be legally bound, the Parties hereto subscribe their names to this LNTP by their duly authorized officers as of the LNTP Effective Date.

CONTRACTOR: AMEC E&C Services, Inc.		CUSTOMER:	
By:		By:	Jaime E. Moreno
Print Name:	Anthony Wedell	Print Name:	Jaime Moreno
Title:	Director of Operations	Title:	~~VP Engineering~~ Vice President of Projects

Attachment A
Legal Description and Access Requirements
Sapphire IABR Project

Legal Description: The Project may be comprised of the following Tracts of Land that Sapphire has Title to in Luna County.

TRACT I

The East Half (E½) of Section Seven (7), Township Twenty-nine (29) South, Range Eight (8) West, N.M.P.M., Luna County, New Mexico.

TRACT II

The Southwest Quarter (SW¼) of Section Eight (8), Township Twenty-nine (29) South, Range Eight (8) West, N.M.P.M., Luna County, New Mexico.

TRACT III

The Southeast Quarter (SE¼) of Section Nine (9), Township Twenty-nine (29) South, Range Eight (8) West, N.M.P.M., Luna County, New Mexico.

TRACT IV

Lots Seven (7) and Eight (8), South Half of Northeast Quarter (S½NE¼) and the Northwest Quarter (NW¼) of Section Seventeen (17), Township Twenty-nine (29) South, Range Eight (8) West, N.M.P.M Luna County, New Mexico.

TRACT V

Lots Four (4), Five (5), Seven (7), Eight (8) and Nine (9), East Half of the Northwest Quarter (E½NW¼ and the Northeast Quarter (NE¼) of Section Eighteen (18), Township Twenty-nine (29) South, Range Eight (8) West, N.M.P.M., Luna County, New Mexico.

TRACT VI

A tract being part of Section Eight (8), Township Twenty-nine (29) South, Range Nine (9) West, N.M.P.M., Luna County, New Mexico and Lying North of New Mexico State Highway No. 9 and being described as follows:

Beginning at the NW corner of the tract herein described which point is the NW corner of said Section Thence N89°54'41"E, 5290.33 feet to the NE corner of this tract, which point is the NE corner of said Section 8; Thence S0°04'04"E., along the East line of said 8, 1074.74 feet to the SE corner of this tract, point on the North Right of Way of New Mexico State Highway No. 9; Thence N81°00'16"W, along sa Right of Way, 5358.31 feet to the SW corner of this tract; Thence N0°12'05"E, along the West line of s Section 8, 228.75 feet to the point of beginning.

and

A tract of land being part of Section Eight (8), Township Twenty-nine (29) South, Range Nine (9) Wes N.M.P.M., Luna County, New Mexico and Lying South of New Mexico State Highway No. 9 and being described as follows:

Beginning at the SW corner of the tract herein described, which point is the SW corner of said Section Thence N0°12'05"E, along the west line of said Section 8, 4945.55 feet to the NW corner of this tract, a point on the South Right of Way of New Mexico State Highway No. 9; Thence S81°05'06"E, along sai Right of Way, 4417.54 feet to a point; Thence S0°05'10"E, 639.18 feet to a point; Thence N89°55'55"E 63.81 feet to a point; Thence S0°05'10"E, 192.47 feet to a point; Thence S89°55'55"W, 63.81 feet to a point; Thence S0°05'10"E, 776.50 feet to a point; Thence N89°56'34"E, 928.07 feet to the E¼ corner of said Section 8; Thence S0°04'04"E, along the East line of said Section 8, 2644.88 feet to the SE corner this tract which is the SE corner of said Section 8; Thence S89°54'17W, along the South line of said Section 8, 5315.19 feet to the point of beginning.

TRACT VII

The South Half (S½) of Section Nine (9), Township Twenty-nine (29) South, Range Nine (9) West, N.M.P.M., Luna County, New Mexico.

TRACT VIII

A Tract of land situate in the Northeast Quarter (NE¼) Section Eight (8), Township Twenty-nine (29) South, Range Nine (9) West, N.M.P.M., Luna County, New Mexico and being described as follows:

Beginning at the NE corner of the tract herein described, which point bears S00°04'04"W along the East line of said Section 8, 1675.83 feet and S89°55'55"W, 500.0 feet from the NE corner of said Section 8; Thence S00°04'04"E, 969.05 feet to the SE corner of this tract; Thence S89°56'34"W, 428.50 feet to the SW corner of this Tract; Thence N00°05'10"W, 776.50 feet to a point of this tract; Thence N89°55'55"E, 63.81 feet to a point of this tract; Thence N00°05'10"W, 192.47 feet to the NW corner of this tract; Thence N89°55'55"E, 365.0 feet to the point of beginning.

TRACT IX

A Tract of land situate in the Northeast Quarter (NE¼) of Section Eight (8), Township Twenty-nine (29) South, Range Nine (9) West, N.M.P.M., Luna County, New Mexico and being described as follows:

Beginning at the SE corner of the tract herein described which point bears S00°04'04"W along the East line of said Section 8, 1675.83 feet and S89°55'55"W, 865.0 feet from the NE corner of said Section 8; Thence S89°55'55"W, 63.81 feet to the SW corner of this tract; Thence N00°05'10"W, 639.18 feet to the NW corner of this tract; Thence S81°04'59"E along the South ROW of New Mexico State Highway No. 9, 64.61 feet to the NE corner of this tract; Thence S00°05'10"E, 629.09 feet to the point of beginning.

Project Access Requirements:

Project access will be as follows:

Normal vehicle entry will enter the project site from NM Highway 9 at a road location as shown on drawing 00-C-103, marked up by AMEC to show temporary facilities and included in Attachment K.

Alternative vehicle entry will be from NM Highway 9 via a road location as shown on drawing 00-G-100, along the East most side of Owner's property. This entry is not intended for normal use of entry to the project site.

Any persons desiring access to the project site will check in at the site guard shack, as shown on drawing 00-C-103, marked up by AMEC to show temporary facilities and included in Attachment K. Any persons or vehicles entering the project site will be subject to the project security requirements as established in the Project Execution Plan, including search of vehicles and persons.

Project access to the site will be controlled by project badges and a positive identification system. All personnel on site will be required to display an access badge at all times.

Attachment B
Scope of Work
Sapphire IABR Project

The Scope of Work for the Project shall be in accordance with the Plans and Specifications reference attachment O of this Contract.

This Contract will be valid to include three phases of work:

Phase 1 – 100 acre of Production Ponds, Harvest Unit, Pre-treatment Unit.
Phase 2 – Expand the pond capacity, reference Phase 1.
Phase 3 – Further expand the capacity of the ponds and installation of the Extraction Unit

For Phase 1 of the Work, Contractor expects to receive multiple work packages consisting of the following general outline:

1. Limited Notice to Proceed
Mobilization activity for establishment of the Project Contractor Offices and utilities. Site work activity will consist of establishment of the SWPPP BMP items, construction water well and establishment of a temporary pond, survey, soil prewet, clear and grub, and mass earthwork related to the Redacted Exemption 4

2. Utility

Redacted Exemption 4

2. Site

Redacted Exemption 4

3. Production Ponds (must directly follow site contract)

Redacted Exemption 4

4. Evaporation

Redacted Exemption 4

6. Harvest

Redacted Exemption 4

Redacted Exemption 4

8. Tanks

Redacted Exemption 4

7. Pre-Treatment

Redacted Exemption 4

For Phases 2 and 3, Contractor expects to receive additional multiple work packages associated with expansion of pond capacity at the Columbus site, expansion of the harvest and pre-treatment facilities at the Columbus site, and installation of an extraction facility at Owner's Las Cruces Test Facility.

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
	Sapphire Construction Schedule	1350	01-Apr-09 A	17-Jun-14
A1000	Redacted Exemption 4			
A1020				
A9030				
A1010				
A1990				
A2000				
	Construction - P			
A8840				
A12780				
	Construction Man			
A2020				
A2030				
	Procurement Phas			
A1980				
A2690				
A3050				
A18460				
A2710				
	Sitework			
A17630				
A17650				
A17640				
A17660				
A17670				
	Site Concrete			
A17680				
A17710				
A17690				
A17700				
A17720				
	Electrical Packag			
A17730				
A17740				
A17750				
A17760				
A17770				
	Electrical Packag			
A17780				
A17790				
A17800				
A17810				
A17820				
	Process Mechani			
A17830				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work | Critical Remaining Work | Summary

Remaining Work | Milestone

Date	Revision	Checked	Approved
10-May-11		JSA	

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A17840	Redacted Exemption 4			
A17850				
A17860				
A17870				
Metal Supply				
A17880				
A17890				
A17900				
A17910				
A17920				
A18470				
A18480				
Metal Installation				
A17930				
A17940				
A17950				
A17960				
A17970				
Work Package 07				
Pre Engineered				
A9440				
A9450				
A9460				
A9470				
A9480				
A9490				
A9500				
A9505				
A9510				
Pipe Insulation				
A17980				
A17990				
A18000				
A18010				
A18020				
Painting				
A18030				
A18040				
A18050				
A18060				
A18070				
Water Well Develo				
A18080				
A18090				
A18100				
A18110				

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Actual Work | Critical Remaining Work | Summary

Remaining Work | Milestone

Date	Revision	Checked	Approved
10-May-11		JSA	

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A18120	Redacted Exemption 4			
Fencing				
A18130				
A18140				
A18150				
A18160				
A18170				
Work Package 12				
Well Water Tan				
A10700				
A10710				
A10720				
A10730				
A10740				
A10750				
A10760				
A10770				
Nitric Acid Tan				
A10860				
A10870				
A10880				
A10890				
A10900				
A10910				
A10920				
A10930				
Algae Oil Stora				
A10460				
A10470				
A10480				
A10490				
A10500				
A10510				
A10520				
A10530				
Fire Water Tan				
A10380				
A10390				
A10400				
A10410				
A10420				
A10430				
A10440				
A10450				
DCS				
A18810				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Date	Revision	Checked	Approved
10-May-11		JSA	

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A18820	Redacted Exemption 4			
A18830				
A18840				
A18850				
A18860				
A18870				
A18880				
Equip. Package 0				
DAF 1				
A11290				
A11300				
A11310				
A11320				
A11330				
A11340				
A11350				
A11360				
Equip. Package 0				
Paddle Wheels				
A18510				
A12240				
A12250				
A12260				
A12200				
A12210				
A12220				
A12230				
Equip. Package 0				
Centrifuge				
A11450				
A11460				
A11470				
A11480				
A11490				
A11500				
A11510				
A11520				
Equip. Package 0				
Packaged Poly				
A18520				
A18530				
A18540				
A18550				
A18560				
A18570				
A18580				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Date	Revision	Checked	Approved
10-May-11		JSA	

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A18590	Redacted Exemption 4			
Equip. Package 0				
Algae Oil Day T				
A10540				
A10550				
A10560				
A10570				
A10580				
A10590				
A10600				
A10610				
Solvent Tank				
A12990				
A13000				
A13010				
A13020				
A13030				
A13040				
A13050				
A13060				
Equip. Package 0				
Phosphoric Ac				
A10060				
A10070				
A10080				
A10090				
A10100				
A10110				
A10120				
A10130				
Sulfuric Acid S				
A10140				
A10150				
A10160				
A10170				
A10180				
A10190				
A10200				
A10210				
Sodium Hypoc				
A10220				
A10230				
A10240				
A10250				
A10260				
A10270				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Date	Revision	Checked	Approved
10-May-11		JSA	

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A10280	Redacted Exemption 4			
A10290				
Coagulant Stor				
A16590				
A16600				
A16610				
A16620				
A16630				
A16640				
A16650				
A16660				
Caustic Storag				
A16670				
A16680				
A16690				
A16700				
A16710				
A16720				
A16730				
A16740				
DAF Thickened				
A16750				
A16760				
A16770				
A16780				
A16790				
A16800				
A16810				
A16820				
Equip. Package 0				
Monorail Syste				
A17550				
A17560				
A17570				
A17580				
A17590				
A17600				
A17610				
A17620				
Equip. Package 0				
Centrifugal Pu				
A9280				
A9290				
A9300				
A9310				
A9320				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Date	Revision	Checked	Approved
10-May-11		JSA	

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A9330	Redacted Exemption 4			
A9340				
A9350				
Positive Displa				
A11100				
A11110				
A11120				
A11130				
A11140				
A11150				
A11160				
A11170				
Equip. Package 0				
Transformers				
A17150				
A17160				
A17170				
A17180				
A17190				
A17200				
A17210				
A17220				
Equip. Package 1				
Switchboard				
A17390				
A17400				
A17410				
A17420				
A17430				
A17440				
A17450				
A17460				
Equip. Package 1				
Switchgear				
A17310				
A17320				
A17330				
A17340				
A17350				
A17360				
A17370				
A17380				
Equip. Package 1				
MCC				
A17230				
A17240				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work | Critical Remaining Work | Summary

Remaining Work | Milestone

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Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A17250	Redacted Exemption 4			
A17260				
A17270				
A17280				
A17290				
A17300				
Equip. Package 1				
Diesel Generat				
A12110				
A12160				
A12170				
A12180				
A12120				
A12130				
A12140				
A12150				
Equip. package 15				
Slide-Shear Ga				
A17470				
A17480				
A17490				
A17500				
A17510				
A17520				
A17530				
A17540				
Procurement Pha				
Sitework				
Earthwork				
A3110				
A12700				
A3170				
A3270				
A18740				
A3130				
A3150				
A18450				
A3140				
A3160				
A18730				
A3120				
A3260				
A12710				
Utilities				
A3200				
A3240				

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Activity ID	Activity Name	Original Duration	Start	Finish
A3840	Redacted Exemption 4			
A18890				
Electrical				
A12660				
A3690				
A3700				
A3770				
A3710				
A3810				
A3720				
A3730				
A3630				
A9010				
A3740				
A3830				
A3800				
A3760				
A3790				
A3820				
A3640				
A3660				
A3620				
A12670				
Piping				
A18430				
A18440				
Paving				
A18700				
A16220				
A16180				
A16200				
A18690				
A18720				
A16160				
A16230				
A16170				
A18710				
A14190				
A16240				
A16190				
A18750				
A18760				
Well System				
A3250				
Exterior Improvem				
A3220				

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amec

Activity ID	Activity Name	Original Duration	Start	Finish
A3230	Redacted Exemption 4			
Buildings & Struct				
A12640				
A12650				
Switchgear Electr				
Foundations				
A13080				
A13090				
Building Install				
A13280				
A13290				
Finishes				
Mechanical				
A13480				
A13490				
A13500				
Electrical / Inst				
A13780				
A13790				
A3750				
A13800				
Lower Pond Elect				
Foundations				
A13240				
A13250				
Building Install				
A13300				
A13310				
Finishes				
A14090				
Mechanical				
A13510				
A13520				
A13530				
Electrical / Inst				
A13810				
A13820				
A13830				
Lower Pond Elect				
Foundations				
A13260				
A13270				
Building Install				
A13460				
A13470				
Finishes				

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amec

Activity ID	Activity Name	Original Duration	Start	Finish
A14170	Redacted Exemption 4			
Mechanical				
A13750				
A13760				
A13770				
Electrical / Inst				
A14050				
A14060				
A14070				
Centrifuge Buildin				
Foundations				
A13200				
A13210				
Building Install				
A13340				
A13350				
Finishes				
A14110				
Mechanical				
A13570				
A13580				
A13590				
Electrical / Inst				
A13870				
A13880				
A13890				
Harvest/Extractio				
Foundations				
A13180				
A13190				
Building Install				
A13360				
A13370				
Finishes				
A14120				
Mechanical				
A13600				
A13610				
A13620				
Electrical / Inst				
A13900				
A13910				
A13920				
Dry Polymer Build				
Foundations				
A13160				

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Activity ID	Activity Name	Original Duration	Start	Finish
A13170	Redacted Exemption 4			
Building Install				
A13380				
A13390				
Finishes				
A5430				
A14130				
Mechanical				
A13630				
A13640				
A13650				
Electrical / Inst				
A13930				
A13940				
A13950				
Maintenance & Sh				
Foundations				
A13140				
A13150				
Building Install				
A13400				
A13410				
Finishes				
A14140				
Mechanical				
A13660				
A13670				
A13680				
Electrical / Inst				
A13960				
A13970				
A13980				
Office Building				
Foundations				
A13120				
A13130				
Building Install				
A13420				
A13430				
Finishes				
A14180				
A14150				
Mechanical				
A13690				
A13700				
A13710				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

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Activity ID	Activity Name	Original Duration	Start	Finish
	Electrical / Inst			
A13990	Redacted Exemption 4			
A14000				
A14010				
	Ponds			
	Production Ponds			
A12610				
A4010				
	Earthwork			
A14200				
A14240				
A14280				
A14320				
A14360				
A14400				
A14440				
A14480				
A14520				
A14560				
A14600				
A14640				
A14680				
A14720				
A14760				
A14800				
A14840				
A14880				
A14920				
A14960				
A15000				
A15040				
	Concrete			
A15940				
A15950				
A15960				
A15970				
A15980				
A15990				
A16000				
A16010				
A16020				
A16030				
A16040				
A16050				
A16060				
A16070				

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Activity ID	Activity Name	Original Duration	Start	Finish
A16080	Redacted Exemption 4			
A16090				
A16100				
A16110				
A16120				
A16130				
A16140				
A16150				
Liner				
A15080				
A15120				
A15160				
A15200				
A15240				
A15280				
A15320				
A15360				
A15400				
A15440				
A15480				
A15520				
A15560				
A15600				
A15640				
A15680				
A15720				
A15760				
A15800				
A15840				
A15880				
A15920				
Piping				
A12680				
A18180				
A18190				
A18200				
A18210				
A18220				
A12690				
A18230				
Electrical / Inst				
A4000				
Paddlewheels				
A16260				
A16270				
A16280				

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Activity ID	Activity Name	Original Duration	Start	Finish
A16290	Redacted Exemption 4			
A16300				
A16310				
A16320				
A16330				
A16340				
A16350				
A16360				
A16370				
A16380				
A16390				
A16400				
A16410				
A16420				
A16430				
A16440				
A16450				
A16460				
A16470				
Evaporation Pond				
A12720				
A12730				
Earthwork				
A5190				
A5200				
A5210				
A16550				
A5220				
A16560				
A16570				
A16580				
Liner				
A16480				
A16490				
A16500				
A16510				
Piping				
A16520				
A16530				
A16540				
Inoculation Ponds				
A12590				
A12600				
Earthwork				
A18240				
A18250				

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Activity ID	Activity Name	Original Duration	Start	Finish
A18260	Redacted Exemption 4			
A18270				
Concrete				
A18350				
Liner				
A18340				
Piping				
A18360				
Paddlewheels				
A18280				
Harvest Return P				
A18290				
A18320				
A18310				
A18300				
DAF Feed Pond &				
A18370				
A18380				
A18390				
Harvest Area				
A12740				
A5310				
A5700				
A12750				
Earthwork				
A5280				
A13070				
Foundations and				
Concrete				
A5420				
A5300				
A5590				
A5770				
A5780				
A5320				
A5330				
A5340				
A5350				
A5360				
A5370				
A5380				
A5450				
A5680				
A5460				
A5490				
A5400				

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Actual Work Critical Remaining Work Summary

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Activity ID	Activity Name	Original Duration	Start	Finish
A5500	Redacted Exemption 4			
A5390				
A5510				
A5580				
A18780				
A5470				
A5480				
A18790				
A18800				
A5810				
A5690				
A3670				
A5820				
Steel				
A12570				
A18620				
A18630				
A5830				
Set Equipment				
A5620				
A5790				
A5730				
A5760				
A18500				
A6700				
A5630				
A5710				
A5720				
A5740				
A18490				
A5750				
A5840				
A3680				
A6660				
Piping				
A5290				
A3300				
A5440				
A5640				
Electrical / Instru				
A5650				
A5660				
A5670				
Finishes				
A18640				
A18600				

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Actual Work | Critical Remaining Work | Summary

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Activity ID	Activity Name	Original Duration	Start	Finish
A18610	Redacted Exemption 4			
Extraction Area				
A12760				
A6650				
Extraction 1A				
Earthwork				
A5960				
Foundations a				
Concrete				
A5990				
A6020				
A6030				
A6040				
A6050				
A6460				
A6100				
A6110				
Steel				
A6120				
A18650				
Set Equipment				
A11180				
A6760				
A6770				
Piping				
A5980				
A6090				
A18770				
Electrical / Inst				
A18680				
Finishes				
A18670				
Extraction 1B				
Construction - P				
Construction - P				
Beneficial Occup				
A12540				
A12560				
A8660				
A8670				
A8680				
Completion of C				
A8700				
A8710				
A8730				

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Activity ID	Activity Name	Original Duration	Start	Finish
A8740	Redacted Exemption 4			
A8720				
A8760				
A8780				
A8800				
A8750				
A8770				
A8790				
A8810				
Stage Gate Evalu				
A8830				

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Attachment – E
Personnel Rates

Redacted Exemption 4	Redacted Exemption 4
Site CM Electrical	
Site Administration	
Site Runner/Delivery	
Off-Site Admin	
Off-Site Accounting	
Off-Site Government Reporting	

Attachment – I
Consumables

Abrasives and Abrasive Wheels & Discs
Absorbents Oil/ Dry General use only
Acetylene
Acid Battery Soldering
Adhesives Construction
Alcohol
Anchors Temporary Construction
Apron, Other Types
Apron, Welders
Arbors, Hole Saw
Bag , Bolt
Bags (Burlap / Paper / Cotton)
Barrels (Water / Trash / etc.
Battery, Flashlight & Lantern
Belt Pipe Sling
Bits for Small Tools
Blades, All Types (except concrete)
Blankets – Fire
Blankets Insulation (Temporary)
Blocking (For Stacking Materials)
Bracket, Float Handle
Brick, Rubbing
Broom. All Types
Brush, All Types
Bucket, All Types
Bulb, Blow Out Dust
Bulb, Flashlight, Lantern
Cable Wire Rope (Temporary)
Calcium Chloride Construction
Can Oil Spray
Canvas
Carbon Tetrachloride
Chains, Log Cable
Chisel All Types
Chocker All Types
Cleaner Tip
Compound Brazing
Compound Sweeping Cleaning Grinding
Construction Joint Prep Materials
Cord Extension
Crayon Marking
Cups Drinking
Cutter Wheels Blades
Dies
Disinfectants
Dispenser, Paper Cup
Dope PIPE
Drop Cloths

Dry finish materials
Dump Fees
Dunnage
Earthwork – small tools
Electric Light Bulbs
Electricity
Extractor Pie Screw
Fall protection
Files (All Hand)
Filters All Types (except equipment)
Fittings Hose
Flares Railroad
Flashlight
Flints Welding Lighter
Fluids Washing Cleaning
Fluids Washing Cleaning (Process Equipment)
Flux Brazing, Solder
Form Lumber
Form nails & fasteners
Form Oil
Form Plywood, ¾" MDO
Form Snaptie, 8 SF/EA
Funnels
Formwork – supported slab
Gases Welding
Gauge Drill
General Safety Equipment
Gloves Welding
Glycerin Construction
Grease
Hand Lines
Handles, All Types (others)
Hard Hats
Hook Cant, Timber
Hose Air/ Water 3/4" Dia Max
Hose Grease Gun
Ice
Jaw-Bolt Cutter Replacement
Key All Type
Knives All Types
Lamps- Flashlight, Lighting
Lanterns- Kerosene, Gasoline, 6Volt
Lens- Welding, Cutting
Light ,Drop
Light Bulbs-Const, Warehouse, Office
Lime
Locks
Lumber
Marker, Pipe Contour
Mirror- Inspection

Mop
Muratic Acid
Nails
Nozzle – Water
Nut Runner
Nut Setter
Oil Cutting
Oxygen Industrial Grade
Pad Polishing
Pail Galvanized
Paint Erection Marking
Pan, Drain
Paper -Towels ,Toilet, Wrapping
Pin Bull, Drift, Taper
Piping – small tools
Plug Pipe Test, Test Balls
Points Bull
Polyethylene and Visqueen
Pouch Canvas
Rags
Rain Wear, Jacket & Overalls
Rasps All Types
Reamers All Types
Rods Welding
Rope All Kinds
Rust Preventatives
Safety Glasses
Safety Vests
Scissors-Electrician
Scraper Hand, Sidewalk, Wall
Shackles
Sheath Plum Bob
Shield Eye Bench Grinder Face with
Brackets - Temporary
Shims
Sleeve, Welding
Snap Ties (Form Work)
Soap
Soapstone
Soapstone Holder
Solvents
Solvents Paints
Spindle, Reel Stand
Sponges
Stakes
Stakes, Paint, & Ribbons
Stencils-Numerical, Alphabetical
Strap Chin
Strap-for Strap Wrenches
Straw
String

Tags (Material/Tool/Shipping)
Tags Permanent Identification
Tap & Die Set Hand, Pipe, Plug, Pulley
Tape- Gum, Scotch, Cambric
Tarps
Temporary Construction Materials
Tip- Torch, Cutting
Torch Tig Repair parts
Tungsten
Turnbuckles
Wedges (Wood/Steel)
Welding Curtains
Wet Cure Materials
Wire (Tie/Form)
Wrap Arounds

Attachment K –
AMEC Temporary Facilities - Scope of Work

Office Trailer - Complete Furniture/Fixtures

Trailer/Office Equipment

Redacted Exemption 4

Construction Utilities

Redacted Exemption 4

ATTACHMENT L
CONTRACTOR INSURANCE

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Initial Drawing Markups Compiled 12/14/2010

ORIGINATOR	AC PLAN	DWG # Area #	DISCP.	DWG #	TITLE 1
HARRIS GROUP	100	00	A	100	Redacted
HARRIS GROUP	100	02	A	100	Exemption 4
HARRIS GROUP	100	03	A	101	
HARRIS GROUP	100	04	A	100	
HARRIS GROUP	100	09	A	100	
HARRIS GROUP	100	10	A	100	
HARRIS GROUP	100	10	A	110	
BROWN AND CALDWELL	100	00	C	100	
BROWN AND CALDWELL	100	00	C	101	
BROWN AND CALDWELL	100	00	C	102	
BROWN AND CALDWELL	100	00	C	103	
BROWN AND CALDWELL	100	00	C	104	
BROWN AND CALDWELL	100	00	C	105	
BROWN AND CALDWELL	100	00	C	106	
BROWN AND CALDWELL	100	00	C	107	
BROWN AND CALDWELL	100	00	C	108	
BROWN AND CALDWELL	100	00	C	109	
BROWN AND CALDWELL	100	00	C	111	
BROWN AND CALDWELL	100	00	C	112	
BROWN AND CALDWELL	100	00	C	113B	
BROWN AND CALDWELL	100	00	C	113	
BROWN AND CALDWELL	100	00	C	114	
BROWN AND CALDWELL	100	00	C	115	
BROWN AND CALDWELL	100	00	C	116	
BROWN AND CALDWELL	100	00	C	117	
BROWN AND CALDWELL	100	00	C	118	
HARRIS GROUP	100	00	C	160	
HARRIS GROUP	100	00	C	170	
HARRIS GROUP	100	00	C	175	
HARRIS GROUP	100	00	C	180	
BROWN AND CALDWELL	100	00	C	300	
BROWN AND CALDWELL	100	00	C	301	
BROWN AND CALDWELL	100	00	C	302	
BROWN AND CALDWELL	100	00	C	304	
BROWN AND CALDWELL	100	00	C	305	
BROWN AND CALDWELL	100	00	C	306	
BROWN AND CALDWELL	100	00	C	307	
HARRIS GROUP	100	00	C	350	
BROWN AND CALDWELL	100	00	C	446	
BROWN AND CALDWELL	100	02	C	100	
BROWN AND CALDWELL	100	02	C	103	
BROWN AND CALDWELL	100	02	C	104	
BROWN AND CALDWELL	100	02	C	110	
BROWN AND CALDWELL	100	02	C	111	
BROWN AND CALDWELL	100	02	C	203	
BROWN AND CALDWELL	100	02	C	204	
BROWN AND CALDWELL	100	02	C	205	
BROWN AND CALDWELL	100	02	C	206	
BROWN AND CALDWELL	100	02	C	207	
BROWN AND CALDWELL	100	02	C	208	
BROWN AND CALDWELL	100	02	C	209	
BROWN AND CALDWELL	100	02	C	220	
BROWN AND CALDWELL	100	02	C	221	
BROWN AND CALDWELL	100	02	C	222	
BROWN AND CALDWELL	100	02	C	223	
BROWN AND CALDWELL	100	02	C	224	

BROWN AND CALDWELL	100	02	C	225
BROWN AND CALDWELL	100	02	C	226
BROWN AND CALDWELL	100	02	C	227
BROWN AND CALDWELL	100	02	C	228
BROWN AND CALDWELL	100	02	C	229
BROWN AND CALDWELL	100	03	C	160
BROWN AND CALDWELL	100	03	C	260
HARRIS GROUP	100	00	E	001
HARRIS GROUP	100	00	E	002
HARRIS GROUP	100	00	E	010
HARRIS GROUP	100	00	E	021
HARRIS GROUP	100	00	E	100
HARRIS GROUP	100	00	E	101
HARRIS GROUP	100	00	E	102
HARRIS GROUP	100	00	E	103
HARRIS GROUP	100	00	E	104
HARRIS GROUP	100	00	E	105
HARRIS GROUP	100	00	E	106
HARRIS GROUP	100	00	E	107
HARRIS GROUP	100	00	E	108
HARRIS GROUP	100	00	E	110
HARRIS GROUP	100	00	E	111
HARRIS GROUP	100	00	E	112
HARRIS GROUP	100	00	E	114
HARRIS GROUP	100	00	E	115
HARRIS GROUP	100	00	E	118
HARRIS GROUP	100	00	E	119
HARRIS GROUP	100	00	E	120
HARRIS GROUP	100	00	E	121
HARRIS GROUP	100	00	E	122
HARRIS GROUP	100	00	E	123
HARRIS GROUP	100	00	E	124
HARRIS GROUP	100	00	E	125
HARRIS GROUP	100	00	E	126
HARRIS GROUP	100	00	E	130
HARRIS GROUP	100	00	E	201
HARRIS GROUP	100	00	E	202
HARRIS GROUP	100	00	E	203
HARRIS GROUP	100	00	E	204
HARRIS GROUP	100	00	E	205
HARRIS GROUP	100	00	E	300
HARRIS GROUP	100	00	E	301
HARRIS GROUP	100	00	E	302
HARRIS GROUP	100	00	E	303
HARRIS GROUP	100	00	E	304
HARRIS GROUP	100	00	E	305
HARRIS GROUP	100	00	E	306
HARRIS GROUP	100	00	E	308
HARRIS GROUP	100	00	E	310
HARRIS GROUP	100	00	E	311
HARRIS GROUP	100	00	E	313
HARRIS GROUP	100	00	E	314
HARRIS GROUP	100	00	E	315
HARRIS GROUP	100	00	E	320
HARRIS GROUP	100	00	E	321
HARRIS GROUP	100	00	E	322
HARRIS GROUP	100	00	E	323
HARRIS GROUP	100	00	E	324
BROWN AND CALDWELL	100	00	E	351
BROWN AND CALDWELL	100	00	E	352
BROWN AND CALDWELL	100	00	E	353
HARRIS GROUP	100	00	E	400

Redacted
Exemption 4

HARRIS GROUP	100	00	E	504	Redacted
HARRIS GROUP	100	00	E	505	Exemption 4
HARRIS GROUP	100	00	E	510	
HARRIS GROUP	100	00	E	511	
HARRIS GROUP	100	00	E	512	
HARRIS GROUP	100	00	E	514	
HARRIS GROUP	100	00	E	515	
HARRIS GROUP	100	00	E	516	
HARRIS GROUP	100	00	E	517	
HARRIS GROUP	100	00	E	518	
HARRIS GROUP	100	00	E	519	
HARRIS GROUP	100	00	E	520	
HARRIS GROUP	100	00	E	521	
HARRIS GROUP	100	00	E	522	
HARRIS GROUP	100	00	E	539	
HARRIS GROUP	100	00	E	540	
HARRIS GROUP	100	00	E	541	
HARRIS GROUP	100	00	E	542	
BROWN AND CALDWELL	100	00	E	560	
BROWN AND CALDWELL	100	00	E	590	
BROWN AND CALDWELL	100	00	E	591	
HARRIS GROUP	100	02	E	025	
HARRIS GROUP	100	02	E	026	
BROWN AND CALDWELL	100	02	E	029	
BROWN AND CALDWELL	100	02	E	030	
BROWN AND CALDWELL	100	02	E	031	
BROWN AND CALDWELL	100	02	E	152	
BROWN AND CALDWELL	100	02	E	153	
BROWN AND CALDWELL	100	02	E	154	
BROWN AND CALDWELL	100	02	E	155	
BROWN AND CALDWELL	100	02	E	156	
BROWN AND CALDWELL	100	02	E	157	
BROWN AND CALDWELL	100	02	E	158	
BROWN AND CALDWELL	100	02	E	159	
BROWN AND CALDWELL	100	02	E	160	
BROWN AND CALDWELL	100	02	E	161	
BROWN AND CALDWELL	100	02	E	162	
BROWN AND CALDWELL	100	02	E	163	
BROWN AND CALDWELL	100	02	E	164	
BROWN AND CALDWELL	100	02	E	165	
BROWN AND CALDWELL	100	02	E	174	
HARRIS GROUP	100	02	E	181	
HARRIS GROUP	100	02	E	182	
BROWN AND CALDWELL	100	02	E	192	
BROWN AND CALDWELL	100	02	E	552	
BROWN AND CALDWELL	100	02	E	553	
BROWN AND CALDWELL	100	02	E	554	
BROWN AND CALDWELL	100	03	E	027	
HARRIS GROUP	100	03	E	035	
HARRIS GROUP	100	03	E	036	
BROWN AND CALDWELL	100	03	E	151	
BROWN AND CALDWELL	100	03	E	152	
BROWN AND CALDWELL	100	03	E	171	
BROWN AND CALDWELL	100	03	E	172	
BROWN AND CALDWELL	100	03	E	173	
BROWN AND CALDWELL	100	03	E	174	
BROWN AND CALDWELL	100	03	E	192	
BROWN AND CALDWELL	100	03	E	195	
BROWN AND CALDWELL	100	03	E	550	
BROWN AND CALDWELL	100	03	E	551	
BROWN AND CALDWELL	100	03	E	560	
BROWN AND CALDWELL	100	03	E	561	
HARRIS GROUP	100	04	E	012	

HARRIS GROUP	100	04	E	013	Redacted
HARRIS GROUP	100	04	E	021	Exemption 4
HARRIS GROUP	100	04	E	022	
HARRIS GROUP	100	04	E	025	
HARRIS GROUP	100	04	E	123	
HARRIS GROUP	100	04	E	133	
HARRIS GROUP	100	04	E	140	
HARRIS GROUP	100	04	E	508	
HARRIS GROUP	100	04	E	509	
HARRIS GROUP	100	09	E	121	
HARRIS GROUP	100	09	E	122	
HARRIS GROUP	100	09	E	123	
HARRIS GROUP	100	09	E	126	
HARRIS GROUP	100	09	E	127	
HARRIS GROUP	100	09	E	131	
HARRIS GROUP	100	09	E	132	
HARRIS GROUP	100	09	E	133	
HARRIS GROUP	100	09	E	134	
HARRIS GROUP	100	09	E	136	
HARRIS GROUP	100	09	E	137	
HARRIS GROUP	100	09	E	141	
HARRIS GROUP	100	09	E	142	
HARRIS GROUP	100	09	E	143	
BROWN AND CALDWELL	100	09	E	151	
BROWN AND CALDWELL	100	09	E	171	
BROWN AND CALDWELL	100	09	E	191	
BROWN AND CALDWELL	100	09	E	560	
HARRIS GROUP	100	10	E	011	
HARRIS GROUP	100	10	E	109	
HARRIS GROUP	100	10	E	138	
HARRIS GROUP	100	10	E	148	
HARRIS GROUP	100	00	G	001	
HARRIS GROUP	100	00	G	002	
HARRIS GROUP	100	00	G	003	
HARRIS GROUP	100	00	G	004	
HARRIS GROUP	100	00	G	005	
HARRIS GROUP	100	00	G	100	
HARRIS GROUP	100	00	G	101	
HARRIS GROUP	100	00	G	103	
HARRIS GROUP	100	00	G	105	
HARRIS GROUP	100	00	G	106	
HARRIS GROUP	100	00	G	107	
HARRIS GROUP	100	00	G	108	
HARRIS GROUP	100	00	G	150	
HARRIS GROUP	100	00	G	200	
HARRIS GROUP	100	00	G	201	
BROWN AND CALDWELL	100	02	G	202	
HARRIS GROUP	100	00	I	100	
HARRIS GROUP	100	00	I	102	
HARRIS GROUP	100	00	I	103	
HARRIS GROUP	100	00	I	104	
HARRIS GROUP	100	00	I	112	
HARRIS GROUP	100	00	I	113	
HARRIS GROUP	100	00	I	119	
HARRIS GROUP	100	00	I	120	
HARRIS GROUP	100	00	I	122	
HARRIS GROUP	100	00	I	124	
HARRIS GROUP	100	00	I	501	
HARRIS GROUP	100	00	I	502	
HARRIS GROUP	100	00	I	503	
HARRIS GROUP	100	00	I	504	

HARRIS GROUP	100	00	I	505	Redacted
BROWN AND CALDWELL	100	02	I	551	Exemption 4
BROWN AND CALDWELL	100	02	I	563	
BROWN AND CALDWELL	100	02	I	591	
BROWN AND CALDWELL	100	02	I	592	
BROWN AND CALDWELL	100	02	I	593	
BROWN AND CALDWELL	100	02	I	594	
BROWN AND CALDWELL	100	02	I	595	
BROWN AND CALDWELL	100	02	I	596	
BROWN AND CALDWELL	100	02	I	597	
BROWN AND CALDWELL	100	02	I	598	
BROWN AND CALDWELL	100	02	I	599	
BROWN AND CALDWELL	100	02	I	600	
BROWN AND CALDWELL	100	02	I	601	
BROWN AND CALDWELL	100	02	I	602	
BROWN AND CALDWELL	100	02	I	603	
BROWN AND CALDWELL	100	02	I	604	
BROWN AND CALDWELL	100	02	I	605	
BROWN AND CALDWELL	100	02	I	606	
BROWN AND CALDWELL	100	02	I	607	
BROWN AND CALDWELL	100	02	I	608	
BROWN AND CALDWELL	100	02	I	609	
BROWN AND CALDWELL	100	02	I	610	
BROWN AND CALDWELL	100	02	I	611	
BROWN AND CALDWELL	100	02	I	612	
BROWN AND CALDWELL	100	02	I	613	
BROWN AND CALDWELL	100	02	I	614	
BROWN AND CALDWELL	100	02	I	615	
BROWN AND CALDWELL	100	02	I	616	
BROWN AND CALDWELL	100	03	I	551	
BROWN AND CALDWELL	100	03	I	552	
BROWN AND CALDWELL	100	03	I	553	
BROWN AND CALDWELL	100	03	I	554	
BROWN AND CALDWELL	100	03	I	555	
BROWN AND CALDWELL	100	03	I	571	
BROWN AND CALDWELL	100	03	I	574	
HARRIS GROUP	100	09	I	514	
HARRIS GROUP	100	09	I	519	
HARRIS GROUP	100	09	I	520-1	
HARRIS GROUP	100	09	I	520-2	
HARRIS GROUP	100	09	I	521-1	
HARRIS GROUP	100	09	I	521-2	
HARRIS GROUP	100	09	I	522-1	
HARRIS GROUP	100	09	I	522-2	
HARRIS GROUP	100	09	I	523-1	
HARRIS GROUP	100	09	I	523-2	
HARRIS GROUP	100	09	I	524	
HARRIS GROUP	100	09	I	525	
HARRIS GROUP	100	09	I	544	
HARRIS GROUP	100	09	I	545	
HARRIS GROUP	100	09	I	546	
HARRIS GROUP	100	09	I	547	
HARRIS GROUP	100	09	I	548	
BROWN AND CALDWELL	100	09	I	571	
BROWN AND CALDWELL	100	09	I	572	
HARRIS GROUP	100	00	F	001	
BROWN AND CALDWELL	100	00	F	001	
HARRIS GROUP	100	00	F	100	
HARRIS GROUP	100	00	F	301	
HARRIS GROUP	100	01	F	210	
HARRIS GROUP	100	01	F	313	
HARRIS GROUP	100	01	F	314	

BROWN AND CALDWELL	100	02	F	238	Redacted
BROWN AND CALDWELL	100	02	F	239	Exemption 4
BROWN AND CALDWELL	100	02	F	250	
BROWN AND CALDWELL	100	02	F	320	
BROWN AND CALDWELL	100	02	F	350	
BROWN AND CALDWELL	100	02	F	351	
BROWN AND CALDWELL	100	02	F	353	
BROWN AND CALDWELL	100	02	F	354	
BROWN AND CALDWELL	100	02	F	355	
BROWN AND CALDWELL	100	02	F	356	
BROWN AND CALDWELL	100	02	F	357	
BROWN AND CALDWELL	100	02	F	358	
BROWN AND CALDWELL	100	02	F	360	
BROWN AND CALDWELL	100	02	F	361	
BROWN AND CALDWELL	100	02	F	362	
BROWN AND CALDWELL	100	02	F	363	
BROWN AND CALDWELL	100	02	F	364	
BROWN AND CALDWELL	100	02	F	220	
BROWN AND CALDWELL	100	02	F	229	
BROWN AND CALDWELL	100	02	F	230	
BROWN AND CALDWELL	100	02	F	231	
BROWN AND CALDWELL	100	02	F	232	
BROWN AND CALDWELL	100	02	F	233	
BROWN AND CALDWELL	100	02	F	234	
BROWN AND CALDWELL	100	02	F	235	
BROWN AND CALDWELL	100	02	F	236	
BROWN AND CALDWELL	100	02	F	237	
BROWN AND CALDWELL	100	02	F	359	
BROWN AND CALDWELL	100	03	F	230	
BROWN AND CALDWELL	100	03	F	233	
BROWN AND CALDWELL	100	03	F	250	
BROWN AND CALDWELL	100	03	F	324	
BROWN AND CALDWELL	100	03	F	330	
BROWN AND CALDWELL	100	03	F	331	
BROWN AND CALDWELL	100	03	F	332	
BROWN AND CALDWELL	100	03	F	333	
BROWN AND CALDWELL	100	03	F	345	
BROWN AND CALDWELL	100	03	F	346	
BROWN AND CALDWELL	100	03	F	350	
BROWN AND CALDWELL	100	03	F	352	
HARRIS GROUP	100	04	F	240	
HARRIS GROUP	100	04	F	241	
HARRIS GROUP	100	04	F	242	
HARRIS GROUP	100	07	F	271	
HARRIS GROUP	100	09	F	290	
HARRIS GROUP	100	09	F	292	
BROWN AND CALDWELL	100	09	F	293	
BROWN AND CALDWELL	100	09	F	294	
HARRIS GROUP	100	09	F	390	
HARRIS GROUP	100	09	F	391	
HARRIS GROUP	100	09	F	392	
HARRIS GROUP	100	09	F	393	
HARRIS GROUP	100	09	F	395	
HARRIS GROUP	100	09	F	399	
HARRIS GROUP	100	09	F	400	
HARRIS GROUP	100	09	F	402	
HARRIS GROUP	100	09	F	403	
HARRIS GROUP	100	09	F	406	
HARRIS GROUP	100	09	F	407	
HARRIS GROUP	100	09	F	408	
HARRIS GROUP	100	09	F	410	
HARRIS GROUP	100	09	F	411	
BROWN AND CALDWELL	100	09	F	415	

BROWN AND CALDWELL	100	09	F	417	Redacted
HARRIS GROUP	100	09	F	396	Exemption 4
BROWN AND CALDWELL	100	00	M	025	
BROWN AND CALDWELL	100	00	M	026	
BROWN AND CALDWELL	100	00	M	027	
BROWN AND CALDWELL	100	00	M	028	
BROWN AND CALDWELL	100	00	M	029	
BROWN AND CALDWELL	100	00	M	030	
BROWN AND CALDWELL	100	00	M	031	
BROWN AND CALDWELL	100	02	M	151	
BROWN AND CALDWELL	100	02	M	153	
BROWN AND CALDWELL	100	02	M	154	
BROWN AND CALDWELL	100	02	M	250	
BROWN AND CALDWELL	100	03	M	151	
BROWN AND CALDWELL	100	03	M	152	
BROWN AND CALDWELL	100	03	M	153	
BROWN AND CALDWELL	100	03	M	154	
BROWN AND CALDWELL	100	03	M	253	
BROWN AND CALDWELL	100	03	M	251	
BROWN AND CALDWELL	100	03	M	252	
HARRIS GROUP	100	09	M	501	
HARRIS GROUP	100	09	M	503	
HARRIS GROUP	100	09	M	504	
HARRIS GROUP	100	09	M	506	
HARRIS GROUP	100	09	M	507	
HARRIS GROUP	100	09	M	508	
HARRIS GROUP	100	09	M	510	
HARRIS GROUP	100	09	M	512	
HARRIS GROUP	100	09	M	513	
HARRIS GROUP	100	09	M	516	
HARRIS GROUP	100	09	M	518	
BROWN AND CALDWELL	100	09	M	190	
BROWN AND CALDWELL	100	09	M	191	
BROWN AND CALDWELL	100	09	M	250	
BROWN AND CALDWELL	100	09	M	251	
HARRIS GROUP	100	00	P	100	
HARRIS GROUP	100	00	P	116	
HARRIS GROUP	100	00	P	119	
HARRIS GROUP	100	00	P	120	
HARRIS GROUP	100	00	P	121	
HARRIS GROUP	100	00	P	122	
HARRIS GROUP	100	00	P	123	
HARRIS GROUP	100	00	P	124	
HARRIS GROUP	100	00	P	130	
HARRIS GROUP	100	00	P	131	
HARRIS GROUP	100	00	P	132	
HARRIS GROUP	100	00	P	133	
HARRIS GROUP	100	00	P	200	
HARRIS GROUP	100	00	P	201	
HARRIS GROUP	100	00	P	202	
HARRIS GROUP	100	00	P	203	
HARRIS GROUP	100	00	P	204	
HARRIS GROUP	100	00	P	300	
HARRIS GROUP	100	00	P	400	
HARRIS GROUP	100	00	P	401	
HARRIS GROUP	100	00	P	102	
HARRIS GROUP	100	00	P	103	
HARRIS GROUP	100	00	P	108	
HARRIS GROUP	100	00	P	112	
HARRIS GROUP	100	00	P	113	
HARRIS GROUP	100	00	P	114	
HARRIS GROUP	100	00	P	115	
HARRIS GROUP	100	00	P	124	

HARRIS GROUP	100	00	P	107
HARRIS GROUP				
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HARRIS GROUP				
HARRIS GROUP	100	00	S	001
HARRIS GROUP	100	00	S	002
HARRIS GROUP	100	00	S	004
HARRIS GROUP	100	00	S	005
HARRIS GROUP	100	00	S	006
HARRIS GROUP	100	00	S	007
HARRIS GROUP	100	00	S	008
HARRIS GROUP	100	00	S	009
HARRIS GROUP	100	00	S	010
HARRIS GROUP	100	00	S	011
BROWN AND CALDWELL	100	00	S	025
BROWN AND CALDWELL	100	00	S	026
BROWN AND CALDWELL	100	00	S	027
HARRIS GROUP	100	00	S	050
HARRIS GROUP	100	00	S	051
HARRIS GROUP	100	00	S	100
HARRIS GROUP	100	00	S	300
HARRIS GROUP	100	02	S	100
BROWN AND CALDWELL	100	02	S	110
BROWN AND CALDWELL	100	02	S	111
BROWN AND CALDWELL	100	02	S	112
BROWN AND CALDWELL	100	02	S	371

Redacted
Exemption 4

BROWN AND CALDWELL	100	02	S	372	Redacted Exemption 4
BROWN AND CALDWELL	100	02	S	373	
BROWN AND CALDWELL	100	02	S	374	
HARRIS GROUP	100	03	S	101	
BROWN AND CALDWELL	100	03	S	151	
BROWN AND CALDWELL	100	03	S	302	
BROWN AND CALDWELL	100	03	S	350	
BROWN AND CALDWELL	100	03	S	351	
BROWN AND CALDWELL	100	03	S	500	
BROWN AND CALDWELL	100	03	S	501 REV A	
HARRIS GROUP	100	04	S	100	
HARRIS GROUP	100	09	S	100	
HARRIS GROUP	100	09	S	101	
HARRIS GROUP	100	09	S	102	
HARRIS GROUP	100	09	S	103	
HARRIS GROUP	100	09	S	104	
HARRIS GROUP	100	09	S	105	
HARRIS GROUP	100	09	S	106	
HARRIS GROUP	100	09	S	107	
BROWN AND CALDWELL	100	09	S	190 REV A	
HARRIS GROUP	100	09	S	300	
HARRIS GROUP	100	10	S	100	
HARRIS GROUP	100	10	S	105	
HARRIS GROUP	100	10	S	111	
HARRIS GROUP	100	10	S	112	
HARRIS GROUP	100	10	S	113	
HARRIS GROUP	100	10	S	114	
HARRIS GROUP	100	10	S	115	
HARRIS GROUP	100	10	S	117	
HARRIS GROUP	100	10	S	118	
HARRIS GROUP	100	10	S	119	
HARRIS GROUP	100	10	S	300	
HARRIS GROUP	100	10	S	500	
HARRIS GROUP	100	10	S	501	

TITLE 2	ISSUED FOR:	CURRENT REV REV	DATE	1 PAST REV REV	DATE	2 PAS REV
ARCHITECTURAL						
Redacted Exemption 4		B	03/31/11			
		B	03/31/11			
		B	03/31/11			
		B	03/31/11			
		B	03/31/11			
		B	03/31/11			
		A	04/12/11			
CIVIL						
Redacted Exemption 4			04/12/11			
			04/12/11			
			04/12/11			
		A	04/14/11		04/12/11	
		A	04/15/11		04/12/11	
			04/12/11			
		A	04/14/11		04/12/11	
			04/12/11			
			04/12/11			
			04/12/11			
		B	04/15/11	A	04/06/11	
			04/14/11		04/12/11	
		A	04/12/11		04/12/11	
		B	04/15/11	A	04/16/11	
			04/12/11			
		A	04/04/11			
		B	04/15/11	A	04/06/11	
		B	04/15/11	A	04/06/11	
		A	04/14/11			
		B	03/31/11			
		B	03/31/11			
		C	03/31/11			
		B	03/31/11			
			04/12/11			
			04/12/11			
			04/12/11			
		A	04/15/11		04/12/11	
		A	04/15/11		04/12/11	
			04/12/11			
			04/12/11			
		B	03/31/11			
			04/12/11			
			04/12/11			
		B	04/15/11	A	04/06/11	
		B	04/15/11	A	04/06/11	
		A	04/06/11		04/12/11	
		A	04/15/11	A	04/12/11	
		A	04/15/11		04/12/11	
		a	04/15/11		04/12/11	
		A	04/12/11			
		A	04/12/11			
		A	04/12/11			
		A	04/15/11		04/12/11	
		A	04/14/11	A	04/12/11	
			04/12/11			
			04/12/11			
			04/12/11			
		A	04/14/11	A	04/12/11	
		A	04/12/11			

Redacted Exemption 4	A	04/12/11		
	A	04/12/11		
	A	04/14/11	A	04/12/11
	A	04/12/11		
	A	04/12/11		
		04/12/11		
		04/12/11		
ELECTRICAL				
Redacted Exemption 4	C	03/31/11		
	B	03/31/11		
	B	03/31/11		
	B	03/31/11		
	C	03/31/11		
	C	04/13/11	B	03/31/11
	C	04/13/11	B	03/31/11
	B	04/13/11		
	C	04/13/11	B	03/31/11
	C	04/13/11	B	03/31/11
	B	03/31/11		
	C	04/13/11	B	03/31/11
	C	04/13/11	B	03/31/11
	C	03/31/11		
	C	03/31/11		
	D	03/31/11		
	C	04/13/11	B	03/31/11
	B	03/31/11		
	B	03/31/11		
	C	04/13/11	B	03/31/11
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	B	04/13/11	A	03/31/11
	B	04/13/11	A	03/31/11
	B	04/13/11	A	03/31/11
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	A	04/13/11		
	A	04/13/11		
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	A	03/31/11		
	B	04/13/11		
	B	04/13/11		
	C	04/13/11	B	03/31/11
	C	04/13/11	B	03/31/11
	A	03/31/11		
	B	04/13/11	A	03/31/11
	A	04/13/11		
		04/12/11		
		04/12/11		
		04/12/11		
	A	03/31/11		

Redacted Exemption 4

	A	03/31/11	
	B	03/31/11	
	A	03/31/11	
	C	03/31/11	
	B	03/31/11	
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	B	03/31/11	
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	B	03/31/11	
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	B	03/31/11	
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	H	03/31/11	
	H	03/31/11	
	D	03/31/11	
	E	03/31/11	
	B	03/31/11	
	A	03/31/11	
		04/12/11	
		04/12/11	
		04/12/11	
	B	03/31/11	
	B	03/31/11	
		04/12/11	
	A	04/12/11	
	A	04/12/11	
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Instrument Controls					
Redacted Exemption 4	A	03/31/11			
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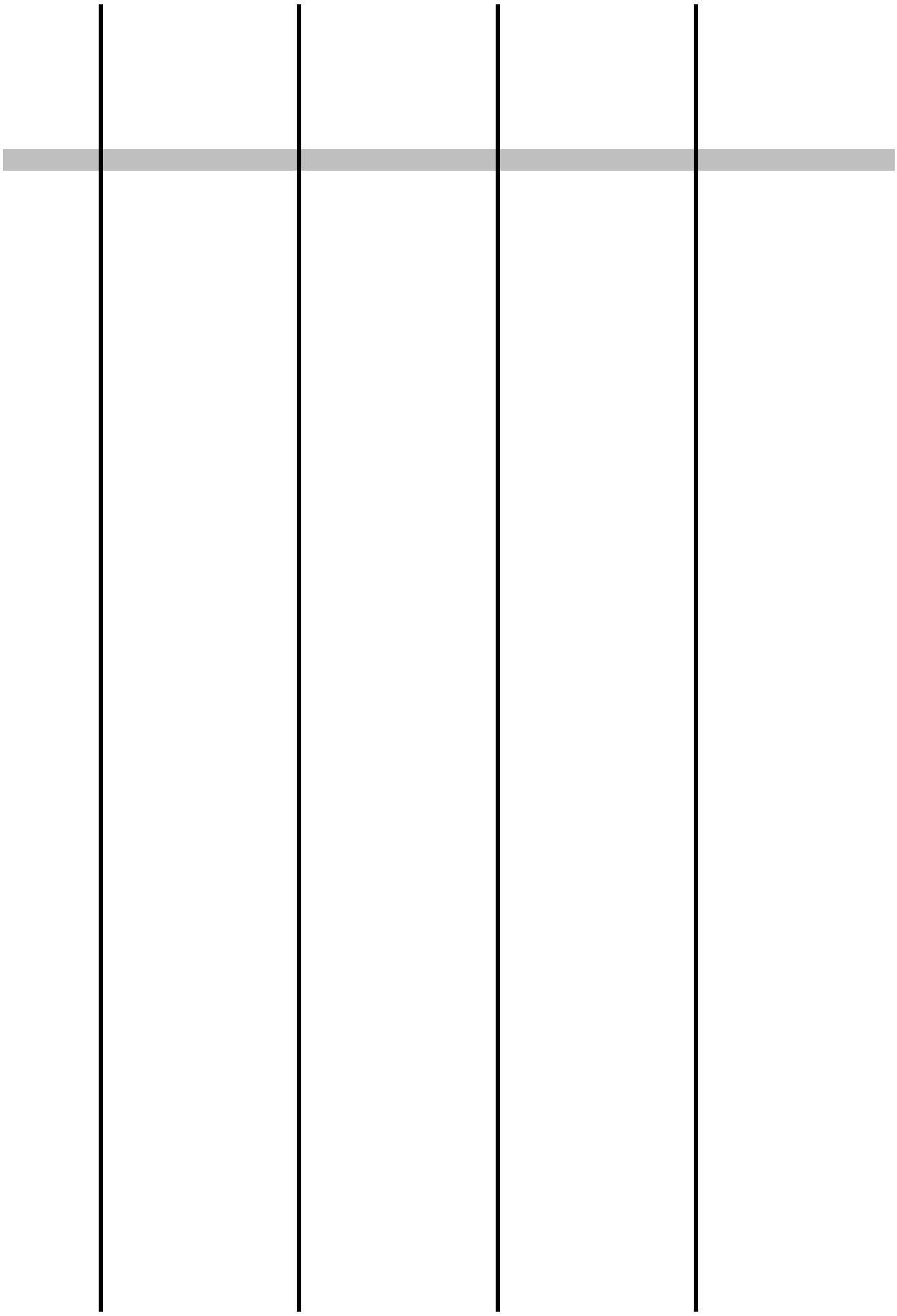

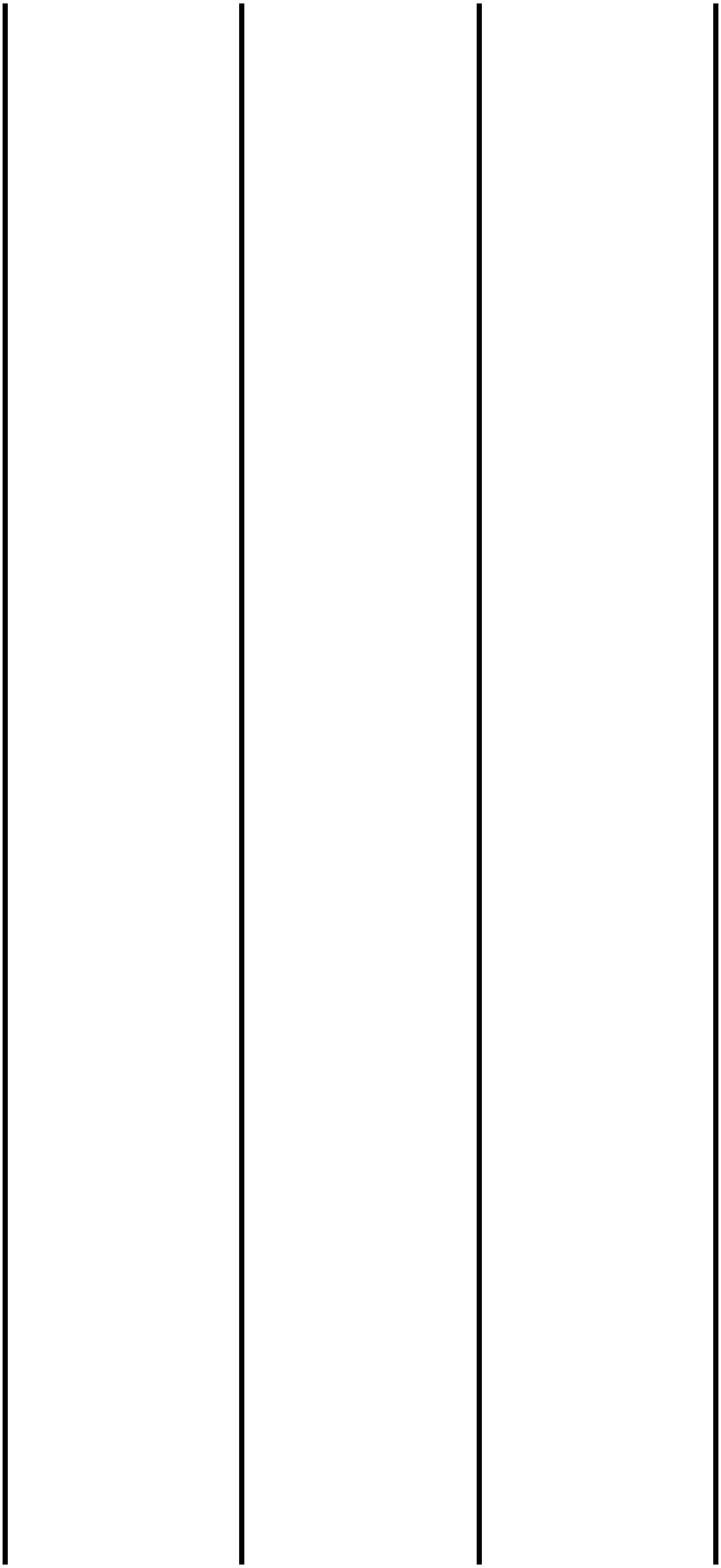

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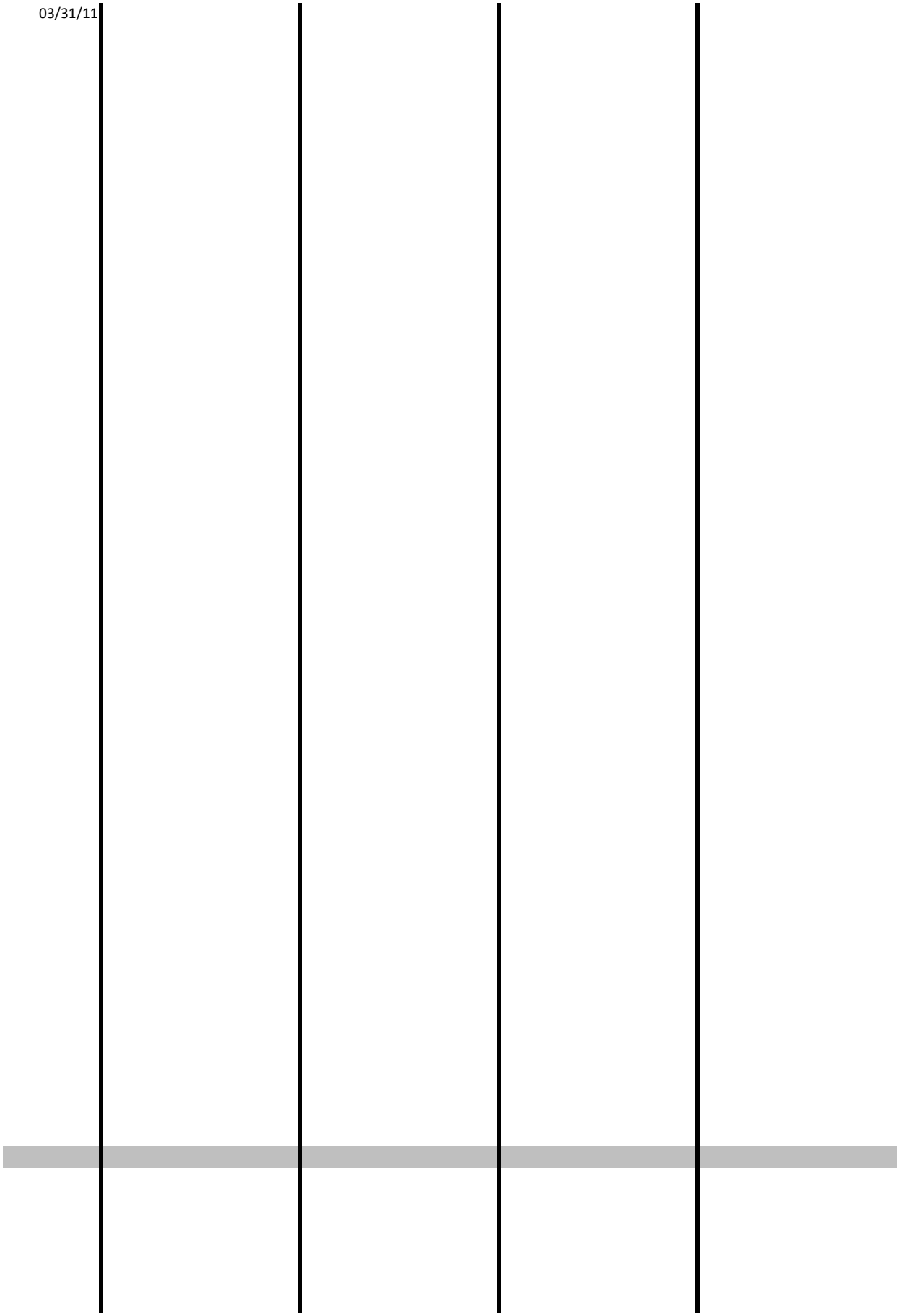

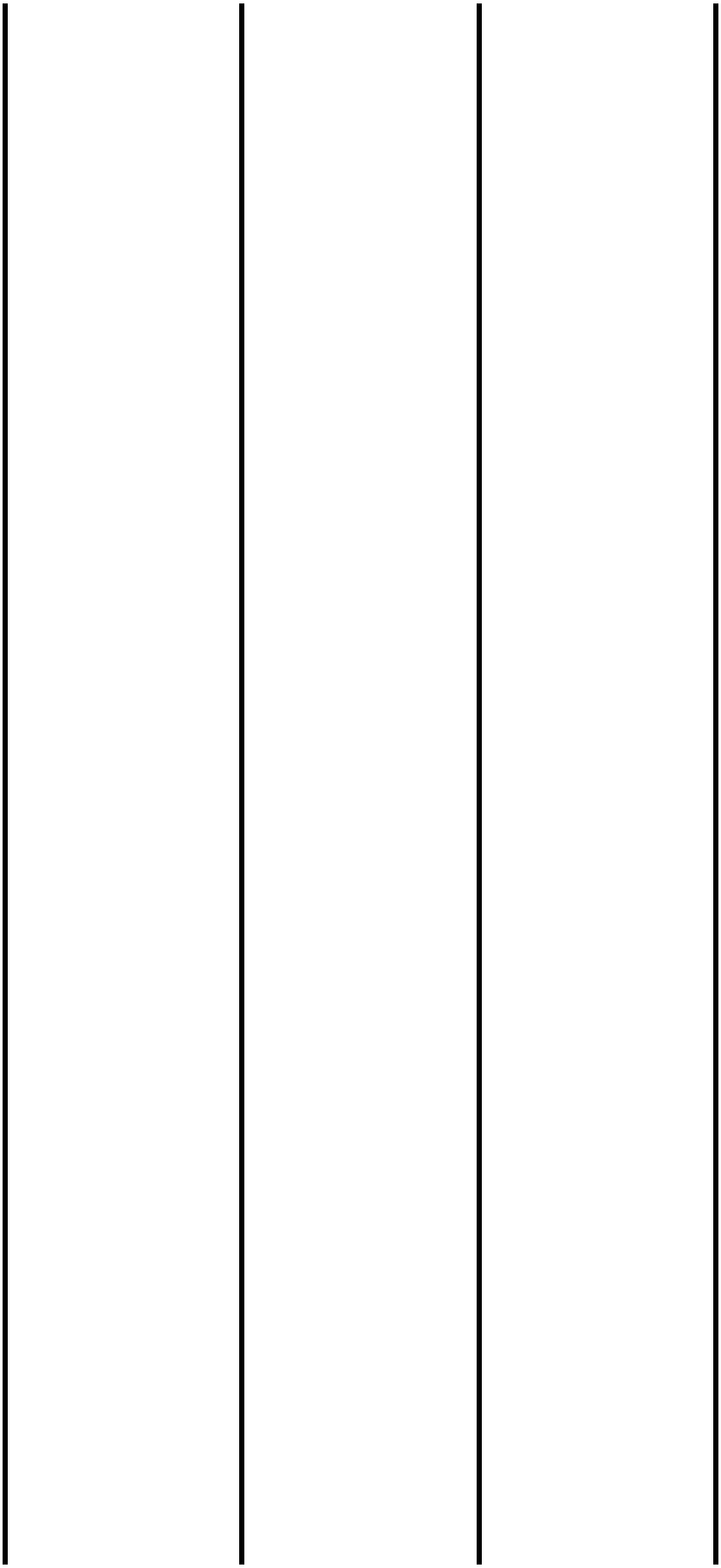

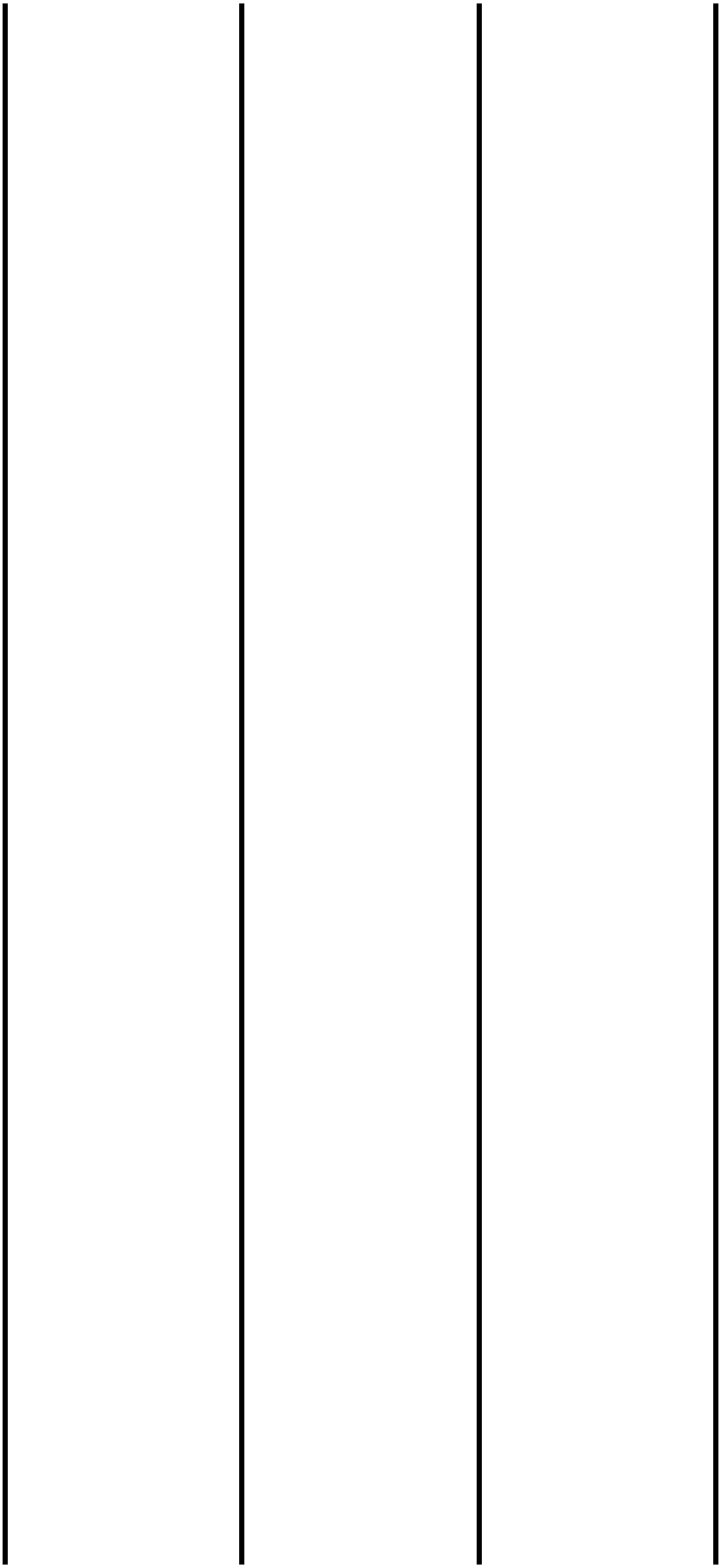

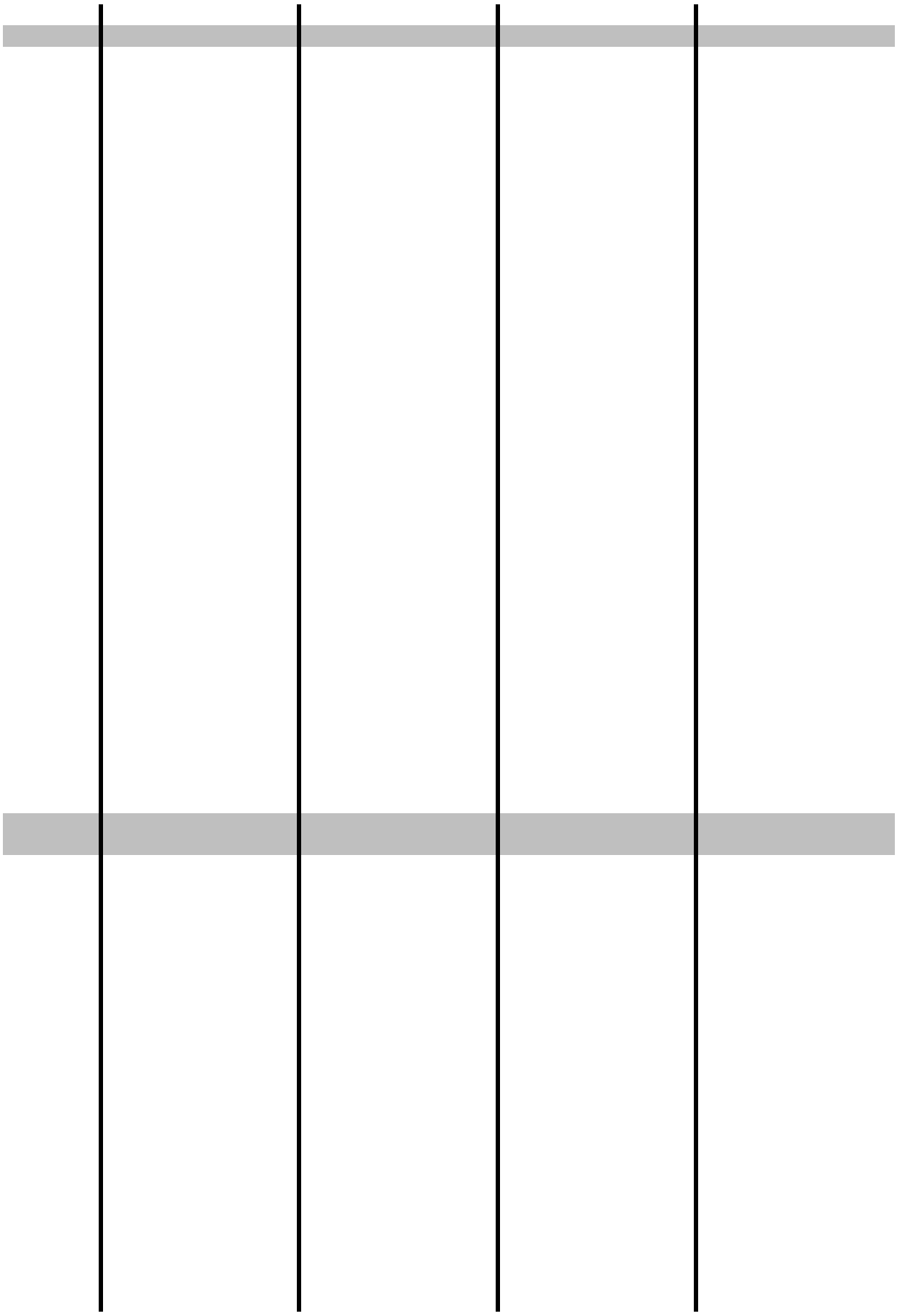

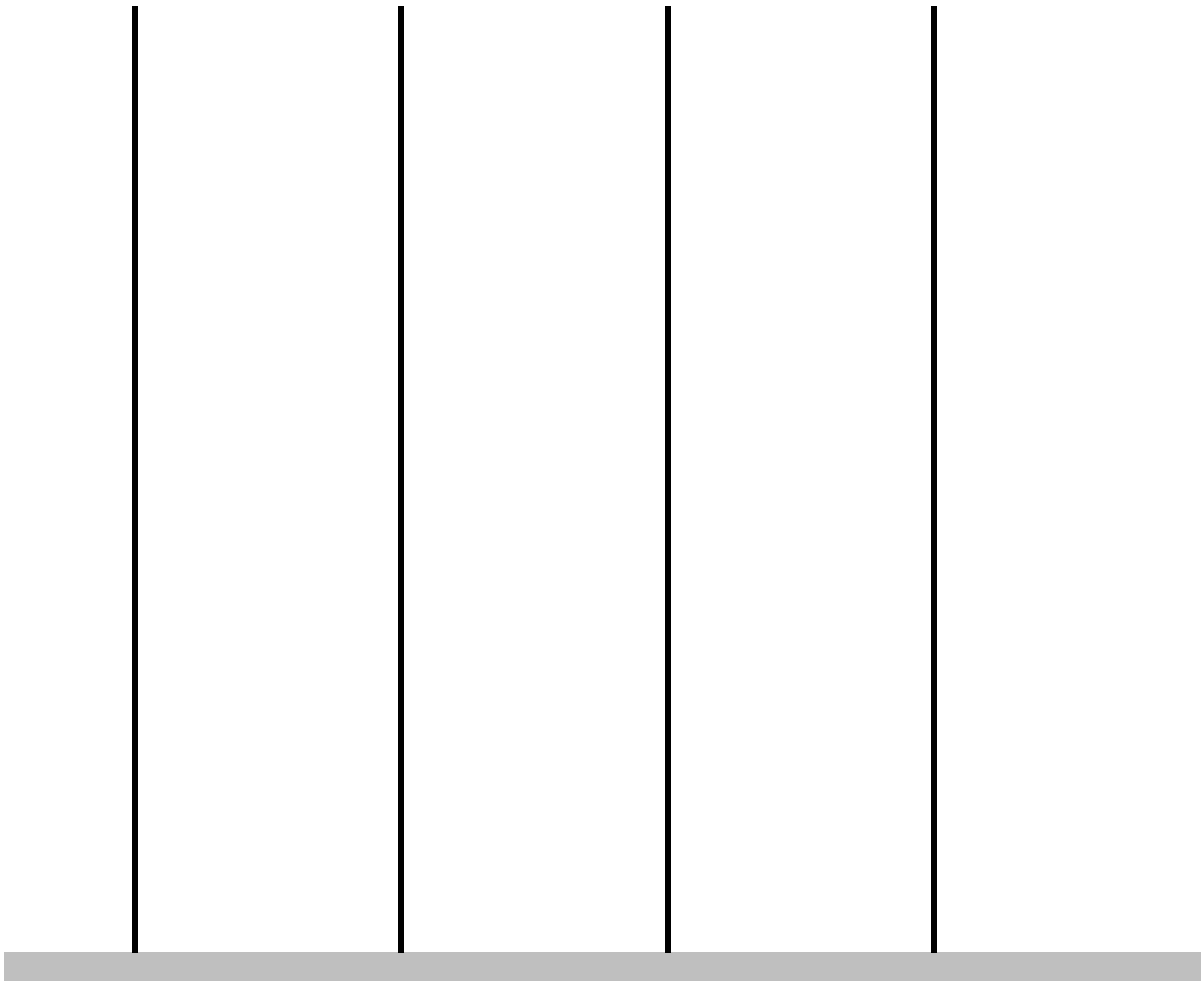

ATTACHMENT Q-1
FORM OF APPLICATION FOR MECHANICAL COMPLETION

[***On Contractor Letterhead***]

[_____], 20__

[NAME OF OWNER]
OWNER ADDRESSS
Attention: [_____]
Telephone: [_____]
Facsimile: [_____]

RE: APPLICATION FOR MECHANICAL COMPLETION

Dear [_____]:

Pursuant to Section of the Construction Contract, dated as of [_____] (the "Contract"), between [NAME OF OWNER] ("Customer") and the undersigned ("Contractor"), the undersigned hereby certifies to [NAME OF OWNER] that it is Contractor's reasonable, good faith believe that as of [INSERT DATE], Contractor has satisfied all of the following Work under the Contract, and accordingly, the Facility has achieved Mechanical Completion in accordance with the terms and conditions of the Contract. Initially capitalized terms used but not defined in this Application for Mechanical Completion have the meanings given in the Contract.

Sincerely,

[Contractor]

By:_____
Name: _____
Title: _____

ATTACHMENT Q-2
DIVISION OF RESPONSIBILITIES

The following Division of Work (**DOW**) summarized the division of responsibilities between Sapphire Energy (**SE**), The Harris Group or Brown and Caldwell (**ENG)** and AMEC (**AMEC**).

1. The responsibilities are divided into three categories:
   "DESIGN": Responsible for the final design.
   "SUPPLY": Responsible for the purchase and delivery to the jobsite.
   "INSTALL": Responsible for the installation of the item at the jobsite.

DESCRIPTION	DESIGN	SUPPLY	INSTALL	COMMENTS
IABR				
Project	ENG	AMEC	AMEC	SE is the Owner
START-UP, COMMISSIONING AND TRANING				
Redacted Exemption 4		SE	AMEC	
		SE	SE	
		AMEC	AMEC	
		AMEC	AMEC	
		SE	SE	
		AMEC	AMEC	Recommended only
		AMEC	AMEC	Recommended only
		AMEC	AMEC	
		AMEC	AMEC	
		SE	SE	SE leads start-up
		AMEC	AMEC	
		SE	SE	
		SE	SE	
		SE	SE	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	Local Utility Provides Connection Labor
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
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		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	

DESCRIPTION	DESIGN	SUPPLY	INSTALL	COMMENTS
Redacted Exemption 4		AMEC	AMEC	
		AMEC	AMEC	
		SE	SE	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	Scheduling only
	ENG			
		SE	SE	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
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		AMEC	AMEC	
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		AMEC	AMEC	Limited standby genset
		AMEC	AMEC	
		SE	SE	
		SE	SE	
		AMEC	AMEC	

DESCRIPTION	DESIGN	SUPPLY	INSTALL	COMMENTS
Redacted Exemption 4		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		SE	SE	
		SE	SE	
		SE	SE	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	As required
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		SE	SE	
		SE/AMEC	SE/AMEC	AMEC responsible for permits necessary for AMEC to perform construction
		AMEC	AMEC	
		AMEC	AMEC	

CERTIFICATE OF MECHANICAL COMPLETION

PROJECT TITLE _____ PROJECT NO. _____

OWNER _____

CONTRACT NO. _____ CONTRACTOR _____

CONTRACT TITLE _____ INSPECTION DATE _____

PROJECT AREA _____

THIS CERTIFICATE REFERS AND RELATES TO THE CONTRACTUAL AGREEMENT DATED _____

BETWEEN _____ (HEREINAFTER REFERRED TO AS THE OWNER)

AND THE CONTRACTOR. IN ACCORDANCE WITH THE CONTRACT BETWEEN THE OWNER AND THE CONTRACTOR, THE ENGINEER _____ ON BEHALF OF THE OWNER HEREBY CERTIFIES THAT ON THE BASIS

OF AN INSPECTION JOINTLY CARRIED OUT, THE WORK IS AT THIS DATE, NAMELY _____

(HEREINAFTER REFERRED TO AS THE "AGREED DATE OF MECHNICAL COMPLETION"), SUITABLE FOR THE PURPOSE FOR WHICH IT WAS DESIGNED.

THE AGREED DATE OF MECHANICAL COMPLETION SHALL BE REGARDED AS THE DATE OF MECHNICAL COMPLETION FOR ALL PURPOSES WHATSOEVER AND, WITHOUT RESTRICTING THE GENERALITY OF THE FOREGOING, FOR DETERMINING THE RIGHTS, DUTIES AND OBLIGATIONS OF THE OWNER AND THE CONTRACTOR UNDER THE AGREEMENT BETWEEN THEM, AS WELL AS FOR ALL PURPOSES UNDER THE BUILDER'S LIEN ACT.

A DEFICIENCY LIST OF ITEMS TO BE COMPLETED OR CORRECTED IS ATTACHED HERETO. THE DEFICIENCY LIST MAY NOT BE ALL INCLUSIVE, AND THE OMISSION OF AN ITEM DOES NOT ALTER THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE ALL OF THE WORK IN ACCORDANCE WITH THE CONTRACT. THE CONTRACTOR UNDERTAKES TO COMPLETE OR CORRECT THE WORK LISTED AS QUICKLY AS POSSIBLE IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF CONTRACT _____

TAKING INTO CONSIDERATION THE AVAILABILITY OF MATERIALS AND LABOR. THE ESTIMATED DATE FOR COMPLETION OF DEFICIENCIES IS _____ VALUE OF DEFICIENCIES AS SHOWN ON ATTACHED LIST IS $ _____

THE RETAINAGE TO BE RELEASED IN ACCORDANCE WITH GENERAL CONDITION CLAUSES _____

THE WARRANTY OF THE CONTRACTOR WITH REGARD TO ACCEPTED PORTIONS OF THE WORK IS TO COMMENCE ON THE AGREED DATE OF THIS MECHANICAL COMPLETION.

EXCEPT AS IN THIS CERTIFICATE EXPRESSLY PROVIDED, THIS CERTIFICATE DOES NOT AFFECT ANY RIGHTS, DUTIES OR OBLIGATIONS BETWEEN THE OWNER AND THE CONTRACTOR.

ENGINEER (On behalf of the OWNER)		CONTRACTOR	
SIGNED BY		SIGNED BY	
TITLE		TITLE	
DATE		DATE	

MUTUAL NONDISCLOSURE AGREEMENT

This Mutual Nondisclosure Agreement (the "Agreement") is made as of (date) January 13, 2009 by and between Sapphire Energy, Inc., a Delaware Corporation (the "Company"),and AMEC Geomatrix, Inc. ("Third Party").

1. **Purpose.** The Company and Third Party wish to explore a possible business opportunity of mutual interest (the "Relationship") in connection with which each party has disclosed and/or may further disclose its Confidential Information (as defined below) to the other. This Agreement is intended to allow the parties to continue to discuss and evaluate the Relationship while protecting each party's Confidential Information (including Confidential Information previously disclosed to the other party) against unauthorized use or disclosure.

2. **Definition of Confidential Information.** "Confidential Information" means any oral, written, graphic or machine-readable information including, but not limited to, that which relates to patents, patent applications, research, product plans, products, developments, inventions, processes, designs, drawings, engineering, formulae, markets, regulatory information, medical reports, clinical data and analysis, reagents, cell lines, biological materials, chemical formulas, business plans, agreements with third parties, services, customers, marketing or finances of the disclosing party, which Confidential Information is designated in writing to be confidential or proprietary, or if given orally, is confirmed in writing as having been disclosed as confidential or proprietary within a reasonable time (not to exceed thirty (30) days) after the oral disclosure.

3. **Nondisclosure of Confidential Information**

(a) The Company and Third Party each agree not to use any Confidential Information disclosed to it by the other party for its own use or for any purpose other than to carry out discussions concerning, and the undertaking of, the Relationship. Neither party shall disclose or permit disclosure of any Confidential Information of the other party to third parties or to employees of the party receiving Confidential Information, other than directors, officers, employees, consultants and agents who are required to have the information in order to carry out the discussions regarding the Relationship. Each party agrees that it shall take all reasonable measures to protect the secrecy of and avoid disclosure or use of Confidential Information of the other party in order to prevent it from falling into the public domain or the possession of persons other than those persons authorized under this Agreement to have any such information. Such measures shall include, but not be limited to, the highest degree of care that the receiving party utilizes to protect its own Confidential Information of a similar nature, which shall be no less than reasonable care. Each party agrees to notify the other in writing of any actual or suspected misuse, misappropriation or unauthorized disclosure of Confidential Information of the disclosing party which may come to the receiving party's attention.

(b) Exceptions. Notwithstanding the above, neither party shall have liability to the other with regard to any Confidential Information of the other which the receiving party can prove:

(i) was in the public domain at the time it was disclosed or has entered the public domain through no fault of the receiving party;

(ii) was known to the receiving party, without restriction, at the time of disclosure, as demonstrated by files in existence at the time of disclosure;

(iii) is disclosed with the prior written approval of the disclosing party;

(iv) is disclosed pursuant to the order or requirement of a court, administrative agency, or other governmental body; provided, however, that the receiving party shall provide prompt notice of such court order or requirement to the disclosing party to enable the disclosing party to seek a protective order or otherwise prevent or restrict such disclosure.

4. Return of Materials. Any materials or documents that have been furnished by one party to the other in connection with the Relationship shall be promptly returned by the receiving party, accompanied by all copies of such documentation, within ten (10) days after (a) the Relationship has been rejected or concluded or (b) the written request of the disclosing party.

5. No Rights Granted. Nothing in this Agreement shall be construed as granting any rights under any patent, copyright or other intellectual property right of either party, nor shall this Agreement grant either party any rights in or to the other party's Confidential Information other than the limited right to review such Confidential Information solely for the purpose of determining whether to enter into the Relationship.

6. Term. The foregoing commitments of each party shall survive any termination of the Relationship between the parties, and shall continue for a period terminating on the later to occur of the date (a) five (5) years following the date of this Agreement or (b) three (3) years from the date on which Confidential Information is last disclosed under this Agreement.

7. Successors and Assigns. The terms and conditions of this Agreement shall inure to the benefit of and be binding upon the respective successors and assigns of the parties, provided that Confidential Information of the disclosing party may not be assigned without the prior written consent of the disclosing party. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and assigns any rights, remedies, obligations, or liabilities under or by reason of this Agreement, except as expressly provided in this Agreement.

8. Severability. If one or more provisions of this Agreement are held to be unenforceable under applicable law, the parties agree to renegotiate such provision in good faith. In the event that the parties cannot reach a mutually agreeable and enforceable replacement for such provision, then (a) such provision shall be excluded from this Agreement, (b) the balance of

the Agreement shall be interpreted as if such provision were so excluded and (c) the balance of the Agreement shall be enforceable in accordance with its terms.

9. Independent Contractors. The Company and Third Party are independent contractors, and nothing contained in this Agreement shall be construed to constitute the Company and Third Party as partners, joint venturers, co-owners or otherwise as participants in a joint or common undertaking.

10. Governing Law. This Agreement and all acts and transactions pursuant hereto and the rights and obligations of the parties hereto shall be governed, construed and interpreted in accordance with the laws of the State of California, without giving effect to principles of conflicts of law.

11. Remedies. The Company and Third Party each agree that its obligations set forth in this Agreement are necessary and reasonable in order to protect the disclosing party and its business. The Company and Third Party each expressly agree that due to the unique nature of the disclosing party's Confidential Information, monetary damages would be inadequate to compensate the disclosing party for any breach by the receiving party of its covenants and agreements set forth in this Agreement. Accordingly, the Company and Third Party each agree and acknowledge that any such violation or threatened violation shall cause irreparable injury to the disclosing party and that, in addition to any other remedies that may be available, in law, in equity or otherwise, the disclosing party shall be entitled to obtain injunctive relief against the threatened breach of this Agreement or the continuation of any such breach by the receiving party, without the necessity of proving actual damages

12. Amendment and Waiver. Any term of this Agreement may be amended with the written consent of the Company and Third Party. Any amendment or waiver effected in accordance with this Section shall be binding upon the parties and their respective successors and assigns. Failure to enforce any provision of this Agreement by a party shall not constitute a waiver of any term hereof by such party.

13. Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original and all of which together shall constitute one instrument.

14. Entire Agreement. This Agreement is the product of both of the parties hereto, and constitutes the entire agreement between such parties pertaining to the subject matter hereof, and merges all prior negotiations and drafts of the parties with regard to the transactions contemplated herein. Any and all other written or oral agreements existing between the parties hereto regarding such transactions are expressly canceled.

The parties have executed this Mutual Nondisclosure Agreement as of the date first above written.

Sapphire Energy, Inc.

By: _____

Name: Jaime E. Moreno
(print)

Title: Vice President

Third Party

By: _____

Name: James J. Weaver
(print)

Title: Vice President

Address: 510 Superior Ave
Suite 200
Newport Beach, CA
92663

ATTACHMENT T

FORM OF CHANGE ORDER

Owner:
[NAME OF OWNER]
[Address]

CONTRACT CHANGE REQUEST

CONTRACTOR:	**Change NO.**	**ISSUE DATE.**
	PROJECT NO.	**CONTRACT NO.**
	REFERENCE Change NO.	**EFFECTIVE DATE OF Change.**

DESCRIPTION OF CHANGE:

LIST OF ATTACHMENTS:

SCHEDULE IMPACT SUMMARY

☐ **NO SCHEDULE IMPACT**

☐ **SCHEDULE EXTENSION OF _____ DAYS from execution of change order**

☐ **SCHEDULE REDUCTION OF_____DAYS from execution of change order**

☐ **CONTRACT TO BE COMPLETED BY:**

COST IMPACT SUMMARY

☐ **NO COST IMPACT**

☐ **COST IMPACT AS FOLLOWS:**

☐ **MANHOURS_____/_____**
(DIRECT) (INDIRECT)

☐ **LABOR $ _____**

BASIC CONTRACT AMOUNT $ _____

TOTAL FOR PREVIOUS Changes $ _____

TOTAL ADDITION THIS CO $ _____

TOTAL REDUCTION THIS CO $ _____

☐ **MATERIAL**	**$** _____	**NEW CONTRACT TOTAL**	**$ 0.00**
☐ **EQUIPMENT**	**$** _____		
☐ **TOTAL**	**$** _____	**The adjusted cost, if any, shown on this CO includes all overhead, G & A, profit and any other expense associated with the change(s) covered herein, including any schedule adjustment. All terms and conditions of base contract remain the same.**	

CONTRACTOR ACCEPTANCE	AUTHORIZATION TO PROCEED
NAME	**NAME**
TITLE	**TITLE**
SIGNATURE/DATE	**SIGNATURE/DATE**
copy:	

REQUEST FOR INFORMATION

Project: **AMEC RFI #**_____

Date:

To:

cc:

From: **SUBCONTRACTOR RFI #** _____

Subject:

Please provide the following information or clarification:

Response required by ___________

Date:

To:

From:

ATTACHMENT W
FORM OF CERTIFICATE OF FINAL COMPLETION

Job Name: _____

Contract Number: _____

Customer: _____

Contract Date: _____

Project or Designated Area Shall Include:

_____

Located at:

[ADDRESS]

The Work under this Contract has been reviewed and found to be Finally complete in accordance with the Contract Documents. The Date of Final Completion is hereby established as:

[DATE]

Customer accepts the Work or designated portion thereof as being Finally Complete and will assume full possession thereof on:

[DATE]

Contractor:
By: _____
Title: _____
Date: _____
Signature: _____

Owner:
By: _____
Title: _____
Date: _____
Signature: _____

ATTACHMENT - D
PAYMENT SCHEDULE
PERCENTAGE

Percent of Cost and Percent Complete Labor Relationship Table		
Month	**% of Approved Budget**	**Physical Progress % of Approved Budget Labor hrs**
Jun 11	Redacted Exemption 4	
Jul 11		
Aug 11		
Sep 11		
Oct 11		
Nov 11		
Dec 11		
Jan 12		
Feb 12		
Mar 12		
Apr 12		
May 12		

This table shall form the basis for payment each month. If the actual physical progress value is not equal to the planned physical progress then the evaluator shall perform a mathematical extrapolation to account for the differential.

Attachment – E
Unit Rates for Staff and Craft Labor

Redacted Exemption 4	Redacted Exemption 4

Site CM Electrical
Site Administration
Site Runner/Delivery
Off-Site Admin
Off-Site Accounting
Off-Site Government Reporting

ATTACHMENT F - RENTAL RATES FOR CONSTRUCTION EQUIPMENT

	DAY_RATE	WEEK_RATE	MONTH_RATE
Air Compressor, Small	Redacted Exemption 4		
Air Compressor, Small			
Air Compressor, Medium			
Air Compressor, Small			
Air Compressor, Medium			
Air Compressor, Trailer Dsl 125cfm			
Air Compressor, Small			
Air Compressor, 20Gal.			
Aircompressor, Medium			
Auto, Chrysler 300C RWD			
Auto, Chevrolet Trailblazer LT			
Bike, 3 Wheel 3 speed			
Bike, Mountain			
Bike, 3 Wheel 3 speed			
26" Single Speed Bike			
Cable Cutter, Manual			
Cable Cutter, Battery Operated			
Cable Cutter, Ratcheting			
PVC Cutter, 1-1/4" Ratcheting			
Cable Cutter, Batter Operated			
Cable Cutter, Drill operated			
Cable Cutter, Ratcheting			
Basket Tray Cutter			
Cable Tray Cutter, Battery Operated			
Cable Cutter, Ratcheting			
PVC Cutter, 2" Ratcheting			
Basket Tray Cutter			
Vacuum Pump for Coredrill			
Coredrill, Handheld			
Coredrill, Self Contained			
Coredrill			
Coredrill			
Coredrill Water Can			
Coredrill, Handheld			
Coredrill			
Coredrill			
Water Sprayer			
Coredrill, Handheld			
Crimper, RJ11/45			
Crimper, Adjustable			
Crimper, Adjustable			
Crimper, MD6-14			
Crimper, Hand Pump			
Crimper, Hydraulic Pump			
Crimper, Remote Head 14ton			
Crimper, Dieless			
Crimper, Battery			
Crimper			
Crimper, Dieless			
Cable Cutter, Aircraft			
Crimper, Hand Pump			
Crimper, Hand Pump			
Crimper, Remote Head 12ton			
Crimper, Hydraulic Pump			
Crimper Hose			
Crimper, Adjustable			

Crimper, Battery	Redacted Exemption 4
Crimper, RJ11/45	
Crimper, Hand	
Crimper, Dieless	
Crimper, Square FC	
Crimper, ZA3	
Crimper, Dieless	
Crimper,Remote Head Dieless	
Crimper, Contour	
Crimper, Dieless	
Crimper, Contact 6F	
Crimper for 3/32 Cable Ferrules	
Foot Pump for Crimper	
Crimper, Terminal	
Crimper, Remote head 14Ton	
Crimper, Adjustable	
Crimper, Remote head 14Ton	
Crimper, Gauge Tester	
Crimper, 10-22AWG	
Crimper, Hydraulic Pump	
Crimper, Gauge Tester	
Crimper Cart	
Crimper, 10-22AWG	
Crimper, Ferrule	
Crimer, Ferrule 8-6AWG	
Crimper, Ferrule 4-2AWG	
Crimper, Ferrule	
Crimper, Swaging	
Crimper, Battery	
Crimper, Hydraulic Kit w/#6-750 Die	
Dolly, Deck	
3/8" Air Drill	
Drill, Devicing	
Drill, Devicing	
Drill, Battery	
Drill, Battery	
Drill, Battery	
Drill, Battery	
Drill, Battery	
Drill, Devicing	
Drill, Battery	
Drill, Battery	
Drill, Devicing	
Drill, Battery	
Drill, Battery	
Devicing Screwdriver 2 pos w/case	
Impact Wrench, 1/4"	
Drill, Battery	
Impact Wrench 1/4"	
Drill, Battery	
Drill, Battery	
Drill, Battery	
Drill, Battery	
Drill, Battery	
Drill, Battery	
Drill, Battery	
Drill, Battery	
Drill, Battery	
Impact Wrench 1/4"	
Drill, Battery	

Drill, Battery	
Drill, Battery	
Drill, Battery	
Drill, Battery	Redacted Exemption 4
Drill, Battery	
Desk Modular Assembly	
Copy Machine	
Copy Machine	
File Cabinet	
Desk	
Telephone W/Ans. Machine	
Floor Tile Puller	
Office Chair	
3 Shelve Steel Bookcase	
File Cabinet	
White Board, 4x8	
2 Drawer Lock Vertical Letter File	
Modular Office Furniture	
Corner Workstations	
Steelcase Freestanding Tables	
Swivel Task Chairs	
ASE Cubicle Panels 48x66	
48" Shelves w/Lights	
Office Chair	
30x60 Double Ped Mahogany Desk	
36x72 Double Ped Mahogany Desk	
White Board, 4x8	
Refrigerator	
Refrigerator, Small	
Refrigerator, Small	
White Board, 3x4	
36 X 96 Conference Table	
24X48 Office Table	
24X60 Desk W/Pedestal	
6X8 L-Shape Desk Free Standing	
Office Furniture, WorkStation Modul	
Office, Confrence Set Up	
Gangbox, Large	
Gangbox, Small	
Gangbox, Large	
Lockable Workbench Gangbox	
Gangbox With Shelves	
Gangbox, X-Large	
Gangbox With Shelves	
Gangbox, Large	
Gangbox, Workbench	
Gangbox, Large	
Gangbox With Shelves	
Gangbox, Workbench	
PMI Senior Gangbox	
Gangbox, Medium	
PMI JR Clam Box Cabinet	
Gangbox, Large	
Gangbox, Small	
Gangbox, X-Large	
Gangbox With Shelves	
PMI JR Nuts/Bolts Clam Box Cabinet	
PTI Gangbox W/Tools	
PMI LV Gangbox W/Tools	
Mobile Cabinet W/Print Table	

Trailer for Utility Vehicle	Redacted Exemption 4
Golf Cart	
Utility Vehicle	
Utility Vehicle	
Utility Vehicle	
Utility Vehicle	
Trailer for Utility Vehicle	
Trailer for Utility Vehicle	
Utility Vehicle	
Generator, 5000W	
Generator, 2600W	
Generator, 1000W	
Generator, 6600W	
Generator, 3500W	
Generator, 1000W	
Generator, 5000W	
Generator, 3000W	
Generator, 5000W	
Generator, 1850W	
Generator, 6500W	
Generator, 2000W	
Generator, 4300W	
Generator, 6000W	
Generator, 7000W	
Generator, 6000W	
Generator, 1000W	
Generator, 6300W	
Generator, 6000W	
Generator, 10KW	
Generator, 15KW	
Generator, 3500W	
Generator, 2000W	
Telescopic Pole	
Grinder, 4-1/2"	
Grinder, 4-1/2"	
Grinder, Bench	
Grinder, 4-1/2"	
Grinder, 9"	
Grinder, 9"	
Grinder, Pencil	
Grinder, Pencil	
Grinder, Pencil	
Grinder, 4-1/2"	
Grinder, 7"	
Grinder, 4-1/2"	
Grinder, 4-1/2"	
Grinder, 4-1/2"	
Grinder, Pencil	
Grinder, 4-1/2"	
Grinder, 4-1/2"	
Grinder, 4-1/2"	
Grinder, 4-1/2"	
Hammer Drill, Medium	
Hammer drill, Small	
Hammer Drill, Large	
Vacuum Attachment for Hammer Drill	
Hammer Drill, Medium	
Hammer Drill, Battery	
Hammer Drill, Battery	
Hammer Drill, Battery	

Hammer Drill, Large	Redacted Exemption 4
Hammer Drill, Medium	
Hammer Drill, Large	
Hammer Drill, Small	
Hammer Drill, Battery	
Hammer Drill, Small	
Hammer Drill, Large	
Hammer Drill, Medium	
Hammer Drill, Medium	
Hammer Drill, Small	
Hammer Drill, Medium	
Hammer Drill, Small	
Hammer Drill, Medium	
Hammer Drill, Small	
Hammer Drill, Small	
Hammer Drill, Medium	
Ground Rod Driver	
Hammer Drill, Battery	
Hammer Drill, Large	
Hammer Drill, Battery	
Vacuum Attachment for Hammerdrill	
Hammer Drill, Battery	
Hammer Drill, Large	
Hammer Drill, Battery	
Hammer Drill, Large	
Hammer Drill, Medium	
Hammer Drill, Battery w/Dust Ext.	
Hammer Drill, Large	
Hammer Drill, Large	
Hammer Drill, Small	
Hammer Drill, Battery	
Hammer Drill, Battery	
Hammer Drill, Small	
Hammer Drill, Battery	
Hammer Drill, Battery	
Hammer Drill, Battery	
Hammer Drill, Medium	
Hammer Drill, Medium	
Hammer Drill, Large	
Hammer Drill, Large	
Hammer Drill, Large	
Hammer Drill, Battery	
Hammer Drill, Medium	
Hammer Drill, Battery	
Hammer Drill, Large	
Hammer Drill, Battery W/Dust Ext.	
Hammer Drill, Small	
Hammer Drill, Large	
Hammer Drill, Medium	
Hammer Drill, Medium	
Hammerdrill, W/Dust Extractor	
Hammer Drill, Large	
Framing Square	
Soldering Pen	
Level, 2'	
Level, 4'	
Ground Rod Driver	
Hammer, 2#	
Hammer, 8#	
Frost Bar	

Saw, hand	Redacted Exemption 4
Crow bar	
Staple gun	
Grease Gun	
Torch, Small	
Torch, Small	
Torch, Small	
ScrewDriver Kit, 40pc Tamper	
Rivet Gun	
Screwdriver Kit, 40pc	
Metric Pin Punch Set, 3mm-8mm	
Soldering Kit	
Wonder Bar	
Screwdriver Kit, 40pc	
Soildering Kit	
Tape Measure, 100'	
Tape Measure, 300'	
HV Insulated Tool Kit	
HV Coveralls, 11 Cal Kit	
HV Coveralls, 11 Cal Kit	
HV Tester	
HV Insulated Tool Kit	
HV BLANKET 36x36	
HV Ground Clusters	
HV Goves, 1000V	
High Voltage, 25c Overalls, Large	
HV Coveralls, 25 Cal	
HV Hot Stick	
HV Insulated Wrench Set	
HV Insulated Socket Set	
HV Insulated Socket Set	
HV Insulated Torque Wrench	
HV Insulated Torque Wrench	
HV Load Break Elbow Puller	
HV Insulated Torque Wrench	
HV Insulated Tool Kit	
HV Coveralls, 40 Cal Kit	
HV Insulated Allen Set	
HV Gloves, 20KV	
HV Insulated Screwdriver	
HV Coveralls, 11 Cal Kit	
HV Insulated Tool Kit	
HV Coveralls, 11 Cal Kit	
HV BLANKET 22x22	
HV Insulated Wrench Set	
HV Ski Mask	
HV Insulated Wrench Set	
HV Insulated Socket Set	
HV Insulated Tool Kit	
HV Coveralls, 40Cal Kit	
HV Coveralls, 25 Cal	
HV Faceshield, 25 Cal	
HV Faceshield, 40 Cal	
HV Coveralls, 11 Cal Kit	
HV Insulated Allen Set	
HV Insulated Torque Wrench	
HV Coveralls, 25 Cal Kit	
HV Insulated Wrench	
HV Coveralls, 25 Cal Kit	
HV Coveralls, 31 Cal Kit	

HV Rescue Hook	Redacted Exemption 4
HV Water Pump Plier	
HV Insulated Srewdriver	
HV Coveralls, 11 Cal	
HV Phase Rotation Meter	
HV Insulated Allen Set	
HV Insulated Allen Set	
HV Insulated Box Wrench	
HV Ground Clusters, Jaw	
HV Insulated Torque Wrench	
HV Coveralls, 65 Cal Kit	
HV Proximity Tester	
HV Discharge Stick	
HV Insulated Allen Set	
HV Rod Clamp Stick	
HV Rescue Hook	
HV Hot Stick	
HV Coveralls, 40 Cal Kit	
HV Gloves, 1000V	
HV Gloves, 1000V	
HV Insulated Socket Set	
HV Insulated Wrench Set	
HV Detector	
HV Phase Sticks w/volt Meter 80kV	
HV Arc Flash Kit, 40cal XL	
Chain Hoist, 3/4ton	
Cable Come Along Hoist	
Chain Hoist, 1/2ton	
Cable Come Along, 1ton	
Chain Hoist, 1/2ton	
Cable Come Along, 2ton	
Chain Hoist, 2ton	
Chain Hoist, 1-1/2ton	
Tele Material Hoist	
Chain Hoist, 1ton	
Cable Come Along, 3/4ton	
Chain Hoist, 1ton	
Chain Hoist, 1/2ton	
Chain Hoist, 1-1/2ton	
Cable Come Along, 1/2"ton	
Chain Hoist, Electric 3ton	
Cable Come Along, 3/4ton	
Chain Hoist, 1-1/2ton Ratcheting	
Chain Hoist, 1-1/2Ton	
Impact Wrench, 1/2"	
Impact Wrench, 3/8"	
Impact Wrench, 1/2"	
Impact Wrench, 3/8"	
Impact Wrench, 1/4"	
Impact Wrench, 1/4"	
Impact Wrench, 1/2"	
Impact Wrench, 1/2"	
Impact Wrench, 1/2"	
Impact Wrench, 1/2"	
Impact Wrench, 3/8"	
Impact Wrench, 1/2"	
Jack Hammer, Air	
Jack Hammer, Air	
Jack Hammer, Electric	
Auto Jack 2 Ton	

Jack, Hydraulic	Redacted Exemption 4
Jack, Hydraulic	
Jack, Hydraulic	
Jack, Ratcheting	
Jack, Hydraulic 10ton	
Knockout, Gutter Punch	
Knockout, Channel Punch	
Knockout Set, Hyd. 1/2"-2" SS	
Knockout Set, Ratchet 1/2"-2"	
Knockout Set, Hyd. 1/2"-2"	
Knockout Set, C-Punch	
Knockout Set, Hyd. 1/2"-4"	
Whitney Punch	
Knockout Set, Hyd. 1/2"-2"	
Knockout Set, Hyd. 1/2"-4"	
Knockout Set, Ratchet 1/2"-2"	
Knockout Set, Ratchet 1/2"-2"	
Knockout Set, Hyd. 1/2"-2" SS	
Knockout Set, Hyd. 1/2"-2" SS	
Knockout Puncher w/o dies or drill	
Knockout Set, Hyd. 1/2"-2"	
Knockout, 1/2"-2 1/2" Cutters	
Kockout, 1/2-2" Drill Opperated	
Knockout, Stamp Kit	
Knockout, 1/2-2" Drill Operated	
Knockout Set, Hyd. 1/2"-4"	
Knockout Set, Hyd. 1/2"-4" C-Punch	
Knockout Set, Hydraulic, 1/2" to 2"	
Knockout Set Dies Only, 2-1/2 to 4"	
Rotating Laser	
Laser Level, Rotating/Self Leveling	
Laser, Plumb	
Laser Level, Rotating/Self Leveling	
Laser, Tape measure	
Laser, Plumb	
Laser Level, Rotating/Self Leveling	
Rotating Laser Level	
Receiver for Laser w/bracket	
Laser, Plumb	
Laser Level	
Laser, Tripod	
Laser, Plumb	
Laser Level, Rotating/Self Leveling	
Plumb, Level, Square Laser 3 Point	
Laser, Plumb	
Laser Level, Line Self Leveling	
Laser, Plumb	
Laser, Plumb	
Laser, Plumb	
Laser Level, Rotating/Self Leveling	
Laser Level, Rotating/Self Leveling	
Laser Range Meter Measuring Tool	
Laser Level, Line Self Leveling	
Laser, Plumb	
Laser, Plumb	
Laser Level, Line Self leveling	
Laser Level, Line Self Leveling	
Laser, Angle Finder	
Laser Level, Rotating/Self Leveling	
Laser Level, Line Self Leveling	

Material Cart, 2 Tray	Redacted Exemption 4
Material Cart, 4 Tray	
Material Cart, 2 Tray narrow	
Material Cart, 2 Tray	
material Cart, 4 Tray	
Material Cart, 2 Tray	
Material Cart W/Locking Cabinet	
Material Cart, Locking	
Flat Cart Pnuematic Wheels	
Tic Tracer	
Clamp On, Donut 50-1	
Clamp for Digital Multimeter	
Light Meter	
Mini Clamp on Meter	
Multimeter	
Meter, Clamp On 1000A	
Cable Length Meter	
Anonemeter	
Meter, Clamp on 400A	
Walker Duct Locator	
Circuit Anaylzer	
Circuit Seeker	
Video Analyzer + Monitor	
Meter, Clamp on 400A	
Cable Length Meter	
GFI Trip Anilyzer Meter	
Megger , 1000V	
IBM Tester	
Multimeter	
Gaus Meter	
Circuit Seeker	
Thermometer, Infrared	
Scope Meter	
Megger, 5000V	
Meter, 4 Gas	
Cable Locater	
Ground Resistance Tester	
Underground Locator	
Battery Tester	
Hy-Pot Tester W/Enc	
Ammeter-Recording	
Power Quality Analyzer	
Cell Resistance Tester	
Digital Low Resistance Ohmeter	
Thermal Camera	
Infrared Thermometer	
Contact & Current Tester	
Underground Locator	
Multimeter	
Multimeter	
Circuit Tracer Open/Closed Circuit	
Ammeter-Recording	
Meter, Clamp On 1000A	
Megger, 1000V	
Circuit Breaker Tester	
Circuit Seeker	
Multimeter	
Meter, Clamp on 300A	
Power Quality Analyzer	
Sound Meter	

Multimeter	Redacted Exemption 4
Megger, 5000V	
Receptacle Tension Tester	
Meter, Clamp on 400A	
600V Megger	
Digital Multimeter	
Meter, Clamp On 700A	
Phase Rotation Meter/Detector	
Clamp on Meter	
Portable Circuit Breaker Tester	
Megger, 1000V	
Multimeter	
Circuit Seeker	
Current Tracer	
Meter, Clamp On 600A	
Megger, 1000V	
Sure Test AFCI GFCI Tester	
Meter, Clamp On 600A	
Continuity Tester	
1000V Clamp On Meter	
Gas Lamp Tester	
Meter, Clamp On 2000A	
Meter, Clamp On 1000A	
AC/DC Current Probe	
EMF Sensor	
Scope Meter	
Multimeter	
Micro-ohmmeter	
Circuit Tracer	
Circuit Seeker	
Digital Sling Psychometer	
Megger, 1000V	
GFCI & Circuit Tester	
Motor Rotator/Phase Sequence	
Tone Generator	
Multimeter	
Meter, Clamp On 600A	
Temperature Probe	
Contact/Current Tester	
5000V Megohmmeter	
Circuit Seeker	
Multimeter	
Meter, Clamp On 600A	
Megger, 1000V	
Meter, Clamp on 400A	
Thermometer, Infrared	
Contact/Current Tester	
Thermometer, Infrared	
Capacitance Meter	
Meter, Clamp On 600A	
Digital Tone Generator	
Lamp Tester	
Meter, Clamp On 600A	
Multimeter	
Megger, 1000V	
Meter, Clamp On 1500A	
Tone Generator	
Digital Electrical Tester	
Voltage & Continuity Tester 1000V	
Light Meter with Memory	

Insulation Resistance Tester - Mego
Meter, 3 Phase Clamp On
Meter, Clamp On 600A
Meter, 4 Gas
Battery Tester
Solenoid Voltage Testers
Meter, Anemometer
Meter, Particulate
Hydrometer, Digital
Ultra Sonic Meter
Ground Risistance Tester
Hydrogen Meter
Hydrometer, Digital
Meter, Clamp on 200A
Thermometer, Multimeter
Meter, Process
Meter, Clamp On 600A
Multimeter
Meter, Clamp On 600A
Light Meter
Digital Light Meter
Circuit Tracer Open/Closed Circuit
Circuit Tracer
Wind Pocket Meter
Circuit Breaker Tester
Pocket sensor, O2 Only
Megger, 500V
Megger, 1000V
Circuit Breaker Functional Test Kit
Meter, 4 Gass
Circuit Tracer Open/Closed Circuit
Phase Rotation Meter / Detector
Wind Meter/Pocket
Megger, 5000V
Ground Resistance Tester, Clamp On
Sound Level Meter
Megger, 500V
Meter, Humidity
Megger, 5000V
Circuit Seeker
Cat 4,1000V Phase Rotation Meter
Circuit Analyzer
Range Meter
Multimeter
Micro-Ohmmeter
Tempurature Probe, 400'
Thermometer, Single Input
Meter, 4 Gas
Megger, 5000V
Meter, Clamp On 3000A
Wire Tracer
Multimeter
Circuit Seeker
Circuit Seeker
Meter, Clamp On 600A
Circuit Analyzer
Ground Fault Locator
Gas Monitor, Hydrogen
Meter, Clamp On 6000A
Aluminum Plank

Redacted Exemption 4

Car Battery Charger	Redacted Exemption 4
Measure Master	
Foam Shooter	
Piston Drive Tool,	
Kroy Marker-210	
Yoke Vise-Clamp Type	
Metal Detector	
banding machine	
Porta-Mark Hot Stamp	
Powered Air Purifying Res, Pirator	
Oxygen Tank W/Masks	
Snow Fence	
Measuring Wheel	
Battery Charger	
Dock Plate	
Leaf Blower, Gas	
Steel Clamp, 48"	
Pressure Washer	
Ceiling Tile Cutter	
Powerwasher, Gas, 2700PSI	
Flat Cart	
Nutting Cart,4-Post 1500pd capacity	
Wagon Type Cart	
Metal Trolley 2500pd capacity	
Tamper, Jumping Jack	
Concrete Vibrator	
Tamper, Jumping Jack	
Concrete Vibrator	
Tamper, Jumping Jack	
Tamper, Jumping Jack	
Tamper, Jumping Jack	
Tamper, Jumping Jack	
Pallet Jack, 4000#	
Pallet Jack, 4000#	
Electric Pallet Jack	
Pallet Jack, 8000#	
Pallet Jack, 6000#	
Pallet Jack, 10000#	
Pallet Jack, Electric	
Pallet Jack, 6000#	
Pallet Jack, 6000#	
Pallet Jack, 4000#	
Pallet Jack, 4000#	
Pallet Jack, 8000#	
Pallet Jack, 6' Long 6000#	
Pickup, Ford F150 4x4 SuperCab	
Pickup, Ford F250 4x4 Ext Cab	
Pick, 3/4 Ton 4x4 w/Liftgate	
Pickup, Ford F250 4x4 Regular Cab	
Pickup, Dodge Ram 1500	
Pickup, Dodge 4x4, Exd Cab	
Pickup, 2001 Gmc Sierra	
Pickup, 1993 Chev 1/2 Ton	
Pickup, 2001 Chevrolet, 4Wd	
Pickup, Dodge 1/2 Ton	
Pickup, Ford F150 4x4 Reg Cab	
Pickup, Ford F150 4X4 SUPERCREW	
Pickup, Ford F150 4X4 3/4 Ton	
Pickup, Chevrolet Silverado	
Pickup, 1 Ton 2x4	

Pickup, Ford F150 4x2 Reg Cab	Redacted Exemption 4
Pickup, Dodge Club Cab	
Pickup, Lincoln Mark LT	
Pickup, Doge Ram 1500SLT	
Pickup, Chevrolet C2500	
S-10 Pickup	
Warning Light for Pickup	
Pickup, 1/2 Ton 2x4	
Pickup, 1/2 Ton 4x4	
Pickup, 3/4 Ton 2x4	
Pickup, 3/4 Ton 4x4	
Pipe Rack	
Pipe Rack	
Pipe Rack	
Life Vest	
Barricade	
Manhole Fencing	
Lifeline, Retractable 20'	
Layard, 11' Retractable	
Lifeline, Retractable 25'	
Lifeline, Retractable 50'	
Lifeline Retractable 25'	
Blower, Ventilation	
Blower, Ventilation	
Lifelife w/Tripod	
Lifeline w/Tripod	
Orange Cones	
Harness Safety Universal	
Positioning Belt	
Fire Extinguisher	
Barricade	
Fire Extinguisher	
Tie Off Strap, D-Ring 3'	
Lanyard, Shockwave 6'	
Lifeline, Retractable 20'	
Lifeline, Retractable 20'	
Hook, Rescue	
20' Web Retractable Lifeline	
Carabiner, 2"	
Lanyard, 11' Retractable	
5H038 Parsons Key	
Lifeline, Retractable 50'	
Lifeline, Rtractable 30'	
Lanyard Extension	
Anchor, Beam Glyder 12"	
Roof Anchor, Steel Reusable	
Tie Off Strap, D-Ring 5'	
Lifeline, Retractable, 75'	
Harness, Safety Construction	
Rebar Assembly, Web	
Harness, Safety XXL	
Harness, Safety 3XL	
Lanyard, 6' 2 Leg W/Rebar Hook	
Blower, Ventilation W/Heater	
Tie Off Strap, D-ring 25'	
Roof Anchor, Steel Reusable	
Tie Off Strap, D-Ring 6'	
Lifeline Rope, 5/8"x100'	
Rope Grab, 5/8"	
Lanyard, 1"x3'	

Rope Grab, 3/8"	Redacted Exemption 4
Lifeline, 50'	
Post Delineator	
Roof Anchor, Steel Reusable	
Roof Anchor, Steel Reusable	
Eye Wash Station	
Anchor, Beam Glyder 16"	
Gas Monitor, CO Single	
Safety Cone	
Trolley, 2 Ton Push Manual	
Safety Cone	
Orange Cones	
Harness, Safety LG Exofit	
Lifeline, Retractable 60'	
Lifeline System, Horizontal	
Blower, Ventilation	
Tie Off Strap, D-Ring 8'	
Lifeline System, Horizontal	
Harness, Safety Universal	
Harness, Safety XXL	
Rope Grab, 3/8"	
Harness, Safety LG Exofit	
Harness, Safety XL Exofit	
Lanyard W/Rebar Hook	
Harness, Safety SM Exofit	
Harness, Safety MD Exofil	
Rope Grab, 3/8"	
Carabiner, 11/16"	
Pole Strap, Nylon	
Lifeline, Retractable 30'	
Portable Eye & Face Wash	
Lifeline w/Tripod	
Lifeline, 325'	
Lifeline, Retractable, 30'	
Lanyard, Shockwave 6'	
Barricade, Safety 3-D	
Lifeline, Retractable 75'	
Blower, Ventilation Gas Powered	
Door/Window Jamb Anchor	
Safety Switch For Arc Flash	
Safety Switch for Arc Flash, Mini	
Saw, Rotozip	
Saw, Dremel	
Saw, Circular Battery	
Saw, Jig	
Saw, Jig	
Saw, Jig	
Saw, Portaband	
Saw, Miter 12"	
Saw, Circular Battery	
Saw, Jig	
Saw, Circular 7-1/4"	
Saw, Portaband	
Saw, Partner 12"	
Saw, Partner 14"	
Saw, Partner 14"	
Saw, Band	
Saw, Diamond Cutting	
Saw, Diamond Cutting	
Saw, Chain	

Saw, Rotozip	Redacted Exemption 4
Saw, Circular 7-1/4"	
Saw, Circular 7-1/4"	
Saw, Circular Battery	
Saw, Table 10"	
Saw, Partner 12"	
Saw, Circular 7-1/4"	
Saw, Circular 7-1/4"	
Saw, Circular 7-1/4"	
Saw, Circular Battery	
Saw, Jig	
Saw, Miter 14"	
Saw, Band	
Saw, Jig	
Panel Saw - Drill Style	
Saw, Circular 7-1/4"	
Saw, Rotozip	
Saw, Rotozip	
Saw ,Rotozip	
Saw, Compound Miter 12"	
Saw, Dremel	
Saw, Plaster Groover	
Saw, Band	
Saw, Band	
Saw, Band	
Saw, Circular 7-1/4"	
Saw, Band	
Saw, Diamond Cutting	
Saw, Curcular Battery	
Saw, Circular 6-1/2"	
Holesaw Kit Cuts up 8 1/4"	
Saw, Miter 14"	
Saw, Circular 8"	
Saw, Jig	
Saw, Portaband	
Saw, Miter 14"	
Saw, Circular 7-1/4"	
Saw, Portaband Battery	
Saw, Circular 7-1/4"	
Saw, Jig	
Saw, Jig	
Saw, Portaband	
Saw, Diamond Cutting 9"	
Saw, Band Wet Metal Cutting	
Saw, Band	
Saw, Portaband	
Porta Band Deep Cut	
Saw, Jig	
Saw, Miter 14"	
Saw, Circular 7-1/4"	
Saw, Table Mount For Portaband	
Sawzall Electric	
Sawzall Electric	
Sawzall, Electric	
Sawzall, Electric	
Sawzall, Battery	
Sawzall, Electric	
Sawzall, Electric	
Sawzall, Electric	
Sawzall, Battery	

Sawzall, Electric	Redacted Exemption 4
Sawzall Electric	
Sawzall, Electric	
Sawzall, Battery	
Sawzall, Battery	
Sawzall, Battery	
Sawzall, Electric	
Sawzall, Electric	
Sawzall, Battery	
Rebar Locator	
Battery Capacity Tester	
Digital Transformer Ratiometer	
Ground Resistivity Tester	
6/12V Dynamic Battery Analyzer	
Phase Rotation Tester to 690V	
Pipe Stand, Roller	
Trivise	
Threader, Hand Ratchet Robroy	
Threading, Stock And Die-Adjust	
Threader 1/2"-2", 300	
Threader 1/2"-2", 700	
Threading, Gear, 4" - 6"	
Threader 1/2"-4"	
Oiler	
Pipe Reamer 2"	
Pipe Reamer, 4"	
Pipe Cutter, Manual	
Threader, Hand Ratchet	
Threader 1/2"-2", 535	
Tow Behind Threader	
Threader 1/2"-4"	
Model A Oil Pump	
Reamer Repair Kit, PVC 1/2"-2"	
Threading, Gear, 2-1/2" - 4"	
Threader Head, 1"-2"	
Threader Head, 1/2"-3/4"	
Threading Machine, 2-1/2"-6"	
Threader 1/2"-2", 200	
Threading Pan	
Tap & Die Set 40pc Metric	
Threading Head, 1/2"-2"	
Pipe Stand	
Tap & Die Set 24pc	
Pipe Stand, Roller	
Tap & Die Set 24pc	
Tap & Die Set 45pc	
Pipe Stand, Roller	
Trigger Tool, 1/4"	
Trigger Tool, 1/4"	
Trigger Tool, 3/8"	
Trigger Tool, 1/4"	
Trigger Tool, 1/4"	
Trigger Tool, 1/4"	
Trigger Tool, 3/8"	
Trigger Tool, Pole	
Trigger Tool, Pole	
Trigger Tool, Pole	
Trigger Tool, Pole	
Trigger Tool, Gas	
Trigger Tool, Pole	

Trigger Tool, Gas	Redacted Exemption 4
Trigger Tool, Gas	
Trigger Tool, Pole	
Trigger Tool, Gas	
Trigger Tool, Pole	
Lag Screw Pole	
Trigger Tool, Gas	
Stake Truck	
Stake Truck	
Radio, Multi Channel	
Radio Repeater	
Radio, Multi Channel	
Radio, Multi Channel	
Radio Charger, Multi Port	
Radio, Multi Channel	
Radio, Multi Channel	
Radio, Multi Channel	
Radio, Multi Channel	
Radio, Multi Channel	
Radio, Multi Channel	
Talk About Head Phones	
Radio, Multi Channel	
Radio, Multi Channel	
Radio Charger, Multi Port	
Radio, Intrinsically Safe	
Radio, CB	
Radio, Multi Channel	
Radio, Intrinsically Safe	
Radio, Multi Channel	
Welding Rod Dryer	
Metal Cutting Torch	
Metal Cutting Torch	
Welder, Gas	
Welder, Electric 85A	
Plasma Cutter	
Welder, Gas Powered 200A	
Metal Cutting Torch	
Cutting Tip 12" long, goes with kit	
Welding Blanket	
100' Cable Leads for welding (renta	
Welding Cable	
Welding Cable	
Welder Rod Dryer	
Welding Blanket	
Welder Rod Dryer	
Welder, Electric 135A	
Welder, Gas Powered 250A	
Welder, Electric 140A	
Plasma Cutter	
Welder, Gas Powered 225A	
Welder, Gas Powered 250A	
Wire Cart, 500'	
Wire Trike	
Wire Spool Tree	
Wire Caddy	
Wire Cart, 500'	
Wire Trike	
Wire Trike	
Wire Caddy	
Wire Caddy	

Wire Stand	Redacted Exemption 4
Wire Spool Tree	
Wire Cart	
Wire Spool Wagon	
Wire Labeler	
Wire Labeler	
Wire Labeler	
Wire Labeler	
Wire Labeler	
Wire Labeler	
Wire Labeler	
Wire Labeler	
Wire Labeler, Desktop	
Wire Labeler	
Wire Labeler, Desktop	
Wire Labeler, Software	
Wire Labeler	
Wire Labeler, Desktop	
Wire Labeler, Software	
Embossing Printer	
Wire Labeler, Desktop	
Wire Labeler	
Wire Labeler, Desktop	
Wire Labeler	
Wire Labeler, Desktop	
Reel Jacks, 22"-54"	
Lil tugger Kit	
Manhole Sheave	
Tugger, Stationary 4000#	
Tugger, Stationary 6000#	
Cable Feeder	
Cable Feeder	
Tugger, Stationary 8000#	
Well Wheel	
Mouse Kit	
Cable Tray Sheave	
1/4" x 600' Nylon Rope	
3/8" Nylon Rope	
1/2" Nylon Rope	
1 1/2" Non Stretch Rope	
Non Stretch Rope, 5/8"x600'	
Non Stretch Rope, 7/8"x600'	
Pulling Sheave, 12"	
Pulling Sheave, 18"	
Pulling Sheave, 24"	
Wire Dispenser	
Non Stretch Rope, 3/4"x600'	
5/8" Nylon Rope	
Non Stretch Rope, 1"x600'	
Set Screw Pulling Grips	
Tugger, Stationary 6000#	
Tugger, Stationary 8000#	
PVC Plug Kit	
Snatch Block	
Pulling Sheave, Tri-Wheel	
1 1/8" Non Stretch Rope	
1 1/4" Non Stretch Rope	
Tugger, Stationary 4000#	
Pulling Basket, Mesh 2" - 2-1/2"	
Pulling Basket, Mesh 3" - 3-1/2"	

Reel Jacks 13"-28"	Redacted Exemption 4
Non Stretch Rope, 1/2"x600'	
Reel Jacks, 13"-28"	
Hook Sheave, 6"	
Tugger, Stationary 8000# Motor Only	
Wire Brush Mandrel 3-1/2"	
Wire Brush Mandrel 4"	
Flexible Mandrel, 4"	
Pulling Sheave, 12"	
Hands Free Wire Lubricating System	
Battery Pack	
1/2" - 2" Aluminum Soaper	
2 1/2" - 4" Aluminum Soaper	
Flexible Mandrel, 5"	
Radius Sheaves, 24"	
Radius Sheaves, 36"	
Tugger, Portable	
Tugger, Stationary 8000#	
Wire Snagger up to 500MCM on combin	
Tugger, Portable	
Non Stretch Rope, 5/8"x1200'	
Non Stretch Rope, 1/2"x1800'	
Nylon Rope, 1/4"x2400'	
Reel Jacks 28"- 46 5/8"	
Non Stretch Rope, 3/8"x600'	
Non Stretch Rope, 3/4"x1200'	
Pipe Stand	
Non Stretch Rope, 7/8"x1200'	
CO2 Hose	
Nylon Rope, 1/4"x1200'	
6" Haines Roller	
Mounting Clip Steel Conduit	
End Cap for Haines Rollers	
Angle Roller, 90 Degree 24"	
Nylon Rope, 1/2"x2400'	
Flexible Mandrel, 3"	
Flexible Mandrel, 3-1/2"	
Spindle, 7500# Spools	
Non Stretch Rope, 1"x300'	
Non Stretch Rope, 1/2"x300'	
Feeding Sheave, 2"	
Feeding Sheave, 3"	
Spiral Duct Brush 4"	
Spiral Duct Brush 2-1/2"	
Spiral Duct Brush 2"	
Flexible Mandrel, 2"	
1 1/2" Flexible Mandrel	
1 1/2" Spiral Duct Brush	
Solid Axle, 1-1/8"	
Non Stretch Rope, 7/8"x300'	
Wire Puller, Tripod	
Reel Jack Stand, Adjustable	
Reel Jacks, Pump Up Style	
Non Stretch Rope, 3/4"x1600'	
Tugger Speed Booster	
Non Stretch Rope, 7/8"x1400'	
Tugger, Stationary 8000#	
Pulling Swivel Head, 1-3/8"	
Pulling Swivel Head, 2"	
Pulling Swivel Head, 7/8"	

Nylon Rope, 3/8"x600'	Redacted Exemption 4
Non Stretch Rope, 1"x1200'	
Non Stretch Rope, 1/2"x1200'	
Pulling Swivel Head, 2-3/8"	
Non Stretch Rope, 5/8"x600'	
Wire Spool Trailer	
Fish Tape Vacuum System	
Single Spool Trailer	
Nylon Rope, 1/4"x600'	
Non Stretch Rope, 3/8"x1200'	
Feeding Sheave, 4"	
Cable Guide	
Wire Spool Roller	
Tugger Motor, 3000X	
Angle Roller, 90 Degree 36"	
Wire Snagging Kit	
Wire Snagging Kit	
Haines Roller	
Cable Tray Roller, 24" Radius	
Feeding Sheave, 6"	
Feeding Sheave, 5"	
Cable Roller 30" Set of 5	
Cable Tray Roller, Radius Kit of 5	
Tugger, Remote Pedals	
Mouse Kit	
V700 Wiremold Raceway Cutter	
2100 Base/Cover Wiremold Cutter	
Wiremold Cutter, Cover G4000	
6000 Cover Wiremold Cutter	
4000 Cover Wiremold Cutter	
6000 Base Wiremold Cutter	
4000 Base Wiremold Cutter	
3000 Cover Wiremold Cutter	
3000 Base Wiremold Cutter	
V500 Wiremold Raceway Cutter	
2000 Raceway Cover/Cutter	
DS4000 Cover Wiremold Cutter	
Box punch for Wiremold 500/700	
Torque Wrench, 3/8"	
110 Impact Tool, 10pt	
Torque Wrench, 1/2"	
HV Insulated Wrench Set	
Torque Wrench, 3/8"	
Wrench, Crescent 10"	
Wrench, Pipe 36"	
Wrench, Pipe 14"	
Wrench, Pipe 18"	
Wrench, Pipe 24"	
Wrench, Chain 24"	
Wrench Set	
Wrench, Strap #2	
Wrench, Pipe 48"	
Wrench, Combo 1"	
Wrench, Combo 1-1/16"	
Wrench, Combo 1-1/8"	
Wrench, Combo 1-1/4"	
Wrench, Combo 1-5/16	
Wrench, Combo 1-3/8"	
Wrench, Combo 1-1/2"	
Wrench, Combo 1-5/8"	

Torque Wrench, 3/8"	Redacted Exemption 4
Wrench, Pipe 48"	
Wrench, Strap #5	
Wrench, Pipe 14"	
Wrench, Pipe 24"	
Wrench, Chain 36"	
Wrench Set, Metric	
Torque Wrench, 1/4"	
Wrench Set	
Wrench, Combo 3/4"	
Wrench, Strap #1	
Wrench, Pipe 14"	
Torque Wrench, 1/4"	
Torque Wrench, 3/8"	
Torque Wrench, 1/2"	
C-Clamp	
Wrench, Chain 18"	
Wrench, Pipe 18"	
Wrench, Pipe 24"	
Wrench, Pipe 24"	
Wrench, Pipe 12"	
Torque Wrench, 1/2"	
Torque Wrench, 3/8"	
Torque Wrench, 3/8"	
Impact Wrench, 1/2"	
Wrench Set	
C-Clamp	
Torque Wrench, 3/8"	
Torque Wrench, 1/2"	
Wrench Set	
14.4V Impact Driver Kit	
Torque Wrench, 3/8"	
Torque Wrench, 1/2"	
Wrench Set, Metric	
Wrench, Pipe 18"	
Ratcheting Box Wrenches, 5pc Set	
Torque Wrench, 3/8"	
Torque Wrench, 3/8"	
Torque Wrench, 1/4"	
Wrench, Transformer	
Tourque Wrench, 1/2"	
Wrench, Strap #4	
Wrench, Pipe 18"	
Torque Wrench, Interchangeable	
Weatherproof Panel Cover, Set Of 4	
Turtle 50amp Temporary Power	
Temp	
Temp Pwr Unit, 45kva Rolling	
Temp Pwr Unit, 30kva Rolling	
Temp Pwr Unit, 75kva Rolling	
Temp Pwr Unit, 150kva Rollin	
Turtle Cord, 50' 120V 50A	
Temp Service, Outlets	
Panel Covers	
Temp Power Unit	
Extension Cord, 25'	
Extension Cord, 50'	
Extension Cord, 100'	
GFCI, 4-Way	
Turtle Cord Splitters	

Temp Pwr Unit, 112.5kva Roll	Redacted Exemption 4
PDU WP(Turtle), 50A W/50' 120V Cord	
GFCI 3-Way	
Turtle Cord, 25' 120V 50A	
200A Temporary Power Service	
Temp Pwr Unit, 75kva Enclosed	
Turtle Cord, 100' 120V 50A	
Turtle Cord, 50' 120V 50A	
Extension Cord, 100'	
Turtle Cord, 75' 120V 50A	
GFCI, Single	
800amp Weatherproof Temporary Servi	
Extension Cord, 50'	
Extension Cord, 25'	
UPS System	
Turtle Cord Splitters	
Class I Div I - 6-10ft. pigtail	
Class I Div I - 6-10ft pigtail	
GFCI, 4-Way	
Temp Pwr Unit, 45kva Enclosed	
Fan, Floor	
Fan, Industrial Pedestal	
Fan, Industrial Pedestal	
Fan, Industrial Pedestal	
Fan, Industrial Floor	
Fan, Industrial Floor	
Fan, Industrial Floor	
Fan, Industrial Pedestal	
Fan, Industrial Pedestal	
Fan, Floor	
Fan, Industrial Pedestal	
Fan, Industrial Floor	
Bender, EMT 1-1/4" Ratchet	
Bender, Cable Hydraulic	
Bender Shoes, EMT 1/2"-2"	
Bender,Wire Ratchet	
Bending Shoes, RGS 1/2"-2"	
Bender, 1"-1-1/2" Ratchet	
Electric Emt/Hyd Bender	
Bender, EMT Hydraulic	
Bender, 885 1-1/4"-5" Hydraulic	
Bender, Buss Bar Hydraulic	
Bender, 1/2"-2" Ratchet	
1 Shot Hydraulic Bender	
Bender, 555 1/2"-2" EMT/RIG	
Bender, 884 1-1/4"-4" Hydraulic	
Bender, 885 1-1/4"-5" Hydraulic	
Bender, 881 2-1/2"-4" Hydraulic	
Torch, Propane	
Bender, Hickey 1/2" Manual	
Bender, Hickey 3/4" Manual	
Bender, Hickey 1" Manual	
Bender, Hickey 1-1/4" Manual	
Bender, Wiremold-Manual	
Bender, EMT 1/2" Offset	
Bender, EMT 3/4" Offset	
Bender, EMT 1/2" Manual	
Bender, EMT 3/4" Manual	
Bender, EMT 1" Manual	
Bender, EMT 1-1/4" Ratchet	

Heat gun	Redacted Exemption 4
PVC Blanket, 1/2" - 1-1/2"	
PVC Blanket 3"- 4"	
PVC Blanket, 3"- 4"	
PVC Hot Box, 1/2"-2"	
PVC Hot Box, 1/2"-4"	
PVC Hot Box, 1/2" - 6"	
Heat Gun	
Bender, 855 1/2"-2" EMT/RIG	
Bender, EMT 1-1/4" Manual	
Bender, Wire-Manual	
Bender, 881 2-1/2"-4" Hydraulic Rac	
Heat Gun	
Bender, 555 1/2"-2" EMT/RIG	
Bender, 555 1/2"-2" EMT/RIG	
Bender, 881 2-1/2"-4" Hydraulic	
Heat Gun	
PVC Hot Box, 1/2" - 6"	
PVC Hot Box, 1/2"- 4"	
PVC Blanket, 3" - 4"	
PVC Hot Box, 1/2" - 2"	
Bender, Juno Track Flex 12-Manual	
Bender, EMT 1/2"-1"	
PVC Blanket 2" - 3"	
Bending Shoes, Robroy	
Bender, Tube 3/8"-Manual	
Bender, Tube 1/2"-Manual	
Bending Shoes, RGS 1/2"-2"	
Heat Gun	
Bender, 555 1/2"-2" EMT/RIG	
PVC Hot Box, 1/2"-4"	
Bender, PVC Propane	
Bending Shoes, Robroy 1/2"-2"	
Heat Gun	
Heat Gun	
Milk House Two Prong Plug	
Heater, Torpedo	
Heater	
Propane Heater w/stat 150,000 BTU	
Heater	
Heater, Sunflower	
Temp Heater, 125000 btu	
Ladders, 8' Step	
Ladder, 6' Step	
6' Wooden Step Ladder	
Ladder, 4' Step	
Ladder, 10' Step	
10' Wood Step Ladder	
Ladder, 12' Step	
12' Wood Step Ladder	
14' Wood Step Ladder	
4' Wooden Step Ladder	
8' Wood Step Ladder	
Ladder, 8' Straight	
Ladder, 13' Articulating	
Ladder, 14' Step	
Ladder, 6' Step	
Ladder, 8' Step	
Ladder, 12' Step	
Ladder, 21' Articulating	

Ladder, 21' Articulating	Redacted Exemption 4
Ladder, 6' Platform	
Ladder, 4' Platform	
Ladder, 8' Articulating	
Ladder, 7' Step	
Ladder, 17' Articulating	
Ladder, 10' Platform	
Ladder, 21' Articulating	
Ladder, 8' Straight	
Ladder, 12' Straight	
Ladder, 10' Straight	
Ladder, 8' Straight	
Ladder, 10' Straight	
Ladder, 12' Straight	
Ladder, 4' Step	
Ladder, Multi-Function	
Ladder, 12'	
Ladder, 6' Straight	
Ladder, 8' Step	
Ladder, 10' Step	
Ladder, 6' Step	
Ladder, 10' Double Step	
Temp Light, Trouble Light	
Temp Light, High Bay MT 480V	
Temp Light, 500W Quartz Light	
Temp Light, Light Cart	
Battery Quartz Light	
Quartz Light, Portable	
Temp Light, High Bay 480V	
Temp Light, High Bay 277V	
Clamp on Mini Quartz Light	
Temp Light, High Bay 120V	
Temp Light, Floodlight 18V	
Temp Light, Flashlight	
Quartz Light, Portable	
Temp Light, 1000W Quartz Light	
Temp Light, 1000W Quartz Light	
Temp Light, Flashlight	
Temp Light, Battery Operated Light	
Temp Light, High Bay MT 277V	
Temp Light, Portable Light	
Temp Light, 1000W Quartz Light	
Temp Light, High Bay 277V	
Warning Light for Pickup	
Temp Light, 175W Portable Light	
Temp Light, 1000W Quartz Light	
Temp Light, 1000W Quartz Light	
Temp Light, Portable Light	
Nylon Lifting Choker, 10'	
Nylon Lifting Choker, 12'	
Nylon Lifting Choker, 14'	
Nylon Lifting Choker, 16'	
Nylon Lifting Choker, 18'	
Nylon Lifting Choker, 2'	
Nylon Lifting Choker, 4'	
Nylon Lifting Choker, 6'	
Nylon Lifting Choker, 8'	
Nylon Lifting Choker, 20'	
Steel Choker, 6'	
Shackle, 3/8" pin	

Shackle, 1" Pin	Redacted Exemption 4
Shackle, 1/2" Pin	
Shackle, 5/8" Pin	
Shackle, 3/4" Pin	
Steel Choker, 4'	
Steel Choker, 2'	
Steel Choker, 8'	
Steel Choker, 10'	
Steel Choker, 12'	
Steel Choker, 20'	
Steel Choker, 24'	
Steel Choker, 28'	
Nylon Lifting Choker, 8'	
Lifting Choker, 8'	
Shacke, 1/4" Pin	
Nylon Lifting Choker, 3'	
BC-3 3T Beam Clamp Flange width 3.2	
Spreader Bar	
Logging Chain w/hooks, 1/2"	
Shackle, 7/8" Pin	
Shackle, 7/16" Pin	
Submersible Pump	
Submersible Pump, 2"-3"	
Submersible Pump	
Submersible Pump	
Submersible Pump	
Submersible Pump	
Submersible Pump	
Utility Pump In-line	
Print Rack, Rolling	
Print Rack, Wall Mount	
Print Holders, 24"	
Print Holder, 30"	
Print Holder, 36"	
Print Holder, 42"	
Print Table/Pipe Rack	
Print Holder, 18"	
Broom	
Furniture, Dust Pan	
10/100 24-Port Hub, Noblis 10/100	
Cpu w/Flat Panel, Mouse & Keyboard	
Laptop Computer	
Printer, All in one	
Fax Machine, Panasonic Fpw111	
Fax Machine	
Fax Machine	
Fax Machine	
Fax Machine	
Fax Machine, Brother 560	
Fax Machine, Panasonic FL501	
Inkjet Printer, Hp Color	
Printer	
Fax Machine	
Fax Machine, Brother 1750	
Fax Machine, Brother 640	
Fax Machine	
Fax Machine, Panasonic FP121	
Fax Machine	
Fax Machine	
Fax Machine	

Fax Machine	Redacted Exemption 4
Fax Machine	
Fax Machine	
Printer	
Port Hub, 8 Port, And Keyboard	
Hp Design Jet Cad,	
Cad Software	
Accubid Estimating Softwr	
Wide Format Printer	
Wide Format Printer	
Flat Screen Monitor	
Phone/Voicemail system	
Copy Machine	
Fax Machine	
Printer, All in one	
Fax Machine	
Fax Machine	
Printer	
Color Inkjet Fax/Copier	
Fax/Copier Machine	
Microsoft Office Software	
Printer, Photo	
Computer, Laptop	
Wide Format Printer	
Printer, All in one	
Sierra Wireless Card	
Temporary Wireless Internet System	
Printer, All in one	
Printer, All in one	
Printer, All in one	
Fax Machine	
Printer, All in one	
Printer, All in one	
Verizon Wireless Card	
Printer, All in one	
Laptop Computer	
Laptop Computer	
Time Entry Device	
Laptop Tablet	
40/8 Switch	
IP Phone	
1841 Switch	
3560 Switch	
Wireless Access Points	
Wide Format Printer	
Printer, All in one	
Phone System w/6 VOIP Phones	
Computer, Desktop	
Computer, Laptop	
Printer, All In One	
Shelving For Vans	
Shelving, Rolling	
Shelving, Baker Scaffold	
Wire Metal Baskets w/o casters	
Wire Metal Baskets w/casters	
16' Scissor Lift	
Scissor Lift, 15'	
13' Scissor Lift	
Scissor Lift, 15'	
Scissor Lift, 9'	

Scissor Lift, 17'	Redacted Exemption 4
Scissor Lift, 19'	
Scissonr Lift, 20'	
Articulationg Boom Lift, 30'	
Scissor Lift, 19'	
Scissor Lift, 20'	
Scissor Lift, 20'	
Scissor Lift, 20'	
Scissor Lift, 20'	
Scissor Lift, 25'	
Scissor Lift, 25'	
Scissor Lift, 26'	
Scissor Lift, 20'	
Scissor Lift, 15'	
25' Gas scissors lift - MEC 2558HT	
Scissor Lift, 15'	
26' Scissor Lift - Skyjack SJ 3226	
Scissor Lift, 20'	
Scissor Lift, 19'	
15' One Man Personell Lift	
38' One Man Personell Lift	
Personnel Lift, 24'	
Personnel Lift, 24'	
Personnel Lift, 12' Drivable	
Personnel Lift, 36'	
15' One Man Personell Lift	
Auditorium Lift (Pew Lift)	
20' One Man Personell Lift	
Personnel Lift, 24'	
24' Genie w/out outriggers	
Personnel Lift, 12' Drivable	
Personnel Lift, 20' Drivable	
Personnel Lift, 12' Drivable	
Personnel Lift, 24'	
Personnel Lift, 30'	
Equipment Lift, Battery 5'	
Equipment Lift, 20'	
Equipment Lift, 18'	
Equipment Lift, 5'	
Equipment Lift, 4.5'	
Equipment Lift, 24'	
Engine Hoist, 1/2-2 Ton	
Equipment Lift, Battery 5'	
Equipment Lift, 24'	
Crane, Gantry 5 Ton	
Equipment Lift, Battery 6'	
Equipment Lift, Battery 6'	
Crane Gantry, 5Ton	
Crane, Gantry Aluminum	
Crane, Gantry 3 Ton	
Fish Tape Reel, Insul	
Fishing System, Vacuum	
Fish Tape, Fiberglass 100'	
Fish Rodder, Fiberglass 400'	
Fish Tape, Steel 200'	
Fish Tape, Steel 1/4"	
Fish Tape, Steel 100'	
Fish Tape, Fiberglass 200'	
Fish Tape, Steel 200'	
Fish Tape, Fiberglass 100'	

Fish Stick	Redacted Exemption 4
Fish Stick	
Fish Tape, Fiberglass 100'	
Fish Rodder, Fiberglass 300'	
Fish Stick	
Fish Rodder, Fiberglass 600'	
Fish Rodder, Fiberglass 1000'	
Fish Rodder, Fiberglass 300'	
Fish Tape, Nylon 100'	
25' x 1/4" Flat Steel Fish Tape	
Fish Sticks	
Magnetic Wall Fishing System	
Fish Tape, Steel 200'	
Fish Tape, Steel 200'	
Fish Tape, Steel 200'	
Fish Tape, Steel 100'	
Fish Tape, Steel 200'	
Fish Tape, Steel 100'	
Fish Tape, Steel 200'	
Fish Rodder, Fiberglass 400'	
Fish Rodder, Fiberglass	
CO2 Tank, 5#	
Stud Punch, Square	
Stud Punch, Large	
Stud Punch, Small	
Caddy Punch	
Keyway Punch	
Stud punch, Battery Operated	
Submersible Pump	
Vacuum, Wet/Dry	
Shop Vac w/blower attachment	
Cordless Vac, 15.6V w/accessories	
Vacuum, Wet/Dry Battery	
Vacuum, Wet/Dry	
Vacuum, Bagless	
Vacuum, Wet/Dry	
Vacuum Wet/Dry	
Vacuum, Bagless	
Vacuum, Wet/Dry	
Vacuum, Wet/Dry	
Vacuum, Wet/Dry	
Vacuum, Bagless	
Vacuum, Wet/Dry	
Vacuum, Wet/Dry	
Vacuum, Wet/Dry	
Vacuum, Concrete Saw	
Medical Grade Negative Air Machines	
Vacuum, Wet/Dry	
Vacuum, Wet/Dry	
Vacuum, Wet/Dry	
Vacuum, Wet/Dry	
Fuel Can, 5 Gallon	
Fuel Tank, 100 Gallon	
40 Gallon Tank w/pump	
Fuel Tank, 100 Gallon	
Storage Cabinet for Gas Cans	
Storage Cabinet for Gas Cans	
Barrel Truck	
Appliance Dolly	
Deck Dolly	

Dolly, 2-Wheeler	Redacted Exemption 4
Johnson Bar	
Rollers, 3/4 Ton	
Dolly, Barrel	
Dolly, Deck	
Dolly, Tank 50#	
Dolly, 12 Ton	
Dolly, 12 Ton	
Dolly, 6 Ton	
Johnson Bar	
Cylinder Caddy	
Sheet Rock Cart	
Dolly, Deck	
Roller, 3 3/4 Ton	
Flat Jack Kit, 5 Ton	
Toe Jack, 5 Ton	
LV Launch Cable	
LV Launch Cable	
LV Computer Interface	
LV Butt-In Set	
LV Tone Generator	
LV Modular Cable Tester	
Unitest Beha	
LV Cable Service Termination Kit	
Talk & Trace, W/Headsets (2)	
Tester, Infared	
LV Hot Melt Fbr Optic Kit	
LV Auto Polisher Kit	
LV Tester,25 Pair Test Kit	
LV Launch Cable	
LV Splice Closure Tool Kit	
Modular Splicing System (MSSquare)	
LV Audio Toolbox	
LV Fiber Optic Power Meter	
Dsp Lan Cablemeter, Smart Remote	
Scope, 155 Mhz	
Cable Analyzer w/Gigabit Multimode	
Scope, 350 Mhz, Remote/Fiber Probe	
LV O.T.D.R. Tester	
LV F.O. Field Stripping Kit	
LV Compression Tool	
LV Fiber Termination Kit	
LV Coax Stripping/Trimming Tool	
LV 4 Pair Tester	
LV Elite Fiber Kit	
LV Modules for Ideal Testers	
LV Door Laser Guide	
LV OmniSeal XL Compression Tool	
LV Fiber Optic Microscope	
LV Fiber Optic Hot Melt Kit	
LV Epoxy Polish Kit	
LV Arc Fusion Splicer	
Cable Analyzer w/Gigabit Multimode	
LV Gigabit Multimode Fiber Module	
LV Single Mode Fiber Modules	
LV Fiber Optic Tool Kit	
LV RF Power Meter	
LV 4 Pair Tester	
LV Butt-In Set	
LV Launch Cable	

LV Launch Cable	Redacted Exemption 4
LV Fiber Termination Kit	
LV Modules for Ideal Testers	
LV Single Mode Launch Cord 500m	
Twisted Pair/Coaxial Cable Terminat	
LV RJ45/RJ11 Telephone Kit	
LV 4 Pair Tester	
LV Tone Generator	
LV SL Series 110 Jack Connectors	
LV Crimping set w/changeable heads	
LV O.T.D.R. Tester	
LV Tone Generator	
LV Air Blown Fiber Kit	
LV Chicago Grips for Al. Conductor	
LV Chicago Grips for bare Conductor	
LV Tone Generator	
Coax Adapters	
Cable Analyzer w/Gigabit Multimode	
LV Multi Mode Fiber Modules (2pcs)	
LV Crimp Tool	
LV Visual Fault Locator	
LV Fiber Optic Behind the Wall Conn	
LV Anaerobic Tool Kit (SC & LC)	
LV Cable IQ Testing Kit	
LV Fiber Optic Microscope	
LV Compression Cable TV "F" kit	
110 Multi punchdown tool w/5 pair h	
LV LinkMaster Tester w/remote	
LV Subscriber Loop Analyzer	
LV Fiber Optic Microscope	
LV Impact Tool	
Television/CATV Signal Level Meter	
LV Color Monitor, Battery Powered	
LV 4 Pair Tester	
Audio & Video Test Generator	
LV Launch Cable	
LV Launch Cable	
LV Launch Cable	
LV Launch Cable	
LV Launch Cable	
LV Launch Cable	
LV Launch Cable	
LV Panduit Termination Kit	
Pro Installer Twisted Pair Tool Kit	
LV Permanent Link Adapter	
LV Personality Module	
LV Personality Module Set	
LV Tone Generator	
LV Pathfinder	
Test Tone Kit	
LV Fiber Test Module Set	
LV Launch Cable	
LV Fiber Optic Fusion Splicer	
LV Arc Fusion Splicer	
LV Fiber Termination Kit	
LV Fiber Kit	
LV Fiber Termination Kit	
LV Fiber Meter	
LV Butt-In Set	
LV Network monitoring device	

String shooting gun, CO2, 120'	Redacted Exemption 4
LV Multifunction CCTV Test Set	
Butt Set	
LV Smoke Detector Test Kit	
LV O.T.D.R. Tester	
LV Fiber Feild Installation Kit	
LV End Plate Cutter Kit	
LV Speaker Calibration System	
Visual Fault Locator	
LV Butt-In Set	
LV Impedance Meter	
LV Butt-In Set	
LV Coaxial Tool Kit	
LV Multimedia Video Genorator	
LV Digital LCD TV, 7"	
LV BNC Termination Tool Kit	
DM-8G-Crimper	
Camera Instalation Device	
Fiber Optic Cleaning Kit	
Fiber Fault Locator, Pocket	
LV BNC Crimp Kit	
Cable Stripper Set	
Cable Strpper Set	
Cable Stripper Set	
Cable Stripper Set	
HV Wire Stripping Kit	
LV Fiber Optic Stripping Kit	
LV Coring Stripping Tool	
Cable Stripper	
Cable Stripper	
Cable Stripper, Adjustable	
URD Insulation Chamfer Tool	
URD Insulation Chamfer Tool	
Cable Stripper Set	
Cable Stripper, Mark 2 Kit	
Cable Stripper, Adjustable	
Cable Stripper, Mark 1 Kit	
Socket Set, 3/4"	
Socket Set, 1/2"	
Socket set, 1/4"	
Socket Set, 3/8"	
Socket Set, Allen	
Socket Set, 3/8"	
Socket Set, 1"	
Socket Set, 3/8"	
Socket Set, 3/8"	
Socket Set, 1/2"	
Socket Set, 1"	
Socket Set, 3/8"	
Socket Set, 1/2"	
Socket Set, 3/8"	
Socket Set, Allen Long	
Socket Set, Allen	
Socket Set, 3/8"	
Socket Set, Allen	
Socket Set, 170pc	
Socket Set, Allen Metric	
Socket Set, Allen Metric	
Socket Set, 1/2"	
Socket Set, 1/4"	

Socket Set, 3/8"	Redacted Exemption 4
Socket Set, 1/2"	
Socket Set, 1/4"	
Socket Set, Allen	
Socket Set, 1/2"	
Socket Set, 99pc	
Socket Set, Allen Long	
Socket Set, Allen Long	
Socket Set, 1/2"	
Socket Set, Allen Long	
Socket Set, Allen Metric	
Socket Set, 1/2"	
Socket Set, 3/8"	
Socket Set, 3/8"	
Drill, Electric 3/8"	
Drill, Electric 1/2"	
Drill, Electric 1/2"	
Drill, Right Angle	
Drill, Electric 1/2"	
Drill, Electric 3/8"	
Drill, Electric 1/2"	
Drill, Electric 3/8"	
Drill, Electric 3/8"	
Drill, Electric 3/8"	
Drill, Right Angle	
Drill Electric, Screw Shooter	
Screw Shooter	
Drill, Electric 3/8"	
Drill, Right Angle	
Drill, Electric 1/2"	
Drill, Electric 1/2"	
Drill, Right Angle Battery	
Drill, Right Angle	
Drill, Right Angle Battery	
Drill, Right Angle Battery	
Drill, Right Angle	
Drill, Right Angle	
Drill, Right Angle	
Drill, Right Angle	
Drill, Right Angle Battery	
Drill, Right Angle	
Drill, Press Mag 1/2"	
Drill Press 5/8"	
Drill, Press 1/2"	
Drill, Press Mag 2"	
Drill, Press Mag 3/4"	
Drill, Press Mag 1-1/4"	
Drill, Press 1/2"	
Drill Press 5/8"	
Drill Press, 5/8"	
Drill, Press 1/2"	
Crimp Die, U8CRT	
Crimp Die, U5CRT	
Crimp Die, U4CRT	
Crimp Die, U3CRT	
Crimp Die, U2CRT	
Crimp Die, U1CRT1	
Crimp Die, U25RT	
Crimp Die, U26RT	
Crimp Die, U28RT	

Crimp Die, U29RT	Redacted Exemption 4
Crimp Die, U31RT	
Crimp Die, U32RT	
Crimp Die, U34RT	
Crimp Die, U36RT	
Crimp Die, U39RT	
Crimp Die, U25ART	
Crimp Die, U28ART	
Crimp Die, U34ART	
Crimp Die, "C"	
Crimp Die, U243	
Crimp Die, U30RT	
Crimp Die, U654	
Crimp Die, U998	
Crimp Die, UN	
Crimp Die, U27RT	
Crimp Die, U1011	
Crimp Die, U27ART	
Crimp Die, U31ART	
Crimp Die, U-D3	
Crimp Die, U-F	
Crimp Die, U39ART-2	
Crimp Die, PYFR	
Crimp Die, U-O	
Crimp Die, U30ART	
Crimp Die, U36ART	
Crimp Die, U317	
Crimp Die, U247	
Crimp Die, U2CABT	
Crimp Die, U-BG	
Crimp Die, U38RXT	
Crimp Die, U29ART	
Crimp Die, U997	
Crimp Die, U29D1	
Crimper Die, YGIB	
Crimp Die, Adapter	
Crimp Die, P44ART	
Crimp Die, P46RT	
Crimp Die, Angle Embossing	
Crimp Die, Angle Embossing	
Crimp Die, P45D	
Crimp Die, P39ART	
Crimp Die, 15514-CK	
Crimp Die, 15515-CK	
Crimp Die, U238	
Crimp Die, U26ART	
Crimp Die, Black & Gold	
Crimp Die, Red	
Crimp Die, Pink	
Crimp Die, Brown	
Crimp Die, Purple & Green	
Crimp Die, Orange & Brown	
Crimp Die, Blue	
Crimp Die, Blue	
Crimp Die, Gray	
Crimp Die, Yellow	
Crimp Die, Green	
Crimp Die, 15506 500MCM	
Crimp Die, U44XRT	
Crimp Die, U32ART	

Crimp Die Kit	Redacted Exemption 4
Label Maker	
Label maker	
Label Maker	
Label Maker	
label Maker	
Labeler, P-Touch 1/4" - 1 1/2"	
Label Maker	
Label Maker	
Label Maker	
Label Maker	
Label Maker	
P-Touch 1/4" - 3/4" Labeler	
Rubber Boots	
Industrial Forklift	
Water Cooler	
Water Jug	
Water Cooler	
Water Cooler	
Water Rack	
(r) 24' Personnel Lift	
(r) 19' Personnel Lift	
(r) 24' Genie W/Wo-Outriggers	
(r) Industrial Forklift	
(r) 20' Scissor Lift	
(r) 20' Scissor Lift	
(r) 30' Boom Lift	
(r) 12' Scissor Lift	
(r) 26' Scissor Lift, Narrow 30-32"	
(r) 6500# Tugger Kit	
(r) 8000# Tugger Kit	
(r) Cable Feeder	
(r) 24' Genie w/outriggers	
(r) 15 - 16' Scissor Lift	
(r) 16' Scissor Lift	
(r) 25'-26' DC 46-68" Scissor Lift	
(r) 19' Scissor Lift	
(r) 19' Scissor Lift	
(r) Air Compressor	
(r) Air Compressor Hose 3/4 x50	
(r) 17 - 19' Scissor Lift	
(r) Plate Compactor	
(r) Trailer, 12'x60'	
(r) Centrifugal Trash Pump, 3"	
(r) Suction Hose 3"	
(r) Discharge hose, 3" x 50'	
(r) Material Lift, 18'-20'	
(r) 1/2-2" Pipe Bender	
(r) Semi Trailer Storage, 48'	
(r) Office/Storage Trailer,10x30	
(r) Mobile Office Trailer, 8x36	
(r) Generator 6000W	
(r) Reel Jacks	
(r) Axel	
(r) 60' Straight 4x2 Boom	
(r) 555 Bender w/ridigid shoes	
(r) 40-44' Articulating Boom	
(r) 30-34' Wide Scissor Lift	
(r) 30-34' Narrow Scissor Lift	
(r) Trencher 15-20hp	

(r) Art Boom Lift 45-49' 2WD DC	Redacted Exemption 4
(r) W/B Roller Padfoot 3000#	
(r) 60-64' Straight Boom 4WD	
(r) 1/2-2" Bender	
(r) Generator 50-54 KW	
(r) 65-69' Straight Boom Lift	
(r) Generator 25-29 KW	
(r) Core Drill	
(r) Water Tank for Coredrill	
(r) 30-32' Narrow Scissor Lift	
(r) Backhoe - 4WD 12-15'	
(r) Trencher w/backhoe	
(r) Mini Excavator 8-9.9'	
(r) Rammer 2.7-3.2K Force	
(r) Trencher r/o 35-39hp	
(r) Utility Vehicle 6x4	
(r) Forklift - trv 8000# 40-44'	
(r) 30' Personnel Lift w/outriggers	
(r) 25-29' 4WD Scissor Lift	
(r) 5-39' 4WD Scissor Lift	
(r) 20' Storage Container	
(r) SDS-Max Rotary Hammerdrill	
(r) 46-96" Reel Jacks	
(r) 80-84' Straight Boom Lift 4WD	
(r) 32# Propane Tank	
(r) 40'-44' 4WD Scissor Lift	
(r) Mini Excavator 10-10.9'	
(r) 40# Propane Tank	
(r) 2 1/2" - 4" Hyd Pipe Bender	
(r) Bending Table for 881 Bender	
(r) 120' 4WD Straight Boom Lift	
(r) 2.7-3.2K Rammer	
(r)555 Bender w/ EMT Shoes	
(r) Jackhammer	
(r) Concrete Saw Walk Behind (Gas)	
(r) 24'x 60' Office Trailer w/skirt	
(r) 40-44' DC Scissor Lift	
(r) 40' Personnel Lift Dc- w/outrig	
(r) Forklift 40-54' 10000#	
(r) 40-44' 4WD Str Boom DSL	
(r) 15' Scissor Lift	
(r) Forklift 40-45' 6000#	
(r) Skidsteer loader w/mini track	
(r) 2.2 - 2.6K Rammer	
(r) Concrete Vibrator Elec 2-2.5	
(r) 3.3-4.3K Rammer	
(r) 1" x 1000' Pulling Rope	
(r) 150T Cylinder	
(r) Hand Pump w/hose	
(r) 1/2" - 3/4" Die Head	
(r) 1" - 2" Die Head	
(r) 60T Roller Kit	
(r) 24' - 25' Equipment Lift	
(r) 15' Self Propelled Scissor Lift	
(r) 135' Str Boom Lift - 4WD DSL	
(r) 1/2-2" Threader Complete	
(r) Generator 3.0-4.9KW	
(r) Air Comp 175-185 CFM w/hose	
(r) Porta Pony Thrdr, less dies	
(r) Oiler	

(r) 40' Storage Container	Redacted Exemption 4
(r) Generator 6kw	
(r) Mini Seesnake 1 1/4" - 6" capac	
(r) Locator for Seesnake	
(r) 15-19' Scissor Lift	
(r) Art Boom Lift 40-44' 2WD Narrow	
(r) Rch Forklift 5000lb 18-24'	
(r) Generator 40-59KW	
(r) Centrifugal Trash Pump - Gas 2"	
(r) Discharge Hose, 2" x 50'	
(r) Suction Hose, 2"	
(r) 50' Tripod Recovery System	
(r) 3 Ton Chainfall w/20' of Lift	
(r) 5 Ton Chain Fall w/20' of lift	
(r) 135' 4WD DSL Boom Lift	
(r) Art Lift 30-34' 2WD DC Narrow	
(r) Art Lift 60-64' 4WD DF	
(r) Trailer, 12'x50'	
(r) Stud Welder	
(r) Electric Welder - Gas Powered 2	
(r)100' Welding Cables	
(r) Welding Table	
(r) Light Tower, 4-6kw 4 lamp Towab	
(r) 1 Ton Chainfall w/30' of Lift	
(r) 8T Roller Kit	
(r) 1 Ton Chainfall w/40' of Lift	
(r) 85-89' Straight Boom - 4WD	
(r) Electric Manhole Blower 12"	
Camera, Infrared	
Camera, Infrared	
Camera, Infrared Lens	
Camera Infrared	
IR Camera, Telephoto Lens	
IR Camera, Wide Angle Lens	
Vacuum, Hepa Small	
Vacuum, Hepa Canister	
Vacuum, Hepa Canister	
Vacuum, Hepa Small	
Vacuum, Hepa Small	
Vacuum, Hepa Small	
Vacuum, Hepa Canister	
Vacuum, Hepa Canister	
Floor Tile Puller	
Ladder, Extension 16'	
Ladder, Extension 20'	
Ladder, Extension 24'	
Ladder, Extension, 28'	
Ladder, Extension 32'	
Ladder, Extension 40'	
Collapsable Workbench	
Work Bench, Rolling	
Trash Hopper, Large	
Trash barrel, Large	
Trash Barrel, Small	
Trash Hopper, Lid	
Trash Hopper, Small	
Material Tub	
Post Hole Digger	
Hand Held Ground Rod Driver	
Trencher, Walk Beside	

Trencher, Walk Beside	Redacted Exemption 4
Trencher, Walk Beside	
Trencher, Walk Beside	
Shovel, Round Point	
Shovel, Trenching	
Shovel, Flat	
Shovel, Snow	
Garden Hose	
Wheelbarrow	
Pick Axe	
Rake, Metal Tined	
Rake, Leaf	
Saw Horses	
Rollalifts	
Van, 2000 Ford E-350 Cargo	
Van, 1979 Chevrolet Step Van	
Van, 1999 < Ford E-350 Cargo	
Van, 2001 Ford Windstar Lx	
Van, 1998 Dodge Caravan	
Van, 1999 < Chevrolet G20	
Van, 2001 Ford E-350 Cargo	
Van, 2002 Ford E-350 Cargo	
Van, 2003 Ford E-350 Cargo	
Van, 2004 Ford E-350 Cargo	
Van, 2005 Ford E-350 Cargo	
Van, 2006 Ford E-350 Cargo	
Slide out Rack w/drawers	
Van, 2007 Ford E-350 Cargo	
Van, 2008 Elec Ford E-350 Cargo	
Van, 2008 Technology E-350 Cargo	
Van, Passenger 12'	
Van, Passenger 12'	
Van, Passenger 8'	
Van, Cargo 1 Ton	
Site Van with interior	
Van, 2005 Technology E-350 Cargo	
Van, 2006 Technology E-350 Cargo	
Van, 2007 Technology E-350 Cargo	
Van, Passenger 12'	
Van, 2009 Elec Ford E-350 Cargo	
Van, 2009 Tech Service Cargo Van	
Van, Cargo 1 Ton	
Van, Cargo 1 Ton	
Van, Cargo 1 Ton	
Framing Nailer, 30 Degree	
Bolt Cutters, 24"	
Bolt Cutter, 18"	
Bolt Cutter, 14"	
Bolt Cutter, 36"	
Metal Shear, Battery	
Metal Shear, 14 Gauge	
Metal Shear, 18 Gauge	
Metal Shear, 16 Gauge	
Microwave	
Microwave	
Microwave	
Devicing Stools	
Chair, Folding	
Folding Table, 6'	
Folding Table, 8'	

Folding Table, 4'	Redacted Exemption 4
Battery Safety Kit	
Hot Plate	
Battery Spill Containtment Kit	
Battery Safety Kit	
Key Chain Remote Control	
Alarm System Mounting Bracket	
Jobsite Portable Alarm Base Unit	
Indoor Motion Sensor	
Door/Window Contact	
Container Sensor	
Security Cable Lock 12' Length	
Trailer Park Security	
Mobilelock Indoor Motion Detectr Ki	
Load Bank 200KW	
Load Bank 100KW	
Sander, Palm	
Router	
Fence Splicing Tool	
Cooler	
Cooler	
Tool Book	
MRI Tool Kit	
Fabrication Machine	
Camcorder	
Digital Video Camera Recorder	
Platinum Plus Multi Function Tripod	
Digital Camera	
Digital Camera	
Inspection Camera	
Power Shot Digital Elph Camera	
LCD TV/DVD	
Digital Camera	
Inspection Camera, 3' Section	
LCD TV/DVD	
Power Shot Digital Camera	
Digital Camera	
Inspection Camera	
Pipe Stand	
Control Unit for Cadweld	
Canvas Bucket, 17"	
Canvas Bucket, 15"	
Portable PA System	
Splice Tent 6'x6'	
Splice Tent 8'x8'	
Splice Tent 6'x6'	
Splice Tent 8'x8'	
Splice Tent 10'x10'	
Corebit, Wet 9" Screw on	
Corebit, Wet 8" Screw on	
Corebit, Wet 7" Screw on	
Corebit, Wet 6" Screw On	
Corebit, Wet 5-1/2" Screw On	
Corebit, Wet 5" Screw On	
Corebit, Wet 4-1/2" Screw On	
Corebit, Wet 4-1/4" Screw On	
Corebit, Wet 4" Screw On	
Corebit, Wet 3-1/2" Screw On	
Corebit, Wet 3" Screw On	
Corebit, Wet 2-3/4" Screw on	

Corebit, Wet 2-1/2" Screw On	Redacted Exemption 4
Corebit, Wet 2" Screw On	
Corebit, Wet 1-1/2" Screw On	
Corebit, Wet 1-1/4" Screw On	
Corebit, Wet 1" Screw On	
Corebit, Wet 6" DD100/130	
Corebit, Wet 5" DD100/130	
Corebit, Wet 4-1/2" DD100/130	
Corebit, Wet 4" DD100/130	
Corebit, Wet 3-1/2" DD100/130	
Corebit, Wet 3" DD100/130	
Corebit, Wet 2-1/2" DD100/130	
Corebit, Wet 2-1/4" DD100/130	
Corebit, Wet 2" DD100/130	
Corebit, Wet 1-3/4" DD100/130	
Corebit, Wet 1-1/2" DD100/130	
Corebit, Wet 1-1/4" DD100/130	
Corebit, Wet 1-1/8" DD100/130	
Corebit, Wet 1" DD100/130	
Corebit, Wet 3/4" DD100/130	
Corebit, Wet 5/8" DD100/130	
Corebit, Wet 1/2" DD100/130	
Corebit, Wet 27/32 DD100/130	
Corebit, Wet 6" Quick Connect	
Corebit, Wet 5" Quick Connect	
Corebit, Wet 4-1/2" Quick Connect	
Corebit, Wet 4-1/4" Quick Connect	
Corebit, Wet 4" Quick Connect	
Corebit, Wet 3-1/2" Quick Connect	
Corebit, Wet 3-1/4" Quick Connect	
Corebit, Wet 3" Quick Connect	
Corebit, Wet 2-1/2" Quick Connect	
Corebit, Wet 2-1/4" Quick Connect	
Corebit, Wet 2" Quick Connect	
Corebit, Wet 1-3/4" Quick Connect	
Corebit, Wet 1-1/2" Quick Connect	
Corebit, Wet 1-1/4" Quick Connect	
Corebit, Wet 1-1/8" Quick Connect	
Corebit, Wet 1" Quick Connect	
Corebit, Dry 6" Screw On	
Corebit, Dry 5" Screw On	
Corebit, Dry 4-1/2" Screw On	
Corebit, Dry 4" Screw On	
Corebit, Dry 3-1/2" Screw On	
Corebit, Dry 3-1/4" Screw on	
Corebit, Dry 3" Screw On	
Corebit, Dry 2-5/8" Screw on	
Corebit, Dry 2-1/2" Screw On	
Corebit, Dry 2-1/4" Screw On	
Corebit, Dry 2" Screw On	
Corebit, Dry 1-3/4" Screw On	
Corebit, Dry 1-1/2" Screw on	
Corebit, Dry 1" Screw on	
Corebit, Dry 3/4" Screw On	
Corebit, Dry 2-1/2" DD130	
Corebit, Dry 2" DD130	
Corebit, Dry 1-1/2" DD130	
Core bit extension	
Core Bit Extention	
Core Bit Extention	

Core Bit Extention	Redacted Exemption 4
Drill, Air CP 1/2"	
Storage Unit, 20'	
Storage Unit, 40'	
Flat Bed Trailer	
Enclosed Trailer	
Flat Bed Trailer	
Enclosed Trailer	
Wire Spool Trailer	
Flat Bed Trailer	
Flatbed Car Trailer	
Semi Trailer	
Semi Trailer	
Semi Trailer	
Semi Trailer	
Semi Trailer	
Office Trailer	
Office Trailer	
Office Trailer	
8x28 Office/Storage Trailer	
Office Trailer	
Office Trailer	
Office Trailer	
Office Trailer	
Office Trailer	
Office Trailer	
24'x 60' Office Trailer (Dbl Wide)	
Parsons Outdoor Sign, 4x8	
Hammerdrill/Recip Saw Combo Kit, 18	
Socket set, 154pc	
18v Drill/Saw Combo Kit	
Router	
Float, Magnesium	
Trowel, Brick Large	
Trowel, Brick Small	
Edger	
Trowel, Concrete Large	
Trowel, Concrete Small	
Trowel, Finishing	
Rebar Tiewire Hooks	
Lockout/Tagout On Stand	
Lockout/Tagout Tool Chest	
Lockout/Tagout Kit	
Lockout/Tagout Box	
Key Cabinet, Wall Mount 240 Key	
Lockout/Tagout Board	
Lockout/Tagout Lock	
Lockout Tags	
Circuit Breaker Lockout	
Cleat for 480/600V Breaker Lockout	
Universal 277V Breaker/Single Pole	
Circuit Breaker Lockout	
Circuit Breaker Lockout	
Lockout/Tagout Lock	
Lockout/Tagout Lock	
Lockout/Tagout Lock	
Lockout/Tagout Lock	
Lockout/Tagout Lock	
Lockout/Tagout Lock	
Key Cabinet, Wall Mount 30 Key	

Lockout/Tagout Box	Redacted Exemption 4
Lockout/Tagout Lock	
Lockout/Tagout Lock	
Lockout/Tagout Lock	
Lockout/Tagout Lock	
Lockout/Tagout lock	
Lockout/Tagout Lock Board	
Circuit Breaker Lockout	
Lockout/Tagout Cording Device	
Lockout/Tagout Lock	
Bucket Van, 8' w/Hyd. Boom	
Bucket Truck, 2 Ton W/Hyd Boom	
Bucket Van, 10' w/Hyd Boom	
Multi Purpose Adjust Poles (qty 4)	
3" Spring Clamp for Zipwalls	
Medical Grade Negative Air Machines	
Wall/Ceiling Combo Containment Unit	
Differential Pressure Manometer	
Wall/Ceiling Combo Containment Unit	
Medical Grade Negative Air Machines	
Wall/Ceiling Combo Containment Unit	
Versa Trip Plus	
Power Quality Analyzer	
Battery Cell Resistance Tester	
VLF Hipot	
Industrial Process Loop Calibrator	
VLF Cable Tester	
Circuit Breaker Tester	
Propane Tank, 20#	
Co2 Tank, 50#	
Propane Tank, 33#	
Cylinder Tank Rack, 20#	
Current Loop Simulator	
Drill Extention Pole	
Torque Wrench Calibrator	
Distance Measuring Inst. Dash Mount	
Total Station	
Threaded Rod Cutter	
Unistrut Cutter, Hydraulic	
4 Gas Meter Cal. System	
Rebar Cutter	
Drill Sharpener 3/32"-1/2"	
MC Cable Cutter and Pigtailer	
Mobile Tool System Scanner	
Threaded Rod Cutter, 3/8" & 1/2"	
Torque Screw Driver	
Torque Limiting Screw Driver Kit	
Ground Rod Driver, Pneumatic	
Pnuematic Hose, 3/8" X 50'	
Pnuematic Ratchet, 3/8 Drive	
Pnuematic Ratchet, 1/4 Drive	
Mack Tri-Axel Dump Truck	
CAT 14 Blade	
CAT 323 Compactor	
CAT 330 Excavator	
CAT 345 Excavator	
Water Truck 4000 Gal	
CAT 426 Backhoe	
CAT 623 Scraper	

CAT 631 Scraper	Redacted Exemption 4
CAT 631 Waterpull	
CAT 950 Loader	
CAT 966 Loader	
CAT 980 Loader	
Bobcat	
Boom Truck 12 Ton	
CAT D5 Dozer	
CAT D6 Dozer	
CAT D6 LGP Dozer	
CAT D9 Dozer	
CAT TH103 Forklift	

Attachment - G Small Tools
Anvil
Auger, Gasoline (Post Hole Digger)
Auger,Hand (Post Hole Digger)
Awl
Axe
Banding Machine, Hand Type
Bar Crow ,Pinch, Paul Handle, Wrecking
Barricades (Flasher / Type)
Beams Lifting, Spreader
Bender, Hand Conduit, Pipe, Rebar, Tubing
Benders Power
Binder Load
Bits Concrete Core Bits
Blades, Concrete
Blanket, First Aid
Block Wood Snatch, Wire Rope Metal Snatch
Blower, Pneumatic Powered
Bob, Plumb
Bolts, Erection
Boring Machine (Power)
Box, Gang (Craft Storage)
Box, Tool, Hand 32" (Length) Max
Breakers Pavement
Bucket Concrete
Buggies Georgia (Push)
Buggies Georgia (Power)
Bus, School
Cable Construction Equipment
Cable Welding
Calipers
Car Movers (Hand Type)
Cart, Welding Bottle
Center Finder Set ,Wiggler
Chain, Engineers
Chair, Bosun's
Chalk, Marking
Chalk Line Box
Charger Battery
Chasers Thread Pipe
Chippers Air
Chucks Tool All Types
Chutes Concrete Metal
Clamp Cable Hose
Clamp Pipe Alignment Lifting Form CARPENTER,
Cleaner Drain Vacuum
Compactor Hand
Compactor Power
Compressors Air
Cones Concrete Slump
Connectors Hose
Cooler Water (Electric)
Cranes All
Creeper Floor
Cribbing Timbers
CRIMPING Tool Wire
Cutters Bolt, Cable, Gasket, Glass, Tube

Cutter Plasma Arc
Cutter, Weed (Gas or Hand)
Cylinder, Hydraulic for Porta Powers
Die Hard (1" to 2" Ratchet)
Die Head (2 1/2 6")
Dies Button, Knockout Hand Threader, Comp Tools ,
Digger, Hand Post Hole
Dispenser, Paper Cup
Divider, Spring Type
Dolly Barrel, Beam Machine, Pry, Warehouse,Pipe
Drill Press (& Stand), Mag Drill
Drill Core
Drill Air Electric Hammer Head
Edger Concrete
Embosser Tape (Hand)
Etcher, Electric
Expanders (Tube Roll / Mandrels)
Extension Socket Set
Fan, Exhaust (to 48")
Fans Electric {up to 24"}
Flaring Tool Tubing
Flints Concrete (Hand Only)
Forge Blacksmith
Fork Lift (All Sizes)
Forms Concrete
Furnace, Propane Melting
Gauge Depth, Feeler, Thickness, Wire
Generators
Grinder Air Electric, Bench
Grip Wire
Grooving Tool
Gun Grease Caulking
Gun Heat Pop Rivet, Powder Actuated, Soldering
Hammer, Chipping (Electric, Pneumatic)
Hammer, Rotary (Electric)
Hammer Sledge, Ball Peen, Claw, Tin
Hammer, Welders Slag
Handle Pull (for Socket Sets)
Handle, Speed
Hatchet
Heater Portable (Electric, Gas, Kerosene, LP)
Heater Induction
Hoe
Hoist, Chain
Hoist, Come-a-long
Hoist, Puller (Wire)
Hoist, Trolley (I Beam)
Holder Welding Rod
Hood Welding
Hose Pump, Suction, Discharge
Hose Air 1" up
Hose Heliarc Oxygen Acetylene
Ice Machine
Indicator, Dial Test-inc Mag Base
Iron-Caulking ,Packing Yarning
Iron- Soldering
Jack Hydraulic, Mechanical, Screw
Jitterbug- Concrete Hand

Joint Runner
Knockout,Hand
Ladders- Extension, Step
Level- Precision, Hand, Torpedo, Rod
Level, SURVEYORS
License and Inspections- State for Const Equip
Lighter, Spark
Mallet
Marker, Lime Rolling
Mattlock
Maul
Meter- AMP, Meger, Volt, Moisture
Micrometer-Depth, Inside, Outside
Miter Box Electric Hand
Nailer- Air
Nibbler- Sheet Metal
Computer
Printer
Fax Machine
Telephone, Hardware
Postage Machine
Desks
Chairs
File Cabinets
Tables
Oiler Hand
Optical Alignment Equipment
Optics Alignment Laser
Oven Rod
Packing-Construction Equipment
Pick Clay
Plane Bench Jack, Block, Electric
Planks- Scaffold
Pliers All Types
Plumb Bob
Protator Pipe
Puller Fuse, Gear, Wire
Pulley Cable, Well
Pump Barrel, Hand
Pumps Electric, Gasoline, Air
Punch & Chisel Sets
Punch, Arch
Punch Center Automatic Sheetmetal
Radio Base Station
Radio Two Way
Rake Garden, Stone, Concrete
Reel Tie Wire
Regulator Acetylene, Argon,Nitrogen, Oxygen
Riveter Hand
Rods Line/Level
Rule Extension Wood Fiberglass, Folding, Tape
Sandblaster
Sander Air Electric
Saw Chain, Circular, Hand, Jig, Portaband, Reciproca
Table
Saw- Concrete
Saw-Demo
Scaffolding

Scaler NEEDLE
Scraper Hand, Sidewalk, Wall
Screed- Portable
Screwdriver- All Hand Types
Shackles
Sharpener, Drill Bit
Sheath Plum Bob
Shelving, Rotobins,etc.
Shores (Metal Adjustable)
Shovel, All Types
Snap Ties (Form Work)
Soapstone Holder
Sponges
Spreader Flange
Stakes
Stand Pipe
Stencils-Numerical, Alphabetical
Stress Relieving Machine
String
Tags Permanent Identification
Tamp- Hand
Tanks- All Other (Temporary Construction)
Tape- Gum, Scotch, Cambric
Teeth & Bolts For All Rippers, Buckets and Dippers
Telephone- Electricians Testing
Temperature- Sticks, Pellets
Temporary Construction Materials
Tester- Antifreeze, Battery
Tester- Circuit, Motor Rotation
Theodolite, Surveyor
Tires and Tube Repair
Tongs- Chain, Pipe, etc.
Torch- Cutting
Torch- Heating, Prestolite, Propane
Trailers- Lowboy, Pole
Trailer-Office, Storage Change
Trailers-Tool
Trenching Machines (All Types)
Trowel-Steel
Truck Flat Bed
Trucks (Automotive Pick ups to 3/4 ton)
Tube Benders Power
Turnbuckles
Universal, For Socket Sets
Vacuum Cleaner HD Wet or Dry Accessories
Vibrator, Concrete
Wackers (Soil Compaction)
Welding Machines

ATTACHMENT H-3

UNCONDITIONAL LIEN WAIVER

IABR PROJECT

COLUMBUS, NM

RECEIPT AND WAIVER OF MECHANIC'S LIEN RIGHTS

Dated: _____, 20____

The undersigned hereby acknowledges receipt of the sum of $_____

CHECK ONLY ONE

1. ☐ as partial payment for labor, skill and material furnished
2. ☐ as payment for all labor, skill and material furnished or to be furnished (except the sum of $_____ retainage or holdback)
3. ☐ as full and final payment for all labor, skill and material furnished or to be furnished

to the following described real property: (legal description, street address or project name)

SAPPHIRE ENERGY

INTEGRATED ALGAL BIOREFINERY (IABR) PROJECT

COLUMBUS, NEW MEXISO

PROJECT NO. 168423

and for the value received hereby waives all rights acquired by the undersigned to file or record mechanic's liens against said real property for labor, skill or material furnished to said property (only for the amount paid if Box 1 is checked, and except for retainage shown if Box 2 is checked). The undersigned affirms that all material furnished by the undersigned has been paid for, and all subcontractors employed by the undersigned have been paid in full:

EXCEPT:

NOTE: If this instrument is executed by a corporation, it must be signed by an officer, and if executed by a partnership, it must be signed by a partner.

By:_____

_____
(Title)

_____
(Company)

_____
(Address)

_____

ATTACHMENT L
CONTRACTOR INSURANCE

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ATTACHMENT Q-1
FORM OF APPLICATION FOR MECHANICAL COMPLETION

[***On Contractor Letterhead***]

[_____], 20__

[NAME OF OWNER]
OWNER ADDRESSS
Attention: [_____]
Telephone: [_____]
Facsimile: [_____]

RE: APPLICATION FOR MECHANICAL COMPLETION

Dear [_____]:

Pursuant to Section of the Construction Contract, dated as of [_____] (the "Contract"), between [NAME OF OWNER] ("Customer") and the undersigned ("Contractor"), the undersigned hereby certifies to [NAME OF OWNER] that it is Contractor's reasonable, good faith believe that as of [INSERT DATE], Contractor has satisfied all of the following Work under the Contract, and accordingly, the Facility has achieved Mechanical Completion in accordance with the terms and conditions of the Contract. Initially capitalized terms used but not defined in this Application for Mechanical Completion have the meanings given in the Contract.

Sincerely,

[Contractor]

By:_____
Name: _____
Title: _____

Attachment R - IABR project: regulatory regimes affecting Sapphire Energy

8/24/11

The Company and its subsidiaries are subject to regulation by the following federal, state or local government entity or any department, agency, or instrumentality thereof:

Regulatory item	Necessary/ Deferred	Agency	Authority	Discussion	Status / next steps / information
Water quality					
1. NPDES (National Pollution Discharge Elimination System) Permit	N/A	US EPA (State of New Mexico does not have primacy)	Clean Water Act (CWA) §402 NPDES (USC title 33, §1251) – required for any planned discharge to surface water.		**N/A:** Because Sapphire does not expect any discharge of wastewater to a surface water course, this permit will not be required.
2. Storm water Discharge Permit	Necessary	EPA Region 6 [New Mexico's Surface Water Quality Bureau assists EPA in regulation of stormwater discharges by performing inspections on behalf of EPA]	Clean Water Act (CWA) §402(p) Part 122.26 – addresses municipal and industrial (including construction) stormwater discharges.	Applies to construction activities which disturb more than one acre – applicant must develop and implement construction site erosion control and stormwater management plans to obtain a Construction General Permit (CGP). The CGP can be converted into an operating General Permit (GP). A Stormwater Pollution Prevention Plan (SWPPP) will be required for the IABR facility as part of the stormwater permit. A NOI should be submitted as early as possible during preparation of CGP and SWPPP.	**COMPLETE**: Storm Water Pollution Prevention Plan (SWPPP) complete and approved; measures are fully in place at the site.
3. Spill Prevention, Control, and Countermeasure (SPCC) Plan	N/A	US EPA	40 CFR § 112.7.	Facilities that could possibly be expected to discharge pollutants in quantities that may be harmful into navigable waters of the United States and adjoining shorelines to develop and implement SPCC Plans. The Plans ensure that these facilities put in place containment and countermeasures that will prevent oil discharges. The requirement to develop, implement, and revise the SPCC Plan, as well as train employees to carry it out, will allow owners and operators to achieve the goal of preventing, preparing for, and responding to discharges that threaten navigable waters and adjoining shorelines. The plan should be in place and implemented prior to storage of oil at the facility.	**N/A:** as a result of the Jurisdiction Determination that Sapphire will not be affecting navigable waters.

Attachment R - IABR project: regulatory regimes affecting Sapphire Energy

8/24/11

Regulatory item	Necessary/ Deferred	Agency	Authority	Discussion	Status / next steps / information
4, 404 (Wetlands) Permit	Necessary	U.S. Army Corps of Engineers El Paso District. The New Mexico Environmental Department (NMED) reviews and certifies all EPA permits issued in the state per CWA Section 401.	Clean Water Act (CWA) §404 and Section 10 of the Rivers and Harbors Act of 1899 (RHA). Under Section 404, the Corps regulates the discharge of dredged and fill material into waters of the United States, including wetlands.		**COMPLETE:** Discussion with the ACOE resulted in issuance of a Jurisdictional Determination of No Wetlands Impacts.
5. Groundwater Discharge Permit	Necessary	New Mexico Environmental Department (NMED).	New Mexico Water Quality Act (WQA) NMAC 20.6.2.3103 and NMAC 20.6.2.3104.	This permit application will cover all liquid discharges to groundwater, including the septic system.	• Notice of Intent to Discharge Submitted in May • Formal response received informing Sapphire of the requirement for a Discharge Permit received 17 May 2011. • Application is being prepared and is intended to be submitted by 1 September 2011
6. Septic System Permit	Deferred	New Mexico Environmental Department District III Office in Las Cruces	NMAC § 20.7.3	A septic system is planned for the IABR facility; therefore a liquid waste (septic tank) permit must be obtained for discharge of supernatant liquids. However, permitting of the Septic system will be rolled into the groundwater discharge system above If the system is larger than 2000 gallons per day, NMED in Santa Fe has responsibility for permitting. This is based on the average usage of 25 gallons per day per employee and the site is projected to have over 100 employees. A smaller system would be permitted by NMED – Las Cruces.	Approval is required prior to construction of the septic system. Certificate of Occupancy for human use buildings will not be issued until the septic system is installed. Sapphire will pursue permits and approvals associated with this installation at the appropriate time.
Air quality					

Regulatory item	Necessary/ Deferred	Agency	Authority	Discussion	Status / next steps / information
7. NSR Construction Air Quality Permit	NMED to determine (see next steps - status)	New Mexico Air Quality Bureau	N.M. Stat. Ann. §§ 74-2-1	Construction and operation of the IABR facility will require Sapphire to apply for a New Source Review (NSR) air quality permit if emissions are projected to exceed Potential to Emit (PTE) thresholds of 10 pounds per hour or 25 tons per year of any criteria pollutant (NMAC § 20.2.72.200). Annual emissions of criteria pollutants under 100 tons per year (tpy) will require an NSR minor source construction permit. Emissions in excess of 100 tpy of any criteria pollutant or emissions in excess of 10 tpy or 25 tpy of any individual or total Hazardous Air Pollutant (HAPs), respectively will also require a construction permit and will require Sapphire to obtain a Title V source permit discussed below.	▪ **Discussion**: The procedure for determining the necessity of a NSR permit requires the applicant to file emissions calculations for review by the Bureau. A No Permit Required (NPR) determination will follow if the facility's potential emissions rate (PER) is less than 10 pounds per hour (pph) and 10 tons per year (tpy) of any regulated contaminant or 1 tpy of lead. If the facility has a PER of less than 10 pph but greater than 10 tpy of a regulated air contaminant, a Notice of Intent to construct (NOI) is required. If the PER is greater than 10 pph and 25 tpy, an air quality permit will be required. ▪ **Public Notice Requirement:** 30 days after NSR permit filing; 30 days after department' analysis ▪ **Expected Time Required to Complete Application:** One month, assuming necessary design information and layouts are available. ▪ **Expected Turn-around Time by Regulator:** 90 days (unless there is a request for hearing, then up to 150 days). • **Status**: Application is being prepared and is intended to be submitted by 1 September 2011. Sapphire anticipates determination for Phase 1 of No Permit Required upon NMED and no subsequent need for further action.
8. Clean Air Act (CAA) Title V Determination	Deferred	New Mexico Air Quality Bureau with likely US EPA review	Clean Air Act (CWA) §40 CFR Parts 50-99.	Annual PTE emissions of a single Hazardous Air Pollutants (HAP) in excess of 10 tpy or a total HAPs emissions level greater than 25 tpy will require application for a Title V permit. Annual PTE emissions of any criteria pollutant greater than 100 tpy will require application for a Title V permit.	▪ **Discussion**: Redacted Exemption 4 ▪ **Public Notice Requirement**: 30 days after Title V

Regulatory item	Necessary/ Deferred	Agency	Authority	Discussion	Status / next steps / information
					permit filing; 30 days after department analysis ▪ E**xpected Time Required to Complete Application**: One month, assuming necessary design information and layouts are available. . ▪ **Expected Turn-around Time by Regulator**: 90 days (unless there is a request for hearing, then up to 150 days). ▪ **Status**: Redacted Exemption 4
9. Prevention of Significant Deterioration (PSD) Permit	N/A	New Mexico Air Quality Bureau with likely US EPA review	Clean Air Act (CWA) §40 CFR Parts 50-99.		**N/A:** The Columbus area is an attainment area, thus PSD requirements are not applicable.
Special species status					
10. New Mexico Protected Wildlife Species	Necessary	New Mexico Game and Fish Department	New Mexico Wildlife Conservation Act (WCA) NMAC §17.2.37 through 46.	New Mexico state statutes establish that it is unlawful for any person to take, possess, transport, export, process, sell or offer for sale or ship any species of wildlife determined as endangered. Wildlife species on other state and federal lists are protected under this law.	**COMPLETE**: as part of the Phase I

Regulatory item	Necessary/ Deferred	Agency	Authority	Discussion	Status / next steps / information
				The lead agency for the IABR EA (US Department of Agriculture) was required to submit a "Request for Informal Consultation" to the NM Game and Fish Department, Conservation Services Division as part of the EA process.	
11. US Fish and Wildlife Service Consultation	Necessary	US Fish and Wildlife Service	Endangered Species Act (ESA) (7 USC §136 and 16 USC §1531 et. seq.).	If federally listed fauna species are determined to be present and takings are unavoidable, or if these species or critical habitat are present and activities proposed at the IABR site are determined to be an action requiring a federal decision, consultation with the U.S. Fish and Wildlife Service will be required.	**COMPLETE**: Surveys of the IABR site have been conducted to ensure T&E species are not an issue, Section 7 consultations were initiated by USDA as part of the EA process for the loan application.
12. Migratory Bird Treaty Act (MBTA)	Necessary	US Fish and Wildlife Service	Migratory Bird Treaty Act	Federal prohibition to "pursue, hunt, take, capture, kill, attempt to take, capture or kill, possess… at any time, or in any manner, any migratory bird, included in the terms of this Convention . . . for the protection of migratory birds . . . or any part, nest, or egg of any such bird." No formal permit issued. Surveys are warranted during the breeding season and non breeding season. Construction and post construction monitoring is necessary. There is no permit to take.	**COMPLETE**: Surveys were conducted in March and June of 2010 prior to ground disturbing activities. A survey was completed in May of 2011 within one month of ground breaking. All reviews have returned negative results.
13. The Bald and Golden Eagle Protection Act (BGEPA)	Necessary	US Fish and Wildlife Service	Bald and Golden Eagle Protection Act	Provides federal protection of the bald and golden eagle by prohibiting, except under certain specified conditions, the taking, possession and commerce of such birds.	**COMPLETE**: Surveys were conducted in March and June of 2010 prior to ground disturbing activities. All reviews have returned negative results. Sapphire is not in violation.
14. Endangered Plants Act (EPA) (NM Stat. Ann. §§75-6-1 et. seq. and	Necessary	New Mexico Energy, Minerals and Natural Resources	New Mexico Administrative Code Chapter 19, Part 21. The taking of endangered plants is prohibited unless with a valid		**COMPLETE**: Surveys have been completed at the IABR site with no affected species noted.

Regulatory item	Necessary/ Deferred	Agency	Authority	Discussion	Status / next steps / information
NMAC 19 Part 21).		Department	permit. "Taking" means the removal, with the intent to possess, transport, export, sell, or offer for sale any of the plants listed in 19.21.2.9 NMAC, from the places in the state of New Mexico where they naturally grow.		
Historic preservation					
15. Eligibility for Listing on the National Register of Historic Places (National Register)	Necessary	New Mexico State Historic Preservation Office (SHPO)	Section 106 of the National Historic Preservation Act of 1966 as amended (PL 89-665) the Archaeological Resource Protection Act of 1979 (PL 96-95), and Executive Order 11593.		**COMPLETE:** A letter of concurrence from SHPO was received stating that there are no resources on the "western parcel" (Sections 8 and 9) eligible for listing on the National Registry of Historic Places. SHPO determined that no consultation with Native American tribes is necessary. USDA consulted with tribes during EA process.
Water rights					
16. Change Application and Permit	Necessary	New Mexico Office of State Engineer (OSE).	New Mexico Code - Section 72-12-1.1	See below	Redacted Exemption 4

Regulatory item	Necessary/ Deferred	Agency	Authority	Discussion	Status / next steps / information
					Redacted Exemption 4
17. Applications to Change Place and Purpose of Use	Deferred	New Mexico Office of State Engineer (OSE).	New Mexico Code - Section 72-12-1.1	**Change in purpose of use:** • The current water rights are "diversion" rights for irrigation at 3 ac-ft/acre. The current rights could be used without having to file any changes to the water rights if the water from each well is used within the boundaries of the farm (sub file) which it supplies. Redacted Exemption 4 • A change in type of use of the diverted water to anything but use for irrigated crops would constitute a change in type of use. The change would result in a conversion of the diversion right to a "consumptive" right. • Consumptive rights are 1.6 ac-ft/acre and are metered. **Change in place of use:** • Sapphire's water rights are presented in seven sub files that constitute separate "farms", five of the farms are located within the western parcel of the ranch and two within the eastern parcels. Nine wells supply water to the 7 farms. • There are 819.8 irrigated acres on the five western farms and 216.9 acres on the eastern farms, resulting in a total of 1036.7 irrigated acres within the Cooper property. • Redacted Exemption 4 ,	**Change in purpose and place of use:** Sapphire is completing the process of permitting (form wr-06) Redacted Exemption 4 • File # M-4747, M-4748, (Redacted Exemption 4) • File # M-3667, M-3668, Cause 6326, Subfile # 29.9.8 (Redacted Exemption 4) • File # M-1933, 3667, 3668,Cause 6326, Subfile # 29.9.8C (Redacted Ex. 4) • File # 4746, Cause 6326, Subfile # 29.9.8D (Redacted Ex. 4) These applications will Redacted Exemption 4 **Status:** Comment period has expired with no resulting comments. Completion expected prior to YE 2011. Not required until start of operations in Q2 2012.

Regulatory item	Necessary/ Deferred	Agency	Authority	Discussion	Status / next steps / information
				Redacted Exemption 4 . This requires a permit to change the place of use. • Points of diversion (POD or, in this case, wells) can be changed within the same "administrative block". Each block is 4 sections in area. The Cooper Ranch property spans four administrative blocks. A POD cannot be moved out of the administrative block.	
18. Applications for Supplemental Wells	N/A	New Mexico Office of State Engineer (OSE).	New Mexico Code - Section 72-12-1.1	Form wr-06 would be filed to make wells supplemental to other water rights.	**N/A currently**: If needed, would require one day to file each application and 5 days are required for OSE to approve each application
19. Possible Additional Permit Applications	N/A	New Mexico Office of State Engineer (OSE).	New Mexico Code - Section 72-12-1.1	If any well repair, replacements or supplemental wells are necessary additional applications	**N/A currently**: If needed, would require one day to file each application and 5 days are required for OSE to approve each application
Other					
20. Building permit	Deferred	Luna county		Completion is required prior to construction of buildings or other permanent structures	Meetings have been held with Luna County Planning Department and the building permit is expected to be issued by the end of August, 2011.

CONSTRUCTION CONTRACT

This Construction Contract (this "Contract") is made and entered into as of the Contract Effective Date by and between AMEC E&C Services, Inc, a Corporation ("Contractor"), having its principal offices at 800 Marquette, Suite 1200, Minneapolis, MN 55402, and Sapphire Energy Inc. ("Owner"), having its principal offices at 3115 Merryfield Row, San Diego, CA 92121, for the purposes of providing construction of Owner's facilities at Owner's site located near Columbus, NM. This Contract comprises this executed cover sheet(s) ("Contract Cover Sheet"), the General Terms and Conditions immediately following this Contract Cover Sheet ("General Terms and Conditions") and the attachments listed below as being attached, all of which are attached hereto and fully incorporated herein.

"Owner"	**Sapphire Energy Inc.**
Owner Address	3115 Merryfield Row, San Diego, CA 92121
"Contract Effective Date"	**June 1, 2011**
"Contract Amount"	**TBD**
Estimated Construction Period	3 Years
Facility	**IABR Demonstration Plant**
"Site"	Approximately 9 miles West of Columbus, New Mexico

ATTACHMENTS TO CONTRACT

Attachment	Title	Attached	Not Applicable/ Not Attached
A	Site Description and Access Requirements	☑	☐
B	Scope of Work	☑	☐
C	Project Schedule	☑	☐
D	Payment Schedule	☑	☐
E	Unit rates for staff and craft labor	☑	☐
F	Rental rates for construction equipment	☑	☐
G	List of what is included in Small Tools	☑	☐
H	Not Used	☐	☑
I	List of what is included in Consumables	☑	☐
J	Not Used	☐	☑
K	Scope of Temporary Facilities	☑	☐
L	Insurance Requirements	☑	☐

M	Not Used	☐	☑
N	Form of Financing Party Consent	☑	☐
O	Engineering Document List	☑	☐
P	Not Used	☐	☑
Q-1	Form of Application for Mechanical Completion	☑	☐
Q-2	Division of Responsibilities	☑	☐
R	Owner Governmental Approvals	☑	☐
S-1	Mechanical Completion	☑	☐
S-2	Non-Disclosure Agreement	☑	☐
T	Form of Change Order	☑	☐
U	Form of Request for Information	☑	☐
V	Form of Bond Language	☑	☐
W	Form of Final Completion Certificate	☑	☐
Y	Contractor's Safety Plan	☑	☐
Z	Contractor's Quality Control Plan	☑	☐

IN WITNESS WHEREOF, and intending to be legally bound, the Parties hereto subscribe their names to this Contract by their duly authorized officers as of the Contract Effective Date.

CONTRACTOR:

AMEC

By: _____
Print Name: Anthony Wedell
Title: Director of Operations

Attachments still being finalized.
9 JUNE 2011

OWNER:

Sapphire Energy Inc..

By: _____
Name: Jaime E. Moreno
Title: Vice President of Projects

GENERAL TERMS AND CONDITIONS

R E C I T A L S

A. Owner will own and operate an IABR Demonstration Plant project (as further defined in Section 1.1 below, the "Facility") at the Site so that Owner may convert algae into algal oils that can be refined into gasoline, diesel and jet fuel;

B. Contractor is a full-service construction services entity with the technical capabilities to provide services to Owner for the Facility, including equipment procurement, construction management, installation and construction of the Facility; and

C. Owner desires to retain Contractor to provide, and Contractor desires to provide, equipment procurement, construction management, installation and construction of the Facility, except for any responsibilities of Owner set forth herein, all as more fully set forth in this Contract. In consideration of the mutual covenants and obligations contained herein, Owner and Contractor agree as set forth herein.

ARTICLE 1
DEFINITIONS; INTERPRETATION; EXHIBITS

1.1 Defined Terms. Initially capitalized terms used in this Contract without other definition shall have the meanings specified in this Section 1.1, unless the context requires otherwise.

"Affiliate" means, with respect to a specified Person, any other Person that directly, or indirectly through one or more intermediaries, controls, is controlled by or is under common control with the Person specified. For purposes of the foregoing, "control," "controlled by" and "under common control with," with respect to any Person, shall mean the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of such Person, whether through the ownership of voting securities or by contract or otherwise.

"Applicable Laws" means (i) all constitutions, statutes, laws, treaties, ordinances, exemptions, judgments, decrees, injunctions, writs, orders, rules, regulations, codes, specified standards or objective criteria contained in any applicable Governmental Approval (which standards or criteria must be met in order for the Work to be performed lawfully) or other legislative, judicial or administrative action of any Governmental Authority, and (ii) the requirements of the codes and standards, including all national, state and local engineering, construction, safety and electrical codes and standards applicable to the Work.

"Application for Mechanical Completion" means the application for Mechanical Completion that is to be submitted by Contractor to Owner as contemplated by Section 9.1, the form of which is attached hereto as Attachment Q-1.

"Arbitration Rules" has the meaning set forth in Section 19.2(a).

"Business Day" means all days excluding Saturdays and Sundays and those federally-recognized holidays established by 5 U.S.C. § 6103.

"Change" means any addition to, deletion from, or other modification to the quality, function, or intent of the Work, including any such addition, deletion, or other modification that constitutes a change to the Scope of Work.

"Change Order" means a written order in the form attached hereto as Attachment T, signed by Owner authorizing a Change in the Work, or an adjustment in the Contract Amount, or schedule for performance or delivery of the Work.

"Commissioning" means the set of tests and procedures performed on the Facility as described in Attachment E.

"Completion Cost" means the total reasonable and necessary expenses incurred and accrued in completing the Work, including the reasonable and necessary amounts charged by the Owner acting as a self-performing owner or any replacement contractor to finish the Work based on the obligations such self – performing owner or replacement contractor assumes under this Contract and under any of Contractor's subcontract(s) or other contractual agreement(s) that Owner elects to have assigned to itself or have assigned to such replacement contractor.

"Construction Documents" refer to the final designs, drawings, and specifications describing the requirements for construction of the Project that have been issued by Owner's Engineer and accepted by Owner, and have been provided by the Owner to Contractor as more fully described in Section 7.2,

"Contract" means this Construction Contract (consisting of the Attachments identified on the Contract Cover Sheet), as the same may be amended, supplemented or modified from time to time in accordance with the provisions hereof, including any Change Orders executed in accordance with this Contract.

"Contract Amount" means the amount of compensation which is set forth on the Contract Cover Sheet, which shall be paid by Owner to Contractor in accordance with ARTICLE 5 for performing the Work in accordance with the Contract Documents, as such amount may be increased or decreased in accordance with Change Orders.

"Contract Cover Sheet" means the cover sheet(s) of this Contract that is executed by the Parties and that identifies the Parties, certain key terms of this Contract and the components of this Contract.

"Contract Documents" means this Contract, the Construction Documents and any amendments thereto.

"Contract Effective Date" means the effective date of this Contract, as set forth on the Contract Cover Sheet.

"Contractor" has the meaning set forth in the preamble to this Contract.

"Contractor Event of Default" has the meaning set forth in Section 15.2.

"Contractor Intellectual Property" has the meaning set forth in Section 12.2(b).

"Contractor Request for Change Order" has the meaning set forth in Section 11.2.

"Damages" means actions, causes of action, claims, demands, damages, liabilities (whether absolute, accrued, contingent, fixed or otherwise, or whether due or to become due), penalties, losses, judgments, costs and expenses (including court costs and reasonable attorneys' fees and costs of investigation), but excluding any Consequential Damages described in Section 16.2.

"Day" or "day" means a calendar day, unless expressly specified otherwise in the Contract Documents.

"Defect" means any Work which is of improper or inferior workmanship as specified in the following Sections below.

"Direct Costs" means Contractor's actual cost of construction labor of any type or kind, materials, equipment, tools, and subcontracts necessary to perform the Work.

"Dispute" has the meaning set forth in Section 19.1.

"Due Date" has the meaning set forth in Section 5.1.

"Equipment" means all of the equipment, materials, apparatus, structures, supplies and other goods required by the terms of this Contract to complete the Work and to be incorporated into the Facility. Equipment shall not include any materials, apparatus or tools owned by Contractor or any Subcontractor that are used to complete the Work but are not contemplated under this Contract to become part of the Facility.

"Equipment Documentation" means copies or originals of all operating specifications, product data, system manuals, manufacturer's system drawings, manufacturer's operation and maintenance manuals, warranties (including module and inverter warranty cards) and other similar information respecting the Equipment.

"Existing Facility" means the wells and power lines at the IABR project site, and any facilities that may be completed as a part of the time phased work of the project (and being operated by Owner) owned by Sapphire Energy located adjacent to the Facility.

"Facility" has the meaning set forth in Attachment A to this Contract, to be designed and constructed by Contractor and including the Equipment as furnished by Contractor all as further defined in the Scope of Work.

"Facility Project Documents" means the project drawings, specifications, and standards issued for use in construction of the Work.

"Final Completion" has the meaning set forth in Attachment B.

"Final Completion Certificate" means the notice delivered by Owner to Contractor pursuant to Section 9.2 in the form attached hereto as Attachment W that Contractor has satisfied the requirements for Final Completion.

"Final Completion Date" means the date on which the Facility achieves Final Completion as per the milestones included in the Project Schedule, as set forth in the Final Completion Certificate.

"Final Payment" has the meaning set forth in Section 5.2.

"Financing Parties" means any and all of Owner's or its Affiliates' lenders or equity investors, and any collateral agent, administrative agent or indenture trustee of the foregoing, their successors or assigns, who have a direct or indirect financial interest in the assets, liabilities, or benefits associated with the Work performed under this Contract, including in connection with the provision of tax equity financing, construction financing, long-term financing or other credit support.

"Force Majeure Event" means the occurrence of any event beyond the reasonable control of the Party affected that results in the failure or delay by such Party of some performance under this Contract, in full or part, including: drought, flood, earthquake, storm, fire, volcanic eruption, lightning, epidemic, pandemic, war, riot, civil disturbance, sabotage, terrorism or threat of terrorism, strike or labor difficulty, accident or curtailment of supply or equipment, vandalism or total or partial casualty to the Equipment,

archeological finds, war, blockage, acts of God, power outages or black-outs, explosion, nuclear emergency, landslide, tornado or other extreme or severe weather, or restraint, order or decree by a Governmental Authority. Notwithstanding the foregoing, Force Majeure events shall expressly not include the following:

(a) mechanical or equipment failures (except to the extent any such failure is itself caused by an event described above);

(b) economic hardship of Contractor;

(c) delays in customs clearance as to any Equipment (except to the extent any such delay is itself caused by an event described above);

(d) labor strikes or other labor difficulties directed at Contractor's personnel that are not of a general and widespread nature;

(e) any weather condition at or in the vicinity of the Site, unless (1) of an unusual nature or (2) in the case of rain or snowfall (or flooding caused by either one or both), in excess of 150% of the rain or snowfall in the area of the Site in the same month as compared to the rainiest or snowiest of that same month in the prior ten (10) years; as determined by NOAA climatological data for Columbus, NM.

"General Terms and Conditions" has the meaning set forth in the Contract Cover Sheet.

"Governmental Approvals" means all authorizations, consents, licenses, leases, rulings, certifications, registrations, exemptions, permits, certificates, and approvals from, or filings or recordings made with, any Governmental Authority.

"Governmental Authority" means any federal, state, county, local or municipal government, any political subdivision thereof, or any governmental, quasi-governmental, judicial, public or statutory instrumentality, administrative agency, authority, body or other entity having jurisdiction over the performance of the Work, the Facility, over its operations, or the health, safety or environmental conditions of the Facility or the Site, or otherwise over the Parties.

"Hazardous Substance" means any hazardous, toxic, or dangerous wastes, substances, chemicals, constituents, contaminants, pollutants, and materials and any other carcinogenic, liquids, corrosive, ignitable, radioactive, reactive, toxic, or otherwise hazardous substances or mixtures (whether solids, liquids or gases) now or at any time subject to regulation, control, remediation, or otherwise addressed under Applicable Laws; (i) any "hazardous substance" as defined by the Resource, Conservation and Recovery Act of 1976 (42 United States Code ("U.S.C.") Section 6901 et seq.), as amended, and regulations promulgated thereunder; (ii) any hazardous substance defined by Wis. Stat. Section 292.01(5); (iii) "hazardous, toxic or dangerous waste, substance or material" specifically defined as such in the Comprehensive Environmental Compensation and Liability Act (42 U.S.C. Section 9601 et seq.), as amended, and regulations promulgated thereunder; and (iv) any hazardous, toxic or dangerous waste, substance, or material as defined in any so-called "superfund" or "superlien" law. For purposes of this Contract, Hazardous Substances shall also include any herbicide or pesticide, or any insecticide, fungicide or rodenticide as described in the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Section 136 et seq.), as amended, and the regulations promulgated thereunder.

"Indemnified Parties" has the meaning set forth in Section 14.1(a).

"Independent Engineer" means any engineering or construction management firm designated by Third Parties to act on their or its behalf.

"Indirect Costs" means Contractor's actual cost of support services, machinery, tools, consumables, safety, indirect subcontracts, temporary jobsite structures and facilities, utilities, permits, insurance, indirect transportation, travel, lodging, and any staffing at Contractor's principal or branch offices necessary to support the Direct Cost performance of the Work.,

"Invention" has the meaning set forth in Section 12.2.

"Level 3 Critical Path Method (CPM) Schedule" has the meaning set forth on Attachment C.

"Mechanical Completion" or "Mechanically Complete" has the meaning set forth in Attachment B.

"Mechanical Completion Certificate" means the notice delivered by Owner to Contractor pursuant to Section 9.1 in the form attached hereto as Attachment Q-1 certifying that the Facility has satisfied the requirements for Mechanical Completion.

"Notice to Proceed" or "NTP" has the meaning set forth in Section 6.2.

"Owner" has the meaning set forth on the Contract Cover Sheet.

"Owner Engineer or Engineer" means any engineering firm selected and designated by Owner to act on its behalf for engineering and design of the work. At the time of signing of this contract, the Owner's Engineers are Harris Group, International and Brown & Caldwell. Owner may bring on additional Owner Engineers at any time.

"Owner Event of Default" has the meaning set forth in Section 15.1.

"Owner Indemnified Parties" has the meaning set forth in Section 15.1(b).

"Owner's Representative" means the person designated by Owner in accordance with Section 4.3 to act as Owner's primary point of contact and to act on its behalf.

"Party" or "Parties" means Contractor, Owner, each or both of them, as the context may require pursuant to the terms and conditions of this Contract.

"Payment Event" has the meaning set forth in Section 5.1.

"Payment Schedule" means the payment schedule set forth in Attachment D, according to which Contractor earns payments against the Contract Amount during the Work in accordance with the provisions of ARTICLE 5.

"Person" means any individual, partnership, corporation, association, business, trust, Governmental Authority or other entity.

"Project Manager" means the Project Manager designated by Contractor pursuant to Section 2.3(e).

"Project Schedule" means the schedule for the Work, as set forth in Attachment C, and as further detailed in Section 6.1.

"Proprietary Interest" has the meaning set forth in Section **Error! Reference source not found.**.

"Project Standards" means, with respect to any Work to be performed hereunder, compliance with the Applicable Law and the exercise of professional care and skill to be expected of nationally recognized construction firms performing work of a similar nature, size and complexity during the relevant time period.

"Punchlist" means the list of minor items of Work (with line item costs) uncompleted upon the achievement of Mechanical Completion that (i) are not material to the safe operation of the Facility, (ii) do not impair the operability or safety, the mechanical or electrical integrity, or the administration and overall monitoring, of the Facility, (iii) can be completed before the Final Completion Date.

"Request for Payment" has the meaning set forth in Section 5.1.

"Request for Information" has the meaning set forth in Section 4.8.

"Scope of Work" means the Scope of Work attached hereto as Attachment B, as it may be amended or supplemented by Change Orders.

"Site" means the location of the Facility as identified on the Contract Cover Sheet and further described in Attachment A.

"Software" means (i) software program consisting of a series of statements or instructions to be used directly or indirectly in a programmable controller or computer to bring about a certain result, (ii) a data base consisting of a systematized collection of data to be used or referenced directly or indirectly by a programmed controller or computer, or (iii) any revisions or updates thereto.

"Subcontractor" means any Person with whom Contractor enters into an arrangement for the performance of the Work or for the supply of services or Equipment to Contractor in connection with the Work, including Persons at any tier with whom any Subcontractor has further subcontracted any part of the Work provided.

"Surety Bond" has the meaning set forth in Attachment D.

"Taxes" has the meaning set forth in Section 5.6.

"Time" means the time period within which Contractor shall complete the Work in accordance with the Project Schedule.

"Warranties" has the meaning set forth in Section 11.1.

"Warranty Period" has the meaning set forth in Section 11.2.

"Work" means all Contractor's construction and other services required by the Contract Documents (except those items or services described herein as the responsibility of the Owner), including procurement of the Equipment described in the Scope of Work, construction and erection of the Equipment, installation,, final walk-through and check-out, and start-up (including calibration, inspection and start-up operation), with respect to the Facility to be performed by Contractor pursuant to this Contract. Work includes (i) furnishing all supervision, labor, inspection, testing, start-up, materials, tools, equipment, services, and any other items to be used by Contractor or its Subcontractors in the performance of this Contract (except those items or services described herein as the responsibility of the Owner), wherever the same are being procured, manufactured, delivered, constructed, installed, trained erected, started-up or operated during start-up and whether the same are on or are not at the Facility or the Site; and (ii) all related items which would be required of a contractor of projects of comparable size and design which are necessary for the Facility to operate in accordance all Applicable Laws, all Governmental Approvals and Project Standards, except those items or services described herein as the responsibility of the Owner. Contractor shall not be responsible for providing any and all additional items and services which are not expressly included by the terms of this Contract.

"Work Package" means that Owner may release work as segregated Work Packages, that each Work Package will be either a fixed price scope of work or a time and material scope of work (as determined by Owner), and that each Work Package will have a determined Completion Date provided that Contractor shall not be obligated to perform a Work Package unless and until the Owner and Contractor have executed a Change Order for such Work Package.

1.2 Interpretation. As used in this Contract, the terms "herein," "herewith" and "hereof" are references to this Contract, taken as a whole, the terms "includes" or "including" shall mean "including, without limitation," and references to a "Section," "Article" or "Attachment" shall mean a Section, Article or Attachment of this Contract, as the case may be, unless in any such case the context requires otherwise. All references to a given agreement, instrument or other document shall be a reference to that agreement, instrument or other document as modified, amended, supplemented and restated through the date as of which such reference is made. A reference to a Person includes its permitted successors and permitted assigns. The singular shall include the plural and the masculine shall include the feminine and neuter, and vice versa.

1.3 Conflicts Among Contract Documents. The Contract Documents are intended to be complementary, and what is set forth in any one Contract Document is as binding as if set forth in each Contract Document. In case of any conflict, discrepancy, error or omission in the Contract Documents, Contractor shall within five (5) days give notice to Owner of same for Owner's instruction as to how to remedy such conflict, discrepancy, error or omission, and Contractor shall either comply with such instruction or the matter shall be resolved pursuant to the dispute resolution procedures of ARTICLE 19. Subject to the requirement to obtain Owner's instruction as to how to resolve conflicts among the Contract Documents, the provisions and requirements of the Contract Documents should be interpreted as being mutually explanatory of one another and in a manner to carry out the intent of this Contract. Contract document precedence shall be: 1) Contract, 2) Contract Attachments, 3) Project Drawings, 4) Project Specifications, 5) Project Standards, 6) Industry Standards.

ARTICLE 2
CONTRACTOR RESPONSIBILITIES

2.1 General Services of Contractor. Contractor shall furnish, erect, install, and perform related activities, or supervise such activities to the extent Contractor engages Subcontractors, as described herein for the completion of the Work and the delivery of the Facility in compliance with this Contract. The Parties understand that Contractor is obligated to perform all tasks required by the Scope of Work (excluding any items or services to be provided by the Owner) to be necessary to deliver to Owner the Facility meeting the requirements of this Contract.

2.2 Compliance with Laws and Third Party Requirements; Expeditious Performance. Throughout the performance of all aspects of the Work, Contractor shall comply with, and shall ensure that each Subcontractor complies with (i) all Applicable Laws and Governmental Approvals, (ii) the Facility Project Documents, (iii) all applicable Equipment manufacturers' requirements, including all requirements necessary to preserve and maintain in effect any and all warranties and, if applicable, any performance guarantees with respect to such Equipment, (iv) the requirements of any insurance policy (or the requirements of the insurer issuing such policy) covering Contractor, any Subcontractor, the Facility or the Work, (v) the requirements of Federal Acquisition Regulations (FAR) for cost reporting and cost compliance as may be imposed as a condition of Owner's project financing, and (v) Project Standards. Contractor shall perform the Work in accordance with the provisions of this Contract and the other Contract Documents. Such Work shall be performed in a manner that is consistent with the standard of care of reasonably prudent contractors performing work similar in scope (and geographic location) to the Work.

2.3 Specific Services of Contractor. Without limiting the generality of Sections 2.1 and 2.2, Contractor shall perform the Work in accordance with the Scope of Work in order to achieve Mechanical Completion, and Final Completion in accordance with this Contract, the Project Schedule, and the following:

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 3
SUBCONTRACTORS

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 4
OWNER RESPONSIBILITIES

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 5
COMPENSATION AND PAYMENT

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 6
PROJECT IMPLEMENTATION -- GENERAL

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 7

FINAL DESIGN PHASE – CONSTRUCTION DOCUMENTS/EQUIPMENT PROCUREMENT

Redacted Exemption 4

ARTICLE 8
CONSTRUCTION PHASE

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 9
PROJECT COMPLETION

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 10

CHANGES; SUSPENSION OF THE WORK; FORCE MAJEURE; OWNER-CAUSED DELAY

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 11
WARRANTIES

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 12
TITLE AND OWNERSHIP

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 13
RISK OF LOSS; INSURANCE

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 14
INDEMNIFICATION

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 15
DEFAULT AND REMEDIES; TERMINATION

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 16
LIMITATIONS ON LIABILITY

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 17
ASSIGNMENT; SUPPORT FOR FINANCING

Redacted Exemption 4

ARTICLE 18
REPRESENTATIONS

Redacted Exemption 4

AMEC __ SE__

Redacted Exemption 4

ARTICLE 19
DISPUTE RESOLUTION

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 20
NOTICES

20.1 Writing. Except as set forth in Section 20.2, any notice, statement, demand, claim, offer or other written instrument required or permitted to be given pursuant to this Contract shall be in writing signed by the Party giving such notice and shall be sent by facsimile, hand messenger delivery, overnight courier service, or certified mail (receipt requested) to the other Party at the address set forth below:

If delivered to Owner, to it at	27101 Puerta Real, Suite 280 Mission Viejo, CA 92691-8009 Tel: 949-202-4700 Fax: 949-367-0650 Attention: Ron Kluwe
If delivered to Contractor, to it at	800 Marquette, Suite 1200 Minneapolis, MN 55402 Phone: 612-332-8326 Fax: 612-332-2423 Attention: Anthony Wedell

Each Party shall have the right to change the place to which notice shall be sent or delivered or to specify one additional address to which copies of notices may be sent, in either case by similar notice sent or delivered in like manner to the other Party. Notices, addressed in compliance with the foregoing, shall be deemed received: (i) on the day on which such notice is delivered personally, (ii) on the third Business Day after deposit in the U.S. Mail; provided such notice is sent by certified mail with a return receipt request and postage prepaid, (iii) the following Business Day if deposited with a recognized overnight carrier, or (iv) upon successful transmission if sent by facsimile; provided that if sent after 5:00 pm local time at the recipient's location, on the Business Day in such location next following such transmission.

20.2 Technical Communications. Any technical or other communications pertaining to the Work shall be between Contractor's Project Manager and Owner's Representative or other representatives appointed by the Project Manager or Owner's Representative. Each Party shall notify the other in writing of the name of such representatives. Contractor's representatives shall be satisfactory to Owner, have knowledge of the Work and be available at all reasonable times for consultation.

ARTICLE 21
MISCELLANEOUS

21.1 Entire Agreement. This Contract, including all its Attachments as set forth on the Contract Cover Sheet and all Contract Documents, embodies the entire agreement and understanding of the Parties with respect to the subject matter hereof and supersedes all prior or contemporaneous agreements and understandings of the Parties, verbal or written, relating to the subject matter hereof.

21.2 Binding Effect. Except as otherwise provided herein, the terms and provisions of this Contract shall apply to, be binding upon, and inure to the benefit of the Parties hereto and their respective heirs, legal representatives, successors, and permitted assigns.

21.3 Amendments. Except for a Change Order issued as a directive by Owner pursuant to Section 10.1, no change, amendment or modification of this Contract shall be valid or binding upon the Parties unless such change, amendment or modification shall be in writing and duly executed by both Parties; provided, however, if Contractor has been notified that Owner has assigned any of its rights, duties or obligations under this Contract to a Financing Party, and Owner notifies Contractor that a Financing Party's consent is required, then the prior written consent of such Financing Party shall be required as well.

21.4 Waiver. Any waiver of the provisions of this Contract must be in writing and shall not be implied by any usage of trade, course of dealing or course of performance. No exercise of any right or remedy by Owner or Contractor constitutes a waiver of any other right or remedy contained or provided by Applicable Law. Any delay or failure of a Party to exercise, or any partial exercise of, its rights and remedies under this Contract shall not operate to limit or otherwise affect such rights or remedies. Any waiver of performance hereunder shall be limited to the specific performance waived and shall not, unless otherwise expressly stated in writing, constitute a continuous waiver or a waiver of future performance.

21.5 Governing Law; Submission to Jurisdiction; Venue.

(a) Governing Law. THIS CONTRACT SHALL BE GOVERNED BY, AND INTERPRETED AND CONSTRUED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF CALIFORNIA.

(b) Submission to Jurisdiction, Venue. The Parties hereby consent to the personal jurisdiction and venue of the United States District Court, District of California located within the City of San Diego, CA for purposes of enforcement of the arbitration provisions of this Contract and any award rendered by the arbitrator.

21.6 Confidentiality; Publicity.

(a) All information (including the terms of this Contract) provided by either Party to the other or which is identified by the disclosing Party in writing as confidential or proprietary information shall be treated in a confidential manner and shall not be disclosed to any third party without the prior written consent of the non-disclosing Party, which consent shall not be unreasonably withheld. Notwithstanding the preceding, this Section 21.6 and the restrictions herein contained shall not apply to any data or documentation which is:

(i) disclosed or required to be disclosed pursuant to state or federal law, an order or requirements of a regulatory body or a court, after five (5) Business Days notice of such intended disclosure is given by the disclosing Party to the non-disclosing Party to the extent such notice is permitted by applicable law or if five (5) Business Days notice is not practical, then such shorter notice as is practical;

(ii) disclosed by a Party to such Party's Affiliate(s), advisors, consultants, legal counsel, and/or accountants or in connection with an assignment permitted by ARTICLE 17;

(iii) disclosed by Owner to a Financing Party; or

(iv) is, as of the time of disclosure, public knowledge without the fault of the disclosing Party.

(b) All Contractor publicity activities regarding this Contract or the Facility shall require the prior written consent of Owner.

21.7 Non-Discrimination. Contractor shall comply with all employment laws and shall ensure that the evaluation and treatment of its employees and applicants for employment are free from discrimination and harassment. Contractor shall include the substance of the nondiscrimination and compliance provisions of this Section 21.7 in all subcontracts, vendor agreements or purchase orders in connection with its obligations hereunder.

21.8 Construction. This Contract is to be construed so as to effectuate the normal and reasonable expectations of a sophisticated buyer and seller of the equipment and services covered by this Contract and shall not be construed either for or against either Party. No provision of this Contract shall be construed or interpreted for or against either Party because such Party drafted or caused its legal representative to draft the provision.

21.9 Headings. The titles or headings of the various sections, articles and paragraphs hereof are intended solely for convenience and ease of reference and are not intended, and are not to be deemed for any purpose, to modify or explain or place any interpretation or construction upon any of the provisions of this Contract.

21.10 Status of the Parties. Contractor and its Subcontractors shall be independent contractors to Owner with respect to the Work, irrespective of whether such Subcontractors are approved by Owner, and neither Contractor nor its Subcontractors, nor the employees or agents of either, shall be deemed to be the employees, representatives or agents of Owner in connection with any matter relating to this Contract. No provision of this Contract shall be construed or represented as creating a partnership, trust, joint venture, fiduciary or any similar relationship between the Parties.

21.11 No Third Party Beneficiaries. This Contract is made and entered into for the sole protection and legal benefit of Owner and Contractor, and their permitted successors and assigns, and no other Person shall be a direct or indirect legal beneficiary of, or have any direct or indirect cause of action or claim in connection with, this Contract, except for (a) the Financing Parties, (b) the Indemnified Parties with respect to Contractor's indemnification obligations hereunder, and (c) the Owner Indemnified Parties with respect to Owner's indemnification obligations hereunder.

21.12 Cooperation. Upon the receipt of a request from the other Party, each Party shall execute such reasonable additional documents, instruments, estoppels, and assurances and take such additional actions as are reasonably necessary and desirable to carry out the terms and intent hereof, including the documents described in Section 17.3 as well as providing updated documents upon request of Owner or its Financing Parties (e.g. unconditional lien waivers). Neither Party shall unreasonably withhold, condition or delay its compliance with any reasonable request made pursuant to this Section 21.12. Without limiting the foregoing, the Parties acknowledge that they are entering into a long-term arrangement in which the cooperation of each of them will be required.

21.13 Severability. In the event that any clause or provision of this Contract or any part thereof becomes or shall be declared by a court of competent jurisdiction invalid, illegal, void, or unenforceable, this Contract shall continue in full force and effect without said provisions, provided that no such severability shall be effective if it materially changes the benefits or obligations of either Party hereunder.

21.14 Survival. The following provisions shall survive termination of this Contract and shall survive the occurrence of Final Completion: Section 10.3, ARTICLE 11, ARTICLE 12, ARTICLE 13, ARTICLE 14, ARTICLE 15, ARTICLE 16, ARTICLE 19, ARTICLE 20, ARTICLE 21, and Attachment L; provided however, all obligations and responsibilities of the Parties under the Contract Documents shall terminate on the second anniversary of the expiration date of the System Warranty Period, except with respect to claims made hereunder prior to such expiration date, in which case each Party's obligations under the Contract Documents shall survive and continue to the extent necessary to resolve such claims in accordance with the terms of this Contract.

21.15 Counterparts. This Contract may be executed in any number of separate counterparts and delivered by electronic means, each of which when so executed shall be deemed an original, and all of said counterpart taken together shall be deemed to constitute but one and the same instrument.

21.16 Owner's Review. Except as expressly set forth herein, no acceptance, inspection or review by Owner, a Financing Party, the Independent Engineer or the Owner Engineer or their representatives shall constitute an approval, endorsement or confirmation of any Work or an acknowledgment by Owner, a Financing Party, the Independent Engineer or the Owner Engineer that any Work satisfies the requirements of this Contract. Additionally, no acceptance, inspection or review shall relieve Contractor of any of its obligations to perform the Work in conformance with all of the requirements of this Contract.

21.17 Records. Contractor shall keep full and detailed records and accounts pertaining to the Work and shall exercise such controls as may be necessary for proper financial management under this Contract. Contractor shall preserve these records for a period of two (2) years after the Final Completion Date, or for such longer period as may be required by Applicable Law.

21.18 Confidentiality. Owner and Contractor each agree to keep confidential: the terms and provisions of this Agreement; the Contract Documents; and all information supplied by any Party to the other hereunder or in connection herewith including, but not limited to, any documentation or information related to the Project; in accordance with the Non-Disclosure Agreement between the Parties, a copy of which is enclosed as Attachment S-2, separately executed by the parties.

ATTACHMENT T

FORM OF CHANGE ORDER

Owner: **[NAME OF OWNER]** **[Address]**		**CONTRACT CHANGE REQUEST**
CONTRACTOR:	**Change NO.**	**ISSUE DATE.**
	PROJECT NO.	**CONTRACT NO.**
	REFERENCE Change NO.	**EFFECTIVE DATE OF Change.**

DESCRIPTION OF CHANGE:

LIST OF ATTACHMENTS:	**SCHEDULE IMPACT SUMMARY**
	☐ **NO SCHEDULE IMPACT** ☐ **SCHEDULE EXTENSION OF _____ DAYS from execution of change order** ☐ **SCHEDULE REDUCTION OF_____DAYS from execution of change order** ☐ **CONTRACT TO BE COMPLETED BY:**

COST IMPACT SUMMARY

☐ **NO COST IMPACT**		**BASIC CONTRACT AMOUNT**	**$** _____
☐ **COST IMPACT AS FOLLOWS:**		**TOTAL FOR PREVIOUS Changes**	**$** _____
☐ **MANHOURS**_____/_____ **(DIRECT) (INDIRECT)**		**TOTAL ADDITION THIS CO**	**$** _____
☐ **LABOR**	**$** _____	**TOTAL REDUCTION THIS CO**	**$** _____

☐ **MATERIAL**	**$** _____	**NEW CONTRACT TOTAL**	**$ 0.00**
☐ **EQUIPMENT**	**$** _____		
☐ **TOTAL**	**$** _____	**The adjusted cost, if any, shown on this CO includes all overhead, G & A, profit and any other expense associated with the change(s) covered herein, including any schedule adjustment. All terms and conditions of base contract remain the same.**	

CONTRACTOR ACCEPTANCE	**AUTHORIZATION TO PROCEED**
NAME	**NAME**
TITLE	**TITLE**
SIGNATURE/DATE	**SIGNATURE/DATE**

copy:

Julia B. Taylor, AFSB
Assistant Vice President

MARSH

Marsh USA Inc.
1255 23rd Street NW
Suite 400
Washington, DC 20037
202 263 7742
Julia.B.Taylor@Marsh.com
www.marsh.com

June 08, 2011

Mr. James A. Bunta
AMEC
10706 Sikes Place
Suite 250
Charlotte, NC 282777

Subject: New Bond

Principal: AMEC E&C Services, Inc.
Obligee: Sapphire Energy, Inc.
Bond Description: Performance and Payment-Project No. PR.110205.100 Sapphire Energy IABR, IABR Facility, Luna County, New Mexico, 1500 Hwy 9 SW, Deming, NM 88030
Bond Amount: $ Redacted Exemption 4
Bond Number: Redacted Exemption 4
Surety Name: Redacted Exemption 4

Dear James:

Enclosed is the above-referenced bond in response to your request dated June 7, 2011. The bond is based on the information we received with the request. Please recheck the bond for accuracy, and have it signed, sealed, and forwarded to the Sapphire Energy, Inc. for acceptance and filing.

In the event that you do not accept and file the bond with the obligee, please return this original document to Marsh so we can notify the surety company that the bond was not accepted and filed; otherwise, the surety company will process a premium billing for the bond.

You will be receiving our invoice for this transaction in the amount of $ Redacted Exemption 4

If you have any questions, please feel free to contact me. Thank you for allowing Marsh to service your surety needs.

Very truly yours,

Julia B. Taylor, AFSB
Assistant Vice President

Copy
David C. Moylan, Marsh
Arlene Gwizd, AMEC

Enclosure

Document A312™ – 2010

Conforms with The American Institute of Architects AIA Document 312

Performance Bond

Bond Number: Redacted Exemption 4

CONTRACTOR:
(Name, legal status and address)
AMEC E&C Services, Inc.
1979 Lakeside Parkway, Suite 500
Tucker, GA 30084

SURETY:
(Name, legal status and principal place of business)
Redacted Exemption 4

OWNER:
(Name, legal status and address)
Sapphire Energy, Inc.
3115 Merryfield Row
San Diego, CA 92121

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT
Date: **June 01, 2011**

Amount: $ Redacted Exemption 4

Description:
(Name and location)
Project No. PR.110205.100 Sapphire Energy IABR, IABR Facility, Luna County, New Mexico, 1500 Hwy 9 SW, Deming, NM 88030

BOND
Date: **June 08, 2011**
(Not earlier than Construction Contract Date)

Amount: $ Redacted Exemption 4

Modifications to this Bond: [X] None [ ] See Section 16

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*
AMEC E&C Services, Inc.

Signature: _____
Name And Title: Phillip Barnes CFO, Power & Process Americas

SURETY
Company: *(Corporate Seal)*
Redacted Exemption 4

Signature: _____
Name And Title: **Julia B. Taylor, Attorney-In-Fact**

(Any additional signatures appear on the last page of this Performance Bond)

(FOR INFORMATION ONLY – Name, address and telephone)
AGENT or BROKER:
Marsh USA Inc.
1255 23rd Street, NW
Washington, DC 20037
202-263-7600

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

Redacted Exemption 4

Redacted Exemption 4

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

Signature:

Name and Title: Philip Barnes CEC, Power & Process Americas

Address

SURETY

Company: *(Corporate Seal)*

Redacted Exemption 4

Signature:

Name and Title: **Julia B. Taylor, Attorney-In-Fact**

Address

Document A312™ – 2010

Conforms with The American Institute of Architects AIA Document 312

Payment Bond

Bond Number: Redacted Exemption 4

CONTRACTOR:
(Name, legal status and address)
AMEC E&C Services, Inc.
1979 Lakeside Parkway, Suite 500
Tucker, GA 30084

SURETY:
(Name, legal status and principal place of business)
Redacted Exemption 4

OWNER:
(Name, legal status and address)
Sapphire Energy, Inc.
3115 Merryfield Row
San Diego, CA 92121

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT
Date: **June 01, 2011**

Amount: $ Redacted Exemption 4

Description:
(Name and location)
Project No. PR.110205.100 Sapphire Energy IABR, IABR Facility, Luna County, New Mexico, 1500 Hwy 9 SW, Deming, NM 88030

BOND
Date: **June 08, 2011**
(Not earlier than Construction Contract Date)

Amount: $ Redacted Exemption 4

Modifications to this Bond: [X] None [ ] See Section 18

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*
AMEC E&C Services, Inc.

Signature:
Name And Title: Philip Barnes
CEO, Power & Process Americas
(Any additional signatures appear on the last page of this Performance Bond)

SURETY
Company: *(Corporate Seal)*
Redacted Exemption 4

Signature:
Name And Title: **Julia B. Taylor, Attorney-In-Fact**

(FOR INFORMATION ONLY – Name, address and telephone)
AGENT or BROKER:
Marsh USA Inc.
1255 23rd Street, NW
Washington, DC 20037
202-263-7600

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

Signature:

Name and Title: Philip Barnes, CFO, Power & Process Americas

Address

SURETY

Company: *(Corporate Seal)*

Redacted Exemption 4

Signature:

Name and Title: **Julia B. Taylor, Attorney-In-Fact**

Address

Redacted Exemption 4

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that the Redacted Exemption 4 , a corporation created by and existing under the laws of the State of New York does hereby nominate, constitute and appoint **Julia B. TAYLOR,** Redacted Exemption 4 Redacted Exemption 4 **, all of Washington, District of Columbia,** EACH its true and lawful Attorneys-In-Fact with power and authority hereby conferred to sign, seal, and execute in its behalf, during the period beginning with the date of issuance of this power, : **any and all bonds and undertakings, recognizances or other written obligations in the nature thereof**, and to bind Redacted Exemption 4 thereby, and all of the acts of said Attorney[s]-in-Fact pursuant to these presents are hereby ratified and confirmed . This Power of Attorney is made and executed pursuant to and by the authority of the following By-Law duly adopted by the Board of Directors of the Company which By-Law has not been amended or rescinded.

Article VI, Section 5. "...The President or a Vice President in a written instrument attested by a Secretary or an Assistant Secretary may appoint any person Attorney-In-Fact with authority to execute surety bonds on behalf of the Company and other formal underwriting contracts in reference thereto and reinsurance agreements relating to individual polices and bonds of all kinds and attach the corporate seal. Any such officers may revoke the powers granted to any Attorney-In-Fact."

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of the Redacted Exemption 4 by unanimous consent in lieu of a special meeting dated December 15, 1998

" RESOLVED, that the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the seal of the Company may be affixed by facsimile on any Power of Attorney pursuant to Article VI, Section 5 of the By-Laws, and the signature of a Secretary or an Assistant Secretary and the seal of the Company may be affixed by facsimile to any certificate of any such power. Any such power or any certificate thereof with such facsimile signature and seal shall be valid and binding on the Company. Furthermore, such power so executed, sealed and certified by certificate so executed and sealed shall, with respect to any bond or undertaking to which it is attached, shall continue to be valid and binding on the Company."

IN WITNESS WHEREOF, the Redacted Exemption 4 has caused these presents to be executed in its name and on its behalf and its Corporate Seal to be hereunto affixed and attested by its officers thereunto duly authorized, this **12th day of April, A.D. 2011**.

This power of attorney revokes that issued on behalf of Julia B. TAYLOR, Redacted Exemption 4 Redacted Exemption 4 , dated December 14, 2010.

Redacted Exemption 4

Redacted Exemption 4

STATE OF MARYLAND }
CITY OF BALTIMORE } ss: Redacted Exemption 4

On the 12th day of April, A.D. 2011, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, came the above named Vice President and Secretary of Redacted Exemption 4 , to me personally known to be the individuals and officers described in and who executed the preceding instrument and they each acknowledged the execution of the same and being by me duly sworn, they severally and each for himself deposed and said that they respectively hold the offices in said Corporation as indicated, that the Seal affixed to the preceding instrument is the Corporate Seal of said Corporation, and that the said Corporate Seal, and their respective signature as such officers, were duly affixed and subscribed to the said instrument pursuant to all due corporate authorization.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above.

Constance A. Dunn

Notary Public *My Commission Expires: July 14, 2011*

This Power of Attorney limits the acts of those named therein to the bonds and undertaking specifically named therein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

CERTIFICATE

I, the undersigned, a Secretary of the Redacted Exemption 4 , do hereby certify that the foregoing Power of Attorney is still in full force and effect, and further certify that Article VI, Section 5 of the By-Laws of the Company and the Resolution of the Board of Directors set forth in said Power of Attorney are still in force.

IN TESTIMONY WHEREOF I have hereto subscribed my name and affixed the seal of said Company

Redacted Exemption 4

Redacted Exemption 4

the 08 day of June 2011

POWER OF ATTORNEY

Redacted Exemption 4

Power No. 31549

No. 06-B-37805

KNOW ALL MEN BY THESE PRESENTS:

That Redacted Exemption 4 does hereby appoint

Redacted Exemption 4 , Julia B. Taylor, Redacted Exemption 4 of Washington, D.C.---

its true and lawful Attorney(s)-in-Fact, with full authority to execute on its behalf bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, issued in the course of its business, and to bind the respective company thereby.

IN WITNESS WHEREOF, Redacted Exemption 4 has executed these presents

this 10th day of January, 2011

Redacted Exemption 4

Redacted Exemption 4

STATE OF NEW YORK }

COUNTY OF NEW YORK } ss.

On this 10th day of January, 2011 before me came the above named officer of Redacted Exemption 4 , to me personally known to be the individual and officer described herein, and acknowledged that he executed the foregoing instrument and affixed the seals of said corporation thereto by authority of his office.

Juliana E. Hallenbeck

JULIANA HALLENBECK
Notary Public - State of New York
No. 01HA6125871
Qualified in Bronx County
My Commission Expires April 18, 2013

CERTIFICATE

Exerpts of Resolutions adopted by the Boards of Directors of Redacted Exemption 4 , on May 18, 1976:

"RESOLVED, that the Chairman of the Board, the President, or any Vice President be, and hereby is, authorized to appoint Attorneys-in-Fact to represent and act for and on behalf of the Company to execute bonds, undertakings, recognizances and other contracts of indemity and writings obligatory in the nature thereof, and to attach thereto the corporate seal of the Company, in the transaction of its surety business;

"RESOLVED, that the signatures and attestations of such officers and the seal of the Company may be affixed to any such Power of Attorney or to any certificate relating thereto by facsimile, and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company when so affixed with respect to any bond, undertaking, recognizance and other contract of indemnity and writing obligatory in the nature thereof;

"RESOLVED, that any such Attorney-in-Fact delivering a secretarial certification that the foregoing resolutions still be in effect may insert in such certification the date thereof, said date to be not later than the date of delivery thereof by such Attorney-in-Fact."

I, Redacted Exemption 4 , do hereby certify that the foregoing exerpts of Resolutions adopted by the Boards of Directors of this corporation, and the Power of Attorney issued pursuant thereto, are true and correct, and that both the Resolutions and the Powers of Attorney are in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the facsimile seal of the corporation

this 08 day of June 2011

Redacted Exemption 4

Redacted Exemption 4

23238 (4/02)

ATTACHMENT W
FORM OF CERTIFICATE OF FINAL COMPLETION

Job Name: _____

Contract Number: _____

Customer: _____

Contract Date: _____

Project or Designated Area Shall Include:

_____

Located at:

[ADDRESS]

The Work under this Contract has been reviewed and found to be finally complete in accordance with the Contract Documents. The Date of Final Completion is hereby established as:

[DATE]

Customer accepts the Work or designated portion thereof as being Finally Complete and will assume full possession thereof on:

[DATE]

Contractor:
By: _____
Title: _____
Date: _____
Signature: _____

Owner:
By: _____
Title: _____
Date: _____
Signature: _____

CONTRACTOR

INCIDENT PREVENTION PROGRAM

Sapphire Energy

Integrated Algal Bio Refinery (IABR) Project

Columbus, New Mexico

Revision: 0

Date: 27 April 2011

TABLE OF CONTENTS

HEALTH AND SAFETY POLICY

The safety and well being of all personnel working on the Sapphire Energy IABR project is paramount. This project is committed to implementing and fostering an Incident and Injury Free Environment throughout the entire project. An Incident and Injury Free Environment is a personal mindset where no injury is acceptable and safety is not optional. Safety will become personal to each of us and will become a way of life. Sapphire Energy values and respects every worker. Performing work in a manner that presents risk of injury is not how we conduct our business. All injuries are preventable when safety becomes an everyday personal value. Committing to an Incident and Injury Free Environment is not just the right choice; it's really the only choice.

Rich Keil
Construction Manager

INCIDENT PREVENTION PROGRAM

This Incident Prevention Program (IPP) was prepared to assist project management, contractor management, supervision, subcontractors and workers in understanding the incident/injury-free philosophy and the health and safety expectations and requirements for this project. ***Compliance of this IPP is expected and as a condition of performing work on the Sapphire Energy IABR project.***

Contractor project managers/superintendents have overall responsibility for the implementation and execution of this Incident Prevention Program.

INCIDENT AND INJURY-FREE ENVIRONMENT (IIFE)

The Sapphire Energy IABR project is committed, both personally and organizationally, to a work environment absent of incidents and injuries. This project is intolerant of any level, frequency, or severity of incident or injury. Incident and Injury-Free Environment (IIFE) is not a goal or a result to seek zero injuries but a personal mindset and environment that everyone working on this project will embrace the conviction that injury-free operations are possible and doing something safely is an inseparable element from "doing the right thing."

Incident and Injury-Free Environment is value-based and not a trade-off with cost and/or schedule. Injury-Free is of continuous improvement from the present Incident Prevention Program and processes to a state of betterment. Incident and Injury-Free Environment is where individual workers choose to hold themselves accountable for their own safety and the well being of their fellow workers on this project.

SIX SAFETY ESSENTIALS

The Sapphire Energy IABR project believes that there are Six Safety Essentials to developing an Incident and Injury Free Environment on this project. These Six Safety Essentials are the foundation of the Sapphire Energy IABR Project Safety Culture and are expected to be complied with by all working on this project:

Always Take Care – Each worker is to be observant, take their time, and think safety first. Nothing any worker does is so important that they cannot take the time to do it safely.

Follow The Rules – Safety procedures are designed to stop workers from getting hurt. Ignoring them is unacceptable and will not be tolerated. If a work or safety procedure is unclear or unworkable, then the worker must inform their supervisor.

Do A Risk Assessment – Before starting any work, a risk assessment is required for identifying potential hazards and selected control measures must be in place. If a worker is unsure they are responsible to ask their supervisor. Risk assessments associated with routine tasks are to be re-examined regularly.

You Must Intervene – If any worker believes their safety or the safety of others is being compromised, they have the right and obligation to intervene to stop and correct the work. Every worker has management's total support to exercise this right without any repercussions.

Manage Any Change – If there is a change or deviation to the planned activity, workers must stop the work and *re-evaluate the risk assessment and the precautions taken.*

Wear Correct PPE – Every worker must ensure that when they undertake any work, they will wear the full PPE correctly as identified in the risk assessment for that specific task.

CONTRACTOR AND SUBCONTRACTOR MINIMUM REQUIREMENTS

CONTRACTOR HEALTH AND SAFETY COMMITMENT AGREEMENT

Prior to award of a contract or purchase order, each contractor and sub-tier subcontractor working on the Sapphire Energy IABR project will complete the Contractor Health and Safety Commitment Agreement. This agreement is to be signed and dated (after reviewing the health and safety requirements contained in this Incident Prevention Program) by the ***most senior representative of the contractor or subcontractor company*** who has the authority to commit the company to comply with the Incident Prevention Program. **CONTRACTOR SAFETY DIRECTORS, PROJECT MANAGERS AND SUPERINTENDENTS ARE NOT TO SIGN THIS DOCUMENT**

PROJECT SAFETY IMPLEMENTATION PLAN:

Prior to mobilization, each contractor's project management and first-line supervision will develop and submit, a written detailed project-specific Safety Implementation Plan that will describe how they and their sub-tier subcontractors intend to implement and conform to the Sapphire Energy IABR project IPP. The Safety Implementation Plan will:

- Identify each major component of the work that the contractor is responsible for completing
- Identify hazards associated with the work and the proper equipment and tools to perform the work
- Plan adequate and sufficient controls to protect their work crews.

The Sapphire Energy Construction Management team will review the contractor project Safety Execution Plans.

Additional work components that may come up later in the project will be analyzed once they are known.

If the Project Safety Implementation Plan needs revision due to scope of work changes, unanticipated or new hazards, or other condition changes, etc., then all work pertaining to that work component will stop until a new Project Safety Implementation Plan is completed.

CONTRACTOR SAFETY PERFORMANCE

The Sapphire Energy IABR project expects each contractor and sub-tier subcontractor to execute their work on this project with a visible, proactive, and extraordinary vision and commitment to safety at all levels. Each contractor and subcontractor will plan their work with a focus on protecting their workers from incidents and injuries.

The Sapphire Energy Construction Manager will continually monitor and assess each contractor and subcontractor for compliance to this Incident Prevention Program (IPP) and appropriate regulations. The Sapphire Energy Construction Manager will further evaluate contractors on safety leadership, ability to become a safety partner and adopt the incident/injury-free philosophy.

Contractors will be held accountable for the safety performance of their sub-tier subcontractors.

Immediate corrective action will be taken to eliminate discrepancies, hazards, at-risk behavior, or nonconformance to the IPP observed.

DESIGNATED SAFETY REPRESENTATIVE

Each contractor with less than thirty (30) workers on-site (this includes sub-tier subcontractors) will designate a competent worker as their project safety representative for their company prior to mobilization. Safety representatives are not necessarily expected to perform in this role as a full time job.

Contractors will have a full time on-site safety professional when there are thirty workers. Additional safety professionals will be required for each additional fifty workers. (Worker count will include sub-tier subcontractors)

Contractors will submit the resume(s) of their proposed safety professional or representative to be reviewed by the Sapphire Energy Construction Manager. This person(s) will have the authority and responsibility to ensure the proper implementation of this Incident Prevention Program.

Contractor safety professionals and representatives will be expected to have adequate knowledge of the NMOSHA Construction and General Industry standards. The Sapphire Energy Construction Manager will determine if the proposed safety representative has the training and experience required for this project.

Contractor safety professionals and representatives will have the full authority to implement safety corrections and recommendations. Contractor safety professionals and representatives will have authority to stop any work they deem unsafe.

Contractor on-site safety professionals shall have the following minimum qualifications based upon the extent of their construction safety supervisory experience and capabilities:

- Five years construction experience, three of which include full-time on-site construction safety experience
- Completion of the OSHA 500 course is desired but minimum OSHA 30 hour Construction Outreach Course
- Specialized safety training relevant to the project
- Demonstrated ability in creating a safe and Injury-Free Environment
- Working knowledge of safety regulations and hazard control methods
- Demonstrated ability to conduct safety training

- Working knowledge of any specific contract hazardous work rules

Contractor safety representative (less than 30 workers) shall have the following minimum qualifications:

- Five years construction experience
- Completion of the OSHA 10 hour Construction Outreach Training Course
- Demonstrated ability in creating a safe and Injury-Free Environment
- Working knowledge of safety regulations and hazard control methods
- Working knowledge of any specific contract hazardous work rules

The minimum duties of designated safety professional and/or representative will be:

- Investigate any incident or near miss and report the findings to the Sapphire Energy Construction Manager
- Attend safety meetings as required by the Sapphire Energy Construction Manager
- Conduct regular safety meetings with workers to instruct them on project safety practices and requirements
- Conduct written daily safety reviews of their work activities to ensure compliance with safe work practices, this Incident Prevention Program, and safety rules and regulations and make available to the Sapphire Energy Construction Manager for review

CONTRACTOR SAFETY ORIENTATION

In addition to the project orientation, each contractor will conduct an additional safety orientation for their own and all subcontractor employees to ensure they understand the project safety requirements as well as their company's requirements.

CONTRACTOR MONTHLY INCIDENT SUMMARY REPORT

Contractors must submit a Monthly Incident Summary Report to the Sapphire Energy Construction Manager with their **monthly pay application**. A copy of the Contractor Monthly Incident Summary Report can be found in Appendix A of this IPP. This form will be submitted even if the contractor has no incidents to report. Information to report on this form includes:

- Monthly total man-hours worked including subcontractors
- First Aid cases including subcontractors
- OSHA Medical Treatment cases including subcontractors
- OSHA Lost Workday cases including subcontractors
- Restricted work cases including subcontractors
- Days Away from work including subcontractors

CONTRACTOR SAFETY SUBMITTALS

Prior to beginning work, each contractor shall submit to the Sapphire Energy Construction Manager the following:

- Executed Contractor Safety and Health Commitment Agreement
- Contractor written project-specific safety program
- Detailed Project Safety Implementation Plan for the scope of work
- Name(s) of designated safety representatives
- Name(s) and training verification of designated competent persons as required by the scope of work for trenching, scaffolding, rigging, etc.
- Name(s) and training verification of trained and qualified equipment operators as required by the scope of work for cranes, forklifts, aerial lifts, etc.
- Name(s) and training verification of employees trained in first aid and CPR
- Current annual crane inspections, by a third party crane inspection firm for all cranes brought onto the project Project-specific hazard communication program
- Master Chemical and Substance Inventory Sheet and Material Safety Data Sheets for all hazardous chemicals and materials to be used or stored on the project
- Training verification of OSHA or project required training as necessary. Verification shall include training rosters.

Examples of OSHA or project-required training are:

- Fall Protection
- Confined Space
- Ladders
- Excavations and Trenches
- Scaffolding
- Crane Signals
- Hazard Communications

On-Going Submittals

Each contractor will be required to submit various on-going safety documents to the Sapphire Energy Construction Manager as required by the scope of work. These submittals may include the following:

- Contractor Monthly Incident Summary Report (Due monthly with pay application)
- Incident Notification and Investigation Report (Within 24-hours of any incident or near miss)
- Weekly “Tool Box” safety meeting minutes

Maintain While Working on the Project

Throughout the course of the project, each contractor will maintain the following records or documents on-site and make available for inspection by the Sapphire Energy Construction Manager:

- Pre-task safety plan (Daily)
- Contractor Daily Work Site Safety Inspection (Daily) (Appendix R)
- Daily Scaffold, Trench, Crane, Rigging, and Forklift Inspections (Daily as required by the work)

Permits or Safety Plans as Required

Contractors will submit work permits or plans for review and approval by the Sapphire Energy Construction Manager prior to start of work as required. Work permits or plans that are required are:

- Confined Space Entry (Appendix J)
- Hot Work (Appendix I)
- Excavation and Trenching (Appendix K)
- Critical Lifts
- Fall Protection Plan
- Lockout/Tryout/Clearance
- Equipment Start-up
- Other work plans as deemed necessary

Submitted Annually

Each contractor(s) and subcontractors will submit their OSHA 300 and OSHA 300A logs for the previous calendar year to the Sapphire Energy Construction Manager by January 31st of each year.

CONTRACTOR SAFETY AND HEALTH COMMITMENT AGREEMENT

I, _____ representing _____

(Senior Contractor representative) (Name of company)

have reviewed this Incident Prevention Program (IPP) and fully understand its contents. I understand our responsibilities and will hold each worker assigned to work on the Sapphire Energy IABR project accountable for complying with the health and safety rules and requirements, regulations, and procedures contained in the Sapphire Energy IABR Project Incident Prevention Program. I will further allocate the necessary personnel, equipment, and supplies required to comply with this Incident Prevention Program.

I fully understand that if my company, subcontractor, or a worker fails to comply with any part of the Incident Prevention Program, Sapphire Energy work rules, or regulations, that part or all of the work being performed by my company may be suspended until such time that a corrective action plan has been developed, accepted by the Sapphire Energy Construction Manager and implemented.

_____ is being submitted by my company as our Designated Contractor Safety Representative/Professional for this project. He or she has met or exceeded the requirements established for the position and has full authority to implement any and all necessary corrective actions to maintain compliance with the Incident Prevention Program.

SAFETY DIRECTORS, PROJECT MANAGERS AND SUPERINTENDENTS ARE NOT TO SIGN THIS DOCUMENT

Signature: _____ Date: _____

Title: _____

THIS DOCUMENT MUST BE SUBMITTED TO THE SAPPHIRE ENERGY CONSTRUCTION MANAGER BEFORE START OF WORK.

SAFETY LEADERSHIP TEAM

A safety leadership team made up of Sapphire Energy Construction management team, project management and safety representatives from all major contractors, and selected subcontractors, as well as craft representation. The safety leadership team will meet regularly to discuss project safety rules, discuss any incident trend, compliance issues, and upcoming project work or activities that may require additional safety controls. At a minimum, these meetings will be held bi-weekly. The Sapphire Energy Construction Manager will prepare meeting minutes.

The craft representatives will serve for a minimum period of ninety days.

To make each meeting productive and informative, all members must be prepared to discuss any items and/or issues provided prior to each meeting.

NOTIFICATION OF UNSAFE OR HAZARDOUS CONDITIONS

Each worker on this project has the right and responsibility to notify their project management or supervision of any unsafe or hazardous condition that may be present without fear of retribution.

Contractor project management or supervision will take immediate action to correct or remove any hazard brought to their attention.

Nonconformance(s) of governmental regulations and requirements of this Incident Prevention Program will be documented on a Notice of Safety, Health or Environmental Nonconformance form (Appendix F). When the nonconformance(s) are classified as a Serious Nonconformance, a written corrective action plan is required. The Safety, Health, or Environmental Corrective Action Report (Appendix G) may be used.

NEW PERSON IDENTIFICATION – BLUE VEST PROGRAM

Every worker and supervision including subcontractors that are new or have been newly assigned to the project will be required to wear a blue reflective vest for thirty (30) days or more**. There will be no exception even if the worker or supervisor has been with the company for many years. Blue Vest Program is described

SAFETY REGULATIONS

All contractors and subcontractors will incorporate, at a minimum, New Mexico OSHA Construction Safety Standards, NMOSHA General Industry Standards (as applicable), Sapphire Energy safety rules and regulations, other specific governmental regulations and requirements (as applicable), and this Incident Prevention Program when determining the safe work practices and protection of our workers. ***If any of these standards, requirements, rules or procedures conflict, the most stringent one will prevail.***

INCIDENT AND NEAR MISS INVESTIGATION PROCESS

Every incident and near miss will be reported immediately and documented using the Incident Notification Form (Appendix B). Contractor project management will notify the Sapphire Energy Construction manager of any incident or near miss and will thoroughly investigate to determine the probable root cause(s). Preventive action will be required to eliminate future occurrences.

First aid and minor near-miss incidents will require a “Safety Down” where the entire work crew will discuss the incident, the causes, and corrective actions. The “Safety Down” will be documented on the Minor Incident Form.

Contractor first-line supervision will be involved in the investigation of incidents and near misses. Safety representatives **will not** conduct investigations alone. The Incident Notification form must be completed and submitted to the Sapphire Energy Construction Manager within TWENTY-FOUR hours of the occurrence.

Injured workers shall be accompanied to the medical facility by a supervisor.

PROCESS SAFETY MANAGEMENT

No work will be performed in any active process area without the contractor or subcontractor reviewing and complying with the sapphire Energy Process Safety Management requirements.

Contractors are responsible for training employees on the requirements and hazards in the work area.

Contractors will not leave a work area unattended in any process area without prior approval of the Sapphire Energy Construction Manager.

SAFETY AND HEALTH ASSURANCE ASSESSMENT MEETING

Major nonconformance(s), serious incidents, near misses, and injuries requiring medical treatment will result in all involved parties attending a Safety and Health Assurance Assessment meeting. At this meeting, Sapphire Energy Construction Management senior project management, HSSE, supervision, and involved contractors and subcontractor(s) will discuss the nonconformance, root causes, and corrective action plans.

Nonconformance of statutory health and safety regulations or the project rules contained in the project IPP will not be tolerated. It is expected all nonconformance issues identified are abated immediately.

Failure to correct nonconformance(s) may result in suspension of part or all work.

An incident is defined as any unplanned or undesired event that results in or has the potential to result in a work-related injury/illness, property damage, or disruption of business where the cause was from human errors of omission or commission.

A near miss is any situation that has the potential to result in a work-related injury/illness, property damage, serious environmental impact, or disruption of business under slightly different circumstances.

DAILY WORK SITE SAFETY INSPECTION

Superintendents will perform daily work site safety inspections of their work and the work of subcontractor's under their direction. These inspections are separate from any inspection performed by the safety coordinators. Inspections can be documented on the Daily Work Site Safety Inspection Form (Appendix R) or an acceptable equivalent. The daily safety inspection reports will be maintained in a binder or file.

DISCIPLINARY PROGRAM

At-risk behavior on the Sapphire Energy IABR project that could contribute to an incident or injury will not be tolerated. Each worker has an individual responsibility to work safely, and each first-line supervisor is responsible to correct at-risk behavior of workers under their direction.

At-risk behaviors that may result in immediate removal from the project, consist of, but are not limited to:

- Failure to follow the Fall Protection Policy
- Failure to follow the Substance Abuse Policy
- Possession of firearms, explosives or dangerous weapons
- Theft and other criminal activity
- Entering or allowing to enter an unprotected trench or excavation
- Failure to wear respiratory protection
- Failure to follow hot work procedures.
- Fighting, horseplay, or practical joking
- Entering or allowing to enter, a confined space without following procedures
- Unsafe and/or reckless operation of motorized vehicles or equipment
- Failure to follow lockout/tryout or clearance procedures
- Any reckless or dangerous behavior or act that could cause or contribute to a serious injury or damage to equipment or material.

For those acts or practices that result in removal from the project, the individual(s) will not have access to the project for twelve (12) months.

For those acts or practices not considered Immediately Dangerous to Life or Health the Sapphire Energy Construction Manager expects contractors and sub-tier subcontractors to have a progressive disciplinary program similar to the following:

- First occurrence: Verbal, written warning and/or re-training
- Second occurrence: Written warning, re-training, suspension, or termination from the project
- Third occurrence: Termination from the project

RESPONSIBILITY AND ACCOUNTABILITY

This Sapphire Energy IABR project has committed to create a work environment absent of incidents and injuries. Incident and Injury-Free is not a goal or a result but a personal mindset intolerant of any level, frequency, or severity of incident or injury.

Everyone associated with the Sapphire Energy IABR project must understand their responsibilities with regards to health and safety on this project. With the responsibilities defined, each contractor and subcontractor project management, supervision, and workers will be held accountable for their health and safety performance.

SUBJECT	PROJECT MANAGEMENT	FIRST-LINE SUPERVISION*	WORKER	SITE SAFETY REPRESENTATIVE(s)
	WILL ENSURE THAT:	**ENSURE THAT:**	**WILL:**	**WILL:**
Incident Prevention Program:	The IPP is understood, implemented, and strictly complied with and that Contractors, subcontractors, vendors, or third party individuals working or having business at this project are in conformance to the IPP.	The IPP is fully understood, implemented in work planning and communicated to workers. The project is compliant to the IPP.	Understand the contents of the IPP and follow the established rules and procedures.	Advise project management and supervision as to status and conformance with the project IPP. Support in administration of the IPP.
Work Practices:	First-line supervision is communicating safe work practices to workers.	All work tasks are properly communicated to workers and complied with.	Follow all safe work practices as communicated to them by their supervisor.	Assess project is compliant with safe work practices and federal, state, local, and company regulations, rules and procedures.
Site-Specific Safety Rules:	The site-specific safety rules and procedures are implemented and enforced.	The site-specific safety rules and procedures are understood and implemented.	Understand and follow the site-specific safety rules and procedures.	Assess project conformance to site-specific safety rules and procedures.
Emergency Action Plan:	Project develops and implements the project Emergency Action Plan and the Crisis Management Plan.	Communicates the project Emergency Action Plan.	Understand the project Emergency Action Plan.	Assess project Emergency Action Plan and Crisis Management Plan.
Training:	Resources are available to implement safety and health training. Training programs are developed and implemented.	They received a project-specific supervisor safety orientation prior to start of work. All workers under their direction are properly trained in hazard recognition and safe work practices.	Attend required project safety and health training. Understand and follow the work practices and guidelines discussed during the training.	Assess that project management, first-line supervision and workers have received proper health and safety training. Assist project supervision in training workers on hazard recognition and safe work practices. Monitor daily safety meetings.
Hazards:	All first-line supervision identifies, evaluate, and control the work site hazards, and resources are available to implement controls.	All hazards are identified, evaluated and controlled. Institute a daily assessment program to identify, evaluate and correct work site hazards	Understand the hazards of the work and follow the safe work practices and controls developed for those hazards.	Assist in evaluating hazards and determining methods of eliminating or reducing the hazard.
Incidents:	All incidents are investigated properly and thoroughly.	They conduct a thorough and proper incident investigation and develop solutions to prevent similar occurrences.	Cooperate and participate in the incident investigation and contribute ideas and solutions.	Assist first-line supervision in investigating incidents. Maintain monthly incident statistics.

* First-line Supervision includes general superintendents, superintendents, field engineers, general foreman and foremen.

SECURITY

For everyone's protection and safety, workers are required to follow established security procedures on this project.

Workers will enter and leave the project at the designated man-gate. Workers will only be allowed access to the project with proper identification. Those workers without proper identification (i.e.; hard hat decal, etc.) will be denied access.

All workers may be subject to search of the person or vehicle.

Only company vehicles with an issued vehicle pass will be allowed on the project. No personal vehicle will be allowed within the project.

All company vehicles shall have the Company Name or Logo displayed on both sides of the vehicle.

No camera or photography is allowed without prior permission.

SUBSTANCE ABUSE POLICY

This project is committed to providing a safe, drug-free work place for all employees. This policy applies to all contractors, subcontractor at any tier, vendor and other third party employees, including management working on or visiting the project.

Drug and alcohol abuse on and off the job can contribute both to incidents and to greater risk for all individuals employed on this project, as well as the general public. Construction work is dangerous; therefore all work tasks on this project will be considered safety-sensitive.

This project will follow the Sapphire Energy IABR project Substance Abuse Program.

The following are prohibited on this job:

- Being under the influence of any amount of alcohol or illegal drugs
- The use, sale, offer to sell, purchase, transfer, distribution or possession of illegal drugs, drug paraphernalia or alcohol products
- Possession of any firearm or other dangerous weapons

Each contractor and subcontractor will promote a Drug Free Workplace with their employees and will communicate what constitutes prohibited activities as described in the project Substance Abuse Program during their safety orientations.

Any worker who suffered or contributed to a work-related injury or illness, which required treatment by a physician or other medical facility or was involved in an incident where damage to property occurred, will be tested for drugs and alcohol within three (3) hours of the incident.

Contractors and Subcontractors will report the results to the Sapphire Energy Construction Manager. At a minimum, drug and alcohol test will follow current NIDA five panel guidelines and alcohol test will follow DOT guidelines.

Workers that refuse to test, stall to be tested, are uncooperative with collectors, or attempt to alter a urine specimen will be considered positive and immediately removed from the project.

Any violation of the project Substance Abuse Program will result in immediate removal from the Sapphire Energy IABR project and ineligible to work on the project for a minimum of twelve months.

SAFETY PLANNING

PRE-WORK TASK SAFETY PLAN:

Prior to the start of any work activities on this project, each contractor and sub-tier subcontractor discipline superintendent is expected to analyze each component of the work that he/she has responsibility for completing, identify hazards, acquired the proper equipment and tools to perform the work and plan adequate and sufficient controls to protect his/her work crews.

A written Pre-Work Task Safety Plan for each identified work component is required. Additional work components that may come up later in the project will be analyzed once they are known.

The Pre-Work Task Safety Plan is an outline describing the major work activities of the component work, identifies health and safety hazards, and lists the controls, tools, or equipment needed to reduce or eliminate those hazards and perform work properly. **A copy of a Pre-Work Task Safety Plan can be found in Appendix E**.

A Safety Hazard Checklist can be used to aid the discipline superintendent in identifying hazards. A copy of a Safety Hazard Checklist can be found in the appendix of this IPP.

Only one Pre-Work Task Safety Plan needs to be completed for each identified work component. If the Pre-Work Task Safety Plan needs revision due to scope of work changes, unanticipated or new hazards plan changes, etc., then all work pertaining to that work component will stop until a new Pre-Work Task Safety Plan is completed.

DAILY TASK/JOB HAZARD ANALYSIS PLAN:

Each, designated trade's first-line supervisor will analyze each task to be performed FOR EACH SHIFT OF WORK and identify the work sequences, hazards and controls necessary to protect workers from the identified hazards.

A Daily Task/Job Hazard Analysis Plan (JHA) will be completed DAILY (for each shift) and each crew performing work on this project. **A copy of the Pre-Task Safety Plan can be found in Appendix D.**

The work will be broken down into individual steps (i.e. all the steps the work crew will have to take in order to complete that task); the known hazards associated with the work; and the hazard controls (tools, safety equipment, safety rules, safe work practices, etc.).

Once the Daily Task/Job Hazard Analysis Plan is completely filled out, first-line supervisors will review the plan with their respective work crew so that each worker is aware of what work activities will occur during the shift, what hazards to be aware of and how to properly control or eliminate those hazards. This is also a time for workers to provide input into the safety plan. First-line supervisors should encourage crewmembers to participate in this planning process.

After a Daily Task/Job Hazard Analysis Plan has been reviewed with crewmembers, each worker is to sign the plan stating that they understand the work activities, hazards and controls. This is also an acknowledgement that each worker agrees to work according to the plan.

Those tasks with similar work can use prior Daily Task/Job Hazard Analysis Plan, but the plan must still be dated and reviewed with crewmembers at the beginning of the shift. If the scope of work changes or a new hazard appears during the work, the first-line supervisor will stop their crewmembers and revise the Daily Task/Job Hazard Analysis Plan.

First-line supervisors can use the Pre-Work Task Safety Plan and Safety Hazard Checklist on the back of the JHA to aid them in developing their Daily Task/Job Hazard Analysis Plan. Each disciplined superintendent is to review and sign each of their foremen's JHA's to ensure they are complete and have properly identified the hazards and controls.

Daily Task/Job Hazard Analysis Plan are to be completed by the first-line supervisor. Safety representatives can provide assistance to foremen in identifying hazards and controls.

HSSE representatives, office engineers, or other persons not involved in the direct execution of the work will not prepare pre-task safety plans on behalf of first-line supervision.

WORKER SITE-SPECIFIC ORIENTATION AND TRAINING

Environmental Health and Safety Training is a requirement and mandatory for all Sapphire Energy IABR contractors and subcontractor (at any tier) workers assigned to this project to promote and ensure an Incident and Injury-Free Environment exists.

Health and Safety Orientation

Every worker shall attend a Sapphire Energy IABR health and safety orientation, which will provide general health and safety information and project-specific work rules and procedures.

Even though the Sapphire Energy IABR project conducts a general informational project safety orientation, contractors and subcontractors are responsible to develop and conduct their own site-specific health and safety orientation.

Each contractor, at a minimum, will conduct a health and safety orientation that will include the project General Safe Work Rules and Procedures contained in this Incident Prevention Program. The site-specific orientation will communicate each worker's responsibility to be compliant with the project safety rules and regulations, accountability, and the disciplinary program.

Health and Safety Training

In addition to the site-specific health and safety orientation, NMOSHA requires that workers receive specific task training. To help comply with NMOSHA minimum worker training requirements and assist in achieving an Incident/Injury-Free workplace, a training matrix has been included in this Incident Prevention Program.

The Sapphire Energy Construction Manager will evaluate contractor orientations and training periodically to verify they are being properly conducted and that the contents adequately cover the standards, policies, rules, and procedures contained in the Incident Prevention Program or NMOSHA standards.

Contractors shall train workers on the safe operation of equipment or machines that they may be assigned to operate. This training shall be documented and available upon request.

Project management or supervision will communicate the health and safety policies, rules, and procedures to all vendors and third party individuals having business on this project.

All safety training is to be documented. A safety-training roster has been included for documenting safety training on this project. A copy of the safety-training roster can be found in the Appendix C of this IPP.

Daily Safety Meetings

All workers assigned to the Sapphire Energy IABR project will participate in daily safety meetings conducted by the contractor. The Sapphire Energy IABR project reserves the right to remove any contractor or subcontractor management/supervision that continually fails to attend or conduct daily safety meetings on the project.

Safety meetings should communicate any incident that occurred on the project, safety concerns, new hazards that may appear on the project, etc. The safety meeting should be five to ten minutes in length.

Workers will attend daily pre-task safety plan meeting where their immediate first-line supervisor will discuss work to be performed, hazards associated with the work, and controls required to protect from hazards. Workers will sign the Pre-Task Safety Plan daily stating they were communicated the plan and understand what was presented.

TOPIC	WHO NEEDS TRAINING	WHAT TRAINING IS NEEDED
Project-Specific Safety Orientation	All project management, supervision, and workers entering the project	Safety rules and procedures contained in the Incident Prevention Program (IPP), site-specific emergency action plan, each worker's responsibilities, disciplinary program
Hazard Communication	All workers entering the project	Hazard Communication Basic Training and Specific Hazard Communication Training (Refer to Hazard Communication Program in this IPP and requirements of NMSA)
Supervisor Training	Any person assigned as a supervisor	Supervisor Training Program
Environmental Management Program	All workers on the projects	The content of the project Environmental Management Plan
Fall Protection	Workers exposed to fall hazards of 6' or greater.	• The nature of fall hazards • Procedures for erecting, disassembling, maintaining and inspecting fall protection systems • Use and operation of: guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones and other protection when used • Procedures for handling equipment and erection of overhead protection • Fall protection standards
Forklifts	Operators of powered industrial trucks	• Types of trucks operated • Hazards of the workplace • Hands-on performance evaluation
Confined Spaces	Workers entering or working within a confined space	• Hazards of the space • Duties of entrants • Air monitoring
Permit-Required Confined Spaces	Workers entering or working within a permit-required confined space	• Hazards of the space • Duties of entrants, attendants, supervisors • Measures used to eliminate or control hazards • Air monitoring requirements • Emergency procedures/rescue equipment • Communications • Permitting procedure • PPE

TOPIC	WHO NEEDS TRAINING	WHAT TRAINING IS NEEDED
Excavations/ Trenches	Workers entering or working within an excavation/trench	• Hazards of the space (slides, cave-ins, water accumulation, etc.) • Safe means of access/egress • Proper support system procedures (erection, maintenance, disassembly and inspection)
Lockout/Tagout/Clearance Procedures	Workers affected by hazardous energy sources	• Nature of known hazardous energy sources • Project-specific Lockout/Tryout/Clearance procedures
Gas Welding & Cutting	Workers conducting gas welding and/or cutting	• The safe use of fuel gas
Respiratory Protection	Workers required to wear respiratory protection, including common dust masks	• NMOSHA Construction and General Industry Standards
Hot Work	Workers conducting hot work activities	• Hazards of the area • Permits • Duties of Fire Watch • How to use a fire extinguisher
Scaffolding	Workers working from scaffolding	• The nature of any known hazards • Proper erection, maintenance and disassembly of fall protection systems • Fall object protection • Material/equipment handling from scaffold • Maximum load-carrying capacity • Scaffold tagging system
Crane Baskets	Workers working from crane baskets	• Safe work rules • 100% fall protection • Lift plans contents • Emergency procedures

GENERAL SAFE WORK PRACTICES

Clean and safe working conditions are absolutely essential for achieving an Incident and Injury-Free Environment, as well as for the promotion of construction efficiency and progress. Each worker on the Sapphire Energy IABR project is valued not only for what they do, but for who they are. Everyone must maintain a strong personal desire to think and act safely, in an effort to create an Incident and Injury-Free Environment.

The following general safe work rules are a partial list of the general rules that apply to each worker on this project. There will be no tolerance for any worker who carelessly or callously disregards these rules or the other applicable health and safety rules.

1. It is the responsibility of each worker to perform their assigned duties so as to provide:
    a. - Safety for themselves
    b. - Safety for their fellow worker
    c. - Protection of the general public and all other workers
    d. - Protection of equipment, materials and tools
2. It is the responsibility of each worker to report all unsafe acts and conditions to their supervisor.
3. No worker will attempt to work under conditions that appear to be unsafe.
4. Workers will wear the minimum personal protective equipment (hardhat, safety glasses, reflective vest, shirt, trousers and work boot).
5. No worker will use damaged tools or equipment. Damaged tools must be removed from the work site.
6. No work will be performed on any equipment, machinery, or system without it being locked out and tagged.
7. It is every worker's responsibility to maintain his or her work area in a clean and orderly manner.
8. No radio or cell phone is allowed in any work area.
9. Tools and equipment will not be operated without proper guards and safety devices in place.
10. Each worker will report work-related injuries or illnesses immediately to their supervisor.
11. If a worker is unsure as to the safe performance of their work, they will request instruction from their supervisor.
12. No worker will enter a confined space without authorization and training.
13. No worker will attempt to operate equipment or machinery or any specialty tool (e.g. powder-actuated tools) unless authorized and properly trained.
14. No worker will cut, weld, grind, chip, or perform other tasks where the danger of flying debris exists without wearing proper eye and face protection.
15. Workers will use safe lifting techniques when required to lift material or other loads.
16. Workers will not remove respiratory protection when the work area requires it.
17. No worker will ride in the bed of pickup trucks.
18. No worker will be under the influence of drugs/alcohol or engage in any horseplay, fighting or gambling of any form.
19. No worker will cross, disregard, or enter a red barricaded, taped, or flagged area.
20. No worker will intentionally discharge or remove fire-fighting equipment.
21. No worker will remove barricades or floor covers without authorization.
22. No worker will work six (6') feet or greater above the surface without proper fall protection.

EMERGENCY ACTION AND EVACUATION PLAN

In the event of an emergency, the following Emergency Action and Evacuation Plan will be followed. During orientation each contractor employee and subcontractor will be advised of the:

- Sapphire Energy IABR Project requirements and procedures
- Sapphire Energy IABR Project Crisis Management and site logistics protocols
- Coordination with local emergency response personnel

The contractor will develop their own Emergency Evacuation Plan that is to be posted throughout their worksite and communicated to workers during the Safety Orientation and weekly safety meetings.

MEDICAL EMERGENCY

During the safety orientation, workers will be given information on how to summon medical assistance in case of a medical emergency. Workers should know the following information:

Emergency Phone Numbers: 9-1-1 or (575) 531-2222

Project Address: 1500 Highway 9 SW

City: Columbus NM

When reporting a medical emergency, the worker will state their name, the nature of the emergency, the severity of the emergency and where assistance is needed. A worker may be required to meet medical personnel and guide them to where the emergency is located.

WORKERS ARE TO BE INSTRUCTED NOT TO MOVE AN INJURED WORKER BEFORE MEDICAL ASSISTANCE ARRIVES UNLESS FURTHER INJURY IS POSSIBLE.

FIRE

In case of a fire, workers will evacuate their work area immediately and report to the pre-determined assembly area.

Workers will not attempt to put a fire out unless they have received special instruction on use of portable fire extinguishers. After reporting the fire, workers will evacuate the work area and report to the pre-determined assembly area that was stated during the safety orientation.

SEVERE WEATHER

Should weather conditions, such as severe thunderstorms develop around or near the Sapphire Energy IABR project, workers will follow the direction of their immediate supervisor. Workers may be directed to a safe area where they will remain until weather conditions improve.

CONTRACTOR-SPECIFIC EMERGENCY EVACUATION PLAN

Contractor Project Management will ensure a project-specific Emergency Evacuation Plan is communicated to all workers during orientation. Specific emergency procedures and emergency phone numbers will be posted in lunch areas, near all telephones and on project bulletin boards.

The Sapphire Energy Construction Manager will routinely assess contractor project management, supervision, subcontractors and workers to ensure adequate knowledge of the project emergency action plan exists.

HOMELAND SECURITY EMERGENCY

Should a Severe Condition "*Red*" threat advisory be issued indicating a terrorist attack occurrence or the severe risk of possible terrorist attacks, the Sapphire Energy Construction Manager will determine whether the project should evacuate or shelter all workers on the Sapphire Energy IABR project. Workers would assemble at the primary point and then directed to the shelter area.

The Sapphire Energy Construction Manager will communicate to contractors all known information of the threat and of the crisis plan.

EMERGENCY EVACUATION PLAN

THIS PLAN SHALL BE REVIEWED BY ALL WORKERS AND POSTED IN PROMINENT LOCATIONS ACCESSIBLE TO ALL WORKERS. THIS PLAN IS A SUPPLEMENT TO THE CONTRACTORS PROJECT SPECIFIC INCIDENT PREVENTION PROGRAM.

PROJECT NAME: **Sapphire Energy IABR Project**

WORK LOCATION: **Columbus NM**

1. This is an Emergency Evacuation Plan communicating evacuation procedures, specific alarms, and assembly points, should an emergency evacuation become necessary because of severe weather, fire, hazardous chemical release, explosion or other emergencies that could cause worker harm.
2. It is each worker's responsibility to familiarize themselves with evacuation routes, alarms and assembly points in case an emergency evacuation of the work area is required.
3. **Caution:** Evacuation routes, alarms or assembly points for one emergency may differ from another emergency. Therefore, familiarize yourself with each of the emergency plans below.
4. **IN CASE OF FIRE OR MEDICAL EMERGENCY:**

   Emergency Phone Number: 9-1-1 or (575) 531-2222

   Alarm or Notification:

   Evacuation Route:

   Primary Assembly Point:

   Secondary Assembly Point:

5. **IN CASE OF SEVERE WEATHER OR HOMELAND SECURITY EMERGENCY:**

   Alarm or Notification:

   Evacuation Route:

   Assembly Point:

6. **IN CASE OF A CHEMICAL RELEASE OR EXPLOSION:**

   Alarm or Notification:

   Evacuation Route:

   Primary Assembly Point:

   Secondary Assembly Point:

   Spill Kit Location:

7. Workers will immediately evacuate their work area upon hearing the alarm or being notified of the emergency and ordered to evacuate. No worker is exempt from evacuation even if the evacuation is a drill.
8. Workers are required to report immediately to their designated assembly point and be accounted for. Failure to report may cause another to risk danger in an effort to search for you. **DO NOT** leave the project without prior authorization from first-line supervision.

EMERGENCY EVACUATION PLAN

INSERT PROJECT EMERGENCY EVACUATON DRAWING OR PHOTO HERE

PROJECT HAZARD COMMUNICATION PROGRAM

All workers on the Sapphire Energy IABR project are entitled to know the properties and potential safety and health hazards of chemicals or substances that they may come in contact with on this project.

Each contractor and sub-tier subcontractor is required to have a written project specific Hazard Communication Plan that will be posted in a location where workers can easily access and review the plan. A written Hazard Communication Plan is required even if the contractor or subcontractor does not use hazardous chemicals or substances.

The contractor/subcontractor Hazard Communication Plan will be reviewed by the Sapphire Energy Construction Manager

Each contractor will submit to the Sapphire Energy Construction Manager, a Master Chemical and Substance Inventory List and a copy of the Material Safety Data Sheet (MSDS) of all known hazardous chemicals that are in their work area. Contractors will be responsible for obtaining all sub-tier subcontractors Master Chemical and Substance Inventory Lists/MSDS and forwarding to project HSSE.

The Master Chemical and Substance Inventory List (Appendix H) will be maintained, even if they do not have or will not use any hazardous chemicals or substances. *This is an NMOSHA requirement.*

Contractors will maintain a project-specific MSDS on location for each hazardous chemical or substance listed on the Master Chemical and Substance Inventory List. Contractors will be responsible to ensure all sub-tier subcontractors have their project-specific MSDS sheets at the project.

It will be the responsibility of each worker's supervision or project manager to assure Material Safety Data Sheets are received prior to, or at the time of delivery of, a hazardous chemical.

Contractor project management and first-line supervision will ensure all hazardous chemicals are properly labeled in accordance with the MSDS. Containers that hazardous chemicals have been transferred into for use during a single work shift will be labeled as to contents.

Every worker on this project shall receive instruction from their employer on their Hazard Communication Program, the location of the Master Hazardous Chemical and Substance Inventory list, the location of the Material Safety Data Sheets, labeling requirements and specific safety or health instructions about the hazardous chemical or substance.

Recommended minimum Hazard Communication Training will consist of:

1. The contents of the program
2. Prior to use of or the potential exposure to any hazardous chemical or substance, workers are to be instructed in:
    - Physical and health hazards
    - Procedures to protect against the hazards
    - Engineering and administrative controls
    - Personal protective equipment
    - Emergency procedures in case of exposure or accidental spill
3. Labeling requirements
4. Whenever a new chemical or substance is introduced into the workplace, workers will be briefed of its hazards

Sapphire Energy, vendors and other contractors that may have business in or near a work area will be notified that hazardous chemicals are being used and the hazards they may encounter.

If a worker believes they have encountered a hazardous chemical or substance unfamiliar to them, they will immediately notify their supervisor. Project management or supervision will attempt to identify the hazardous chemical or substance and initiate all precautions to handle and dispose of this material, if required, and to properly protect workers.

WRITTEN HAZARD COMMUNICATION PROGRAM

THIS PLAN WILL BE REVIEWED BY ALL WORKERS AND POSTED IN A PROMINENT LOCATION ACCESSIBLE BY ALL WORKERS. THIS PLAN IS A SUPPLEMENT TO THE PROJECT INCIDENT PREVENTION PROGRAM.

CONTRACTOR/SUBCONTRACTOR NAME:

WORK LOCATION:

1. This is a project-specific Hazard Communication Plan ensuring that information on hazardous chemicals and substances is communicated to workers in accordance with NMOSHA and the Sapphire Energy IABR project Hazard Communication Safety Program.
2. An inventory of known hazardous chemicals and substances used on this project has been conducted and listed on the Master Chemical and Substance Inventory which is located and can be reviewed at: _____
3. A copy of the Material Safety Data Sheets (MSDS) for known hazardous chemicals and substances used on this project are located and can be reviewed at: _____
4. If a copy of a MSDS cannot be located, contact your Company Project Manager, Superintendent, Foreman or Sapphire Energy Construction Manager. Management and first line supervision are responsible for obtaining MSDS and ensuring they are received prior to, or at the time of delivery of any hazardous chemical.
5. Hazardous chemicals will be properly labeled in accordance with the MSDS. Containers that hazardous chemicals have been transferred into for use during a single work shift require secondary labeling.
6. Workers who work with, or may be potentially exposed to, a hazardous chemical or substance will be informed of the physical and health hazards and procedures to protect against those hazards. Included in the procedures are engineering and administrative controls, personal protective equipment, and emergency instructions for accidental exposure, emergency evacuations, or spill containment of the hazardous chemical or substance.
7. When new hazardous chemicals or substances are introduced into the work environment, workers will be informed of the physical and health hazards.
8. Employers, who may be working in any work area where workers could be exposed to a hazardous chemical or substance, will be informed of where that hazardous chemical or substance is in use.
9. Workers performing non-routine tasks will be informed of chemical hazards associated with the work activity and the appropriate protection measures.

PROJECT-SPECIFIC SAFE WORK REQUIREMENTS

The Sapphire Energy IABR project-specific safe work requirements are the minimum requirements for this project. The purpose of these requirements is to ensure an incident/injury-free environment and compliance of regulatory standards and regulations. The Sapphire Energy IABR project believes by concentrating on four main focus areas, incidents and near misses could be reduced. Those four main areas are Personal Protective Equipment, Housekeeping and Orderliness, Fall Protection and Ladders.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Every contractors, subcontractors, vendors, and third party individuals will, at a minimum, wear the following personal protective equipment without exception while on this project (except in office and lunch areas).

Head Protection

Hard hats will be worn at all times on this project; in addition the following rules apply:

- **HARDHATS WILL BE WORN WITH THE BILL FACING FORWARD)** The hardhat may be turned around to accommodate welder hoods but will be turned forward when not actively engaged in welding.
- The Company name and workers name will displayed on hardhat. Nicknames are not allowed
- **Hardhats that have a manufacturer date of five years or greater will not be used on this project**
- Ball caps, stocking caps, or other headgear not specifically designed to wear with a hardhat will not be authorized at anytime
- Meets ANSI Z 89.1 requirements

Eye and Face Protection

Safety glasses with side-shields that meet ANSI Z-87 criteria are to be worn at all times including inside vehicles.

Workers with prescription glasses must meet ANSI Z-87requirements or will be required to wear over the glasses (OTG) safety eyewear.

In addition, the following eye/face protective equipment must be used when performing the following work activities:

Activity	Safety Equipment
Welding	Welding Hood*
Burning	Burning Goggles
Abrasive grinding or cutting	Face Shield*
Drilling	Goggles/Face Shield*
Reaming	Goggles/Face Shield*
Chemical Handling	Goggles/Face Shield*
Molten Materials	Goggles/Face Shield*
Corrosive Liquids	Goggles/Face Shield*
Concrete Pouring	Goggles/Face Shield*
* Safety glasses will be used in conjunction with face shields and welding hoods.	

Foot Protection

Sturdy leather work boots with steel toes that are in good condition must be worn (heal and sole will not show excessive wear). Work boot height must be over the ankle. Tennis shoes, soft top hiking boots, sandals, or other street-type shoes are not allowed, even if they have steel toes.

Reflective Vest

Every worker, visitor, and vendor will wear a high-visibility reflective vest when working and/or conducting business outdoors. Electricians and welders will be issued flame resistant style that meets NFPA 70E/ASTM F1506.

Work Attire

Shirt sleeves will have a minimum sleeve length of four (4) inches. No sleeveless shirts will be allowed in the work area. Additionally, shorts, tank tops, or cut-off shirts are not permitted.

Long trousers are required that fit properly around the waist and ankles. Trousers that are worn low on the hips or thigh are not allowed. The length of the trouser will be such as to not present a tripping hazard.

Respiratory Protection

First-line supervision will determine if hazards exist requiring respiratory protection prior to start of work. Written documentation supporting this hazard assessment will be made available to the Sapphire Energy Construction Manager upon request.

Whenever respiratory protection is deemed required or requested by a worker on this project, the requirements outlined in NMOSHA Standards will be followed, which include:

1. Have affected workers complete a Medical Questionnaire for Respirator Use (Appendix T).
2. Submit questionnaires to a Physician or Licensed Health Care Professional (PLHCP) for review and further testing.
    a. Once medical approval to wear a respirator is received from the PLHCP:
    b. Select the appropriate type of respirator to protect workers from the hazard(s)
    c. For air purifying respirators, choose the appropriate filter/cartridge
    d. For supplied air respirators, ensure breathing air source provides “Grade D” breathing air
    e. Train affected workers about the specific type(s) of respirator(s) being used
    f. Fit-test the workers with the specific type(s) of respirator being used

If a worker desires to voluntarily wear a filtering face piece (dust mask) and a respirator is not required, the first-line supervisor must inform the worker about the limitations of the selected respirator. Voluntary Use of a Disposable Respirator form should be used (Appendix S). ***NOTE: disposable dust masks are prohibited for protection of silica exposure***

Hearing Protection

Approved hearing protection will be worn as specified in posted areas in the plant and while working with or around high-noise level producing machines, tools, or equipment. A good rule to follow is: When you must raise your voice to be heard, you need hearing protection. Exposure to impulsive or impact noise will not exceed 140dB noise level.

Duration per day, hours	Sound Level dBA Slow Response
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

NOTE: *Any tool or equipment, which produces noise levels that require you to shout to be heard, will be considered to have exceeded the Permissible Exposure Level for noise and hearing protection is required – no matter the duration of use.*

Impulsive Or Impact Noise	
Equipment or tools	Sound Level Created
Pneumatic chip hammer	103-113
Jack hammer	102-111
Concrete joint cutter	99-102
Chop saw	88-102
Stud welder	101
Bulldozer	93-95
Crane	90-96
Hammer	87-95
Backhoe	84-93
Above hearing exposure based on an 8 hour exposure	

Hand Protection

Every person working or visiting the Sapphire Energy IABR project will have on their person a durable pair of gloves. Gloves will be worn at anytime the hands will touch or handle any material, equipment, or machinery. Specialized gloves may be required when exposure to sharp objects, abrasive surfaces, temperature extremes, hazardous chemicals, or electrical hazards. Supervisor will determine type of glove and include on the work task JSA.

Additional Protections

During the course of work or activity, contractors may be required to provide workers additional personal protective equipment to reduce the likelihood of an exposure to a specific hazard or work related injury or illness.

Personally owned protective equipment

Contractors and subcontractor employees are prohibited from using personally owned personal protective equipment such as but not limited to; hardhats, fall protection harness and lanyard, respirator, etc.

Contractor or the subcontractor is responsible for issuing personal protective equipment as required.

PROCESS SAFETY MANAGEMENT

No work will be performed in any process area without reviewing and complying with the Sapphire Energy IABR Project Process Safety Management Plan

First-line supervisors are responsible for ensuring all workers have been trained on the requirements and hazards in the work area.

First-line supervision will not leave a work area within any operating section of the plant unattended without prior approval of the Sapphire Energy Construction Manager.

HOUSEKEEPING AND ORDERLINESS

The Sapphire Energy IABR project policy on housekeeping is that all equipment, tools, materials, or apparatuses will be stored, stacked, located, placed, temporarily spotted, or set up for manipulation in such a manner as to render it highly improbable that an incident or injury could occur in the work area. The area will give the direct and obvious impression of a clean and orderly work place.

Contractor project management, supervision, workers, vendors and third party persons will maintain all work locations in an orderly and clean manner at all times.

Mud and dirt tracked onto roads or public streets and alleyways will be removed continuously during the workday.

The following are the minimum housekeeping and orderliness requirements for this project:

- Access walkways, roadways, and fire lanes will not be blocked with material, tools, ladders, scaffolds, welding leads, air hoses or electrical cords
- Electrical extension cords, light stringers, air hoses, and welding leads will be elevated above walkways seven (7') feet
- Welding rod, nuts, bolts, and washers will be kept in proper containers
- Pipe, rebar, all thread and other round stock will be stored properly away from access walkways and work common areas.
- Shackles, slings, chokers, ladders, and safety equipment will be removed from the work area when not needed and properly stored
- Trash containers will be placed at appropriate locations
- All nails will be removed from scrap and form lumbers and swept up daily
- Rubbish, trash, and debris will be removed from the work area daily
- At all locations where drinking water is dispensed, an adequate trash container will be located for disposal of used drinking cups.

FALL PREVENTION/PROTECTION

This project is committed to the philosophy of 100% continuous fall protection, whenever workers are exposed to fall hazards of six feet (6') or greater.

CONTRACTORS, SUBCONTRACTORS, VENDORS, OR OTHER THIRD PARTY INDIVIDUALS WILL TAKE ALL PRACTICAL MEASURES TO ELIMINATE, PREVENT, AND CONTROL FALL HAZARDS.

All work will be planned with the intent to eliminate identified fall hazards and use best practices before selecting personal fall arrest protection.

Passive fall protection will be implemented before personal fall arrest systems are used.

When a fall hazard has been identified and cannot be eliminated, then effective means of acceptable passive fall protection systems include the following:

- Guardrail systems
- Safety Netting
- Covers for Floor, Roof and Wall Openings
- Positioning Device Systems
- Protection from Falling Objects

Only when fall hazards cannot be eliminated or passive fall protection applied will workers be uniformly equipped, trained and given periodic refresher training in the personal fall protection systems to minimize the adverse effects of accidental falls.

Fall protection training records will be maintained on the project and available for review by the Sapphire Energy Construction Manager.

On this project, 100% FALL PROTECTION MEANS PROTECTED FROM FALLS AT ALL TIMES WHEN WORKING AT OR ABOVE SIX FEET. This means it is mandatory for all trades, including but not limited to:

- Structural steel erection (bolt up and connectors)
- Re-bar assembly
- Concrete forming
- Pre-cast erection
- Masonry
- Carpentry
- Scaffold erection/disassembly
- Roofing

Workers may work from ladders without personal fall protection when the following criteria are met with no exception:

- Working height does not exceed six (6') feet
- Work can be performed without reaching (worker remains inside the area between the vertical side rails)
- Ladder is properly tied off or in the case of a stepladder; spreaders are fully extended and locked
- A three point contact while working from a ladder is always maintained
- Work does not involve working within 15 feet or above an open side, leading edge, or shaft, even if the edge has a proper guardrail.

Horizontal Lifeline or Rat-Line

Workers will not tie off to a perimeter cable or wire rope handrail. These are only designed for 250lbs and do not meet the criteria for proper fall protection anchorages or horizontal lifelines.

When wire rope is used to construct guardrail systems, at least 3/8" diameter cable shall be used with three cable clamps per connection.

Contractors and subcontractors will submit all engineered documentation on horizontal lifelines to the Sapphire Energy Construction Manager for review and approval. Rope will not be approved as a component of a horizontal lifeline without approval of a qualified PE in fall protection.

All horizontal lifelines will be installed under the direct supervision of a qualified person.

Personal Fall Protection

When no other practical means of fall protection can be used, workers will be tied off at all times utilizing a full body harness and double shock-absorbing lanyard.

WHEN PERSONAL FALL PROTECTION SYSTEMS WILL BE USED, A WRITTEN FALL PROTECTION PLAN IS REQUIRED OUTLINING THE SYSTEM TO BE USED THAT WILL PREVENT A FREE FALL OF GREATER THAN SIX FEET, ANCHORAGE SYSTEMS, TRAINING TO BE CONDUCTED, AND RESCUE PROCEDURE.

When personal fall protection is used, the following will be included in the project fall protection plan:

- A description of the equipment to be used (Harness, lanyard, connector, and anchorage point).
- That the total safe fall distance is calculated and documented for each area that personal fall arrest equipment will be used to ensure a safe distance exists.
- That all anchorage point(s) will support 5,000 pounds. If the anchorage point will be job fabricated, it will be designed by a qualified person with no exception.
- That each anchorage point will be placed such that the worker could not fall greater than six feet. A six foot fall is measured from the workers shoulder level and not at his feet.
- A detail plan on how a worker would be rescued if they were subject to a fall.
- A detail training outline that each worker required to use personal fall protection would complete. Training would follow as a minimum the requirements contained in NMOSHA Standards and the Sapphire Energy IABR Project Incident Prevention Program, which includes:
    - Instruction on how to recognize a fall hazard
    - Instruction on how to wear the personal fall protection equipment
    - Installation and use of anchorage devices or other fall protection equipment
    - Instruction on how to calculate total fall arrest distance
    - Instruction on how to self rescue

Personal Fall Arrest System will consist of an ANSI certified full-body harness, double lanyard with shock absorbing device or retractable lifeline, locking snap hook and properly engineered anchorage points.

Lanyards will not be tied back to themselves unless the lanyard is specifically manufactured to tie back to itself.

General Fall Protection Rules

Workers on this project who are exposed to falls of six feet (6') or greater while working off scaffolding, elevated decks, elevated platforms, low-slope roofing, stairways, stairwells, reinforced steel, and any other elevated area or equipment will be protected from falls. There is no set safe distance from any unprotected open side, leading edge, or shaft that would exempt a worker from fall protection.

On properly constructed scaffold, elevated decks and elevated platforms that have perimeter guardrail systems consisting of a top and mid rail, workers are not required to tie off. If the perimeter guardrail system must be removed, workers will wear full body harnesses with double shock-absorbing lanyards.

When climbing a ladder greater than twelve (12') feet, personal fall protection is required, such as use of a retractable lanyard.

Floor openings 2-inches or greater and all wall openings will be guarded or covered with an appropriate cover or guardrail. Floor covers will be secured to the floor to prevent easy removal. The floor or wall cover will be properly marked with a Danger sign stating, "COVER-DO NOT REMOVE". SPRAY PAINTING "HOLE" ON PLYWOOD IS NOT ALLOWED.

Any contractor that must remove a guardrail, hole cover, or other fall protection system in the course of their work will be responsible for immediately replacing the protective system.

Workers will be protected from falling objects from above.

When working from an elevated work location, all tools will be tethered to prevent being dropped to a lower level.

In the event any deviation of this fall protection procedure is required, the Sapphire Energy Construction Manager will be required to approve.

LADDERS AND STAIRWAYS

Stairways having four or more risers or rising 30 inches or more shall have a stair rail system 36 inches high on each unprotected side.

Metal pan stairs shall not be used until the pans are filled to prevent a tripping hazard.

Ladders, stairs or ramps will be provided where there is a change in elevation of 19 inches or greater.

Ladders used on this project will meet the requirements established in NMOSHA Standards.

Workers will be trained on the safe use of ladders.

Ladders are required to ascend or descend truck beds and/or trailers.

Ladders will extend past the bearing point no less than 36 inches.

Ladder landings shall remain clear of all obstacles and obstructions to allow easy access on and off the ladder.

Fall protection while working from a ladder is addressed in the previous section on fall protection.

Ladders with broken or bent rungs, steps or side rails will be immediately destroyed and removed from the project.

Before use each ladder will be inspected daily. All ladders will be inspected monthly and the project distinctive color code applied. Ladders that do not have the current color code will be removed from service immediately.

Month	Color		Month	Color	
January	Orange		July	Red	
February	Blue		August	Yellow	
March	Red		September	Orange	
April	Yellow		October	Blue	
May	Orange		November	Red	
June	Blue		December	Yellow	

When ladders are used to access upper levels, they must be secured at the base and at the top by tying to prevent displacement.

Aluminum ladders are discouraged but are allowed except when working near energized electrical wires or equipment.

All ladders including job made ladders will conform to NMOSHA and ANSI standards.

All ladders will be heavy-duty type with a minimum capacity rating of 250 lbs.

Stepladders

STEPLADDERS WILL NOT BE USED AS STRAIGHT LADDERS. Stepladders will only be used with the spreaders fully extended and spreader bar locked in place.

Workers will not stand on the top or top step of a stepladder. No worker will work when their knees are above the top of the stepladder.

Straight/Extension Ladders

Ladders will be set up so the horizontal distance at the bottom is not less than ¼ of the vertical distance to the bearing point.

Workers will not stand on the top three rungs of a ladder. No worker will work when their knees are above the top of the ladder.

All straight ladders will have non-skid feet at the base.

Job Made Ladders

Job-made ladders shall be constructed for intended use. If a ladder is to provide the only means of access or exit from a working area for 25 or more employees, or simultaneous two-way traffic is expected, a double cleat ladder shall be installed.

Job-made ladders will be constructed in accordance with NMOSHA and ANSI standards.

HAND AND POWER TOOLS

All hand and power tools will be kept in good condition with regular maintenance. Hand and power tools are to be operated according to manufacturer's instructions and guidelines and the personal protective equipment appropriate for the hand or power tool will be worn.

Hand Tools

- Impact tools such as chisels, wedges, etc. are not to have mushroomed heads
- Wooden handles will not be splintered or cracked
- Pocketknives will not be used for stripping wire
- Must be tethered if working at elevated work locations

Electric Tools

- Never lift or carry a power tool by its cord
- Guards and safety switches will not be removed or made inoperative
- Electric tools must have a three-wire cord unless it is double insulated

Portable Abrasive Wheel Tools

- Guards will not be removed
- Grinding disks and wheels will be checked to verify they are the correct one for the grinder and rpm
- Material will not be held in an individual's hand while using a grinder

Pneumatic Tools

- **Air hoses ½ inch in diameter or greater will have a safety excess valve installed at the source of air**
- Clips, whips or retainers are required at each air hose coupling and to prevent attachments from being ejected from the tool
- Only the pneumatic nail gun, where the muzzle is pressed against the work surface to fire, is allowed
- Hose couplings will be secured to prevent displacement
- Pneumatic nail guns shall be disconnected from the air supply when unattended

Powder Actuated Tools

- Workers will be trained to operate a powder actuated tool and required to carry their training card at all times
- Fired cartridges are not to be discarded on the floor but placed in a container or bucket and properly disposed of
- The powder-actuated tool must not be able to fire until it is placed against the surface with a force of 5 pounds or greater
- Misfire cartridges are to be placed in water for five minutes

FIRE PROTECTION/PREVENTION

Fire Protection

Temporary fire protection measures, such as fire extinguishers, temporary hose lines, and temporary standpipes, are required near hazardous locations.

Project team shall develop a fire protection plan in accordance with NMOSHA Standards.

Fire extinguishers will be:

- Conspicuously located
- Inspected monthly
- Protected from freezing
- Placed within the immediate area of any welding/cutting operation or flammable liquid storage area
- Placed within five feet whenever gasoline operated equipment is used

If a fire extinguisher is discharged for any purpose, it should be reported to the Sapphire Energy Construction Manager.

All temporary buildings and trailer complexes (shops, field offices, Conex's, etc.) will have a class ABC fire extinguisher located within the building.

Access to fire hydrants will be maintained at all times. Access to buildings and other structures will be maintained at all times.

Fire Prevention

Temporary buildings located within another building or structure shall be constructed of non-combustible material or have a fire resistance rating of one (1) hour. Plastic tarps or covers (visqueen) used for any purpose inside a building where welding, cutting, or open flame is present will be made of fire retardant material.

Combustible refuse from construction operations will not be burned or dumped anywhere on the construction site. Such refuse will be removed at frequent intervals, as needed. Storage of large quantities of construction debris will be placed in metal dumpsters.

Storage of compressed gases will be:

- Stored with valve caps securely on when not attached to a regulator
- Secured upright at all times, including when transported in vehicles
- Fuel and oxygen cylinders separated by 20 feet or greater
- Empty cylinders stored separate from full cylinders

Only approved high flash point solvents are to be used for cleaning purposes.

Oily rags and waste are to be stored separately in metal containers fitted with self-closing lids. Trash and refuse must be placed in trash containers provided for this purpose.

No open burning is permitted on this project.

A minimum clearance of 15 feet from fire hydrants must be maintained at all times.

All fire safety rules and signs on this project will be observed and obeyed.

Fire and Flammable Liquid Storage and Dispensing

High flash and methylene chloride solvents are prohibited.

Flammable Liquids will be:

- Stored outside not within 20 feet of any structure or in a properly constructed storage locker whenever possible
- Stored in approved portable containers that are marked as to its contents
- No more than 25 gallons stored inside any trailer or room
- Posted with “NO SMOKING” signs. When a large number of workers speak a foreign language, the warning signs will be posted in that language as well
- Outside storage areas kept free of weeds and other combustible material

All flammables will be stored in approved containers and marked as to the contents. If storing flammables for more than one day, contact the Sapphire Energy Construction Manager for approval.

Storage of flammables will be in an enclosure away from open flame, heat, direct sun or other sources of ignition.

Transportation and transferring of volatile liquids will be made in Underwriter Laboratory or Department of Transportation approved containers.

All Gasoline or Diesel storage tanks/drums will be placed in a berm or other secondary containment. Earth berms will be lined with minimum 6-mil plastic sheeting that is fuel resistant. PVC linings are not allowed.

The Sapphire Energy Construction Manager will approve vehicle refueling locations and procedures.

Fuel and flammable liquid tanks, drums, or barrels will have the proper DOT placard and be labeled as to content. If workers speak a foreign language, the labels will also be in that language.

LP gas storage tanks will be protected from vehicle traffic.

At fuel dispensing points, the following is required:

- Portable 20 B-C fire extinguisher within 25 to 75 feet from the fueling point
- No Smoking signs posted. Additional signs in a second language if required
- Self-locking fuel nozzle prohibited
- Spill kit stored nearby
- Tanks will be grounded and when dispensing flammable liquids, the containers will be bonded

LINE BREAK PROCEDURES

Sapphire Energy IABR Project Line break procedures will be followed when but not limited to, the opening of or working on any process lines, their connected fittings, or valves, thermowells, gauges, sight glasses, pumps or vessels that contain or have contained acidic, alkaline, flammable, or otherwise hazardous liquids or gases.

Contractor first-line supervision will follow the Sapphire Energy IABR Project line-break procedures and obtain the necessary permits prior to working or opening any process line.

Contractor first-line supervision are responsible for ensuring all workers involved in a line-break process have the proper personal protective equipment and clothing prior to start of work.

Lock-out/Tag-out procedures will be followed to ensure the line is properly identified and isolated. No work is to be performed on any process line before the owner representative has given approval that the line has been isolated.

Workers will receive special hazard communication training on the hazardous liquid or gas that they may be exposed to.

Prior to beginning work, contractor shall have a written Spill Response Plan that has been approved by the Sapphire Energy Construction Manager.

The surrounding area around where the line break will occur is to be barricaded to protect any passersby from exposure to a hazard.

HOT WORK

Hot work is defined as the use of open flames, other heat sources and/or spark producing devices in areas where combustible materials may be or do exist or where there is potential for explosion or fire.

The Sapphire Energy Construction manager will identify those work areas or tasks to be considered Hot Work areas. Hot Work areas will follow the Sapphire Energy IABR Project Mill Hot Work procedures.

Hot work activities include burning, welding, cutting, grinding or other operations that produce a flame or sparks that could cause catastrophic results if not controlled. Therefore, prior to performing any “Hot Work” operations, contractors or subcontractors will obtain a Hot Work Permit (Appendix I) from the Sapphire Energy Construction Manager.

A Hot Work Permit is valid only for the date and shift that is stated on the permit.

The following precautionary measures will be taken when a Hot Work Permit is required:

- Grating, openings, etc. will be completely covered in such a way to prevent sparks and slag from falling to a level below
- Fire extinguisher in the immediate area of work
- No flammable or combustible material stored within 35 feet in any direction
- Combustible/flammable materials that cannot be moved must be covered with fire blankets or other suitable material
- Worker(s) designated as fire watch will be trained and remain for one-half hour after work has ended
- Follow confined space entry procedures, if required

When burning or welding using compressed gases, flame arrestors will be installed on both the torch side and regulator side of the oxygen and gas hoses.

Welding screens will be used whenever possible to protect workers from welding flash.

Workers will be trained prior to performing any fire watch duties. The training will consist of:

- A review of the work to be performed
- Precautions to be taken
- How to use the fire extinguisher correctly
- Emergency procedure in case of fire
- Duties of fire watch

SCAFFOLDING

All scaffolding used on this project will meet the requirements established in NMOSHA Standards.

Each contractor using scaffolds must designate a scaffolding competent person to direct and supervise the erection and dismantling of all scaffolding on this project. The competent person will sign and attach one of the following color-coded scaffold tags to each scaffold:

- Green Tag: Scaffolding complete and ready for use
- Red Tag: Scaffolding incomplete and not for use
- Yellow Tag: Scaffolding usable but personal fall protection required

Scaffolding will be inspected daily by the competent person prior to use and sign the tag at the time of inspection. The Daily Scaffold Safety Inspection Report (Appendix Q) will be used to document these inspections.

- Workers required to work from scaffolding will receive training on the following:
- Nature of any known hazards, such as electrical, fall or falling objects
- Correct method of erecting, maintaining, and disassembling fall protection systems
- Falling object protection system

- Proper handling of equipment or material on the scaffold
- Maximum load-carrying capacity of the scaffold
- Any other pertinent requirements about the scaffold

During erection and dismantling of scaffolding, if deviation of the fall protection procedure is required, the Sapphire Energy Construction Manager will be required to approve.

Records will be maintained of scaffolding training and be available for review by the Sapphire Energy Construction Manager.

Prior to erection, all scaffolding components will be inspected for defects and any damaged components will not be used.

Scaffolding will be erected on a firm foundation/footing. Scaffold poles, legs, posts, frames and uprights will bear on metal base plates and mud sills where required.

Scaffold legs, poles, posts, frames and uprights will be pinned or locked to prevent uplift.

No scaffold will be enclosed unless a qualified engineer designed the enclosure.

Scaffold platforms will be constructed with no space between the platform components. The space between the platform components and the scaffold uprights will not exceed one inch.

Because of special circumstances such as building a scaffold around a pipe, the space opening between the scaffold and the object/structure cannot exceed 9½ inches.

Scaffold planks shall extend past the horizontal support a minimum of six inches and not more than 12 inches unless cleated or restrained by hooks.

Scaffold plank will not be overlapped unless:

- Overlap occurs at a horizontal support
- The minimum planking overlap is 12 inches

Scaffold plank will be only scaffolding-grade planking.

Ladders or stairs must be used to access any scaffold platform that is more than two feet above the point of access. End frames of tubular welded scaffold can be used as a ladder if the following criteria are used:

- Specifically designed and constructed as ladder rungs
- Rung length of at least eight inches
- Spacing between rungs not to exceed 16 ¾ inches

No worker will climb up or down a scaffold using the cross bracing.

Any worker working on an incomplete scaffold above six feet without standard handrails will wear a full body harness and tied off to a fixed anchorage point.

Workers will not stand or place any platform on the middle rail of a scissor lift to gain added height.

An access gate will be included when workers must climb a ladder to access the work platform. **Workers will not be allowed to climb over the handrail to gain access to a scaffold work platform.**

Wheels on mobile scaffolding will be locked in place when workers are working from it.

A competent person will evaluate suspended scaffolding and anchorages before use and its suspension lines daily.

Workers working from suspended scaffolding will wear a full body harness attached to an independent vertical lifeline.

Scaffold platforms more than six feet above lower levels will be equipped with guardrail systems. If guardrails cannot be used on a scaffold, workers will wear a full body harness and be tied off to a fixed anchorage point.

Workers that work from a scaffold will be protected from falling objects such as hand tools, debris, and other small objects from above.

Workers working below scaffolding will also be protected from falling objects. Scaffold will be equipped with toe plates, screening, debris netting, catch platforms, or a canopy structure.

When welding is required from swing stage scaffolding, the scaffold will be grounded and suspension ropes protected.

Interior or dry wall scaffolding (Perry or Baker type scaffolding) greater than one section high will be equipped with outriggers. All other built-up scaffolding will follow the four to one rule.

STEEL ERECTION

No steel erection will begin without a written Notice to Commence Steel Erection (Appendix P) from Sapphire Energy Construction Manager.

WORKERS ENGAGED IN STEEL ERECTION ACTIVITIES TO INCLUDE CONNECTING, DECKING AND BOLT UP ARE *NOT EXEMPT* FROM THE PROJECT 100% FALL PROTECTION REQUIREMENTS WHEN WORKING FROM SIX FEET OR GREATER.

Perimeter safety cable installed by steel erector will remain in place unless otherwise instructed by the Sapphire Energy Construction Manager.

All workers engaged in the erection of steel will complete Steel Erection Training prior to start of work.

Training records indicating workers have received required steel erection training will be maintained by each contractor or sub-tier subcontractor and made available for review by Sapphire Energy Construction Manager.

All steel deliveries will be coordinated with the Sapphire Energy Construction Manager to ensure maintenance of traffic around the project is maintained.

Design criteria for any multi-lift device that may be used on this project will be available for review by the Sapphire Energy Construction Manager.

Work will be planned that no load will be swung over the public or other workers. During bolt-up activities all steps will be taken to protect workers below from falling objects.

CONFINED SPACE

Workers may be required to work in an area that is defined as a confined space. A confined space is any space large enough and so configured that a person can bodily enter and perform work; has limited openings for entry and exit; and was not designed for continuous human occupancy. **NOTE THAT NOT ALL CONFINED SPACES ARE PERMIT REQUIRED.**

Confined spaces include, but are not limited to:

- Storage tanks
- Excavations and trenches
- Ventilation and exhaust ducts
- Sewers
- Underground vaults and utility tunnels
- Pipelines
- Pits and tubs
- Open top spaces more than four feet in depth

No worker will be allowed to enter or work in any space that meets the definition of a confined space without a Sapphire Energy IABR Project l Confined Space Entry Permit (Appendix J) and written confined space entry plan. Refer to NMOSHA Standards and Sapphire Energy IABR Project Safety Procedures for further direction. The written Confined Space Entry Plan will be submitted to the Sapphire Energy Construction Manager for approval and issuance of a Confined Space Entry Permit.

Prior to working in any confined space, contractor or subcontractor first-line supervision will determine what hazards exist. Any operating system or equipment will be locked out and tagged to prevent accidental operation. Contact the Sapphire Energy Construction Manager prior to any confined space entry work.

Every confined space will have the atmosphere tested and a permit completed and authorized by the Sapphire Energy Construction Manager prior to any worker entering the space. The atmosphere will be tested for oxygen deficiency, toxic gases or vapors, and combustible or flammable gases or vapors.

Prior to any worker entering a confined space, they will be trained in:

- Contents of the Confined Space Entry Plan
- Known hazards in the confined space
- Emergency procedures in case of an emergency
- Correct use of personal protective equipment when required
- Hot Work Permit if required
- Atmosphere testing requirements
- Lockout/ Tryout procedures
- Fall protection if required

Confine Space that is classified by Sapphire Energy IABR Project as Permit Required Confine Space shall follow the Sapphire Energy IABR Project Confine Space Procedures.

EXCAVATION AND TRENCHING

Prior to any disruption of ground, excavation or trenching on this project, the following will be performed:

- No ground breaking, excavation or trenching work will be performed without the presence of a competent person
- Underground utility locating authorities must be given the required advance notices to locate and mark the utility
- If underground utilities are known or suspected, proper notification will be given to the Sapphire Energy Construction Manager
- The competent person will analyze the soil of the work area to determine the condition and type of soil to ascertain proper sloping or shoring requirements
- An excavation permit (Appendix K) is completed and approved by the excavation competent person prior to breaking ground

During excavation or trenching operations on this project, the following requirements will be followed:

- All trenches and excavations six feet or deeper will have as a minimum, solid barricading, signage posted at the work area and appropriate fall protection
- Trenches or excavations will be sloped or benched in accordance with local rules and regulations, and as determined by the competent person
- Supporting systems (i.e. shoring, piling, etc.) will be utilized for all trenches and excavations where sloping or benching could not be performed. Trench boxes or shields will be utilized if neither of the above is used
- Spoil piles and all other material will be placed a minimum of two feet from the edges of all trenches or excavations
- When underground utilities are suspected, they will be located first by hand digging
- Adequate access must be maintained at all times during trenching or excavating activities. When ladders are used, they will be placed such that no worker travels more than 25 feet lateral in any direction
- The competent person will inspect excavations and trenches at the beginning of each day and when conditions change
- Excavations in Type C soil will not be benched
- Excavations and trenches four feet or greater in depth will be evaluated for confined space.
- A registered professional engineer must design all excavation over 20-feet in depth. In addition, a registered professional engineer must also design all protective systems for use in excavations more than 20-feet in depth

CONCRETE AND MASONRY OPERATIONS

All vertical and horizontal rebar, form stakes, metal and/or plastic conduit, and/or small pipe stub-ups will be protected with approved caps or wood troughs to protect against impalement and injury.

Workers that will operate vibrators pump nozzles, and concrete buckets will wear appropriate eye and foot protection.

Long sleeve shirts are worn to protect against exposure of concrete to the bare skin and the possibility of concrete burn and contact dermatitis.

Workers engaged in vertical rebar assembly shall comply with the project six-foot fall protection rules. Positioning devices alone are not approved fall protection but can be used in conjunction with personal fall protection equipment.

Walkways along form walls will be constructed in accordance with NMOSHA scaffold and fall protection standards.

Pre-fabricated forms and form making material will be stacked neatly at all times. When stripping concrete forms, all material will be immediately removed and stacked in an orderly manner. Forming material or debris will not block walkways and aisles. Contractors and subcontractors will remove rebar, tie-wire and other debris from the work area daily.

No employee is permitted to ride a concrete bucket.

Contractors will ensure that reinforcing steel for walls, piers, columns and similar vertical structures is adequately supported to prevent overturning and collapse. Ensure that uncoiled wire mesh is adequately secured to prevent recoiling.

Concrete buckets will be equipped with a discharge device that a worker can operate without being exposed to the load. A safety device will be on concrete buckets to prevent premature or accidental dumping, and ensure that the release is self-closing.

Contractors will follow safe rigging practices when handling concrete buckets. Employees controlling the concrete bucket must use tag lines.

When using bull floats, inspect the area to ensure there is no energized equipment or power lines nearby that the handles could touch.

Concrete buggy handles must not extend beyond the wheels on either side of the buggy.

Rotating-type, powered concrete trowels shall be equipped with dead-man controls that automatically shut down the equipment when the operator's hands are removed from the controls.

Finishers shall wear kneepads and gloves when hand finishing concrete.

A limited access zone is required to be in place prior to the construction of any masonry wall.

Masonry walls over eight feet in height shall be adequately braced to prevent collapse and remain in place until permanent support is in place.

TEMPORARY BARRICADES

Whenever the following hazards or processes are encountered on the Sapphire Energy IABR project, temporary barricades will be erected to protect workers:

- Floor or wall openings
- Working above other workers
- Open excavations/trenches
- Unguarded equipment
- Exposure to vehicular traffic
- Low light work areas
- Startup operations and testing of equipment/systems
- Process hazards such as discharges, open systems, etc.

When barricading is required, the following guidelines should be kept in mind:

- **Yellow "Caution" tape** is used to limit the passage of workers through the barricaded area. This barricading should only be used to protect workers from hazards that are not severe or the potential for severe injury or death is unlikely.
- **Red "Danger" tape** is used to prohibit the passage of unauthorized workers through the barricaded area. This barricading should be used to protect workers from hazards that have the potential to cause serious injury or death. Danger tape is not to be used if the hazards cannot be eliminated or removed during in a single work shift.
- **Rigid barricades** will be used when protection is required beyond a work shift or longer. It will be used to protect workers from unguarded moving machinery/equipment, vehicular or heavy equipment traffic and low light conditions. Rigid barricading will consist of standard guardrail, temporary chain linked fencing, tube and couple scaffold members with construction fencing attached, and concrete barriers.
- **Radiation "Danger" tape** is used to identify x-raying operations and warn of a radiation hazard in the area.

When using "Caution" or "Danger" tape barricading:

- **Caution and Danger tape will be made of reinforced material or fabric. Regular barricade tape is not allowed.**
- Install the tape on rigid supports every six feet and at a height of 42 inches above the surface
- Install at least six feet from excavations, trenches, holes, leading edges and floor or wall openings. Install barricading at least five feet from all other hazards
- Install a standard "Caution" or "Danger" sign that identifies the hazard at ten-foot intervals around the barricaded area and the name and contact information that erected the barricade
- Do not impede walkways, driveways or aisles if possible. Identify alternative passageways when this is impossible
- Install for temporary protection only and remove the barricading after 48 hours and install rigid barricades

Rigid barricading must be capable of supporting and withstanding a 200 lb. force in any direction. Concrete barriers used along public roads must meet the requirements of the local jurisdiction, NMOSHA or the Manual of Uniform Traffic Control Devices.

When using rigid barricading:

- Install it in a way to prevent tipping or sagging. Support construction fencing every eight feet
- Install pins in concrete barriers whenever there is a danger of vehicles or heavy equipment striking them
- Provide sufficient points of access to the work area

When work is complete and the hazard is eliminated, remove the barricading immediately and dispose of or store the barricading properly.

Workers who enter a "Danger" or "Radiation" barricaded work area without authorization will be subject to disciplinary action up to and including removal from the project.

LOCKOUT/TAG-OUT CLEARANCE PROCEDURE

Sapphire Energy IABR Project has established a lockout/tryout procedure to ensure that workers are not exposed to the hazards from moving machinery or equipment and those hazards posed by an energized source (pneumatic, steam, hydraulic, chemical, etc.).

Safety locks and tags will be applied to all circuits, switches, valves, isolating devices and any other energy sources to ensure equipment, machinery, or processes that have been considered functioning, charge or could otherwise be operable and render it non-operational or de-energized.

No person will remove another worker's safety lock or attempt to energize any piece of equipment, machinery or process that has been locked out and tagged.

If a worker fails to remove his or her safety lock at the completion of the job or assigned duties, their immediate supervisor will immediately notify the Sapphire Energy Construction Manager. **Every attempt should be made to contact the worker and require them to return to the project to remove their lock.**

If the worker is unwilling or cannot return to the Sapphire Energy IABR Project, it must be VERIFIED that he/she is not physically at the project before the safety lock can be removed. Removal of locks will follow the Sapphire Energy procedure.

All safety lock removal incidents will be investigated following the incident investigation process and disciplinary action is expected.

De-Energizing Equipment and Processes

A designated Sapphire Energy Construction Manager Representative will coordinate with the Sapphire Energy representative and/or construction start-up group when any energized equipment or process must be de-energized.

The Sapphire Energy Construction Manager representative, contractor, subcontractor and Sapphire Energy IABR Project representative and/or construction start-up group will identify all circuits and sources of energy that require locking and tagging to make the equipment or process inoperable. The Sapphire Energy IABR Project representative/construction start-up group will notify their personnel that may be affected by the de-energizing.

The contractor or subcontractor first-line supervisor overseeing the work will sign out sufficient safety locks to lockout the piece of equipment or process.

The Sapphire Energy representative and/or construction start-up group and first-line supervisor will make certain the operating controls to the equipment, machinery or process are in the "off" or "neutral" position.

Once the operating controls are in the "off" or "neutral" position, the Sapphire Energy representative will place a safety lock and tag on the energy isolating device(s) first. Then the contractor first-line supervisor will apply their safety lock to each of the isolating devices that provides power or other energy to the machinery, equipment or process. The first-line supervisor will also apply a visible warning tag. The tag will contain the name of the first-line supervisor, company, date and phone number.

Once the first-line supervisor has placed their safety lock(s) and tag(s) on the energy-isolating device, all affected workers will then apply a safety lock and tag to the energy-isolating device. Alternatively, the first-line supervisor may place the key(s) to their equipment safety lock(s) in a safety lock box, place their individual safety lock and tag on the safety lock box, and then have each affected worker place their safety lock and tag on the lock box.

Prior to any work being performed on the piece of equipment, machinery, or process, the Sapphire Energy representative/construction start-up group and first-line supervisor will verify that it is inoperable. The Sapphire Energy representative/construction start-up group will attempt to operate the piece of equipment machinery, or process. After verifying it is inoperable, the switch will be returned to the "off" or "neutral" position.

Stored or residual energy will be dissipated by whatever means are necessary. Capacitors will be discharged and high capacitance elements short-circuited and grounded by a qualified electrician.

Re-Energizing Equipment and Processes

When the required work is completed and the machinery, equipment or process can be returned to service, the first-line supervisor will notify the Sapphire Energy Construction Manager of the completed work.

The first-line supervisor will make a visual inspection of the equipment, machinery, or process to insure all workers have completed their work and equipment, tools and other material is removed from the area.

After confirming all workers, materials, tools and other equipment are out of the area, the operating controls are still in the "off" or "neutral" position, and each worker has removed their safety lock and tag, the first-line supervisor will remove their safety lock and tag from each of the isolating devices.

The Sapphire Energy Construction Manager will notify the Sapphire Energy representative/construction start-up group that the equipment, machinery or process is clear to be energized.

De-Energizing Fluid Processes

The Sapphire Energy Construction Manager and contractor/subcontractor will coordinate with Sapphire Energy representative/construction start-up group when any fluid process requires de-energizing.

The Sapphire Energy Construction Manager and contractor/subcontractor along with Sapphire Energy representative/construction start-up group will identify all valves or gates and where blanks are required to be installed to isolate the work area. The Sapphire Energy representative/construction start-up group will notify their personnel that may be affected by the de-energizing.

The first-line supervisor overseeing the work will sign out sufficient safety locks and tags to completely isolate the system.

The Sapphire Energy representative/construction start-up group and first-line supervisor will verify that each valve or gate is in the "off", "neutral" or closed position.

Once the valve or gate is in the "off", "neutral" or closed position, the Sapphire Energy representative will place a safety lock on the valve or gate first. Then the first-line supervisor will apply a safety lock to each valve or gate. The first-line supervisor will also apply a visible warning tag. The tag will contain the name of the first-line supervisor, company, date and phone number.

Once the first-line supervisor has placed their safety lock(s) and tag(s) on the energy-isolating device, all affected workers will then apply a safety lock and tag to the energy-isolating device. Alternatively, the first-line supervisor may place the key(s) to their equipment safety lock(s) in a safety lock box, place their individual safety lock and tag on the safety lock box and then have each affected worker place their safety lock and tag on the lock box. The required blanks will be placed at this time.

Prior to commencing work, the Sapphire Energy representative and first-line supervisor will verify the system and all piping, hoses, valves and processes are de-energized and that any stored energy is dissipated or restrained.

Welded valve connections should have the valve handles removed and the stem tagged "DO NOT OPERATE". All other valves and isolating devices must be physically prohibited from being operated.

Hydraulic and pneumatic equipment or machinery will be blocked to prevent movement.

Any vessel, pipe, hose or process that contains a combustible or flammable liquid or gas will be purged with nitrogen or an alternate before work begins.

Re-Energizing Fluid Processes

When the required work is completed and the machinery, equipment or process can be returned to service, the first-line supervisor will notify the Sapphire Energy Construction Manager of the completed work.

The first-line supervisor will make a visual inspection of the area to ensure all workers; equipment, tools and materials are removed from the area.

After confirming all workers, equipment, tools and materials are removed from the area, the valves and gates are in the "off", "neutral" or "closed" position, and each worker has removed their safety lock and tag, the first-line supervisor will remove their safety lock and tag from each of the isolating devices.

The management representative will notify the Sapphire Energy representative/construction start-up group that the system is ready to be energized.

ELECTRICAL

No work will be performed on any energized electrical circuit, bussbars, equipment, or panels unless an approved written work plan is developed in accordance with Chapter 1 of NFPA 70E and submitted to the Sapphire Energy Construction Manager for review prior to performance of work.

Electrical equipment and tools used on this project will be inspected to prevent any worker from receiving an accidental electrical shock. This rule will apply to all cord sets, portable electrical equipment, tools and appliances not part of any permanent building or structural electrical systems.

All temporary cords will be three wire types S, ST, SO, or STO with a 16 or greater wire gauge.

Ground Fault Circuit Interrupters (GFCI)

All cord sets and cord-plug electrical equipment, tools or appliances that are 120 volts will be connected to a ground fault circuit interrupter (GFCI). No cord set or cord-plug electrical equipment, tool or appliance will be plugged directly into any permanent building or structural electrical system not equipped with a GFCI. Exemptions are office equipment and appliances in site offices.

When the source of electricity is from a two-wire, single-phase portable or vehicle mounted generator rated not more than 5_kW, a GFCI is not required, as long as the generator is insulated from the frame and all other grounded surfaces.

Double-Insulated Tools

Double-insulated tools are allowed on the project, if the case bears the Underwriter Laboratories “double-insulated” label. No tool where this label has been removed, painted over or otherwise not readable will be allowed on the project.

Inspection Program

An inspection program will be established to inspect all cord sets, portable electrical equipment, tools and appliances as described below and before first use, before returned to service following any repair, and after an incident that could have caused damage.

Daily Inspection:

Each cord set, attachment cap, plug, and receptacle of cord sets, portable electrical equipment, tools or appliances connected by a cord and plug, will be visually inspected daily by workers for external damage, such as deformed or missing ground pins, insulation damage, frayed wires or indications of possible internal damage. Exceptions include cord sets and receptacles that are fixed to the permanent electrical system and are not exposed or damaged.

Any electrical equipment, tool, appliance or cord set that is damaged or defective will be immediately removed from service and tagged out as defective equipment for repair. A qualified electrician will repair tagged electrical items.

Monthly Inspection:

All cord sets, receptacles and cord-plug connected electrical equipment, tools or appliances not part of the building or structure's permanent wiring, will have the following performed each month:

- Visually inspect for damage or missing ground pin
- Inspect insulation for damage
- Inspect for frayed or exposed wires
- Inspect for signs of internal damage
- Check polarity

All cord sets and cord-plug connected electrical equipment, tools, or appliances not part of a permanent building or structure’s permanent wiring will be identified monthly with the distinctive color code at both the male and female end.

Month	Color		Month	Color	
January	Orange		July	Red	
February	Blue		August	Yellow	
March	Red		September	Orange	
April	Yellow		October	Blue	
May	Orange		November	Red	
June	Blue		December	Yellow	

General Electrical Rules

All cord sets will be elevated above the work surface when practical.

Cord sets and electrical tools that have the grounding prong missing will be cut and the offending crew or subcontractor shall roll back within 24 hours all cord sets and inspect for other damage. Contractor first-line supervisor or subcontractor will supply written certification to the Sapphire Energy Construction Manager that this inspection was completed.

Wire, nails or other conductive material will not be used to hang or attach cord sets or welding leads.

Cord sets that cross roadways will be protected from damage by vehicle and equipment traffic by devices such as hose bridges.

Light stringers will have the light bulbs protected from accidental contact or breakage.

Necessary steps will be taken to prevent unauthorized or unqualified workers access to energized electrical parts or equipment.

SCISSOR AND ARTICULATING BOOM LIFTS

Only trained and authorized workers will be allowed to operate a scissor or articulating boom lift.

Scissor and articulating boom lifts will be inspected daily before use. Operators will use the Daily Equipment Checklist (Appendix W).

When working in a scissor lift, workers will use personal fall protection connected to the manufacturers tie-off points.

The safety chain or gate on each scissor lift will be fastened or latched.

When working from an articulating boom lift, workers will use a retractable lanyard. Regular six foot lanyards will not be used.

When working above areas where workers are below, the basket areas of articulating boom lifts will be equipped with screening or other means to prevent debris, material, or tools from falling to below levels.

NO WORKER WILL STAND ON THE MID OR TOP RAIL OF A SCISSOR OR ARTICULATING BOOM LIFT TO GAIN ADDITIONAL HEIGHT.

Workers cutting or welding out of an articulating boom or scissor lift will have a sufficient size portable fire extinguisher.

MOTORIZED EQUIPMENT AND VEHICLES

Heavy equipment (cranes, forklifts, dump trucks, excavators/back hoes, man-lifts, etc.) used on this project will be inspected daily prior to use and comply with applicable NMOSHA and ANSI standards, which will be documented.

Forklifts will be equipped with rollover devices. Operators of forklifts will complete the Daily Forklift Safety Inspection Report (Appendix L) or an acceptable equivalent.

Cell phone usage is prohibited by anyone when operating any motorized equipment or vehicle (pickups, sedans, trucks)

Equipment that is equipped with a windshield will be free of cracks or other visible damage.

All equipment will be equipped with rollover protective structures (ROPS).

Seatbelts are required to be worn at all times in any moving equipment, vehicle, cart, or ATV.

Only authorized company and/or delivery vehicles used for the sole purpose of conducting work tasks on-site are permitted in construction areas. Vehicles one ton or greater and equipment used on-site must have an audible backup alarm. The driver and all front seat passengers of any vehicle will wear seat belts.

No equipment or vehicle will be used to transport personnel unless it is specifically designed to do so. This includes beds of pickup trucks.

Equipment operators and vehicle drivers (including golf carts and utility vehicles) are responsible to check their equipment daily to verify it is working properly. Use the Daily Equipment Checklist (Appendix V). As a minimum, each operator will check:

- The brakes
- Lights
- Backup alarm
- Hydraulic systems
- Steering mechanism
- Operating controls
- Mirrors
- Fire extinguisher
- Limit switches
- Leaks

Equipment operators will possess the required training, certification and licenses as required by law and/or Sapphire Energy IABR project HSSE policies or procedures for the equipment that they are required to operate.

GOLF CARTS AND ALL TERRAIN UTILITY VEHICLES

Golf cart means a motor vehicle that is designed and manufactured for recreational or work purposes that is not capable of exceeding speeds of 20 miles per hour.

Utility vehicle means a motor vehicle designed and manufactured for general maintenance, security, and landscaping purposes, but does not include any vehicle designed or used primarily for the transportation of persons or property on a street or highway.

All-terrain vehicle means any motorized off-highway or all-terrain vehicle 50 inches or less in width, having a dry weight of 900 pounds or less, designed to travel on four low-pressure tires, has a seat designed to be straddled by the operator, handlebars for steering control and is intended for use by a single operator without passengers.

Operating Procedures:

- Golf Cart/Utility Vehicle operators are subject to the rules of the road, including stopping, turning and safe operation.
- Golf Cart/Utility Vehicle operators observed in violation of these rules will be subject to disciplinary action.
- Golf Cart/Utility Vehicles are to be operated at speeds no greater than 15 MPH or as safety concerns demand.
- Operators should always consider the terrain, weather conditions, and existing pedestrian and vehicular traffic, which may affect the ability to operate the Golf Cart/Utility Vehicle safely.
- Golf Cart/Utility Vehicle operators will stop at all "blind intersections" and then proceed with caution.
- Golf Cart/Utility Vehicles will be operated only within the confines of the project.
- Golf Cart/Utility Vehicles will be operated in such a manner that they do not impede or interfere with normal pedestrian or vehicular traffic flow on sidewalks, ramps or roadways
- Golf Cart/Utility Vehicles will be operated with the utmost courtesy, care, and consideration for the safety of pedestrians.
- Pedestrians will be given the right-of-way at all times.
- All passengers must be in seats designed for such use. No more than two adults per seat unless designed to transport three adults.
- All occupants of motorized Utility Vehicles will wear seatbelts when the vehicle is in motion.
- No passengers are allowed to be transported in the truck beds or on the sides of Golf Cart/Utility Vehicles with the exception of the transport of an injured person secured on a backboard.
- Cell phone usage while driving a Golf Cart/Utility Vehicle is prohibited.

MOBILE CRANES

Mobile cranes will be operated in strict accordance with the Sapphire Energy IABR project HSSE Procedure, NMOSHA Standards and ANSI B 30.5.

Contractors and subcontractors shall designate a qualified person as their Crane Lifting Supervisor. The Crane Lifting Supervisor shall:

1. Have the necessary knowledge and experience of the specific type of equipment and knowledge of the hazards of critical lifts to direct the safe completion of the operation. The Crane Lifting Supervisor will assist in certification of new operators, inspection of new operators' capabilities, and overall review of crane safety.
2. Have the capabilities and experience to review the on-site management of cranes and assure that Federal and NMOSHA Safety Regulations are complied, the required recordkeeping is complete and safe work practices are followed.
3. The Crane Lifting Supervisor may be a foreman or other supervisor who has extensive experience with cranes or in some cases, a crane operator. Each designated person will have a good understanding of the OSHA Federal Construction Crane and Derrick Standard.
4. **Be present whenever cranes are operating.** Each contractor must designate enough Crane Lifting Supervisors to assure adequate coverage.
5. Understand the rules and procedures implemented at the site to ensure that the following are completed:
    - Necessary administrative requirements.
    - Personnel assignments and responsibilities.
    - Selection of proper equipment and tools.
    - Recognition and control of hazardous or unsafe conditions.
    - Job efficiency and safety.
    - Critical-lift documentation.

The Sapphire Energy Construction Manager shall approve the contractor/subcontractor Crane Lifting Supervisor upon review of the individual(s) knowledge of crane operations as well as project and NMOSHA regulations and standards.

No crane will be brought onto the project without a current annual inspection by a qualified third party. A crane-specific operating manual with the crane serial number on the cover and applicable load charts will be located in the crane at all times. A copy of the current annual inspection will remain in the crane at all times.

Crane operators will perform daily and monthly crane safety inspections. Inspections can be documented on the daily and monthly safety inspection checklists (Appendix M & N) or an acceptable equivalent. Crane operators are to turn the Daily Crane Safety Checklist into their supervisor daily.

CRANE OPERATORS ON THIS PROJECT OPERATING ANY CRANE OVER ONE TON LIFTING CAPACITY WILL BE CERTIFIED BY A NATIONALLY RECOGNIZED CERTIFICATION AGENCY.

All cranes will be equipped with anti-two block devices on both the load and whip lines.

Use of crane baskets is strictly prohibited on this project without prior approval of the Sapphire Energy Construction Manager.

Contractor and subcontractor supervision will review the safe operations of the crane with each operator.

NO WORKER WILL SIGNAL OR BE ASSIGNED TO SIGNAL ANY CRANE WHO IS NOT CERTIFIED AND QUALIFIED AS REQUIRED BY FEDERAL OSHA CRANE AND DERRICK STANDARD SUBPART CC.

The crane manufacturer's operating manual, instructions and load charts for a specific crane will be used to determine the safe operation of that crane. Under ideal conditions, the manufacturer develops load charts and the typical field condition does not approach these ideal conditions.

Therefore, the following guidelines should be adhered to:

1. The ground where the crane will be setup must be solid and able to support the weight of the loaded crane. Determine if underground utilities exist near where the crane will be set up.
2. Ensure the crane is level 360^{o} and maintained during operation.
3. Extend outriggers fully or set per the manufacturer's recommendation for a particular lift configuration. Weight must be off the tires.
4. Cribbing or mats under outrigger pads should be of sufficient size and properly placed to ensure adequate soil bearing Tonnage of the crane ÷ by 5 = Square feet of cribbing required for the crane.
5. Before a lift, determine the load weight and load capacity. Crane capacity charts are the ideal gross capacity of the crane at certain boom lengths, boom angles and load radius from the crane center pin.
    - Deductions to the net capacity should be made per manufacturer's load chart or operating manual for attachments such as jibs (stowed or attached), headache balls, wind, less than ideal setups, etc. to determine the load that can be safely lifted.
    - Additional deductions to the net capacity are the weight of the cranes load block, rigging and amount of load line required to make the lift. Some manufacturers include the load line in their load charts but others like Manitowoc do not.
6. A designated, qualified person will determine the load weight. Note: OEM drawings listing the equipment or machinery assemblies are not always accurate. Refer to the shipping weight or have the equipment or machinery assembly weighed. Calculate all structural loads and determine the center of gravity. **Cranes equipped with systems that provide weight of a load as it is lifted will not be used to weigh equipment or machinery assemblies.**
7. Determine the radius from the center pin of the crane to the load using a steel ruler. **This is required for capacity- and near-capacity lifts.**
8. Determine the boom length, counterweight and crane configuration to determine the correct load chart required.
9. Position the hook over the "Center of Gravity" of the load before starting the lift.
10. Position the crane so there is a minimum swing and load path clearance of two feet. Distance from overhead electrical will be a minimum of ten feet. When working near electrical sources (overhead lines or lighting), the crane should be grounded and a safety spotter required.

Crane operators are to know the weight of the load they are lifting.

A Pre-lift Checklist (Appendix U) is required to be completed on any lift 5 ton (10,000 lbs) or greater.

A written critical lift or rigging plan is required for any lift where:

1. The load is greater than 75% of the crane capacity as configured for the lift or as defined by the crane manufacturer
2. Two cranes are used
3. Any non-routine or critical equipment lift as defined in the project Crane Management Policy (The Project Manager/Superintendent or Safety Coordinator determines any lift to be non-routine)

The written critical lift or rigging plan will be submitted to the project HSSE Department for review and approval.

TOWER CRANES

Tower crane(s) will be equipped with and visible at all times, a substantial and durable load chart both in the operator cab and/or on the remote control console.

No employee will work or travel on any part of the crane boom without proper personal fall arrest equipment. No worker will be allowed to climb the tower or get on the boom when the crane is in operation.

Crane operators will perform daily tower crane safety inspections. Project management will ensure all tower crane operators are trained, experienced and competent.

Tower cranes that remain erected for twelve (12) months or longer, a qualified person will inspect all structural components annually.

Hoisting ropes must be shortened by the removal of ten (10) feet at the dead end after every three (3) months of use unless otherwise specified by the manufacturer.

No load will be swung over any public street that is occupied by the general public.

Prior to a load being swung over other workers, the designated crane supervisor using the crane will provide a lookout that shall sound an alarm as the load is moved across the work area.

A written crane-dismantling plan is required for the dismantling of any crane.

FORKLIFTS

Only qualified and authorized operators shall be permitted to operate powered forklift trucks. Operator trainees may operate powered forklift trucks under the direct supervision of a qualified operator or trainer and only where such operation does not endanger the trainee or other employees.

Forklift operators that are required to move suspended loads will also meet the qualifications of a qualified crane operator.

Forklift operators will meet all requirements contained in SAPPHIRE ENERGY CONSTRUCTION MANAGER Crane Management Procedure.

Forklifts shall not carry any material or equipment suspended from the tines of the forks. Suspension of a load can only be performed with a specialty crane lifting device attached to the forklift. Articulating boom forklifts (Lull type) that may carry suspended material or equipment will meet the same requirements as a mobile crane.

An articulating boom forklift (Lull type) shall not travel with any load where the operator does not have a clear vision in front without a spotter. The spotter must remain in the operators vision at all times that the equipment is moving.

Forklifts operations shall meet the requirements contained in the SAPPHIRE ENERGY CONSTRUCTION MANAGER Crane Management Procedure and OSHA 29 CFR 1910.178.

Forklift operators will perform daily safety inspections of their equipment and document on the Daily Forklift Safety Inspection Report (Appendix L)

CRANE SIGNAL PERSON

No worker will signal or be assigned to signal ANY CRANE who is not certified and qualified as required by Federal OSHA Crane and Derrick Standard Subpart CC.

Qualified Signal Person must meet the following requirements:

1. Be at least 18 years of age.
2. Know and understand the Standard Method of crane hand signals (Figure-1: Standard hand signals for controlling crane operation).
3. Been evaluated by a third party evaluator that documents the individual has met the requirements of this section and OSHA requirements.
4. Know and understand basic safe rigging techniques and practices.
5. Have basic understanding of crane operations and limitations including the crane dynamics involved in swinging and stopping loads and boom deflection from hoisting loads.
6. Know and understand the relevant requirements for hand, radio, audible, and voice signaling.
7. Demonstrate to appropriate management the personal skills required through a written and practical test.

RIGGING

No contractor or subcontractor worker will rig material or equipment lifted by a crane, forklift or other device unless under the direction of a Qualified Rigger who meets all requirements and certifications described in the Sapphire Energy IABR project IPP and NMOSHA.

Qualified Riggers shall meet the following requirements:

1. Be at least 18 years of age.
2. Has a minimum of four years documented experience as a rigger
3. Understand spoken and written English.
4. Have basic knowledge and understanding of crane-operating characteristics, capabilities and limitations. Understand rigging principles as applied to the job for which they are to be qualified.
5. Demonstrate to appropriate management personnel skills in using rigging principles.
6. Complete an Operator Medical Physical (Exhibit 13.2 Equipment Operator and Rigger Physical Examination)
    - Must be free of any detectable or known disease or physical restriction that would render them incapable of safe operation or rigging duties. Where any loss of function of an upper or lower extremity exists, the acceptability of the candidate shall be the decision of the supervisor, after consulting with the designated physician.
    - Have normal depth perception, field of vision, color vision reaction time, manual dexterity and coordination.

Contractors or subcontractors Qualified Rigger will monitor all rigging. When the rigging does not fall within the expertise of the designated person, the load will not be lifted until a more qualified person has reviewed the rigging.

Rigging from the tines of a forklift is prohibited unless equipped with specialty crane lifting device.

Hooks will be equipped with safety latches. Moused and/or cargo/shakeout hooks will not be allowed.

All rigging equipment and spreader bars shall have a manufacturer's tag or otherwise marked noting its safe working load. Rigging slings, chokers and spreader bars will have the safe lifting capacity displayed by means of a tag or other marking. Rigging equipment not properly tagged or marked will be immediately removed from the project.

A qualified rigger will rig all critical lifts.

All rigging to be used will be inspected daily before each shift by the qualified rigger and documented in writing.

The Daily Rigging Safety Inspection Form (Appendix O) is to be used or an equivalent. Inspection reports will be made available to the project HSSE Department for review.

The color coded tape will be applied in a visible location on each piece of rigging or hook. Rigging or hooks not in compliance with the current color will be taken out of service immediately.

Month	Color		Month	Color	
January	Orange		July	Red	
February	Blue		August	Yellow	
March	Red		September	Orange	
April	Yellow		October	Blue	
May	Orange		November	Red	
June	Blue		December	Yellow	

LASERS

Precautions will be taken to ensure all workers that will use a laser are trained in proper use and the hazards associated with lasers. Each worker is to be issued a qualification card, which must be carried by the worker and available upon request by the Sapphire Energy Construction Manager.

No worker will install, adjust, or operate any laser equipment without a valid qualification card.

Standard" Laser" warning signs will be placed around the perimeter of the area the laser is being used.

No laser equipment will be used that does not contain a label, indicating make, maximum output, and beam spread.

Whenever a laser is not in use, shudders or caps will be will be used and the laser turned off.

When performing internal alignment, lasers will only be guided by mechanical or electronic means.

No laser beam will be directed at any worker.

When environmental conditions exist such as rain, fog, snow or extremely dusty conditions, use of lasers will not be permitted.

Workers using lasers will have appropriate laser safety goggles available.

QUALITY OF LIFE REQUIREMENTS

SMOKING POLICY

The Sapphire Energy IABR project is established as a Smoke-Free Workplace. No worker will smoke any tobacco product within any building or structure on this project designated as Smoke-Free. In Smoke-Free workplaces, smoking is only authorized in designated areas or inside your personal vehicle. Chew or other types of chewing tobacco will not be discarded on the floor or other working surface but disposed of in proper containers. Workers that violate this rule will be subject to disciplinary action to include removal from the project.

The Sapphire Energy Construction Manager will post where the designated smoking areas are within the project..

SANITATION

Toilet Facilities

Contractors will ensure adequate chemical toilets are available on the jobsite for the use of workers. Toilets should be located on or within two hundred (200) feet of each work area within the project. The following is the minimum requirement for toilets on this project:

Adequate chemical toilets will be made available for the female workforce.

Chemical toilets shall be serviced often enough to prevent overflowing, creation of an unsanitary condition, a health hazard or nuisance, and shall be maintained in good repair so as to prevent leakage of the contents to the surrounding ground or onto the floor or other portions of the structure.

Hand Wash Stations

Adequate hand wash stations will be provided at key locations such as break locations for use by workers. The hand wash stations should contain adequate soap and water or hand sanitizer for the number of workers.

Drinking Water

Contractors will provide daily, fresh clean drinking water to their employees. Drinking water will be dispensed in containers with a tight sealing lid and labeled as Drinking Water. Drinking water containers are to be cleaned daily.

Adequate cups will be made available at each drinking water container. Cups will be stored in a durable clean dispenser. A trash can or other type receptacle will be provided to collect used cups. Contractors are responsible for cleaning up around the water container area.

The use of a common cup, soda cans and bottles, drinking directly from the spout, and the placing of hands or material into drinking water is prohibited.

HEAT STRESS

Workers who are exposed to extreme heat or work in hot environments may be at risk of heat stress. Exposure to extreme heat can result in occupational illnesses and injuries. Heat stress can result in heat stroke, heat exhaustion, heat cramps, or heat rashes. Heat can also increase the risk of injuries in workers as it may result in sweaty palms, fogged-up safety glasses, and dizziness.

Common heat stress disorders:

Heat Stroke

Heat stroke is the most serious heat-related disorder. It occurs when the body becomes unable to control its temperature: the body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. When heat stroke occurs, the body temperature can rise to 106 degrees Fahrenheit or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not given.

Symptoms

Symptoms of heat stroke include:

- Hot, dry skin (no sweating)
- Hallucinations
- Chills
- Throbbing headache
- High body temperature
- Confusion/dizziness
- Slurred speech

First Aid

Take the following steps to treat a worker with heat stroke:

- Call 911 and notify their supervisor.
- Move the sick worker to a cool shaded area.
- Cool the worker using methods such as:
  - Soaking their clothes with water.
  - Spraying, sponging, or showering them with water.
  - Fanning their body.

Heat Exhaustion

Heat exhaustion is the body's response to an excessive loss of the water and salt, usually through excessive sweating. Workers most prone to heat exhaustion are those that are elderly, have high blood pressure, and those working in a hot environment.

Symptoms

Symptoms of heat exhaustion include:

- Heavy sweating
- Extreme weakness or fatigue
- Dizziness, confusion
- Nausea
- Clammy, moist skin
- Pale or flushed complexion
- Muscle cramps
- Slightly elevated body temperature
- Fast and shallow breathing

First Aid

Treat a worker suffering from heat exhaustion with the following:

- Have them rest in a cool, shaded or air-conditioned area.
- Have them drink plenty of water or other cool, nonalcoholic beverages.
- Have them take a cool shower, bath, or sponge bath.

Heat Syncope

Heat syncope is a fainting (syncope) episode or dizziness that usually occurs with prolonged standing or sudden rising from a sitting or lying position. Factors that may contribute to heat syncope include dehydration and lack of acclimatization.

Symptoms

Symptoms of heat syncope include:

- Light-headedness
- Dizziness
- Fainting

First Aid

Workers with heat syncope should:

- Sit or lie down in a cool place when they begin to feel symptoms.
- Slowly drink water, clear juice, or a sports beverage.

Heat Cramps

Heat cramps usually affect workers who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture levels. Low salt levels in muscles causes painful cramps. Heat cramps may also be a symptom of heat exhaustion.

Symptoms

Muscle pain or spasms usually in the abdomen, arms, or legs.

First Aid

Workers with heat cramps should:

- Stop all activity, and sit in a cool place.
- Drink clear juice or a sports beverage.

- Do not return to strenuous work for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention if any of the following apply:
  - The worker has heart problems.
  - The worker is on a low-sodium diet.
  - The cramps do not subside within one hour.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather.

Symptoms

Symptoms of heat rash include:

- Heat rash looks like a red cluster of pimples or small blisters.
- It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

First Aid

Workers experiencing heat rash should:

- Try to work in a cooler, less humid environment when possible.
- Keep the affected area dry.
- Dusting powder may be used to increase comfort.

Prevention of heat stress in workers is important. Employers should provide training to workers so they understand what heat stress is, how it affects their health and safety, and how it can be prevented.

Recommendations for Workers

Workers should avoid exposure to extreme heat, sun exposure, and high humidity when possible. When these exposures cannot be avoided, workers should take the following steps to prevent heat stress: Refer to Appendix Z

- Wear light-colored, loose-fitting, breathable clothing such as cotton.
  - Avoid non-breathing synthetic clothing.
- Gradually build up to heavy work.
- Schedule heavy work during the coolest parts of day.
- Take more breaks in extreme heat and humidity.
  - Take breaks in the shade or a cool area when possible.
- Drink water frequently. Drink enough water that you never become thirsty.
- Avoid drinks with caffeine, alcohol, and large amounts of sugar.
- Be aware that protective clothing or personal protective equipment may increase the risk of heat stress.
- Monitor your physical condition and that of your coworkers.

HAZARDOUS MATERIALS

SILICA

Workers that perform any of the following work tasks will be protected from exposure to silica dust:

- Chipping, hammering, or mixing of refractory
- Abrasive blasting using silica sand as a blasting medium
- Abrasive blasting of concrete regardless of the type of medium
- Sawing, hammering, drilling, grinding, or chipping of concrete or masonry products
- Chipping, hammering, or mixing of concrete grout
- Demolition of concrete or masonry structures
- Dry sweeping or compressed air blowing of concrete, masonry, rock or sand dust

Workers performing any of the above tasks or could be exposed to silica dust will receive hazard communication training on silica.

Acceptable engineering controls will be used when exposure to silica is likely. Examples of acceptable engineering controls are:

- Substitute blasting medium for less hazardous material with less than 1-% silica
- Maintain an effective dust control program
- Use internal blast-cleaning machines
- Wet saw
- Use water through the drill stem

When acceptable engineering controls cannot be used, workers will wear respiratory protection, protective coveralls and gloves. Respirators equipped with a NIOSH N-95, R-95, or P-100 are approved for silica. **Note:** ***The common dust mask is not permitted for silica protection.***

Workers will follow these safe work rules when exposed to silica:

- Do not eat, drink or use tobacco products in areas where silica dust is present
- Always wash hands and face before eating, drinking or using tobacco products

First-line supervisors should consult their safety representative or the project HSSE Department for further assistance.

LEAD

When welding, cutting, burning, grinding, chipping, abrasive blasting or rivet busting on painted or coated surfaces, a pre-assessment will be required to determine if the surface(s) contain lead-based paint. If sampling results indicate lead-based paint 0.02% lead by weight, NMOSHA Standard s will be followed.

An initial hazard assessment is required and will be performed to determine worker exposure levels. The assessment will involve personal sampling of a representative group of workers performing different tasks. During the initial exposure assessment, workers will wear protective clothing and the proper respiratory protection until the results of the assessment are known.

Copies of sampling results will be made available to the Sapphire Energy Construction Manager. Area sampling of a work area will not to be used for determining worker exposure levels.

If sampling results indicate the exposure limits are above 30 $\mu g/m^3$ but below 50 $\mu g/m^3$, the following are required:

- Written compliance plan
- Medical surveillance (Blood Lead and ZPP)
- Personal monitoring
- Hazard communication training for lead

If sampling results are above 50 $\mu g/m^3$, the following are required:

- Written compliance plan
- Engineering controls
- Respiratory protection
- Protective clothing
- Medical surveillance
- Clean change rooms and showers
- Clean lunchrooms
- Warning signs
- Training

Each worker is to be notified in writing of their blood and/or personal monitoring results within five working days after the results are known.

INCIDENTAL EXPOSURE TO PRESUMED ASBESTOS CONTAINING MATERIAL (PACM)

If presumed asbestos-containing material (PACM) is found during performance of the work, the following procedure will be followed:

- Workers observing PACM should immediately stop work
- Warn other workers nearby of the disturbed or damaged material
- Contact your immediate supervisor
- Barricade the immediate area around the disturbed or damaged material
- Do not enter the barricaded area until the area is deemed safe by the Sapphire Energy Construction Manager or abatement subcontractor

Contractor will investigate and develop an action plan that may include testing PACM and/or abating suspected material.

ONLY A LICENSED CONTRACTOR WILL REPAIR AND CLEANUP DISTURBED OR DAMAGED MATERIAL.hexavalent chromium

When workers are exposed to any of the following, the contractor must assume Hexavalent Chromium is present and above the action level of 5µg/m^3 and follow the contents of OSHA 29 CFR 1926.1126.

- Exposure to Portland Cement
- Working with dyes, paints, inks, or plastic that contains chromium VI
- Application of pesticides regulated by the EPA
- Welding, grinding, or cutting of stainless steel or nonferrous chromium alloys
- Welding, grinding, or cutting of chrome plated metals

Contractors will be responsible to conduct an exposure assessment to determine the level of concentration for Chromium IV.

When the result of the exposure assessment is:

- Below 2.5 µg/m^3 chromium IV – No further sampling is required, no protective measures required.
- At or above 2.5 µg/m^3 chromium IV but below 5 µg/m^3 – Employee monitoring continues a minimum of once a month or until new engineering controls reduce the concentration below 2.5 µg/m^3. A written compliance plan is required.
- Greater than 5 µg/m^3 – Employee exposure monitoring is required as a minimum every three weeks. The full requirements of OSHA 29 CFR 1926.1126 are required to be followed.

ENVIRONMENTAL MANAGEMENT PLAN

This project is committed to providing high standards of quality in its construction activities and doing so in an environmentally responsible and safe manner. The ultimate goal of this environmental management program is to maintain a project that is compliant with all environmental agency permits and governmental regulations, is free from negative environmental records and financial interest of Sapphire Energy IABR Project.

The contractor is responsible to administer and enforce this Environmental Management Plan as well as ensure the day to day oversight and management of environmental issues and enforcements of provisions of the Environmental Management Plan.

Contractors will ensure all work that may impact the environment will be coordinated with the Sapphire Energy Construction Manager and assure the Sapphire Energy policies, procedures, and regulations are maintained.

INSPECTIONS AND ASSESSMENTS

Weekly project self assessments using the Weekly Environmental Self Assessment Form (Appendix U) will be conducted by each contractor and documented or as may otherwise be required by permits, regulations, or Sapphire Energy. During these assessments, any problem or discrepancy will be documented and corrected by the responsible supervisor. Potential non-compliance will be immediately reported to the Sapphire Energy Construction Manager. All documentation of daily assessments should be provided to the Sapphire Energy Construction Manager.

AGENCY PERMITS AND REGULATORY COMPLIANCE

Permits:

Sapphire Energy is responsible for obtaining all environmental permits and registrations necessary for the construction of the Sapphire Energy IABR project. In addition if applicable, Sapphire Energy will obtain approval of its Sediment and Erosion Plan from the State of New Mexico. Additional permits that may arise will be coordinated with Sapphire Energy.

Scheduling/Tracking of Environmental Notifications:

Contractors will incorporate environmental and regulatory notifications and submittals in the on-site project schedule. Any environmental or regulatory schedule activities are to be available upon request and reviewed during the weekly project schedule reviews as well as during the monthly project review meetings.

Notice of Violation (NOV):

At any time a Notice of Violation is received from a governmental or regulatory agency, the contractor will report the NOV to the Sapphire Energy Construction Manager immediately. Notices of Violation are written notifications of a regulatory or legal non-compliance or deficiency.

All Notice of Violation's will be reported to the Sapphire Energy Construction Manager, documented, investigated, root causes determined, and a corrective action plan developed and implemented.

ENVIRONMENTAL AWARENESS TRAINING

All contractor and subcontractor personnel will be instructed in the requirements of the Environmental Management Plan (EMP) and the project environmental practices through training and discussions at the daily Task/Job Hazard Analysis meetings.

Topics to be discussed at a minimum are:

- Spill prevention and control
- Emergency response procedures
- Collection and storage of waste material
- Protection of storm water sediment controls
- Petroleum product dispensing best practices
- Handling and disposal of welding rod
- Location of spill kits

Contractors, subcontractor, or vendor employees that may perform environmentally sensitive or potentially damaging activities will be specifically trained in that particular task. Training on such subjects but not limited to:

- Chemical handling and storage
- Spill prevention and control
- Fuel and lube truck operations
- Waste Management
- Storm water controls
- Maintenance operations
- Emergency response

Environmental topics will be routinely part of daily and weekly project safety meetings.

RECORDKEEPING

All records pertaining to environmental issues such as waste management, storm water management, any spills, and other environmental issues will be maintained by the contractor as required by Sapphire Energy or by permits and regulations.

Contractor will further maintain records of weekly environmental inspections and other non-permit related issues and made available to the Sapphire Energy Construction Manager upon request.

PROJECT SPECIFIC SPILL RESPONSE PLAN

Each contractor will develop a Spill Response Plan in the event of an accidental spill or environmental incident. The plan will detail directions for spill containment, accidental release of a chemical or hazardous material, and emergency evacuation.

The following are the minimum items that will be contained in the project Spill Response Plan:

- The phone contact numbers of key project personnel, Sapphire Energy personnel, and emergency response agencies.
  - Fire Department
  - Sheriff's Department
  - USCG
  - Emergency clean-up contractor
  - State EPA
  - US EPA
  - National Response Center
- An inventory of spill containment material on the project.
  - Booms large enough to contain the volume of the largest quantity of chemical or hazardous material.
  - Pillows
  - Pads
  - Gloves
  - Tyvek coveralls
  - Hazardous material disposal bags
- Identification of areas where spills may likely occur

- Detail action plan listing the steps to be performed by the first worker discovering a leak or spill. The action plan is to include such items as assessing the hazards, stopping or controlling the release or flow of the chemical or hazardous material, and the reporting of the release or spill.
- Description of controls in place to prevent spills from reaching navigable water
- Inspection program to ensure leaks are detected
- Fueling procedures to ensure reduction of spills

The Spill Response Plan is to be communicated to all workers during the safety orientation and frequently during project safety meetings. The Spill Response Plan will be clearly communicated to each first-line supervisor along with their responsibilities to prevent spills or leaks.

SPILL PREVENTION

No petroleum products in quantities larger than individual five (5) gallons US containers will be stored on the Sapphire Energy IABR project without approval of the Sapphire Energy Construction Manager. Petroleum product quantities will be reported to the Sapphire Energy Construction Manager so they can be added to the plant Spill Prevention Control Plan (SPCC). If a contractor or subcontractor exceeds 1320 gallons, a separate Spill Prevention Control Plan will be prepared and approved by a licensed engineer.

The Sapphire Energy IABR project annual goal is no reportable spill or release of a hazardous chemical or substance to include any oil or chemical.

HAZARDOUS AND REGULATED MATERIAL MANAGEMENT

Minimization:

Non-hazardous materials will always be purchased whenever possible. Non-hazardous substitutes will meet all requirements of equipment manufacturers and have properties that assure quality construction is maintained.

Approval:

Any hazardous or regulated material that may be purchased or transported onto the project must have a material safety data sheet on file in the HSSE Department prior to the material arriving at the project. If urgency occurs, same day purchases may be authorized but will be handled on a case by case basis.

Inventories:

Contractor will maintain current inventories of regulated substances stored on Sapphire Energy property. Inventories will be conducted during environmental assessments and reports transmitted monthly to the Sapphire Energy Construction Manager.

Hazard Communications (HAZCOM)

Material Safety Data Sheets (MSDS) for all purchased chemical products will be submitted to the Sapphire Energy Construction Manager along with the Contractor Chemical Control Form. The storage and handling of any chemical or hazardous material will follow the project Hazard Communication Program contained in this Incident Prevention Program. All chemicals or hazardous materials on the project will be listed on the Master Chemical and Substance Inventory List (Appendix H).

Inventory Control:

Purchases of regulated substances or chemicals will be limited to quantities required for the use in near future. Excess purchases may result in environmental notifications and unused material which can become hazardous or regulated wastes and result in high cost of disposal and increased hazardous waste generator compliance requirements.

Contractor is to notify the Sapphire Energy Construction Manager each time regulated substances or chemicals must be replenished including gasoline or diesel fuel.

Material Handling and Storage:

Regulated substances or chemicals will be stored in containers approved by the EPA and compatible with the materials stored. Any regulated substances or chemicals in storage will be properly sealed and secured to prevent damage, spillage, and minimization of vapor release. All containers used to store regulated substances or chemicals will be properly labeled for product identification and appropriate hazard signage when applicable. Any material with temperature or flammable/combustible storage requirements shall be stored as required in approved storage facilities.

Any waste materials, if generated, will be stored in a location that is separate from storage of useable, non-waste materials to prevent mixing and contamination of non-waste material. Regulated substances or chemicals will be temporarily stored so as to prevent contamination of rainwater runoff. All containers will be properly sealed when not in use and inspected daily to ensure no leakage.

ANY SPILL NO MATTER HOW SLIGHT WILL BE CLEANED UP IMMEDIATELY AND REPORTED TO THE SAPPHIRE ENERGY CONSTRUCTION MANAGER. Any spill of 25 gallons or less will be stored in proper labeled containers. Waste resulting from the cleanup will be stored temporarily according to Sapphire Energy policies and procedures until it can be properly disposed of.

Flammable materials will be stored according to NMOSHA, NFPA, and this Incident Prevention Program requirement. All flammable storage areas will be properly signed and fire protection immediately available. Material requiring controlled temperature or flammable storage requirements shall be stored as required.

EROSION AND SEDIMENTATION

Erosion and Sediment Control Plan Approval, Storm Water Permitting, and excavating permits for the project have been obtained by Sapphire Energy. Contractor is to be familiar with the Erosion and Sediment Control Plan developed by Sapphire Energy. Erosion and sediment controls and BMP's will be inspected twice a week or after any rain of ½ inch or greater to assure effective erosion and sediment controls are maintained. Special attention to drainage and run-off from temporary roads, parking areas, lay-down areas, de-watering, and final grading activities at the end of construction must also be considered.

Contractor will maintain an after hour contact list and provided to the Sapphire Energy Construction Manager in case of an emergency. Contractors performing any work where land will be disturbed will be familiar with the Erosion and Sediment Control and Excavation Plan requirements and will remain in compliance of the plans during the work activity.

DUST CONTROL

Contractors will control dust on and around the project using water trucks or designated fire hydrants.

CONTAMINATED SOIL OR GROUNDWATER

Contaminated soil and groundwater will be quickly identified to prevent environmental problems, as well as potential health and safety problems. Environmentally, once contaminated soil or water is transported and deposited at another location, the new location automatically becomes contaminated.

Evidence that soil or groundwater may be contaminated include: unusual or unnatural soil coloration or consistency, foul or chemical odors, floating oil or chemical residue, buried containers (such as 55 gallon drums), and dead vegetation. Knowledge of the site's history, as well as that of neighboring sites, may also be an indicator. Underground storage tanks, piping systems and drainage systems on the property are possible sources of contamination.

CONCRETE

The effluent from washing out concrete trucks can pose an environmental threat, especially near streams, lakes, ponds, or wetland areas. Wash out operations will only be performed at locations designated by the Sapphire Energy Construction Manager. When possible, concrete waste material will be recycled and used on-site as directed by the Sapphire Energy Construction Manager or otherwise hauled off site to a local landfill as waste.

No concrete wash water or other process water discharges will be allowed to enter any storm sewer system or other conveyances which will allow the water to leave the project.

SOLID WASTE DISPOSAL (HAZARDOUS AND REGULATED WASTE MATERIALS)

In the event that an unplanned hazardous waste is incurred, the Sapphire Energy Construction Manager will be notified immediately. The Sapphire Energy Construction Manager may provide direction or instruction on temporary storage of the hazardous waste.

Any work task that may generate a hazardous waste will require a Waste Minimization Plan, prior to start of work. The Waste Minimization Plan will describe how the contractor plans to control the hazardous waste including storage and disposal.

All waste oil will be placed in properly identified storage containers until it can be disposed of.

All hazardous waste will be disposed of as soon as practical. Hazardous waste stored on the project will not exceed 2200 pounds in any calendar month.

Containers used to store hazardous or regulated waste will be maintained in good condition at all times. Containers will be inspected weekly and that inspection documented to ensure no leaks have occurred.

Oily rags will be collected and properly stored on a daily basis.

Used oil will be tested for halogens prior to being placed in storage containers for disposal.

SPENT WELDING ROD IS TO BE CONSIDERED A HAZARDOUS OR REGULATED MATERIAL. Spent welding rod is to be collected in scrap metal containers. Spent welding rod is not to be allowed to accumulate in work areas at any time.

Cutting oil used on pipe threading machines will be contained in catch basins.

Any absorbent used will be collected separately and disposed of with construction debris as long as there is no free flowing material visible.

LITTER AND CONSTRUCTION DEBRIS (NON-HAZARDOUS MATERIALS)

General construction debris that is a non-hazardous solid waste material are (examples include lumber, metal, concrete, paper, and plastics). Non-hazardous materials generally do not pose a health problem, in normal use, and do not contaminate soil, water, or the atmosphere in their normal applied state.

Litter and construction debris will be contained in adequate containers or roll-off boxes. The containers or boxes will be properly labeled as to the contents. Containers or boxes will be inspected regularly to ensure unsuitable material was not wrongfully deposited.

Contractor will dispose of litter and construction debris on a regular basis.

The vendor that transports the litter and construction debris from the project shall cover the container or box to prevent possible spillage. Off-site disposal will only be at authorized Sapphire Energy facilities.

On-site burning may or may not be legal, depending on the area, and may or may not require a temporary air permit.

Sapphire Energy prohibits open burning on all projects.

MAINTENANCE AND FUELING OF EQUIPMENT

Storage of fluids used for equipment maintenance will be in designated areas approved by the Sapphire Energy Construction Manager.

On-site maintenance is only allowed on large equipment that remains on the Sapphire Energy IABR project for a specific period of time.

No vehicle will have any service performed on the project with the exception of a vehicle breakdown.

Used oil will be placed in containers and stored in a location approved by the Sapphire Energy Construction Manager. Accumulated oil is to be removed from the project by an approved vendor. All used oil will be tested for halogens.

Maintenance of equipment on the project will be limited to routine fluid and filter servicing. Minor change out or repairs that are not considered major may be allowed to get the equipment back into operation.

Oil from equipment will be drained into catch basins. When fluids are changed on equipment, plastic sheeting or visqueen shall be placed on the ground prior to start of maintenance to ensure fluids do not migrate to surrounding soil.

Any spilled fluid on the ground will be immediately cleaned up, collected, properly stored in approved containers, and disposed of in accordance of this EMP and Sapphire Energy procedures.

All equipment used on this project will be inspected daily for leaks and drips. Any drip observed on a piece of equipment will be repaired immediately. Absorbent will be placed on the ground to ensure fluids do not contaminate the ground.

Equipment that has a leak will be removed from the project immediately or parked in a designated lined area if repairs cannot be made immediately.

Subcontractor or vendor equipment will be inspected at time of delivery and any equipment that is in poor condition or have signs of leaks will be removed from the project immediately until repairs have been made.

There will be no stationary fuel storage tanks allowed on the project without prior approval of the Sapphire Energy Construction Manager.

When fueling of equipment is being performed, catch pans and spill kits will be required on each truck or fueling location.

No fueling of equipment will occur near any storm drain or catch basin.

Portable fuel containers will meet NMOSHA and NFPA standards. Portable fuel containers will only be stored at approved flammable storage locations.

Equipment will be properly grounded when fueling. No equipment will be allowed to be running while fueling.

FORMS APPENDIX

APPENDIX A:	SUBCONTRACTOR MONTHLY INCIDENT SUMMARY REPORT
APPENDIX B:	INCIDENT NOTIFICATION & INVESTIGATION FORM
APPENDIX C:	SAFETY TRAINING ROSTER
APPENDIX D:	DAILY TASK/JOB SAFETY ANALYSIS PLAN
APPENDIX E:	PRE-WORK TASK PLAN
APPENDIX F:	NOTICE OF SAFETY, HEALTH OR ENVIRONMENTAL NONCONFORMANCE
APPENDIX G:	SAFETY, HEALTH, OR ENVIRONMENTAL CORRECTIVE ACTION REPORT
APPENDIX H:	MASTER CHEMICAL & SUBSTANCE INVENTORY LIST
APPENDIX I:	HOT WORK PERMIT
APPENDIX J:	CONFINED SPACE ENTRY PERMIT
APPENDIX K:	EXCAVATION PERMIT
APPENDIX L:	DAILY FORKLIFT SAFETY INSPECTION CHECKLIST
APPENDIX M:	DAILY CRANE SAFETY INSPECTION CHECKLIST
APPENDIX N:	MONTHLY CRANE SAFETY INSPECTION CHECKLIST
APPENDIX O:	DAILY TOWER CRANE SAFETY INSPECTION CHECKLIST
APPENDIX P:	DAILY RIGGING SAFETY NSPECTION CHECKLIST
APPENDIX Q:	NOTICE TO COMMENCE STEEL ERECTION
APPENDIX R:	DAILY SCAFFOLD SAFETY INSPECTION REPORT
APPENDIX S:	DAILY WORK SITE SAFETY INSPECTION
APPENDIX T:	VOLUNTARY USE OF A DISPOSABLE RESPIRATOR
APPENDIX U:	MEDICAL QUESTIONNAIRE FOR RESPIRATOR USE
APPENDIX V:	PRE-LIFT CHECKLIST
APPENDIX W	DAILY EQUIPMENT CHECKLIST
APPENDIX X:	WEEKLY ENVIRONMENTAL SELF ASSESSMENT REPORT
APPENDIX Y:	BLUE VEST PROGRAM
APPENDIX Z:	HEAT INDEX AND PHYSICAL ACTIVITY CHART

SUBCONTRACTOR MONTHLY INCIDENT SUMMARY REPORT

AMEC Job Number: (COMPLETED BY AMEC PROJECT)

Subcontractor Name:

Project Name:

Reporting Period: **Month:** **Year:**

This form must be submitted to AMEC Project Manager, Site Manager, or SHE Manager with monthly pay application. It is to be submitted even if no accidents occurred.

DIRECTIONS: Report OSHA recordable medical cases. Report number of OSHA recordable medical cases that had lost work days, and number of calendar days away from work (Do not count first day of injury, but the weekends must be counted). Carry-over Days are for a previously reported lost time case where the worker is still off work in this reporting period. Report the number of OSHA recordable medical cases that had restricted or light duty work and the total number of calendar days on restricted or light duty (Do not count the first day of injury, but the weekend must be counted). Carry-over Days are for a previously reported restricted or light duty case where the worker is still on restricted or light duty. Report number of first aid only cases for period as well.

	Man-hours Worked	First Aid Injuries	Medical Treatment Only	Lost Time Injuries	Days Lost	Restricted Work Injuries	Days of Restricted Work
Month							
YTD							

Attach copy of employer First Report of Injury or OSHA 301 Report for each recordable injury case reported.

Person Making Report: Phone Number:

INCIDENT INVESTIGATION FORM

INCIDENT INFORMATION

Crew or Subcontractor: _____ Job Name: _____

Check Applicable: Injury/Illness ☐ Traffic/Auto ☐ Property Damage ☐ Near-Miss

EMPLOYEE INVOLVED

Name: _____ Address: _____

City: _____ State: _____ Zip: _____ Home Phone No: _____

Social Security Number: _____ Date of Birth: _____ Sex: _____

Marital Status: _____ Number of Dependents: _____

JOB INFORMATION

Date of Hire: _____ Craft: _____ Position: _____

Wage: _____ Shift: ☐ Day ☐ Evening ☐ Night

Hours Worked Per Day: _____ Days Worked Per Week: _____ Hours Worked Per Week: _____

INCIDENT INVESTIGATION

Directions: Answer all questions as complete and detailed as possible.

Date of Incident: _____ Date Incident Reported: _____

Time of Incident: _____ Exact Location Where Incident Occurred: _____

What job/task was employee(s) doing when incident occurred?

What tool/equipment was involved? _____ Any defects? _____

What was employee doing exactly at the time of the incident? _____

Describe in detail the incident: _____

What actually caused the incident? _____

Why did that cause the incident? _____

Could there have been other factors that contributed to the incident? _____

The probable cause of the incident: _____

INJURY INFORMATION

Nature of Injury: _____ Part of Body Injured: _____

Name of Physician or Hospital: _____

Address: _____ City: _____ State: _____ Zip: _____

Phone Number: _____ Diagnosis: _____

Any work restrictions? _____ Any prescriptions given? _____

INVESTIGATION TEAM

First-Line Supervisor Name: _____ SHE Coordinator Name: _____

Witnesses Names: _____

SOLUTIONS

Solutions developed to prevent similar future occurrences: _____

SOLUTION IMPLEMENTATION

Activity Required	Who Assigned	Due Date

APPROVAL

Project Manager/Superintendent Signature: _____ Date: _____

NOTE: ON-LINE INCIDENT INVESTIGATION FORMS ARE AVAILABLE ON AMEC COMPANY INTRANET

APPENDIX B

SAFETY TRAINING ROSTER

	Project Name:	**Project Location:**
	Course:	
	Date:	**Presented by:**

	Name	Social Security Number	Signature
This is to certify that I, the undersigned, have attended this AMEC or subcontractor Safety Training course and understand the contents presented during the program.			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Superintendent for this crew is _____

DAILY TASK/JOB HAZARD ANALYSIS

DIRECTIONS: Complete the Daily Task/Job Hazard Analysis each day and each time a task changes

FOREMAN NAME:		**TASK DESCRIPTION:**	
WORK LOCATION:		**SPECIFIC MATERIALS, TOOLS, OR EQUIPMENT REQUIRED TO COMPLETE THE TASK:**	
DATE:			

LIST ALL THE STEPS OF THE JOB (Use additional paper if needed)		**IDENTIFY ALL SPECIFIC HAZARDS FOUND**		**HOW WILL *YOU* CONTROL THE HAZARDS?**
1	1		1	
2	2		2	
3	3		3	
4	4		4	
5	5		5	
6	6		6	
7	7		7	

EVACUATION ROUTE	**EMERGENCY NUMBERS**	**ADDITIONAL NOTES or COMMENTS:**
What is your evacuation route and assembly point?	Emergency Phone:	
	Radio Channel	
	Fire:	
THIS JOB/TASK HAZARD ANALYSIS PLAN IS COMPLETE	Medical:	
Foreman:	SAFETY AND HEALTH REVIEW	
SUPERVISION REVIEW and APPROVAL	Safety:	
1. Can Foreman maintain continuous eye contact with crew? Yes ☐ No ☐ 2. Can crew perform this task safely? Yes ☐ No ☐ 3. Is the crew trained to perform this task? Yes ☐ No ☐ **If any answer is no, do not proceed with the work and reassignment is required**	Safety Comments:	
THIS PLAN HAS BEEN REVIEWED IS SAFE AND IS ADEQUATE		
GF or Superintendent:		

CREW SIGNATURES — **By your signature you agree that your supervisor has informed you of all hazards associated with the task; that you are aware of the hazards; and you are comfortable in performing the task.**

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

PLAN THE WORK – COMMUNICATE THE PLAN – WORK THE PLAN

Appendix D

NOTE: ***This checklist is only a guide to assist in the identification of possible hazards during a component installation. It is in no way an all-inclusive listing of all hazards present.***

SUBJECT	REQUIRED		TYPE (IF APPLICABLE)	TRAINING		PROCURED		COMMENTS
	YES	NO		YES	NO	YES	NO	
PERSONAL PROTECTIVE EQUIPMENT:								
• Will any special personal protective equipment be required for the component installation?	☐	☐		☐	☐	☐	☐	
• Will workers need training for the equipment?	☐	☐		☐	☐	☐	☐	
• Will any special services be needed for the equipment? (i.e. fit testing, etc.)	☐	☐		☐	☐	☐	☐	
LADDERS/SCAFFOLDING:								
• Will ladders and/or scaffolding be required for the installation?	☐	☐		☐	☐	☐	☐	
• Will fall protection be required for these items?	☐	☐		☐	☐	☐	☐	
PERMITS/TAGS:								
• Will any hot work permits be needed during the installation?	☐	☐		☐	☐	☐	☐	
• Will any confined space permits be needed?	☐	☐		☐	☐	☐	☐	
• Will lockout/tagout tags be needed?	☐	☐		☐	☐	☐	☐	
CONFINED SPACES:								
• Will any confined space work be performed?	☐	☐		☐	☐	☐	☐	
• Will ventilation be needed?	☐	☐		☐	☐	☐	☐	
• Will air monitoring be required?	☐	☐		☐	☐	☐	☐	
• Have workers been trained for confined space entry?	☐	☐		☐	☐	☐	☐	
FLAMMABLE GASES/LIQUIDS:								
• Will any flammable gases and/or liquids be used during the installation?	☐	☐		☐	☐	☐	☐	
• Will fire extinguishers be available, if needed?	☐	☐		☐	☐	☐	☐	
SIGNS, SIGNALS, AND BARRICADES								
• Will yellow caution tape be needed?	☐	☐		☐	☐	☐	☐	
• Will red danger tape be needed?	☐	☐		☐	☐	☐	☐	
• Will perimeter barricades be needed?	☐	☐		☐	☐	☐	☐	
• Will any caution/danger signs be needed?	☐	☐		☐	☐	☐	☐	
• Will a guard be needed?	☐	☐		☐	☐	☐	☐	
LOCKOUT/TAGOUT:								
• Will lockout/tagout be conducted?	☐	☐		☐	☐	☐	☐	
• Has a responsible person been assigned for locking/tagging out?	☐	☐		☐	☐	☐	☐	
TOXIC/HAZARDOUS CHEMICALS:								
• Will any work activities involve toxic/hazardous chemicals?	☐	☐		☐	☐	☐	☐	
• Will a compliance plan be needed?	☐	☐		☐	☐	☐	☐	
• Will exposure monitoring be needed?	☐	☐		☐	☐	☐	☐	
• Will worker training be needed?	☐	☐		☐	☐	☐	☐	
• Will any medical clearances/medical surveillance be needed?	☐	☐		☐	☐	☐	☐	
HOT WORK:								
• Are hot work activities to be performed during installation?	☐	☐		☐	☐	☐	☐	
• Will any special PPE be needed?	☐	☐		☐	☐	☐	☐	
• Will fire blankets be needed?	☐	☐		☐	☐	☐	☐	
• Will a fire watch be required for any hot work activities?	☐	☐		☐	☐	☐	☐	
MOBILE EQUIPMENT:								
• Will any mobile equipment be required for the installation?	☐	☐		☐	☐	☐	☐	
• If so, have all required safety inspections been completed?	☐	☐		☐	☐	☐	☐	
• Have equipment operators been properly trained?	☐	☐		☐	☐	☐	☐	
CRANES & RIGGING:								
• Will any special lifting devices be needed?	☐	☐		☐	☐	☐	☐	
• Have shackles/rigging been inspected?	☐	☐		☐	☐	☐	☐	

PRE-WORK TASK SAFETY PLAN

PROJECT: _____ **DATE:** _____
LOCATION: _____ **RESPONSIBLE SUPERINTENDENT:** _____
DISCIPLINE: _____ **GENERAL FOREMAN/FOREMAN:** _____
WORK AREA _____ **SHE REPRESENTATIVE** _____

WORK DESCRIPTION	RISK/HAZARDS	RISK/HAZARD PREVENTION ACTION	DATE OF ACTION	RESPOSBILE PARTY

Prepared By: _____ _____ _____
Supervisor Other: Other:

Approved By: _____ _____ _____
Site Manager Safety Other:

Appendix E

NOTICE OF SAFETY, HEALTH, OR ENVIRONMENTAL NONCONFORMANCE

ASSESSMENT #: **NONCONFORMANCE #:**

PROJECT LOCATION: **JOB NUMBER:**

DATE OF NONCONFORMANCE: **TIME OF NONCONFORMANCE:**

LOCATION OF NONCONFORMANCE:

FIRST-LINE SUPERVISOR or SUBCONTRACTOR NAME:

During an inspection of your work operations, the following safety, health, or environmental nonconformance was observed:

Reference:

☐ **MAJOR**
SERIOUS INJURY, DEATH, PROPERTY DAMAGE, OR ENVIRONMENTAL ASPECT LIKELY

Written corrective action plan is required
Written corrective action plan due date:

☐ **MINOR**
SERIOUS INJURY, DEATH, PROPERTY DAMAGE OR ENVIRONMENTAL ASPECT UNLIKELY

Corrective action plan **not** required

☐ **Opportunity For Improvement**
ISOLATED LAPSE OF A RULE OR PROCEDURE OR AN OPPORTUNITY FOR IMPROVEMENT.

To be corrected by:

☐ **WORK IS SUSPENDED AND A SAFETY AND HEALTH ASSURANCE ASSESSMENT MEETING IS REQUIRED**

Date: Time:

Assessor(s): _____ Date: _____

APPENDIX F

SAFETY, HEALTH, OR ENVIRONMENTAL CORRECTIVE/PREVENTIVE ACTION REPORT

Report or Assessment No: **Corrective/Preventive Action Plan Due Date:**

NONCONFORMANCE

NONCONFORMANCE NUMBER

Describe Nonconformance:

Action Team Assigned:

ROOT CAUSE

Root Cause Analysis:

CORRECTIVE or PREVENTIVE ACTIONS

(Use Additional Paper if Needed)

Describe Immediate Action(s) **ACTION TAKEN IMMEDIATELY TO CORRECT NONCONFORMANCE:**

Describe Intermediate Action(s) ACTION TAKEN UNTIL A PERMANENT FIX IS IN PLACE:

Describe Permanent Action(s) **PERMANENT ACTION TO ELIMINATE FUTURE NONCONFORMANCE:**

APPROVALS

Safety, Health, and Environmental	Project Manager	Project Vice President

APPENDIX G

MASTER CHEMICAL & SUBSTANCE INVENTORY LIST

PROJECT NUMBER: **PROJECT LOCATION:**

DATE	BRAND NAME	MANUFACTURER	CHEMICAL NAME

Permit #	Date

HOT WORK PERMIT

HOT WORK INFORMATION

Location: _____

Company Name: _____ Shift: ☐1st ☐2nd ☐3rd

Location of Work: _____

Floor/Level/Elevation: _____

Description of Work: _____

Any Special Precautions: _____

Employees Performing Work:

Name:	Signature:

Fire Watch:

Name: _____ Signature: _____

HOT WORK REQUIREMENTS

Hot Work Activities:

1. Hot work activities include any spark-producing activity that includes welding, burning, and grinding.

Requirements:

1. Each foreman will complete permit and have authorized prior to performing any hot work activities.
2. Foreman will instruct employees as to work being performed, precautions to be taken, how to use a fire extinguisher correctly, emergency procedures in case of fire, and the duties of a fire watch.
3. Work area must be clear of combustible and/or flammable material within a 35' radius. If these materials are immovable, then fire blankets or other fire-resistive material must protect them.
4. A twenty-pound, or larger, dry-chemical fire extinguisher must be in immediate vicinity of work area.
5. Sparks and slag shall be confined to the work area. When working in elevated areas, protect areas below from sparks and slag.

Fire Watch Duties:

1. Continually check work area and all adjacent areas (above, below, around) to ensure free of fire during work activities, during breaks and for ½ hour after completed activities.
2. Trained in the proper use of a fire extinguisher and how to summon fire department or brigade.

Fire Extinguisher Use - Follow the P.A.S.S. method:

1. **P**ull the pin on the extinguisher.
2. **A**im the extinguisher nozzle at the base of the fire.
3. **S**queeze the handle.
4. **S**weep the base of the fire.

APPROVAL

AMEC Project/Site Manager or Safety Representative: _____ Date: _____

CONFINED SPACE ENTRY PERMIT

DESCRIPTION

Permit #: _____ Crew/ Subcontractor: _____

Supervisor: _____ Location: _____

Type: ☐ Non-Permit ☐ Permit Date and Time of Entry: / / AM/PM

Location of Confined Space: _____

Type of Confined Space: ☐ Tank ☐ Pipe ☐ Manhole ☐ Tunnel ☐ Vault ☐ Other: _____

Work Description/Purpose of Entry: _____

_____

Hazards: _____

VERIFICATIONS

	Date	Entry Supervisor's Initials
Lockout/Tagout (electrical, mechanical, hydraulic, etc.)		
Purged, Cleaned, Drained, and Ventilated		
Employee Training		

SPECIAL REQUIREMENTS (Completed and Reviewed Prior to Entry)

	Required	Verified		Required	Verified
Safety Department Notified	☐	☐	Hot Work Permit Required	☐	☐
Adequate Access	☐	☐	Fire Extinguisher Available	☐	☐
Adequate Lighting (low voltage)	☐	☐	Lifelines Required	☐	☐
Attendant Required	☐	☐	Harnesses Required	☐	☐
Warning Signs Posted at Access	☐	☐	Respirators Required (Type :)	☐	☐
Ventilation Required	☐	☐	Air Supplied Respirators Required	☐	☐
Authorized Entry Log at Access	☐	☐	Protective Clothing Required	☐	☐
Rescue Equip./Services Available	☐	☐	Communications Equipment	☐	☐
Rescue Team Required	☐	☐	Continuous Air Monitoring	☐	☐
Other:	☐	☐	Other:	☐	☐

Attendant(s) Name(s): _____ _____

AIR MONITORING

Make: _____ Model: _____ ID# _____

Field Calibration Date: _____ Calibrated By: _____

Atmosphere Checked By: _____

Contaminants	Permissible Levels	1st Check*	Time	2nd Check*	Time	3rd Check*	Time
% Oxygen (O2)	19.5% to 23.5%						
LEL	Less than 10%						
Carbon Monoxide (CO)	Less than 35 ppm						
Hydrogen Sulfide (H2S)	Less than 10 ppm						
Other:							

*** 1ST CHECK TO BE COMPLETED PRIOR TO ENTRY**

IN CASE OF EMERGENCY, CALL: _____ OR _____

AUTHORIZATION

Entry Supervisor: _____ Date: _____

Permit #	Date

EXCAVATION PERMIT

EXCAVATION INFORMATION

Location: _____

Permit #: _____ Date: _____

Company Name: _____ Shift: _____

Excavation Location: _____

Excavation Length
Width & Depth: _____

Soil Classification:
- ☐ Type A
- ☐ Type B
- ☐ Type C

NOTE: Trenches over 4 feet deep will use a protective system.

Excavations > 4 feet deep are considered Confined Spaces. Follow Confined Space Entry procedures.

Protective System Used: ☐ Yes ☐ No

Type:
- ☐ **Shielding (Box)**
- ☐ **Sloping**
- ☐ **Shoring**
- ☐ **Benching**
- ☐ **Other:**

Weather: _____

Competent Person: _____ Person Completing Report _____

EXCAVATION REQUIREMENTS

YES	NO	N/A	GENERAL
☐	☐	☐	Protective system used in any trench/excavation greater than 4 feet deep
☐	☐	☐	Spoils, materials & equipment set back ≥ 2 feet from the edges of the excavation
☐	☐	☐	Engineering designs for sheeting &/or manufacturer's data on trench box capabilities on site
☐	☐	☐	Adequate signs posted and barricades provided
☐	☐	☐	Employee training conducted prior to beginning work
YES	**NO**	**N/A**	**UTILITIES**
☐	☐	☐	Utility company contacted & given 24 hours notice &/or utilities already located & marked
☐	☐	☐	Utility locations (overhead & underground) reviewed with operator & employees
☐	☐	☐	Utilities protected, supported or removed when excavation opened
YES	**NO**	**N/A**	**WET CONDITIONS**
☐	☐	☐	Employees protected from water accumulations (continuous dewatering)
☐	☐	☐	Inspection made after every rainstorm
YES	**NO**	**N/A**	**HAZARDOUS ATMOSPHERES**
☐	☐	☐	Air monitored for methane gas prior to entering trench/excavation
☐	☐	☐	Air monitoring & ventilation provided for potentially hazardous atmospheres
☐	☐	☐	Emergency equipment available where hazardous atmospheres could or do exist
YES	**NO**	**N/A**	**ENTRY & EXIT**
☐	☐	☐	Ladders no further than 25 feet from ANY employee in ANY direction
☐	☐	☐	Ladders extend 3 feet above excavation edge and secured
☐	☐	☐	Wood ramps constructed of uniform material thickness & cleated together at bottom
☐	☐	☐	Employees protected from cave-ins where entering/exiting the excavation

NOTE: Items marked NO below MUST be corrected prior to any employee entering the excavation.

APPROVAL

AMEC Project/Site Manager: _____ Date: _____

DAILY FORKLIFT SAFETY INSPECTION REPORT

Inspection by: _____ **Date:** _____
(Licensed Forklift Operator)

Company Name: _____ **Time:** _____

Project Name: _____ **Project #:** _____

Forklift Make & Model: _____

INSPECTION CRITERIA

	M	T	W	TH	F	S	Comments
1. Forks free of damage.	☐	☐	☐	☐	☐	☐	
2. Forks of appropriate capacity and match.	☐	☐	☐	☐	☐	☐	
3. Engine oil.	☐	☐	☐	☐	☐	☐	
4. Hydraulic fluid.	☐	☐	☐	☐	☐	☐	
5. Fuel, engine coolant and brake fluid.	☐	☐	☐	☐	☐	☐	
6. Hydraulic leaks.	☐	☐	☐	☐	☐	☐	
7. Condition of hydraulic hoses.	☐	☐	☐	☐	☐	☐	
8. Tire pressure.	☐	☐	☐	☐	☐	☐	
9. Tire condition.	☐	☐	☐	☐	☐	☐	
10. Tire ballast.	☐	☐	☐	☐	☐	☐	
11. Lugs tight.	☐	☐	☐	☐	☐	☐	
12. Seat belt.	☐	☐	☐	☐	☐	☐	
13. Back-up alarm.	☐	☐	☐	☐	☐	☐	
14. Horn.	☐	☐	☐	☐	☐	☐	
15. Lights and signals.	☐	☐	☐	☐	☐	☐	
16. Load chart visible to operator.	☐	☐	☐	☐	☐	☐	
17. Fire extinguisher.	☐	☐	☐	☐	☐	☐	
18. Mirrors.	☐	☐	☐	☐	☐	☐	
19. Roll Over Protective Structure.	☐	☐	☐	☐	☐	☐	
20. Frame level indicator.	☐	☐	☐	☐	☐	☐	
21. Boom angle indicator.	☐	☐	☐	☐	☐	☐	
22. Operator's Manual available.	☐	☐	☐	☐	☐	☐	
23. Evidence of structural damage.	☐	☐	☐	☐	☐	☐	
24. Floorboard free of debris.	☐	☐	☐	☐	☐	☐	
25. Gauges working properly.	☐	☐	☐	☐	☐	☐	
26. Service brake.	☐	☐	☐	☐	☐	☐	
27. Parking brake.	☐	☐	☐	☐	☐	☐	
28. Steering (All modes).	☐	☐	☐	☐	☐	☐	
29. Transmission.	☐	☐	☐	☐	☐	☐	
30. Hydraulic controls (Function test and cycle):							
Boom/Mast – Up & Down.	☐	☐	☐	☐	☐	☐	
Boom – Extend & Retract.	☐	☐	☐	☐	☐	☐	
Fork Tilt – Forward & Backward.	☐	☐	☐	☐	☐	☐	
Frame Level – Left & Right.	☐	☐	☐	☐	☐	☐	
Carriage Tilt – Left & Right.	☐	☐	☐	☐	☐	☐	
Traverse – Forward & Backward.	☐	☐	☐	☐	☐	☐	
Fork Side Shift – Left & Right.	☐	☐	☐	☐	☐	☐	
Outriggers – Up & Down.	☐	☐	☐	☐	☐	☐	

SIGNATURES

Inspector's Signature: _____ Date: _____

Superintendent's Signature: _____ Date: _____

DAILY CRANE

SAFETY INSPECTION CHECKLIST

Equipment Number: _____ Equipment Type: _____

Subcontractor Name: _____ Contract Location: _____

Operator Name: _____ Shift: _____ Date: _____

CHECKS	OK	N/A	REPAIR
	Check Appropriate Box Below:		
Hoist Cable	☐	☐	☐
Boom Cable	☐	☐	☐
Sheaves	☐	☐	☐
Hook	☐	☐	☐
Limit Switches, Boom Stops, Pins & Keepers	☐	☐	☐
Hydraulic Control & Cylinder	☐	☐	☐
Leaks	☐	☐	☐
Hoist Brakes	☐	☐	☐
Steering Mechanism	☐	☐	☐
Lights	☐	☐	☐
Operating Controls	☐	☐	☐
Windshield	☐	☐	☐
Windshield Wipers	☐	☐	☐
Horn	☐	☐	☐
Back-Up Alarm	☐	☐	☐
Fire Alarm	☐	☐	☐
Mirrors	☐	☐	☐

ADJUSTMENTS OR REPAIRS NEEDED: _____

Operator Signature: _____

TURN IN DAILY TO SUPERVISOR

MONTHLY CRANE
SAFETY INSPECTION CHECKLIST

Date: _____ Inspection Period: _____

Subcontractor Name: _____ Contract Location: _____

Manufacturer: _____ Model: _____

Equipment #: _____ Machine Hours: _____ Capacity: _____

Crane Type: ☐ Crawler ☐ Truck ☐ Hydraulic

Block Code: 4= Satisfactory 8= Not Satisfactory N/A = Not Applicable

GENERAL CHECKS

- ☐ Operators Manual/Configuration Drawings
- ☐ Hand Signals Posted
- ☐ Anti-Two Block Warning Sign
- ☐ High Voltage Warning Sign
- ☐ Capacity Chart in Cab
- ☐ Warning Horn Operational
- ☐ Fire Extinguisher
- ☐ Boom Angle Indicator
- ☐ Back-Up Alarm
- ☐ Anti-Two Block Device, Main
- ☐ Anti-Two Block Device, Auxiliary
- ☐ Load Movement Indicator (If Required)
- ☐ Handholds and Steps
- ☐ Non-Skid Surfaces
- ☐ Catwalk and Handrails
- ☐ Directional Signals
- ☐ Head, Tail, and Brake Lights
- ☐ Lubrication, Fluid Levels, and Fluid Condition

CRANE CONFIGURATION COMPLIES WITH MANUFACTURER DESIGN

- ☐ Counterweights
- ☐ Gantry Position
- ☐ Mast Position
- ☐ Boom Hoist Reeving
- ☐ Maximum Boom Not Exceeded
- ☐ Maximum Jib not Exceeded

LATTICE BOOM/JIB

- ☐ Check Integrity of Boom Stops
- ☐ Check Boom Hoist Kick-Out
- ☐ Check Boom for Alignment with Revolving Frame, Chords, and Lacing for Damage or Improper and Undocumented Repairs. Check for Cracked Welds.
- ☐ Check Jib for Alignment, Damage, or Improper and Undocumented Repairs.
- ☐ Check Jib Backstop NOTE: Cable Type Belly Slings Do Not Comply with 29 CFR 1926.550
- ☐ Check all Boom and Jib Connecting Pins and Locks
- ☐ Check Point Sheaves and Wire Rope Guides
- ☐ Check Jib Suspension

HYDRAULIC BOOM

- ☐ Check Operation by Fully Extending and Retracting
- ☐ Check for Twists and Bends by Viewing Over Top of Boom as it is Being Fully Extended
- ☐ Check for Bends, Fully Extended, Viewing from Side
- ☐ Check Welds and Check for Cracks
- ☐ Check Boom Pivot Shaft and Keepers
- ☐ Check Boom Hoist Cylinders and Pins
- ☐ Check Boom Extension Cables and Sheaves
- ☐ Check Wear Pads and Adjustment

GANTRY/BACK HITCH/COUNTERWEIGHT

- ☐ Check Welds and Check for Cracks
- ☐ Check Sheaves, Shafts, Pins and Keepers
- ☐ Check Counterweight Bolts/Retainers

WIRE ROPE AND PENDANTS

- ☐ Check Condition of Main Hoist Rope
- ☐ Check Condition of Auxiliary Hoist Rope
- ☐ Check Condition of Boom Hoist Rope
- ☐ Check Condition of Pendants, Especially at Sockets
- ☐ Check all Hoisting Rope Dead Ends, Clamps, and Sockets

LOAD BLOCK AND OVERHAUL BALL

- ☐ Check Main Hook for Cracks, Bending, and Safety Latch
- ☐ Check Auxiliary Hook for Cracks, Bending, and Safety Latch
- ☐ Check Sheaves
- ☐ N.D.T. Main Hook. Documentation or Certification by Manufacturer (If Required) N.D.T. Date:

HOIST AND SWING MACHINERY

- ☐ Hydraulic Main Hoist
- ☐ Hydraulic Auxiliary Hoist
- ☐ Hydraulic Swing and Brake
- ☐ Main Hoist Clutch
- ☐ Main Hoist Brake
- ☐ Auxiliary Hoist Clutch
- ☐ Auxiliary Hoist Brake
- ☐ Third Drum Frictions
- ☐ Boom Hoist Clutch and Brake
- ☐ Boom Hoist Dog
- ☐ Power Down Drive and Operation
- ☐ Gear and Drive Guards

MONTHLY CRANE
SAFETY INSPECTION CHECKLIST

CARRIER	LOAD ENHANCEMENT DEVICE
☐ Outrigger Operation and Controls	☐ Ringer Type
☐ Outrigger Structure and Pads	☐ Skyhorse Type
☐ Frame Cracks and Welds	☐ Linkbelt Heavy Lift Type
☐ Wheel Lug Nuts	☐ Configuration Complies with Mfr. Design
☐ Tire Condition and Pressure	☐ Integrity of Device
☐ Cab Seat, Gauges, Horn	**CARBODY AND CRAWLERS**
☐ Engine Operation and Mounts	☐ Check for Structural Cracks
☐ Radiator, Hoses, Belts	☐ Drive Chains
☐ Air Cleaner	☐ Drive Motors
☐ Alternator, Batteries	☐ Lower Jaw Clutch Operation
☐ Service Brakes	☐ Travel Brakes and Dogs
☐ Parking Brake, Safety Brakes	☐ Crawler Extension Mechanism
☐ Steering Apparatus	**MISCELLANEOUS CHECKS**
☐ Check for Blistered Brake Hoses	☐ _____
UPPER ENGINE, TRANSMISSION, AND T.C.	☐ _____
☐ Engine Operation	☐ _____
☐ Belts, Radiator, Hoses	☐
☐ Air Cleaner	**The Mobile, Hydraulic, and Crawler Crane Inspector and Operator**
☐ Air Compressor	**Should be Familiar with the Requirements of:**
☐ Transmission or Converter	**Virginia OSH Standard 1926.550, ANSI Standard B30.5-1968, &**
☐ Electrical System, Batteries	**PCSA Mobile Hydraulic Crane Standard No. 2**

REMARKS

_____

_____

_____

_____

_____

_____

_____

Inspected by: _____ Date: _____

Repairs Completed by: _____ Date: _____

TOWER CRANE

DAILY SAFETY INSPECTION CHECKLIST

Equipment Number: _____ Equipment Type: _____

Subcontractor Name: _____ Job Location: _____

Operator Name: _____ Shift: _____ Date: _____

CHECKS	OK	N/A	REPAIR
	Check Appropriate Box Below:		
Hoist Cable Has Been Shortened as to Manufacturers Recommendation	☐	☐	☐
Sheaves	☐	☐	☐
Hook	☐	☐	☐
Anemometer Functioning	☐	☐	☐
Manufacturers Maximum Safe Operating Wind Speed Posted in Cab	☐	☐	☐
Travel Limit and Overload Protection Switches Functioning	☐	☐	☐
Jib Does Not Cross Over Cab or other Tower Crane	☐	☐	☐
Lateral Clearance of 1 Foot From Any Obstruction	☐	☐	☐
Vertical Clearance of 3 Feet From Any Obstruction	☐	☐	☐
360° Rotation Clearance From Any Obstruction	☐	☐	☐
Hoist Brakes	☐	☐	☐
Counterweights clearly marked and weight entered in Equipment Record	☐	☐	☐
Lights	☐	☐	☐
Operating Controls	☐	☐	☐
Windshield	☐	☐	☐
Windshield Wipers	☐	☐	☐
Horn	☐	☐	☐
Two-Way Communications Tested	☐	☐	☐
Clean and Free of Concrete	☐	☐	☐
Base Free of Debris and Water	☐	☐	☐
Operating Manual and Records	☐	☐	☐
All Ladders and Walkways in Good Condition	☐	☐	☐

ADJUSTMENTS OR REPAIRS NEEDED: _____

Operator Signature: _____

TURN IN DAILY TO SUPERVISOR

DAILY RIGGING

SAFETY INSPECTION CHECKLIST

WIRE ROPE SLING INSPECTION

DATE_____ BY_____

LOCATION:_____

SLING	SLING ID	LOCATION	SIZE	LENGTH REACH	CONDITION CODE	COMMENT	ACTION
1							
2							
3							
4							
5							
6							
7							
8							

CONDITION CODE	CONDITION	ACCEPTABLE	SHOULD BE MONITORED	EXCESSIVE
	WEAR/ABRASION	A	AM	AX
	BROKEN WIRES	B	BM	BX
	HEAT DAMAGE	C	CM	CX
	CORROSION	D	DM	DX
	KINKS/DOG LEGS	E	EM	EX
	EYE DEFORMATION	F	FM	FX
	CONDITION OF END FITTING	G	GM	GX

CHAIN SLING INSPECTION FORM

SLING	SLING ID	LOCATION	SIZE	LENGTH REACH	CONDITION CODE	COMMENT	ACTION
1							
2							
3							
4							
5							
6							
7							
8							

CONDITION CODE	CONDITION	ACCEPTABLE	SHOULD BE MONITORED	EXCESSIVE
	INNER LINK WEAR	A	AM	AX
	BENT LINK	B	BM	BX
	STRETCHED CHAIN	C	CM	CX
	GOUGES	D	DM	DX
	HEAT DAMAGE	E	EM	EX
	CUTS OR NICKS	F	FM	FX

DAILY RIGGING
SAFETY INSPECTION CHECKLIST

SYNTHETIC SLING INSPECTION

SLING	SLING ID	LOCATION	SIZE	LENGTH REACH	CONDITION CODE	COMMENT	ACTION
1							
2							
3							
4							
5							
6							
7							
8							

CONDITION CODE	CONDITION	ACCEPTABLE	SHOULD BE MONITORED	EXCESSIVE
	WEAR	A	AM	AX
	BROKEN STICHES	B	BM	BX
	HEAT DAMAGE	C	CM	CX
	CHEMICAL DAMAGE	D	DM	DX
	HOLES AND TEARS	E	EM	EX
	CUTS OR SNAGS	F	FM	FX
	CONDITION OF END FITTING	G	GM	GX

Comments or Notes:

Qualified Rigger:		Date:	

NOTICE TO COMMENCE STEEL ERECTION

Steel Erector Subcontractor:
Contact Name:
Address:

Sapphire Energy is hereby authorizing you to commence steel erection activities with the following notifications:

Concrete in footings, piers, and walls, and mortar in masonry piers and walls has attained, based on the appropriate ASTM standard test for field cured samples either 75% of the intended minimum compressive strength or sufficient strength to support the loads imposed during steel erection.	Name of testing agency: Attached testing reports:
Repairs or modifications were made to anchor rods/bolts: ☐ Yes ☐ No Locations of repairs/modifications:	Approval by: (Structural Engineer of Record): Approval in writing? ☐ Yes ☐ No (attach) Date approved: As built drawings available? ☐ Yes ☐ No

You are notified of your responsibility to: (Initial each)

Indicate to Sapphire Energy what material lay-down areas are needed, and intended routes of transferring materials. Only those designated laydown areas will be utilized, and Sapphire Energy responsibility to maintain laydown areas will be limited to those that are designated.	Initials:
Preplan all overhead hoisting operations to prevent traveling loads over other contractor personnel, and to coordinate hoisting activities with Sapphire Energy and other contractors to minimize impacts on other operations.	
Provide a written site specific erection plan if any part of your operations will deviate from the published OSHA Standard 29 CFR 1926.752(e.	
Conduct documented daily inspections of all cranes, forklifts, and other hoisting equipment utilized in steel erection activities.	
Designate a qualified trained rigger(s) to inspect all rigging equipment (Submit record of training) Name of qualified rigger:	
Maintain on the project written proof of training for all employees engaged in connecting, bolt-up, multiple lift rigging procedures, exposure to falls, equipment operation, and as required by any other specific standard.	
Assure that all columns are properly anchored by a minimum of 4 anchor bolts.	
Maintain and require the use of fall protection equipment for all employees exposed to fall elevations of 6 feet or greater as directed in the Sapphire Energy project Incident Prevention Program.	
Properly install perimeter guardrail systems on all exterior and interior leading edges consisting of a top rail and mid rail meeting the requirements of OSHA 1926.502 (b)(1-15)	
Maintain required fire protection/prevention equipment appropriate to the type of work operation and hazards involved.	
Meet all other requirements of the Sapphire Energy Project Incident Prevention Program, Published OSHA Standards, and the requirements of local regulations.	

Sapphire Energy Construction Manager

Steel Erector Subcontractor (If required)

Sapphire Energy

DAILY SCAFFOLD SAFETY INSPECTION REPORT

Inspection by: _____ **Date:** _____
(Must Be a Competent Person)

Company Name: _____ **Time:** _____

Project Name: _____ **Project #:** _____

Scaffold Location: _____

INSPECTION CRITERIA

		Yes	No	N/A	Action Taken
1.	Are 2"x10" mud sills and base plates used?	☐	☐	☐	
2.	If CMU piers are used for footings are they poured solid?	☐	☐	☐	
3.	Are all components free of damage?	☐	☐	☐	
4.	Are scaffold frames plumb and level?	☐	☐	☐	
5.	Are scaffold frames pinned together to prevent displacement?	☐	☐	☐	
6.	Are cross braces used at all locations?	☐	☐	☐	
7.	Are frames and braces compatible?	☐	☐	☐	
8.	Are all working levels fully planked (Max. 1" gap between planks)?	☐	☐	☐	
9.	Are all platforms at least 18" wide?	☐	☐	☐	
10.	Is the work platform not more than 14" from the wall?	☐	☐	☐	
11.	Do all planks overlap their end supports 6"-12"?	☐	☐	☐	
12.	Are scaffold planks free of damage, splits, etc.?	☐	☐	☐	
13.	Are scaffolds secured to the structure once the scaffold is 4 times as high as it is wide including guardrails?	☐	☐	☐	
14.	Are scaffold ties repeated every 26' vertically after the first set of ties?	☐	☐	☐	
15.	Where scaffold ties are required are they installed at both ends of the scaffold and at 30' max. intervals between ends?	☐	☐	☐	
16.	Is a safe means of access provided to all scaffold platforms more than 2' high? (Extension ladders, attachable ladders, stairs or integral ladder access frames must be used.)	☐	☐	☐	
17.	Does the ladder extend 3' above the platform?	☐	☐	☐	
18.	Are ladders secured to prevent displacement?	☐	☐	☐	
19.	Are ladders installed as scaffold is erected to provide access for erectors?	☐	☐	☐	
20.	Are scaffolds at safe distances from power lines?	☐	☐	☐	
21.	Are tag lines used when hoisting loads onto scaffolds with cranes?	☐	☐	☐	
22.	Are guardrails installed on all platforms over 6' high?	☐	☐	☐	
23.	Is the top rail between 38"–45" high and capable of supporting 200 lbs?	☐	☐	☐	
24.	Are mid-rails capable of supporting 150 lbs.?	☐	☐	☐	
25.	Where cross bracing is used as a mid-rail is the crossing point of the brace between 20" –30" above the work platform?	☐	☐	☐	
26.	Where cross bracing is used as a top rail is the crossing point of the brace between 38" –48" above the work platform? (cross bracing cannot serve as both top rail and mid-rail)	☐	☐	☐	
27.	Are platforms kept clear of unnecessary material and debris?	☐	☐	☐	
28.	Are all material platforms equipped w/ toeboards?	☐	☐	☐	
29.	Are all areas below and around scaffolds barricaded to prevent workers from walking under scaffolds?	☐	☐	☐	
30.	Are canopies erected when workers must pass under scaffolds?	☐	☐	☐	
31.	Are all scaffolds that are incomplete tagged "Danger Do Not Use"?	☐	☐	☐	
32.	Are all damaged components removed from service and tagged "Danger Do Not Use"?	☐	☐	☐	

SIGNATURES

Competent Person's Signature: _____ Date: _____

Superintendent's Signature: _____ Date: _____

DAILY WORK SITE SAFETY INSPECTION

SUPERINTENDENT'S NAME: _____

SPECIFIC AREA(S) INSPECTED: _____

INSTRUCTIONS: Performed daily by superintendent/foreman of work area responsible for. Daily Work Site Safety Inspections will be maintained at project location and available for inspection by Sapphire Energy HSSE.
Y=Yes, N= No, NA=Not applicable

Pre-Work											
Y	**N**	**NA**		**Y**	**N**	**NA**					
☐	☐	☐	Pre-task safety plan communicated, understood and signed by each worker?	☐	☐	☐	All required permits obtained				
☐	☐	☐	Pre-task safety plan posted in conspicuous place at work site?	☐	☐	☐	Lockout/Tryout performed				
☐	☐	☐	Workers physically ready for work?	☐	☐	☐	All training completed for work to be performed?				
☐	☐	☐	MSDS Sheets obtained and available?	☐	☐	☐					
Personal Protective Equipment											
Y	**N**	**NA**		**Y**	**N**	**NA**		**Y**	**N**	**NA**	
☐	☐	☐	Hardhat bills forward	☐	☐	☐	Safety glasses with side shields	☐	☐	☐	Leatherwork Boot
☐	☐	☐	Face shields	☐	☐	☐	Burning goggles	☐	☐	☐	Welding hood and gloves
☐	☐	☐	Gloves	☐	☐	☐	Hearing Protection	☐	☐	☐	Reflective Vests
Fall Protection (100% Fall Protection Required at six feet or greater)											
Y	**N**	**NA**		**Y**	**N**	**NA**		**Y**	**N**	**NA**	
☐	☐	☐	Guardrail system checked	☐	☐	☐	Harness and lanyards checked	☐	☐	☐	Horizontal lifeline checked
☐	☐	☐	Floor Openings covered	☐	☐	☐	Roof Opening guarded	☐	☐	☐	Wall openings guarded
☐	☐	☐	Blue fencing up	☐	☐	☐	Netting checked	☐	☐	☐	
Ladders and Scaffolding											
Y	**N**	**NA**		**Y**	**N**	**NA**		**Y**	**N**	**NA**	
☐	☐	☐	Ladder tied off	☐	☐	☐	Ladder extended three feet	☐	☐	☐	Stepladders in open position
☐	☐	☐	Scaffold inspected and tagged	☐	☐	☐	Sections properly pinned	☐	☐	☐	Components not damaged
☐	☐	☐	Ladder access	☐	☐	☐	Handrail in place	☐	☐	☐	Planking secured
Housekeeping											
Y	**N**	**NA**		**Y**	**N**	**NA**		**Y**	**N**	**NA**	
☐	☐	☐	Material stacked orderly	☐	☐	☐	Trash cans in work area	☐	☐	☐	Debris removed
☐	☐	☐	Cords and hoses off floor	☐	☐	☐	Access maintained	☐	☐	☐	
Hoisting and Rigging Equipment											
Y	**N**	**NA**		**Y**	**N**	**NA**		**Y**	**N**	**NA**	
☐	☐	☐	Daily crane inspection	☐	☐	☐	One-eye per hook	☐	☐	☐	Sling/chokers stored
☐	☐	☐	Qualified rigger named	☐	☐	☐	Safety latch on hook checked	☐	☐	☐	Cranes flagged off
☐	☐	☐	Slings/chokers inspected	☐	☐	☐	Knowledge of crane signals	☐	☐	☐	Lift zone designated
Mobile Equipment											
Y	**N**	**NA**		**Y**	**N**	**NA**		**Y**	**N**	**NA**	
☐	☐	☐	Seatbelts used	☐	☐	☐	Workers trained	☐	☐	☐	Equipment inspected
☐	☐	☐	Backup alarms working	☐	☐	☐	Spotters used when needed	☐	☐	☐	
Excavations											
Y	**N**	**NA**		**Y**	**N**	**NA**		**Y**	**N**	**NA**	
☐	☐	☐	Competent person named	☐	☐	☐	Shore/shield/slope/bench proper	☐	☐	☐	Excavation checked daily
☐	☐	☐	Proper access/egress	☐	☐	☐	Spoil pile 2' from edge	☐	☐	☐	Workers trained
Temporary Barricades											
Y	**N**	**NA**		**Y**	**N**	**NA**		**Y**	**N**	**NA**	
☐	☐	☐	Proper tape used (Red-Danger, Yellow-Caution)	☐	☐	☐	All sides of work area barricaded	☐	☐	☐	Barricade removed or disposed of properly
Electrical											
Y	**N**	**NA**		**Y**	**N**	**NA**		**Y**	**N**	**NA**	
☐	☐	☐	Cords checked for damage	☐	☐	☐	Current inspection color on cords	☐	☐	☐	GFCI working

Comments

INSPECTION PERFORMED BY:	**TITLE:**	**DATE**

VOLUNTARY USE OF A RESPIRATOR

I _____ am requesting to use a disposable paper filter respirator, also known as a Dust Mask for my personal comfort.

I will be performing the following work task: (Example Sweeping Floor, etc.)

_____

_____

I clearly described the task I am to perform to my supervisor or safety coordinator and upon evaluating the task they determined I should not be exposed to a hazardous chemical or substance.

I have been supplied the following Dust Mask:

Brand: Model:

I understand that the disposable dust mask is for personal comfort and not intended to protect me from a hazardous chemical or substance. I further understand the voluntary use is limited to the task described above.

Please read the following:

Appendix D to Section 1910.134 (Mandatory) Information for Employees Using Respirators. When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirators use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substances does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

<u>You should do the following:</u>

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern, NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

I HAVE READ THE ABOVE SECTION FROM THE OSHA STANDARD FOR RESPIRATORY PROTECTION AND UNDERSTAND ITS CONTENT. I FURTHER UNDERSTAND THAT I AM RESPONSIBLE FOR THE CARE, MAINTENANCE/UPKEEP, AND PROPER STORAGE OF THIS RESPIRATOR. INSTRUCTIONS ON THE PROPER WEAR WERE MADE AVAILABLE TO ME.

_____

Signature: Date:

MEDICAL QUESTIONNAIRE FOR RESPIRATOR USE

Today's Date: _____ Subcontractor & Location: _____
Name: _____ Age: _____ Sex: _____
Height: ____Ft. ____ In. Weight: ____ Lbs. Job Title: _____
Home Telephone No: _____ Best Time to Call: _____
Has your company instructed you on how to contact the health care professional who will review your medical questionnaire? ____ Yes ____ No

Type respirator to be used:

☐ Disposable ☐ 1/2 Face ☐ Full Face ☐ PAPR ☐ Supplied Air ☐ SCBA
☐ Other:
Have you worn a respirator before? ___ Yes ___ No If yes, list type:

You must answer the following questions:

1	**Do you know how to read and write?**	___ Yes ___ No
2	**Are you a smoker?**	___ Yes ___ No
3	**Do you have trouble smelling odors?**	___ Yes ___ No
4	**Have you ever had any of the following conditions?:**	
	a. Seizures	___ Yes ___ No
	b. Diabetes	___ Yes ___ No
	c. Allergic reactions that interfere with your breathing	___ Yes ___ No
	d. Claustrophobia (fear of closed-in places)	___ Yes ___ No
5	**Have you ever had any of the following pulmonary or lung problems?:**	
	a. Asbestosis	___ Yes ___ No
	b. Asthma	___ Yes ___ No
	c. Chronic bronchitis	___ Yes ___ No
	d. Emphysema	___ Yes ___ No
	e. Pneumonia	___ Yes ___ No
	f. Tuberculosis	___ Yes ___ No
	g. Silicosis	___ Yes ___ No
	h. Pneumothorax	___ Yes ___ No
	i. Lung cancer	___ Yes ___ No
	j. Broken ribs	___ Yes ___ No
	k. Any chest injuries or surgeries	___ Yes ___ No
	l. Any other lung problem that you've been told about	___ Yes ___ No
6	**Do you currently have any of the following symptoms of pulmonary or lung illness?:**	
	a. Shortness of breath	___ Yes ___ No
	b. Shortness of breath when walking fast on level ground or up a slight incline	___ Yes ___ No
	c. Shortness of breath when walking with other people at an ordinary pace	___ Yes ___ No
	d. Have to stop for breath when walking at your own pace on level ground	___ Yes ___ No
	e. Shortness of breath when washing or dressing yourself	___ Yes ___ No
	f. Shortness of breath that interferes with your job	___ Yes ___ No
	g. Coughing that produces phlegm	___ Yes ___ No
	h. Coughing that wakes you early in morning	___ Yes ___ No
	i. Coughing that occurs mostly when you are lying down	___ Yes ___ No
	j. Coughing up blood in the last month	___ Yes ___ No
	k. Wheezing	___ Yes ___ No
	l. Wheezing that interferes with your job	___ Yes ___ No
	m. Chest pain when you breathe deeply	___ Yes ___ No
	n. Any other symptoms that you think may be related to lung problems	___ Yes ___ No
7	**Have you ever had any of the following cardiovascular or heart problems?:**	
	a. Heart attack	___ Yes ___ No
	b. Stroke	___ Yes ___ No
	c. Angina	___ Yes ___ No
	d. Heart failure	___ Yes ___ No
	e. Swelling in your legs or feet	___ Yes ___ No
	f. Heart arrhythmia	___ Yes ___ No
	g. High blood pressure	___ Yes ___ No
	h. Any other heart problem that you've been told about	___ Yes ___ No

MEDICAL QUESTIONNAIRE FOR RESPIRATOR USE cont

8	**Have you ever had any of the following cardiovascular or heart symptoms?:**	
	a. Frequent pain or tightness in your chest	___ Yes ___ No
	b. Pain or tightness in your chest during physical activity	___ Yes ___ No
	c. Pain or tightness in your chest that interferes with your job	___ Yes ___ No
	d. In the past two years, have you noticed your heart skipping or missing a beat	___ Yes ___ No
	e. Heartburn or indigestion that is not related to eating	___ Yes ___ No
	f. Any other symptoms that you think may be related to heart or circulation	___ Yes ___ No
9	**Do you currently take medication for any of the following problems?:**	
	a. Breathing or lung problems	___ Yes ___ No
	b. Heart trouble	___ Yes ___ No
	c. Blood pressure	___ Yes ___ No
	d. Seizures	___ Yes ___ No
10	**If you've used a respirator, have you experienced any of the following problems?:**	
	a. Eye irritation	___ Yes ___ No
	b. Skin allergies or rashes	___ Yes ___ No
	c. Anxiety	___ Yes ___ No
	d. General weakness or fatigue	___ Yes ___ No
	e. Any other problems that interfere with your use of a respirator	___ Yes ___ No
11	**Would you like to talk to the health professional who will review this questionnaire about your answers to this questionnaire?**	___ Yes ___ No
Answer the following questions, if required, to wear a full-face respirator or self-contained breathing apparatus (SCBA)		
1	**Have you ever lost vision in either eye?**	___ Yes ___ No
2	**Do you currently have any of the following vision problems?:**	
	a. Wear contact lenses	___ Yes ___ No
	b. Wear glasses	___ Yes ___ No
	c. Color blindness	___ Yes ___ No
	d. Any other eye or vision problems	___ Yes ___ No
3	**Have you ever had an injury to your ears, including a broken eardrum?**	___ Yes ___ No
4	**Do you currently have any of the following hearing problems?:**	
	a. Difficulty hearing	___ Yes ___ No
	b. Wear a hearing aid	___ Yes ___ No
	c. Any other hearing or ear problem	___ Yes ___ No
5	**Have you ever had a back injury?**	___ Yes ___ No
6	**Do you currently have any of the following musculoskeletal problems?:**	
	a. Weakness in any of your arms, hands, legs or feet	___ Yes ___ No
	b. Back pain	___ Yes ___ No
	c. Difficulty fully moving your arms and legs	___ Yes ___ No
	d. Pain or stiffness when you lean forward or backwards at the waist	___ Yes ___ No
	e. Difficult fully moving your head up or down	___ Yes ___ No
	f. Difficulty fully moving your head side to side	___ Yes ___ No
	g. Difficulty bending at your knees	___ Yes ___ No
	h. Difficulty squatting to the ground	___ Yes ___ No
	i. Difficulty climbing a flight of stairs or a ladder carrying more than 25 lbs.	___ Yes ___ No
	j. Any other muscle or skeletal problem that interferes with using a respirator	___ Yes ___ No

I certify that I answered the questions accurately and to the best of my knowledge and understand the training for the respiratory protection that has been provided.

Employee Signature _____ Date _____

I have reviewed this employee questionnaire and:

- ☐ Approve wearing of a respirator
- ☐ Approved, but with the following conditions:
- ☐ Do not approve this employee to wear a respirator

PLHCP Signature _____ Date _____

PRE-LIFT CHECKLIST

Required for lifts between 5 tons (10,000 lbs) up to but not including 25 tons (49999 lbs). All lifts 25 tons and over (50,000 lbs) or over 75% of cranes configured capacity, or require multiple (Tandem) crane lifts still require a critical lift plan.

Job No.:_____ Date:_____ Lift Description_____

Set up / Site Conditions

Soil Condition:

Weather Conditions: Suitable_____ Unsuitable_____ Explain_____

Are there underground hazards?	**Yes____**	**No__**
Will blocking or crane mats be used?	**Yes____**	**No__**
Are there fire or explosive hazards in the area?	**Yes____**	**No__**
Are there power lines within boom's length?	**Yes____**	**No__**
Are softeners required?	**Yes____**	**No__**

Reeving/parts of line_____ Center of Gravity Known_____

Load/Rigging/Attachments *Rigging Checked and Inspected*

Spreader Weight	_____	***Lbs.***		***Type of Sling***	_____
Jib Weight	_____	***Lbs.***		***Size of Sling***	_____
Load Weight	_____	Lbs.	Type of Hitch		_____
Block Weight	_____	Lbs.	Number Required		_____
Rigging Weight	_____	Lbs.	Angle of Slings		_____
Jib Ball Weight	_____	Lbs.	Shackle of Size		_____
Hoist Line Weight	_____	Lbs.	Hand Flagging		_____
Auxiliary Line Weight	_____	Lbs.	Radios		_____
Total Load	_____	Lbs.	Tag Line Quantity		_____
				Tag Line Length	

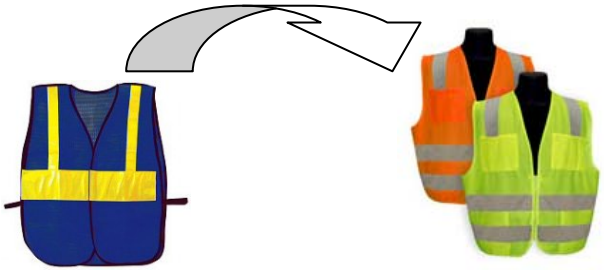
Crane Information

Crane Manufacturer	_____	Model No.	_____
Boom Length	_____	***On Outriggers***	_____
Boom Angle	_____	On Tires	_____
Boom Tip Height	_____	On Crawlers-Extended	_____
Jib Length	_____	On Crawlers-Retracted	_____
Maximum Load Radius	_____	Crane Level	_____
		Rated Capacity	_____

Lift will be: On Boom_____ On Jib_____ Over Side_____ Over End_____ 360°_____

Operator_____ Lift Supervisor_____

Blue Safety Vest Program



History

The reason for the development of the Blue Vest Program is to help Sapphire Energy identify "new" personnel on our jobsites. The Blue Vest Program emerged when there was a noticeable increase in, or a high number of, incidents occurring with "new" personnel. New personnel are identified as ANYONE who is NEW to a project, regardless of their tenure with the company or level of work experience.

While the vest colors (high visible yellow) will remain as our primary color of choice, we wanted to make it easy for everyone on site to recognize someone that was on the project for thirty (30) days or less. That being said, we considered the feasibility of issuing orientation decals or stripes on hardhats, and/or different colored hardhats, but came to the conclusion that these directives are not easily recognizable, are too varied to initiate and are believed to be somewhat ineffective. Hence, the concept of the Blue high-visibility Safety Vests was initiated.

The Program:

Initial Classification:

Sapphire Energy is aware that workers will range from brand new workers to those that have been employed in the construction industry for years but are just new to this project.

Level 1 Worker – New to this Sapphire Energy project or a former worker with greater than six month's separation.

a. Wear the Blue Safety Vest for a minimum of thirty (30) days, and

b. Complete the initial project HSSE Orientation

c. Complete specified On-line University training modules or through an assigned training vendor (or specified training such as, OSHA 10-hour, OSHA 30-hour and so on)

d. Assigned a mentor by their superintendent

e. Not assigned to work with another Blue Vest person alone

2. **Level 2 Worker** – All former workers with six months or less separation that are an AMEC "long-term" employee or journeyman classification.

a. Wear an Orange Safety Vest for a minimum of two (2) weeks, and

b. Complete the initial project HSSE Orientation

c. Complete specified On-line University training or through an assigned training vendor (or specified training such as, OSHA 10-hour, OSHA 30-hour and so on)

d. Assigned a mentor by their superintendent

Superintendent Interview:

1. The individual's superintendent sits down with the individual privately and completes a quick New Worker Questionnaire. From the questionnaire, the superintendent should have a basic understanding of:
    a. Years in construction
    b. Types of construction projects the individual worked on
    c. Specific types of job or craft classifications they have worked
    d. Whether they worked on this Sapphire Energy project before
    e. What their basic safety beliefs might be.
2. At the time of the interview, the superintendent will assign the individual training modules such as:
    a. Six Safety Essentials
    b. Safety Watch training
    c. OSHA 10 or 30 hour training
    d. First Aid/CPR
    e. NFPA 70E Arc Flash Training
    f. Competent Person training
    g. Rigging and/or Crane Signaling training
    h. And any three training modules located on the On-line University
3. The superintendent would at the conclusion of the initial interview assign the individual to a mentor within his work crew.
4. Superintendent will not assign two blue vested workers to work together without direct supervision.

Mentor:

1. A mentor is an individual within a work crew that the superintendent has assigned one or more new employees to.
2. The primary responsibility of a mentor is to educate new workers on Sapphire Energy safety culture and the necessary safety policies and procedures to follow when performing the work on this project.
3. The mentor monitors the new workers work with specific concentration on safety behavior. When at-risk behavior was observed take appropriate action to correct and counsel the new worker on how to change that behavior.

Evaluation:

1. At the end of the required wearing of the blue vest, the superintendent and mentor will meet to discuss whether the individual meets their expectations.
2. If the superintendent and mentor determine the individual has completed all training and demonstrates a good safety attitude, the new worker will be allowed to progress to the yellow/orange vest.
3. If the superintendent and mentor determine that the individual has not completed the training or demonstrates a good safety attitude, the new worker will remain in the blue vest until completion of training and/or demonstrates a good safety attitude.

NEW WORKER QUESTIONNAIRE

Employee Name: _____

Job Title: _____

Contractor: _____

Supervisor: _____ Date: _____

Supervision must interview each new worker assigned to them in an effort to determine the level of experience and skill the individual has; determine their personal safety culture; and determine any additional training the individual may be required to complete.

How many years has the individual worked in construction?

What type of construction has the individual worked on? (Industrial, Commercial, Residential, Road)

What specific job titles has the individual held in the past?

Has the individual worked on this Sapphire Energy project before? **Yes** **No**

Safety Beliefs Questions		Yes	No
1	Does strict compliance to corporate safety rules slow down production?		
2	Do you think that AMEC is serious about safety?		
3	Is the HSE professional responsible for safety?		
4	Do you believe you should be held accountable for your safety performance?		
5	Would you intervene and stop another worker that is working unsafe?		
6	Do you think safety training is overall a waste of time?		

Assign Safety Training (Does not include job specific training)

☐	Six Safety Essentials	☐	NFPA 70E Arc Flash Training
☐	Safety Watch	☐	Competent Person Training
☐	Supervisor Training	☐	
☐	OSHA 10 Hour	☐	
☐	OSHA 30 Hour	☐	
☐	Safety Trained Supervisor (STS) Course	☐	
☐	First Aid/CPR	☐	

Assigned Mentor(s)

Comments

HEAT INDEX AND PHYSICAL ACTIVITY:

Obtain from the local weather or internet weather site(s) what the current heat index is for the project.

Once the WBGT heat index has been determine, the following chart can be used as a guide when planning work:

AIR TEMPERATURE/RELATIVE HUMIDITY TO HEAT CATEGORY CONVERSION CHART

TEMPERATURE	RELATIVE HUMIDITY (Round up)														
	25	30	35	40	45	50	55	60	65	70	75	85	90	95	100
98	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
97	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
96	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
95	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
94	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
93	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
92	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
91	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
90	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5
89	3	4	5	5	5	5	5	5	5	5	5	5	5	5	5
88	3	4	4	5	5	5	5	5	5	5	5	5	5	5	5
87	3	3	3	4	5	5	5	5	5	5	5	5	5	5	5
86	2	3	3	4	4	4	5	5	5	5	5	5	5	5	5
85	2	2	2	3	3	4	4	5	5	5	5	5	5	5	5
84	2	2	2	3	3	3	3	4	4	5	5	5	5	5	5
83	1	1	2	2	2	3	3	3	3	4	5	5	5	5	5
82	1	1	1	2	2	2	2	3	3	4	4	5	5	5	5
81	1	1	1	1	1	2	2	2	2	3	4	4	5	5	5
80	0	1	1	1	1	1	1	2	2	3	3	3	4	4	5
79	0	0	0	1	1	1	1	1	1	2	2	3	3	3	4
78	0	0	0	0	1	1	1	1	1	2	2	2	3	3	3
77	0	0	0	0	0	1	1	1	1	1	1	2	2	2	3
76	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2
75	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Once the Heat Category has been determined use the below chart to assist in determining the time a worker should normally work and res. The chart further recommends the amount of water the worker should consume to maintain hydration.

WORK REST CYCLES/WATER CONSUMPTION TABLE

Heat Category	WBGT Index. F°	Easy Work		Moderate Work		Hard Work	
		Work/Rest	Water Intake (Qt/hr)	Work/Rest	Water Intake (Qt/hr)	Work/Rest	Water Intake (Qt/hr)
0	77 Below	NL	NL	NL	NL	NL	NL
1	78 – 81.9	NL	1/2	NL	3/4	40/20 min	3/4
2	82 – 84.9	NL	1/2	50/10 min	3/4	30/30	1
3	85 – 87.9	NL	3/4	40/20 min	3/4	30/30 min	1
4	88 – 89.9	NL	3/4	30/30	3/4	20/40 min	1
5	>90	50/10 min	1	20/40 min	1	10/50 min	1

The work-rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hours of work in the specified heat category. Fluids needs can vary based on individuals differences and exposures to full sun or full shade

CAUTION: ***HOURLY FLUID INTAKE SHOULD NOT EXCEED 1.5 QUARTS.***

DAILY FLUID INTAKE SHOULD NOT EXCEED 12 QUARTS.

Category 5 is considered a “Black Flag” and extreme caution must be taken when work is being performed in this condition.

Brown & Caldwell

Work Order	Date		Incremental	Total Budget
1	27-Apr-10	$		
2	10-Aug-10	$	Redacted Exemption 4	
3	31-Aug-10	$		
4	14-Dec-10	$		
5	17-Apr-11	$		
6	28-Apr-11	$		
7	28-Apr-11	$		
8	28-Apr-11	$		
(ETC)	TBD	$		

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 01

SAPPHIRE ENERGY PROJECT NO. PR.100027.100

BROWN AND CALDWELL PROJECT NO. _____

Brown and Caldwell is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Brown and Caldwell ("BC"), and Sapphire Energy, Inc. ("CLIENT") dated February 27, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
Design Services in Support of IABR Development

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico.

DESCRIP. OF WORK: As described in BC's proposal dated April 25, 2010 which is included as a part of this Addendum as **Attachment A**.

PERIOD OF SERVICE: March 1, 2010 through December 31, 2010.

PAYMENT: BC will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $Redacted Ex. 4**Attachment A** summarizes hourly rates and cost breakdown by task.

INITIAL AUTHORIZATION: The limit of authorized budget associated with this work order is $ Redacted Ex. 4 services through Redacted Ex. 4 The balance of authorizations needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between BC and CLIENT, dated February 27, 2009.

SAPPHIRE ENERGY, INC.

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: April 27, 2010

Send copies of communications and notices to Sapphire Energy: Attn: Jaime E. Moreno, P.E.

ATTACHMENT A
Proposal dated April 25, 2010

PR100027, 100

201 North Civic Drive, Suite 115
Walnut Creek, California 94596-3864

Tel: 925.937.9010
Fax: 925.937.9026

www.brownandcaldwell.com

April 25, 2010

Attachment A

Brown AND Caldwell

Mr. Jaime Moreno
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, California 92691

071767.003.010

Subject: Proposal for Design Services In Support of IABR Development

Dear Mr. Moreno:

Sapphire Energy, Inc., (Sapphire) plans to construct an Integrated Algal Bio Refinery (IABR) in Columbus, New Mexico, to grow algae and convert algal biomass to fuel. Brown and Caldwell (BC) has produced preliminary designs and cost estimates for portions of the IABR. This proposal presents our scope, schedule and budget for continuing design services.

Background and Approach

Sapphire has committed to completing an engineering package in late May 2010 and final design in September 2010. BC submitted a 25 percent design package and cost estimate on March 16, 2010. That submittal was focused mainly on Redacted Ex. 4 ; we included few details on Redacted Exemption 4

We propose four submittals in this work:

1. 25 percent design package for Redacted Exemption 4
2. 60 percent design package for Redacted Exemption 4
3. 90 percent design package
4. 100 percent design package

Budgetary cost estimates for construction will be included in the 60, 90 and 100 percent design packages. Constructability and operability reviews will be performed for the 60 percent design package.

Table 1 shows our estimate of the number of drawings in each submittal. The values are cumulative; e.g., all the drawings in the 25 percent design package will be included in the subsequent packages (some with modifications).

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 02

SAPPHIRE ENERGY PROJECT NO. PR.100027.100

BROWN AND CALDWELL PROJECT NO. 139197

Brown and Caldwell is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Brown and Caldwell ("BC"), and Sapphire Energy, Inc. ("CLIENT") dated February 27, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
Design Services in Support of IABR Development

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico.

DESCRIP. OF WORK: As described in BC's proposal dated April 25, 2010 which is included as a part of this Addendum as **Attachment A**.

PERIOD OF SERVICE: March 1, 2010 through December 31, 2010.

PAYMENT: BC will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Ex. 4 **Attachment A** summarizes hourly rates and cost breakdown by task.

INITIAL AUTHORIZATION: The limit of authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of $ Redacted Ex. 4 The balance of authorizations needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between BC and CLIENT, dated February 27, 2009.

SAPPHIRE ENERGY, INC.

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: August 10, 2010

Send copies of communications and notices to
Sapphire Energy: Attn: Jaime E. Moreno, P.E.

ATTACHMENT A
Proposal dated April 25, 2010

PR100027, 100

201 North Civic Drive, Suite 115
Walnut Creek, California 94596-3864

Tel: 925.937.9010
Fax: 925.937.9026

www.brownandcaldwell.com

April 25, 2010

Attachment A

Brown AND Caldwell

Mr. Jaime Moreno
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, California 92691

071767.003.010

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We propose four submittals in this work:

1. 25 percent design package for Redacted Exemption 4
2. 60 percent design package for Redacted Exemption 4
3. 90 percent design package
4. 100 percent design package

Budgetary cost estimates for construction will be included in the 60, 90 and 100 percent design packages. Constructability and operability reviews will be performed for the 60 percent design package.

Table 1 shows our estimate of the number of drawings in each submittal. The values are cumulative; e.g., all the drawings in the 25 percent design package will be included in the subsequent packages (some with modifications).

Table 1. Estimated Number of Drawings		
Submittal	Drawing Type	Number
25 percent Ex. 4	General Civil Process and Instrumentation Diagrams Mechanical Instrumentation	Redacted Exemption 4
60 percent	General Civil Process and Instrumentation Diagrams Mechanical Structural Electrical	
90 percent and 100 percent	General Civil Process and Instrumentation Diagrams Mechanical Structural Electrical Instrumentation	

Additional drawings will likely be needed; therefore, we have included a contingency phase that includes budget for another 25 drawings.

Scope of Work

Brown and Caldwell will perform the following tasks. Because the State of New Mexico imposes a gross receipts tax on engineering consultants, we must track work done in New Mexico (NM) separately; therefore, each phase for which work will be done both in-state and out-of-state has two separate numbers.

Phase 100 – Project Management Through 60 Percent

Redacted Exemption 4

Phases 101 (out-of-NM) and Phase 501 (in-NM)

Redacted Exemption 4

Phase 102 – DAF 25 Percent Design

Redacted Exemption 4

Phase 103 (out-of-NM) and Phase 503 (in-NM) – 60 Percent Design

Redacted Exemption 4

Phase 200 – Project Management for 90 and 100 Percent Design

Redacted Exemption 4

Phase 201 (out-of-NM) and Phase 601 (in-NM) – Meetings for 90 and 100 Percent Design

Redacted Exemption 4

Phase 202 (out-of-NM) and Phase 602 (in-NM) –90 Percent Design

Redacted Exemption 4

Phase 203 (out-of-NM) and Phase 603 (in-NM) –100 Percent Design

Redacted Exemption 4

Phase 700 – Contingency

Redacted Exemption 4

Compensation

Redacted Exemption 4

**Table 2. Estimated Level of Effort and Fee
IABR Design**

Phase[a]	Description	Hours	Cost			Total
			Labor	APC[b]	Other Expenses	
100	Project Management through 60 Percent Design					
101/501	Meetings through 60 Percent Design					
102	Ex. 4 25 Percent Design					
103/503	60 Percent Design					
	New Mexico Gross Receipts Tax[b]					
	Subtotal					
200	Project Management for 90 and 100 Percent Design					
201/601	Meetings for 90 and 100 Percent Design					
202/602	IABR 90 Percent Design					
203/603	IABR 100 Percent Design					
700	Contingency					
	New Mexico Gross Receipts Tax[c]					
	Subtotal					
	Total					

Redacted Exemption 4

[a]*Where two numbers are shown, the second is for activities performed within New Mexico, which must be tracked separately for state tax purposes.*

[b]*Associated project charge, which covers costs for personal and CADD computers, reprographics, facsimile transmissions, local and long distance telephone, postage, and express mail services.*

[c]*Tax rate = 5 percent on applicable items*

Labor will be charged in accordance with the attached Schedule of Hourly Billing Rates. Expenses will be billed at cost plus 10 percent. BC will perform this work under the Terms and Conditions of our agreement with Sapphire dated February 27, 2009.

Scope and Budget Assumptions

Assuming we receive written authorization to proceed by April 26, 2010, we will submit the 100 percent design package by September 1, 2010.

Scope and Budget Assumptions

1. Redacted Exemption 4

significant rework Redacted Exemption 4 will be required that is not included in this scope of work.

2. At the request of Sapphire, we will indicate that Redacted Exemption 4 We will neither evaluate nor validate the specification of this Redacted Exemption 4
3. This proposal does not include Redacted Exemption 4 for algae production.
4. Redacted Exemption 4 , we will prepare a supplementary proposal to cover additional costs.
5. Placeholder Redacted Exemption 4 have been included for Redacted Exemption 4 have not yet been established. Based on the current schedule of process development activities, we anticipate that the Redacted Exemption 4 will not be included in Redacted Exemption 4 and will be delayed until the Redacted Exemption 4
6. Placeholder Redacted Exemption 4 have been included for Redacted Exemption 4 , but no process has been selected and Redacted Ex. 4 have not yet been established. Based on the current schedule of process development activities, we anticipate that the Redacted Exemption 4 will not be included in the Redacted Exemption 4 and will be delayed until the Redacted Exemption 4.
7. Redacted Ex. 4 will begin at the point of Redacted Ex. 4 designed and sized by others (e.g., HGI).
8. Redacted Exemption 4 for algae production will begin downstream of storage facilities designed and sized by others (e.g., HGI).
9. Redacted Exemption 4 We can provide a supplemental proposal for this support if requested by Sapphire.
10. Redacted Exemption 4
11. The scope of work includes preparing Redacted Exemption 4 only. We assume that Redacted Exemption 4 for bidding will be prepared by others.
12. The scope of work includes Redacted Exemption 4
13. Attendance at meetings is included, as specified in the Scope of Work, but Sapphire will keep and distribute meeting minutes.
14. We will keep Sapphire apprised of our progress in meetings and conference calls; however, after each Redacted Exemption 4 , we will commence work immediately on the simultaneous with Sapphire's review. We will incorporate Sapphire's comments as they become available. Any pause in the work will cause us to miss our projected schedule and budget.
15. Redacted Exemption 4 will be based on the Redacted Exemption 4 , and minimal changes are anticipated.

To accept this proposal, please sign and date two copies and return one copy to BC within five days.

We look forward to working with you in the IABR design. Please contact Matt Gerhardt at 925.210.2275 with any questions on this proposal.

Very truly yours,

BROWN AND CALDWELL

Matthew B. Gerhardt, Ph.D., P.E.
Managing Engineer

Melih M. Ozbilgin, Ph.D.
Vice President

MBG:

The undersigned agrees to the Terms and Conditions of this Letter Agreement attached hereto

SAPPHIRE ENERGY, INC.

Signature:_____

Printed Name:_____

Title: _____

Date: _____

cc: Ms. Jenelle Armstrong, Brown and Caldwell
Dr. Carla De Las Casas, Brown and Caldwell
Mr. Robert Finn, Brown and Caldwell
Mr. Bryan Plude, Brown and Caldwell

Brown and Caldwell 2010 Schedule of Hourly Billing Rates

Level	Engineering	Technical/Scientific	Administrative	$/Hour
Level C				
		Redacted Exemption 4		
Level D				
Level E				
Level F				
Level G				
Level H				

Brown and Caldwell 2010 Schedule of Hourly Billing Rates

Level	Engineering	Technical/Scientific	Administrative	$/Hour
Level I				
		Redacted Exemption 4		
Level J				-
Level K				-
Level L				-
Level M				-
Level N				-

Notes:

Brown and Caldwell hourly billing rates are revised annually to reflect changes in employee pay rates. The above rates are effective through December 31, 2010.

An associated project charge of Ex.4 *will be added to cover costs for personal and CADD computers, reprographics, facsimile transmissions, local and long distance telephone, postage, and express mail services.*

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 03

SAPPHIRE ENERGY PROJECT NO. PR.100027.100

BROWN AND CALDWELL PROJECT NO. 139197

Brown and Caldwell is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Brown and Caldwell ("BC"), and Sapphire Energy, Inc. ("CLIENT") dated February 27, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
Design Services in Support of IABR Development

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico.

DESCRIP. OF WORK: As described in BC's proposal dated April 25, 2010 which is included as a part of this Addendum as **Attachment A**.

PERIOD OF SERVICE: March 1, 2010 through December 31, 2010.

PAYMENT: BC will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Ex. 4 **Attachment A** summarizes hourly rates and cost breakdown by task.

INITIAL AUTHORIZATION: The limit of authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of $ Redacted Ex. 4 The balance of authorizations needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between BC and CLIENT, dated February 27, 2009.

SAPPHIRE ENERGY, INC.

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: August 31, 2010

Send copies of communications and notices to Sapphire Energy: Attn: Jaime E. Moreno, P.E.

ATTACHMENT A
Proposal dated April 25, 2010

PR1000027, 100

201 North Civic Drive, Suite 115
Walnut Creek, California 94596-3864

Tel: 925.937.9010
Fax: 925.937.9026

www.brownandcaldwell.com

April 25, 2010 Attachment A

Brown AND Caldwell

Mr. Jaime Moreno
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, California 92691

071767.003.010

Subject: Proposal for Design Services In Support of IABR Development

Dear Mr. Moreno:

Sapphire Energy, Inc., (Sapphire) plans to construct an Integrated Algal Bio Refinery (IABR) in Columbus, New Mexico, to grow algae and convert algal biomass to fuel. Brown and Caldwell (BC) has produced preliminary designs and cost estimates for portions of the IABR. This proposal presents our scope, schedule and budget for continuing design services.

Background and Approach

Sapphire has committed to completing an engineering package in late May 2010 and final design in September 2010. BC submitted a 25 percent design package and cost estimate on March 16, 2010. That submittal was focused mainly on the Redacted Ex. 4 , we included few details on the Redacted Exemption 4

We propose four submittals in this work:

1. 25 percent design package for Redacted Exemption 4
2. 60 percent design package for Redacted Exemption 4
3. 90 percent design package
4. 100 percent design package

Budgetary cost estimates for construction will be included in the 60, 90 and 100 percent design packages. Constructability and operability reviews will be performed for the 60 percent design package.

Table 1 shows our estimate of the number of drawings in each submittal. The values are cumulative; e.g., all the drawings in the 25 percent design package will be included in the subsequent packages (some with modifications).

Table 1. Estimated Number of Drawings		
Submittal	Drawing Type	Number
25 percent Ex.4	General Civil Process and Instrumentation Diagrams Mechanical Instrumentation	Redacted Exemption 4
60 percent	General Civil Process and Instrumentation Diagrams Mechanical Structural Electrical	
90 percent and 100 percent	General Civil Process and Instrumentation Diagrams Mechanical Structural Electrical Instrumentation	

Additional drawings will likely be needed; therefore, we have included a contingency phase that includes budget for another 25 drawings.

Scope of Work

Brown and Caldwell will perform the following tasks. Because the State of New Mexico imposes a gross receipts tax on engineering consultants, we must track work done in New Mexico (NM) separately; therefore, each phase for which work will be done both in-state and out-of-state has two separate numbers.

Phase 100 – Project Management Through 60 Percent

Redacted Exemption 4

Phases 101 (out-of-NM) and Phase 501 (in-NM)

Redacted Exemption 4

Phase 102 – DAF 25 Percent Design

Redacted Exemption 4

Phase 103 (out-of-NM) and Phase 503 (in-NM) – 60 Percent Design

Redacted Exemption 4

Phase 200 – Project Management for 90 and 100 Percent Design

Redacted Exemption 4

Phase 201 (out-of-NM) and Phase 601 (in-NM) – Meetings for 90 and 100 Percent Design

Redacted Exemption 4

Phase 202 (out-of-NM) and Phase 602 (in-NM) –90 Percent Design

Redacted Exemption 4

Phase 203 (out-of-NM) and Phase 603 (in-NM) –100 Percent Design

Redacted Exemption 4

Phase 700 – Contingency

Redacted Exemption 4

Compensation

Redacted Exemption 4

Table 2. Estimated Level of Effort and Fee
IABR Design

Phase[a]	Description	Hours	Cost			Total
			Labor	APC[b]	Other Expenses	
100	Project Management through 60 Percent Design	Redacted Exemption 4				
101/501	Meetings through 60 Percent Design					
102	Ex.4 25 Percent Design					
103/503	60 Percent Design					
	New Mexico Gross Receipts Tax[b]					
	Subtotal					
200	Project Management for 90 and 100 Percent Design					
201/601	Meetings for 90 and 100 Percent Design					
202/602	IABR 90 Percent Design					
203/603	IABR 100 Percent Design					
700	Contingency					
	New Mexico Gross Receipts Tax[c]					
	Subtotal					
	Total					

[a] *Where two numbers are shown, the second is for activities performed within New Mexico, which must be tracked separately for state tax purposes.*

[b] *Associated project charge, which covers costs for personal and CADD computers, reprographics, facsimile transmissions, local and long distance telephone, postage, and express mail services.*

[c] *Tax rate = 5 percent on applicable items*

Labor will be charged in accordance with the attached Schedule of Hourly Billing Rates. Expenses will be billed at cost plus 10 percent. BC will perform this work under the Terms and Conditions of our agreement with Sapphire dated February 27, 2009.

Scope and Budget Assumptions

Assuming we receive written authorization to proceed by April 26, 2010, we will submit the 100 percent design package by September 1, 2010.

Scope and Budget Assumptions

1. Redacted Exemption 4

significant rework Redacted Exemption 4 will be required that is not included in this scope of work.

2. At the request of Sapphire, we will indicate that Redacted Exemption 4 We will neither evaluate nor validate the specification of this Redacted Exemption 4
3. This proposal does not include Redacted Exemption 4 for algae production.
4. Redacted Exemption 4 , we will prepare a supplementary proposal to cover additional costs.
5. Placeholder Redacted Exemption 4 have been included for Redacted Exemption 4 have not yet been established. Based on the current schedule of process development activities, we anticipate that the Redacted Exemption 4 will not be included in Redacted Exemption 4 and will be delayed until the Redacted Exemption 4
6. Placeholder Redacted Exemption 4 have been included for Redacted Exemption 4 , but no process has been selected and Redacted Ex. 4 have not yet been established. Based on the current schedule of process development activities, we anticipate that the Redacted Exemption 4 will not be included in the Redacted Exemption 4 and will be delayed until the Redacted Exemption 4.
7. Redacted Ex. 4 will begin at the point of Redacted Ex. 4 designed and sized by others (e.g., HGI).
8. Redacted Exemption 4 for algae production will begin downstream of storage facilities designed and sized by others (e.g., HGI).
9. Redacted Exemption 4 We can provide a supplemental proposal for this support if requested by Sapphire.
10. Redacted Exemption 4
11. The scope of work includes preparing Redacted Exemption 4 only. We assume that Redacted Exemption 4 for bidding will be prepared by others.
12. The scope of work includes Redacted Exemption 4
13. Attendance at meetings is included, as specified in the Scope of Work, but Sapphire will keep and distribute meeting minutes.
14. We will keep Sapphire apprised of our progress in meetings and conference calls; however, after each Redacted Exemption 4 , we will commence work immediately on the simultaneous with Sapphire's review. We will incorporate Sapphire's comments as they become available. Any pause in the work will cause us to miss our projected schedule and budget.
15. Redacted Exemption 4 will be based on the Redacted Exemption 4 , and minimal changes are anticipated.

To accept this proposal, please sign and date two copies and return one copy to BC within five days.

We look forward to working with you in the IABR design. Please contact Matt Gerhardt at 925.210.2275 with any questions on this proposal.

Very truly yours,

BROWN AND CALDWELL

Matthew B. Gerhardt, Ph.D., P.E.
Managing Engineer

Melih M. Ozbilgin, Ph.D.
Vice President

MBG:

The undersigned agrees to the Terms and Conditions of this Letter Agreement attached hereto

SAPPHIRE ENERGY, INC.

Signature:_____

Printed Name:_____

Title: _____

Date: _____

cc: Ms. Jenelle Armstrong, Brown and Caldwell
Dr. Carla De Las Casas, Brown and Caldwell
Mr. Robert Finn, Brown and Caldwell
Mr. Bryan Plude, Brown and Caldwell

Brown and Caldwell 2010 Schedule of Hourly Billing Rates

Level	Engineering	Technical/Scientific	Administrative	$/Hour
Level C				
		Redacted Exemption 4		
Level D				
Level E				
Level F				
Level G				
Level H				

Brown and Caldwell 2010 Schedule of Hourly Billing Rates

Level	Engineering	Technical/Scientific	Administrative	$/Hour
Level I				
		Redacted Exemption 4		
Level J				-
Level K				-
Level L				-
Level M				-
Level N				-

Notes:

Brown and Caldwell hourly billing rates are revised annually to reflect changes in employee pay rates. The above rates are effective through December 31, 2010.

An associated project charge of Ex.4 *will be added to cover costs for personal and CADD computers, reprographics, facsimile transmissions, local and long distance telephone, postage, and express mail services.*

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 04 & CHANGE ORDER NO.01

SAPPHIRE ENERGY PROJECT NO. PR.100027.100

BROWN AND CALDWELL PROJECT NO. 139197

Brown and Caldwell is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Brown and Caldwell ("BC"), and Sapphire Energy, Inc. ("CLIENT") dated February 27, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
Design Services in Support of IABR Development

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico.

DESCRIP. OF WORK: As described in BC's proposals dated April 25, 2010 and December 6,2010 which are included as a part of this Addendum as **Attachments A** and **B**.

PERIOD OF SERVICE: March 1, 2010 through December 31, 2011.

PAYMENT: BC will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Ex. 4 **Attachment A** summarizes hourly rates and cost breakdown by task and original budget summary totaling $ Redacted Ex. 4 **Attachment B** summarizes the hourly rates and cost breakdown totaling $ Redacted Ex. 4 associated with Change Order No. 01.

INITIAL AUTHORIZATION: The limit of authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of $ Redacted Ex. 4 The balance of authorizations needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between BC and CLIENT, dated February 27, 2009.

SAPPHIRE ENERGY, INC.

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: December 14, 2010

Send copies of communications and notices to Sapphire Energy: Attn: Jaime E. Moreno, P.E.

ATTACHMENT A
Proposal dated April 25, 2010

PR1000027, 100

201 North Civic Drive, Suite 115
Walnut Creek, California 94596-3864

Tel: 925.937.9010
Fax: 925.937.9026

www.brownandcaldwell.com

April 25, 2010 Attachment A

Brown AND Caldwell

Mr. Jaime Moreno
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, California 92691

071767.003.010

Subject: Proposal for Design Services In Support of IABR Development

Dear Mr. Moreno:

Sapphire Energy, Inc., (Sapphire) plans to construct an Integrated Algal Bio Refinery (IABR) in Columbus, New Mexico, to grow algae and convert algal biomass to fuel. Brown and Caldwell (BC) has produced preliminary designs and cost estimates for portions of the IABR. This proposal presents our scope, schedule and budget for continuing design services.

Background and Approach

Sapphire has committed to completing an engineering package in late May 2010 and final design in September 2010. BC submitted a 25 percent design package and cost estimate on March 16, 2010. That submittal was focused mainly on the Redacted Ex. 4 , we included few details on the Redacted Exemption 4

We propose four submittals in this work:

1. 25 percent design package for Redacted Exemption 4
2. 60 percent design package for Redacted Exemption 4
3. 90 percent design package
4. 100 percent design package

Budgetary cost estimates for construction will be included in the 60, 90 and 100 percent design packages. Constructability and operability reviews will be performed for the 60 percent design package.

Table 1 shows our estimate of the number of drawings in each submittal. The values are cumulative; e.g., all the drawings in the 25 percent design package will be included in the subsequent packages (some with modifications).

Table 1. Estimated Number of Drawings		
Submittal	Drawing Type	Number
25 percent Ex.4	General Civil Process and Instrumentation Diagrams Mechanical Instrumentation	Redacted Exemption 4
60 percent	General Civil Process and Instrumentation Diagrams Mechanical Structural Electrical	
90 percent and 100 percent	General Civil Process and Instrumentation Diagrams Mechanical Structural Electrical Instrumentation	

Additional drawings will likely be needed; therefore, we have included a contingency phase that includes budget for another 25 drawings.

Scope of Work

Brown and Caldwell will perform the following tasks. Because the State of New Mexico imposes a gross receipts tax on engineering consultants, we must track work done in New Mexico (NM) separately; therefore, each phase for which work will be done both in-state and out-of-state has two separate numbers.

Phase 100 – Project Management Through 60 Percent

Redacted Exemption 4

Phases 101 (out-of-NM) and Phase 501 (in-NM)

Redacted Exemption 4

Phase 102 – DAF 25 Percent Design

Redacted Exemption 4

Phase 103 (out-of-NM) and Phase 503 (in-NM) – 60 Percent Design

Redacted Exemption 4

Phase 200 – Project Management for 90 and 100 Percent Design

Redacted Exemption 4

Phase 201 (out-of-NM) and Phase 601 (in-NM) – Meetings for 90 and 100 Percent Design

Redacted Exemption 4

Phase 202 (out-of-NM) and Phase 602 (in-NM) –90 Percent Design

Redacted Exemption 4

Phase 203 (out-of-NM) and Phase 603 (in-NM) –100 Percent Design

Redacted Exemption 4

Phase 700 – Contingency

Redacted Exemption 4

Compensation

Redacted Exemption 4

Table 2. Estimated Level of Effort and Fee
IABR Design

Phase[a]	Description	Hours	Cost			Total
			Labor	APC[b]	Other Expenses	
100	Project Management through 60 Percent Design					
101/501	Meetings through 60 Percent Design					
102	Ex.4 25 Percent Design					
103/503	60 Percent Design					
	New Mexico Gross Receipts Tax[b]					
	Subtotal					
200	Project Management for 90 and 100 Percent Design					
201/601	Meetings for 90 and 100 Percent Design					
202/602	IABR 90 Percent Design					
203/603	IABR 100 Percent Design					
700	Contingency					
	New Mexico Gross Receipts Tax[c]					
	Subtotal					
	Total					

Redacted Exemption 4

[a] *Where two numbers are shown, the second is for activities performed within New Mexico, which must be tracked separately for state tax purposes.*

[b] *Associated project charge, which covers costs for personal and CADD computers, reprographics, facsimile transmissions, local and long distance telephone, postage, and express mail services.*

[c] *Tax rate = 5 percent on applicable items*

Labor will be charged in accordance with the attached Schedule of Hourly Billing Rates. Expenses will be billed at cost plus 10 percent. BC will perform this work under the Terms and Conditions of our agreement with Sapphire dated February 27, 2009.

Scope and Budget Assumptions

Assuming we receive written authorization to proceed by April 26, 2010, we will submit the 100 percent design package by September 1, 2010.

Scope and Budget Assumptions

1. Redacted Exemption 4

significant rework Redacted Exemption 4 will be required that is not included in this scope of work.

2. At the request of Sapphire, we will indicate that Redacted Exemption 4 We will neither evaluate nor validate the specification of this Redacted Exemption 4
3. This proposal does not include Redacted Exemption 4 for algae production.
4. Redacted Exemption 4 , we will prepare a supplementary proposal to cover additional costs.
5. Placeholder Redacted Exemption 4 have been included for Redacted Exemption 4 have not yet been established. Based on the current schedule of process development activities, we anticipate that the Redacted Exemption 4 will not be included in Redacted Exemption 4 and will be delayed until the Redacted Exemption 4
6. Placeholder Redacted Exemption 4 have been included for Redacted Exemption 4 , but no process has been selected and Redacted Ex. 4 have not yet been established. Based on the current schedule of process development activities, we anticipate that the Redacted Exemption 4 will not be included in the Redacted Exemption 4 and will be delayed until the Redacted Exemption 4.
7. Redacted Ex. 4 will begin at the point of Redacted Ex. 4 designed and sized by others (e.g., HGI).
8. Redacted Exemption 4 for algae production will begin downstream of storage facilities designed and sized by others (e.g., HGI).
9. Redacted Exemption 4 We can provide a supplemental proposal for this support if requested by Sapphire.
10. Redacted Exemption 4
11. The scope of work includes preparing Redacted Exemption 4 only. We assume that Redacted Exemption 4 for bidding will be prepared by others.
12. The scope of work includes Redacted Exemption 4
13. Attendance at meetings is included, as specified in the Scope of Work, but Sapphire will keep and distribute meeting minutes.
14. We will keep Sapphire apprised of our progress in meetings and conference calls; however, after each Redacted Exemption 4 , we will commence work immediately on the simultaneous with Sapphire's review. We will incorporate Sapphire's comments as they become available. Any pause in the work will cause us to miss our projected schedule and budget.
15. Redacted Exemption 4 will be based on the Redacted Exemption 4 , and minimal changes are anticipated.

To accept this proposal, please sign and date two copies and return one copy to BC within five days.

We look forward to working with you in the IABR design. Please contact Matt Gerhardt at 925.210.2275 with any questions on this proposal.

Very truly yours,

BROWN AND CALDWELL

Matthew B. Gerhardt, Ph.D., P.E.
Managing Engineer

Melih M. Ozbilgin, Ph.D.
Vice President

MBG:

The undersigned agrees to the Terms and Conditions of this Letter Agreement attached hereto

SAPPHIRE ENERGY, INC.

Signature:_____

Printed Name:_____

Title: _____

Date: _____

cc: Ms. Jenelle Armstrong, Brown and Caldwell
Dr. Carla De Las Casas, Brown and Caldwell
Mr. Robert Finn, Brown and Caldwell
Mr. Bryan Plude, Brown and Caldwell

Note: The information contained in this proposal is proprietary and contains confidential information that is of significant economic value to Brown and Caldwell. It is intended to be used only for evaluation of our qualifications to provide services. It should not be duplicated, used, or disclosed, in whole or in part, for any purpose other than to evaluate this proposal.

Brown and Caldwell 2010 Schedule of Hourly Billing Rates

Level	Engineering	Technical/Scientific	Administrative	$/Hour
Level C				
		Redacted Exemption 4		
Level D				
Level E				
Level F				
Level G				
Level H				

Brown and Caldwell 2010 Schedule of Hourly Billing Rates

Level	Engineering	Technical/Scientific	Administrative	$/Hour
Level I				
		Redacted Exemption 4		
Level J				
Level K				
Level L				
Level M				
Level N				

Notes:

Brown and Caldwell hourly billing rates are revised annually to reflect changes in employee pay rates. The above rates are effective through December 31, 2010.

An associated project charge of Ex.4 *will be added to cover costs for personal and CADD computers, reprographics, facsimile transmissions, local and long distance telephone, postage, and express mail services.*

ATTACHMENT B
Scope Augmentation Request dated December 6, 2010

PR100027.100
Attachment B

201 North Civic Drive
Walnut Creek, California 94596
Tel: 925.937.9010
Fax: 925.937.9026
www.brownandcaldwell.com

Brown AND Caldwell

December 6, 2010

Mr. Jaime Moreno
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, California 92691

071767.003.010

Subject: IABR Design Services – Scope Augmentation
Proposal and Letter Agreement

Dear Mr. Moreno:

Sapphire Energy, Inc. (Sapphire) is preparing to construct an Integrated Algal Bio Refinery (IABR) in Columbus, New Mexico. Brown and Caldwell (BC) has been designing elements of the IABR. This proposal presents our request for funding of out-of-scope items.

Background and Approach

BC has submitted a 90 percent design and cost estimate for elements of the IABR for which we are responsible, including

Redacted Exemption 4

We are completing the value engineering assignment requested by Sapphire and preparing a 100 percent design package for the first phase of construction.

Our original proposal, dated April 25, 2010, was for $

Redacted Exemption 4

Sapphire has requested BC to perform several activities that were not in our proposal. These include Redacted Exemption 4

Budget Impact of Out-of-Scope Items

Table 1 lists the activities Brown and Caldwell has conducted at Sapphire's request that were not included in the scope of work in our April 25, 2010 proposal and their cost.

Revised Scope of Work

BC proposes to amend the April 25, 2010 scope of work as follows:

Phases 100, 101, 102, 103 and 501 (Activities Through 60 Percent Design)

Unchanged.

Phases 100, 101, 102, 103, 501 and 503 (Activities Through 60 Percent Design)

Unchanged.

Table 1. Out of Scope Items Performed

Description	Hours	Labor	APC[a]	Expenses	Total
Redacted Exemption 4					
Total					

[a]*Associated project charge, which covers costs for personal and CADD computers, reprographics, facsimile transmissions, local and long distance telephone, postage and express mail services.*

Phase 200 – Project Management for 90 and 100 Percent Design

Scope description unchanged. However, since project has extended past original September 1, 2010 end date, project management budget is increased Redacted Exemption 4

Phases 201 and 601 – Meetings for 90 and 100 Percent Design

Redacted Exemption 4

Phases 202 (out-of-NM) and 602 (in-NM) –90 Percent Design

Redacted Exemption 4

Phases 203 (out-of-NM) and 603 (in-NM) –100 Percent Design

Redacted Exemption 4

Compensation

Table 2 shows our proposed budget.

Table 2. Revised Estimated Level of Effort and Fee IABR Design

Phase[a]	Description	Hours	Labor	APC[b]	Expenses	Total
100, 101, 102, 103, and 501	Redacted Exemption 4					
200						
201/601						
202/602						
203/603						
700						
Total Project						
Amount Previously Authorized						
Additional Amount Requested						

[a]*Where two numbers are shown, the second is for activities performed within New Mexico, which must be tracked separately for state tax purposes.*

[b]*Associated project charge, which covers costs for personal and CADD computers, reprographics, facsimile transmissions, local and long distance telephone, postage and express mail services.*

[c]*The total ($* Redacted Exemption 4

[d]*Tax rate = 5 percent on applicable items*

To accept this proposal, please sign two copies and return one copy to BC within 10 days.

Please contact Matt Gerhardt at 925.210.2275 with any questions on this proposal.

Very truly yours,

BROWN AND CALDWELL,

Matthew B. Gerhardt, Ph.D., P.E.
Managing Engineer

Melih M. Ozbilgin, Ph.D.
Vice President

MBG:dem

cc: Ms. Lori L. Jones, Brown and Caldwell
Mr. Jay N. Patil, Brown and Caldwell
Mr. Bryan Plude, Brown and Caldwell

The undersigned agrees to the Terms and Conditions of this Letter Agreement attached hereto.

SAPPHIRE ENERGY, INC.

Signature _____

Printed Name _____

Title _____

Date _____

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 05

SAPPHIRE ENERGY PROJECT NO. PR.100027.100

BROWN AND CALDWELL PROJECT NO. 139197

Brown and Caldwell is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Brown and Caldwell ("BC"), and Sapphire Energy, Inc. ("CLIENT") dated February 27, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
IABR HAZOP

PROJECT LOCATION: Las Cruces, NM Research Facility, Corner of Venture Dr & Advancement Ave., Las Cruces, New Mexico

DESCRIP. OF WORK: Complete the Scope of Work as described in **Attachment A** to this Work Order

PERIOD OF SERVICE: April 18, 2010 through Jul 31, 2011

PAYMENT: BC will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Ex.4 Attachment A summarizes the costs for this work order by task.

INITIAL AUTHORIZATION: The limit of authorized budget associated with this work order is $ Redacted Ex. 4 services through completion. The balance of authorizations needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between BC and Client dated February 27, 2009.

SAPPHIRE ENERGY, INC.

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: 4/17/11

Send copies of communications and notices to Sapphire Energy: Attn: Jaime E. Moreno, P.E.

SAPPHIRE ENERGY DOCUMENT NO. 10062.BC

ATTACHMENT A
Work Description and Cost Summary

201 North Civic Drive
Walnut Creek, California 94596
Tel: 925.937.9010
Fax: 925.937.9026
www.brownandcaldwell.com

Brown AND Caldwell

April 14, 2011

MrJaime Moreno
Sapphire Energy, Inc.
27101 Puerta Real
Suite 280
Mission Viejo, California 92691

071767.112

Subject: Participation in HAZOP Review
Proposal and Letter Agreement

Dear Mr. Moreno:

Sapphire Energy, Inc. (Sapphire) has completed the design of its Integrated Algal Bio Refinery (IABR) and plans to hold a process hazards analyis (HAZOP) on the design. Brown and Caldwell (BC) has been asked to participate. This letter BC's proposal for our participation.

Scope of Work

Phase 210 – HAZOP

Redacted Exemption 4

Compensation

Table 1 shows our proposed budget for this work. We will perform this work under the Terms and Conditions of our agreement with Sapphire dated February 27, 2009. Labor and expenses will be billed in accordance with our agreement with Sapphire dated March 21, 2011.

Table 1. Proposed Budget for HAZOP (Phase 210)

Phase	Description	Hours	Labor	Expenses	Total
210	Redacted Exemption 4				

To accept this proposal, please sign two copies and return one copy to BC.

Please contact Matt Gerhardt at 925.210.2275 with any questions on this proposal.

Very truly yours,

BROWN AND CALDWELL,

Matthew B. Gerhardt, Ph.D., P.E.
Managing Engineer

Melih M. Ozbilgin, Ph.D.
Vice President

MBG:

cc: Mr. Marc Damikolas, Brown and Caldwell
Mr. Bryan Zinn, Brown and Caldwell

The undersigned agrees to the Terms and Conditions of this Letter Agreement attached hereto.

SAPPHIRE ENERGY, INC.

Signature: _____

Printed Name: _____

Title: _____

Date: _____

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 06

SAPPHIRE ENERGY PROJECT NO. PR.100027.100

BROWN AND CALDWELL PROJECT NO. 139197

Brown and Caldwell is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Brown and Caldwell ("BC"), and Sapphire Energy, Inc. ("CLIENT") dated February 27, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
Design Services in Support of IABR Development

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico
1500 HWY 9 SW, Deming, NM 88030

DESCRIP. OF WORK: As described in BC's proposal dated March 10, 2011 which is included as a part of this Addendum as **Attachment A.**

PERIOD OF SERVICE: January 1, 2011 through Dec 31, 2011

PAYMENT: BC will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Ex. 4 **Attachment A** summarizes the cost breakdown by task.

ADDITIONAL AUTHORIZATION: The limit of additional authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of $ Redacted Ex. 4 The balance of authorization needed to complete the approved Scope of Work will be contained in subsequent Work Orders..

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between BC and Client dated February 27, 2009.

SAPPHIRE ENERGY, INC.

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: April 28, 2011

Send copies of communications and notices to Sapphire Energy: Attn: Jaime E. Moreno, P.E.

SAPPHIRE ENERGY DOCUMENT NO. SD.11.0096.BC

ATTACHMENT A
Work Description and Cost Summary

201 North Civic Drive
Walnut Creek, California 94596
Tel: 925.937.9010
Fax: 925.937.9026
www.brownandcaldwell.com

Brown AND Caldwell

March 10, 2011

Mr. Jaime Moreno
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, California 92691

139197.200

Subject: IABR Design – Scope Augmentation
Proposal and Letter Agreement

Dear Mr. Moreno:

Sapphire Energy, Inc. (Sapphire) is preparing to construct an Integrated Algal Bio Refinery (IABR) in Columbus, New Mexico. Brown and Caldwell (BC) has been designing elements of the IABR. This proposal presents our request for funding of out-of-scope items.

Background

BC's original IABR design scope was for Redacted Exemption 4 , for a total of Redacted Exemption 4 . On April 25, 2010, BC submitted a scope and cost estimate of $

Redacted Exemption 4

At Sapphire's request, we put the design on hold.

As a result of a series of value engineering exercises, Sapphire elected to change the scope of the project. BC was requested to produce a 100 acre design with a number of changes related to

Redacted Exemption 4

Each review set included various changes and enhancements developed during project team meetings.

In preparation for the finalization of the design and submittal to the Sapphire's construction contractor, during late December 2010 and early January 201, a senior BC design professional conducted an internal coordination, quality and constructability check of our December 2010 drawings. The drawing set submitted to Sapphire on January 30, 2011, incorporated most of these changes. BC planned to incorporate the remainder of the coordination check comments plus recently received comments from Harris Group, Inc., (HGI) in a future submittal, currently scheduled to be submitted February 28, 2011.

During the IABR review meetings held in January 2011, BC was asked to prepare a technical memoranda evaluating and comparing the IABR gravity pond design to the conventional Oswald ponds. We submitted a draft version of this technical memorandum to Sapphire on January 28, 2011.

Budget Status

BC's April 2010 proposal to prepare Redacted Exemption 4 . Sapphire authorized $ Ex. 4 in April 2010 and another $ Ex. 4 in August 2010. In December 2010, Sapphire authorized an additional $ Ex. 4 to cover out-of-scope work on Redacted Exemption 4 . This brought the total authorized amount to $ Ex. 4 .[1] Through January 27, 2011, we have spent $ Ex. 4 .[2] We estimate another $ Ex. 4 was spent through January 31, 2011.

Attachment A shows how the four Work Orders correspond to Brown and Caldwell's work breakdown structure. In summary,

- Work Order 1 ($ Ex. 4) corresponds to our work Redacted Exemption 4 This work was completed within budget.
- Work Orders 2 and 3 ($ Ex. 4 total) correspond to our work on the Redacted Ex. 4 . This work was also completed within budget, and we moved $ Ex. 4 into the Redacted Exemption 4
- Work Order 4 ($ Ex. 4) was to cover out-of-scope work on Redacted Exemption 4

Compensation

Our recent discussions with Sapphire suggest that Sapphire management wishes to change the current approach to pond designs. We believe that this represents a point at which we should close the current phase and start the new effort in a new phase. Hence, we respectfully request a change order with $ Redacted Exemption 4 budget to cover out-of-scope work already conducted. Table 1 shows the amount of additional funds requested for the work done to date. Details are shown in Attachment A.

---

[1] New Mexico charges a Gross Receipts tax for in-state work.

Redacted Exemption 4

[2] Includes $ Redacted Exemption 4

Table 1. Additional Funds Requested for IABR Design

Task	Sapphire Number	Previously Authorized	Additional Amount Requested
Work through 60 percent design	PR.100027.100	Redacted Exemption 4	
Work on 90 percent design	PR.100027.100		
Value Engineering and IPA meetings	PR.100027.100		
100 percent design (including incorporation of value engineering changes, reduction from 300 to 100 acres, three submittals and review meetings)	PR.100027.100		
Technical memorandum comparing Redacted Exemption 4	PR.100027.100		
Total			

To accept this proposal, please sign two copies and return one copy to BC.

Please contact Matt Gerhardt at 925.210.2275 with any questions on this proposal.

Very truly yours,

BROWN AND CALDWELL,

Matthew B. Gerhardt, Ph.D., P.E.
Managing Engineer

Melih M. Ozbilgin, Ph.D.
Vice President

MBG:ddt

The undersigned agrees to the Terms and Conditions of this Letter Agreement attached hereto.

SAPPHIRE ENERGY, INC.

Signature: _____

Printed Name: _____

Title: _____

Date: _____

cc: Ms. Lori L. Jones, Brown and Caldwell
Mr. Jay N. Patil, Brown and Caldwell
Mr. Bryan Plude, Brown and Caldwell

Attachments (1)

1. Attachment A: Brown and Caldwell Budget Status on Sapphire Energy IABR Design

Attachment A
Brown and Caldwell Budget Status on Sapphire Energy IABR Design Through February 3, 2011
Sapphire Project No. PR.100027.100
Brown and Caldwell Project 139197

Sapphire Authorization	Date	Amount	Corresponding Phase Numbers in Brown and Caldwell Work Breakdown Structure	Phase Description	Budget Labor Hours	Budget Labor Dollars	Budget Expenses Dollars	Budget Total Dollars	Amount Spent through February 3, 2011 Labor Hours	Amount Spent through February 3, 2011 Labor Dollars	Amount Spent through February 3, 2011 Expenses Dollars	Amount Spent through February 3, 2011 Total Dollars	Remaining Budget, Dollars	Additional Amount Requested Dollars
Work Order No. 1	4/27/2010		100, 101, 102, 103, 501, 503	Work through 60% Design										
				Gross Receipts Tax										
				Subtotal										
Work Order No. 2	8/10/2010	Redacted Exemption 4	200	Project Management (90% and 100%)										
Work Order No. 3	8/31/2010		201	Meetings (90% and 100%)										
Less amount moved to 100%				90% Design										
Subtotal			[a]	Subtotal										
Work Order No. 4	12/14/2010		203	100% Design										
Work Order No. 4	12/14/2010		203	Value Engineering and IPA Meetings										
			203	Tech Memo - pond design										
Plus amount moved from 90%				Gross Receipts Tax										
Subtotal			[a,b]	Subtotal										
Total														

Redacted Exemption 4

[a]Note: $ Redacted Exemption 4

[b]Of this amount, $ Redacted Exemption 4

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 07

SAPPHIRE ENERGY PROJECT NO. PR.100027.100

BROWN AND CALDWELL PROJECT NO. 139197

Brown and Caldwell is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Brown and Caldwell ("BC"), and Sapphire Energy, Inc. ("CLIENT") dated February 27, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
Design Services in Support of IABR Development

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico
1500 HWY 9 SW, Deming, NM 88030

DESCRIP. OF WORK: As described in BC's proposal dated March 4, 2011 which is included as a part of this Addendum as **Attachment A.**

PERIOD OF SERVICE: January 1, 2011 through Dec 31, 2011

PAYMENT: BC will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Ex. 4 **Attachment A** summarizes the cost breakdown by task.

ADDITIONAL AUTHORIZATION: The limit of additional authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of $ Redacted Ex. 4 The balance of authorization needed to complete the approved Scope of Work will be contained in subsequent Work Orders..

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between BC and Client dated February 27, 2009.

SAPPHIRE ENERGY, INC.

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: April 28, 2011

Send copies of communications and notices to Sapphire Energy: Attn: Jaime E. Moreno, P.E.

SAPPHIRE ENERGY DOCUMENT NO. SD 11.0095.BC

ATTACHMENT A
Work Description and Cost Summary

201 North Civic Drive
Walnut Creek, California 94596
Tel: 925.937.9010
Fax: 925.937.9026
www.brownandcaldwell.com

Brown AND Caldwell

March 4, 2011

Mr. Jaime Moreno
27101 Puerta Real
Suite 280
Mission Viejo, California 92691

140619.102

Subject: Proposal for Revised IABR Design
Proposal and Letter Agreement

Dear Mr. Moreno:

Sapphire Energy, Inc., (Sapphire) is finalizing plans for its Integrated Algal Bio Refinery (IABR) in Columbus, New Mexico, and has decided to modify much of the design.

Redacted Exemption 4

This letter presents Brown and Caldwell's proposal to prepare a revised set of plans, specifications and cost estimate.

Scope of Work

Brown and Caldwell (BC) will perform the following:

Phase 200– March 2011 IABR Redesign

-
- Redacted Exemption 4
-
-
-
-

Scope and Budget Assumptions

1. We will rely on the Redacted Exemption 4 by AMEC Geomatrix, Inc., dated February 24, 2011,[1] and we will make no attempt to verify it. As directed by Sapphire on February 23, 2011, we will indicate Redacted Exemption 4
2. The scope and budget are based on the design basis shown in Attachment C. We assume that this design basis will not significantly change during the course of this project
3. We will indicate that Redacted Exemption 4
4. This proposal does not include Redacted Exemption 4
5. Redacted Exemption 4
6. Redacted Exemption 4
7. Redacted Ex. 4 will begin at the point of Redacted Ex. 4 designed and sized by others (e.g., HGI).
8. Redacted Exemption 4
9. Redacted Exemption 4
10. We will make a good faith effort within the schedule constraints to achieve the Redacted Exemption 4
11. Redacted Exemption 4
12. The scope of work includes Redacted Exemption 4 only. We assume that Redacted Exemption 4 for bidding will be prepared by others.
13. The scope of work includes Redacted Exemption 4
14. Attendance at meetings and conference calls is included, as specified in the Scope of Work, but Sapphire will keep and distribute meeting minutes.
15. Redacted Exemption 4

---

[1] Preliminary Redacted Exemption 4 for Proposed Integrated Algal Biorefinery Project Luna County, New Mexico

15. Redacted Exemption 4

16. We will consult with Ex. 4 , consultant to Sapphire, on an as-needed basis. Design changes recommended by Ex. 4 will be discussed with Sapphire before being incorporated into the design documents.
17. Redacted Exemption 4

Schedule

Assuming notice to proceed by March 8, 2011 and no significant changes to the basis of design or the assumptions described above, we will deliver plans, specifications and a cost estimate on April 1, 2011.

Compensation

Table 1 shows our proposed budget for this work. We will perform this work under the Terms and Conditions of our agreement with Sapphire dated February 27, 2009. Labor will be billed in accordance with our 2011 Schedule of Hourly Billing Rates (Attachment B). Expenses will be billed at cost plus 10 percent.

Table 1. Proposed Budget for IABR Redesign

Phase	Description	Hours	Labor	Expenses	Total
200	March 2011 IABR Redesign	Redacted Exemption 4			

To accept this proposal, please sign two copies and return one copy to BC.

Please contact Matt Gerhardt at 925.210.2275 with any questions on this proposal.

Very truly yours,

BROWN AND CALDWELL,

Matthew B. Gerhardt, Ph.D., P.E.
Managing Engineer

Melih M. Ozbilgin, Ph.D.
Vice President

MBG:

The undersigned agrees to the Terms and Conditions of this Letter Agreement attached hereto.

SAPPHIRE ENERGY, INC.

Signature: _____

Printed Name: _____

Title: _____

Date: _____

cc: Mr. Marc Damikolas, Brown and Caldwell
Mr. Robert Finn, Brown and Caldwell
Mr. Bryan Plude, Brown and Caldwell
Mr. Bryan Zinn, Brown and Caldwell

Attachments (3)
Attachment A: Preliminary Drawing List
Attachment B: Brown and Caldwell 2011 Schedule of Hourly Billing Rates
Attachment C: Design Basis

ATTACHMENT A - PRELIMINARY DRAWING LIST

COVER SHEET

GENERAL

02-G-202 Redacted Exemption 4

CIVIL

00-C-100
00-C-101
00-C-102
00-C-103
00-C-104
00-C-105
00-C-106
00-C-107
00-C-108
00-C-109
00-C-111
00-C-112
00-C-113
00-C-114
00-C-300
00-C-302
00-C-304
00-C-305
00-C-306
00-C-307

02-C-100
02-C-103
02-C-104
02-C-105
02-C-110
02-C-203
02-C-204
02-C-205
02-C-210
02-C-220
02-C-221
02-C-224
02-C-226
02-C-301

02-C-302
02-C-309
02-C-311
03-C-160
03-C-260
03-C-261

Redacted Exemption 4

PROCESS FLOW DIAGRAMS

02-F-211
02-F-212
02-F-220
02-F-229
02-F-230
02-F-231
02-F-232
02-F-233
02-F-234
02-F-235
02-F-236
02-F-237
02-F-238
02-F-239
02-F-250

03-F-230
03-F-233
03-F-234
09-F-293
09-F-294

Redacted Exemption 4

PROCESS AND INSTRUMENTATION

00-F-001
02-F-315
02-F-316
02-F-317
02-F-320

02-F-351
02-F-353
02-F-354

Redacted Exemption 4

02-F-355
02-F-356
02-F-357
02-F-358
02-F-359
02-F-360
02-F-361
02-F-362
02-F-363
02-F-364
02-F-365
02-F-366
02-F-367
02-F-368
02-F-369
02-F-370
02-F-371
02-F-372
02-F-373
02-F-374
03-F-324
03-F-330
03-F-331
03-F-332
03-F-333
03-F-345
03-F-346
03-F-350
03-F-352
03-F-353
09-F-415
09-F-417

Redacted Exemption 4

STRUCTURAL

00-S-025
00-S-026
00-S-027

02-S-357
02-S-359
02-S-360
02-S-370

02-S-371
02-S-372
02-S-373

Redacted Exemption 4

03-S-302
03-S-350
03-S-351
03-S-500
03-S-501

MECHANICAL

00-M-025
00-M-026
00-M-027
00-M-028

02-M-112
02-M-151
02-M-152
02-M-153
02-M-154
02-M-155
02-M-250
02-M-252
03-M-151
03-M-152
03-M-153
03-M-154
03-M-251
03-M-252
03-M-253
03-M-254

09-M-190
09-M-191
09-M-250
09-M-251

ELECTRICAL

00-E-351
00-E-352

00-E-590

02-E-029
02-E-030
02-E-031
02-E-152
02-E-153
02-E-154
02-E-155
02-E-156
02-E-157
02-E-158
02-E-161
02-E-171
02-E-191
02-E-192
02-E-552
02-E-553
03-E-027
03-E-151
03-E-152
03-E-171
03-E-172
03-E-173
03-E-174
03-E-192
03-E-195
03-E-550
03-E-551
03-E-560
03-E-561

Redacted Exemption 4

09-E-151
09-E-171
09-E-191
09-E-560

INSTRUMENTATION

02-I-562
02-I-563
02-I-591
02-I-592

Redacted Exemption 4

02-I-593
02-I-594
02-I-595
02-I-596
02-I-597
02-I-598
02-I-599
03-I-551
03-I-552
03-I-553
03-I-554
03-I-555
03-I-571
03-I-574

09-I-571
09-I-572

Redacted Exemption 4

Attachment B
Brown and Caldwell 2011 Schedule of Hourly Billing Rates

Level	Engineering	Technical/Scientific	Administrative	$/Hour
Level C				
		Redacted Exemption 4		
Level D				
Level E				
Level F				
Level G				

Attachment B
Brown and Caldwell 2011 Schedule of Hourly Billing Rates

Level	Engineering	Technical/Scientific	Administrative	$/Hour
Level H				

Redacted Exemption 4

Level I				
Level J				
Level K				
Level L				
Level M				
Level N				

BROWN AND CALDWELL

Note:

Brown and Caldwell hourly billing rates are revised annually to reflect changes in employee pay rates. The above rates are effective through December 31, 2011.

ATTACHMENT C - DESIGN BASIS

Item	Value

Redacted Exemption 4

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 08

SAPPHIRE ENERGY PROJECT NO. PR.100027.100

BROWN AND CALDWELL PROJECT NO. 139197

Brown and Caldwell is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Brown and Caldwell ("BC"), and Sapphire Energy, Inc. ("CLIENT") dated February 27, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
Design Services in Support of IABR Development

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico
1500 HWY 9 SW, Deming, NM 88030

DESCRIP. OF WORK: As described in BC's proposal dated April 19, 2011 which is included as a part of this Addendum as **Attachment A.**

PERIOD OF SERVICE: January 1, 2011 through Dec 31, 2011

PAYMENT: BC will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Ex. 4 **Attachment A** summarizes the cost breakdown by task.

ADDITIONAL AUTHORIZATION: The limit of additional authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of $ Redacted Ex. 4 The balance of authorization needed to complete the approved Scope of Work will be contained in subsequent Work Orders..

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between BC and Client dated February 27, 2009.

SAPPHIRE ENERGY, INC.

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: April 28, 2011

Send copies of communications and notices to
Sapphire Energy: Attn: Jaime E. Moreno, P.E.

SAPPHIRE ENERGY
DOCUMENT NO. SD11.0094.BC

ATTACHMENT A
Work Description and Cost Summary

201 North Civic Drive
Walnut Creek, California 94596
Tel: 925.937.9010
Fax: 925.937.9026
www.brownandcaldwell.com

Brown AND Caldwell

April 19, 2011

Mr. Jaime Moreno
Sapphire Energy, Inc.
27101 Puerta Real
Suite 280
Mission Viejo, California 92691

071767.112

Subject: Engineering services for IABR post design support
Proposal and Letter Agreement

Dear Mr. Moreno:

Sapphire Energy, Inc. (Sapphire) has completed the design of its Integrated Algal Bio Refinery (IABR). Brown and Caldwell (BC) has been asked to provide additional engineering services related the IABR for post design support as this project moves from beyond the design phase through the bidding and construction phases. This letter BC's proposal for our participation in these efforts.

Scope of Work

Phase 201 – IABR Post Design & Bid Support Services

BC staff will be made available to Sapphire as requested to assist Sapphire in support of the post design phase of the IABR project. Work will be performed on an as needed basis by BC staff when requested by Sapphire. BC's post design support services may include:

- Redacted Exemption 4
-
-
-
-
-
-

Compensation

Table 1 shows our proposed budget for this work. We will perform this work under the Terms and Conditions of our agreement with Sapphire dated February 27, 2009. Labor and expenses will be billed in accordance with our agreement with Sapphire dated March 21, 2011.

Table 1. Proposed Budget for IABR Post Design & Bid Support Services

Phase	Description	Hours	Labor	Expenses	Total
201	IABR Post Design & Bid Support Services	Redacted Exemption 4			

*The average hourly rate for services provided to Sapphire to date has been $ Ex.4 /hr. The actual rate billed under this phase will vary depending on the classification of employee performing the work requested.

To accept this proposal, please sign two copies and return one copy to BC.

Please contact Bryan Zinn at 714.689.4830 with any questions on this proposal.

Very truly yours,

BROWN AND CALDWELL,

Bryan J. Zinn, P.E.
Executive Engineer

Melih M. Ozbilgin, Ph.D.
Vice President

MBG:

The undersigned agrees to the Terms and Conditions of this Letter Agreement attached hereto.

SAPPHIRE ENERGY, INC.

Signature: _____

Printed Name: _____

Title: _____

Date: _____

cc: Mr. Marc Damikolas, Brown and Caldwell
Dr. Matt Gerhardt, Brown and Caldwell

Dave Marsh

From: Zinn, Bryan [bzinn@BrwnCald.com]
Sent: Wednesday, April 20, 2011 7:15 AM
To: Jaime Moreno
Cc: Dave Marsh; Ron Kluwe; Ozbilgin, Melih; Damikolas, Marc; Plude, Bryan; Finn, Bob; Gerhardt, Matt
Subject: Brown & Caldwell Proposal for post design IABR support
Attachments: Sapphire IABR Post Design & Bid Support Proposal 010419.pdf

Categories: Follow-Up

Jaime,

Attached is our proposal for ongoing post design IABR support services. This proposal will allow us to open up a new phase under the existing project number for Redacted Exemption 4 , and any other services Sapphire may need as you move the project toward green ponds.

As we discussed recently with the 2011 IABR re-design largely complete,

Redacted Exemption 4

Unlike the previous proposals which were more narrowly scoped around very specific tasks and deliverables, this proposal is more broad for the time of any BC Sapphire team members you need to meet your goals. Our objective is to have a number of hours and dollars allocated to responding to whatever issues Sapphire may need our help with.

Please let me know if you have any questions or comments on this. As with the other recent proposal, an approval of this proposal would be greatly appreciated.

Best Regards,

Bryan J. Zinn, P.E.
Executive Engineer
Brown and Caldwell
bzinn@brwncald.com
T 714.689.4830 | F 714.734.0940 | C 714.478.8132

Harris Group

Work Order	Date		Incremental	Total Budget
1	27-Apr-10	$		
2	23-Jul-10	$	Redacted Exemption 4	
3	24-Aug-10	$		
4	27-Oct-10	$		
5	28-Apr-11	$		
6	28-Apr-11	$		
7	29-Apr-11	$		
8	23-May-11	$		
(ETC)	TBD	$		

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 01

SAPPHIRE ENERGY PROJECT NO. PR.100026.100

HARRIS GROUP, INC. PROJECT NO. _____

Harris Group, Inc. is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Harris Group, Inc. ("Harris"), and Sapphire Energy, Inc. ("CLIENT") dated January 23, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
IABR Detailed Design
Proposal for Professional Services
HGI Proposal No. PI610.01-11, Rev 2

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico.

DESCRIP. OF WORK: As described in Harris' proposal dated April 23, 2010 which is included as a part of this Addendum as **Attachment A**.

PERIOD OF SERVICE: March 1, 2010 through December 31, 2010.

PAYMENT: Harris will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Exemption 4 **Attachment A** summarizes hourly rates and cost breakdown by task.

INITIAL AUTHORIZATION: The limit of authorized budget associated with this work order is $ Redacted Ex. 4 The balance of authorizations needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between Harris and CLIENT, dated January 23, 2009.

SAPPHIRE ENERGY COMPANY

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: April 27, 2010

Send copies of communications and notices to
Sapphire Energy: Attn: Jaime E. Moreno, P.E.

ATTACHMENT A
Proposal dated April 23, 2010

PR100026.100

Harris Group Inc.

Attachment A

April 23, 2010

Mr. Jaime Moreno
Vice President of Projects
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, CA 92691

Sent via email to: jaime.moreno@sapphireenergy.com

Reference: Sapphire Energy, Inc.
IABR Detailed Design
Proposal for Professional Services
HGI Proposal No. PI610.01-11, Rev 2

Dear Jaime,

We are pleased to provide you with this proposal for engineering services for your proposed integrated algal bio-refinery (IABR) in Columbus, New Mexico. We have appreciated the opportunity to provide project development services for the IABR and believe we are uniquely qualified for the detailed design.

Project Description

Sapphire Energy plans to scale up its process for cultivating and harvesting algal biomass, extracting oil from the algae, and converting those oils into liquid transportation fuels. Sapphire has developed its own process for growing and harvesting algae, and recovering algal oil from the harvested biomass. Conversion of these oils into liquid fuels will be accomplished using Syntroleum's Bio-Synfining™ process. Each facility will consist of the following major process areas: algae growth and harvesting; algae oil extraction and purification; Syntroleum Bio-Synfining™; and auxiliary equipment.

The IABR facility will be built at demonstration scale (91 bbl refined algae oil/day). In the demonstration-scale facility, algae will be grown, harvested, and extracted using a process developed by Sapphire. Extracted oil will be stockpiled at Sapphire's site and then shipped to the Dynamic Fuels refinery, where it will be converted into green diesel and green jet fuels using the Syntroleum process. Spent solids left over after the extraction process will be fed to an anaerobic digester. Biogas from the digester will be collected and combusted to supply a portion of the heat and CO_2 needed for the process. In the commercial-scale facility, all unit operations will take place on one site and be owned and operated by Sapphire.

Communications:
P.O. Box 3855
Seattle, WA 98124-3855
(206) 494-9400
Fax (206) 494-9500
www.harrisgroup.com

Office:
Suite 200
200 W Thomas St.
Seattle, WA
98119

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 02

SAPPHIRE ENERGY PROJECT NO. PR.100026.100

HARRIS GROUP, INC. PROJECT NO. 30070.00

Harris Group, Inc. is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Harris Group, Inc. ("Harris"), and Sapphire Energy, Inc. ("CLIENT") dated January 23, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
IABR Detailed Design
Proposal for Professional Services
HGI Proposal No. PI610.01-11, Rev 2

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico.

DESCRIP. OF WORK: As described in Harris' proposal dated April 23, 2010 which is included as a part of this Addendum as **Attachment A**.

PERIOD OF SERVICE: March 1, 2010 through December 31, 2010.

PAYMENT: Harris will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $Redacted Exemption 4 **Attachment A** summarizes hourly rates and cost breakdown by task.

ADDITIONAL AUTHORIZATION: The limit of additional authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of $ Redacted Ex. 4 The balance of authorizations needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between Harris and CLIENT, dated January 23, 2009.

SAPPHIRE ENERGY COMPANY

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: July 23, 2010

Send copies of communications and notices to
Sapphire Energy: Attn: Jaime E. Moreno, P.E.

ATTACHMENT A
Proposal dated April 23, 2010

PR100026.100

Harris Group Inc.

Attachment A

April 23, 2010

Mr. Jaime Moreno
Vice President of Projects
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, CA 92691

Sent via email to: jaime.moreno@sapphireenergy.com

Reference: Sapphire Energy, Inc.
IABR Detailed Design
Proposal for Professional Services
HGI Proposal No. PI610.01-11, Rev 2

Dear Jaime,

We are pleased to provide you with this proposal for engineering services for your proposed integrated algal bio-refinery (IABR) in Columbus, New Mexico. We have appreciated the opportunity to provide project development services for the IABR and believe we are uniquely qualified for the detailed design.

Project Description
Sapphire Energy plans to scale up its process for cultivating and harvesting algal biomass, extracting oil from the algae, and converting those oils into liquid transportation fuels. Sapphire has developed its own process for growing and harvesting algae, and recovering algal oil from the harvested biomass. Conversion of these oils into liquid fuels will be accomplished using Syntroleum's Bio-Synfining™ process. Each facility will consist of the following major process areas: algae growth and harvesting; algae oil extraction and purification; Syntroleum Bio-Synfining™; and auxiliary equipment.

The IABR facility will be built at demonstration scale (91 bbl refined algae oil/day). In the demonstration-scale facility, algae will be grown, harvested, and extracted using a process developed by Sapphire. Extracted oil will be stockpiled at Sapphire's site and then shipped to the Dynamic Fuels refinery, where it will be converted into green diesel and green jet fuels using the Syntroleum process. Spent solids left over after the extraction process will be fed to an anaerobic digester. Biogas from the digester will be collected and combusted to supply a portion of the heat and CO_2 needed for the process. In the commercial-scale facility, all unit operations will take place on one site and be owned and operated by Sapphire.

Communications:
P.O. Box 3855
Seattle, WA 98124-3855
(206) 494-9400
Fax (206) 494-9500
www.harrisgroup.com

Office:
Suite 200
200 W Thomas St.
Seattle, WA
98119

Sapphire is currently utilizing both Harris Group (HGI) and Brown and Caldwell (B&C) for engineering scopes of work. Responsibilities are delineated as follows:

Area	Name	Operations	Responsible Engineer
00	Redacted Exemption 4		HGI
			HGI
			HGI
			HGI
			HGI
			HGI
			HGI
01			B&C
			B&C
			HGI/B&C
			B&C
02			B&C
			B&C
			B&C
03			B&C
04			HGI
			HGI
			HGI
05			N/A
06			Dynamic
07			B&C
			HGI
			B&C
08			B&C
			B&C
09			HGI
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			HGI
			HGI
			HGI
			HGI
			HGI
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10			HGI
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			HGI

Engineering Scope of Work
HGI proposes to provide the engineering design necessary for the construction of the IABR as delineated in the above table. This estimate is based upon the scope of process and project as delineated in HGI's March 25, 2010, Class 25 feasibility study and estimate. General design services include the following:

- Process engineering to finalize the process design
- Specifying equipment, preparing RFQs, and evaluating supplier proposals and equipment selection
- Developing a site arrangement (GA) for the process areas and working with B&C to integrate the pond design
- Civil engineering for the process area infrastructure
- Structural design of foundations, buildings, and structures, except as noted.
- Mechanical engineering for the equipment installation
- Design of piping systems
- Electrical distribution and lighting of the process area
- Instrumentation
- Process control system including programming

A discipline-specific deliverables list, along with a list of assumptions and clarifications, are attached.

Project Approach
We understand from Sapphire that time is of the essence and Sapphire desires to have as much engineering complete by September 2010 as possible. Upon receipt of the "notice to proceed," we will immediately begin

Redacted Exemption 4

As soon as is practical, we request that a kick-off meeting be held either in person for coordination with Sapphire and B&C. The remaining sections of the facility will commence design efforts following that meeting.

We will provide weekly reports detailing issues that require resolution, key decisions made over the last week, current and upcoming work activities, and a summary of the engineering hours expended. On a monthly basis, we will provide a report showing our progress against the schedule and our forecast to complete the engineering. We also encourage regular conference calls to discuss issues and resolve problems.

Schedule
We believe that we can complete most of the engineering by mid-October 2010. A schedule is attached showing the basic sequencing of the engineering activities. In order to meet this schedule HGI will need to begin the design activities outlined in this letter almost immediately. Completing the engineering by mid October will depend upon

quickly finalizing the process design so that equipment can be selected, and on timely receipt of design information from B&C.

Compensation

We propose to provide these engineering services on a Redacted Exemption 4 basis in accordance with the attached detailed design rate sheet. We will invoice bi-weekly on our normal billing cycle. The agreement between our companies will be in accordance with our existing Memorandum of Engagement, attached hereto as Exhibit A and incorporated herein by reference.

Based on the scope of work described in this letter, we estimate our services will cost Redacted Exemption 4 . We have not included any allowance for contingency or significant changes that will cause either additional or re-work.

The following is a breakdown of our estimated engineering costs by discipline:

	Hours	Cost
Redacted Exemption 4		
Total (Rounded)		

Thank you for the opportunity to work with you on this project. We look forward to the challenge of meeting your schedule.

Very truly yours,

Mark Warner, P.E.
Vice President, Process Industries

Enclosures:

Consolidated HGI/B&C Sheet Count
Overall HGI Deliverables List
Clarifications and Assumptions List
Schedule
Rate Sheet
Exhibit A – Memorandum of Engagement

cc: Dave Marsh (Sapphire Energy)
Doug Dudgeon (Harris Group)

Approved and Accepted by:

Sapphire Energy, Inc.

_____ _____
Signature Date

_____
Name, Title (Print or Type)

IABR Combined Drawing list

4/21/2010

Sheet	Sheet Number	Name
		Brown & Caldwell Drawings
1	G0	
2	G	
3	C-100	Redacted Exemption 4
4	C-101	
5	C-102	
6	02-C-110	
7	02-C-111	
8	02-C-112	
9	02-C-113	
10	02-C-114	
11	02-C	
12	02-C-200	
13	02-C-201	
14	02-C-202	
15	02-C-210	
16	02-C-211	
17	02-C-212	
18	02-C-301	
19	02-C	
20	02-C	
21	02-C	
22	03-C	
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IABR Combined Drawing list

4/21/2010

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IABR Combined Drawing list

4/21/2010

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Process Area Deliverables List

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Engineering Estimate Clarifications

The following assumptions and clarifications are made to the engineering estimate for the IABR process area detailed design.

1. General

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2. Process

Redacted Exemption 4

3. Civil/Structural/Architectural

Redacted Exemption 4

Redacted Exemption 4

4. Electrical

Redacted Exemption 4

5. Controls/Instrumentation

Redacted Exemption 4

Initial Here _____

GENERAL CONDITIONS
MEMORANDUM OF ENGAGEMENT FOR PROFESSIONAL SERVICES
HARRIS GROUP INC.

Attachment to and part of Letter, Proposal, or Agreement dated: January 23, 2009
Client: Sapphire Energy, Inc.
Project: Process Development and Cost Estimating

All professional services provided by HARRIS GROUP INC. ("Harris Group") are subject to the terms and conditions set forth in this Memorandum of Engagement unless and only to the extent expressly modified in writing and signed by Harris Group and Client. The parties acknowledge that from time to time forms containing printed terms and conditions inconsistent with the terms and conditions of this Memorandum of Engagement may be used and that such preprinted terms and conditions are not intended to, and will not apply to the services covered by this Memorandum of Engagement.

1. Personnel. Harris Group shall furnish the personnel required to perform the services covered by this Memorandum of Engagement ("the Services") and shall engage any other professional parties as it deems necessary for the performance of the Services.

2. Facilities and Equipment. Harris Group shall provide office space and customary office equipment and facilities at the offices of Harris Group for its own staff. Unless otherwise agreed in writing between the parties.

3. Instructions and Approvals. Harris Group shall cooperate fully with Client in providing the Services. Client shall name an authorized representative at or before the start of the work who shall be responsible for providing information, instructions, and approvals on Client's behalf. Such representative shall be available to Harris Group at all reasonable times. Client shall be responsible for all delays in performance of the Services caused by or arising out of Client's unavailability or its failure to provide information, instructions, or approvals timely.

4. Terms of Payment. Invoices shall be issued by Harris Group as set forth in its Rate Schedule then in effect and shall be due and payable on presentation. Invoices not paid within thirty (30) days of invoice date may be carried forward to the next invoice date and shall be subject to a carrying charge of 1.5 percent per month. If Client fails to pay any invoice as agreed, Harris Group shall have the right to terminate this Memorandum of Engagement immediately. The right to terminate under the terms of this paragraph shall be in addition to all other legal, equitable or contractual remedies available to Harris Group. Client shall have no right of setoff against any billings of Harris Group for disputed claims.

5. Differing Conditions. Harris Group shall be entitled to rely on the accuracy and completeness of all testing, services, reports, data, and other information furnished by Client regarding the project or the site. If Harris Group believes that any condition encountered at the site or during the course of the project is inaccurate or differs materially from the indicated, reflected or referred to by Client, its representative(s), employees, or consultants at the time of Harris Group's proposal, Harris Group shall notify Client within a reasonable time. Such differing conditions such as subsurface conditions or underground utilities; condition of existing structures; and the presence of asbestos or any substance or material categorized as hazardous or toxic by federal, state or local laws and regulations. Harris Group shall not be required to continue performing the Services until such time as Client and Harris Group have mutually agreed to a change in compensation, time for performance, and/or other resolution of the differing condition.

6. Changes. In addition to the change in compensation and/or time for performance referred to in paragraph 5 above, Harris Group shall be entitled to an increase in compensation and/or time for performance for any other changes to be made in the scope of the Services to the extent such changes do not arise from the negligence of Harris Group. Harris Group shall be required to give notice to Client that it intends to seek additional time or compensation within a reasonable time after the change has been requested. Harris Group shall not be required to perform any work connected with a change unless the parties have agreed on the amount of or the basis for calculating the time and/or compensation associated with the change.

7. Delays. Harris Group shall be entitled to prompt written notice by Client, and additional time and/or compensation for delays caused by or resulting from acts of Client, contractors, subcontractors, suppliers, or other third parties over whom Harris Group has no direction or control to the extent the delay(s) are not caused by Harris Group's negligence.

8. Insurance. Harris Group at its own expense, carries professional liability, workers' compensation and employer's liability coverage as required by applicable state law, and general liability insurance (including automobile liability). The amount of insurance available may vary from year to year. The professional liability insurance is written on a claims-made basis.

9. Standard of Care. Harris Group represents and agrees that its Services shall be performed in accordance with locally recognized engineering codes and standards and sound industry practices prevailing at the time of performance that are followed by professional engineers performing similar Services under similar conditions. Harris Group's liability for failing to meet the above referenced standard of care in any of Harris Group's Services shall be limited to the re-performance of such substandard Services to the extent that they arise out of the negligence of Harris Group. Such re-performance of Services shall be at no cost to Client, provided that Harris Group is notified by Client in writing of Harris Group's negligently performed Services within one year of Harris Group's completion of Services; and such notice shall specifically include a request for re-performance.

10. Indemnity. Harris Group agrees to indemnify and hold harmless Client from and against any and all liabilities, claims, penalties suits, and the cost and expense incident thereto which Client may hereinafter incur as a result of death or bodily injuries to any person or the destruction or damage to property to the extent caused solely by the negligent act, negligent omission or willful misconduct of Harris Group employees. In no event shall Harris Group be liable or responsible for special or consequential damages for claims, disputes, or other matters arising out of or relating to this Memorandum of Engagement, that exceeds three (3) times the amount of fees paid to Harris Group under this Memorandum of Engagement.

11. Performance by Contractors, Subcontractors and Suppliers. Harris Group shall not be required to make exhaustive, extensive, or continuous on-site inspections of the work except to the extent that such inspections are expressly specified in the description of the scope of the Services to be undertaken by Harris Group. No acceptance or approval by Harris Group of the work of contractors, subcontractors or suppliers shall excuse them of their obligations to Client for the proper performance of their work.

12. Construction Means and Safety. Client hereby expressly agrees that Harris Group shall assume no responsibility for control or right of control over any contractor, subcontractor or supplier, their agents, employees or others for whom they may be liable in connection with the means, methods, techniques, sequences, procedures and equipment used or not used by such contractors, subcontractors, or suppliers in their performance of any phase of the work, for placing into operation any plant or equipment, or for any safety precautions or programs related thereto. Responsibility and control for all such activities shall be solely and exclusively that of Client, such contractors, subcontractors, and suppliers.

13. Ownership of Documents. All designs, drawings, specifications, notes, data, samples, materials, report reproducibles and other work developed by Harris Group are "instruments of service" and after payment shall therefore become the property of the Client. Client agrees not to use, reuse, or adapt any work product developed by Harris Group for the specific project or application intended if Harris Group's services have been terminated prior to completion, unless agreement has been reached for such further use. Client shall defend, indemnify and hold harmless Harris Group Inc. from all claims, losses, liabilities, damages, expenses, and costs arising out of the unauthorized use or reuse of such work product by Client or agents of Client.

14. Costs and Attorneys' Fees. If either party under this Memorandum of Engagement makes any claim, the prevailing party shall be entitled to its costs and reasonable attorneys' fees at trial and on appeal.

15. Termination. Client and Harris Group have the right at any time to terminate this Memorandum of Engagement by giving five (5) days' written notice to the other party. If Harris Group is terminated for any reason other than a material breach of the terms and conditions of this Memorandum of Engagement, Client shall be responsible for payment of all reasonable demobilization costs, all expenses incurred or obligated at the date of termination, including the proportionate share of any Harris Group fee applicable to the Services performed through the date of termination.

16. Third-Party Beneficiaries. Nothing in this Memorandum of Engagement shall be interpreted or construed as giving any rights or benefits to anyone other than Harris Group and Client unless such third party has been expressly designated as a third-party beneficiary in this Memorandum of Engagement.

17. Governing Law and Severability. Washington law shall govern this Memorandum of Engagement unless otherwise provided. If any term, condition or provision of this Memorandum of Engagement or the application thereof to any circumstances is determined to be invalid or unenforceable to any extent, the remaining provisions of this Memorandum of Engagement shall not be affected but shall instead remain valid and fully enforceable.

18. Waivers. No waiver by either party of any default by the other will operate as, or be construed as, a waiver of any future default, whether like or different in character.

19. Headings. The headings used in this Memorandum of Engagement are for convenience and reference purposes only and are not to be used in interpreting or construing the substantive provisions of the Memorandum.

RATE SCHEDULE

PROFESSIONAL, TECHNICAL, AND PROJECT STAFF

Services performed by Harris Group Inc. shall be compensated at the following hourly billing rates:

Position*	Billing Rate**	Position*	Billing Rate**
Redacted Exemption 4			

* Based on National Society of Professional Engineers (NSPE) position descriptions as edited by Harris Group Inc.
** All rates are shown in U.S. dollars

Certain individuals with special expertise may be charged out at a rate independent of the Rate Schedule.

TECHNOLOGY EXPENSES

The following technology expenses shall be billed at $ Redacted Exemption 4

- Process simulation, CAD, and engineering computers
- Harris Group Inc. in-house reproduction and prints
- Communications (local & long distance telephone, cellular telephones, fax, e-mail)
- Office equipment, materials, and consumables

TRAVEL EXPENSES

Travel and living expenses incurred for personnel assignments will be billed at Redacted Exemption 4 Per diem may be used for long term assignments. Mileage charges for use of personal or company car will be at the current IRS allowable rate.

OTHER EXPENSES

The following expenses shall be billed at Redacted Exemption 4

- Outside reproduction and printing
- Courier service
- Services of subconsultants and subcontractors, and other special services
- Equipment and materials purchased specifically to perform the work of the project

INVOICING PROCEDURE

Unless otherwise arranged, charges will be billed every two weeks, accompanied by a summary of time spent by each staff member on the project, along with related direct charges. Invoices are due and payable on presentation. Invoices not paid within thirty (30) days shall accrue interest, until paid, at the lesser of 1.5% per month or the highest rate permitted by law.

This rate sheet is subject to adjustment on December 31, 2010.

PI-210

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 03

SAPPHIRE ENERGY PROJECT NO. PR.100026.100

HARRIS GROUP, INC. PROJECT NO. 30070.00

Harris Group, Inc. is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Harris Group, Inc. ("Harris"), and Sapphire Energy, Inc. ("CLIENT") dated January 23, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
IABR Detailed Design
Proposal for Professional Services
HGI Proposal No. PI610.01-11, Rev 2

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico.

DESCRIP. OF WORK: As described in Harris' proposal dated April 23, 2010 which is included as a part of this Addendum as **Attachment A**.

PERIOD OF SERVICE: March 1, 2010 through December 31, 2010.

PAYMENT: Harris will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Ex. 4 **Attachment A** summarizes hourly rates and cost breakdown by task.

ADDITIONAL AUTHORIZATION: The limit of additional authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of Redacted Ex. 4 The balance of authorizations needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between Harris and CLIENT, dated January 23, 2009.

SAPPHIRE ENERGY COMPANY

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: August 24, 2010

Send copies of communications and notices to
Sapphire Energy: Attn: Jaime E. Moreno, P.E.

ATTACHMENT A
Proposal dated April 23, 2010

PR100026.100

Harris Group Inc.

Attachment A

April 23, 2010

Mr. Jaime Moreno
Vice President of Projects
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, CA 92691

Sent via email to: jaime.moreno@sapphireenergy.com

Reference: **Sapphire Energy, Inc.**
IABR Detailed Design
Proposal for Professional Services
HGI Proposal No. PI610.01-11, Rev 2

Dear Jaime,

We are pleased to provide you with this proposal for engineering services for your proposed integrated algal bio-refinery (IABR) in Columbus, New Mexico. We have appreciated the opportunity to provide project development services for the IABR and believe we are uniquely qualified for the detailed design.

Project Description

Sapphire Energy plans to scale up its process for cultivating and harvesting algal biomass, extracting oil from the algae, and converting those oils into liquid transportation fuels. Sapphire has developed its own process for growing and harvesting algae, and recovering algal oil from the harvested biomass. Conversion of these oils into liquid fuels will be accomplished using Syntroleum's Bio-Synfining™ process. Each facility will consist of the following major process areas: algae growth and harvesting; algae oil extraction and purification; Syntroleum Bio-Synfining™; and auxiliary equipment.

The IABR facility will be built at demonstration scale (91 bbl refined algae oil/day). In the demonstration-scale facility, algae will be grown, harvested, and extracted using a process developed by Sapphire. Extracted oil will be stockpiled at Sapphire's site and then shipped to the Dynamic Fuels refinery, where it will be converted into green diesel and green jet fuels using the Syntroleum process. Spent solids left over after the extraction process will be fed to an anaerobic digester. Biogas from the digester will be collected and combusted to supply a portion of the heat and CO_2 needed for the process. In the commercial-scale facility, all unit operations will take place on one site and be owned and operated by Sapphire.

Communications:
P.O. Box 3855
Seattle, WA 98124-3855
(206) 494-9400
Fax (206) 494-9500
www.harrisgroup.com

Office:
Suite 200
200 W Thomas St.
Seattle, WA
98119

Sapphire is currently utilizing both Harris Group (HGI) and Brown and Caldwell (B&C) for engineering scopes of work. Responsibilities are delineated as follows:

Area	Name	Operations	Responsible Engineer
00	Redacted Exemption 4		HGI
			HGI
			HGI
			HGI
			HGI
			HGI
			HGI
01			B&C
			B&C
			HGI/B&C
			B&C
02			B&C
			B&C
			B&C
03			B&C
04			HGI
			HGI
			HGI
05			N/A
06			Dynamic
07			B&C
			HGI
			B&C
08			B&C
			B&C
09			HGI
			HGI
			HGI
			HGI
			HGI
			HGI
			HGI
			HGI
			HGI
10			HGI
			HGI
			HGI
			HGI
			HGI

Engineering Scope of Work
HGI proposes to provide the engineering design necessary for the construction of the IABR as delineated in the above table. This estimate is based upon the scope of process and project as delineated in HGI's March 25, 2010, Class 25 feasibility study and estimate. General design services include the following:

- Process engineering to finalize the process design
- Specifying equipment, preparing RFQs, and evaluating supplier proposals and equipment selection
- Developing a site arrangement (GA) for the process areas and working with B&C to integrate the pond design
- Civil engineering for the process area infrastructure
- Structural design of foundations, buildings, and structures, except as noted.
- Mechanical engineering for the equipment installation
- Design of piping systems
- Electrical distribution and lighting of the process area
- Instrumentation
- Process control system including programming

A discipline-specific deliverables list, along with a list of assumptions and clarifications, are attached.

Project Approach
We understand from Sapphire that time is of the essence and Sapphire desires to have as much engineering complete by September 2010 as possible. Upon receipt of the "notice to proceed," we will immediately begin

Redacted Exemption 4

As soon as is practical, we request that a kick-off meeting be held either in person for coordination with Sapphire and B&C. The remaining sections of the facility will commence design efforts following that meeting.

We will provide weekly reports detailing issues that require resolution, key decisions made over the last week, current and upcoming work activities, and a summary of the engineering hours expended. On a monthly basis, we will provide a report showing our progress against the schedule and our forecast to complete the engineering. We also encourage regular conference calls to discuss issues and resolve problems.

Schedule
We believe that we can complete most of the engineering by mid-October 2010. A schedule is attached showing the basic sequencing of the engineering activities. In order to meet this schedule HGI will need to begin the design activities outlined in this letter almost immediately. Completing the engineering by mid October will depend upon

quickly finalizing the process design so that equipment can be selected, and on timely receipt of design information from B&C.

Compensation

We propose to provide these engineering services on a Redacted Exemption 4 basis in accordance with the attached detailed design rate sheet. We will invoice bi-weekly on our normal billing cycle. The agreement between our companies will be in accordance with our existing Memorandum of Engagement, attached hereto as Exhibit A and incorporated herein by reference.

Based on the scope of work described in this letter, we estimate our services will cost Redacted Exemption 4 . We have not included any allowance for contingency or significant changes that will cause either additional or re-work.

The following is a breakdown of our estimated engineering costs by discipline:

	Hours	Cost
Redacted Exemption 4		
Total (Rounded)		

Thank you for the opportunity to work with you on this project. We look forward to the challenge of meeting your schedule.

Very truly yours,

Mark Warner, P.E.
Vice President, Process Industries

Enclosures:

Consolidated HGI/B&C Sheet Count
Overall HGI Deliverables List
Clarifications and Assumptions List
Schedule
Rate Sheet
Exhibit A – Memorandum of Engagement

cc: Dave Marsh (Sapphire Energy)
Doug Dudgeon (Harris Group)

Approved and Accepted by:

Sapphire Energy, Inc.

_____ _____
Signature Date

_____
Name, Title (Print or Type)

IABR Combined Drawing list

4/21/2010

Sheet	Sheet Number	Name

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1	G0	
2	G	
3	C-100	
4	C-101	
5	C-102	
6	02-C-110	
7	02-C-111	
8	02-C-112	
9	02-C-113	
10	02-C-114	
11	02-C	
12	02-C-200	
13	02-C-201	
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18	02-C-301	
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IABR Combined Drawing list

4/21/2010

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IABR Combined Drawing list

4/21/2010

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Process Area Deliverables List

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1	Ea	Redacted Exemption 4
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Process Area Deliverables List

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Process Area Deliverables List

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Process Area Deliverables List

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Engineering Estimate Clarifications

The following assumptions and clarifications are made to the engineering estimate for the IABR process area detailed design.

1. General

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2. Process

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3. Civil/Structural/Architectural

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4. Electrical

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5. Controls/Instrumentation

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GENERAL CONDITIONS
MEMORANDUM OF ENGAGEMENT FOR PROFESSIONAL SERVICES
HARRIS GROUP INC.

Attachment to and part of Letter, Proposal, or Agreement dated: January 23, 2009
Client: Sapphire Energy, Inc.
Project: Process Development and Cost Estimating

All professional services provided by HARRIS GROUP INC. ("Harris Group") are subject to the terms and conditions set forth in this Memorandum of Engagement unless and only to the extent expressly modified in writing and signed by Harris Group and Client. The parties acknowledge that from time to time forms containing printed terms and conditions inconsistent with the terms and conditions of this Memorandum of Engagement may be used and that such preprinted terms and conditions are not intended to, and will not apply to the services covered by this Memorandum of Engagement.

1. Personnel. Harris Group shall furnish the personnel required to perform the services covered by this Memorandum of Engagement ("the Services") and shall engage any other professional parties as it deems necessary for the performance of the Services.

2. Facilities and Equipment. Harris Group shall provide office space and customary office equipment and facilities at the offices of Harris Group for its own staff. Unless otherwise agreed in writing between the parties.

3. Instructions and Approvals. Harris Group shall cooperate fully with Client in providing the Services. Client shall name an authorized representative at or before the start of the work who shall be responsible for providing information, instructions, and approvals on Client's behalf. Such representative shall be available to Harris Group at all reasonable times. Client shall be responsible for all delays in performance of the Services caused by or arising out of Client's unavailability or its failure to provide information, instructions, or approvals timely.

4. Terms of Payment. Invoices shall be issued by Harris Group as set forth in its Rate Schedule then in effect and shall be due and payable on presentation. Invoices not paid within thirty (30) days of invoice date may be carried forward to the next invoice date and shall be subject to a carrying charge of 1.5 percent per month. If Client fails to pay any invoice as agreed, Harris Group shall have the right to terminate this Memorandum of Engagement immediately. The right to terminate under the terms of this paragraph shall be in addition to all other legal, equitable or contractual remedies available to Harris Group. Client shall have no right of setoff against any billings of Harris Group for disputed claims.

5. Differing Conditions. Harris Group shall be entitled to rely on the accuracy and completeness of all testing, services, reports, data, and other information furnished by Client regarding the project or the site. If Harris Group believes that any condition encountered at the site or during the course of the project is inaccurate or differs materially from the indicated, reflected or referred to by Client, its representative(s), employees, or consultants at the time of Harris Group's proposal, Harris Group shall notify Client within a reasonable time. Such differing conditions such as subsurface conditions or underground utilities; condition of existing structures; and the presence of asbestos or any substance or material categorized as hazardous or toxic by federal, state or local laws and regulations. Harris Group shall not be required to continue performing the Services until such time as Client and Harris Group have mutually agreed to a change in compensation, time for performance, and/or other resolution of the differing condition.

6. Changes. In addition to the change in compensation and/or time for performance referred to in paragraph 5 above, Harris Group shall be entitled to an increase in compensation and/or time for performance for any other changes to be made in the scope of the Services to the extent such changes do not arise from the negligence of Harris Group. Harris Group shall be required to give notice to Client that it intends to seek additional time or compensation within a reasonable time after the change has been requested. Harris Group shall not be required to perform any work connected with a change unless the parties have agreed on the amount of or the basis for calculating the time and/or compensation associated with the change.

7. Delays. Harris Group shall be entitled to prompt written notice by Client, and additional time and/or compensation for delays caused by or resulting from acts of Client, contractors, subcontractors, suppliers, or other third parties over whom Harris Group has no direction or control to the extent the delay(s) are not caused by Harris Group's negligence.

8. Insurance. Harris Group at its own expense, carries professional liability, workers' compensation and employer's liability coverage as required by applicable state law, and general liability insurance (including automobile liability). The amount of insurance available may vary from year to year. The professional liability insurance is written on a claims-made basis.

9. Standard of Care. Harris Group represents and agrees that its Services shall be performed in accordance with locally recognized engineering codes and standards and sound industry practices prevailing at the time of performance that are followed by professional engineers performing similar Services under similar conditions. Harris Group's liability for failing to meet the above referenced standard of care in any of Harris Group's Services shall be limited to the re-performance of such substandard Services to the extent that they arise out of the negligence of Harris Group. Such re-performance of Services shall be at no cost to Client, provided that Harris Group is notified by Client in writing of Harris Group's negligently performed Services within one year of Harris Group's completion of Services; and such notice shall specifically include a request for re-performance.

10. Indemnity. Harris Group agrees to indemnify and hold harmless Client from and against any and all liabilities, claims, penalties suits, and the cost and expense incident thereto which Client may hereinafter incur as a result of death or bodily injuries to any person or the destruction or damage to property to the extent caused solely by the negligent act, negligent omission or willful misconduct of Harris Group employees. In no event shall Harris Group be liable or responsible for special or consequential damages for claims, disputes, or other matters arising out of or relating to this Memorandum of Engagement, that exceeds three (3) times the amount of fees paid to Harris Group under this Memorandum of Engagement.

11. Performance by Contractors, Subcontractors and Suppliers. Harris Group shall not be required to make exhaustive, extensive, or continuous on-site inspections of the work except to the extent that such inspections are expressly specified in the description of the scope of the Services to be undertaken by Harris Group. No acceptance or approval by Harris Group of the work of contractors, subcontractors or suppliers shall excuse them of their obligations to Client for the proper performance of their work.

12. Construction Means and Safety. Client hereby expressly agrees that Harris Group shall assume no responsibility for control or right of control over any contractor, subcontractor or supplier, their agents, employees or others for whom they may be liable in connection with the means, methods, techniques, sequences, procedures and equipment used or not used by such contractors, subcontractors, or suppliers in their performance of any phase of the work, for placing into operation any plant or equipment, or for any safety precautions or programs related thereto. Responsibility and control for all such activities shall be solely and exclusively that of Client, such contractors, subcontractors, and suppliers.

13. Ownership of Documents. All designs, drawings, specifications, notes, data, samples, materials, report reproducibles and other work developed by Harris Group are "instruments of service" and after payment shall therefore become the property of the Client. Client agrees not to use, reuse, or adapt any work product developed by Harris Group for the specific project or application intended if Harris Group's services have been terminated prior to completion, unless agreement has been reached for such further use. Client shall defend, indemnify and hold harmless Harris Group Inc. from all claims, losses, liabilities, damages, expenses, and costs arising out of the unauthorized use or reuse of such work product by Client or agents of Client.

14. Costs and Attorneys' Fees. If either party under this Memorandum of Engagement makes any claim, the prevailing party shall be entitled to its costs and reasonable attorneys' fees at trial and on appeal.

15. Termination. Client and Harris Group have the right at any time to terminate this Memorandum of Engagement by giving five (5) days' written notice to the other party. If Harris Group is terminated for any reason other than a material breach of the terms and conditions of this Memorandum of Engagement, Client shall be responsible for payment of all reasonable demobilization costs, all expenses incurred or obligated at the date of termination, including the proportionate share of any Harris Group fee applicable to the Services performed through the date of termination.

16. Third-Party Beneficiaries. Nothing in this Memorandum of Engagement shall be interpreted or construed as giving any rights or benefits to anyone other than Harris Group and Client unless such third party has been expressly designated as a third-party beneficiary in this Memorandum of Engagement.

17. Governing Law and Severability. Washington law shall govern this Memorandum of Engagement unless otherwise provided. If any term, condition or provision of this Memorandum of Engagement or the application thereof to any circumstances is determined to be invalid or unenforceable to any extent, the remaining provisions of this Memorandum of Engagement shall not be affected but shall instead remain valid and fully enforceable.

18. Waivers. No waiver by either party of any default by the other will operate as, or be construed as, a waiver of any future default, whether like or different in character.

19. Headings. The headings used in this Memorandum of Engagement are for convenience and reference purposes only and are not to be used in interpreting or construing the substantive provisions of the Memorandum.

RATE SCHEDULE

PROFESSIONAL, TECHNICAL, AND PROJECT STAFF

Services performed by Harris Group Inc. shall be compensated at the following hourly billing rates:

Position*	Billing Rate**	Position*	Billing Rate**
Redacted Exemption 4			

* Based on National Society of Professional Engineers (NSPE) position descriptions as edited by Harris Group Inc.
** All rates are shown in U.S. dollars

Certain individuals with special expertise may be charged out at a rate independent of the Rate Schedule.

TECHNOLOGY EXPENSES

The following technology expenses shall be billed at $ Redacted Exemption 4

- Process simulation, CAD, and engineering computers
- Harris Group Inc. in-house reproduction and prints
- Communications (local & long distance telephone, cellular telephones, fax, e-mail)
- Office equipment, materials, and consumables

TRAVEL EXPENSES

Travel and living expenses incurred for personnel assignments will be billed at Redacted Exemption 4 Per diem may be used for long term assignments. Mileage charges for use of personal or company car will be at the current IRS allowable rate.

OTHER EXPENSES

The following expenses shall be billed at Redacted Exemption 4

- Outside reproduction and printing
- Courier service
- Services of subconsultants and subcontractors, and other special services
- Equipment and materials purchased specifically to perform the work of the project

INVOICING PROCEDURE

Unless otherwise arranged, charges will be billed every two weeks, accompanied by a summary of time spent by each staff member on the project, along with related direct charges. Invoices are due and payable on presentation. Invoices not paid within thirty (30) days shall accrue interest, until paid, at the lesser of 1.5% per month or the highest rate permitted by law.

This rate sheet is subject to adjustment on December 31, 2010.

PI-210

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 04

SAPPHIRE ENERGY PROJECT NO. PR.100026.100

HARRIS GROUP, INC. PROJECT NO. 30070.00

Harris Group, Inc. is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Harris Group, Inc. ("Harris"), and Sapphire Energy, Inc. ("CLIENT") dated January 23, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
IABR Detailed Design
Proposal for Professional Services
HGI Proposal No. PI610.01-11, Rev 2

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico.

DESCRIP. OF WORK: As described in Harris' proposal dated April 23, 2010 which is included as a part of this Addendum as **Attachment A**.

PERIOD OF SERVICE: March 1, 2010 through December 31, 2010.

PAYMENT: Harris will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $Redacted Exemption 4 **Attachment A** summarizes hourly rates and cost breakdown by task.

ADDITIONAL AUTHORIZATION: The limit of additional authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of $ Redacted Ex. 4 The balance of authorizations needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between Harris and CLIENT, dated January 23, 2009.

SAPPHIRE ENERGY COMPANY

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: October 27, 2010

Send copies of communications and notices to
Sapphire Energy: Attn: Jaime E. Moreno, P.E.

ATTACHMENT A
Proposal dated April 23, 2010

PR160026.100

Harris Group Inc.

Attachment A

April 23, 2010

Mr. Jaime Moreno
Vice President of Projects
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, CA 92691

Sent via email to: jaime.moreno@sapphireenergy.com

Reference: **Sapphire Energy, Inc.**
IABR Detailed Design
Proposal for Professional Services
HGI Proposal No. PI610.01-11, Rev 2

Dear Jaime,

We are pleased to provide you with this proposal for engineering services for your proposed integrated algal bio-refinery (IABR) in Columbus, New Mexico. We have appreciated the opportunity to provide project development services for the IABR and believe we are uniquely qualified for the detailed design.

Project Description

Sapphire Energy plans to scale up its process for cultivating and harvesting algal biomass, extracting oil from the algae, and converting those oils into liquid transportation fuels. Sapphire has developed its own process for growing and harvesting algae, and recovering algal oil from the harvested biomass. Conversion of these oils into liquid fuels will be accomplished using Syntroleum's Bio-Synfining™ process. Each facility will consist of the following major process areas: algae growth and harvesting; algae oil extraction and purification; Syntroleum Bio-Synfining™; and auxiliary equipment.

The IABR facility will be built at demonstration scale (91 bbl refined algae oil/day). In the demonstration-scale facility, algae will be grown, harvested, and extracted using a process developed by Sapphire. Extracted oil will be stockpiled at Sapphire's site and then shipped to the Dynamic Fuels refinery, where it will be converted into green diesel and green jet fuels using the Syntroleum process. Spent solids left over after the extraction process will be fed to an anaerobic digester. Biogas from the digester will be collected and combusted to supply a portion of the heat and CO_2 needed for the process. In the commercial-scale facility, all unit operations will take place on one site and be owned and operated by Sapphire.

Communications:
P.O. Box 3855
Seattle, WA 98124-3855
(206) 494-9400
Fax (206) 494-9500
www.harrisgroup.com

Office:
Suite 200
200 W Thomas St.
Seattle, WA
98119

Sapphire is currently utilizing both Harris Group (HGI) and Brown and Caldwell (B&C) for engineering scopes of work. Responsibilities are delineated as follows:

Area	Name	Operations	Responsible Engineer
00	Redacted Exemption 4		HGI
			HGI
			HGI
			HGI
			HGI
			HGI
			HGI
01			B&C
			B&C
			HGI/B&C
			B&C
02			B&C
			B&C
			B&C
03			B&C
04			HGI
			HGI
			HGI
05			N/A
06			Dynamic
07			B&C
			HGI
			B&C
08			B&C
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09			HGI
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			HGI

Engineering Scope of Work
HGI proposes to provide the engineering design necessary for the construction of the IABR as delineated in the above table. This estimate is based upon the scope of process and project as delineated in HGI's March 25, 2010, Class 25 feasibility study and estimate. General design services include the following:

- Process engineering to finalize the process design
- Specifying equipment, preparing RFQs, and evaluating supplier proposals and equipment selection
- Developing a site arrangement (GA) for the process areas and working with B&C to integrate the pond design
- Civil engineering for the process area infrastructure
- Structural design of foundations, buildings, and structures, except as noted.
- Mechanical engineering for the equipment installation
- Design of piping systems
- Electrical distribution and lighting of the process area
- Instrumentation
- Process control system including programming

A discipline-specific deliverables list, along with a list of assumptions and clarifications, are attached.

Project Approach
We understand from Sapphire that time is of the essence and Sapphire desires to have as much engineering complete by September 2010 as possible. Upon receipt of the "notice to proceed," we will immediately begin

Redacted Exemption 4

As soon as is practical, we request that a kick-off meeting be held either in person for coordination with Sapphire and B&C. The remaining sections of the facility will commence design efforts following that meeting.

We will provide weekly reports detailing issues that require resolution, key decisions made over the last week, current and upcoming work activities, and a summary of the engineering hours expended. On a monthly basis, we will provide a report showing our progress against the schedule and our forecast to complete the engineering. We also encourage regular conference calls to discuss issues and resolve problems.

Schedule
We believe that we can complete most of the engineering by mid-October 2010. A schedule is attached showing the basic sequencing of the engineering activities. In order to meet this schedule HGI will need to begin the design activities outlined in this letter almost immediately. Completing the engineering by mid October will depend upon

quickly finalizing the process design so that equipment can be selected, and on timely receipt of design information from B&C.

Compensation

We propose to provide these engineering services on a Redacted Exemption 4 basis in accordance with the attached detailed design rate sheet. We will invoice bi-weekly on our normal billing cycle. The agreement between our companies will be in accordance with our existing Memorandum of Engagement, attached hereto as Exhibit A and incorporated herein by reference.

Based on the scope of work described in this letter, we estimate our services will cost Redacted Exemption 4 . We have not included any allowance for contingency or significant changes that will cause either additional or re-work.

The following is a breakdown of our estimated engineering costs by discipline:

	Hours	Cost
Redacted Exemption 4		
Total (Rounded)		

Thank you for the opportunity to work with you on this project. We look forward to the challenge of meeting your schedule.

Very truly yours,

Mark Warner, P.E.
Vice President, Process Industries

Enclosures:

Consolidated HGI/B&C Sheet Count
Overall HGI Deliverables List
Clarifications and Assumptions List
Schedule
Rate Sheet
Exhibit A – Memorandum of Engagement

cc: Dave Marsh (Sapphire Energy)
Doug Dudgeon (Harris Group)

Approved and Accepted by:

Sapphire Energy, Inc.

_____ _____
Signature Date

_____
Name, Title (Print or Type)

IABR Combined Drawing list

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Sheet	Sheet Number	Name
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12	02-C-200	
13	02-C-201	
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IABR Combined Drawing list

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Process Area Deliverables List

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Process Area Deliverables List

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Process Area Deliverables List

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Redacted Exemption 4

Engineering Estimate Clarifications

The following assumptions and clarifications are made to the engineering estimate for the IABR process area detailed design.

1. General

Redacted Exemption 4

2. Process

Redacted Exemption 4

3. Civil/Structural/Architectural

Redacted Exemption 4

Redacted Exemption 4

4. Electrical

Redacted Exemption 4

5. Controls/Instrumentation

Redacted Exemption 4

Initial Here _____

GENERAL CONDITIONS
MEMORANDUM OF ENGAGEMENT FOR PROFESSIONAL SERVICES
HARRIS GROUP INC.

Attachment to and part of Letter, Proposal, or Agreement dated: January 23, 2009
Client: Sapphire Energy, Inc.
Project: Process Development and Cost Estimating

All professional services provided by HARRIS GROUP INC. ("Harris Group") are subject to the terms and conditions set forth in this Memorandum of Engagement unless and only to the extent expressly modified in writing and signed by Harris Group and Client. The parties acknowledge that from time to time forms containing printed terms and conditions inconsistent with the terms and conditions of this Memorandum of Engagement may be used and that such preprinted terms and conditions are not intended to, and will not apply to the services covered by this Memorandum of Engagement.

1. Personnel. Harris Group shall furnish the personnel required to perform the services covered by this Memorandum of Engagement ("the Services") and shall engage any other professional parties as it deems necessary for the performance of the Services.

2. Facilities and Equipment. Harris Group shall provide office space and customary office equipment and facilities at the offices of Harris Group for its own staff. Unless otherwise agreed in writing between the parties.

3. Instructions and Approvals. Harris Group shall cooperate fully with Client in providing the Services. Client shall name an authorized representative at or before the start of the work who shall be responsible for providing information, instructions, and approvals on Client's behalf. Such representative shall be available to Harris Group at all reasonable times. Client shall be responsible for all delays in performance of the Services caused by or arising out of Client's unavailability or its failure to provide information, instructions, or approvals timely.

4. Terms of Payment. Invoices shall be issued by Harris Group as set forth in its Rate Schedule then in effect and shall be due and payable on presentation. Invoices not paid within thirty (30) days of invoice date may be carried forward to the next invoice date and shall be subject to a carrying charge of 1.5 percent per month. If Client fails to pay any invoice as agreed, Harris Group shall have the right to terminate this Memorandum of Engagement immediately. The right to terminate under the terms of this paragraph shall be in addition to all other legal, equitable or contractual remedies available to Harris Group. Client shall have no right of setoff against any billings of Harris Group for disputed claims.

5. Differing Conditions. Harris Group shall be entitled to rely on the accuracy and completeness of all testing, services, reports, data, and other information furnished by Client regarding the project or the site. If Harris Group believes that any condition encountered at the site or during the course of the project is inaccurate or differs materially from the indicated, reflected or referred to by Client, its representative(s), employees, or consultants at the time of Harris Group's proposal, Harris Group shall notify Client within a reasonable time. Such differing conditions such as subsurface conditions or underground utilities; condition of existing structures; and the presence of asbestos or any substance or material categorized as hazardous or toxic by federal, state or local laws and regulations. Harris Group shall not be required to continue performing the Services until such time as Client and Harris Group have mutually agreed to a change in compensation, time for performance, and/or other resolution of the differing condition.

6. Changes. In addition to the change in compensation and/or time for performance referred to in paragraph 5 above, Harris Group shall be entitled to an increase in compensation and/or time for performance for any other changes to be made in the scope of the Services to the extent such changes do not arise from the negligence of Harris Group. Harris Group shall be required to give notice to Client that it intends to seek additional time or compensation within a reasonable time after the change has been requested. Harris Group shall not be required to perform any work connected with a change unless the parties have agreed on the amount of or the basis for calculating the time and/or compensation associated with the change.

7. Delays. Harris Group shall be entitled to prompt written notice by Client, and additional time and/or compensation for delays caused by or resulting from acts of Client, contractors, subcontractors, suppliers, or other third parties over whom Harris Group has no direction or control to the extent the delay(s) are not caused by Harris Group's negligence.

8. Insurance. Harris Group at its own expense, carries professional liability, workers' compensation and employer's liability coverage as required by applicable state law, and general liability insurance (including automobile liability). The amount of insurance available may vary from year to year. The professional liability insurance is written on a claims-made basis.

9. Standard of Care. Harris Group represents and agrees that its Services shall be performed in accordance with locally recognized engineering codes and standards and sound industry practices prevailing at the time of performance that are followed by professional engineers performing similar Services under similar conditions. Harris Group's liability for failing to meet the above referenced standard of care in any of Harris Group's Services shall be limited to the re-performance of such substandard Services to the extent that they arise out of the negligence of Harris Group. Such re-performance of Services shall be at no cost to Client, provided that Harris Group is notified by Client in writing of Harris Group's negligently performed Services within one year of Harris Group's completion of Services; and such notice shall specifically include a request for re-performance.

10. Indemnity. Harris Group agrees to indemnify and hold harmless Client from and against any and all liabilities, claims, penalties suits, and the cost and expense incident thereto which Client may hereinafter incur as a result of death or bodily injuries to any person or the destruction or damage to property to the extent caused solely by the negligent act, negligent omission or willful misconduct of Harris Group employees. In no event shall Harris Group be liable or responsible for special or consequential damages for claims, disputes, or other matters arising out of or relating to this Memorandum of Engagement, that exceeds three (3) times the amount of fees paid to Harris Group under this Memorandum of Engagement.

11. Performance by Contractors, Subcontractors and Suppliers. Harris Group shall not be required to make exhaustive, extensive, or continuous on-site inspections of the work except to the extent that such inspections are expressly specified in the description of the scope of the Services to be undertaken by Harris Group. No acceptance or approval by Harris Group of the work of contractors, subcontractors or suppliers shall excuse them of their obligations to Client for the proper performanee of their work.

12. Construction Means and Safety. Client hereby expressly agrees that Harris Group shall assume no responsibility for control or right of control over any contraetor, subcontractor or supplier, their agents, employees or others for whom they may be liable in connection with the means, methods, techniques, sequences, procedures and equipment used or not used by such contractors, subcontractors, or suppliers in their performance of any phase of the work, for placing into operation any plant or equipment, or for any safety precautions or programs related thereto. Responsibility and control for all such activities shall be solely and exclusively that of Client, such contractors, subcontractors, and suppliers.

13. Ownership of Documents. All designs, drawings, specifications, notes, data, samples, materials, report reproducibles and other work developed by Harris Group are "instruments of service" and after payment shall therefore become the property of the Client. Client agrees not to use, reuse, or adapt any work product developed by Harris Group for the specific project or application intended if Harris Group's services have been terminated prior to completion, unless agreement has been reached for such further use. Client shall defend, indemnify and hold harmless Harris Group Inc. from all claims, losses, liabilities, damages, expenses, and costs arising out of the unauthorized use or reuse of such work product by Client or agents of Client.

14. Costs and Attorneys' Fees. If either party under this Memorandum of Engagement makes any claim, the prevailing party shall be entitled to its costs and reasonable attorneys' fees at trial and on appeal.

15. Termination. Client and Harris Group have the right at any time to terminate this Memorandum of Engagement by giving five (5) days' written notice to the other party. If Harris Group is terminated for any reason other than a material breach of the terms and conditions of this Memorandum of Engagement, Client shall be responsible for payment of all reasonable demobilization costs, all expenses incurred or obligated at the date of termination, including the proportionate share of any Harris Group fee applicable to the Services performed through the date of termination.

16. Third-Party Beneficiaries. Nothing in this Memorandum of Engagement shall be interpreted or construed as giving any rights or benefits to anyone other than Harris Group and Client unless such third party has been expressly designated as a third-party beneficiary in this Memorandum of Engagement.

17. Governing Law and Severability. Washington law shall govern this Memorandum of Engagement unless otherwise provided. If any term, condition or provision of this Memorandum of Engagement or the application thereof to any circumstances is determined to be invalid or unenforceable to any extent, the remaining provisions of this Memorandum of Engagement shall not be affected but shall instead remain valid and fully enforceable.

18. Waivers. No waiver by either party of any default by the other will operate as, or be construed as, a waiver of any future default, whether like or different in character.

19. Headings. The headings used in this Memorandum of Engagement are for convenience and reference purposes only and are not to be used in interpreting or construing the substantive provisions of the Memorandum.

RATE SCHEDULE

PROFESSIONAL, TECHNICAL, AND PROJECT STAFF

Services performed by Harris Group Inc. shall be compensated at the following hourly billing rates:

Position*	Billing Rate**	Position*	Billing Rate**
Redacted Exemption 4			

* Based on National Society of Professional Engineers (NSPE) position descriptions as edited by Harris Group Inc.
** All rates are shown in U.S. dollars

Certain individuals with special expertise may be charged out at a rate independent of the Rate Schedule.

TECHNOLOGY EXPENSES

The following technology expenses shall be billed at $ Redacted Exemption 4

- Process simulation, CAD, and engineering computers
- Harris Group Inc. in-house reproduction and prints
- Communications (local & long distance telephone, cellular telephones, fax, e-mail)
- Office equipment, materials, and consumables

TRAVEL EXPENSES

Travel and living expenses incurred for personnel assignments will be billed at Redacted Exemption 4 Per diem may be used for long term assignments. Mileage charges for use of personal or company car will be at the current IRS allowable rate.

OTHER EXPENSES

The following expenses shall be billed at Redacted Exemption 4

- Outside reproduction and printing
- Courier service
- Services of subconsultants and subcontractors, and other special services
- Equipment and materials purchased specifically to perform the work of the project

INVOICING PROCEDURE

Unless otherwise arranged, charges will be billed every two weeks, accompanied by a summary of time spent by each staff member on the project, along with related direct charges. Invoices are due and payable on presentation. Invoices not paid within thirty (30) days shall accrue interest, until paid, at the lesser of 1.5% per month or the highest rate permitted by law.

This rate sheet is subject to adjustment on December 31, 2010.

PI-210

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 05

SAPPHIRE ENERGY PROJECT NO. PR.100026.100

HARRIS GROUP, INC. PROJECT NO. 30070.00

Harris Group, Inc. is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Harris Group, Inc. ("Harris"), and Sapphire Energy, Inc. ("CLIENT") dated January 23, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
IABR Detailed Design
Proposal for Professional Services
HGI Proposal No. P1610.01-11, Rev 2

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico
1500 HWY 9 SW, Deming, NM 88030

DESCRIP. OF WORK: As described in Harris' proposal dated March 22, 2011 which is included as a part of this Addendum as **Attachment A.**

PERIOD OF SERVICE: Jan 1, 2011 through April 1, 2011

PAYMENT: Harris will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Exemption 4 **Attachment A** summarizes the cost breakdown by task.

ADDITIONAL AUTHORIZATION: The limit of additional authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of $ Redacted Ex. 4 The balance of authorization needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between Harris and Client, dated January 23, 2009.

SAPPHIRE ENERGY, INC.

By: _____
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: April 28, 2011

Send copies of communications and notices to
Sapphire Energy: Attn: Jaime E. Moreno, P.E.

SAPPHIRE ENERGY DOCUMENT NO. SO11.0098.HG

ATTACHMENT A
Work Description and Cost Summary

Harris Group Inc.

March 22, 2011

Mr. Jaime Moreno
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, CA 92691-8009

Reference: Sapphire Energy, Inc.
IABR Detailed Design
Change Order No. 3
HGI Project No. 30070

Dear Jaime:

This letter explains the change in scope that occurred to the IABR project during the period from January 21 to April 1, 2011 and the period defined as Phase 1A below. During the value engineering meetings, a number of changes were made that affected the engineering effort during this period. Among the significant changes were the

Redacted Exemption 4

Significant changes to the site arrangement included the following relocations of equipment:

- Redacted Exemption 4
-
-
-

Additional changes to the Redacted Exemption 4 resulted from the above revisions.

Because the changes were extensive and interrelated, it was not feasible to estimate the impact of each change. Instead, the cost of completing the project was re-estimated with all the changes incorporated. For example, the above changes resulted in Redacted Exemption 4

300 Elliott Avenue W.
Suite 500
Seattle, WA 98119.
Phone (206) 494-9400
Fax (206) 494-9500
www.harrisgroup.com

Redacted Exemption 4

Included in this change order is the additional effort to produce full CSI specifications for this phase of the work and for the effort to coordinate the project specifications between HGI and Brown & Caldwell (B&C).

Phase Definition and Phase 1 Scope

Phase 1 is

Redacted Exemption 4

Documents forming the basis of design are listed in a following section.

Phase 1 is further divided into two sub-phases: Phase 1A and Phase 1B. Phase 1A design encompasses most of Phase 1 except for the

Redacted Exemption 4

which will be part of Phase 1B. Phase 1B will be delayed until the necessary data from the PDU is available. Detailed lists of items included in Phase 1A and Phase 1B are provided below.

The configuration and processes for Phase 2 and subsequent phases have not been full determined. For purpose of Phase 1 design, common features serving multiple phases will be designed in accordance with the criteria established in the Process Design Criteria for 300 acres of pond production. For instance, the

Redacted Exemption 4

Efforts will be made to reduce the initial capital expenditures by initially installing only what is required for Phase 1. Additional capacity to serve the full 300-acre production may be provided when (1) it is not practical to reduce the capacity to Phase 1 requirements or (2) it is more economical to provide a single unit that will be adequate for the entire facility.

<u>Phase 1A Detailed List</u>

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Phase 1B Detailed List

1. Redacted Exemption 4
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12. Redacted Exemption 4
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Estimate to Complete Phase 1A

We estimate that it will cost approximately $Redacted Exemption 4 to complete the Phase 1A engineering as described above. In addition to the estimate for the Phase 1A engineering, we suggest that you include $Redacted Ex. 4 for additional work not directly covered in this scope of work that may be requested that does not directly relate to the Phase 1A design. The addition of this amount to the balance of our expenses through January 31 would increase our budget to $Redacted Exemption 4 This represents a decrease in our authorized budget of $Redacted Exemption 4

The following table, in which total amounts have been rounded, summarizes the engineering costs by discipline:

Estimate to Complete BOP (Phase 1A)

	Eng Hrs	Des Hrs	Eng Rate	Des Rate	Total
Project Admin					
Project Manager			Redacted Exemption 4		
Project Engineer					
Engineering Assistant					
Process					
Mechanical/Piping					
Structural					
Civil					
Architectural					
Electrical					
I&C					
Subtotal Labor					
Internal Expenses					
Expenses					
Contingency					
Total To Complete Phase 1A					
Full Specifications and Coordination Effort					
Development Activities	Allowance				
Spent to date (1/28/2011)					
Total					**$**

Assumptions and Clarifications
The budget and schedule are based on the following clarifications and assumptions:

1. No further changes will occur in the B&C design that impact our design.
2. This design budget covers our effort until the drawings are issued for bid. The incorporation of additional changes that will come out of further drawing reviews, construction assistance, vendor and shop drawing review, and code-required construction observations is not included. This is consistent with our original budget.

Design Basis
The Process Design Criteria and the following drawings further define our effort for Phase 1.

Drawing Number	Title	Revision
00-F-301	Redacted Exemption 4	E
01-F-313		F
01-F-314		E
04-F-340		F
04-F-341		F
04-F-343		F
04-F-345		F
04-F-346		F
04-F-347		F
04-F-348		F
04-F-349		F
04-F-354		F
04-F-355		F
04-F-356		F

Drawing Number	Title	Revision
04-F-360	Redacted Exemption 4	F
04-F-362		E
07-F-373		F
07-F-374		F
09-F-390		F
09-F-391		F
09-F-392		E
09-F-393		F
09-F-395		E
09-F-396		E
09-F-399		F
09-F-400		F
09-F-402		F
09-F-403		F
09-F-405		E

Drawing Number	Title	Revision
09-F-406	Redacted Exemption 4	E
09-F-407		E
09-F-408		F
09-F-409		F
09-F-410		E
09-F-411		E
00-G-100		E
00-G-101		E

Very truly yours,

Bob McNiesh
Senior Project Manager

Enclosures: Budget Reconciliation, January 21 to April 1, 2011

cc: Sapphire Energy – Ron Kluwe, Dave Marsh
Harris Group – Mark Warner, Mike Buckland, Bryan Olthof, File 30070.1106

30070CO03 110322

Project 30070.00
IABR Detailed Design

Sapphire Energy, Inc.
Columbus, NM
3/21/2011

Budget Reconciliation

January 21 to April 1, 2011

	Budget	Spent
Carryover from previous period (see Change Order No 2)	$ Redacted Exemption 4	
Process Changes		
Redacted Exemption 4		
Site Arrangement Changes		
Redacted Exemption 4		
Contingency		
Expenses		
Specifications		
Allowance for other assigned work		
Estimate to complete phase 1A		
Adjusted budget for phase 1A work	**$**	
Estimated spending as of 4/1/11		

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 06

SAPPHIRE ENERGY PROJECT NO. PR.100026.100

HARRIS GROUP, INC. PROJECT NO. 30070.00

Harris Group, Inc. is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Harris Group, Inc. ("Harris"), and Sapphire Energy, Inc. ("CLIENT") dated January 23, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
IABR Detailed Design
Proposal for Professional Services
HGI Proposal No. P1610.01-11, Rev 2

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico
1500 HWY 9 SW, Deming, NM 88030

DESCRIP. OF WORK: As described in Harris' proposal dated April 18, 2011 which is included as a part of this Addendum as **Attachment A.**

PERIOD OF SERVICE: April 1, 2011 through Dec 31, 2011

PAYMENT: Harris will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Exemption 4 **Attachment A** summarizes the cost breakdown by task.

ADDITIONAL AUTHORIZATION: The limit of additional authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of $ Redacted Ex. 4 The balance of authorization needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between Harris and Client, dated January 23, 2009.

SAPPHIRE ENERGY, INC.

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: April 28, 2011

Send copies of communications and notices to Sapphire Energy: Attn: Jaime E. Moreno, P.E.

SAPPHIRE ENERGY DOCUMENT NO. SD11.0097.HG

ATTACHMENT A
Work Description and Cost Summary

Harris Group Inc.

April 18, 2011

Mr. Jaime Moreno
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, CA 92691-8009

Reference: Sapphire Energy, Inc.
IABR Detailed Design
Change Order No. 4
HGI Project No. 30070

Dear Jaime:

This letter is to request additional budget authorization for our Redacted Exemption 4 , which was substantially completed on April 1st, up to the time that we begin Redacted Exemption 4 , assumed to be July 1, 2011.

There have been two significant tasks requested by Sapphire that are part of this request and that have already been completed. The first was for a new capital cost estimate that was published on April 11th. The cost of producing this Redacted Exemption 4 The second item was a design review

Redacted Exemption 4

This week, we have been requested to attend meetings in Las Cruces, New Mexico. The objectives of these meetings are to perform a Hazop review and discuss alternate methods of providing Redacted Exemption 4 The estimated cost to attend this meeting, along with time for preparation and a final report, is $ Redacted Exemption 4

In addition to the three items listed above, we will be involved in other activities that cannot be fully estimated because we can't forecast what will be required in terms of level of effort and duration. Examples of this include weekly conference calls, responding to questions from Sapphire, Brown & Caldwell and AMEC, and issuing drawings for construction. We recommend that an allowance be set aside for this work in the amount of $ Redacted Exemption 4

This does not allow for significant detailed design efforts that may arise during this time period.

Suite 500
300 Elliott Ave W.
Seattle, WA 98119
(206) 494-9400
Fax (206) 494-9500
www.harrisgroup.com

We request that you increase our authorized budget Redacted Exemption 4

Very truly yours,

Bob McNiesh
Senior Project Manager

cc: Sapphire Energy – Ron Kluwe, Dave Marsh
Harris Group – Mark Warner, Mike Buckland, File 30070.1106

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 07

SAPPHIRE ENERGY PROJECT NO. PR.100026.100

HARRIS GROUP, INC. PROJECT NO. 30070.00

Harris Group, Inc. is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Harris Group, Inc. ("Harris"), and Sapphire Energy, Inc. ("CLIENT") dated January 23, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
IABR Detailed Design
Proposal for Professional Services
HGI Proposal No. P1610.01-11, Rev 2

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico
1500 HWY 9 SW, Deming, NM 88030

DESCRIP. OF WORK: As described in Harris' proposal dated April 18, 2011 which is included as a part of this Addendum as **Attachment A.**

PERIOD OF SERVICE: April 1, 2011 through Dec 31, 2011

PAYMENT: Harris will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Exemption 4 **Attachment A** summarizes the cost breakdown by task.

ADDITIONAL AUTHORIZATION: The limit of additional authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of $ Redacted Ex. 4 The balance of authorization needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between Harris and Client, dated January 23, 2009.

SAPPHIRE ENERGY, INC.

By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: April 29, 2011

Send copies of communications and notices to Sapphire Energy: Attn: Jaime E. Moreno, P.E.

SAPPHIRE ENERGY DOCUMENT NO. S011.0099.HG

ATTACHMENT A
Work Description and Cost Summary

Dave Marsh

From: McNiesh, Bob [Robert.McNiesh@Harrisgroup.com]
Sent: Monday, April 25, 2011 4:12 PM
To: Ron Kluwe
Cc: Buckland, Michael; Jaime Moreno; Dave Marsh
Subject: Potential Blast Overpressure

Categories: Follow-Up

Ron,

We have a sub consultant lined up to do Redacted Exemption 4 , this is something that Redacted Exemption 4

They will take about 4 weeks to develop a draft and the total cost will probably be around $ Redacted Ex. 4 The person we have been dealing with will be out of the country next week so we would like to get this buttoned up this week so that his people can get started while he is gone.

We don't have their costs budgeted so this would Redacted Exemption 4 . In any event, they will need to sign a Sapphire NDA.

Please let us know if this is acceptable.

Thanks,
Bob

Robert McNiesh, P.E.
Harris Group Inc.
300 Elliott Avenue West, Suite 500
Seattle, WA 98119
Office: 206.494.9556
Mobile: 206.518.0194
E-mail: Robert.McNiesh@Harrisgroup.com

ADDENDUM TO AGREEMENT FOR PROFESSIONAL SERVICES
WORK ORDER NO. 08

SAPPHIRE ENERGY PROJECT NO. PR.100026.100

HARRIS GROUP, INC. PROJECT NO. 30070.00

Harris Group, Inc. is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Professional Services previously executed between Harris Group, Inc. ("Harris"), and Sapphire Energy, Inc. ("CLIENT") dated January 23, 2009.

CLIENT NAME: Sapphire Energy, Inc.

PROJECT NAME: Sapphire Energy, Inc.
IABR Detailed Design
Proposal for Professional Services
HGI Proposal No. P1610.01-11, Rev 2
(Blast Overpressure Study)

PROJECT LOCATION: Proposed IABR Facility Location – Luna County, New Mexico
1500 HWY 9 SW, Deming, NM 88030

DESCRIP. OF WORK: As described in Harris' proposal dated May 23, 2011 which is included as a part of this Addendum as **Attachment A.**

PERIOD OF SERVICE: April 1, 2011 through Dec 31, 2011

PAYMENT: Harris will perform the Scope of Work for this Work Order on a time and expense basis not-to-exceed $ Redacted Exemption 4 **Attachment A** summarizes the cost breakdown by task.

ADDITIONAL AUTHORIZATION: The limit of additional authorized budget associated with this work order is $ Redacted Ex. 4 a total authorization to date of $ Redacted Ex. 4 The balance of authorization needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between Harris and Client, dated January 23, 2009.

SAPPHIRE ENERGY, INC.

By: _____
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: May 31, 2011

Send copies of communications and notices to Sapphire Energy: Attn: Jaime E. Moreno, P.E.

SAPPHIRE ENERGY
DOCUMENT NO. 11.0104

ATTACHMENT A
Work Description and Cost Summary

Harris Group Inc.

May 23, 2011

Mr. Jaime Moreno
Sapphire Energy, Inc.
27101 Puerta Real, Suite 280
Mission Viejo, CA 92691-8009

Reference: Sapphire Energy, Inc.
IABR Detailed Design
Change Order No. 5
HGI Project No. 30070

Dear Jaime:

This letter is to request additional budget authorization for support of the IABR project. At this point we do not have a complete scope of work, but are responding to your requests to attend meetings,

Redacted Exemption 4

We request that you increase our authorized budget by $ Redacted Exemption 4

Very truly yours,

Bob McNiesh
Senior Project Manager

cc: Sapphire Energy - Ron Kluwe, Dave Marsh
Harris Group - Mark Warner, Mike Buckland, File 30070.1106

30070CO05 110523.docx

Suite 500
300 Elliott Ave W.
Seattle, WA 98119
(206) 494-9400
Fax (206) 494-9500
www.harrisgroup.com

PMC 120.1
(12/09)

U.S. DEPARTMENT OF ENERGY
GOLDEN FIELD OFFICE

FINANCIAL ASSISTANCE COMBINED COST/TECHNICAL EVALUATION AND NEGOTIATION MEMORANDUM

SECTION I - GENERAL INFORMATION

This technical evaluation/negotiation memorandum will be prepared jointly by the assigned DOE/Golden OCPM AND OAFA personnel, to document the specific action being evaluated and supported. Each office is responsible for certain sections of this document. The assigned OCPM and OAFA personnel responsible for the action will both sign this document upon its completion, demonstrating their agreement on its contents.

1. Recipient: Sapphire Energy, Inc.

2. Grant/Cooperative Agreement No.: DE-EE0002884 Modification No. 007
   Requisition No: 12EE000075
   Project Title: Recovery Act - Sapphire Integrated Algal Biorefinery (IABR)

3. Type of Action: ☐ New Award ☐ Renewal ☐ Continuation ☒ Revision
   Description of this Action: (NOTE: Indicate what is addressed by this Action only):

   The purpose of this action is to lift conditions and release funding for Phase 1 of Budget Period 2 for the Sapphire Energy, Inc. (DE-EE0002884) project entitled, "Recovery Act - Sapphire Integrated Algal Biorefinery (IABR)." This action also updates the Budget Period 1 budget to reflect actual costs incurred. Specifically, this action approves the Statement of Project Objectives and budget associated with activities in Phase 1 of Budget Period 2. The total approved budget for Phase 1 of Budget Period 2 is $Redacted Exemption 4 $21,954,072 DOE share and $Redacted Exemption 4 Recipient cost share.

4. Award type, as determined at Procurement Strategy Meeting (for new awards): ☐ Grant ☒ Cooperative Agreement
   If Cooperative Agreement, provide the specifics of the Substantial Involvement. (Note: This language will be used in the Substantial Involvement provision of the award.):

   1. Government Insight
      In order to adequately monitor project progress and provide technical direction and/or redirection to the Recipient, DOE must be provided an adequate level of insight into various Recipient activities. Government Insight activities by DOE include attendance at Recipient meetings, reviews and tests, as well as access for DOE's consultants to perform independent evaluations of Recipient's plans and processes. Recipient shall notify the DOE Project Officer of meetings, reviews, and tests in sufficient time to permit DOE participation, and provide all appropriate documentation for DOE review.

   2. Specific activities to be conducted by DOE:
      a. Risk Evaluation – DOE will review the Recipient's initial Risk Mitigation Plan (RMP) for quality and completeness. DOE will also monitor updates to the RMP and actions taken by the Recipient during the performance of its award to mitigate risks and improve the probability of successful execution of the integrated Biorefinery project. At DOE's discretion, additional independent risk analyses of the project by DOE consultants may be requested.
      b. Independent Engineering Assessments – DOE will engage a private, independent engineering (IE) firm to assist in assessing the progress of the project and provide timely and accurate reports to DOE. The Recipient will ensure that the IE has access to any and all relevant documentation sufficient to allow the IE to provide independent evaluations to DOE on the progress of the project. Such documentation includes but is not limited to the following:
         - Drawings and specifications
         - Construction and Execution plans
         - Resource loaded schedules
         - Design functions and requirements for the site final design review
         - Risk management plans
         - Value management and engineering studies and/or plans
         - Acquisition strategies

- Project execution plans
- Project controls including earned value management systems
- Qualifications of the integrated project team.
- Financial strategy for funding the construction project
- Updated marketing and business plan
- Invoices submitted to DOE

DOE will evaluate the quality and completeness of information and documentation provided by the Recipient to DOE and its consultants in order to allow DOE to provide technical direction and/or redirection to the Recipient about how best to achieve the purposes of the award. Consultants to DOE may not provide technical direction and/or redirection to the Recipient.

5. New/Revised Project Period for this Award: From: 12/29/2009 To: 09/30/2014
   New/Revised Budget Period 1 for this Award: From: 12/29/2009 To: 10/20/2011
   New/Revised Budget Period 2 / Phase 1 for this Award: From: 10/21/2011 To: 09/30/2014
   New/Revised Budget Period 2 / Phase 2 for this Award: From: TBD To: 09/30/2014
   New/Revised Budget Period 2 / Phase 3 for this Award: From: TBD To: 09/30/2014
   New/Revised Budget Period 3 for this Award From: TBD To: 09/30/2014

6. Compliance Assessment (skip if new award):
   a. Deliverables
   The Recipient is current in submitting required reports: ☒ Yes ☐ No
   If no, identify the delinquent report(s), indicate what action(s) have been taken to remedy the situation, and identify what further action(s) are necessary, if any:

N/A

   b. Financial
   The Recipient is current in meeting the cost share requirement: ☒ Yes ☐ No
   If no, indicate what action(s) have been taken to remedy the situation and validate why this new action should proceed:

N/A

7. Check the applicable box for Funding Appropriation:
   ☒ Energy and Water ☐ Other _____

8. Check the applicable box for Statutory Authority:
   ☒ 109-58, Energy Policy Act 2005
   ☐ 110-140, Energy Independence and Security Act 2007
   ☒ ARRA
   ☐ Other: _____

9. Per 10 CFR 600, the preferred payment method for State/Local Governments, Institutions of Higher Education, Hospitals, or Other Non-Profit Organizations is **Advance**. The preferred Payment Method for For-Profit organizations is **Reimbursement**. Please state the payment method that will be used for this award in the box below. If the preferred payment method is not planned for a new award, provide an explanation below. Also, explain below if the payment method for the award is being changed by this action. If the ACH or the "ASAP Approval Required" payment methods is required, include an explanation for the restriction.

The recipient will remain on the ACH reimbursement payment method.

10. Is the proposed Recipient on the debarred or suspended list? Yes ☐ No ☒
    Are any of the proposed subrecipients/subcontractors on the debarred or suspended list? Yes ☐ No ☒
    Is the Project Director on the debarred or suspended list? Yes ☐ No ☒
    If yes for either response above, award cannot be made without obtaining a waiver. See attached waiver.
    The review was conducted on the Internet on 10/12/2011 (Include Printout in permanent STRIPES file)

11. A risk determination has been completed on the PMC Form 460.2 Yes ☐ N/A ☒

12. Negotiation:

	Government Negotiator(s)		Recipient Negotiator(s)	
	Name	Organization	Name	Position
1.	Molly Hames	Contracting Officer	Jaime Moreno	Vice President
2.	Christy Sterner	Project Officer	Dave Marsh	Engineer
3.	Christine English	CN-JV Project Engineer		

SECTION II – NEGOTIATION SUMMARY

1. Please record any significant application or budget submissions that resulted in a revised budget in the Negotiation History Table below (including SF424A, budget justifications, e-mails, etc.):

Application/Budget Submission	Reference Document (s)	Date of Submission	Summary of Change
Original		8/5/2011	
Revision 1	123.1, 424A, SOPO	10/3/2011	Updated contractual, construction and other direct cost categories for Phase I BP2. Updated indirects and fringe with actuals for BP1 and increased ODC's. SOPO updated to include BP2 Phase I activities.
Revision 2	backup	10/4/2011	Submitted contractual backup documentation
Final	123.1	10/3/2011	Updated contractual, construction and other direct cost categories. SOPO updated to include BP2 Phase I activities.

2. Complete Budget Table below (only include the original budget and final negotiated costs – the Percent of Total Negotiated Budget will calculate automatically)
Note: List proposed amounts by category even if there are no differences in the dollar amount.

Element of Cost	Originally Approved Budget Period 1 Negotiated Costs (005 modification)	Final Approved Budget Period 1 Negotiated Costs (007 modification)	Original Phase I Budget Period 2 Negotiated Costs (007 modification)	Final Phase I Budget Period 2 Negotiated Costs (007 modification)	Percent of Total Negotiated Budget	Fringe Benefits and Indirects	
						Proposed Rate	Negotiated Rate
Personnel							
Fringe Benefits							
Travel							
Equipment							
Supplies							
Contractual							
Construction							
Other							
Total Direct Charges							
Indirect Charges							
TOTAL							
Program Income							
DOE Share (non-FFRDC)	$9,970,000	$9,145,000	$21,954,072	$21,954,072			
DOE Share (FFRDC)	$275,000	$275,000	$0	$0			
Total DOE Share	$10,245,000	$9,420,000	$21,954,072	$21,954,072			
Non-Federal Cost Share	Redacted Exemption 4						

Redacted Exemption 4

SEE ATTACHED SF 424A FOR BUDGET PERIOD BREAKDOWN

3. Total Allowable Adjustment without Concurrence from the Selection Official per the Selection Statement: 10%
Actual Total Adjustment based on Budget Table Above: 0%
Is the original budget the same as the negotiated budget: ☐ Yes ☒ No
If No, please check all boxes that apply:
☒ Change in the Project Scope
☐ Changes due to Time Delays
☐ Math Errors in Budget
☐ Changes in Indirect/Fringe Costs Caused Changes in Direct Costs or Total Project Costs
☐ Indirect/Fringe Rates incorrectly applied
☒ Other (explain): Construction costs were miscategorized

4. Briefly describe and explain any substantial change(s) to the original Statement of Project Objectives submitted by the recipient:

Project Officer commentary:
The Statement of Project Objectives has been updated to include all Budget Period 2 tasks. The tasks that are being approved with this action are those that will be performed in Phase 1 of Budget Period 2. Phase 1 of BP2 will begin 10/21/2011, and will continue through the beginning of Phases II and III. Thus, while the construction portion of Phase 1 is scheduled to end 06/06/2012, the official end date of BP2-PH1 is the end date of the project, 09/30/2014.

SECTION III – TECHNICAL EVALUATION SUMMARY

A. For each cost category, the Project Officer and the Specialist will complete his/her Technical Evaluation of the Negotiated Costs to confirm that they are all reasonable, allowable, and allocable. Additional comments should be added as necessary and as indicated below.

1. Personnel:

Total Negotiated Personnel Costs for BP1: Total Negotiated Personnel Costs for BP2-PH1:	Redacted Exemption 4	Not Applicable, the recipient did not propose Personnel costs: ☐

Project Officer:
Mod005 BP1Personnel: $Redacted
Final Approved BP1 Pers Exemption 4
There is no change between the approved personnel costs for BP1 and the actual incurred costs for BP1.

Original BP2-PH1 Personnel: $Redacted
Final Approved BP2-PH1 Perso Exemption 4
The labor hours proposed in the negotiated budget are reasonable for the scope of work: ☒
The types of labor and labor mix proposed in the negotiated budget is reasonable: ☒
The proposed labor rates are reasonable: ☒

The personnel that have been included in Phase 1 of BP2 include
Redacted Exemption 4
The type of personnel that have been included in this budget reflect the actual personnel that have been working on the project throughout Budget Period 1 and that will continue working on the project throughout Phase 1 of Budget Period 2.

The types of personnel and the associated hours and costs (detailed in the budget justification AWD-007) that have been included are reasonable for the scope of work that is being performed. A brief description of the scope of work for each personnel type is provided to substantiate the number of hours and the associated costs. These scopes of work are described below:

Redacted Exemption 4

Redacted Exemption 4

Specialist:
Please fill out the following table with the negotiated costs:

Labor Type	Budget Period 2 - Phase 1		
	Hours	Rate	Total
Redacted Exemption 4			
Total:			

Negotiated labor rates are reasonable: ☒
Labor rates are loaded rates (with fringe benefits or overhead costs): ☐

Please detail the basis for the reasonable determination:
The $4 difference is due to rounding in the rates for estimation purposes. The proposed amount of $ Redacted Ex. 4 reasonable and acceptable.

2. Fringe Benefits:

Total Negotiated Fringe Benefit Costs for BP1:	$ Redacted	Not Applicable, the recipient did not propose Fringe Benefit costs: ☐
Total Negotiated Fringe Benefit Costs for BP2-PH1:	$ Ex. 4	

Specialist:
Mod005 Approved BP1 Fringe Redacted
Final Approved BP1 Fringe: $ Exemption 4
The total BP1 fringe benefits have been reduced from the originally approved budget (Mod 005) because the rates have been updated and reflect actual costs incurred.

Original BP2-PH1 Fringe: $ Redacted
Final Approved BP2-PH1 Fı Exemption 4
Does the Recipient have an approved rate agreement: ☐ Yes ☒ No
If No, select one of the following:
☒ Rate proposal was reviewed by the Cost/Price Analyst and found to be reasonable, allowable, and allocable (attach Cost/Price Analyst Determination)
☐ Rate Proposal was reviewed by the Cost/Price Analyst for a previous award (attach Cost/Price Analyst Determination)
List Date of review:
☐ Specialist determined that rate was reasonable
☒ Other: In accordance with the 03/22/2011 memo "Streamlining Authorization Process for Financial Assistance Awards", if no IDC is proposed, fringes up to 35% of direct labor costs are reasonable and acceptable based on internal benchmarks. A copy of the memo is filed under tab AWD-021.

Please fill out the following table with the negotiated costs:

	General Fringe	R&D Staff OH	Base Subtotal	Fringe Totals
BP-1 (2010)				
R&D Staff				
Non R&D Staff				
BP-1 (2011)			Redacted Exemption 4	
R&D Staff				
Non R&D Staff				
BP-1 TOTAL				
BP-2 (Phase 1)				
R&D Staff				
Non R&D Staff				
BP-2 Calculated				
BP-2 Proposed				

The fringe benefit costs in the negotiated budget were appropriately applied and are reasonable: ☒
The recipient proposed $Redacted Ex. 4 indirect costs, and these costs are recommended acceptable. The recipient calculated the total for BP2 correctly; however, the breakout of the individual phases was calculated incorrectly. Based on the recipient's proposed rates for general fringe and the R&D staff, their calculated fringe for BP2-PH1 totals $Redacted Ex. 4 The fringe benefit costs will be reconciled for BP2 when Phases 2 & 3 are submitted for reviewed and release.

The recipient has reported 2010 costs in accordance with their submitted Incurred Cost Proposal (AWD-014) and the recipient will true up invoicing calculations from actual costs for personnel on an annual basis.

3. Travel:

Total Negotiated Travel Costs for BP1:	$ Redacted	Not Applicable, the recipient did not propose Travel costs: ☐
Total Negotiated Travel Costs for BP2-PH1:	$ Exemption 4	

Project Officer:
Mod005 BP1Travel: $
Final Approved BP1 T Redacted Exemption 4
There is no change between the approved travel costs for BP1 and the actual incurred costs for BP1.

Original BP2-PH1 Travel: $ Redacted Exemption 4
Final Approved BP2-PH1 T
The number and type of trips proposed in the negotiated budget are reasonable for the scope of work: ☒
The costs per trip proposed in the negotiated budget are reasonable: ☒
Is foreign travel included in the negotiated budget: ☐ Yes ☒ No

Travel has been included for trips to meet with the Department of Energy (DOE) to present the results of the project and to discuss the progress/status of the project. Over the course of BP2-PH1, Sapphire expects

Redacted Exemption 4

. These costs are reasonable for the scope of work being performed.

☒ Specialist concurs.

4. Equipment:

Total Negotiated Equipment Costs for BP1: Total Negotiated Equipment Costs for BP2-PH1:	$Redacted $Exemption 4	Not Applicable, the recipient did not propose Equipment costs: ☒

Project Officer:
Mod005 BP1Equipment: $ Redacted
Final Approved BP1 Equi Exemption 4
There is no change between the approved equipment costs for BP1 and the actual incurred costs for BP1.
Original BP2-PH1 Equipment: $0
Final Approved BP2-PH1 Equipment: $0
No equipment costs are proposed for BP2-PH1.

☒ Specialist concurs.

5. Supplies:

Total Negotiated Supplies Costs for BP1: Total Negotiated Supplies Costs for BP2-PH1:	$Redacted $Exemption 4	Not Applicable, the recipient did not propose Supplies costs: ☐

Project Officer:
Mod005 BP1Supplies: $Redacted
Final Approved BP1 Su Exemption 4
There is no change between the approved supplies costs for BP1 and the actual incurred costs for BP1.

Original BP2-PH1 Supplies: $Redacted
Final Approved BP2-PH1 Sup Exemption 4
The types /quantities of supplies proposed in the negotiated budget are reasonable based on the scope of work: ☒
The costs of supplies proposed in the negotiated budget are reasonable: ☒

Supplies have been requested for the printing of the engineering designs and for the materials necessary for the issuance of the bid packages and standards to the EPC. A total of $ Redacted Ex. 4 been budgeted for these supplies and is reasonable for BP2-PH1. Costs are based on Redacted Exemption 4
This basis is reasonable and comparable to similar costs on similar projects, and to actual costs incurred in BP1 for similar activities.

☒ Specialist concurs.

6. Contractual:

Total Negotiated Contractual Costs for BP1: Total Negotiated Contractual Costs for BP2-PH1:	$Redacted $Exemption 4	Not Applicable, the recipient did not propose Contractual costs: ☐

Project Officer:
Mod005 BP1Contractual: $Redacted Exemption 4
Final Approved BP1 Contr
There is no change between the approved contractual costs for BP1 and the actual incurred costs for BP1.

Original BP2-PH1 Contractual Costs: $Redacted Exemption 4
Final Approved BP2-PH1 Contractual
The subrecipients proposed in the negotiated budget are appropriate for the scope of work: ☒
The contractual costs proposed in the negotiated budget are reasonable: ☒ Yes

The final approved BP2-PH1 contractual costs are different from the original BP2-PH1 costs because the recipient had Redacted Exemption 4

Please fill out the following table with the negotiated costs:

Subrecipient/Vendor Name	Final BP2-PH1 Cost	Role in Project (Identify SOPO Tasks)
Harris Group (Vendor)	Redacted Exemption 4	Engineering support during Construction
Brown and Caldwell (Vendor)		Engineering support during Construction
Geomatrix (Vendor)		Project Permitting during Construction
Las Cruces Security (Vendor)		Site Security Services
AMEC plc (Vendor)		Construction
TOTAL		

Did the Recipient propose any subrecipients with total costs above $100,000? Yes ☒ No ☐

Vendors:
The following vendors have been included in BP2-PH1. An explanation of the scope of work and justification for the associated costs is provided below for each vendor.

- **Harris Group ($ Redacted Ex. 4), Brown and Caldwell ($ Redacted Ex. 4), Geomatrix ($ Redacted Ex. 4):** During Phase 1 of the IABR project, professional services will be required from three key vendors, Harris Group, Brown and Caldwell, and Geomatrix. During construction activities, Sapphire will utilize engineers from these companies to provide responses to contractor construction information requests, provide clarification on engineering documents and drawings, and react to identify field construction queries. This work will fall to all three main design vendors: Brown and Caldwell, Harris Group and Geomatrix. Additional design services during Phase 1 will be required of Harris Group to provide Redacted Exemption 4 The estimates associated with these three vendors are based on engineering and permitting services provided to Sapphire to date under BP1. The costs associated with the work that is to be performed by each of the vendors are based on the following duties:
  - Redacted Exemption 4
  -
  -
  -
- **Las Cruces Security Services ($ Redacted Ex. 4):** Las Cruces Security Services has been contracted by Sapphire to provide security services for the IABR from June 6, 2011 through July 31, 2012 (approximate end of BP2-PH1 construction). LCSS will provide Sapphire with armed, uniformed security guards to conduct security services at the IABR in order to protect Sapphire's employees, customers, and property. The guard will also be in charge of regulating the access of individuals to the property. Sapphire will pay the LCSS security guard $ Redacted Ex. 4 regular hours and $ Redacted Ex. 4 for overtime and holidays. A work order and cost basis has been provided (LCSS_WO-1pdf) and can be located in AWD-007. This scope of work is reasonable for the project.
- **AMEC ($ Redacted Ex. 4):** A breakdown of the construction costs that will be incurred during Phase 1 of Budget Period 2 is presented in the table below:

Item	Material	Equipment	Subcontract	Total
Redacted Exemption 4				

Redacted Exemption 4	
Total Construction Cost:	

The construction contract between Sapphire and AMEC has been provided, along with all of the attachments and is located in AWD-007. Backup documentation of the construction costs that will be incurred during Phase 1 of Budget Period 2 has been provided (Sapphire IABR GMP.pdf) and is also located in AWD-007. However, it should be noted that the total shown in this document ($ Redacted Exemption 4 , which were previously approved in Mod 005). AMEC is the EPC provider under a fixed-price contract. Work orders are issued and priced accordingly. Once agreed upon by both AMEC and Sapphire, the work orders are issued. Payments are made on a performance schedule. All additional subcontracts issued by AMEC within the EPC contract will be issued through a competitive bid process that includes Sapphire's involvement. This EPC contract represents a standard engineering, construct and procurement contracting mechanism. Redacted Exemption 4 in this area and is very familiar with this type of effort and contract.

Please note that all contractual costs are reviewed by the Independent Engineer as well as by the Project Officer. Based on discussions with the IE and the release of the EIR 2 report, the contractual costs are reasonable, necessary, and based on acceptable industry and engineering practices and standards.

☒ Specialist concurs.

7. Construction:

Total Negotiated Construction Costs for BP1: Total Negotiated Construction Costs for BP2-PH1:	$0 $0	Not Applicable, the recipient did not propose Construction costs: ☒

Project Officer:
No construction costs proposed for this project.

☒ Specialist concurs.

8. Other Direct Costs:

Total Negotiated Other Direct Costs for BP1: Total Negotiated Other Direct Costs for BP2-PH1:	$ Redacted $ Ex. 4	Not Applicable, the recipient did not propose Other Direct costs: ☐

Project Officer:
Mod005 BP1 ODCs: $0
Final Approved BP1 ODCs: $0
There is no change between the approved other direct costs for BP1 and the actual incurred costs for BP1.

Original BP2-PH1 ODCs: $ Redacted Exemption 4
Final Approved BP2-PH1 C
The types of other direct costs proposed in the negotiated budget are reasonable for the scope of work: ☒
The costs proposed in the negotiated budget for other direct costs are reasonable for the scope of work: ☒

The other direct costs in BP2-PH1 have been included to cover the operating expenses necessary for Phase 1 of the IABR. These expenses will cover activities occurring at both the IABR site (cultivation, harvesting etc.) and activities that will occur at the PDU that are also part of the IABR process Ex. 4 A breakdown of the costs that have been included for each of the major process components are detailed in the table below. The costs are based on actual operating costs incurred at the PDU scale, increased appropriately – standard engineering estimates – by scale and volume to the size of the Phase 1 effort. Sapphire will continue throughout the life of the project to examine volume contracts and pricing for many of the ODCs in this list. For example, they are currently working with Redacted Exemption 4 . Sapphire has been working with the firm(s) (Redacted Exemption 4) that will perform these activities; however, like the full EPC contract (not the limited notices) the agreements cannot be signed until the project officially moves into BP2. Once signed, Sapphire will submit the finalized agreements to DOE for record. The items in the Table below are listed under ODCs rather than split into separate cost categories because for purposes of the BP2-PH1 estimate and for the Loan Guarantee, the costs are examined in terms of unit operations rather than the direct cost categories. Most of the items would be considered supplies and ODCs; however, to remain consistent with the budget as submitted between agencies, the evaluation of these costs remains within ODCs. Based on experience with costs incurred to date in BP1 for similar items, experience with similar costs for similar items on comparable projects, and the IE's review of these costs, they are reasonable and acceptable as proposed.

OpEx Cost Basis Calculations	
Redacted Exemption 4	

The difference from the calculated amount and the proposed amount is $1 and is not a material difference.

☒ Specialist concurs.

9. Indirect Charges:

Total Negotiated Indirect Costs for BP1:	$Redacted	Not Applicable, the recipient did not propose
Total Negotiated Indirect Costs for BP2-PH1:	$Exemption 4	Indirect Costs: ☒

Specialist:

Mod005 BP1Indirects: $ Redacted Exemption 4

Final Indirects BP1 Pers

The total BP1 indirect charges have been reduced from the originally approved budget (Mod 005) because the rates have been updated and reflect actual costs incurred. The revised costs were reviewed and recommended acceptable by Cost/Price (see AWD-014).

Original BP2-PH1 Indirects: $0

Final Approved BP2-PH1 Indirects: $0

Sapphire has decided Redacted Exemption 4

Does the Recipient have an approved rate agreement: ☐ Yes ☒ No

If No, select one of the following:

☒ Rate proposal was reviewed by the Cost/Price Analyst and found to be reasonable, allowable, and allocable (attach Cost/Price Analyst Determination)

☐ Rate Proposal was reviewed by the Cost/Price Analyst for a previous award (attach Cost/Price Analyst Determination)

List Date of review:

☐ Specialist determined that rate was reasonable

☒ Other: No indirects are proposed for BP2-PH1, and the proposed changes to the indirects for BP1 are below the recommended cap from C/P analyst for BP1 in Mod 005.

BP-1 Detail

$ Redacted Total Direct Charges
Ex. 4 Less proposed direct costs without indirects
$ Proposed direct costs for Indirect application

	Direct Costs	Indirect Rate	Indirect Subtotals
2010 Direct costs	$	Redacted Exemption 4	
2011 Direct costs	$		

The indirect costs proposed in the negotiated budget were appropriately applied and are reasonable: ☒

10. Cost Share:

Project Officer:
Project is a: ☐ Research ☐ Development ☒ Demonstration ☐ Other: _____
The minimum recipient's cost share required for this award is: 50%
The recipient proposed cost share for this award is: Redacted Exemption 4
Does the proposed cost share meet the minimum requirement: ☒ Yes ☐ No

Specialist:
Is the proposed cost share: ☒ Cash ☐ In-kind
Sapphire will be providing matching funds of $ Redacted Ex.4 cost share toward the BP2-PH1 expenses. $Redacted Exemption 4
BP2-PH1cost share will be provided by Sapphire as Redacted Exemption 4

Organization	Type of Cost Share	Cost Share Amount
Sapphire	Cash	Redacted Exemption 4
Sapphire (Pending)	Cash	
Total:		

Third Party cost share commitment letters have been obtained: ☒

B. The following Project Officer and Specialist evaluation and negotiation commentary and recommendations address their agreement on all additional considerations for this award.

1. Please list any other special provisions agreed upon for inclusion in this award and describe the rationale for their inclusion below.

This action only approves Phase 1 of BP2 for the specific scope and budget associated with BP2-PH1. It is recommended that the remaining phases in BP2 – Phases 2 and 3, and BP3 be held conditional pending submittal, review, and approval of later Phases and BP applications (scopes, budgets, and any other required BP2 documentation). In BP2-PH1, DOE funds will be held proportionate to the amount of cost share that is pending verification from the recipient.

2. If a negotiation strategy, or strategies, is/are specified in the selection statement, provide a discussion below of how this was addressed and resolved.

25% of Total Project Costs must be kept aside from the project budget as contingency for the project. This contingency is applicable to total project costs and will be verified by the Project Officer as requested and discussed in the Contingency Appendix that is attached to the award. Contingency will be reported and tracked as well to address the 25% requirement per the Selection Statement.

3. Any other comments or concerns of the Project Officer and/or Specialist for this award, and the recommended approach to mitigating them, will be explained and addressed below.

See #1 above.

4. Is this a Recovery Act award? ☒ Yes ☐ No
   - If Yes, does the Buy American Act apply (see applicability below)? ☒ Yes ☐ No
   - If Yes, does Davis Bacon Act apply (see applicability below)? ☒ Yes ☐ No

If the answer to either the Buy American Act or Davis Bacon Act questions is Yes, provide a short discussion below on: 1) the type of entity; 2) what applies; Davis Bacon, Buy American, or both; 3) whether it applies to the prime, subrecipient, or both; and 4) work to be performed that requires applicability of Buy American and/or Davis Bacon.

Sapphire Energy, Inc., their subrecipients, contractors, vendors, and other entities involved in this project will comply with Davis Bacon Act requirements where those requirements are applicable within the project.

SECTION IV – RECOMMENDATIONS/APPROVAL

Signatures of the Project Officer and Specialist, indicating their recommendations, as indicated below, will occur after their mutual agreement on the contents of this document, and before the review and approval process for the action. The signatures below indicate that the costs in the negotiated budget are reasonable, allowable, and allocable.

1. Technical Recommendation

The project costs are acceptable and should be considered for a financial assistance award. The resources have been reviewed relative to the Statement of Project Objectives and are found to be reasonable, except as previously noted herein.

Christy Sterner — Signature
10/19/11 — Date

Christy Sterner
Project Officer

2. Specialist Recommendation

In view of the above analysis, the technical evaluation, and considering all known factors, this Award is recommended.

Molly R Hames — Signature
10/19/11 — Date

Molly Hames
Grants Management Specialist

3. Contracting Officer Approval

☐ I concur with the above recommendation and have determined that the Recipient is responsible. I consider this Award to be in the best interest of the Government, and approve the award documents.

☒ In view of the analysis, the technical evaluation, and considering all known factors, I have determined that the Recipient is responsible. This Award is considered to be in the best interest of the Government and approved.

Molly R Hames — Signature
10/19/11 — Date

Molly Hames
Contracting Officer

Hames, Molly

From: Daniel Sachs [daniel.sachs@sapphireenergy.com]
Sent: Wednesday, October 19, 2011 2:21 PM
To: Hames, Molly; Jaime Moreno
Cc: Sterner, Christy; Wise, Melissa; Craig, Kevin; Barron, Matt; Battershell, Carol; Tim Zenk
Subject: RE: DE-EE0002884 - Sapphire Energy - Follow Up Email
Attachments: Cost Share Letter 10_19_11.pdf

Molly,

Please find attached the letter we have discussed. Please let me know if this satisfies the requirement.

Thank you very much for your rapid responses and attention. It is much appreciated.

I hope all is well, and look forward to moving to the next step.

Best,
Dan

From: Hames, Molly [molly.hames@go.doe.gov]
Sent: Tuesday, October 18, 2011 3:44 PM
To: Daniel Sachs; Jaime Moreno
Cc: Sterner, Christy; Wise, Melissa; Craig, Kevin; Barron, Matt; Battershell, Carol
Subject: DE-EE0002884 - Sapphire Energy - Follow Up Email

Hello,
I just wanted to follow up in writing and confirm the conversation we had earlier today at 12pm MST.

To summarize, the modification we are currently working on is to lift conditions for Budget

Redacted Exemption 4

It is our team's intention to have this award modification completed by the end of this week. However, after review of the cost share commitment letter provided, we have requested that Sapphire provide a firm cost share commitment letter stating the amount of Redacted Exemption 4 for Budget Period 2, Phase 1 as shown in the current budget.

Also noted in the call, Sapphire has agreed to provide the following documents should a Loan Guarantee be acquired: 1) A notice of encumbered property, and 2) A notice of a secured Loan Guarantee with USDA.

If you would, please confirm this was our understanding. If you have any questions or concerns please do not hesitate to contact me.

Thanks,

Molly Hames

Grants Management Specialist
U.S. Department of Energy
Golden Field Office
1617 Cole Blvd. Golden, CO 80401
Phone: 720-356-1552 ** New Phone Number**
Fax: 720-356-1730

Hames, Molly

From: Jaime Moreno [jaime.moreno@sapphireenergy.com]
Sent: Wednesday, October 19, 2011 11:25 AM
To: Sterner, Christy
Cc: Hames, Molly; Dave Marsh; Joshua Lavers; Daniel Sachs
Subject: Re: Revised BP2 SOPO

Thank you Christy and Molly,
We concur with the revised SOPO.

Best regards,
Jaime

On Oct 19, 2011, at 11:23 AM, "Sterner, Christy" <christy.sterner@go.doe.gov> wrote:

> Jaime,
>
> Here is the revised SOPO. Please let me know if you concur.
>
> Best regards,
>
> Christy
>
> Christy Sterner
>
> Project Officer
>
> U.S. Department of Energy
>
> Golden Field Office
>
> Phone: 303-275-4720
>
> Fax: 303-275-4753
>
> email: christy.sterner@go.doe.gov
>
> ***Please note my new phone number, 720-356-1788, effective August 29.***

<Attachment 2 - Statement of Project Objectives.doc>

Hames, Molly

From: Daniel Sachs [daniel.sachs@sapphireenergy.com]
Sent: Wednesday, October 19, 2011 6:51 AM
To: Hames, Molly; Jaime Moreno
Cc: Sterner, Christy; Wise, Melissa; Craig, Kevin; Barron, Matt; Battershell, Carol
Subject: RE: DE-EE0002884 - Sapphire Energy - Follow Up Email

Molly,

Thank you for providing us with this request so quickly. Christy, thank you also.

We are working on providing the requested materials ASAP. This may take a day or two.

To make sure that I understand the requirement and expected material properly, I would like to propose that we have a short call today to discuss (at least with Molly and Christy). My schedule today will be busy but is still unconfirmed. Please propose a time that works on your end and I will work to make myself available.

Thanks very much.

-Dan

From: Hames, Molly [molly.hames@go.doe.gov]
Sent: Tuesday, October 18, 2011 3:44 PM
To: Daniel Sachs; Jaime Moreno
Cc: Sterner, Christy; Wise, Melissa; Craig, Kevin; Barron, Matt; Battershell, Carol
Subject: DE-EE0002884 - Sapphire Energy - Follow Up Email

Hello,
I just wanted to follow up in writing and confirm the conversation we had earlier today at 12pm MST.

To summarize, the modification we are currently working on is to lift conditions for Budget

Redacted Exemption 4

It is our team's intention to have this award modification completed by the end of this week. However, after review of the cost share commitment letter provided, we have requested that Sapphire provide a firm cost share commitment letter stating the amount of Redacted Exemption 4 for Budget Period 2, Phase 1 as shown in the current budget.

Also noted in the call, Sapphire has agreed to provide the following documents

Redacted Exemption 4

If you would, please confirm this was our understanding. If you have any questions or concerns please do not hesitate to contact me.

Thanks,

Molly Hames
Grants Management Specialist
U.S. Department of Energy
Golden Field Office
1617 Cole Blvd. Golden, CO 80401
Phone: 720-356-1552 ** New Phone Number**
Fax: 720-356-1730

AGREEMENT FOR SECURITY SERVICES
WORK ORDER NO. 01

SAPPHIRE ENERGY PROJECT NO. PR.100035.000.05

LAS CRUCES SECURITY SERVICES, INC.

Las Cruces Security Services, Inc. is hereby authorized to perform the following work (the "Work") pursuant to the Agreement for Security Services previously executed between Las Cruces Security Services, Inc. ("Agent"), and Sapphire Energy, Inc. ("CLIENT") dated June 6, 2011.

CLIENT NAME: Sapphire Energy, Inc.

AGENT NAME: Las Cruces Security Services, Inc.

PROJECT NAME: Sapphire Energy IABR

PROJECT LOCATION: IABR Facility Location – Luna County, New Mexico
1500 HWY 9 SW, Deming, NM 88030

DESCRIP. OF WORK: As described in Agent's Agreement dated June 6, 2011 which is included as a part of this work order as **Attachment A.**

PERIOD OF SERVICE: June 6, 2011 through July 31, 2012

PAYMENT: Agent will perform the Scope of Work for this Work Order on a time basis not-to-exceed $ Ex. 4 **Attachment A** summarizes the cost rates associated with these services.

ADDITIONAL AUTHORIZATION: The balance of authorization needed to complete the approved Scope of Work will be contained in subsequent Work Orders.

OTHER TERMS AND CONDITIONS: Work to be performed in accordance with the Terms and Conditions stated in an Agreement for Services between Agent and Client, dated June 6, 2011.

SAPPHIRE ENERGY, INC.

RCK By: Jaime E. Moreno
(Authorized Representative)

Printed Name: Jaime E. Moreno, P.E.

Date: June 1, 2011

Send copies of communications and notices to Sapphire Energy: Attn: Jaime E. Moreno, P.E.

SAPPHIRE ENERGY DOCUMENT NO. 11.0106

ATTACHMENT A
Agreement for Services and Rate Summary

AGREEMENT

This agreement is entered into and made by and between the Sapphire Energy, hereafter called Client, and the Las Cruces Security Services, Inc., hereafter called Agent, on this 6th day of June 2011.

Client authorizes Agent to set in Client's name, place, and stead in the performance of it's duties as agreed upon between Client and Agent, during the existence of this contract. The Agent shall provide the Client only those services authorized by the New Mexico Private Investigators and Polygraph Act which specifically involve Security Guard Services and Security Guard Patrol Services.

Services: Agent agrees to provide the Client with armed uniformed security guards to conduct security services at the Client's facilities located approximately 9 miles East of Columbus, New Mexico off of New Mexico State Highway 9.

This stationary security guard will be placed at the location for the protection of the Client, Client's employees, Client's customers, and properties. This guard will also allow only individuals access to the property that are placed on an access list provided by the Client. The guard will be placed at these facilities 24 hours a day 7 days a week for the term of this agreement.

Cost: The Client agrees to pay the Agent $ Redacted Exemption 4
for overtime and holidays for this security guard. Holidays will be those recognized by the Federal Government. These costs are subject to NM GRT for the Las Cruces area.

Payment: The Client will be billed by invoice weekly and agrees to pay balance due within 15 days of receipt of the Agent's invoice.

Insurance: Agent agrees to maintain commercial liability insurance of at least
Redacted Exemption 4
compensation and name the Client as an also insured on all of its policies.

Independent Contractor: Agent will be an independent contractor for all performance of its services under this contract.

Termination: This agreement will terminate on July 31, 2012 unless renewed with the agreement of both parties. Either party may terminate the agreement prior to July 31, 2012 with cause and with 30 days notification to the other party.

By: Jaime Moreno

Signature: [redacted]

Title: Vice President Projects

Date: May 31, 2011

Redacted Exemption 4

Broughall, Mary

Subject: Original Contract & Attachments
Attachments: Sapphire-AMEC Final Construction Contract 31May2011.pdf; 110603 A B C E I K L O Q1 Q2 S1 S2 T U W.pdf; Attachment D - Payment Schedule.pdf; Y - Safety Plan.pdf; V - Bond 1.pdf

Joshua Lavers, CCC | **Sapphire Energy, Inc.** | Project Controls Manager | Mission Viejo, CA | M: 949.633.9295 | P: 949.202.4708 | F: 949.367.0650

CONSTRUCTION CONTRACT

This Construction Contract (this "Contract") is made and entered into as of the Contract Effective Date by and between AMEC E&C Services, Inc, a Corporation ("Contractor"), having its principal offices at 800 Marquette, Suite 1200, Minneapolis, MN 55402, and Sapphire Energy Inc. ("Owner"), having its principal offices at 3115 Merryfield Row, San Diego, CA 92121, for the purposes of providing construction of Owner's facilities at Owner's site located near Columbus, NM. This Contract comprises this executed cover sheet(s) ("Contract Cover Sheet"), the General Terms and Conditions immediately following this Contract Cover Sheet ("General Terms and Conditions") and the attachments listed below as being attached, all of which are attached hereto and fully incorporated herein.

"Owner"	**Sapphire Energy Inc.**
Owner Address	3115 Merryfield Row, San Diego, CA 92121
"Contract Effective Date"	**June 1, 2011**
"Contract Amount"	**TBD**
Estimated Construction Period	3 Years
Facility	**IABR Demonstration Plant**
"Site"	Approximately 9 miles West of Columbus, New Mexico

ATTACHMENTS TO CONTRACT

Attachment	Title	Attached	Not Applicable/ Not Attached
A	Site Description and Access Requirements	☑	☐
B	Scope of Work	☑	☐
C	Project Schedule	☑	☐
D	Payment Schedule	☑	☐
E	Unit rates for staff and craft labor	☑	☐
F	Rental rates for construction equipment	☑	☐
G	List of what is included in Small Tools	☑	☐
H	Not Used	☐	☑
I	List of what is included in Consumables	☑	☐
J	Not Used	☐	☑
K	Scope of Temporary Facilities	☑	☐
L	Insurance Requirements	☑	☐

M	Not Used	☐	☑
N	Form of Financing Party Consent	☑	☐
O	Engineering Document List	☑	☐
P	Not Used	☐	☑
Q-1	Form of Application for Mechanical Completion	☑	☐
Q-2	Division of Responsibilities	☑	☐
R	Owner Governmental Approvals	☑	☐
S-1	Mechanical Completion	☑	☐
S-2	Non-Disclosure Agreement	☑	☐
T	Form of Change Order	☑	☐
U	Form of Request for Information	☑	☐
V	Form of Bond Language	☑	☐
W	Form of Final Completion Certificate	☑	☐
Y	Contractor's Safety Plan	☑	☐
Z	Contractor's Quality Control Plan	☑	☐

IN WITNESS WHEREOF, and intending to be legally bound, the Parties hereto subscribe their names to this Contract by their duly authorized officers as of the Contract Effective Date.

CONTRACTOR:

AMEC

By: _____
Print Name: Anthony Wedell
Title: Director of Operations

Attachments still being finalized.
9 JUNE 2011

OWNER:

Sapphire Energy Inc..

By: _____
Name: Jaime E. Moreno
Title: Vice President of Projects

GENERAL TERMS AND CONDITIONS

R E C I T A L S

A. Owner will own and operate an IABR Demonstration Plant project (as further defined in Section 1.1 below, the "Facility") at the Site so that Owner may convert algae into algal oils that can be refined into gasoline, diesel and jet fuel;

B. Contractor is a full-service construction services entity with the technical capabilities to provide services to Owner for the Facility, including equipment procurement, construction management, installation and construction of the Facility; and

C. Owner desires to retain Contractor to provide, and Contractor desires to provide, equipment procurement, construction management, installation and construction of the Facility, except for any responsibilities of Owner set forth herein, all as more fully set forth in this Contract. In consideration of the mutual covenants and obligations contained herein, Owner and Contractor agree as set forth herein.

ARTICLE 1
DEFINITIONS; INTERPRETATION; EXHIBITS

1.1 Defined Terms. Initially capitalized terms used in this Contract without other definition shall have the meanings specified in this Section 1.1, unless the context requires otherwise.

"Affiliate" means, with respect to a specified Person, any other Person that directly, or indirectly through one or more intermediaries, controls, is controlled by or is under common control with the Person specified. For purposes of the foregoing, "control," "controlled by" and "under common control with," with respect to any Person, shall mean the possession, directly or indirectly, of the power to direct or cause the direction of the management and policies of such Person, whether through the ownership of voting securities or by contract or otherwise.

"Applicable Laws" means (i) all constitutions, statutes, laws, treaties, ordinances, exemptions, judgments, decrees, injunctions, writs, orders, rules, regulations, codes, specified standards or objective criteria contained in any applicable Governmental Approval (which standards or criteria must be met in order for the Work to be performed lawfully) or other legislative, judicial or administrative action of any Governmental Authority, and (ii) the requirements of the codes and standards, including all national, state and local engineering, construction, safety and electrical codes and standards applicable to the Work.

"Application for Mechanical Completion" means the application for Mechanical Completion that is to be submitted by Contractor to Owner as contemplated by Section 9.1, the form of which is attached hereto as Attachment Q-1.

"Arbitration Rules" has the meaning set forth in Section 19.2(a).

"Business Day" means all days excluding Saturdays and Sundays and those federally-recognized holidays established by 5 U.S.C. § 6103.

"Change" means any addition to, deletion from, or other modification to the quality, function, or intent of the Work, including any such addition, deletion, or other modification that constitutes a change to the Scope of Work.

"Change Order" means a written order in the form attached hereto as Attachment T, signed by Owner authorizing a Change in the Work, or an adjustment in the Contract Amount, or schedule for performance or delivery of the Work.

"Commissioning" means the set of tests and procedures performed on the Facility as described in Attachment E.

"Completion Cost" means the total reasonable and necessary expenses incurred and accrued in completing the Work, including the reasonable and necessary amounts charged by the Owner acting as a self-performing owner or any replacement contractor to finish the Work based on the obligations such self – performing owner or replacement contractor assumes under this Contract and under any of Contractor's subcontract(s) or other contractual agreement(s) that Owner elects to have assigned to itself or have assigned to such replacement contractor.

"Construction Documents" refer to the final designs, drawings, and specifications describing the requirements for construction of the Project that have been issued by Owner's Engineer and accepted by Owner, and have been provided by the Owner to Contractor as more fully described in Section 7.2,

"Contract" means this Construction Contract (consisting of the Attachments identified on the Contract Cover Sheet), as the same may be amended, supplemented or modified from time to time in accordance with the provisions hereof, including any Change Orders executed in accordance with this Contract.

"Contract Amount" means the amount of compensation which is set forth on the Contract Cover Sheet, which shall be paid by Owner to Contractor in accordance with ARTICLE 5 for performing the Work in accordance with the Contract Documents, as such amount may be increased or decreased in accordance with Change Orders.

"Contract Cover Sheet" means the cover sheet(s) of this Contract that is executed by the Parties and that identifies the Parties, certain key terms of this Contract and the components of this Contract.

"Contract Documents" means this Contract, the Construction Documents and any amendments thereto.

"Contract Effective Date" means the effective date of this Contract, as set forth on the Contract Cover Sheet.

"Contractor" has the meaning set forth in the preamble to this Contract.

"Contractor Event of Default" has the meaning set forth in Section 15.2.

"Contractor Intellectual Property" has the meaning set forth in Section 12.2(b).

"Contractor Request for Change Order" has the meaning set forth in Section 11.2.

"Damages" means actions, causes of action, claims, demands, damages, liabilities (whether absolute, accrued, contingent, fixed or otherwise, or whether due or to become due), penalties, losses, judgments, costs and expenses (including court costs and reasonable attorneys' fees and costs of investigation), but excluding any Consequential Damages described in Section 16.2.

"Day" or "day" means a calendar day, unless expressly specified otherwise in the Contract Documents.

"Defect" means any Work which is of improper or inferior workmanship as specified in the following Sections below.

"Direct Costs" means Contractor's actual cost of construction labor of any type or kind, materials, equipment, tools, and subcontracts necessary to perform the Work.

"Dispute" has the meaning set forth in Section 19.1.

"Due Date" has the meaning set forth in Section 5.1.

"Equipment" means all of the equipment, materials, apparatus, structures, supplies and other goods required by the terms of this Contract to complete the Work and to be incorporated into the Facility. Equipment shall not include any materials, apparatus or tools owned by Contractor or any Subcontractor that are used to complete the Work but are not contemplated under this Contract to become part of the Facility.

"Equipment Documentation" means copies or originals of all operating specifications, product data, system manuals, manufacturer's system drawings, manufacturer's operation and maintenance manuals, warranties (including module and inverter warranty cards) and other similar information respecting the Equipment.

"Existing Facility" means the wells and power lines at the IABR project site, and any facilities that may be completed as a part of the time phased work of the project (and being operated by Owner) owned by Sapphire Energy located adjacent to the Facility.

"Facility" has the meaning set forth in Attachment A to this Contract, to be designed and constructed by Contractor and including the Equipment as furnished by Contractor all as further defined in the Scope of Work.

"Facility Project Documents" means the project drawings, specifications, and standards issued for use in construction of the Work.

"Final Completion" has the meaning set forth in Attachment B.

"Final Completion Certificate" means the notice delivered by Owner to Contractor pursuant to Section 9.2 in the form attached hereto as Attachment W that Contractor has satisfied the requirements for Final Completion.

"Final Completion Date" means the date on which the Facility achieves Final Completion as per the milestones included in the Project Schedule, as set forth in the Final Completion Certificate.

"Final Payment" has the meaning set forth in Section 5.2.

"Financing Parties" means any and all of Owner's or its Affiliates' lenders or equity investors, and any collateral agent, administrative agent or indenture trustee of the foregoing, their successors or assigns, who have a direct or indirect financial interest in the assets, liabilities, or benefits associated with the Work performed under this Contract, including in connection with the provision of tax equity financing, construction financing, long-term financing or other credit support.

"Force Majeure Event" means the occurrence of any event beyond the reasonable control of the Party affected that results in the failure or delay by such Party of some performance under this Contract, in full or part, including: drought, flood, earthquake, storm, fire, volcanic eruption, lightning, epidemic, pandemic, war, riot, civil disturbance, sabotage, terrorism or threat of terrorism, strike or labor difficulty, accident or curtailment of supply or equipment, vandalism or total or partial casualty to the Equipment,

archeological finds, war, blockage, acts of God, power outages or black-outs, explosion, nuclear emergency, landslide, tornado or other extreme or severe weather, or restraint, order or decree by a Governmental Authority. Notwithstanding the foregoing, Force Majeure events shall expressly not include the following:

(a) mechanical or equipment failures (except to the extent any such failure is itself caused by an event described above);

(b) economic hardship of Contractor;

(c) delays in customs clearance as to any Equipment (except to the extent any such delay is itself caused by an event described above);

(d) labor strikes or other labor difficulties directed at Contractor's personnel that are not of a general and widespread nature;

(e) any weather condition at or in the vicinity of the Site, unless (1) of an unusual nature or (2) in the case of rain or snowfall (or flooding caused by either one or both), in excess of 150% of the rain or snowfall in the area of the Site in the same month as compared to the rainiest or snowiest of that same month in the prior ten (10) years; as determined by NOAA climatological data for Columbus, NM.

"General Terms and Conditions" has the meaning set forth in the Contract Cover Sheet.

"Governmental Approvals" means all authorizations, consents, licenses, leases, rulings, certifications, registrations, exemptions, permits, certificates, and approvals from, or filings or recordings made with, any Governmental Authority.

"Governmental Authority" means any federal, state, county, local or municipal government, any political subdivision thereof, or any governmental, quasi-governmental, judicial, public or statutory instrumentality, administrative agency, authority, body or other entity having jurisdiction over the performance of the Work, the Facility, over its operations, or the health, safety or environmental conditions of the Facility or the Site, or otherwise over the Parties.

"Hazardous Substance" means any hazardous, toxic, or dangerous wastes, substances, chemicals, constituents, contaminants, pollutants, and materials and any other carcinogenic, liquids, corrosive, ignitable, radioactive, reactive, toxic, or otherwise hazardous substances or mixtures (whether solids, liquids or gases) now or at any time subject to regulation, control, remediation, or otherwise addressed under Applicable Laws; (i) any "hazardous substance" as defined by the Resource, Conservation and Recovery Act of 1976 (42 United States Code ("U.S.C.") Section 6901 et seq.), as amended, and regulations promulgated thereunder; (ii) any hazardous substance defined by Wis. Stat. Section 292.01(5); (iii) "hazardous, toxic or dangerous waste, substance or material" specifically defined as such in the Comprehensive Environmental Compensation and Liability Act (42 U.S.C. Section 9601 et seq.), as amended, and regulations promulgated thereunder; and (iv) any hazardous, toxic or dangerous waste, substance, or material as defined in any so-called "superfund" or "superlien" law. For purposes of this Contract, Hazardous Substances shall also include any herbicide or pesticide, or any insecticide, fungicide or rodenticide as described in the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. Section 136 et seq.), as amended, and the regulations promulgated thereunder.

"Indemnified Parties" has the meaning set forth in Section 14.1(a).

"Independent Engineer" means any engineering or construction management firm designated by Third Parties to act on their or its behalf.

"Indirect Costs"

Redacted Exemption 4

"Invention" has the meaning set forth in Section 12.2.

"Level 3 Critical Path Method (CPM) Schedule" has the meaning set forth on Attachment C.

"Mechanical Completion" or "Mechanically Complete" has the meaning set forth in Attachment B.

"Mechanical Completion Certificate" means the notice delivered by Owner to Contractor pursuant to Section 9.1 in the form attached hereto as Attachment Q-1 certifying that the Facility has satisfied the requirements for Mechanical Completion.

"Notice to Proceed" or "NTP" has the meaning set forth in Section 6.2.

"Owner" has the meaning set forth on the Contract Cover Sheet.

"Owner Engineer or Engineer" means any engineering firm selected and designated by Owner to act on its behalf for engineering and design of the work. At the time of signing of this contract, the Owner's Engineers are Harris Group, International and Brown & Caldwell. Owner may bring on additional Owner Engineers at any time.

"Owner Event of Default" has the meaning set forth in Section 15.1.

"Owner Indemnified Parties" has the meaning set forth in Section 15.1(b).

"Owner's Representative" means the person designated by Owner in accordance with Section 4.3 to act as Owner's primary point of contact and to act on its behalf.

"Party" or "Parties" means Contractor, Owner, each or both of them, as the context may require pursuant to the terms and conditions of this Contract.

"Payment Event" has the meaning set forth in Section 5.1.

"Payment Schedule" means the payment schedule set forth in Attachment D, according to which Contractor earns payments against the Contract Amount during the Work in accordance with the provisions of ARTICLE 5.

"Person" means any individual, partnership, corporation, association, business, trust, Governmental Authority or other entity.

"Project Manager" means the Project Manager designated by Contractor pursuant to Section 2.3(e).

"Project Schedule" means the schedule for the Work, as set forth in Attachment C, and as further detailed in Section 6.1.

"Proprietary Interest" has the meaning set forth in Section **Error! Reference source not found.**.

"Project Standards" means, with respect to any Work to be performed hereunder, compliance with the Applicable Law and the exercise of professional care and skill to be expected of nationally recognized construction firms performing work of a similar nature, size and complexity during the relevant time period.

"Punchlist" means the list of minor items of Work (with line item costs) uncompleted upon the achievement of Mechanical Completion that (i) are not material to the safe operation of the Facility, (ii) do not impair the operability or safety, the mechanical or electrical integrity, or the administration and overall monitoring, of the Facility, (iii) can be completed before the Final Completion Date.

"Request for Payment" has the meaning set forth in Section 5.1.

"Request for Information" has the meaning set forth in Section 4.8.

"Scope of Work" means the Scope of Work attached hereto as Attachment B, as it may be amended or supplemented by Change Orders.

"Site" means the location of the Facility as identified on the Contract Cover Sheet and further described in Attachment A.

"Software" means (i) software program consisting of a series of statements or instructions to be used directly or indirectly in a programmable controller or computer to bring about a certain result, (ii) a data base consisting of a systematized collection of data to be used or referenced directly or indirectly by a programmed controller or computer, or (iii) any revisions or updates thereto.

"Subcontractor" means any Person with whom Contractor enters into an arrangement for the performance of the Work or for the supply of services or Equipment to Contractor in connection with the Work, including Persons at any tier with whom any Subcontractor has further subcontracted any part of the Work provided.

"Surety Bond" has the meaning set forth in Attachment D.

"Taxes" has the meaning set forth in Section 5.6.

"Time" means the time period within which Contractor shall complete the Work in accordance with the Project Schedule.

"Warranties" has the meaning set forth in Section 11.1.

"Warranty Period" has the meaning set forth in Section 11.2.

"Work" means all Contractor's construction and other services required by the Contract Documents (except those items or services described herein as the responsibility of the Owner), including

Redacted Exemption 4

"Work Package" means that Owner may release work as segregated Work Packages, that each Work Package will be either a fixed price scope of work or a time and material scope of work (as determined by Owner), and that each Work Package will have a determined Completion Date provided that Contractor shall not be obligated to perform a Work Package unless and until the Owner and Contractor have executed a Change Order for such Work Package.

1.2 Interpretation. As used in this Contract, the terms "herein," "herewith" and "hereof" are references to this Contract, taken as a whole, the terms "includes" or "including" shall mean "including, without limitation," and references to a "Section," "Article" or "Attachment" shall mean a Section, Article or Attachment of this Contract, as the case may be, unless in any such case the context requires otherwise. All references to a given agreement, instrument or other document shall be a reference to that agreement, instrument or other document as modified, amended, supplemented and restated through the date as of which such reference is made. A reference to a Person includes its permitted successors and permitted assigns. The singular shall include the plural and the masculine shall include the feminine and neuter, and vice versa.

1.3 Conflicts Among Contract Documents. The Contract Documents are intended to be complementary, and what is set forth in any one Contract Document is as binding as if set forth in each Contract Document. In case of any conflict, discrepancy, error or omission in the Contract Documents, Contractor shall within five (5) days give notice to Owner of same for Owner's instruction as to how to remedy such conflict, discrepancy, error or omission, and Contractor shall either comply with such instruction or the matter shall be resolved pursuant to the dispute resolution procedures of ARTICLE 19. Subject to the requirement to obtain Owner's instruction as to how to resolve conflicts among the Contract Documents, the provisions and requirements of the Contract Documents should be interpreted as being mutually explanatory of one another and in a manner to carry out the intent of this Contract. Contract document precedence shall be: 1) Contract, 2) Contract Attachments, 3) Project Drawings, 4) Project Specifications, 5) Project Standards, 6) Industry Standards.

ARTICLE 2
CONTRACTOR RESPONSIBILITIES

2.1 General Services of Contractor. Contractor shall furnish, erect, install, and perform related activities, or supervise such activities to the extent Contractor engages Subcontractors, as described herein for the completion of the Work and the delivery of the Facility in compliance with this Contract. The Parties understand that Contractor is obligated to perform all tasks required by the Scope of Work (excluding any items or services to be provided by the Owner) to be necessary to deliver to Owner the Facility meeting the requirements of this Contract.

2.2 Compliance with Laws and Third Party Requirements; Expeditious Performance. Throughout the performance of all aspects of the Work, Contractor shall comply with, and shall ensure that each Subcontractor complies with (i) all Applicable Laws and Governmental Approvals, (ii) the Facility Project Documents, (iii) all applicable Equipment manufacturers' requirements, including all requirements necessary to preserve and maintain in effect any and all warranties and, if applicable, any performance guarantees with respect to such Equipment, (iv) the requirements of any insurance policy (or the requirements of the insurer issuing such policy) covering Contractor, any Subcontractor, the Facility or the Work, (v) the requirements of Federal Acquisition Regulations (FAR) for cost reporting and cost compliance as may be imposed as a condition of Owner's project financing, and (v) Project Standards. Contractor shall perform the Work in accordance with the provisions of this Contract and the other Contract Documents. Such Work shall be performed in a manner that is consistent with the standard of care of reasonably prudent contractors performing work similar in scope (and geographic location) to the Work.

2.3 Specific Services of Contractor. Without limiting the generality of Sections 2.1 and 2.2, Contractor shall perform the Work in accordance with the Scope of Work in order to achieve Mechanical Completion, and Final Completion in accordance with this Contract, the Project Schedule, and the following:

Redacted Exemption 4

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Redacted Exemption 4

ARTICLE 3
SUBCONTRACTORS

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 4
OWNER RESPONSIBILITIES

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 5
COMPENSATION AND PAYMENT

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 6
PROJECT IMPLEMENTATION -- GENERAL

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 7
FINAL DESIGN PHASE – CONSTRUCTION DOCUMENTS/EQUIPMENT PROCUREMENT

Redacted Exemption 4

ARTICLE 8
CONSTRUCTION PHASE

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 9
PROJECT COMPLETION

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 10

CHANGES; SUSPENSION OF THE WORK; FORCE MAJEURE; OWNER-CAUSED DELAY

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 11
WARRANTIES

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 12
TITLE AND OWNERSHIP

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 13
RISK OF LOSS; INSURANCE

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 14
INDEMNIFICATION

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 15
DEFAULT AND REMEDIES; TERMINATION

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 16
LIMITATIONS ON LIABILITY

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 17
ASSIGNMENT; SUPPORT FOR FINANCING

Redacted Exemption 4

ARTICLE 18
REPRESENTATIONS

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 19
DISPUTE RESOLUTION

Redacted Exemption 4

Redacted Exemption 4

ARTICLE 20
NOTICES

20.1 Writing. Except as set forth in Section 20.2, any notice, statement, demand, claim, offer or other written instrument required or permitted to be given pursuant to this Contract shall be in writing signed by the Party giving such notice and shall be sent by facsimile, hand messenger delivery, overnight courier service, or certified mail (receipt requested) to the other Party at the address set forth below:

If delivered to Owner, to it at	27101 Puerta Real, Suite 280 Mission Viejo, CA 92691-8009 Tel: 949-202-4700 Fax: 949-367-0650 Attention: Ron Kluwe
If delivered to Contractor, to it at	800 Marquette, Suite 1200 Minneapolis, MN 55402 Phone: 612-332-8326 Fax: 612-332-2423 Attention: Anthony Wedell

Each Party shall have the right to change the place to which notice shall be sent or delivered or to specify one additional address to which copies of notices may be sent, in either case by similar notice sent or delivered in like manner to the other Party. Notices, addressed in compliance with the foregoing, shall be deemed received: (i) on the day on which such notice is delivered personally, (ii) on the third Business Day after deposit in the U.S. Mail; provided such notice is sent by certified mail with a return receipt request and postage prepaid, (iii) the following Business Day if deposited with a recognized overnight carrier, or (iv) upon successful transmission if sent by facsimile; provided that if sent after 5:00 pm local time at the recipient's location, on the Business Day in such location next following such transmission.

20.2 Technical Communications. Any technical or other communications pertaining to the Work shall be between Contractor's Project Manager and Owner's Representative or other representatives appointed by the Project Manager or Owner's Representative. Each Party shall notify the other in writing of the name of such representatives. Contractor's representatives shall be satisfactory to Owner, have knowledge of the Work and be available at all reasonable times for consultation.

ARTICLE 21
MISCELLANEOUS

21.1 Entire Agreement. This Contract, including all its Attachments as set forth on the Contract Cover Sheet and all Contract Documents, embodies the entire agreement and understanding of the Parties with respect to the subject matter hereof and supersedes all prior or contemporaneous agreements and understandings of the Parties, verbal or written, relating to the subject matter hereof.

21.2 Binding Effect. Except as otherwise provided herein, the terms and provisions of this Contract shall apply to, be binding upon, and inure to the benefit of the Parties hereto and their respective heirs, legal representatives, successors, and permitted assigns.

21.3 Amendments. Except for a Change Order issued as a directive by Owner pursuant to Section 10.1, no change, amendment or modification of this Contract shall be valid or binding upon the Parties unless such change, amendment or modification shall be in writing and duly executed by both Parties; provided, however, if Contractor has been notified that Owner has assigned any of its rights, duties or obligations under this Contract to a Financing Party, and Owner notifies Contractor that a Financing Party's consent is required, then the prior written consent of such Financing Party shall be required as well.

21.4 Waiver. Any waiver of the provisions of this Contract must be in writing and shall not be implied by any usage of trade, course of dealing or course of performance. No exercise of any right or remedy by Owner or Contractor constitutes a waiver of any other right or remedy contained or provided by Applicable Law. Any delay or failure of a Party to exercise, or any partial exercise of, its rights and remedies under this Contract shall not operate to limit or otherwise affect such rights or remedies. Any waiver of performance hereunder shall be limited to the specific performance waived and shall not, unless otherwise expressly stated in writing, constitute a continuous waiver or a waiver of future performance.

21.5 Governing Law; Submission to Jurisdiction; Venue.

(a) Governing Law. THIS CONTRACT SHALL BE GOVERNED BY, AND INTERPRETED AND CONSTRUED IN ACCORDANCE WITH, THE LAWS OF THE STATE OF CALIFORNIA.

(b) Submission to Jurisdiction, Venue. The Parties hereby consent to the personal jurisdiction and venue of the United States District Court, District of California located within the City of San Diego, CA for purposes of enforcement of the arbitration provisions of this Contract and any award rendered by the arbitrator.

21.6 Confidentiality; Publicity.

(a) All information (including the terms of this Contract) provided by either Party to the other or which is identified by the disclosing Party in writing as confidential or proprietary information shall be treated in a confidential manner and shall not be disclosed to any third party without the prior written consent of the non-disclosing Party, which consent shall not be unreasonably withheld. Notwithstanding the preceding, this Section 21.6 and the restrictions herein contained shall not apply to any data or documentation which is:

(i) disclosed or required to be disclosed pursuant to state or federal law, an order or requirements of a regulatory body or a court, after five (5) Business Days notice of such intended disclosure is given by the disclosing Party to the non-disclosing Party to the extent such notice is permitted by applicable law or if five (5) Business Days notice is not practical, then such shorter notice as is practical;

(ii) disclosed by a Party to such Party's Affiliate(s), advisors, consultants, legal counsel, and/or accountants or in connection with an assignment permitted by ARTICLE 17;

(iii) disclosed by Owner to a Financing Party; or

(iv) is, as of the time of disclosure, public knowledge without the fault of the disclosing Party.

(b) All Contractor publicity activities regarding this Contract or the Facility shall require the prior written consent of Owner.

21.7 Non-Discrimination. Contractor shall comply with all employment laws and shall ensure that the evaluation and treatment of its employees and applicants for employment are free from discrimination and harassment. Contractor shall include the substance of the nondiscrimination and compliance provisions of this Section 21.7 in all subcontracts, vendor agreements or purchase orders in connection with its obligations hereunder.

21.8 Construction. This Contract is to be construed so as to effectuate the normal and reasonable expectations of a sophisticated buyer and seller of the equipment and services covered by this Contract and shall not be construed either for or against either Party. No provision of this Contract shall be construed or interpreted for or against either Party because such Party drafted or caused its legal representative to draft the provision.

21.9 Headings. The titles or headings of the various sections, articles and paragraphs hereof are intended solely for convenience and ease of reference and are not intended, and are not to be deemed for any purpose, to modify or explain or place any interpretation or construction upon any of the provisions of this Contract.

21.10 Status of the Parties. Contractor and its Subcontractors shall be independent contractors to Owner with respect to the Work, irrespective of whether such Subcontractors are approved by Owner, and neither Contractor nor its Subcontractors, nor the employees or agents of either, shall be deemed to be the employees, representatives or agents of Owner in connection with any matter relating to this Contract. No provision of this Contract shall be construed or represented as creating a partnership, trust, joint venture, fiduciary or any similar relationship between the Parties.

21.11 No Third Party Beneficiaries. This Contract is made and entered into for the sole protection and legal benefit of Owner and Contractor, and their permitted successors and assigns, and no other Person shall be a direct or indirect legal beneficiary of, or have any direct or indirect cause of action or claim in connection with, this Contract, except for (a) the Financing Parties, (b) the Indemnified Parties with respect to Contractor's indemnification obligations hereunder, and (c) the Owner Indemnified Parties with respect to Owner's indemnification obligations hereunder.

21.12 Cooperation. Upon the receipt of a request from the other Party, each Party shall execute such reasonable additional documents, instruments, estoppels, and assurances and take such additional actions as are reasonably necessary and desirable to carry out the terms and intent hereof, including the documents described in Section 17.3 as well as providing updated documents upon request of Owner or its Financing Parties (e.g. unconditional lien waivers). Neither Party shall unreasonably withhold, condition or delay its compliance with any reasonable request made pursuant to this Section 21.12. Without limiting the foregoing, the Parties acknowledge that they are entering into a long-term arrangement in which the cooperation of each of them will be required.

21.13 Severability. In the event that any clause or provision of this Contract or any part thereof becomes or shall be declared by a court of competent jurisdiction invalid, illegal, void, or unenforceable, this Contract shall continue in full force and effect without said provisions, provided that no such severability shall be effective if it materially changes the benefits or obligations of either Party hereunder.

21.14 Survival. The following provisions shall survive termination of this Contract and shall survive the occurrence of Final Completion: Section 10.3, ARTICLE 11, ARTICLE 12, ARTICLE 13, ARTICLE 14, ARTICLE 15, ARTICLE 16, ARTICLE 19, ARTICLE 20, ARTICLE 21, and Attachment L; provided however, all obligations and responsibilities of the Parties under the Contract Documents shall terminate on the second anniversary of the expiration date of the System Warranty Period, except with respect to claims made hereunder prior to such expiration date, in which case each Party's obligations under the Contract Documents shall survive and continue to the extent necessary to resolve such claims in accordance with the terms of this Contract.

21.15 Counterparts. This Contract may be executed in any number of separate counterparts and delivered by electronic means, each of which when so executed shall be deemed an original, and all of said counterpart taken together shall be deemed to constitute but one and the same instrument.

21.16 Owner's Review. Except as expressly set forth herein, no acceptance, inspection or review by Owner, a Financing Party, the Independent Engineer or the Owner Engineer or their representatives shall constitute an approval, endorsement or confirmation of any Work or an acknowledgment by Owner, a Financing Party, the Independent Engineer or the Owner Engineer that any Work satisfies the requirements of this Contract. Additionally, no acceptance, inspection or review shall relieve Contractor of any of its obligations to perform the Work in conformance with all of the requirements of this Contract.

21.17 Records. Contractor shall keep full and detailed records and accounts pertaining to the Work and shall exercise such controls as may be necessary for proper financial management under this Contract. Contractor shall preserve these records for a period of two (2) years after the Final Completion Date, or for such longer period as may be required by Applicable Law.

21.18 Confidentiality. Owner and Contractor each agree to keep confidential: the terms and provisions of this Agreement; the Contract Documents; and all information supplied by any Party to the other hereunder or in connection herewith including, but not limited to, any documentation or information related to the Project; in accordance with the Non-Disclosure Agreement between the Parties, a copy of which is enclosed as Attachment S-2, separately executed by the parties.

Attachment A
Legal Description and Access Requirements
Sapphire IABR Project

Legal Description: The Project may be comprised of the following Tracts of Land that Sapphire has Title to in Luna County.

TRACT I

The East Half (E½) of Section Seven (7), Township Twenty-nine (29) South, Range Eight (8) West, N.M.P.M., Luna County, New Mexico.

TRACT II

The Southwest Quarter (SW¼) of Section Eight (8), Township Twenty-nine (29) South, Range Eight (8) West, N.M.P.M., Luna County, New Mexico.

TRACT III

The Southeast Quarter (SE¼) of Section Nine (9), Township Twenty-nine (29) South, Range Eight (8) West, N.M.P.M., Luna County, New Mexico.

TRACT IV

Lots Seven (7) and Eight (8), South Half of Northeast Quarter (S½NE¼) and the Northwest Quarter (NW¼) of Section Seventeen (17), Township Twenty-nine (29) South, Range Eight (8) West, N.M.P.M Luna County, New Mexico.

TRACT V

Lots Four (4), Five (5), Seven (7), Eight (8) and Nine (9), East Half of the Northwest Quarter (E½NW¼ and the Northeast Quarter (NE¼) of Section Eighteen (18), Township Twenty-nine (29) South, Range Eight (8) West, N.M.P.M., Luna County, New Mexico.

TRACT VI

A tract being part of Section Eight (8), Township Twenty-nine (29) South, Range Nine (9) West, N.M.P.M., Luna County, New Mexico and Lying North of New Mexico State Highway No. 9 and being described as follows:

Beginning at the NW corner of the tract herein described which point is the NW corner of said Section Thence N89°54'41"E, 5290.33 feet to the NE corner of this tract, which point is the NE corner of said Section 8; Thence S0°04'04"E., along the East line of said 8, 1074.74 feet to the SE corner of this tract, point on the North Right of Way of New Mexico State Highway No. 9; Thence N81°00'16"W, along sa Right of Way, 5358.31 feet to the SW corner of this tract; Thence N0°12'05"E, along the West line of s Section 8, 228.75 feet to the point of beginning.

and

A tract of land being part of Section Eight (8), Township Twenty-nine (29) South, Range Nine (9) Wes N.M.P.M., Luna County, New Mexico and Lying South of New Mexico State Highway No. 9 and being described as follows:

Beginning at the SW corner of the tract herein described, which point is the SW corner of said Section Thence N0°12'05"E, along the west line of said Section 8, 4945.55 feet to the NW corner of this tract, a point on the South Right of Way of New Mexico State Highway No. 9; Thence S81°05'06"E, along sai Right of Way, 4417.54 feet to a point; Thence S0°05'10"E, 639.18 feet to a point; Thence N89°55'55"E 63.81 feet to a point; Thence S0°05'10"E, 192.47 feet to a point; Thence S89°55'55"W, 63.81 feet to a point; Thence S0°05'10"E, 776.50 feet to a point; Thence N89°56'34"E, 928.07 feet to the E¼ corner of said Section 8; Thence S0°04'04"E, along the East line of said Section 8, 2644.88 feet to the SE corner this tract which is the SE corner of said Section 8; Thence S89°54'17W, along the South line of said Section 8, 5315.19 feet to the point of beginning.

TRACT VII

The South Half (S½) of Section Nine (9), Township Twenty-nine (29) South, Range Nine (9) West, N.M.P.M., Luna County, New Mexico.

TRACT VIII

A Tract of land situate in the Northeast Quarter (NE¼) Section Eight (8), Township Twenty-nine (29) South, Range Nine (9) West, N.M.P.M., Luna County, New Mexico and being described as follows:

Beginning at the NE corner of the tract herein described, which point bears S00°04'04"W along the East line of said Section 8, 1675.83 feet and S89°55'55"W, 500.0 feet from the NE corner of said Section 8; Thence S00°04'04"E, 969.05 feet to the SE corner of this tract; Thence S89°56'34"W, 428.50 feet to the SW corner of this Tract; Thence N00°05'10"W, 776.50 feet to a point of this tract; Thence N89°55'55"E, 63.81 feet to a point of this tract; Thence N00°05'10"W, 192.47 feet to the NW corner of this tract; Thence N89°55'55"E, 365.0 feet to the point of beginning.

TRACT IX

A Tract of land situate in the Northeast Quarter (NE¼) of Section Eight (8), Township Twenty-nine (29) South, Range Nine (9) West, N.M.P.M., Luna County, New Mexico and being described as follows:

Beginning at the SE corner of the tract herein described which point bears S00°04'04"W along the East line of said Section 8, 1675.83 feet and S89°55'55"W, 865.0 feet from the NE corner of said Section 8; Thence S89°55'55"W, 63.81 feet to the SW corner of this tract; Thence N00°05'10"W, 639.18 feet to the NW corner of this tract; Thence S81°04'59"E along the South ROW of New Mexico State Highway No. 9, 64.61 feet to the NE corner of this tract; Thence S00°05'10"E, 629.09 feet to the point of beginning.

Project Access Requirements:

Project access will be as follows:

Normal vehicle entry will enter the project site from NM Highway 9 at a road location as shown on drawing 00-C-103, marked up by AMEC to show temporary facilities and included in Attachment K.

Alternative vehicle entry will be from NM Highway 9 via a road location as shown on drawing 00-G-100, along the East most side of Owner's property. This entry is not intended for normal use of entry to the project site.

Any persons desiring access to the project site will check in at the site guard shack, as shown on drawing 00-C-103, marked up by AMEC to show temporary facilities and included in Attachment K. Any persons or vehicles entering the project site will be subject to the project security requirements as established in the Project Execution Plan, including search of vehicles and persons.

Project access to the site will be controlled by project badges and a positive identification system. All personnel on site will be required to display an access badge at all times.

Attachment B
Scope of Work
Sapphire IABR Project

The Scope of Work for the Project shall be in accordance with the Plans and Specifications reference attachment O of this Contract.

This Contract will be valid to include three phases of work:

Phase 1 – 100 acre of Production Ponds, Harvest Unit, Pre-treatment Unit.
Phase 2 – Expand the pond capacity, reference Phase 1.
Phase 3 – Further expand the capacity of the ponds and installation of the Extraction Unit

For Phase 1 of the Work, Contractor expects to receive multiple work packages consisting of the following general outline:

1. Limited Notice to Proceed
Mobilization activity for establishment of the Project Contractor Offices and utilities. Site work activity will consist of establishment of the SWPPP BMP items, construction water well and establishment of a temporary pond, survey, soil prewet, clear and grub, and mass earthwork related to the Redacted Exemption 4

2. Utility

Redacted Exemption 4

2. Site

Redacted Exemption 4

3. Production Ponds (must directly follow site contract)

Redacted Exemption 4

4. Evaporation

Redacted Exemption 4

6. Harvest

Redacted Exemption 4

Redacted Exemption 4

8. Tanks

Redacted Exemption 4

7. Pre-Treatment

Redacted Exemption 4

For Phases 2 and 3, Contractor expects to receive additional multiple work packages associated with expansion of pond capacity at the Columbus site, expansion of the harvest and pre-treatment facilities at the Columbus site, and installation of an extraction facility at Owner's Las Cruces Test Facility.

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
	Sapphire Construction Schedule	1350	01-Apr-09 A	17-Jun-14
A1000	Redacted Exemption 4			
A1020				
A9030				
A1010				
A1990				
A2000				
	Construction - P			
A8840				
A12780				
	Construction Mana			
A2020				
A2030				
	Procurement Phas			
A1980				
A2690				
A3050				
A18460				
A2710				
	Sitework			
A17630				
A17650				
A17640				
A17660				
A17670				
	Site Concrete			
A17680				
A17710				
A17690				
A17700				
A17720				
	Electrical Packag			
A17730				
A17740				
A17750				
A17760				
A17770				
	Electrical Packag			
A17780				
A17790				
A17800				
A17810				
A17820				
	Process Mechani			
A17830				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

Date	Revision	Checked	Approved
10-May-11		JSA	

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A17840	Redacted Exemption 4			
A17850				
A17860				
A17870				
Metal Supply				
A17880				
A17890				
A17900				
A17910				
A17920				
A18470				
A18480				
Metal Installation				
A17930				
A17940				
A17950				
A17960				
A17970				
Work Package 07				
Pre Engineered				
A9440				
A9450				
A9460				
A9470				
A9480				
A9490				
A9500				
A9505				
A9510				
Pipe Insulation				
A17980				
A17990				
A18000				
A18010				
A18020				
Painting				
A18030				
A18040				
A18050				
A18060				
A18070				
Water Well Develo				
A18080				
A18090				
A18100				
A18110				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work | Critical Remaining Work | Summary

Remaining Work | Milestone

Date	Revision	Checked	Approved
10-May-11		JSA	

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A18120	Redacted Exemption 4			
Fencing				
A18130				
A18140				
A18150				
A18160				
A18170				
Work Package 12				
Well Water Tan				
A10700				
A10710				
A10720				
A10730				
A10740				
A10750				
A10760				
A10770				
Nitric Acid Tan				
A10860				
A10870				
A10880				
A10890				
A10900				
A10910				
A10920				
A10930				
Algae Oil Stora				
A10460				
A10470				
A10480				
A10490				
A10500				
A10510				
A10520				
A10530				
Fire Water Tan				
A10380				
A10390				
A10400				
A10410				
A10420				
A10430				
A10440				
A10450				
DCS				
A18810				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Date	Revision	Checked	Approved
10-May-11		JSA	

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A18820	Redacted Exemption 4			
A18830				
A18840				
A18850				
A18860				
A18870				
A18880				
Equip. Package 0				
DAF 1				
A11290				
A11300				
A11310				
A11320				
A11330				
A11340				
A11350				
A11360				
Equip. Package 0				
Paddle Wheels				
A18510				
A12240				
A12250				
A12260				
A12200				
A12210				
A12220				
A12230				
Equip. Package 0				
Centrifuge				
A11450				
A11460				
A11470				
A11480				
A11490				
A11500				
A11510				
A11520				
Equip. Package 0				
Packaged Poly				
A18520				
A18530				
A18540				
A18550				
A18560				
A18570				
A18580				

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Actual Work
Remaining Work
Critical Remaining Work
Summary
Milestone

Date	Revision	Checked	Approved
10-May-11		JSA	

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A18590	Redacted Exemption 4			
Equip. Package 0				
Algae Oil Day T				
A10540				
A10550				
A10560				
A10570				
A10580				
A10590				
A10600				
A10610				
Solvent Tank				
A12990				
A13000				
A13010				
A13020				
A13030				
A13040				
A13050				
A13060				
Equip. Package 0				
Phosphoric Ac				
A10060				
A10070				
A10080				
A10090				
A10100				
A10110				
A10120				
A10130				
Sulfuric Acid S				
A10140				
A10150				
A10160				
A10170				
A10180				
A10190				
A10200				
A10210				
Sodium Hypoc				
A10220				
A10230				
A10240				
A10250				
A10260				
A10270				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

Date	Revision	Checked	Approved
10-May-11		JSA	

Sapphire Energy

IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A10280	Redacted Exemption 4			
A10290				
Coagulant Stor				
A16590				
A16600				
A16610				
A16620				
A16630				
A16640				
A16650				
A16660				
Caustic Storag				
A16670				
A16680				
A16690				
A16700				
A16710				
A16720				
A16730				
A16740				
DAF Thickened				
A16750				
A16760				
A16770				
A16780				
A16790				
A16800				
A16810				
A16820				
Equip. Package 0				
Monorail Syste				
A17550				
A17560				
A17570				
A17580				
A17590				
A17600				
A17610				
A17620				
Equip. Package 0				
Centrifugal Pu				
A9280				
A9290				
A9300				
A9310				
A9320				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
Remaining Work
Critical Remaining Work
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Activity ID	Activity Name	Original Duration	Start	Finish
A9330	Redacted Exemption 4			
A9340				
A9350				
Positive Displa				
A11100				
A11110				
A11120				
A11130				
A11140				
A11150				
A11160				
A11170				
Equip. Package 0				
Transformers				
A17150				
A17160				
A17170				
A17180				
A17190				
A17200				
A17210				
A17220				
Equip. Package 1				
Switchboard				
A17390				
A17400				
A17410				
A17420				
A17430				
A17440				
A17450				
A17460				
Equip. Package 1				
Switchgear				
A17310				
A17320				
A17330				
A17340				
A17350				
A17360				
A17370				
A17380				
Equip. Package 1				
MCC				
A17230				
A17240				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work — Critical Remaining Work — Summary

Remaining Work — Milestone

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Sapphire Energy

IABR Construction Schedule

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Activity ID	Activity Name	Original Duration	Start	Finish
A17250	Redacted Exemption 4			
A17260				
A17270				
A17280				
A17290				
A17300				
Equip. Package 1				
Diesel Generat				
A12110				
A12160				
A12170				
A12180				
A12120				
A12130				
A12140				
A12150				
Equip. package 1				
Slide-Shear Ga				
A17470				
A17480				
A17490				
A17500				
A17510				
A17520				
A17530				
A17540				
Procurement Pha				
Sitework				
Earthwork				
A3110				
A12700				
A3170				
A3270				
A18740				
A3130				
A3150				
A18450				
A3140				
A3160				
A18730				
A3120				
A3260				
A12710				
Utilities				
A3200				
A3240				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
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Sapphire Energy

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Activity ID	Activity Name	Original Duration	Start	Finish
A3840	Redacted Exemption 4			
A18890				
Electrical				
A12660				
A3690				
A3700				
A3770				
A3710				
A3810				
A3720				
A3730				
A3630				
A9010				
A3740				
A3830				
A3800				
A3760				
A3790				
A3820				
A3640				
A3660				
A3620				
A12670				
Piping				
A18430				
A18440				
Paving				
A18700				
A16220				
A16180				
A16200				
A18690				
A18720				
A16160				
A16230				
A16170				
A18710				
A14190				
A16240				
A16190				
A18750				
A18760				
Well System				
A3250				
Exterior Improve				
A3220				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
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Sapphire Energy

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Activity ID	Activity Name	Original Duration	Start	Finish
A3230	Redacted Exemption 4			
Buildings & Struct				
A12640				
A12650				
Switchgear Electr				
Foundations				
A13080				
A13090				
Building Install				
A13280				
A13290				
Finishes				
Mechanical				
A13480				
A13490				
A13500				
Electrical / Inst				
A13780				
A13790				
A3750				
A13800				
Lower Pond Elect				
Foundations				
A13240				
A13250				
Building Install				
A13300				
A13310				
Finishes				
A14090				
Mechanical				
A13510				
A13520				
A13530				
Electrical / Inst				
A13810				
A13820				
A13830				
Lower Pond Elect				
Foundations				
A13260				
A13270				
Building Install				
A13460				
A13470				
Finishes				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
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IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish
A14170	Redacted Exemption 4			
Mechanical				
A13750				
A13760				
A13770				
Electrical / Inst				
A14050				
A14060				
A14070				
Centrifuge Buildi				
Foundations				
A13200				
A13210				
Building Install				
A13340				
A13350				
Finishes				
A14110				
Mechanical				
A13570				
A13580				
A13590				
Electrical / Inst				
A13870				
A13880				
A13890				
Harvest/Extractio				
Foundations				
A13180				
A13190				
Building Install				
A13360				
A13370				
Finishes				
A14120				
Mechanical				
A13600				
A13610				
A13620				
Electrical / Inst				
A13900				
A13910				
A13920				
Dry Polymer Build				
Foundations				
A13160				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

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amec

Activity ID	Activity Name	Original Duration	Start	Finish
A13170	Redacted Exemption 4			
Building Install				
A13380				
A13390				
Finishes				
A5430				
A14130				
Mechanical				
A13630				
A13640				
A13650				
Electrical / Inst				
A13930				
A13940				
A13950				
Maintenance & Sh				
Foundations				
A13140				
A13150				
Building Install				
A13400				
A13410				
Finishes				
A14140				
Mechanical				
A13660				
A13670				
A13680				
Electrical / Inst				
A13960				
A13970				
A13980				
Office Building				
Foundations				
A13120				
A13130				
Building Install				
A13420				
A13430				
Finishes				
A14180				
A14150				
Mechanical				
A13690				
A13700				
A13710				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work | Critical Remaining Work | Summary

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IABR Construction Schedule

amec

Activity ID	Activity Name	Original Duration	Start	Finish	N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J
	Electrical / Inst				
A13990					
A14000					
A14010					
	Ponds				
	Production Ponds				
A12610					
A4010					
	Earthwork				
A14200					
A14240					
A14280					
A14320					
A14360					
A14400					
A14440					
A14480					
A14520					
A14560					
A14600					
A14640					
A14680					
A14720					
A14760					
A14800					
A14840					
A14880					
A14920					
A14960					
A15000					
A15040					
	Concrete				
A15940					
A15950					
A15960					
A15970					
A15980					
A15990					
A16000					
A16010					
A16020					
A16030					
A16040					
A16050					
A16060					
A16070					

Redacted Exemption 4

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Activity ID	Activity Name	Original Duration	Start	Finish
A16080	Redacted Exemption 4			
A16090				
A16100				
A16110				
A16120				
A16130				
A16140				
A16150				
Liner				
A15080				
A15120				
A15160				
A15200				
A15240				
A15280				
A15320				
A15360				
A15400				
A15440				
A15480				
A15520				
A15560				
A15600				
A15640				
A15680				
A15720				
A15760				
A15800				
A15840				
A15880				
A15920				
Piping				
A12680				
A18180				
A18190				
A18200				
A18210				
A18220				
A12690				
A18230				
Electrical / Inst				
A4000				
Paddlewheels				
A16260				
A16270				
A16280				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
Remaining Work
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amec

Activity ID	Activity Name	Original Duration	Start	Finish
A16290	Redacted Exemption 4			
A16300				
A16310				
A16320				
A16330				
A16340				
A16350				
A16360				
A16370				
A16380				
A16390				
A16400				
A16410				
A16420				
A16430				
A16440				
A16450				
A16460				
A16470				
Evaporation Pond				
A12720				
A12730				
Earthwork				
A5190				
A5200				
A5210				
A16550				
A5220				
A16560				
A16570				
A16580				
Liner				
A16480				
A16490				
A16500				
A16510				
Piping				
A16520				
A16530				
A16540				
Inoculation Ponds				
A12590				
A12600				
Earthwork				
A18240				
A18250				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

Date	Revision	Checked	Approved
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Activity ID	Activity Name	Original Duration	Start	Finish
A18260	Redacted Exemption 4			
A18270				
Concrete				
A18350				
Liner				
A18340				
Piping				
A18360				
Paddlewheels				
A18280				
Harvest Return P				
A18290				
A18320				
A18310				
A18300				
DAF Feed Pond &				
A18370				
A18380				
A18390				
Harvest Area				
A12740				
A5310				
A5700				
A12750				
Earthwork				
A5280				
A13070				
Foundations and				
Concrete				
A5420				
A5300				
A5590				
A5770				
A5780				
A5320				
A5330				
A5340				
A5350				
A5360				
A5370				
A5380				
A5450				
A5680				
A5460				
A5490				
A5400				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work | Critical Remaining Work | Summary

Remaining Work | Milestone

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Activity ID	Activity Name	Original Duration	Start	Finish
A5500	Redacted Exemption 4			
A5390				
A5510				
A5580				
A18780				
A5470				
A5480				
A18790				
A18800				
A5810				
A5690				
A3670				
A5820				
Steel				
A12570				
A18620				
A18630				
A5830				
Set Equipment				
A5620				
A5790				
A5730				
A5760				
A18500				
A6700				
A5630				
A5710				
A5720				
A5740				
A18490				
A5750				
A5840				
A3680				
A6660				
Piping				
A5290				
A3300				
A5440				
A5640				
Electrical / Instru				
A5650				
A5660				
A5670				
Finishes				
A18640				
A18600				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
Remaining Work
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Activity ID	Activity Name	Original Duration	Start	Finish
A18610	Redacted Exemption 4			
Extraction Area				
A12760				
A6650				
Extraction 1A				
Earthwork				
A5960				
Foundations a				
Concrete				
A5990				
A6020				
A6030				
A6040				
A6050				
A6460				
A6100				
A6110				
Steel				
A6120				
A18650				
Set Equipment				
A11180				
A6760				
A6770				
Piping				
A5980				
A6090				
A18770				
Electrical / Inst				
A18680				
Finishes				
A18670				
Extraction 1B				
Construction - P				
Construction - P				
Beneficial Occup				
A12540				
A12560				
A8660				
A8670				
A8680				
Completion of C				
A8700				
A8710				
A8730				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
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IABR Construction Schedule

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Activity ID	Activity Name	Original Duration	Start	Finish
A8740	Redacted Exemption 4			
A8720				
A8760				
A8780				
A8800				
A8750				
A8770				
A8790				
A8810				
Stage Gate Evalu				
A8830				

N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J

Actual Work
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Attachment – E
Personnel Rates

Redacted Exemption 4	Redacted Exemption 4

Site CM Electrical
Site Administration
Site Runner/Delivery
Off-Site Admin
Off-Site Accounting
Off-Site Government Reporting

Attachment – I
Consumables

Abrasives and Abrasive Wheels & Discs
Absorbents Oil/ Dry General use only
Acetylene
Acid Battery Soldering
Adhesives Construction
Alcohol
Anchors Temporary Construction
Apron, Other Types
Apron, Welders
Arbors, Hole Saw
Bag , Bolt
Bags (Burlap / Paper / Cotton)
Barrels (Water / Trash / etc.
Battery, Flashlight & Lantern
Belt Pipe Sling
Bits for Small Tools
Blades, All Types (except concrete)
Blankets – Fire
Blankets Insulation (Temporary)
Blocking (For Stacking Materials)
Bracket, Float Handle
Brick, Rubbing
Broom. All Types
Brush, All Types
Bucket, All Types
Bulb, Blow Out Dust
Bulb, Flashlight, Lantern
Cable Wire Rope (Temporary)
Calcium Chloride Construction
Can Oil Spray
Canvas
Carbon Tetrachloride
Chains, Log Cable
Chisel All Types
Chocker All Types
Cleaner Tip
Compound Brazing
Compound Sweeping Cleaning Grinding
Construction Joint Prep Materials
Cord Extension
Crayon Marking
Cups Drinking
Cutter Wheels Blades
Dies
Disinfectants
Dispenser, Paper Cup
Dope PIPE
Drop Cloths

Dry finish materials
Dump Fees
Dunnage
Earthwork – small tools
Electric Light Bulbs
Electricity
Extractor Pie Screw
Fall protection
Files (All Hand)
Filters All Types (except equipment)
Fittings Hose
Flares Railroad
Flashlight
Flints Welding Lighter
Fluids Washing Cleaning
Fluids Washing Cleaning (Process Equipment)
Flux Brazing, Solder
Form Lumber
Form nails & fasteners
Form Oil
Form Plywood, ¾” MDO
Form Snaptie, 8 SF/EA
Funnels
Formwork – supported slab
Gases Welding
Gauge Drill
General Safety Equipment
Gloves Welding
Glycerin Construction
Grease
Hand Lines
Handles, All Types (others)
Hard Hats
Hook Cant, Timber
Hose Air/ Water 3/4" Dia Max
Hose Grease Gun
Ice
Jaw-Bolt Cutter Replacement
Key All Type
Knives All Types
Lamps- Flashlight, Lighting
Lanterns- Kerosene, Gasoline, 6Volt
Lens- Welding, Cutting
Light ,Drop
Light Bulbs-Const, Warehouse, Office
Lime
Locks
Lumber
Marker, Pipe Contour
Mirror- Inspection

Mop
Muratic Acid
Nails
Nozzle – Water
Nut Runner
Nut Setter
Oil Cutting
Oxygen Industrial Grade
Pad Polishing
Pail Galvanized
Paint Erection Marking
Pan, Drain
Paper -Towels ,Toilet, Wrapping
Pin Bull, Drift, Taper
Piping – small tools
Plug Pipe Test, Test Balls
Points Bull
Polyethylene and Visqueen
Pouch Canvas
Rags
Rain Wear, Jacket & Overalls
Rasps All Types
Reamers All Types
Rods Welding
Rope All Kinds
Rust Preventatives
Safety Glasses
Safety Vests
Scissors-Electrician
Scraper Hand, Sidewalk, Wall
Shackles
Sheath Plum Bob
Shield Eye Bench Grinder Face with
Brackets - Temporary
Shims
Sleeve, Welding
Snap Ties (Form Work)
Soap
Soapstone
Soapstone Holder
Solvents
Solvents Paints
Spindle, Reel Stand
Sponges
Stakes
Stakes, Paint, & Ribbons
Stencils-Numerical, Alphabetical
Strap Chin
Strap-for Strap Wrenches
Straw
String

Tags (Material/Tool/Shipping)
Tags Permanent Identification
Tap & Die Set Hand, Pipe, Plug, Pulley
Tape- Gum, Scotch, Cambric
Tarps
Temporary Construction Materials
Tip- Torch, Cutting
Torch Tig Repair parts
Tungsten
Turnbuckles
Wedges (Wood/Steel)
Welding Curtains
Wet Cure Materials
Wire (Tie/Form)
Wrap Arounds

Attachment K –
AMEC Temporary Facilities - Scope of Work

Office Trailer - Complete Furniture/Fixtures

Trailer/Office Equipment

Redacted Exemption 4

Construction Utilities

Redacted Exemption 4

ATTACHMENT L
CONTRACTOR INSURANCE

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Initial Drawing Markups Compiled 12/14/2010

ORIGINATOR	AC PLAN	DWG # Area #	DISCP.	DWG #	TITLE 1
HARRIS GROUP	100	00	A	100	Redacted
HARRIS GROUP	100	02	A	100	Exemption 4
HARRIS GROUP	100	03	A	101	
HARRIS GROUP	100	04	A	100	
HARRIS GROUP	100	09	A	100	
HARRIS GROUP	100	10	A	100	
HARRIS GROUP	100	10	A	110	
BROWN AND CALDWELL	100	00	C	100	
BROWN AND CALDWELL	100	00	C	101	
BROWN AND CALDWELL	100	00	C	102	
BROWN AND CALDWELL	100	00	C	103	
BROWN AND CALDWELL	100	00	C	104	
BROWN AND CALDWELL	100	00	C	105	
BROWN AND CALDWELL	100	00	C	106	
BROWN AND CALDWELL	100	00	C	107	
BROWN AND CALDWELL	100	00	C	108	
BROWN AND CALDWELL	100	00	C	109	
BROWN AND CALDWELL	100	00	C	111	
BROWN AND CALDWELL	100	00	C	112	
BROWN AND CALDWELL	100	00	C	113B	
BROWN AND CALDWELL	100	00	C	113	
BROWN AND CALDWELL	100	00	C	114	
BROWN AND CALDWELL	100	00	C	115	
BROWN AND CALDWELL	100	00	C	116	
BROWN AND CALDWELL	100	00	C	117	
BROWN AND CALDWELL	100	00	C	118	
HARRIS GROUP	100	00	C	160	
HARRIS GROUP	100	00	C	170	
HARRIS GROUP	100	00	C	175	
HARRIS GROUP	100	00	C	180	
BROWN AND CALDWELL	100	00	C	300	
BROWN AND CALDWELL	100	00	C	301	
BROWN AND CALDWELL	100	00	C	302	
BROWN AND CALDWELL	100	00	C	304	
BROWN AND CALDWELL	100	00	C	305	
BROWN AND CALDWELL	100	00	C	306	
BROWN AND CALDWELL	100	00	C	307	
HARRIS GROUP	100	00	C	350	
BROWN AND CALDWELL	100	00	C	446	
BROWN AND CALDWELL	100	02	C	100	
BROWN AND CALDWELL	100	02	C	103	
BROWN AND CALDWELL	100	02	C	104	
BROWN AND CALDWELL	100	02	C	110	
BROWN AND CALDWELL	100	02	C	111	
BROWN AND CALDWELL	100	02	C	203	
BROWN AND CALDWELL	100	02	C	204	
BROWN AND CALDWELL	100	02	C	205	
BROWN AND CALDWELL	100	02	C	206	
BROWN AND CALDWELL	100	02	C	207	
BROWN AND CALDWELL	100	02	C	208	
BROWN AND CALDWELL	100	02	C	209	
BROWN AND CALDWELL	100	02	C	220	
BROWN AND CALDWELL	100	02	C	221	
BROWN AND CALDWELL	100	02	C	222	
BROWN AND CALDWELL	100	02	C	223	
BROWN AND CALDWELL	100	02	C	224	

BROWN AND CALDWELL	100	02	C	225
BROWN AND CALDWELL	100	02	C	226
BROWN AND CALDWELL	100	02	C	227
BROWN AND CALDWELL	100	02	C	228
BROWN AND CALDWELL	100	02	C	229
BROWN AND CALDWELL	100	03	C	160
BROWN AND CALDWELL	100	03	C	260
HARRIS GROUP	100	00	E	001
HARRIS GROUP	100	00	E	002
HARRIS GROUP	100	00	E	010
HARRIS GROUP	100	00	E	021
HARRIS GROUP	100	00	E	100
HARRIS GROUP	100	00	E	101
HARRIS GROUP	100	00	E	102
HARRIS GROUP	100	00	E	103
HARRIS GROUP	100	00	E	104
HARRIS GROUP	100	00	E	105
HARRIS GROUP	100	00	E	106
HARRIS GROUP	100	00	E	107
HARRIS GROUP	100	00	E	108
HARRIS GROUP	100	00	E	110
HARRIS GROUP	100	00	E	111
HARRIS GROUP	100	00	E	112
HARRIS GROUP	100	00	E	114
HARRIS GROUP	100	00	E	115
HARRIS GROUP	100	00	E	118
HARRIS GROUP	100	00	E	119
HARRIS GROUP	100	00	E	120
HARRIS GROUP	100	00	E	121
HARRIS GROUP	100	00	E	122
HARRIS GROUP	100	00	E	123
HARRIS GROUP	100	00	E	124
HARRIS GROUP	100	00	E	125
HARRIS GROUP	100	00	E	126
HARRIS GROUP	100	00	E	130
HARRIS GROUP	100	00	E	201
HARRIS GROUP	100	00	E	202
HARRIS GROUP	100	00	E	203
HARRIS GROUP	100	00	E	204
HARRIS GROUP	100	00	E	205
HARRIS GROUP	100	00	E	300
HARRIS GROUP	100	00	E	301
HARRIS GROUP	100	00	E	302
HARRIS GROUP	100	00	E	303
HARRIS GROUP	100	00	E	304
HARRIS GROUP	100	00	E	305
HARRIS GROUP	100	00	E	306
HARRIS GROUP	100	00	E	308
HARRIS GROUP	100	00	E	310
HARRIS GROUP	100	00	E	311
HARRIS GROUP	100	00	E	313
HARRIS GROUP	100	00	E	314
HARRIS GROUP	100	00	E	315
HARRIS GROUP	100	00	E	320
HARRIS GROUP	100	00	E	321
HARRIS GROUP	100	00	E	322
HARRIS GROUP	100	00	E	323
HARRIS GROUP	100	00	E	324
BROWN AND CALDWELL	100	00	E	351
BROWN AND CALDWELL	100	00	E	352
BROWN AND CALDWELL	100	00	E	353
HARRIS GROUP	100	00	E	400

Redacted
Exemption 4

HARRIS GROUP	100	00	E	504	Redacted
HARRIS GROUP	100	00	E	505	Exemption 4
HARRIS GROUP	100	00	E	510	
HARRIS GROUP	100	00	E	511	
HARRIS GROUP	100	00	E	512	
HARRIS GROUP	100	00	E	514	
HARRIS GROUP	100	00	E	515	
HARRIS GROUP	100	00	E	516	
HARRIS GROUP	100	00	E	517	
HARRIS GROUP	100	00	E	518	
HARRIS GROUP	100	00	E	519	
HARRIS GROUP	100	00	E	520	
HARRIS GROUP	100	00	E	521	
HARRIS GROUP	100	00	E	522	
HARRIS GROUP	100	00	E	539	
HARRIS GROUP	100	00	E	540	
HARRIS GROUP	100	00	E	541	
HARRIS GROUP	100	00	E	542	
BROWN AND CALDWELL	100	00	E	560	
BROWN AND CALDWELL	100	00	E	590	
BROWN AND CALDWELL	100	00	E	591	
HARRIS GROUP	100	02	E	025	
HARRIS GROUP	100	02	E	026	
BROWN AND CALDWELL	100	02	E	029	
BROWN AND CALDWELL	100	02	E	030	
BROWN AND CALDWELL	100	02	E	031	
BROWN AND CALDWELL	100	02	E	152	
BROWN AND CALDWELL	100	02	E	153	
BROWN AND CALDWELL	100	02	E	154	
BROWN AND CALDWELL	100	02	E	155	
BROWN AND CALDWELL	100	02	E	156	
BROWN AND CALDWELL	100	02	E	157	
BROWN AND CALDWELL	100	02	E	158	
BROWN AND CALDWELL	100	02	E	159	
BROWN AND CALDWELL	100	02	E	160	
BROWN AND CALDWELL	100	02	E	161	
BROWN AND CALDWELL	100	02	E	162	
BROWN AND CALDWELL	100	02	E	163	
BROWN AND CALDWELL	100	02	E	164	
BROWN AND CALDWELL	100	02	E	165	
BROWN AND CALDWELL	100	02	E	174	
HARRIS GROUP	100	02	E	181	
HARRIS GROUP	100	02	E	182	
BROWN AND CALDWELL	100	02	E	192	
BROWN AND CALDWELL	100	02	E	552	
BROWN AND CALDWELL	100	02	E	553	
BROWN AND CALDWELL	100	02	E	554	
BROWN AND CALDWELL	100	03	E	027	
HARRIS GROUP	100	03	E	035	
HARRIS GROUP	100	03	E	036	
BROWN AND CALDWELL	100	03	E	151	
BROWN AND CALDWELL	100	03	E	152	
BROWN AND CALDWELL	100	03	E	171	
BROWN AND CALDWELL	100	03	E	172	
BROWN AND CALDWELL	100	03	E	173	
BROWN AND CALDWELL	100	03	E	174	
BROWN AND CALDWELL	100	03	E	192	
BROWN AND CALDWELL	100	03	E	195	
BROWN AND CALDWELL	100	03	E	550	
BROWN AND CALDWELL	100	03	E	551	
BROWN AND CALDWELL	100	03	E	560	
BROWN AND CALDWELL	100	03	E	561	
HARRIS GROUP	100	04	E	012	

HARRIS GROUP	100	04	E	013	Redacted
HARRIS GROUP	100	04	E	021	Exemption 4
HARRIS GROUP	100	04	E	022	
HARRIS GROUP	100	04	E	025	
HARRIS GROUP	100	04	E	123	
HARRIS GROUP	100	04	E	133	
HARRIS GROUP	100	04	E	140	
HARRIS GROUP	100	04	E	508	
HARRIS GROUP	100	04	E	509	
HARRIS GROUP	100	09	E	121	
HARRIS GROUP	100	09	E	122	
HARRIS GROUP	100	09	E	123	
HARRIS GROUP	100	09	E	126	
HARRIS GROUP	100	09	E	127	
HARRIS GROUP	100	09	E	131	
HARRIS GROUP	100	09	E	132	
HARRIS GROUP	100	09	E	133	
HARRIS GROUP	100	09	E	134	
HARRIS GROUP	100	09	E	136	
HARRIS GROUP	100	09	E	137	
HARRIS GROUP	100	09	E	141	
HARRIS GROUP	100	09	E	142	
HARRIS GROUP	100	09	E	143	
BROWN AND CALDWELL	100	09	E	151	
BROWN AND CALDWELL	100	09	E	171	
BROWN AND CALDWELL	100	09	E	191	
BROWN AND CALDWELL	100	09	E	560	
HARRIS GROUP	100	10	E	011	
HARRIS GROUP	100	10	E	109	
HARRIS GROUP	100	10	E	138	
HARRIS GROUP	100	10	E	148	
HARRIS GROUP	100	00	G	001	
HARRIS GROUP	100	00	G	002	
HARRIS GROUP	100	00	G	003	
HARRIS GROUP	100	00	G	004	
HARRIS GROUP	100	00	G	005	
HARRIS GROUP	100	00	G	100	
HARRIS GROUP	100	00	G	101	
HARRIS GROUP	100	00	G	103	
HARRIS GROUP	100	00	G	105	
HARRIS GROUP	100	00	G	106	
HARRIS GROUP	100	00	G	107	
HARRIS GROUP	100	00	G	108	
HARRIS GROUP	100	00	G	150	
HARRIS GROUP	100	00	G	200	
HARRIS GROUP	100	00	G	201	
BROWN AND CALDWELL	100	02	G	202	
HARRIS GROUP	100	00	I	100	
HARRIS GROUP	100	00	I	102	
HARRIS GROUP	100	00	I	103	
HARRIS GROUP	100	00	I	104	
HARRIS GROUP	100	00	I	112	
HARRIS GROUP	100	00	I	113	
HARRIS GROUP	100	00	I	119	
HARRIS GROUP	100	00	I	120	
HARRIS GROUP	100	00	I	122	
HARRIS GROUP	100	00	I	124	
HARRIS GROUP	100	00	I	501	
HARRIS GROUP	100	00	I	502	
HARRIS GROUP	100	00	I	503	
HARRIS GROUP	100	00	I	504	

HARRIS GROUP	100	00	I	505	Redacted
BROWN AND CALDWELL	100	02	I	551	Exemption 4
BROWN AND CALDWELL	100	02	I	563	
BROWN AND CALDWELL	100	02	I	591	
BROWN AND CALDWELL	100	02	I	592	
BROWN AND CALDWELL	100	02	I	593	
BROWN AND CALDWELL	100	02	I	594	
BROWN AND CALDWELL	100	02	I	595	
BROWN AND CALDWELL	100	02	I	596	
BROWN AND CALDWELL	100	02	I	597	
BROWN AND CALDWELL	100	02	I	598	
BROWN AND CALDWELL	100	02	I	599	
BROWN AND CALDWELL	100	02	I	600	
BROWN AND CALDWELL	100	02	I	601	
BROWN AND CALDWELL	100	02	I	602	
BROWN AND CALDWELL	100	02	I	603	
BROWN AND CALDWELL	100	02	I	604	
BROWN AND CALDWELL	100	02	I	605	
BROWN AND CALDWELL	100	02	I	606	
BROWN AND CALDWELL	100	02	I	607	
BROWN AND CALDWELL	100	02	I	608	
BROWN AND CALDWELL	100	02	I	609	
BROWN AND CALDWELL	100	02	I	610	
BROWN AND CALDWELL	100	02	I	611	
BROWN AND CALDWELL	100	02	I	612	
BROWN AND CALDWELL	100	02	I	613	
BROWN AND CALDWELL	100	02	I	614	
BROWN AND CALDWELL	100	02	I	615	
BROWN AND CALDWELL	100	02	I	616	
BROWN AND CALDWELL	100	03	I	551	
BROWN AND CALDWELL	100	03	I	552	
BROWN AND CALDWELL	100	03	I	553	
BROWN AND CALDWELL	100	03	I	554	
BROWN AND CALDWELL	100	03	I	555	
BROWN AND CALDWELL	100	03	I	571	
BROWN AND CALDWELL	100	03	I	574	
HARRIS GROUP	100	09	I	514	
HARRIS GROUP	100	09	I	519	
HARRIS GROUP	100	09	I	520-1	
HARRIS GROUP	100	09	I	520-2	
HARRIS GROUP	100	09	I	521-1	
HARRIS GROUP	100	09	I	521-2	
HARRIS GROUP	100	09	I	522-1	
HARRIS GROUP	100	09	I	522-2	
HARRIS GROUP	100	09	I	523-1	
HARRIS GROUP	100	09	I	523-2	
HARRIS GROUP	100	09	I	524	
HARRIS GROUP	100	09	I	525	
HARRIS GROUP	100	09	I	544	
HARRIS GROUP	100	09	I	545	
HARRIS GROUP	100	09	I	546	
HARRIS GROUP	100	09	I	547	
HARRIS GROUP	100	09	I	548	
BROWN AND CALDWELL	100	09	I	571	
BROWN AND CALDWELL	100	09	I	572	
HARRIS GROUP	100	00	F	001	
BROWN AND CALDWELL	100	00	F	001	
HARRIS GROUP	100	00	F	100	
HARRIS GROUP	100	00	F	301	
HARRIS GROUP	100	01	F	210	
HARRIS GROUP	100	01	F	313	
HARRIS GROUP	100	01	F	314	

BROWN AND CALDWELL	100	02	F	238	Redacted
BROWN AND CALDWELL	100	02	F	239	Exemption 4
BROWN AND CALDWELL	100	02	F	250	
BROWN AND CALDWELL	100	02	F	320	
BROWN AND CALDWELL	100	02	F	350	
BROWN AND CALDWELL	100	02	F	351	
BROWN AND CALDWELL	100	02	F	353	
BROWN AND CALDWELL	100	02	F	354	
BROWN AND CALDWELL	100	02	F	355	
BROWN AND CALDWELL	100	02	F	356	
BROWN AND CALDWELL	100	02	F	357	
BROWN AND CALDWELL	100	02	F	358	
BROWN AND CALDWELL	100	02	F	360	
BROWN AND CALDWELL	100	02	F	361	
BROWN AND CALDWELL	100	02	F	362	
BROWN AND CALDWELL	100	02	F	363	
BROWN AND CALDWELL	100	02	F	364	
BROWN AND CALDWELL	100	02	F	220	
BROWN AND CALDWELL	100	02	F	229	
BROWN AND CALDWELL	100	02	F	230	
BROWN AND CALDWELL	100	02	F	231	
BROWN AND CALDWELL	100	02	F	232	
BROWN AND CALDWELL	100	02	F	233	
BROWN AND CALDWELL	100	02	F	234	
BROWN AND CALDWELL	100	02	F	235	
BROWN AND CALDWELL	100	02	F	236	
BROWN AND CALDWELL	100	02	F	237	
BROWN AND CALDWELL	100	02	F	359	
BROWN AND CALDWELL	100	03	F	230	
BROWN AND CALDWELL	100	03	F	233	
BROWN AND CALDWELL	100	03	F	250	
BROWN AND CALDWELL	100	03	F	324	
BROWN AND CALDWELL	100	03	F	330	
BROWN AND CALDWELL	100	03	F	331	
BROWN AND CALDWELL	100	03	F	332	
BROWN AND CALDWELL	100	03	F	333	
BROWN AND CALDWELL	100	03	F	345	
BROWN AND CALDWELL	100	03	F	346	
BROWN AND CALDWELL	100	03	F	350	
BROWN AND CALDWELL	100	03	F	352	
HARRIS GROUP	100	04	F	240	
HARRIS GROUP	100	04	F	241	
HARRIS GROUP	100	04	F	242	
HARRIS GROUP	100	07	F	271	
HARRIS GROUP	100	09	F	290	
HARRIS GROUP	100	09	F	292	
BROWN AND CALDWELL	100	09	F	293	
BROWN AND CALDWELL	100	09	F	294	
HARRIS GROUP	100	09	F	390	
HARRIS GROUP	100	09	F	391	
HARRIS GROUP	100	09	F	392	
HARRIS GROUP	100	09	F	393	
HARRIS GROUP	100	09	F	395	
HARRIS GROUP	100	09	F	399	
HARRIS GROUP	100	09	F	400	
HARRIS GROUP	100	09	F	402	
HARRIS GROUP	100	09	F	403	
HARRIS GROUP	100	09	F	406	
HARRIS GROUP	100	09	F	407	
HARRIS GROUP	100	09	F	408	
HARRIS GROUP	100	09	F	410	
HARRIS GROUP	100	09	F	411	
BROWN AND CALDWELL	100	09	F	415	

BROWN AND CALDWELL	100	09	F	417	Redacted
HARRIS GROUP	100	09	F	396	Exemption 4
BROWN AND CALDWELL	100	00	M	025	
BROWN AND CALDWELL	100	00	M	026	
BROWN AND CALDWELL	100	00	M	027	
BROWN AND CALDWELL	100	00	M	028	
BROWN AND CALDWELL	100	00	M	029	
BROWN AND CALDWELL	100	00	M	030	
BROWN AND CALDWELL	100	00	M	031	
BROWN AND CALDWELL	100	02	M	151	
BROWN AND CALDWELL	100	02	M	153	
BROWN AND CALDWELL	100	02	M	154	
BROWN AND CALDWELL	100	02	M	250	
BROWN AND CALDWELL	100	03	M	151	
BROWN AND CALDWELL	100	03	M	152	
BROWN AND CALDWELL	100	03	M	153	
BROWN AND CALDWELL	100	03	M	154	
BROWN AND CALDWELL	100	03	M	253	
BROWN AND CALDWELL	100	03	M	251	
BROWN AND CALDWELL	100	03	M	252	
HARRIS GROUP	100	09	M	501	
HARRIS GROUP	100	09	M	503	
HARRIS GROUP	100	09	M	504	
HARRIS GROUP	100	09	M	506	
HARRIS GROUP	100	09	M	507	
HARRIS GROUP	100	09	M	508	
HARRIS GROUP	100	09	M	510	
HARRIS GROUP	100	09	M	512	
HARRIS GROUP	100	09	M	513	
HARRIS GROUP	100	09	M	516	
HARRIS GROUP	100	09	M	518	
BROWN AND CALDWELL	100	09	M	190	
BROWN AND CALDWELL	100	09	M	191	
BROWN AND CALDWELL	100	09	M	250	
BROWN AND CALDWELL	100	09	M	251	
HARRIS GROUP	100	00	P	100	
HARRIS GROUP	100	00	P	116	
HARRIS GROUP	100	00	P	119	
HARRIS GROUP	100	00	P	120	
HARRIS GROUP	100	00	P	121	
HARRIS GROUP	100	00	P	122	
HARRIS GROUP	100	00	P	123	
HARRIS GROUP	100	00	P	124	
HARRIS GROUP	100	00	P	130	
HARRIS GROUP	100	00	P	131	
HARRIS GROUP	100	00	P	132	
HARRIS GROUP	100	00	P	133	
HARRIS GROUP	100	00	P	200	
HARRIS GROUP	100	00	P	201	
HARRIS GROUP	100	00	P	202	
HARRIS GROUP	100	00	P	203	
HARRIS GROUP	100	00	P	204	
HARRIS GROUP	100	00	P	300	
HARRIS GROUP	100	00	P	400	
HARRIS GROUP	100	00	P	401	
HARRIS GROUP	100	00	P	102	
HARRIS GROUP	100	00	P	103	
HARRIS GROUP	100	00	P	108	
HARRIS GROUP	100	00	P	112	
HARRIS GROUP	100	00	P	113	
HARRIS GROUP	100	00	P	114	
HARRIS GROUP	100	00	P	115	
HARRIS GROUP	100	00	P	124	

HARRIS GROUP	100	00	P	107	Redacted Exemption 4
HARRIS GROUP					
HARRIS GROUP					
HARRIS GROUP					
HARRIS GROUP					
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HARRIS GROUP					
HARRIS GROUP					
HARRIS GROUP	100	00	S	001	
HARRIS GROUP	100	00	S	002	
HARRIS GROUP	100	00	S	004	
HARRIS GROUP	100	00	S	005	
HARRIS GROUP	100	00	S	006	
HARRIS GROUP	100	00	S	007	
HARRIS GROUP	100	00	S	008	
HARRIS GROUP	100	00	S	009	
HARRIS GROUP	100	00	S	010	
HARRIS GROUP	100	00	S	011	
BROWN AND CALDWELL	100	00	S	025	
BROWN AND CALDWELL	100	00	S	026	
BROWN AND CALDWELL	100	00	S	027	
HARRIS GROUP	100	00	S	050	
HARRIS GROUP	100	00	S	051	
HARRIS GROUP	100	00	S	100	
HARRIS GROUP	100	00	S	300	
HARRIS GROUP	100	02	S	100	
BROWN AND CALDWELL	100	02	S	110	
BROWN AND CALDWELL	100	02	S	111	
BROWN AND CALDWELL	100	02	S	112	
BROWN AND CALDWELL	100	02	S	371	

BROWN AND CALDWELL	100	02	S	372	Redacted
BROWN AND CALDWELL	100	02	S	373	Exemption 4
BROWN AND CALDWELL	100	02	S	374	
HARRIS GROUP	100	03	S	101	
BROWN AND CALDWELL	100	03	S	151	
BROWN AND CALDWELL	100	03	S	302	
BROWN AND CALDWELL	100	03	S	350	
BROWN AND CALDWELL	100	03	S	351	
BROWN AND CALDWELL	100	03	S	500	
BROWN AND CALDWELL	100	03	S	501 REV A	
HARRIS GROUP	100	04	S	100	
HARRIS GROUP	100	09	S	100	
HARRIS GROUP	100	09	S	101	
HARRIS GROUP	100	09	S	102	
HARRIS GROUP	100	09	S	103	
HARRIS GROUP	100	09	S	104	
HARRIS GROUP	100	09	S	105	
HARRIS GROUP	100	09	S	106	
HARRIS GROUP	100	09	S	107	
BROWN AND CALDWELL	100	09	S	190 REV A	
HARRIS GROUP	100	09	S	300	
HARRIS GROUP	100	10	S	100	
HARRIS GROUP	100	10	S	105	
HARRIS GROUP	100	10	S	111	
HARRIS GROUP	100	10	S	112	
HARRIS GROUP	100	10	S	113	
HARRIS GROUP	100	10	S	114	
HARRIS GROUP	100	10	S	115	
HARRIS GROUP	100	10	S	117	
HARRIS GROUP	100	10	S	118	
HARRIS GROUP	100	10	S	119	
HARRIS GROUP	100	10	S	300	
HARRIS GROUP	100	10	S	500	
HARRIS GROUP	100	10	S	501	

TITLE 2	ISSUED FOR:	CURRENT REV REV	DATE	1 PAST REV REV	DATE	2 PAS REV
ARCHITECTURAL						
Redacted Exemption 4		B	03/31/11			
		B	03/31/11			
		B	03/31/11			
		B	03/31/11			
		B	03/31/11			
		B	03/31/11			
		A	04/12/11			
CIVIL						
Redacted Exemption 4			04/12/11			
			04/12/11			
			04/12/11			
		A	04/14/11		04/12/11	
		A	04/15/11		04/12/11	
			04/12/11			
		A	04/14/11		04/12/11	
			04/12/11			
			04/12/11			
			04/12/11			
		B	04/15/11	A	04/06/11	
			04/14/11		04/12/11	
		A	04/12/11		04/12/11	
		B	04/15/11	A	04/16/11	
			04/12/11			
		A	04/04/11			
		B	04/15/11	A	04/06/11	
		B	04/15/11	A	04/06/11	
		A	04/14/11			
		B	03/31/11			
		B	03/31/11			
		C	03/31/11			
		B	03/31/11			
			04/12/11			
			04/12/11			
			04/12/11			
		A	04/15/11		04/12/11	
		A	04/15/11		04/12/11	
			04/12/11			
			04/12/11			
		B	03/31/11			
			04/12/11			
			04/12/11			
		B	04/15/11	A	04/06/11	
		B	04/15/11	A	04/06/11	
		A	04/06/11		04/12/11	
		A	04/15/11	A	04/12/11	
		A	04/15/11		04/12/11	
		a	04/15/11		04/12/11	
		A	04/12/11			
		A	04/12/11			
		A	04/12/11			
		A	04/15/11		04/12/11	
		A	04/14/11	A	04/12/11	
			04/12/11			
			04/12/11			
			04/12/11			
		A	04/14/11	A	04/12/11	
		A	04/12/11			

Redacted Exemption 4	A	04/12/11		
	A	04/12/11		
	A	04/14/11	A	04/12/11
	A	04/12/11		
	A	04/12/11		
		04/12/11		
		04/12/11		
ELECTRICAL				
Redacted Exemption 4	C	03/31/11		
	B	03/31/11		
	B	03/31/11		
	B	03/31/11		
	C	03/31/11		
	C	04/13/11	B	03/31/11
	C	04/13/11	B	03/31/11
	B	04/13/11		
	C	04/13/11	B	03/31/11
	C	04/13/11	B	03/31/11
	B	03/31/11		
	C	04/13/11	B	03/31/11
	C	04/13/11	B	03/31/11
	C	03/31/11		
	C	03/31/11		
	D	03/31/11		
	C	04/13/11	B	03/31/11
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	B	03/31/11		
	C	04/13/11	B	03/31/11
	B	03/31/11		
	B	03/31/11		
	B	03/31/11		
	C	04/13/11	B	03/31/11
	B	03/31/11		
	B	03/31/11		
	B	03/31/11		
	C	04/13/11	B	03/31/11
	B	04/13/11	A	03/31/11
	B	04/13/11	A	03/31/11
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MECHANICAL-PIPING ISOMETRICS				
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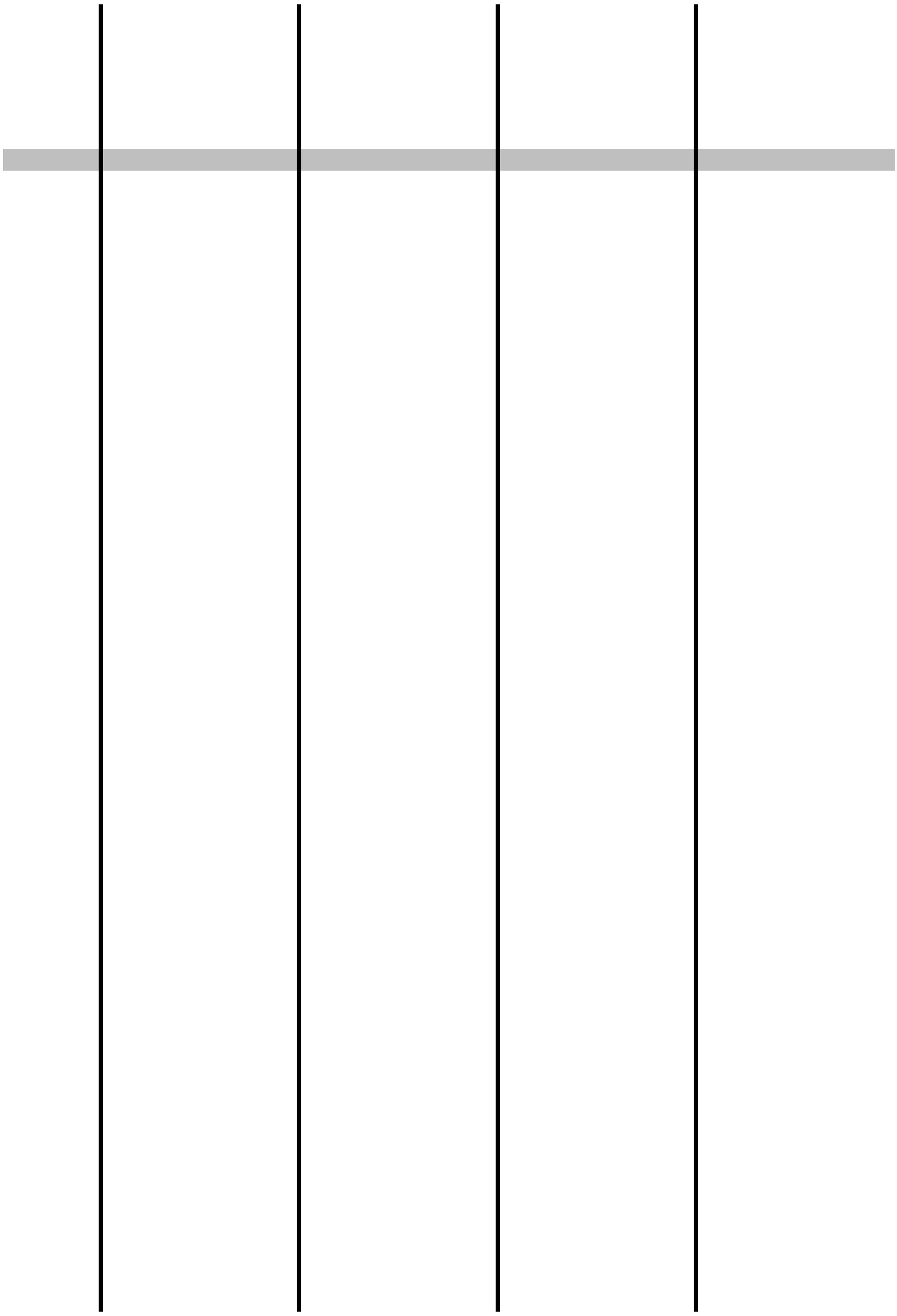

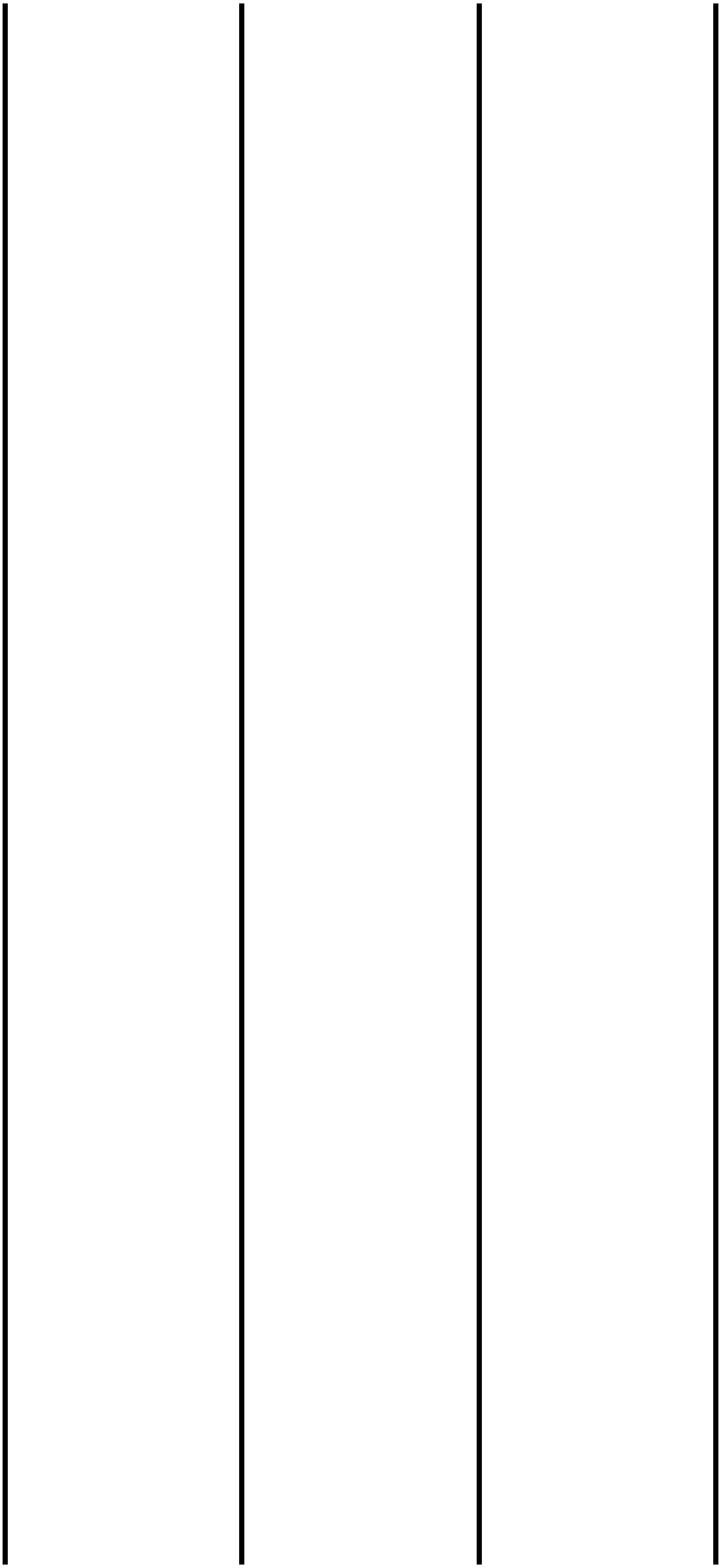

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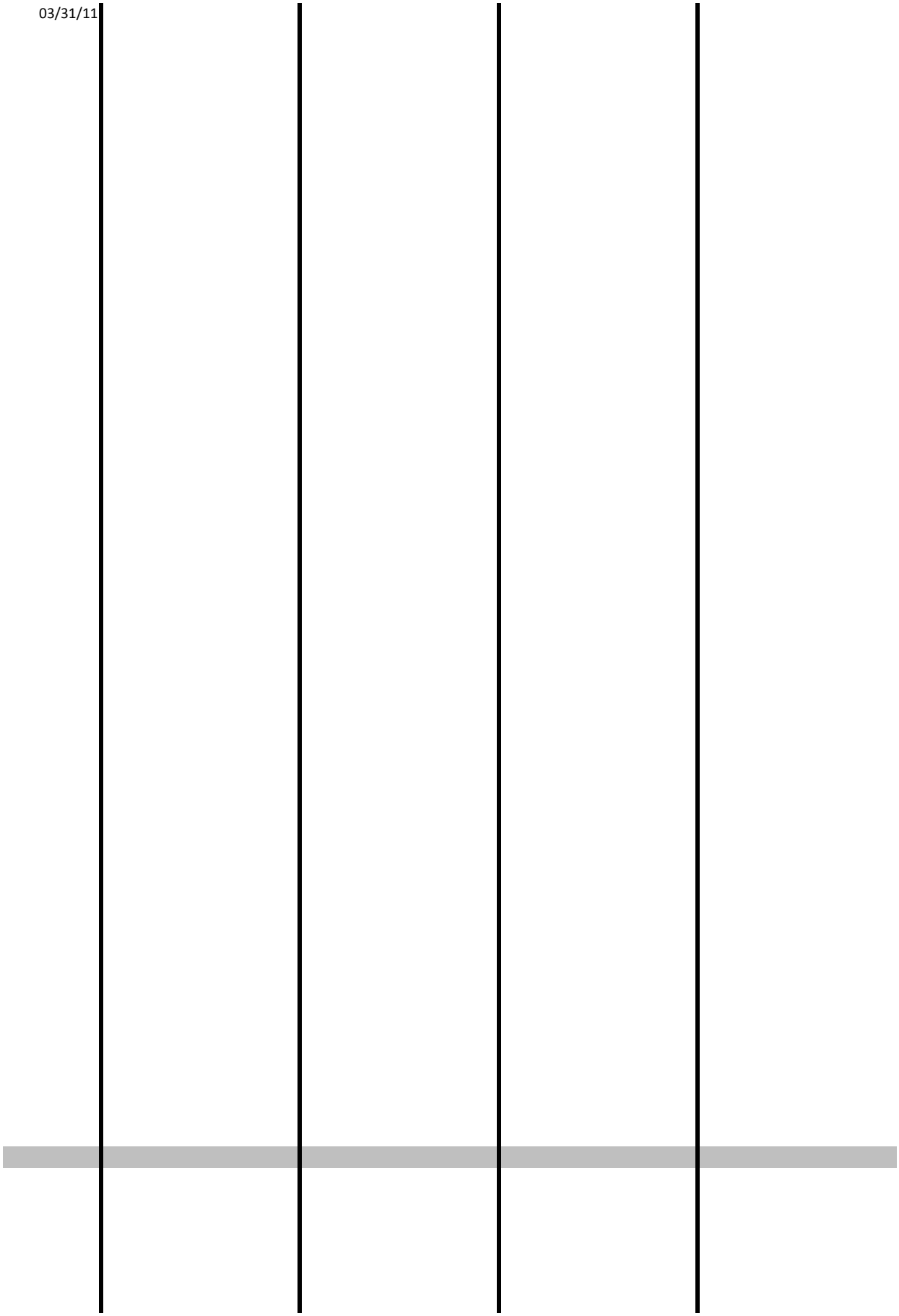

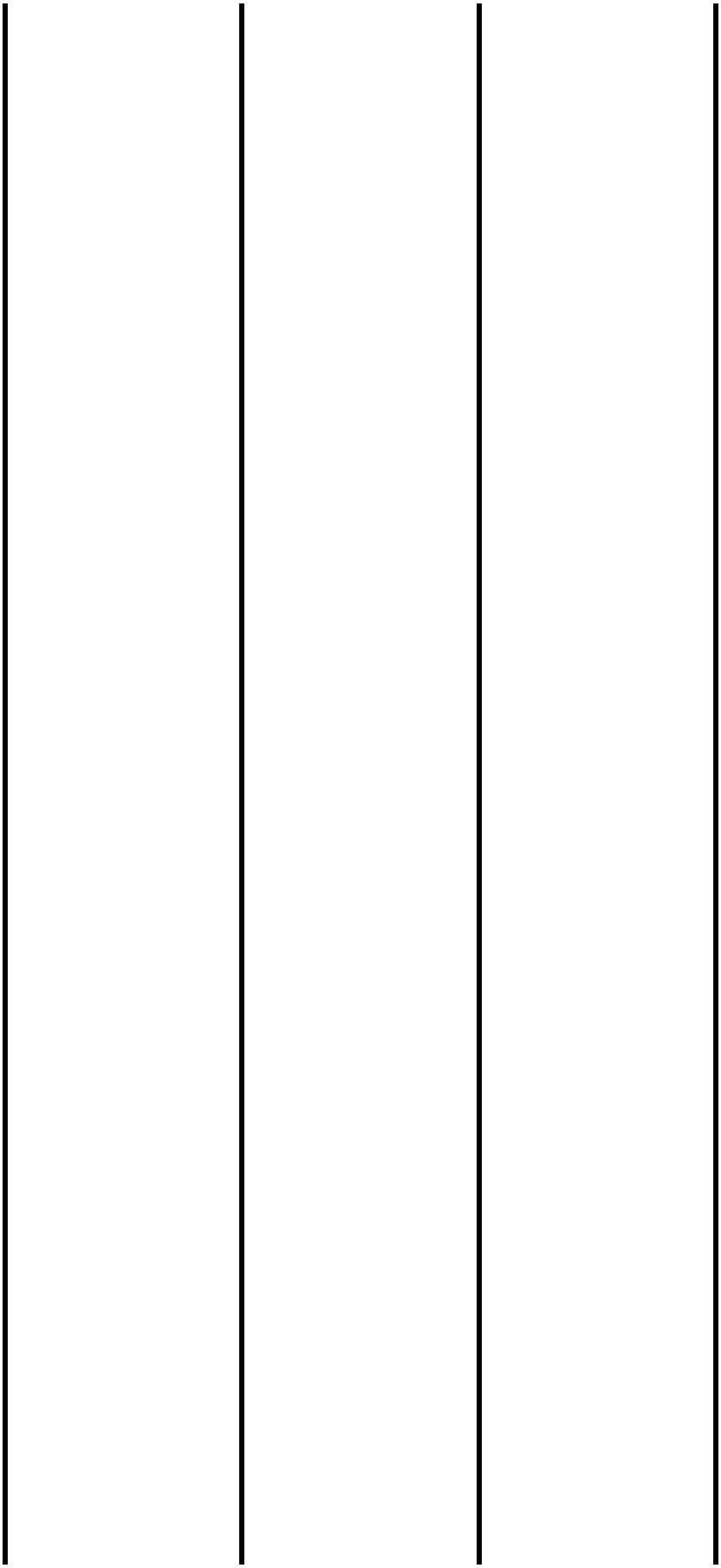

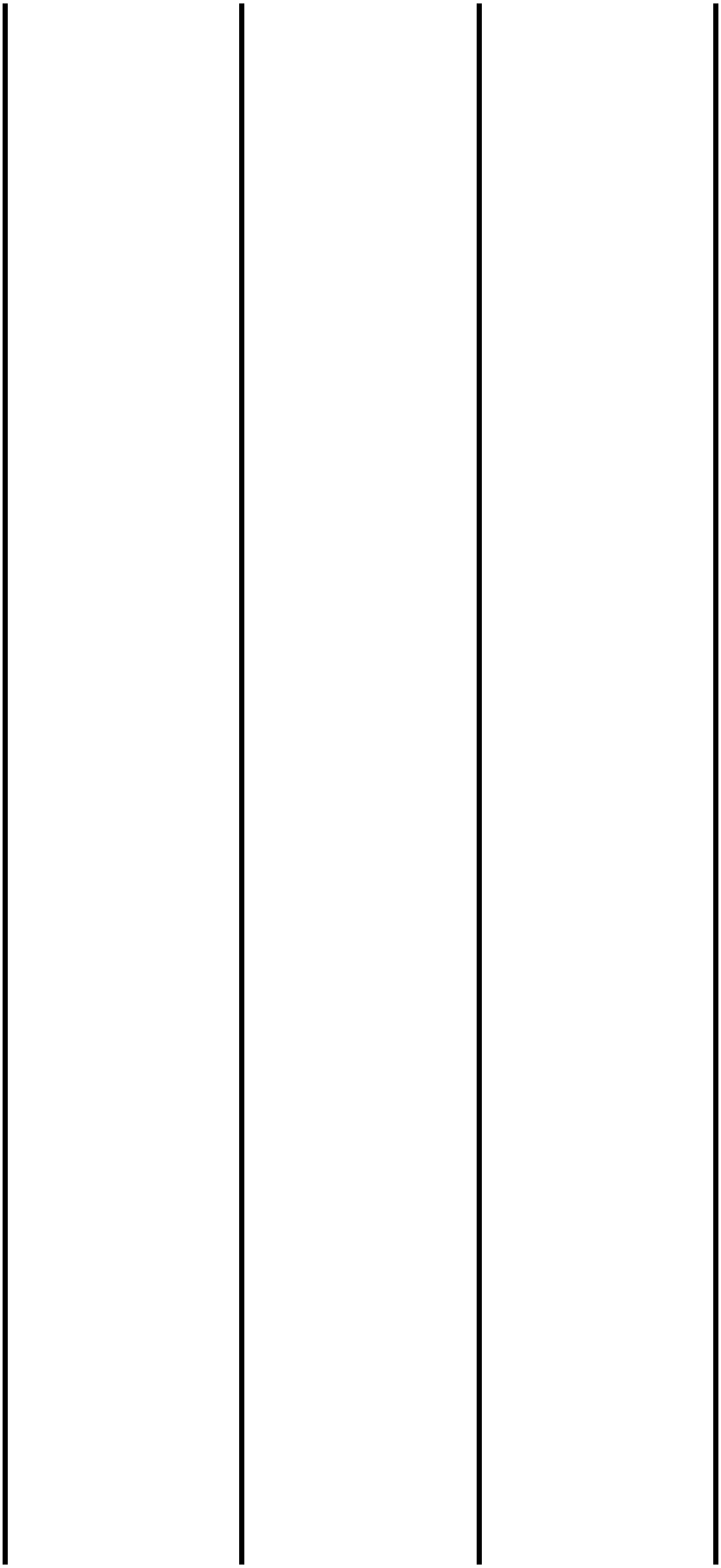

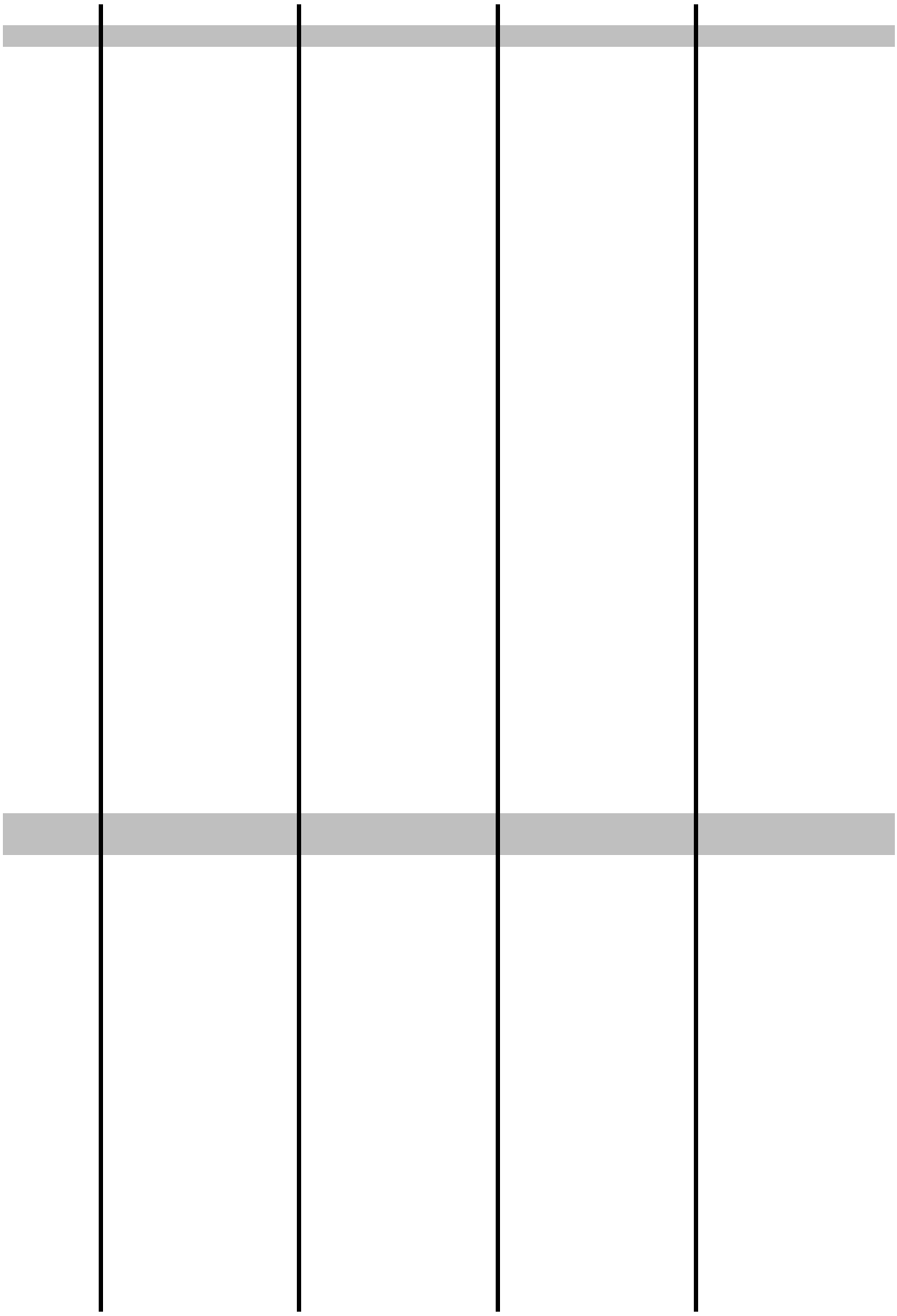

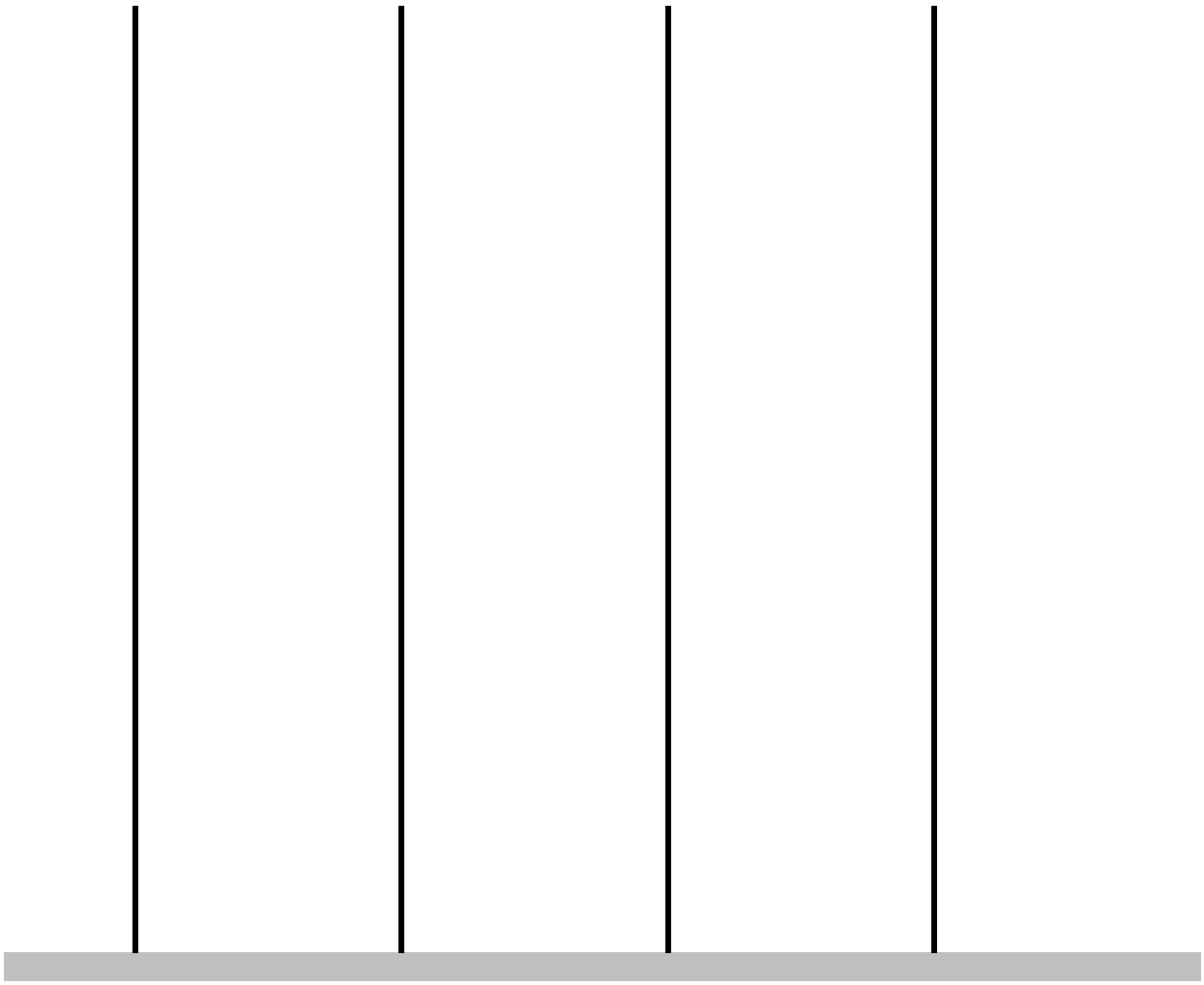

ATTACHMENT Q-1
FORM OF APPLICATION FOR MECHANICAL COMPLETION

[***On Contractor Letterhead***]

[_____], 20__

[NAME OF OWNER]
OWNER ADDRESSS
Attention: [_____]
Telephone: [_____]
Facsimile: [_____]

RE: APPLICATION FOR MECHANICAL COMPLETION

Dear [_____]:

Pursuant to Section of the Construction Contract, dated as of [_____] (the "Contract"), between [NAME OF OWNER] ("Customer") and the undersigned ("Contractor"), the undersigned hereby certifies to [NAME OF OWNER] that it is Contractor's reasonable, good faith believe that as of [INSERT DATE], Contractor has satisfied all of the following Work under the Contract, and accordingly, the Facility has achieved Mechanical Completion in accordance with the terms and conditions of the Contract. Initially capitalized terms used but not defined in this Application for Mechanical Completion have the meanings given in the Contract.

Sincerely,

[Contractor]

By:_____
Name: _____
Title: _____

ATTACHMENT Q-2
DIVISION OF RESPONSIBILITIES

The following Division of Work (**DOW**) summarized the division of responsibilities between Sapphire Energy (**SE**), The Harris Group or Brown and Caldwell (**ENG)** and AMEC (**AMEC**).

1. The responsibilities are divided into three categories:
   "DESIGN": Responsible for the final design.
   "SUPPLY": Responsible for the purchase and delivery to the jobsite.
   "INSTALL": Responsible for the installation of the item at the jobsite.

DESCRIPTION	DESIGN	SUPPLY	INSTALL	COMMENTS
IABR				
Project	ENG	AMEC	AMEC	SE is the Owner
START-UP, COMMISSIONING AND TRANING				
Redacted Exemption 4		SE	AMEC	
		SE	SE	
		AMEC	AMEC	
		AMEC	AMEC	
		SE	SE	
		AMEC	AMEC	Recommended only
		AMEC	AMEC	Recommended only
		AMEC	AMEC	
		AMEC	AMEC	
		SE	SE	SE leads start-up
		AMEC	AMEC	
		SE	SE	
		SE	SE	
		SE	SE	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	Local Utility Provides Connection Labor
		AMEC	AMEC	
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		AMEC	AMEC	
		AMEC	AMEC	

DESCRIPTION	DESIGN	SUPPLY	INSTALL	COMMENTS
Redacted Exemption 4		AMEC	AMEC	
		AMEC	AMEC	
		SE	SE	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	Scheduling only
	ENG			
		SE	SE	
		AMEC	AMEC	
		AMEC	AMEC	
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		AMEC	AMEC	Limited standby genset
		AMEC	AMEC	
		SE	SE	
		SE	SE	
		AMEC	AMEC	

DESCRIPTION	DESIGN	SUPPLY	INSTALL	COMMENTS
Redacted Exemption 4		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		SE	SE	
		SE	SE	
		SE	SE	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	As required
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		AMEC	AMEC	
		SE	SE	
		SE/AMEC	SE/AMEC	AMEC responsible for permits necessary for AMEC to perform construction
		AMEC	AMEC	
		AMEC	AMEC	

CERTIFICATE OF MECHANICAL COMPLETION

PROJECT TITLE _____ PROJECT NO. _____

OWNER _____

CONTRACT NO. _____ CONTRACTOR _____

CONTRACT TITLE _____ INSPECTION DATE _____

PROJECT AREA _____

THIS CERTIFICATE REFERS AND RELATES TO THE CONTRACTUAL AGREEMENT DATED _____ BETWEEN _____ (HEREINAFTER REFERRED TO AS THE OWNER) AND THE CONTRACTOR. IN ACCORDANCE WITH THE CONTRACT BETWEEN THE OWNER AND THE CONTRACTOR, THE ENGINEER _____ ON BEHALF OF THE OWNER HEREBY CERTIFIES THAT ON THE BASIS OF AN INSPECTION JOINTLY CARRIED OUT, THE WORK IS AT THIS DATE, NAMELY _____ (HEREINAFTER REFERRED TO AS THE "AGREED DATE OF MECHNICAL COMPLETION"), SUITABLE FOR THE PURPOSE FOR WHICH IT WAS DESIGNED.

THE AGREED DATE OF MECHANICAL COMPLETION SHALL BE REGARDED AS THE DATE OF MECHNICAL COMPLETION FOR ALL PURPOSES WHATSOEVER AND, WITHOUT RESTRICTING THE GENERALITY OF THE FOREGOING, FOR DETERMINING THE RIGHTS, DUTIES AND OBLIGATIONS OF THE OWNER AND THE CONTRACTOR UNDER THE AGREEMENT BETWEEN THEM, AS WELL AS FOR ALL PURPOSES UNDER THE BUILDER'S LIEN ACT.

A DEFICIENCY LIST OF ITEMS TO BE COMPLETED OR CORRECTED IS ATTACHED HERETO. THE DEFICIENCY LIST MAY NOT BE ALL INCLUSIVE, AND THE OMISSION OF AN ITEM DOES NOT ALTER THE RESPONSIBILITY OF THE CONTRACTOR TO COMPLETE ALL OF THE WORK IN ACCORDANCE WITH THE CONTRACT. THE CONTRACTOR UNDERTAKES TO COMPLETE OR CORRECT THE WORK LISTED AS QUICKLY AS POSSIBLE IN ACCORDANCE WITH THE TERMS AND CONDITIONS OF CONTRACT _____ TAKING INTO CONSIDERATION THE AVAILABILITY OF MATERIALS AND LABOR. THE ESTIMATED DATE FOR COMPLETION OF DEFICIENCIES IS _____ VALUE OF DEFICIENCIES AS SHOWN ON ATTACHED LIST IS $ _____

THE RETAINAGE TO BE RELEASED IN ACCORDANCE WITH GENERAL CONDITION CLAUSES _____

THE WARRANTY OF THE CONTRACTOR WITH REGARD TO ACCEPTED PORTIONS OF THE WORK IS TO COMMENCE ON THE AGREED DATE OF THIS MECHANICAL COMPLETION.

EXCEPT AS IN THIS CERTIFICATE EXPRESSLY PROVIDED, THIS CERTIFICATE DOES NOT AFFECT ANY RIGHTS, DUTIES OR OBLIGATIONS BETWEEN THE OWNER AND THE CONTRACTOR.

ENGINEER (On behalf of the OWNER)		CONTRACTOR	
SIGNED BY	_____	SIGNED BY	_____
TITLE	_____	TITLE	_____
DATE	_____	DATE	_____

MUTUAL NONDISCLOSURE AGREEMENT

This Mutual Nondisclosure Agreement (the "Agreement") is made as of (date) January 13, 2009 by and between Sapphire Energy, Inc., a Delaware Corporation (the "Company"),and AMEC Geomatrix, Inc. ("Third Party").

1. **Purpose.** The Company and Third Party wish to explore a possible business opportunity of mutual interest (the "Relationship") in connection with which each party has disclosed and/or may further disclose its Confidential Information (as defined below) to the other. This Agreement is intended to allow the parties to continue to discuss and evaluate the Relationship while protecting each party's Confidential Information (including Confidential Information previously disclosed to the other party) against unauthorized use or disclosure.

2. **Definition of Confidential Information.** "Confidential Information" means any oral, written, graphic or machine-readable information including, but not limited to, that which relates to patents, patent applications, research, product plans, products, developments, inventions, processes, designs, drawings, engineering, formulae, markets, regulatory information, medical reports, clinical data and analysis, reagents, cell lines, biological materials, chemical formulas, business plans, agreements with third parties, services, customers, marketing or finances of the disclosing party, which Confidential Information is designated in writing to be confidential or proprietary, or if given orally, is confirmed in writing as having been disclosed as confidential or proprietary within a reasonable time (not to exceed thirty (30) days) after the oral disclosure.

3. **Nondisclosure of Confidential Information**

(a) The Company and Third Party each agree not to use any Confidential Information disclosed to it by the other party for its own use or for any purpose other than to carry out discussions concerning, and the undertaking of, the Relationship. Neither party shall disclose or permit disclosure of any Confidential Information of the other party to third parties or to employees of the party receiving Confidential Information, other than directors, officers, employees, consultants and agents who are required to have the information in order to carry out the discussions regarding the Relationship. Each party agrees that it shall take all reasonable measures to protect the secrecy of and avoid disclosure or use of Confidential Information of the other party in order to prevent it from falling into the public domain or the possession of persons other than those persons authorized under this Agreement to have any such information. Such measures shall include, but not be limited to, the highest degree of care that the receiving party utilizes to protect its own Confidential Information of a similar nature, which shall be no less than reasonable care. Each party agrees to notify the other in writing of any actual or suspected misuse, misappropriation or unauthorized disclosure of Confidential Information of the disclosing party which may come to the receiving party's attention.

(b) Exceptions. Notwithstanding the above, neither party shall have liability to the other with regard to any Confidential Information of the other which the receiving party can prove:

(i) was in the public domain at the time it was disclosed or has entered the public domain through no fault of the receiving party;

(ii) was known to the receiving party, without restriction, at the time of disclosure, as demonstrated by files in existence at the time of disclosure;

(iii) is disclosed with the prior written approval of the disclosing party;

(iv) is disclosed pursuant to the order or requirement of a court, administrative agency, or other governmental body; provided, however, that the receiving party shall provide prompt notice of such court order or requirement to the disclosing party to enable the disclosing party to seek a protective order or otherwise prevent or restrict such disclosure.

4. Return of Materials. Any materials or documents that have been furnished by one party to the other in connection with the Relationship shall be promptly returned by the receiving party, accompanied by all copies of such documentation, within ten (10) days after (a) the Relationship has been rejected or concluded or (b) the written request of the disclosing party.

5. No Rights Granted. Nothing in this Agreement shall be construed as granting any rights under any patent, copyright or other intellectual property right of either party, nor shall this Agreement grant either party any rights in or to the other party's Confidential Information other than the limited right to review such Confidential Information solely for the purpose of determining whether to enter into the Relationship.

6. Term. The foregoing commitments of each party shall survive any termination of the Relationship between the parties, and shall continue for a period terminating on the later to occur of the date (a) five (5) years following the date of this Agreement or (b) three (3) years from the date on which Confidential Information is last disclosed under this Agreement.

7. Successors and Assigns. The terms and conditions of this Agreement shall inure to the benefit of and be binding upon the respective successors and assigns of the parties, provided that Confidential Information of the disclosing party may not be assigned without the prior written consent of the disclosing party. Nothing in this Agreement, express or implied, is intended to confer upon any party other than the parties hereto or their respective successors and assigns any rights, remedies, obligations, or liabilities under or by reason of this Agreement, except as expressly provided in this Agreement.

8. Severability. If one or more provisions of this Agreement are held to be unenforceable under applicable law, the parties agree to renegotiate such provision in good faith. In the event that the parties cannot reach a mutually agreeable and enforceable replacement for such provision, then (a) such provision shall be excluded from this Agreement, (b) the balance of

the Agreement shall be interpreted as if such provision were so excluded and (c) the balance of the Agreement shall be enforceable in accordance with its terms.

9. Independent Contractors. The Company and Third Party are independent contractors, and nothing contained in this Agreement shall be construed to constitute the Company and Third Party as partners, joint venturers, co-owners or otherwise as participants in a joint or common undertaking.

10. Governing Law. This Agreement and all acts and transactions pursuant hereto and the rights and obligations of the parties hereto shall be governed, construed and interpreted in accordance with the laws of the State of California, without giving effect to principles of conflicts of law.

11. Remedies. The Company and Third Party each agree that its obligations set forth in this Agreement are necessary and reasonable in order to protect the disclosing party and its business. The Company and Third Party each expressly agree that due to the unique nature of the disclosing party's Confidential Information, monetary damages would be inadequate to compensate the disclosing party for any breach by the receiving party of its covenants and agreements set forth in this Agreement. Accordingly, the Company and Third Party each agree and acknowledge that any such violation or threatened violation shall cause irreparable injury to the disclosing party and that, in addition to any other remedies that may be available, in law, in equity or otherwise, the disclosing party shall be entitled to obtain injunctive relief against the threatened breach of this Agreement or the continuation of any such breach by the receiving party, without the necessity of proving actual damages

12. Amendment and Waiver. Any term of this Agreement may be amended with the written consent of the Company and Third Party. Any amendment or waiver effected in accordance with this Section shall be binding upon the parties and their respective successors and assigns. Failure to enforce any provision of this Agreement by a party shall not constitute a waiver of any term hereof by such party.

13. Counterparts. This Agreement may be executed in two or more counterparts, each of which shall be deemed an original and all of which together shall constitute one instrument.

14. Entire Agreement. This Agreement is the product of both of the parties hereto, and constitutes the entire agreement between such parties pertaining to the subject matter hereof, and merges all prior negotiations and drafts of the parties with regard to the transactions contemplated herein. Any and all other written or oral agreements existing between the parties hereto regarding such transactions are expressly canceled.

The parties have executed this Mutual Nondisclosure Agreement as of the date first above written.

Sapphire Energy, Inc.

By: _____

Name: Jaime E. Moreno
(print)

Title: Vice President

Third Party

By: _____

Name: James J. Weaver
(print)

Title: Vice President

Address: 510 Superior Ave
Suite 200
Newport Beach, CA
92663

ATTACHMENT T

FORM OF CHANGE ORDER

Owner:
[NAME OF OWNER]
[Address]

CONTRACT CHANGE REQUEST

CONTRACTOR:	**Change NO.**	**ISSUE DATE.**
	PROJECT NO.	**CONTRACT NO.**
	REFERENCE Change NO.	**EFFECTIVE DATE OF Change.**

DESCRIPTION OF CHANGE:

LIST OF ATTACHMENTS:

SCHEDULE IMPACT SUMMARY

- ☐ **NO SCHEDULE IMPACT**
- ☐ **SCHEDULE EXTENSION OF _____ DAYS from execution of change order**
- ☐ **SCHEDULE REDUCTION OF_____DAYS from execution of change order**
- ☐ **CONTRACT TO BE COMPLETED BY:**

COST IMPACT SUMMARY

- ☐ **NO COST IMPACT**
- ☐ **COST IMPACT AS FOLLOWS:**
- ☐ **MANHOURS_____/_____** (DIRECT) (INDIRECT)
- ☐ **LABOR $ _____**

BASIC CONTRACT AMOUNT $ _____

TOTAL FOR PREVIOUS Changes $ _____

TOTAL ADDITION THIS CO $ _____

TOTAL REDUCTION THIS CO $ _____

☐ **MATERIAL**	**$** _____	**NEW CONTRACT TOTAL**	**$ 0.00**
☐ **EQUIPMENT**	**$** _____		
☐ **TOTAL**	**$** _____	**The adjusted cost, if any, shown on this CO includes all overhead, G & A, profit and any other expense associated with the change(s) covered herein, including any schedule adjustment. All terms and conditions of base contract remain the same.**	

CONTRACTOR ACCEPTANCE	**AUTHORIZATION TO PROCEED**
NAME	**NAME**
TITLE	**TITLE**
SIGNATURE/DATE	**SIGNATURE/DATE**
copy:	

REQUEST FOR INFORMATION

Project: **AMEC RFI #_____**

Date:

To:

cc:

From: **SUBCONTRACTOR RFI # _____**

Subject:

Please provide the following information or clarification:

Response required by ___________

Date:

To:

From:

ATTACHMENT W
FORM OF CERTIFICATE OF FINAL COMPLETION

Job Name: _____

Contract Number: _____

Customer: _____

Contract Date: _____

Project or Designated Area Shall Include:

_____

Located at:

[ADDRESS]

The Work under this Contract has been reviewed and found to be Finally complete in accordance with the Contract Documents. The Date of Final Completion is hereby established as:

[DATE]

Customer accepts the Work or designated portion thereof as being Finally Complete and will assume full possession thereof on:

[DATE]

Contractor:
By: _____
Title: _____
Date: _____
Signature: _____

Owner:
By: _____
Title: _____
Date: _____
Signature: _____

ATTACHMENT - D
PAYMENT SCHEDULE
PERCENTAGE

Percent of Cost and Percent Complete Labor Relationship Table		
Month	**% of Approved Budget**	**Physical Progress % of Approved Budget Labor hrs**
Jun 11	Redacted Exemption 4	
Jul 11		
Aug 11		
Sep 11		
Oct 11		
Nov 11		
Dec 11		
Jan 12		
Feb 12		
Mar 12		
Apr 12		
May 12		

This table shall form the basis for payment each month. If the actual physical progress value is not equal to the planned physical progress then the evaluator shall perform a mathematical extrapolation to account for the differential.

CONTRACTOR

INCIDENT PREVENTION PROGRAM

Sapphire Energy

Integrated Algal Bio Refinery (IABR) Project

Columbus, New Mexico

Revision: 0

Date: 27 April 2011

TABLE OF CONTENTS

HEALTH AND SAFETY POLICY

The safety and well being of all personnel working on the Sapphire Energy IABR project is paramount. This project is committed to implementing and fostering an Incident and Injury Free Environment throughout the entire project. An Incident and Injury Free Environment is a personal mindset where no injury is acceptable and safety is not optional. Safety will become personal to each of us and will become a way of life. Sapphire Energy values and respects every worker. Performing work in a manner that presents risk of injury is not how we conduct our business. All injuries are preventable when safety becomes an everyday personal value. Committing to an Incident and Injury Free Environment is not just the right choice; it's really the only choice.

Rich Keil
Construction Manager

INCIDENT PREVENTION PROGRAM

This Incident Prevention Program (IPP) was prepared to assist project management, contractor management, supervision, subcontractors and workers in understanding the incident/injury-free philosophy and the health and safety expectations and requirements for this project. ***Compliance of this IPP is expected and as a condition of performing work on the Sapphire Energy IABR project.***

Contractor project managers/superintendents have overall responsibility for the implementation and execution of this Incident Prevention Program.

INCIDENT AND INJURY-FREE ENVIRONMENT (IIFE)

The Sapphire Energy IABR project is committed, both personally and organizationally, to a work environment absent of incidents and injuries. This project is intolerant of any level, frequency, or severity of incident or injury. Incident and Injury-Free Environment (IIFE) is not a goal or a result to seek zero injuries but a personal mindset and environment that everyone working on this project will embrace the conviction that injury-free operations are possible and doing something safely is an inseparable element from "doing the right thing."

Incident and Injury-Free Environment is value-based and not a trade-off with cost and/or schedule. Injury-Free is of continuous improvement from the present Incident Prevention Program and processes to a state of betterment. Incident and Injury-Free Environment is where individual workers choose to hold themselves accountable for their own safety and the well being of their fellow workers on this project.

SIX SAFETY ESSENTIALS

The Sapphire Energy IABR project believes that there are Six Safety Essentials to developing an Incident and Injury Free Environment on this project. These Six Safety Essentials are the foundation of the Sapphire Energy IABR Project Safety Culture and are expected to be complied with by all working on this project:

Always Take Care – Each worker is to be observant, take their time, and think safety first. Nothing any worker does is so important that they cannot take the time to do it safely.

Follow The Rules – Safety procedures are designed to stop workers from getting hurt. Ignoring them is unacceptable and will not be tolerated. If a work or safety procedure is unclear or unworkable, then the worker must inform their supervisor.

Do A Risk Assessment – Before starting any work, a risk assessment is required for identifying potential hazards and selected control measures must be in place. If a worker is unsure they are responsible to ask their supervisor. Risk assessments associated with routine tasks are to be re-examined regularly.

You Must Intervene – If any worker believes their safety or the safety of others is being compromised, they have the right and obligation to intervene to stop and correct the work. Every worker has management's total support to exercise this right without any repercussions.

Manage Any Change – If there is a change or deviation to the planned activity, workers must stop the work and *re-evaluate the risk assessment and the precautions taken.*

Wear Correct PPE – Every worker must ensure that when they undertake any work, they will wear the full PPE correctly as identified in the risk assessment for that specific task.

CONTRACTOR AND SUBCONTRACTOR MINIMUM REQUIREMENTS

CONTRACTOR HEALTH AND SAFETY COMMITMENT AGREEMENT

Prior to award of a contract or purchase order, each contractor and sub-tier subcontractor working on the Sapphire Energy IABR project will complete the Contractor Health and Safety Commitment Agreement. This agreement is to be signed and dated (after reviewing the health and safety requirements contained in this Incident Prevention Program) by the ***most senior representative of the contractor or subcontractor company*** who has the authority to commit the company to comply with the Incident Prevention Program. **CONTRACTOR SAFETY DIRECTORS, PROJECT MANAGERS AND SUPERINTENDENTS ARE NOT TO SIGN THIS DOCUMENT**

PROJECT SAFETY IMPLEMENTATION PLAN:

Prior to mobilization, each contractor's project management and first-line supervision will develop and submit, a written detailed project-specific Safety Implementation Plan that will describe how they and their sub-tier subcontractors intend to implement and conform to the Sapphire Energy IABR project IPP. The Safety Implementation Plan will:

- Identify each major component of the work that the contractor is responsible for completing
- Identify hazards associated with the work and the proper equipment and tools to perform the work
- Plan adequate and sufficient controls to protect their work crews.

The Sapphire Energy Construction Management team will review the contractor project Safety Execution Plans.

Additional work components that may come up later in the project will be analyzed once they are known.

If the Project Safety Implementation Plan needs revision due to scope of work changes, unanticipated or new hazards, or other condition changes, etc., then all work pertaining to that work component will stop until a new Project Safety Implementation Plan is completed.

CONTRACTOR SAFETY PERFORMANCE

The Sapphire Energy IABR project expects each contractor and sub-tier subcontractor to execute their work on this project with a visible, proactive, and extraordinary vision and commitment to safety at all levels. Each contractor and subcontractor will plan their work with a focus on protecting their workers from incidents and injuries.

The Sapphire Energy Construction Manager will continually monitor and assess each contractor and subcontractor for compliance to this Incident Prevention Program (IPP) and appropriate regulations. The Sapphire Energy Construction Manager will further evaluate contractors on safety leadership, ability to become a safety partner and adopt the incident/injury-free philosophy.

Contractors will be held accountable for the safety performance of their sub-tier subcontractors.

Immediate corrective action will be taken to eliminate discrepancies, hazards, at-risk behavior, or nonconformance to the IPP observed.

DESIGNATED SAFETY REPRESENTATIVE

Each contractor with less than thirty (30) workers on-site (this includes sub-tier subcontractors) will designate a competent worker as their project safety representative for their company prior to mobilization. Safety representatives are not necessarily expected to perform in this role as a full time job.

Contractors will have a full time on-site safety professional when there are thirty workers. Additional safety professionals will be required for each additional fifty workers. (Worker count will include sub-tier subcontractors)

Contractors will submit the resume(s) of their proposed safety professional or representative to be reviewed by the Sapphire Energy Construction Manager. This person(s) will have the authority and responsibility to ensure the proper implementation of this Incident Prevention Program.

Contractor safety professionals and representatives will be expected to have adequate knowledge of the NMOSHA Construction and General Industry standards. The Sapphire Energy Construction Manager will determine if the proposed safety representative has the training and experience required for this project.

Contractor safety professionals and representatives will have the full authority to implement safety corrections and recommendations. Contractor safety professionals and representatives will have authority to stop any work they deem unsafe.

Contractor on-site safety professionals shall have the following minimum qualifications based upon the extent of their construction safety supervisory experience and capabilities:

- Five years construction experience, three of which include full-time on-site construction safety experience
- Completion of the OSHA 500 course is desired but minimum OSHA 30 hour Construction Outreach Course
- Specialized safety training relevant to the project
- Demonstrated ability in creating a safe and Injury-Free Environment
- Working knowledge of safety regulations and hazard control methods
- Demonstrated ability to conduct safety training

- Working knowledge of any specific contract hazardous work rules

Contractor safety representative (less than 30 workers) shall have the following minimum qualifications:

- Five years construction experience
- Completion of the OSHA 10 hour Construction Outreach Training Course
- Demonstrated ability in creating a safe and Injury-Free Environment
- Working knowledge of safety regulations and hazard control methods
- Working knowledge of any specific contract hazardous work rules

The minimum duties of designated safety professional and/or representative will be:

- Investigate any incident or near miss and report the findings to the Sapphire Energy Construction Manager
- Attend safety meetings as required by the Sapphire Energy Construction Manager
- Conduct regular safety meetings with workers to instruct them on project safety practices and requirements
- Conduct written daily safety reviews of their work activities to ensure compliance with safe work practices, this Incident Prevention Program, and safety rules and regulations and make available to the Sapphire Energy Construction Manager for review

CONTRACTOR SAFETY ORIENTATION

In addition to the project orientation, each contractor will conduct an additional safety orientation for their own and all subcontractor employees to ensure they understand the project safety requirements as well as their company's requirements.

CONTRACTOR MONTHLY INCIDENT SUMMARY REPORT

Contractors must submit a Monthly Incident Summary Report to the Sapphire Energy Construction Manager with their **monthly pay application**. A copy of the Contractor Monthly Incident Summary Report can be found in Appendix A of this IPP. This form will be submitted even if the contractor has no incidents to report. Information to report on this form includes:

- Monthly total man-hours worked including subcontractors
- First Aid cases including subcontractors
- OSHA Medical Treatment cases including subcontractors
- OSHA Lost Workday cases including subcontractors
- Restricted work cases including subcontractors
- Days Away from work including subcontractors

CONTRACTOR SAFETY SUBMITTALS

Prior to beginning work, each contractor shall submit to the Sapphire Energy Construction Manager the following:

- Executed Contractor Safety and Health Commitment Agreement
- Contractor written project-specific safety program
- Detailed Project Safety Implementation Plan for the scope of work
- Name(s) of designated safety representatives
- Name(s) and training verification of designated competent persons as required by the scope of work for trenching, scaffolding, rigging, etc.
- Name(s) and training verification of trained and qualified equipment operators as required by the scope of work for cranes, forklifts, aerial lifts, etc.
- Name(s) and training verification of employees trained in first aid and CPR
- Current annual crane inspections, by a third party crane inspection firm for all cranes brought onto the project Project-specific hazard communication program
- Master Chemical and Substance Inventory Sheet and Material Safety Data Sheets for all hazardous chemicals and materials to be used or stored on the project
- Training verification of OSHA or project required training as necessary. Verification shall include training rosters.

Examples of OSHA or project-required training are:

- Fall Protection
- Confined Space
- Ladders
- Excavations and Trenches
- Scaffolding
- Crane Signals
- Hazard Communications

On-Going Submittals

Each contractor will be required to submit various on-going safety documents to the Sapphire Energy Construction Manager as required by the scope of work. These submittals may include the following:

- Contractor Monthly Incident Summary Report (Due monthly with pay application)
- Incident Notification and Investigation Report (Within 24-hours of any incident or near miss)
- Weekly “Tool Box” safety meeting minutes

Maintain While Working on the Project

Throughout the course of the project, each contractor will maintain the following records or documents on-site and make available for inspection by the Sapphire Energy Construction Manager:

- Pre-task safety plan (Daily)
- Contractor Daily Work Site Safety Inspection (Daily) (Appendix R)
- Daily Scaffold, Trench, Crane, Rigging, and Forklift Inspections (Daily as required by the work)

Permits or Safety Plans as Required

Contractors will submit work permits or plans for review and approval by the Sapphire Energy Construction Manager prior to start of work as required. Work permits or plans that are required are:

- Confined Space Entry (Appendix J)
- Hot Work (Appendix I)
- Excavation and Trenching (Appendix K)
- Critical Lifts
- Fall Protection Plan
- Lockout/Tryout/Clearance
- Equipment Start-up
- Other work plans as deemed necessary

Submitted Annually

Each contractor(s) and subcontractors will submit their OSHA 300 and OSHA 300A logs for the previous calendar year to the Sapphire Energy Construction Manager by January 31st of each year.

CONTRACTOR SAFETY AND HEALTH COMMITMENT AGREEMENT

I, _____ representing _____

(Senior Contractor representative) (Name of company)

have reviewed this Incident Prevention Program (IPP) and fully understand its contents. I understand our responsibilities and will hold each worker assigned to work on the Sapphire Energy IABR project accountable for complying with the health and safety rules and requirements, regulations, and procedures contained in the Sapphire Energy IABR Project Incident Prevention Program. I will further allocate the necessary personnel, equipment, and supplies required to comply with this Incident Prevention Program.

I fully understand that if my company, subcontractor, or a worker fails to comply with any part of the Incident Prevention Program, Sapphire Energy work rules, or regulations, that part or all of the work being performed by my company may be suspended until such time that a corrective action plan has been developed, accepted by the Sapphire Energy Construction Manager and implemented.

_____ is being submitted by my company as our Designated Contractor Safety Representative/Professional for this project. He or she has met or exceeded the requirements established for the position and has full authority to implement any and all necessary corrective actions to maintain compliance with the Incident Prevention Program.

SAFETY DIRECTORS, PROJECT MANAGERS AND SUPERINTENDENTS ARE NOT TO SIGN THIS DOCUMENT

Signature: _____ Date: _____

Title: _____

THIS DOCUMENT MUST BE SUBMITTED TO THE SAPPHIRE ENERGY CONSTRUCTION MANAGER BEFORE START OF WORK.

SAFETY LEADERSHIP TEAM

A safety leadership team made up of Sapphire Energy Construction management team, project management and safety representatives from all major contractors, and selected subcontractors, as well as craft representation. The safety leadership team will meet regularly to discuss project safety rules, discuss any incident trend, compliance issues, and upcoming project work or activities that may require additional safety controls. At a minimum, these meetings will be held bi-weekly. The Sapphire Energy Construction Manager will prepare meeting minutes.

The craft representatives will serve for a minimum period of ninety days.

To make each meeting productive and informative, all members must be prepared to discuss any items and/or issues provided prior to each meeting.

NOTIFICATION OF UNSAFE OR HAZARDOUS CONDITIONS

Each worker on this project has the right and responsibility to notify their project management or supervision of any unsafe or hazardous condition that may be present without fear of retribution.

Contractor project management or supervision will take immediate action to correct or remove any hazard brought to their attention.

Nonconformance(s) of governmental regulations and requirements of this Incident Prevention Program will be documented on a Notice of Safety, Health or Environmental Nonconformance form (Appendix F). When the nonconformance(s) are classified as a Serious Nonconformance, a written corrective action plan is required. The Safety, Health, or Environmental Corrective Action Report (Appendix G) may be used.

NEW PERSON IDENTIFICATION – BLUE VEST PROGRAM

Every worker and supervision including subcontractors that are new or have been newly assigned to the project will be required to wear a blue reflective vest for thirty (30) days or more**. There will be no exception even if the worker or supervisor has been with the company for many years. Blue Vest Program is described

SAFETY REGULATIONS

All contractors and subcontractors will incorporate, at a minimum, New Mexico OSHA Construction Safety Standards, NMOSHA General Industry Standards (as applicable), Sapphire Energy safety rules and regulations, other specific governmental regulations and requirements (as applicable), and this Incident Prevention Program when determining the safe work practices and protection of our workers. ***If any of these standards, requirements, rules or procedures conflict, the most stringent one will prevail.***

INCIDENT AND NEAR MISS INVESTIGATION PROCESS

Every incident and near miss will be reported immediately and documented using the Incident Notification Form (Appendix B). Contractor project management will notify the Sapphire Energy Construction manager of any incident or near miss and will thoroughly investigate to determine the probable root cause(s). Preventive action will be required to eliminate future occurrences.

First aid and minor near-miss incidents will require a “Safety Down” where the entire work crew will discuss the incident, the causes, and corrective actions. The “Safety Down” will be documented on the Minor Incident Form.

Contractor first-line supervision will be involved in the investigation of incidents and near misses. Safety representatives **will not** conduct investigations alone. The Incident Notification form must be completed and submitted to the Sapphire Energy Construction Manager within TWENTY-FOUR hours of the occurrence.

Injured workers shall be accompanied to the medical facility by a supervisor.

PROCESS SAFETY MANAGEMENT

No work will be performed in any active process area without the contractor or subcontractor reviewing and complying with the sapphire Energy Process Safety Management requirements.

Contractors are responsible for training employees on the requirements and hazards in the work area.

Contractors will not leave a work area unattended in any process area without prior approval of the Sapphire Energy Construction Manager.

SAFETY AND HEALTH ASSURANCE ASSESSMENT MEETING

Major nonconformance(s), serious incidents, near misses, and injuries requiring medical treatment will result in all involved parties attending a Safety and Health Assurance Assessment meeting. At this meeting, Sapphire Energy Construction Management senior project management, HSSE, supervision, and involved contractors and subcontractor(s) will discuss the nonconformance, root causes, and corrective action plans.

Nonconformance of statutory health and safety regulations or the project rules contained in the project IPP will not be tolerated. It is expected all nonconformance issues identified are abated immediately.

Failure to correct nonconformance(s) may result in suspension of part or all work.

An incident is defined as any unplanned or undesired event that results in or has the potential to result in a work-related injury/illness, property damage, or disruption of business where the cause was from human errors of omission or commission.

A near miss is any situation that has the potential to result in a work-related injury/illness, property damage, serious environmental impact, or disruption of business under slightly different circumstances.

DAILY WORK SITE SAFETY INSPECTION

Superintendents will perform daily work site safety inspections of their work and the work of subcontractor's under their direction. These inspections are separate from any inspection performed by the safety coordinators. Inspections can be documented on the Daily Work Site Safety Inspection Form (Appendix R) or an acceptable equivalent. The daily safety inspection reports will be maintained in a binder or file.

DISCIPLINARY PROGRAM

At-risk behavior on the Sapphire Energy IABR project that could contribute to an incident or injury will not be tolerated. Each worker has an individual responsibility to work safely, and each first-line supervisor is responsible to correct at-risk behavior of workers under their direction.

At-risk behaviors that may result in immediate removal from the project, consist of, but are not limited to:

- Failure to follow the Fall Protection Policy
- Failure to follow the Substance Abuse Policy
- Possession of firearms, explosives or dangerous weapons
- Theft and other criminal activity
- Entering or allowing to enter an unprotected trench or excavation
- Failure to wear respiratory protection
- Failure to follow hot work procedures.
- Fighting, horseplay, or practical joking
- Entering or allowing to enter, a confined space without following procedures
- Unsafe and/or reckless operation of motorized vehicles or equipment
- Failure to follow lockout/tryout or clearance procedures
- Any reckless or dangerous behavior or act that could cause or contribute to a serious injury or damage to equipment or material.

For those acts or practices that result in removal from the project, the individual(s) will not have access to the project for twelve (12) months.

For those acts or practices not considered Immediately Dangerous to Life or Health the Sapphire Energy Construction Manager expects contractors and sub-tier subcontractors to have a progressive disciplinary program similar to the following:

- First occurrence: Verbal, written warning and/or re-training
- Second occurrence: Written warning, re-training, suspension, or termination from the project
- Third occurrence: Termination from the project

RESPONSIBILITY AND ACCOUNTABILITY

This Sapphire Energy IABR project has committed to create a work environment absent of incidents and injuries. Incident and Injury-Free is not a goal or a result but a personal mindset intolerant of any level, frequency, or severity of incident or injury.

Everyone associated with the Sapphire Energy IABR project must understand their responsibilities with regards to health and safety on this project. With the responsibilities defined, each contractor and subcontractor project management, supervision, and workers will be held accountable for their health and safety performance.

SUBJECT	PROJECT MANAGEMENT	FIRST-LINE SUPERVISION*	WORKER	SITE SAFETY REPRESENTATIVE(s)
	WILL ENSURE THAT:	**ENSURE THAT:**	**WILL:**	**WILL:**
Incident Prevention Program:	The IPP is understood, implemented, and strictly complied with and that Contractors, subcontractors, vendors, or third party individuals working or having business at this project are in conformance to the IPP.	The IPP is fully understood, implemented in work planning and communicated to workers. The project is compliant to the IPP.	Understand the contents of the IPP and follow the established rules and procedures.	Advise project management and supervision as to status and conformance with the project IPP. Support in administration of the IPP.
Work Practices:	First-line supervision is communicating safe work practices to workers.	All work tasks are properly communicated to workers and complied with.	Follow all safe work practices as communicated to them by their supervisor.	Assess project is compliant with safe work practices and federal, state, local, and company regulations, rules and procedures.
Site-Specific Safety Rules:	The site-specific safety rules and procedures are implemented and enforced.	The site-specific safety rules and procedures are understood and implemented.	Understand and follow the site-specific safety rules and procedures.	Assess project conformance to site-specific safety rules and procedures.
Emergency Action Plan:	Project develops and implements the project Emergency Action Plan and the Crisis Management Plan.	Communicates the project Emergency Action Plan.	Understand the project Emergency Action Plan.	Assess project Emergency Action Plan and Crisis Management Plan.
Training:	Resources are available to implement safety and health training. Training programs are developed and implemented.	They received a project-specific supervisor safety orientation prior to start of work. All workers under their direction are properly trained in hazard recognition and safe work practices.	Attend required project safety and health training. Understand and follow the work practices and guidelines discussed during the training.	Assess that project management, first-line supervision and workers have received proper health and safety training. Assist project supervision in training workers on hazard recognition and safe work practices. Monitor daily safety meetings.
Hazards:	All first-line supervision identifies, evaluate, and control the work site hazards, and resources are available to implement controls.	All hazards are identified, evaluated and controlled. Institute a daily assessment program to identify, evaluate and correct work site hazards	Understand the hazards of the work and follow the safe work practices and controls developed for those hazards.	Assist in evaluating hazards and determining methods of eliminating or reducing the hazard.
Incidents:	All incidents are investigated properly and thoroughly.	They conduct a thorough and proper incident investigation and develop solutions to prevent similar occurrences.	Cooperate and participate in the incident investigation and contribute ideas and solutions.	Assist first-line supervision in investigating incidents. Maintain monthly incident statistics.

* First-line Supervision includes general superintendents, superintendents, field engineers, general foreman and foremen.

SECURITY

For everyone's protection and safety, workers are required to follow established security procedures on this project.

Workers will enter and leave the project at the designated man-gate. Workers will only be allowed access to the project with proper identification. Those workers without proper identification (i.e.; hard hat decal, etc.) will be denied access.

All workers may be subject to search of the person or vehicle.

Only company vehicles with an issued vehicle pass will be allowed on the project. No personal vehicle will be allowed within the project.

All company vehicles shall have the Company Name or Logo displayed on both sides of the vehicle.

No camera or photography is allowed without prior permission.

SUBSTANCE ABUSE POLICY

This project is committed to providing a safe, drug-free work place for all employees. This policy applies to all contractors, subcontractor at any tier, vendor and other third party employees, including management working on or visiting the project.

Drug and alcohol abuse on and off the job can contribute both to incidents and to greater risk for all individuals employed on this project, as well as the general public. Construction work is dangerous; therefore all work tasks on this project will be considered safety-sensitive.

This project will follow the Sapphire Energy IABR project Substance Abuse Program.

The following are prohibited on this job:

- Being under the influence of any amount of alcohol or illegal drugs
- The use, sale, offer to sell, purchase, transfer, distribution or possession of illegal drugs, drug paraphernalia or alcohol products
- Possession of any firearm or other dangerous weapons

Each contractor and subcontractor will promote a Drug Free Workplace with their employees and will communicate what constitutes prohibited activities as described in the project Substance Abuse Program during their safety orientations.

Any worker who suffered or contributed to a work-related injury or illness, which required treatment by a physician or other medical facility or was involved in an incident where damage to property occurred, will be tested for drugs and alcohol within three (3) hours of the incident.

Contractors and Subcontractors will report the results to the Sapphire Energy Construction Manager. At a minimum, drug and alcohol test will follow current NIDA five panel guidelines and alcohol test will follow DOT guidelines.

Workers that refuse to test, stall to be tested, are uncooperative with collectors, or attempt to alter a urine specimen will be considered positive and immediately removed from the project.

Any violation of the project Substance Abuse Program will result in immediate removal from the Sapphire Energy IABR project and ineligible to work on the project for a minimum of twelve months.

SAFETY PLANNING

PRE-WORK TASK SAFETY PLAN:

Prior to the start of any work activities on this project, each contractor and sub-tier subcontractor discipline superintendent is expected to analyze each component of the work that he/she has responsibility for completing, identify hazards, acquired the proper equipment and tools to perform the work and plan adequate and sufficient controls to protect his/her work crews.

A written Pre-Work Task Safety Plan for each identified work component is required. Additional work components that may come up later in the project will be analyzed once they are known.

The Pre-Work Task Safety Plan is an outline describing the major work activities of the component work, identifies health and safety hazards, and lists the controls, tools, or equipment needed to reduce or eliminate those hazards and perform work properly. **A copy of a Pre-Work Task Safety Plan can be found in Appendix E**.

A Safety Hazard Checklist can be used to aid the discipline superintendent in identifying hazards. A copy of a Safety Hazard Checklist can be found in the appendix of this IPP.

Only one Pre-Work Task Safety Plan needs to be completed for each identified work component. If the Pre-Work Task Safety Plan needs revision due to scope of work changes, unanticipated or new hazards plan changes, etc., then all work pertaining to that work component will stop until a new Pre-Work Task Safety Plan is completed.

DAILY TASK/JOB HAZARD ANALYSIS PLAN:

Each, designated trade's first-line supervisor will analyze each task to be performed FOR EACH SHIFT OF WORK and identify the work sequences, hazards and controls necessary to protect workers from the identified hazards.

A Daily Task/Job Hazard Analysis Plan (JHA) will be completed DAILY (for each shift) and each crew performing work on this project. **A copy of the Pre-Task Safety Plan can be found in Appendix D.**

The work will be broken down into individual steps (i.e. all the steps the work crew will have to take in order to complete that task); the known hazards associated with the work; and the hazard controls (tools, safety equipment, safety rules, safe work practices, etc.).

Once the Daily Task/Job Hazard Analysis Plan is completely filled out, first-line supervisors will review the plan with their respective work crew so that each worker is aware of what work activities will occur during the shift, what hazards to be aware of and how to properly control or eliminate those hazards. This is also a time for workers to provide input into the safety plan. First-line supervisors should encourage crewmembers to participate in this planning process.

After a Daily Task/Job Hazard Analysis Plan has been reviewed with crewmembers, each worker is to sign the plan stating that they understand the work activities, hazards and controls. This is also an acknowledgement that each worker agrees to work according to the plan.

Those tasks with similar work can use prior Daily Task/Job Hazard Analysis Plan, but the plan must still be dated and reviewed with crewmembers at the beginning of the shift. If the scope of work changes or a new hazard appears during the work, the first-line supervisor will stop their crewmembers and revise the Daily Task/Job Hazard Analysis Plan.

First-line supervisors can use the Pre-Work Task Safety Plan and Safety Hazard Checklist on the back of the JHA to aid them in developing their Daily Task/Job Hazard Analysis Plan. Each disciplined superintendent is to review and sign each of their foremen's JHA's to ensure they are complete and have properly identified the hazards and controls.

Daily Task/Job Hazard Analysis Plan are to be completed by the first-line supervisor. Safety representatives can provide assistance to foremen in identifying hazards and controls.

HSSE representatives, office engineers, or other persons not involved in the direct execution of the work will not prepare pre-task safety plans on behalf of first-line supervision.

WORKER SITE-SPECIFIC ORIENTATION AND TRAINING

Environmental Health and Safety Training is a requirement and mandatory for all Sapphire Energy IABR contractors and subcontractor (at any tier) workers assigned to this project to promote and ensure an Incident and Injury-Free Environment exists.

Health and Safety Orientation

Every worker shall attend a Sapphire Energy IABR health and safety orientation, which will provide general health and safety information and project-specific work rules and procedures.

Even though the Sapphire Energy IABR project conducts a general informational project safety orientation, contractors and subcontractors are responsible to develop and conduct their own site-specific health and safety orientation.

Each contractor, at a minimum, will conduct a health and safety orientation that will include the project General Safe Work Rules and Procedures contained in this Incident Prevention Program. The site-specific orientation will communicate each worker's responsibility to be compliant with the project safety rules and regulations, accountability, and the disciplinary program.

Health and Safety Training

In addition to the site-specific health and safety orientation, NMOSHA requires that workers receive specific task training. To help comply with NMOSHA minimum worker training requirements and assist in achieving an Incident/Injury-Free workplace, a training matrix has been included in this Incident Prevention Program.

The Sapphire Energy Construction Manager will evaluate contractor orientations and training periodically to verify they are being properly conducted and that the contents adequately cover the standards, policies, rules, and procedures contained in the Incident Prevention Program or NMOSHA standards.

Contractors shall train workers on the safe operation of equipment or machines that they may be assigned to operate. This training shall be documented and available upon request.

Project management or supervision will communicate the health and safety policies, rules, and procedures to all vendors and third party individuals having business on this project.

All safety training is to be documented. A safety-training roster has been included for documenting safety training on this project. A copy of the safety-training roster can be found in the Appendix C of this IPP.

Daily Safety Meetings

All workers assigned to the Sapphire Energy IABR project will participate in daily safety meetings conducted by the contractor. The Sapphire Energy IABR project reserves the right to remove any contractor or subcontractor management/supervision that continually fails to attend or conduct daily safety meetings on the project.

Safety meetings should communicate any incident that occurred on the project, safety concerns, new hazards that may appear on the project, etc. The safety meeting should be five to ten minutes in length.

Workers will attend daily pre-task safety plan meeting where their immediate first-line supervisor will discuss work to be performed, hazards associated with the work, and controls required to protect from hazards. Workers will sign the Pre-Task Safety Plan daily stating they were communicated the plan and understand what was presented.

TOPIC	WHO NEEDS TRAINING	WHAT TRAINING IS NEEDED
Project-Specific Safety Orientation	All project management, supervision, and workers entering the project	Safety rules and procedures contained in the Incident Prevention Program (IPP), site-specific emergency action plan, each worker's responsibilities, disciplinary program
Hazard Communication	All workers entering the project	Hazard Communication Basic Training and Specific Hazard Communication Training (Refer to Hazard Communication Program in this IPP and requirements of NMSA)
Supervisor Training	Any person assigned as a supervisor	Supervisor Training Program
Environmental Management Program	All workers on the projects	The content of the project Environmental Management Plan
Fall Protection	Workers exposed to fall hazards of 6' or greater.	• The nature of fall hazards • Procedures for erecting, disassembling, maintaining and inspecting fall protection systems • Use and operation of: guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones and other protection when used • Procedures for handling equipment and erection of overhead protection • Fall protection standards
Forklifts	Operators of powered industrial trucks	• Types of trucks operated • Hazards of the workplace • Hands-on performance evaluation
Confined Spaces	Workers entering or working within a confined space	• Hazards of the space • Duties of entrants • Air monitoring
Permit-Required Confined Spaces	Workers entering or working within a permit-required confined space	• Hazards of the space • Duties of entrants, attendants, supervisors • Measures used to eliminate or control hazards • Air monitoring requirements • Emergency procedures/rescue equipment • Communications • Permitting procedure • PPE

TOPIC	WHO NEEDS TRAINING	WHAT TRAINING IS NEEDED
Excavations/ Trenches	Workers entering or working within an excavation/trench	• Hazards of the space (slides, cave-ins, water accumulation, etc.) • Safe means of access/egress • Proper support system procedures (erection, maintenance, disassembly and inspection)
Lockout/Tagout/Clearance Procedures	Workers affected by hazardous energy sources	• Nature of known hazardous energy sources • Project-specific Lockout/Tryout/Clearance procedures
Gas Welding & Cutting	Workers conducting gas welding and/or cutting	• The safe use of fuel gas
Respiratory Protection	Workers required to wear respiratory protection, including common dust masks	• NMOSHA Construction and General Industry Standards
Hot Work	Workers conducting hot work activities	• Hazards of the area • Permits • Duties of Fire Watch • How to use a fire extinguisher
Scaffolding	Workers working from scaffolding	• The nature of any known hazards • Proper erection, maintenance and disassembly of fall protection systems • Fall object protection • Material/equipment handling from scaffold • Maximum load-carrying capacity • Scaffold tagging system
Crane Baskets	Workers working from crane baskets	• Safe work rules • 100% fall protection • Lift plans contents • Emergency procedures

GENERAL SAFE WORK PRACTICES

Clean and safe working conditions are absolutely essential for achieving an Incident and Injury-Free Environment, as well as for the promotion of construction efficiency and progress. Each worker on the Sapphire Energy IABR project is valued not only for what they do, but for who they are. Everyone must maintain a strong personal desire to think and act safely, in an effort to create an Incident and Injury-Free Environment.

The following general safe work rules are a partial list of the general rules that apply to each worker on this project. There will be no tolerance for any worker who carelessly or callously disregards these rules or the other applicable health and safety rules.

1. It is the responsibility of each worker to perform their assigned duties so as to provide:
    a. - Safety for themselves
    b. - Safety for their fellow worker
    c. - Protection of the general public and all other workers
    d. - Protection of equipment, materials and tools
2. It is the responsibility of each worker to report all unsafe acts and conditions to their supervisor.
3. No worker will attempt to work under conditions that appear to be unsafe.
4. Workers will wear the minimum personal protective equipment (hardhat, safety glasses, reflective vest, shirt, trousers and work boot).
5. No worker will use damaged tools or equipment. Damaged tools must be removed from the work site.
6. No work will be performed on any equipment, machinery, or system without it being locked out and tagged.
7. It is every worker's responsibility to maintain his or her work area in a clean and orderly manner.
8. No radio or cell phone is allowed in any work area.
9. Tools and equipment will not be operated without proper guards and safety devices in place.
10. Each worker will report work-related injuries or illnesses immediately to their supervisor.
11. If a worker is unsure as to the safe performance of their work, they will request instruction from their supervisor.
12. No worker will enter a confined space without authorization and training.
13. No worker will attempt to operate equipment or machinery or any specialty tool (e.g. powder-actuated tools) unless authorized and properly trained.
14. No worker will cut, weld, grind, chip, or perform other tasks where the danger of flying debris exists without wearing proper eye and face protection.
15. Workers will use safe lifting techniques when required to lift material or other loads.
16. Workers will not remove respiratory protection when the work area requires it.
17. No worker will ride in the bed of pickup trucks.
18. No worker will be under the influence of drugs/alcohol or engage in any horseplay, fighting or gambling of any form.
19. No worker will cross, disregard, or enter a red barricaded, taped, or flagged area.
20. No worker will intentionally discharge or remove fire-fighting equipment.
21. No worker will remove barricades or floor covers without authorization.
22. No worker will work six (6') feet or greater above the surface without proper fall protection.

EMERGENCY ACTION AND EVACUATION PLAN

In the event of an emergency, the following Emergency Action and Evacuation Plan will be followed. During orientation each contractor employee and subcontractor will be advised of the:

- Sapphire Energy IABR Project requirements and procedures
- Sapphire Energy IABR Project Crisis Management and site logistics protocols
- Coordination with local emergency response personnel

The contractor will develop their own Emergency Evacuation Plan that is to be posted throughout their worksite and communicated to workers during the Safety Orientation and weekly safety meetings.

MEDICAL EMERGENCY

During the safety orientation, workers will be given information on how to summon medical assistance in case of a medical emergency. Workers should know the following information:

Emergency Phone Numbers: 9-1-1 or (575) 531-2222

Project Address: 1500 Highway 9 SW

City: Columbus NM

When reporting a medical emergency, the worker will state their name, the nature of the emergency, the severity of the emergency and where assistance is needed. A worker may be required to meet medical personnel and guide them to where the emergency is located.

WORKERS ARE TO BE INSTRUCTED NOT TO MOVE AN INJURED WORKER BEFORE MEDICAL ASSISTANCE ARRIVES UNLESS FURTHER INJURY IS POSSIBLE.

FIRE

In case of a fire, workers will evacuate their work area immediately and report to the pre-determined assembly area.

Workers will not attempt to put a fire out unless they have received special instruction on use of portable fire extinguishers. After reporting the fire, workers will evacuate the work area and report to the pre-determined assembly area that was stated during the safety orientation.

SEVERE WEATHER

Should weather conditions, such as severe thunderstorms develop around or near the Sapphire Energy IABR project, workers will follow the direction of their immediate supervisor. Workers may be directed to a safe area where they will remain until weather conditions improve.

CONTRACTOR-SPECIFIC EMERGENCY EVACUATION PLAN

Contractor Project Management will ensure a project-specific Emergency Evacuation Plan is communicated to all workers during orientation. Specific emergency procedures and emergency phone numbers will be posted in lunch areas, near all telephones and on project bulletin boards.

The Sapphire Energy Construction Manager will routinely assess contractor project management, supervision, subcontractors and workers to ensure adequate knowledge of the project emergency action plan exists.

HOMELAND SECURITY EMERGENCY

Should a Severe Condition "*Red*" threat advisory be issued indicating a terrorist attack occurrence or the severe risk of possible terrorist attacks, the Sapphire Energy Construction Manager will determine whether the project should evacuate or shelter all workers on the Sapphire Energy IABR project. Workers would assemble at the primary point and then directed to the shelter area.

The Sapphire Energy Construction Manager will communicate to contractors all known information of the threat and of the crisis plan.

EMERGENCY EVACUATION PLAN

THIS PLAN SHALL BE REVIEWED BY ALL WORKERS AND POSTED IN PROMINENT LOCATIONS ACCESSIBLE TO ALL WORKERS. THIS PLAN IS A SUPPLEMENT TO THE CONTRACTORS PROJECT SPECIFIC INCIDENT PREVENTION PROGRAM.

PROJECT NAME: **Sapphire Energy IABR Project**

WORK LOCATION: **Columbus NM**

1. This is an Emergency Evacuation Plan communicating evacuation procedures, specific alarms, and assembly points, should an emergency evacuation become necessary because of severe weather, fire, hazardous chemical release, explosion or other emergencies that could cause worker harm.
2. It is each worker's responsibility to familiarize themselves with evacuation routes, alarms and assembly points in case an emergency evacuation of the work area is required.
3. **Caution:** Evacuation routes, alarms or assembly points for one emergency may differ from another emergency. Therefore, familiarize yourself with each of the emergency plans below.
4. **IN CASE OF FIRE OR MEDICAL EMERGENCY:**

   Emergency Phone Number: 9-1-1 or (575) 531-2222

   Alarm or Notification:

   Evacuation Route:

   Primary Assembly Point:

   Secondary Assembly Point:

5. **IN CASE OF SEVERE WEATHER OR HOMELAND SECURITY EMERGENCY:**

   Alarm or Notification:

   Evacuation Route:

   Assembly Point:

6. **IN CASE OF A CHEMICAL RELEASE OR EXPLOSION:**

   Alarm or Notification:

   Evacuation Route:

   Primary Assembly Point:

   Secondary Assembly Point:

   Spill Kit Location:

7. Workers will immediately evacuate their work area upon hearing the alarm or being notified of the emergency and ordered to evacuate. No worker is exempt from evacuation even if the evacuation is a drill.
8. Workers are required to report immediately to their designated assembly point and be accounted for. Failure to report may cause another to risk danger in an effort to search for you. **DO NOT** leave the project without prior authorization from first-line supervision.

EMERGENCY EVACUATION PLAN

INSERT PROJECT EMERGENCY EVACUATON DRAWING OR PHOTO HERE

PROJECT HAZARD COMMUNICATION PROGRAM

All workers on the Sapphire Energy IABR project are entitled to know the properties and potential safety and health hazards of chemicals or substances that they may come in contact with on this project.

Each contractor and sub-tier subcontractor is required to have a written project specific Hazard Communication Plan that will be posted in a location where workers can easily access and review the plan. A written Hazard Communication Plan is required even if the contractor or subcontractor does not use hazardous chemicals or substances.

The contractor/subcontractor Hazard Communication Plan will be reviewed by the Sapphire Energy Construction Manager

Each contractor will submit to the Sapphire Energy Construction Manager, a Master Chemical and Substance Inventory List and a copy of the Material Safety Data Sheet (MSDS) of all known hazardous chemicals that are in their work area. Contractors will be responsible for obtaining all sub-tier subcontractors Master Chemical and Substance Inventory Lists/MSDS and forwarding to project HSSE.

The Master Chemical and Substance Inventory List (Appendix H) will be maintained, even if they do not have or will not use any hazardous chemicals or substances. *This is an NMOSHA requirement.*

Contractors will maintain a project-specific MSDS on location for each hazardous chemical or substance listed on the Master Chemical and Substance Inventory List. Contractors will be responsible to ensure all sub-tier subcontractors have their project-specific MSDS sheets at the project.

It will be the responsibility of each worker's supervision or project manager to assure Material Safety Data Sheets are received prior to, or at the time of delivery of, a hazardous chemical.

Contractor project management and first-line supervision will ensure all hazardous chemicals are properly labeled in accordance with the MSDS. Containers that hazardous chemicals have been transferred into for use during a single work shift will be labeled as to contents.

Every worker on this project shall receive instruction from their employer on their Hazard Communication Program, the location of the Master Hazardous Chemical and Substance Inventory list, the location of the Material Safety Data Sheets, labeling requirements and specific safety or health instructions about the hazardous chemical or substance.

Recommended minimum Hazard Communication Training will consist of:

1. The contents of the program
2. Prior to use of or the potential exposure to any hazardous chemical or substance, workers are to be instructed in:
    - Physical and health hazards
    - Procedures to protect against the hazards
    - Engineering and administrative controls
    - Personal protective equipment
    - Emergency procedures in case of exposure or accidental spill
3. Labeling requirements
4. Whenever a new chemical or substance is introduced into the workplace, workers will be briefed of its hazards

Sapphire Energy, vendors and other contractors that may have business in or near a work area will be notified that hazardous chemicals are being used and the hazards they may encounter.

If a worker believes they have encountered a hazardous chemical or substance unfamiliar to them, they will immediately notify their supervisor. Project management or supervision will attempt to identify the hazardous chemical or substance and initiate all precautions to handle and dispose of this material, if required, and to properly protect workers.

WRITTEN HAZARD COMMUNICATION PROGRAM

THIS PLAN WILL BE REVIEWED BY ALL WORKERS AND POSTED IN A PROMINENT LOCATION ACCESSIBLE BY ALL WORKERS. THIS PLAN IS A SUPPLEMENT TO THE PROJECT INCIDENT PREVENTION PROGRAM.

CONTRACTOR/SUBCONTRACTOR NAME:

WORK LOCATION:

1. This is a project-specific Hazard Communication Plan ensuring that information on hazardous chemicals and substances is communicated to workers in accordance with NMOSHA and the Sapphire Energy IABR project Hazard Communication Safety Program.
2. An inventory of known hazardous chemicals and substances used on this project has been conducted and listed on the Master Chemical and Substance Inventory which is located and can be reviewed at: _____
3. A copy of the Material Safety Data Sheets (MSDS) for known hazardous chemicals and substances used on this project are located and can be reviewed at: _____
4. If a copy of a MSDS cannot be located, contact your Company Project Manager, Superintendent, Foreman or Sapphire Energy Construction Manager. Management and first line supervision are responsible for obtaining MSDS and ensuring they are received prior to, or at the time of delivery of any hazardous chemical.
5. Hazardous chemicals will be properly labeled in accordance with the MSDS. Containers that hazardous chemicals have been transferred into for use during a single work shift require secondary labeling.
6. Workers who work with, or may be potentially exposed to, a hazardous chemical or substance will be informed of the physical and health hazards and procedures to protect against those hazards. Included in the procedures are engineering and administrative controls, personal protective equipment, and emergency instructions for accidental exposure, emergency evacuations, or spill containment of the hazardous chemical or substance.
7. When new hazardous chemicals or substances are introduced into the work environment, workers will be informed of the physical and health hazards.
8. Employers, who may be working in any work area where workers could be exposed to a hazardous chemical or substance, will be informed of where that hazardous chemical or substance is in use.
9. Workers performing non-routine tasks will be informed of chemical hazards associated with the work activity and the appropriate protection measures.

PROJECT-SPECIFIC SAFE WORK REQUIREMENTS

The Sapphire Energy IABR project-specific safe work requirements are the minimum requirements for this project. The purpose of these requirements is to ensure an incident/injury-free environment and compliance of regulatory standards and regulations. The Sapphire Energy IABR project believes by concentrating on four main focus areas, incidents and near misses could be reduced. Those four main areas are Personal Protective Equipment, Housekeeping and Orderliness, Fall Protection and Ladders.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Every contractors, subcontractors, vendors, and third party individuals will, at a minimum, wear the following personal protective equipment without exception while on this project (except in office and lunch areas).

Head Protection

Hard hats will be worn at all times on this project; in addition the following rules apply:

- **HARDHATS WILL BE WORN WITH THE BILL FACING FORWARD)** The hardhat may be turned around to accommodate welder hoods but will be turned forward when not actively engaged in welding.
- The Company name and workers name will displayed on hardhat. Nicknames are not allowed
- **Hardhats that have a manufacturer date of five years or greater will not be used on this project**
- Ball caps, stocking caps, or other headgear not specifically designed to wear with a hardhat will not be authorized at anytime
- Meets ANSI Z 89.1 requirements

Eye and Face Protection

Safety glasses with side-shields that meet ANSI Z-87 criteria are to be worn at all times including inside vehicles.

Workers with prescription glasses must meet ANSI Z-87requirements or will be required to wear over the glasses (OTG) safety eyewear.

In addition, the following eye/face protective equipment must be used when performing the following work activities:

Activity	Safety Equipment
Welding	Welding Hood*
Burning	Burning Goggles
Abrasive grinding or cutting	Face Shield*
Drilling	Goggles/Face Shield*
Reaming	Goggles/Face Shield*
Chemical Handling	Goggles/Face Shield*
Molten Materials	Goggles/Face Shield*
Corrosive Liquids	Goggles/Face Shield*
Concrete Pouring	Goggles/Face Shield*
* Safety glasses will be used in conjunction with face shields and welding hoods.	

Foot Protection

Sturdy leather work boots with steel toes that are in good condition must be worn (heal and sole will not show excessive wear). Work boot height must be over the ankle. Tennis shoes, soft top hiking boots, sandals, or other street-type shoes are not allowed, even if they have steel toes.

Reflective Vest

Every worker, visitor, and vendor will wear a high-visibility reflective vest when working and/or conducting business outdoors. Electricians and welders will be issued flame resistant style that meets NFPA 70E/ASTM F1506.

Work Attire

Shirt sleeves will have a minimum sleeve length of four (4) inches. No sleeveless shirts will be allowed in the work area. Additionally, shorts, tank tops, or cut-off shirts are not permitted.

Long trousers are required that fit properly around the waist and ankles. Trousers that are worn low on the hips or thigh are not allowed. The length of the trouser will be such as to not present a tripping hazard.

Respiratory Protection

First-line supervision will determine if hazards exist requiring respiratory protection prior to start of work. Written documentation supporting this hazard assessment will be made available to the Sapphire Energy Construction Manager upon request.

Whenever respiratory protection is deemed required or requested by a worker on this project, the requirements outlined in NMOSHA Standards will be followed, which include:

1. Have affected workers complete a Medical Questionnaire for Respirator Use (Appendix T).
2. Submit questionnaires to a Physician or Licensed Health Care Professional (PLHCP) for review and further testing.
    a. Once medical approval to wear a respirator is received from the PLHCP:
    b. Select the appropriate type of respirator to protect workers from the hazard(s)
    c. For air purifying respirators, choose the appropriate filter/cartridge
    d. For supplied air respirators, ensure breathing air source provides “Grade D” breathing air
    e. Train affected workers about the specific type(s) of respirator(s) being used
    f. Fit-test the workers with the specific type(s) of respirator being used

If a worker desires to voluntarily wear a filtering face piece (dust mask) and a respirator is not required, the first-line supervisor must inform the worker about the limitations of the selected respirator. Voluntary Use of a Disposable Respirator form should be used (Appendix S). ***NOTE: disposable dust masks are prohibited for protection of silica exposure***

Hearing Protection

Approved hearing protection will be worn as specified in posted areas in the plant and while working with or around high-noise level producing machines, tools, or equipment. A good rule to follow is: When you must raise your voice to be heard, you need hearing protection. Exposure to impulsive or impact noise will not exceed 140dB noise level.

Duration per day, hours	Sound Level dBA Slow Response
8	90
6	92
4	95
3	97
2	100
1 ½	102
1	105
½	110
¼ or less	115

NOTE: *Any tool or equipment, which produces noise levels that require you to shout to be heard, will be considered to have exceeded the Permissible Exposure Level for noise and hearing protection is required – no matter the duration of use.*

Impulsive Or Impact Noise	
Equipment or tools	Sound Level Created
Pneumatic chip hammer	103-113
Jack hammer	102-111
Concrete joint cutter	99-102
Chop saw	88-102
Stud welder	101
Bulldozer	93-95
Crane	90-96
Hammer	87-95
Backhoe	84-93
Above hearing exposure based on an 8 hour exposure	

Hand Protection

Every person working or visiting the Sapphire Energy IABR project will have on their person a durable pair of gloves. Gloves will be worn at anytime the hands will touch or handle any material, equipment, or machinery. Specialized gloves may be required when exposure to sharp objects, abrasive surfaces, temperature extremes, hazardous chemicals, or electrical hazards. Supervisor will determine type of glove and include on the work task JSA.

Additional Protections

During the course of work or activity, contractors may be required to provide workers additional personal protective equipment to reduce the likelihood of an exposure to a specific hazard or work related injury or illness.

Personally owned protective equipment

Contractors and subcontractor employees are prohibited from using personally owned personal protective equipment such as but not limited to; hardhats, fall protection harness and lanyard, respirator, etc.

Contractor or the subcontractor is responsible for issuing personal protective equipment as required.

PROCESS SAFETY MANAGEMENT

No work will be performed in any process area without reviewing and complying with the Sapphire Energy IABR Project Process Safety Management Plan

First-line supervisors are responsible for ensuring all workers have been trained on the requirements and hazards in the work area.

First-line supervision will not leave a work area within any operating section of the plant unattended without prior approval of the Sapphire Energy Construction Manager.

HOUSEKEEPING AND ORDERLINESS

The Sapphire Energy IABR project policy on housekeeping is that all equipment, tools, materials, or apparatuses will be stored, stacked, located, placed, temporarily spotted, or set up for manipulation in such a manner as to render it highly improbable that an incident or injury could occur in the work area. The area will give the direct and obvious impression of a clean and orderly work place.

Contractor project management, supervision, workers, vendors and third party persons will maintain all work locations in an orderly and clean manner at all times.

Mud and dirt tracked onto roads or public streets and alleyways will be removed continuously during the workday.

The following are the minimum housekeeping and orderliness requirements for this project:

- Access walkways, roadways, and fire lanes will not be blocked with material, tools, ladders, scaffolds, welding leads, air hoses or electrical cords
- Electrical extension cords, light stringers, air hoses, and welding leads will be elevated above walkways seven (7') feet
- Welding rod, nuts, bolts, and washers will be kept in proper containers
- Pipe, rebar, all thread and other round stock will be stored properly away from access walkways and work common areas.
- Shackles, slings, chokers, ladders, and safety equipment will be removed from the work area when not needed and properly stored
- Trash containers will be placed at appropriate locations
- All nails will be removed from scrap and form lumbers and swept up daily
- Rubbish, trash, and debris will be removed from the work area daily
- At all locations where drinking water is dispensed, an adequate trash container will be located for disposal of used drinking cups.

FALL PREVENTION/PROTECTION

This project is committed to the philosophy of 100% continuous fall protection, whenever workers are exposed to fall hazards of six feet (6') or greater.

CONTRACTORS, SUBCONTRACTORS, VENDORS, OR OTHER THIRD PARTY INDIVIDUALS WILL TAKE ALL PRACTICAL MEASURES TO ELIMINATE, PREVENT, AND CONTROL FALL HAZARDS.

All work will be planned with the intent to eliminate identified fall hazards and use best practices before selecting personal fall arrest protection.

Passive fall protection will be implemented before personal fall arrest systems are used.

When a fall hazard has been identified and cannot be eliminated, then effective means of acceptable passive fall protection systems include the following:

- Guardrail systems
- Safety Netting
- Covers for Floor, Roof and Wall Openings
- Positioning Device Systems
- Protection from Falling Objects

Only when fall hazards cannot be eliminated or passive fall protection applied will workers be uniformly equipped, trained and given periodic refresher training in the personal fall protection systems to minimize the adverse effects of accidental falls.

Fall protection training records will be maintained on the project and available for review by the Sapphire Energy Construction Manager.

On this project, 100% FALL PROTECTION MEANS PROTECTED FROM FALLS AT ALL TIMES WHEN WORKING AT OR ABOVE SIX FEET. This means it is mandatory for all trades, including but not limited to:

- Structural steel erection (bolt up and connectors)
- Re-bar assembly
- Concrete forming
- Pre-cast erection
- Masonry
- Carpentry
- Scaffold erection/disassembly
- Roofing

Workers may work from ladders without personal fall protection when the following criteria are met with no exception:

- Working height does not exceed six (6') feet
- Work can be performed without reaching (worker remains inside the area between the vertical side rails)
- Ladder is properly tied off or in the case of a stepladder; spreaders are fully extended and locked
- A three point contact while working from a ladder is always maintained
- Work does not involve working within 15 feet or above an open side, leading edge, or shaft, even if the edge has a proper guardrail.

Horizontal Lifeline or Rat-Line

Workers will not tie off to a perimeter cable or wire rope handrail. These are only designed for 250lbs and do not meet the criteria for proper fall protection anchorages or horizontal lifelines.

When wire rope is used to construct guardrail systems, at least 3/8" diameter cable shall be used with three cable clamps per connection.

Contractors and subcontractors will submit all engineered documentation on horizontal lifelines to the Sapphire Energy Construction Manager for review and approval. Rope will not be approved as a component of a horizontal lifeline without approval of a qualified PE in fall protection.

All horizontal lifelines will be installed under the direct supervision of a qualified person.

Personal Fall Protection

When no other practical means of fall protection can be used, workers will be tied off at all times utilizing a full body harness and double shock-absorbing lanyard.

WHEN PERSONAL FALL PROTECTION SYSTEMS WILL BE USED, A WRITTEN FALL PROTECTION PLAN IS REQUIRED OUTLINING THE SYSTEM TO BE USED THAT WILL PREVENT A FREE FALL OF GREATER THAN SIX FEET, ANCHORAGE SYSTEMS, TRAINING TO BE CONDUCTED, AND RESCUE PROCEDURE.

When personal fall protection is used, the following will be included in the project fall protection plan:

- A description of the equipment to be used (Harness, lanyard, connector, and anchorage point).
- That the total safe fall distance is calculated and documented for each area that personal fall arrest equipment will be used to ensure a safe distance exists.
- That all anchorage point(s) will support 5,000 pounds. If the anchorage point will be job fabricated, it will be designed by a qualified person with no exception.
- That each anchorage point will be placed such that the worker could not fall greater than six feet. A six foot fall is measured from the workers shoulder level and not at his feet.
- A detail plan on how a worker would be rescued if they were subject to a fall.
- A detail training outline that each worker required to use personal fall protection would complete. Training would follow as a minimum the requirements contained in NMOSHA Standards and the Sapphire Energy IABR Project Incident Prevention Program, which includes:
    - Instruction on how to recognize a fall hazard
    - Instruction on how to wear the personal fall protection equipment
    - Installation and use of anchorage devices or other fall protection equipment
    - Instruction on how to calculate total fall arrest distance
    - Instruction on how to self rescue

Personal Fall Arrest System will consist of an ANSI certified full-body harness, double lanyard with shock absorbing device or retractable lifeline, locking snap hook and properly engineered anchorage points.

Lanyards will not be tied back to themselves unless the lanyard is specifically manufactured to tie back to itself.

General Fall Protection Rules

Workers on this project who are exposed to falls of six feet (6') or greater while working off scaffolding, elevated decks, elevated platforms, low-slope roofing, stairways, stairwells, reinforced steel, and any other elevated area or equipment will be protected from falls. There is no set safe distance from any unprotected open side, leading edge, or shaft that would exempt a worker from fall protection.

On properly constructed scaffold, elevated decks and elevated platforms that have perimeter guardrail systems consisting of a top and mid rail, workers are not required to tie off. If the perimeter guardrail system must be removed, workers will wear full body harnesses with double shock-absorbing lanyards.

When climbing a ladder greater than twelve (12') feet, personal fall protection is required, such as use of a retractable lanyard.

Floor openings 2-inches or greater and all wall openings will be guarded or covered with an appropriate cover or guardrail. Floor covers will be secured to the floor to prevent easy removal. The floor or wall cover will be properly marked with a Danger sign stating, "COVER-DO NOT REMOVE". SPRAY PAINTING "HOLE" ON PLYWOOD IS NOT ALLOWED.

Any contractor that must remove a guardrail, hole cover, or other fall protection system in the course of their work will be responsible for immediately replacing the protective system.

Workers will be protected from falling objects from above.

When working from an elevated work location, all tools will be tethered to prevent being dropped to a lower level.

In the event any deviation of this fall protection procedure is required, the Sapphire Energy Construction Manager will be required to approve.

LADDERS AND STAIRWAYS

Stairways having four or more risers or rising 30 inches or more shall have a stair rail system 36 inches high on each unprotected side.

Metal pan stairs shall not be used until the pans are filled to prevent a tripping hazard.

Ladders, stairs or ramps will be provided where there is a change in elevation of 19 inches or greater.

Ladders used on this project will meet the requirements established in NMOSHA Standards.

Workers will be trained on the safe use of ladders.

Ladders are required to ascend or descend truck beds and/or trailers.

Ladders will extend past the bearing point no less than 36 inches.

Ladder landings shall remain clear of all obstacles and obstructions to allow easy access on and off the ladder.

Fall protection while working from a ladder is addressed in the previous section on fall protection.

Ladders with broken or bent rungs, steps or side rails will be immediately destroyed and removed from the project.

Before use each ladder will be inspected daily. All ladders will be inspected monthly and the project distinctive color code applied. Ladders that do not have the current color code will be removed from service immediately.

Month	Color		Month	Color	
January	Orange		July	Red	
February	Blue		August	Yellow	
March	Red		September	Orange	
April	Yellow		October	Blue	
May	Orange		November	Red	
June	Blue		December	Yellow	

When ladders are used to access upper levels, they must be secured at the base and at the top by tying to prevent displacement.

Aluminum ladders are discouraged but are allowed except when working near energized electrical wires or equipment.

All ladders including job made ladders will conform to NMOSHA and ANSI standards.

All ladders will be heavy-duty type with a minimum capacity rating of 250 lbs.

Stepladders

STEPLADDERS WILL NOT BE USED AS STRAIGHT LADDERS. Stepladders will only be used with the spreaders fully extended and spreader bar locked in place.

Workers will not stand on the top or top step of a stepladder. No worker will work when their knees are above the top of the stepladder.

Straight/Extension Ladders

Ladders will be set up so the horizontal distance at the bottom is not less than ¼ of the vertical distance to the bearing point.

Workers will not stand on the top three rungs of a ladder. No worker will work when their knees are above the top of the ladder.

All straight ladders will have non-skid feet at the base.

Job Made Ladders

Job-made ladders shall be constructed for intended use. If a ladder is to provide the only means of access or exit from a working area for 25 or more employees, or simultaneous two-way traffic is expected, a double cleat ladder shall be installed.

Job-made ladders will be constructed in accordance with NMOSHA and ANSI standards.

HAND AND POWER TOOLS

All hand and power tools will be kept in good condition with regular maintenance. Hand and power tools are to be operated according to manufacturer's instructions and guidelines and the personal protective equipment appropriate for the hand or power tool will be worn.

Hand Tools

- Impact tools such as chisels, wedges, etc. are not to have mushroomed heads
- Wooden handles will not be splintered or cracked
- Pocketknives will not be used for stripping wire
- Must be tethered if working at elevated work locations

Electric Tools

- Never lift or carry a power tool by its cord
- Guards and safety switches will not be removed or made inoperative
- Electric tools must have a three-wire cord unless it is double insulated

Portable Abrasive Wheel Tools

- Guards will not be removed
- Grinding disks and wheels will be checked to verify they are the correct one for the grinder and rpm
- Material will not be held in an individual's hand while using a grinder

Pneumatic Tools

- **Air hoses ½ inch in diameter or greater will have a safety excess valve installed at the source of air**
- Clips, whips or retainers are required at each air hose coupling and to prevent attachments from being ejected from the tool
- Only the pneumatic nail gun, where the muzzle is pressed against the work surface to fire, is allowed
- Hose couplings will be secured to prevent displacement
- Pneumatic nail guns shall be disconnected from the air supply when unattended

Powder Actuated Tools

- Workers will be trained to operate a powder actuated tool and required to carry their training card at all times
- Fired cartridges are not to be discarded on the floor but placed in a container or bucket and properly disposed of
- The powder-actuated tool must not be able to fire until it is placed against the surface with a force of 5 pounds or greater
- Misfire cartridges are to be placed in water for five minutes

FIRE PROTECTION/PREVENTION

Fire Protection

Temporary fire protection measures, such as fire extinguishers, temporary hose lines, and temporary standpipes, are required near hazardous locations.

Project team shall develop a fire protection plan in accordance with NMOSHA Standards.

Fire extinguishers will be:

- Conspicuously located
- Inspected monthly
- Protected from freezing
- Placed within the immediate area of any welding/cutting operation or flammable liquid storage area
- Placed within five feet whenever gasoline operated equipment is used

If a fire extinguisher is discharged for any purpose, it should be reported to the Sapphire Energy Construction Manager.

All temporary buildings and trailer complexes (shops, field offices, Conex's, etc.) will have a class ABC fire extinguisher located within the building.

Access to fire hydrants will be maintained at all times. Access to buildings and other structures will be maintained at all times.

Fire Prevention

Temporary buildings located within another building or structure shall be constructed of non-combustible material or have a fire resistance rating of one (1) hour. Plastic tarps or covers (visqueen) used for any purpose inside a building where welding, cutting, or open flame is present will be made of fire retardant material.

Combustible refuse from construction operations will not be burned or dumped anywhere on the construction site. Such refuse will be removed at frequent intervals, as needed. Storage of large quantities of construction debris will be placed in metal dumpsters.

Storage of compressed gases will be:

- Stored with valve caps securely on when not attached to a regulator
- Secured upright at all times, including when transported in vehicles
- Fuel and oxygen cylinders separated by 20 feet or greater
- Empty cylinders stored separate from full cylinders

Only approved high flash point solvents are to be used for cleaning purposes.

Oily rags and waste are to be stored separately in metal containers fitted with self-closing lids. Trash and refuse must be placed in trash containers provided for this purpose.

No open burning is permitted on this project.

A minimum clearance of 15 feet from fire hydrants must be maintained at all times.

All fire safety rules and signs on this project will be observed and obeyed.

Fire and Flammable Liquid Storage and Dispensing

High flash and methylene chloride solvents are prohibited.

Flammable Liquids will be:

- Stored outside not within 20 feet of any structure or in a properly constructed storage locker whenever possible
- Stored in approved portable containers that are marked as to its contents
- No more than 25 gallons stored inside any trailer or room
- Posted with “NO SMOKING” signs. When a large number of workers speak a foreign language, the warning signs will be posted in that language as well
- Outside storage areas kept free of weeds and other combustible material

All flammables will be stored in approved containers and marked as to the contents. If storing flammables for more than one day, contact the Sapphire Energy Construction Manager for approval.

Storage of flammables will be in an enclosure away from open flame, heat, direct sun or other sources of ignition.

Transportation and transferring of volatile liquids will be made in Underwriter Laboratory or Department of Transportation approved containers.

All Gasoline or Diesel storage tanks/drums will be placed in a berm or other secondary containment. Earth berms will be lined with minimum 6-mil plastic sheeting that is fuel resistant. PVC linings are not allowed.

The Sapphire Energy Construction Manager will approve vehicle refueling locations and procedures.

Fuel and flammable liquid tanks, drums, or barrels will have the proper DOT placard and be labeled as to content. If workers speak a foreign language, the labels will also be in that language.

LP gas storage tanks will be protected from vehicle traffic.

At fuel dispensing points, the following is required:

- Portable 20 B-C fire extinguisher within 25 to 75 feet from the fueling point
- No Smoking signs posted. Additional signs in a second language if required
- Self-locking fuel nozzle prohibited
- Spill kit stored nearby
- Tanks will be grounded and when dispensing flammable liquids, the containers will be bonded

LINE BREAK PROCEDURES

Sapphire Energy IABR Project Line break procedures will be followed when but not limited to, the opening of or working on any process lines, their connected fittings, or valves, thermowells, gauges, sight glasses, pumps or vessels that contain or have contained acidic, alkaline, flammable, or otherwise hazardous liquids or gases.

Contractor first-line supervision will follow the Sapphire Energy IABR Project line-break procedures and obtain the necessary permits prior to working or opening any process line.

Contractor first-line supervision are responsible for ensuring all workers involved in a line-break process have the proper personal protective equipment and clothing prior to start of work.

Lock-out/Tag-out procedures will be followed to ensure the line is properly identified and isolated. No work is to be performed on any process line before the owner representative has given approval that the line has been isolated.

Workers will receive special hazard communication training on the hazardous liquid or gas that they may be exposed to.

Prior to beginning work, contractor shall have a written Spill Response Plan that has been approved by the Sapphire Energy Construction Manager.

The surrounding area around where the line break will occur is to be barricaded to protect any passersby from exposure to a hazard.

HOT WORK

Hot work is defined as the use of open flames, other heat sources and/or spark producing devices in areas where combustible materials may be or do exist or where there is potential for explosion or fire.

The Sapphire Energy Construction manager will identify those work areas or tasks to be considered Hot Work areas. Hot Work areas will follow the Sapphire Energy IABR Project Mill Hot Work procedures.

Hot work activities include burning, welding, cutting, grinding or other operations that produce a flame or sparks that could cause catastrophic results if not controlled. Therefore, prior to performing any “Hot Work” operations, contractors or subcontractors will obtain a Hot Work Permit (Appendix I) from the Sapphire Energy Construction Manager.

A Hot Work Permit is valid only for the date and shift that is stated on the permit.

The following precautionary measures will be taken when a Hot Work Permit is required:

- Grating, openings, etc. will be completely covered in such a way to prevent sparks and slag from falling to a level below
- Fire extinguisher in the immediate area of work
- No flammable or combustible material stored within 35 feet in any direction
- Combustible/flammable materials that cannot be moved must be covered with fire blankets or other suitable material
- Worker(s) designated as fire watch will be trained and remain for one-half hour after work has ended
- Follow confined space entry procedures, if required

When burning or welding using compressed gases, flame arrestors will be installed on both the torch side and regulator side of the oxygen and gas hoses.

Welding screens will be used whenever possible to protect workers from welding flash.

Workers will be trained prior to performing any fire watch duties. The training will consist of:

- A review of the work to be performed
- Precautions to be taken
- How to use the fire extinguisher correctly
- Emergency procedure in case of fire
- Duties of fire watch

SCAFFOLDING

All scaffolding used on this project will meet the requirements established in NMOSHA Standards.

Each contractor using scaffolds must designate a scaffolding competent person to direct and supervise the erection and dismantling of all scaffolding on this project. The competent person will sign and attach one of the following color-coded scaffold tags to each scaffold:

- Green Tag: Scaffolding complete and ready for use
- Red Tag: Scaffolding incomplete and not for use
- Yellow Tag: Scaffolding usable but personal fall protection required

Scaffolding will be inspected daily by the competent person prior to use and sign the tag at the time of inspection. The Daily Scaffold Safety Inspection Report (Appendix Q) will be used to document these inspections.

- Workers required to work from scaffolding will receive training on the following:
- Nature of any known hazards, such as electrical, fall or falling objects
- Correct method of erecting, maintaining, and disassembling fall protection systems
- Falling object protection system

- Proper handling of equipment or material on the scaffold
- Maximum load-carrying capacity of the scaffold
- Any other pertinent requirements about the scaffold

During erection and dismantling of scaffolding, if deviation of the fall protection procedure is required, the Sapphire Energy Construction Manager will be required to approve.

Records will be maintained of scaffolding training and be available for review by the Sapphire Energy Construction Manager.

Prior to erection, all scaffolding components will be inspected for defects and any damaged components will not be used.

Scaffolding will be erected on a firm foundation/footing. Scaffold poles, legs, posts, frames and uprights will bear on metal base plates and mud sills where required.

Scaffold legs, poles, posts, frames and uprights will be pinned or locked to prevent uplift.

No scaffold will be enclosed unless a qualified engineer designed the enclosure.

Scaffold platforms will be constructed with no space between the platform components. The space between the platform components and the scaffold uprights will not exceed one inch.

Because of special circumstances such as building a scaffold around a pipe, the space opening between the scaffold and the object/structure cannot exceed 9½ inches.

Scaffold planks shall extend past the horizontal support a minimum of six inches and not more than 12 inches unless cleated or restrained by hooks.

Scaffold plank will not be overlapped unless:

- Overlap occurs at a horizontal support
- The minimum planking overlap is 12 inches

Scaffold plank will be only scaffolding-grade planking.

Ladders or stairs must be used to access any scaffold platform that is more than two feet above the point of access. End frames of tubular welded scaffold can be used as a ladder if the following criteria are used:

- Specifically designed and constructed as ladder rungs
- Rung length of at least eight inches
- Spacing between rungs not to exceed 16 ¾ inches

No worker will climb up or down a scaffold using the cross bracing.

Any worker working on an incomplete scaffold above six feet without standard handrails will wear a full body harness and tied off to a fixed anchorage point.

Workers will not stand or place any platform on the middle rail of a scissor lift to gain added height.

An access gate will be included when workers must climb a ladder to access the work platform. **Workers will not be allowed to climb over the handrail to gain access to a scaffold work platform.**

Wheels on mobile scaffolding will be locked in place when workers are working from it.

A competent person will evaluate suspended scaffolding and anchorages before use and its suspension lines daily.

Workers working from suspended scaffolding will wear a full body harness attached to an independent vertical lifeline.

Scaffold platforms more than six feet above lower levels will be equipped with guardrail systems. If guardrails cannot be used on a scaffold, workers will wear a full body harness and be tied off to a fixed anchorage point.

Workers that work from a scaffold will be protected from falling objects such as hand tools, debris, and other small objects from above.

Workers working below scaffolding will also be protected from falling objects. Scaffold will be equipped with toe plates, screening, debris netting, catch platforms, or a canopy structure.

When welding is required from swing stage scaffolding, the scaffold will be grounded and suspension ropes protected.

Interior or dry wall scaffolding (Perry or Baker type scaffolding) greater than one section high will be equipped with outriggers. All other built-up scaffolding will follow the four to one rule.

STEEL ERECTION

No steel erection will begin without a written Notice to Commence Steel Erection (Appendix P) from Sapphire Energy Construction Manager.

WORKERS ENGAGED IN STEEL ERECTION ACTIVITIES TO INCLUDE CONNECTING, DECKING AND BOLT UP ARE *NOT EXEMPT* FROM THE PROJECT 100% FALL PROTECTION REQUIREMENTS WHEN WORKING FROM SIX FEET OR GREATER.

Perimeter safety cable installed by steel erector will remain in place unless otherwise instructed by the Sapphire Energy Construction Manager.

All workers engaged in the erection of steel will complete Steel Erection Training prior to start of work.

Training records indicating workers have received required steel erection training will be maintained by each contractor or sub-tier subcontractor and made available for review by Sapphire Energy Construction Manager.

All steel deliveries will be coordinated with the Sapphire Energy Construction Manager to ensure maintenance of traffic around the project is maintained.

Design criteria for any multi-lift device that may be used on this project will be available for review by the Sapphire Energy Construction Manager.

Work will be planned that no load will be swung over the public or other workers. During bolt-up activities all steps will be taken to protect workers below from falling objects.

CONFINED SPACE

Workers may be required to work in an area that is defined as a confined space. A confined space is any space large enough and so configured that a person can bodily enter and perform work; has limited openings for entry and exit; and was not designed for continuous human occupancy. **NOTE THAT NOT ALL CONFINED SPACES ARE PERMIT REQUIRED.**

Confined spaces include, but are not limited to:

- Storage tanks
- Excavations and trenches
- Ventilation and exhaust ducts
- Sewers
- Underground vaults and utility tunnels
- Pipelines
- Pits and tubs
- Open top spaces more than four feet in depth

No worker will be allowed to enter or work in any space that meets the definition of a confined space without a Sapphire Energy IABR Project l Confined Space Entry Permit (Appendix J) and written confined space entry plan. Refer to NMOSHA Standards and Sapphire Energy IABR Project Safety Procedures for further direction. The written Confined Space Entry Plan will be submitted to the Sapphire Energy Construction Manager for approval and issuance of a Confined Space Entry Permit.

Prior to working in any confined space, contractor or subcontractor first-line supervision will determine what hazards exist. Any operating system or equipment will be locked out and tagged to prevent accidental operation. Contact the Sapphire Energy Construction Manager prior to any confined space entry work.

Every confined space will have the atmosphere tested and a permit completed and authorized by the Sapphire Energy Construction Manager prior to any worker entering the space. The atmosphere will be tested for oxygen deficiency, toxic gases or vapors, and combustible or flammable gases or vapors.

Prior to any worker entering a confined space, they will be trained in:

- Contents of the Confined Space Entry Plan
- Known hazards in the confined space
- Emergency procedures in case of an emergency
- Correct use of personal protective equipment when required
- Hot Work Permit if required
- Atmosphere testing requirements
- Lockout/ Tryout procedures
- Fall protection if required

Confine Space that is classified by Sapphire Energy IABR Project as Permit Required Confine Space shall follow the Sapphire Energy IABR Project Confine Space Procedures.

EXCAVATION AND TRENCHING

Prior to any disruption of ground, excavation or trenching on this project, the following will be performed:

- No ground breaking, excavation or trenching work will be performed without the presence of a competent person
- Underground utility locating authorities must be given the required advance notices to locate and mark the utility
- If underground utilities are known or suspected, proper notification will be given to the Sapphire Energy Construction Manager
- The competent person will analyze the soil of the work area to determine the condition and type of soil to ascertain proper sloping or shoring requirements
- An excavation permit (Appendix K) is completed and approved by the excavation competent person prior to breaking ground

During excavation or trenching operations on this project, the following requirements will be followed:

- All trenches and excavations six feet or deeper will have as a minimum, solid barricading, signage posted at the work area and appropriate fall protection
- Trenches or excavations will be sloped or benched in accordance with local rules and regulations, and as determined by the competent person
- Supporting systems (i.e. shoring, piling, etc.) will be utilized for all trenches and excavations where sloping or benching could not be performed. Trench boxes or shields will be utilized if neither of the above is used
- Spoil piles and all other material will be placed a minimum of two feet from the edges of all trenches or excavations
- When underground utilities are suspected, they will be located first by hand digging
- Adequate access must be maintained at all times during trenching or excavating activities. When ladders are used, they will be placed such that no worker travels more than 25 feet lateral in any direction
- The competent person will inspect excavations and trenches at the beginning of each day and when conditions change
- Excavations in Type C soil will not be benched
- Excavations and trenches four feet or greater in depth will be evaluated for confined space.
- A registered professional engineer must design all excavation over 20-feet in depth. In addition, a registered professional engineer must also design all protective systems for use in excavations more than 20-feet in depth

CONCRETE AND MASONRY OPERATIONS

All vertical and horizontal rebar, form stakes, metal and/or plastic conduit, and/or small pipe stub-ups will be protected with approved caps or wood troughs to protect against impalement and injury.

Workers that will operate vibrators pump nozzles, and concrete buckets will wear appropriate eye and foot protection.

Long sleeve shirts are worn to protect against exposure of concrete to the bare skin and the possibility of concrete burn and contact dermatitis.

Workers engaged in vertical rebar assembly shall comply with the project six-foot fall protection rules. Positioning devices alone are not approved fall protection but can be used in conjunction with personal fall protection equipment.

Walkways along form walls will be constructed in accordance with NMOSHA scaffold and fall protection standards.

Pre-fabricated forms and form making material will be stacked neatly at all times. When stripping concrete forms, all material will be immediately removed and stacked in an orderly manner. Forming material or debris will not block walkways and aisles. Contractors and subcontractors will remove rebar, tie-wire and other debris from the work area daily.

No employee is permitted to ride a concrete bucket.

Contractors will ensure that reinforcing steel for walls, piers, columns and similar vertical structures is adequately supported to prevent overturning and collapse. Ensure that uncoiled wire mesh is adequately secured to prevent recoiling.

Concrete buckets will be equipped with a discharge device that a worker can operate without being exposed to the load. A safety device will be on concrete buckets to prevent premature or accidental dumping, and ensure that the release is self-closing.

Contractors will follow safe rigging practices when handling concrete buckets. Employees controlling the concrete bucket must use tag lines.

When using bull floats, inspect the area to ensure there is no energized equipment or power lines nearby that the handles could touch.

Concrete buggy handles must not extend beyond the wheels on either side of the buggy.

Rotating-type, powered concrete trowels shall be equipped with dead-man controls that automatically shut down the equipment when the operator's hands are removed from the controls.

Finishers shall wear kneepads and gloves when hand finishing concrete.

A limited access zone is required to be in place prior to the construction of any masonry wall.

Masonry walls over eight feet in height shall be adequately braced to prevent collapse and remain in place until permanent support is in place.

TEMPORARY BARRICADES

Whenever the following hazards or processes are encountered on the Sapphire Energy IABR project, temporary barricades will be erected to protect workers:

- Floor or wall openings
- Working above other workers
- Open excavations/trenches
- Unguarded equipment
- Exposure to vehicular traffic
- Low light work areas
- Startup operations and testing of equipment/systems
- Process hazards such as discharges, open systems, etc.

When barricading is required, the following guidelines should be kept in mind:

- **Yellow "Caution" tape** is used to limit the passage of workers through the barricaded area. This barricading should only be used to protect workers from hazards that are not severe or the potential for severe injury or death is unlikely.
- **Red "Danger" tape** is used to prohibit the passage of unauthorized workers through the barricaded area. This barricading should be used to protect workers from hazards that have the potential to cause serious injury or death. Danger tape is not to be used if the hazards cannot be eliminated or removed during in a single work shift.
- **Rigid barricades** will be used when protection is required beyond a work shift or longer. It will be used to protect workers from unguarded moving machinery/equipment, vehicular or heavy equipment traffic and low light conditions. Rigid barricading will consist of standard guardrail, temporary chain linked fencing, tube and couple scaffold members with construction fencing attached, and concrete barriers.
- **Radiation "Danger" tape** is used to identify x-raying operations and warn of a radiation hazard in the area.

When using "Caution" or "Danger" tape barricading:

- **Caution and Danger tape will be made of reinforced material or fabric. Regular barricade tape is not allowed.**
- Install the tape on rigid supports every six feet and at a height of 42 inches above the surface
- Install at least six feet from excavations, trenches, holes, leading edges and floor or wall openings. Install barricading at least five feet from all other hazards
- Install a standard "Caution" or "Danger" sign that identifies the hazard at ten-foot intervals around the barricaded area and the name and contact information that erected the barricade
- Do not impede walkways, driveways or aisles if possible. Identify alternative passageways when this is impossible
- Install for temporary protection only and remove the barricading after 48 hours and install rigid barricades

Rigid barricading must be capable of supporting and withstanding a 200 lb. force in any direction. Concrete barriers used along public roads must meet the requirements of the local jurisdiction, NMOSHA or the Manual of Uniform Traffic Control Devices.

When using rigid barricading:

- Install it in a way to prevent tipping or sagging. Support construction fencing every eight feet
- Install pins in concrete barriers whenever there is a danger of vehicles or heavy equipment striking them
- Provide sufficient points of access to the work area

When work is complete and the hazard is eliminated, remove the barricading immediately and dispose of or store the barricading properly.

Workers who enter a "Danger" or "Radiation" barricaded work area without authorization will be subject to disciplinary action up to and including removal from the project.

LOCKOUT/TAG-OUT CLEARANCE PROCEDURE

Sapphire Energy IABR Project has established a lockout/tryout procedure to ensure that workers are not exposed to the hazards from moving machinery or equipment and those hazards posed by an energized source (pneumatic, steam, hydraulic, chemical, etc.).

Safety locks and tags will be applied to all circuits, switches, valves, isolating devices and any other energy sources to ensure equipment, machinery, or processes that have been considered functioning, charge or could otherwise be operable and render it non-operational or de-energized.

No person will remove another worker's safety lock or attempt to energize any piece of equipment, machinery or process that has been locked out and tagged.

If a worker fails to remove his or her safety lock at the completion of the job or assigned duties, their immediate supervisor will immediately notify the Sapphire Energy Construction Manager. **Every attempt should be made to contact the worker and require them to return to the project to remove their lock.**

If the worker is unwilling or cannot return to the Sapphire Energy IABR Project, it must be VERIFIED that he/she is not physically at the project before the safety lock can be removed. Removal of locks will follow the Sapphire Energy procedure.

All safety lock removal incidents will be investigated following the incident investigation process and disciplinary action is expected.

De-Energizing Equipment and Processes

A designated Sapphire Energy Construction Manager Representative will coordinate with the Sapphire Energy representative and/or construction start-up group when any energized equipment or process must be de-energized.

The Sapphire Energy Construction Manager representative, contractor, subcontractor and Sapphire Energy IABR Project representative and/or construction start-up group will identify all circuits and sources of energy that require locking and tagging to make the equipment or process inoperable. The Sapphire Energy IABR Project representative/construction start-up group will notify their personnel that may be affected by the de-energizing.

The contractor or subcontractor first-line supervisor overseeing the work will sign out sufficient safety locks to lockout the piece of equipment or process.

The Sapphire Energy representative and/or construction start-up group and first-line supervisor will make certain the operating controls to the equipment, machinery or process are in the "off" or "neutral" position.

Once the operating controls are in the "off" or "neutral" position, the Sapphire Energy representative will place a safety lock and tag on the energy isolating device(s) first. Then the contractor first-line supervisor will apply their safety lock to each of the isolating devices that provides power or other energy to the machinery, equipment or process. The first-line supervisor will also apply a visible warning tag. The tag will contain the name of the first-line supervisor, company, date and phone number.

Once the first-line supervisor has placed their safety lock(s) and tag(s) on the energy-isolating device, all affected workers will then apply a safety lock and tag to the energy-isolating device. Alternatively, the first-line supervisor may place the key(s) to their equipment safety lock(s) in a safety lock box, place their individual safety lock and tag on the safety lock box, and then have each affected worker place their safety lock and tag on the lock box.

Prior to any work being performed on the piece of equipment, machinery, or process, the Sapphire Energy representative/construction start-up group and first-line supervisor will verify that it is inoperable. The Sapphire Energy representative/construction start-up group will attempt to operate the piece of equipment machinery, or process. After verifying it is inoperable, the switch will be returned to the "off" or "neutral" position.

Stored or residual energy will be dissipated by whatever means are necessary. Capacitors will be discharged and high capacitance elements short-circuited and grounded by a qualified electrician.

Re-Energizing Equipment and Processes

When the required work is completed and the machinery, equipment or process can be returned to service, the first-line supervisor will notify the Sapphire Energy Construction Manager of the completed work.

The first-line supervisor will make a visual inspection of the equipment, machinery, or process to insure all workers have completed their work and equipment, tools and other material is removed from the area.

After confirming all workers, materials, tools and other equipment are out of the area, the operating controls are still in the "off" or "neutral" position, and each worker has removed their safety lock and tag, the first-line supervisor will remove their safety lock and tag from each of the isolating devices.

The Sapphire Energy Construction Manager will notify the Sapphire Energy representative/construction start-up group that the equipment, machinery or process is clear to be energized.

De-Energizing Fluid Processes

The Sapphire Energy Construction Manager and contractor/subcontractor will coordinate with Sapphire Energy representative/construction start-up group when any fluid process requires de-energizing.

The Sapphire Energy Construction Manager and contractor/subcontractor along with Sapphire Energy representative/construction start-up group will identify all valves or gates and where blanks are required to be installed to isolate the work area. The Sapphire Energy representative/construction start-up group will notify their personnel that may be affected by the de-energizing.

The first-line supervisor overseeing the work will sign out sufficient safety locks and tags to completely isolate the system.

The Sapphire Energy representative/construction start-up group and first-line supervisor will verify that each valve or gate is in the "off", "neutral" or closed position.

Once the valve or gate is in the "off", "neutral" or closed position, the Sapphire Energy representative will place a safety lock on the valve or gate first. Then the first-line supervisor will apply a safety lock to each valve or gate. The first-line supervisor will also apply a visible warning tag. The tag will contain the name of the first-line supervisor, company, date and phone number.

Once the first-line supervisor has placed their safety lock(s) and tag(s) on the energy-isolating device, all affected workers will then apply a safety lock and tag to the energy-isolating device. Alternatively, the first-line supervisor may place the key(s) to their equipment safety lock(s) in a safety lock box, place their individual safety lock and tag on the safety lock box and then have each affected worker place their safety lock and tag on the lock box. The required blanks will be placed at this time.

Prior to commencing work, the Sapphire Energy representative and first-line supervisor will verify the system and all piping, hoses, valves and processes are de-energized and that any stored energy is dissipated or restrained.

Welded valve connections should have the valve handles removed and the stem tagged "DO NOT OPERATE". All other valves and isolating devices must be physically prohibited from being operated.

Hydraulic and pneumatic equipment or machinery will be blocked to prevent movement.

Any vessel, pipe, hose or process that contains a combustible or flammable liquid or gas will be purged with nitrogen or an alternate before work begins.

Re-Energizing Fluid Processes

When the required work is completed and the machinery, equipment or process can be returned to service, the first-line supervisor will notify the Sapphire Energy Construction Manager of the completed work.

The first-line supervisor will make a visual inspection of the area to ensure all workers; equipment, tools and materials are removed from the area.

After confirming all workers, equipment, tools and materials are removed from the area, the valves and gates are in the "off", "neutral" or "closed" position, and each worker has removed their safety lock and tag, the first-line supervisor will remove their safety lock and tag from each of the isolating devices.

The management representative will notify the Sapphire Energy representative/construction start-up group that the system is ready to be energized.

ELECTRICAL

No work will be performed on any energized electrical circuit, bussbars, equipment, or panels unless an approved written work plan is developed in accordance with Chapter 1 of NFPA 70E and submitted to the Sapphire Energy Construction Manager for review prior to performance of work.

Electrical equipment and tools used on this project will be inspected to prevent any worker from receiving an accidental electrical shock. This rule will apply to all cord sets, portable electrical equipment, tools and appliances not part of any permanent building or structural electrical systems.

All temporary cords will be three wire types S, ST, SO, or STO with a 16 or greater wire gauge.

Ground Fault Circuit Interrupters (GFCI)

All cord sets and cord-plug electrical equipment, tools or appliances that are 120 volts will be connected to a ground fault circuit interrupter (GFCI). No cord set or cord-plug electrical equipment, tool or appliance will be plugged directly into any permanent building or structural electrical system not equipped with a GFCI. Exemptions are office equipment and appliances in site offices.

When the source of electricity is from a two-wire, single-phase portable or vehicle mounted generator rated not more than 5_kW, a GFCI is not required, as long as the generator is insulated from the frame and all other grounded surfaces.

Double-Insulated Tools

Double-insulated tools are allowed on the project, if the case bears the Underwriter Laboratories “double-insulated” label. No tool where this label has been removed, painted over or otherwise not readable will be allowed on the project.

Inspection Program

An inspection program will be established to inspect all cord sets, portable electrical equipment, tools and appliances as described below and before first use, before returned to service following any repair, and after an incident that could have caused damage.

Daily Inspection:

Each cord set, attachment cap, plug, and receptacle of cord sets, portable electrical equipment, tools or appliances connected by a cord and plug, will be visually inspected daily by workers for external damage, such as deformed or missing ground pins, insulation damage, frayed wires or indications of possible internal damage. Exceptions include cord sets and receptacles that are fixed to the permanent electrical system and are not exposed or damaged.

Any electrical equipment, tool, appliance or cord set that is damaged or defective will be immediately removed from service and tagged out as defective equipment for repair. A qualified electrician will repair tagged electrical items.

Monthly Inspection:

All cord sets, receptacles and cord-plug connected electrical equipment, tools or appliances not part of the building or structure's permanent wiring, will have the following performed each month:

- Visually inspect for damage or missing ground pin
- Inspect insulation for damage
- Inspect for frayed or exposed wires
- Inspect for signs of internal damage
- Check polarity

All cord sets and cord-plug connected electrical equipment, tools, or appliances not part of a permanent building or structure’s permanent wiring will be identified monthly with the distinctive color code at both the male and female end.

Month	Color		Month	Color	
January	Orange		July	Red	
February	Blue		August	Yellow	
March	Red		September	Orange	
April	Yellow		October	Blue	
May	Orange		November	Red	
June	Blue		December	Yellow	

General Electrical Rules

All cord sets will be elevated above the work surface when practical.

Cord sets and electrical tools that have the grounding prong missing will be cut and the offending crew or subcontractor shall roll back within 24 hours all cord sets and inspect for other damage. Contractor first-line supervisor or subcontractor will supply written certification to the Sapphire Energy Construction Manager that this inspection was completed.

Wire, nails or other conductive material will not be used to hang or attach cord sets or welding leads.

Cord sets that cross roadways will be protected from damage by vehicle and equipment traffic by devices such as hose bridges.

Light stringers will have the light bulbs protected from accidental contact or breakage.

Necessary steps will be taken to prevent unauthorized or unqualified workers access to energized electrical parts or equipment.

SCISSOR AND ARTICULATING BOOM LIFTS

Only trained and authorized workers will be allowed to operate a scissor or articulating boom lift.

Scissor and articulating boom lifts will be inspected daily before use. Operators will use the Daily Equipment Checklist (Appendix W).

When working in a scissor lift, workers will use personal fall protection connected to the manufacturers tie-off points.

The safety chain or gate on each scissor lift will be fastened or latched.

When working from an articulating boom lift, workers will use a retractable lanyard. Regular six foot lanyards will not be used.

When working above areas where workers are below, the basket areas of articulating boom lifts will be equipped with screening or other means to prevent debris, material, or tools from falling to below levels.

NO WORKER WILL STAND ON THE MID OR TOP RAIL OF A SCISSOR OR ARTICULATING BOOM LIFT TO GAIN ADDITIONAL HEIGHT.

Workers cutting or welding out of an articulating boom or scissor lift will have a sufficient size portable fire extinguisher.

MOTORIZED EQUIPMENT AND VEHICLES

Heavy equipment (cranes, forklifts, dump trucks, excavators/back hoes, man-lifts, etc.) used on this project will be inspected daily prior to use and comply with applicable NMOSHA and ANSI standards, which will be documented.

Forklifts will be equipped with rollover devices. Operators of forklifts will complete the Daily Forklift Safety Inspection Report (Appendix L) or an acceptable equivalent.

Cell phone usage is prohibited by anyone when operating any motorized equipment or vehicle (pickups, sedans, trucks)

Equipment that is equipped with a windshield will be free of cracks or other visible damage.

All equipment will be equipped with rollover protective structures (ROPS).

Seatbelts are required to be worn at all times in any moving equipment, vehicle, cart, or ATV.

Only authorized company and/or delivery vehicles used for the sole purpose of conducting work tasks on-site are permitted in construction areas. Vehicles one ton or greater and equipment used on-site must have an audible backup alarm. The driver and all front seat passengers of any vehicle will wear seat belts.

No equipment or vehicle will be used to transport personnel unless it is specifically designed to do so. This includes beds of pickup trucks.

Equipment operators and vehicle drivers (including golf carts and utility vehicles) are responsible to check their equipment daily to verify it is working properly. Use the Daily Equipment Checklist (Appendix V). As a minimum, each operator will check:

- The brakes
- Lights
- Backup alarm
- Hydraulic systems
- Steering mechanism
- Operating controls
- Mirrors
- Fire extinguisher
- Limit switches
- Leaks

Equipment operators will possess the required training, certification and licenses as required by law and/or Sapphire Energy IABR project HSSE policies or procedures for the equipment that they are required to operate.

GOLF CARTS AND ALL TERRAIN UTILITY VEHICLES

Golf cart means a motor vehicle that is designed and manufactured for recreational or work purposes that is not capable of exceeding speeds of 20 miles per hour.

Utility vehicle means a motor vehicle designed and manufactured for general maintenance, security, and landscaping purposes, but does not include any vehicle designed or used primarily for the transportation of persons or property on a street or highway.

All-terrain vehicle means any motorized off-highway or all-terrain vehicle 50 inches or less in width, having a dry weight of 900 pounds or less, designed to travel on four low-pressure tires, has a seat designed to be straddled by the operator, handlebars for steering control and is intended for use by a single operator without passengers.

Operating Procedures:

- Golf Cart/Utility Vehicle operators are subject to the rules of the road, including stopping, turning and safe operation.
- Golf Cart/Utility Vehicle operators observed in violation of these rules will be subject to disciplinary action.
- Golf Cart/Utility Vehicles are to be operated at speeds no greater than 15 MPH or as safety concerns demand.
- Operators should always consider the terrain, weather conditions, and existing pedestrian and vehicular traffic, which may affect the ability to operate the Golf Cart/Utility Vehicle safely.
- Golf Cart/Utility Vehicle operators will stop at all "blind intersections" and then proceed with caution.
- Golf Cart/Utility Vehicles will be operated only within the confines of the project.
- Golf Cart/Utility Vehicles will be operated in such a manner that they do not impede or interfere with normal pedestrian or vehicular traffic flow on sidewalks, ramps or roadways
- Golf Cart/Utility Vehicles will be operated with the utmost courtesy, care, and consideration for the safety of pedestrians.
- Pedestrians will be given the right-of-way at all times.
- All passengers must be in seats designed for such use. No more than two adults per seat unless designed to transport three adults.
- All occupants of motorized Utility Vehicles will wear seatbelts when the vehicle is in motion.
- No passengers are allowed to be transported in the truck beds or on the sides of Golf Cart/Utility Vehicles with the exception of the transport of an injured person secured on a backboard.
- Cell phone usage while driving a Golf Cart/Utility Vehicle is prohibited.

MOBILE CRANES

Mobile cranes will be operated in strict accordance with the Sapphire Energy IABR project HSSE Procedure, NMOSHA Standards and ANSI B 30.5.

Contractors and subcontractors shall designate a qualified person as their Crane Lifting Supervisor. The Crane Lifting Supervisor shall:

1. Have the necessary knowledge and experience of the specific type of equipment and knowledge of the hazards of critical lifts to direct the safe completion of the operation. The Crane Lifting Supervisor will assist in certification of new operators, inspection of new operators' capabilities, and overall review of crane safety.
2. Have the capabilities and experience to review the on-site management of cranes and assure that Federal and NMOSHA Safety Regulations are complied, the required recordkeeping is complete and safe work practices are followed.
3. The Crane Lifting Supervisor may be a foreman or other supervisor who has extensive experience with cranes or in some cases, a crane operator. Each designated person will have a good understanding of the OSHA Federal Construction Crane and Derrick Standard.
4. **Be present whenever cranes are operating.** Each contractor must designate enough Crane Lifting Supervisors to assure adequate coverage.
5. Understand the rules and procedures implemented at the site to ensure that the following are completed:
    - Necessary administrative requirements.
    - Personnel assignments and responsibilities.
    - Selection of proper equipment and tools.
    - Recognition and control of hazardous or unsafe conditions.
    - Job efficiency and safety.
    - Critical-lift documentation.

The Sapphire Energy Construction Manager shall approve the contractor/subcontractor Crane Lifting Supervisor upon review of the individual(s) knowledge of crane operations as well as project and NMOSHA regulations and standards.

No crane will be brought onto the project without a current annual inspection by a qualified third party. A crane-specific operating manual with the crane serial number on the cover and applicable load charts will be located in the crane at all times. A copy of the current annual inspection will remain in the crane at all times.

Crane operators will perform daily and monthly crane safety inspections. Inspections can be documented on the daily and monthly safety inspection checklists (Appendix M & N) or an acceptable equivalent. Crane operators are to turn the Daily Crane Safety Checklist into their supervisor daily.

CRANE OPERATORS ON THIS PROJECT OPERATING ANY CRANE OVER ONE TON LIFTING CAPACITY WILL BE CERTIFIED BY A NATIONALLY RECOGNIZED CERTIFICATION AGENCY.

All cranes will be equipped with anti-two block devices on both the load and whip lines.

Use of crane baskets is strictly prohibited on this project without prior approval of the Sapphire Energy Construction Manager.

Contractor and subcontractor supervision will review the safe operations of the crane with each operator.

NO WORKER WILL SIGNAL OR BE ASSIGNED TO SIGNAL ANY CRANE WHO IS NOT CERTIFIED AND QUALIFIED AS REQUIRED BY FEDERAL OSHA CRANE AND DERRICK STANDARD SUBPART CC.

The crane manufacturer's operating manual, instructions and load charts for a specific crane will be used to determine the safe operation of that crane. Under ideal conditions, the manufacturer develops load charts and the typical field condition does not approach these ideal conditions.

Therefore, the following guidelines should be adhered to:

1. The ground where the crane will be setup must be solid and able to support the weight of the loaded crane. Determine if underground utilities exist near where the crane will be set up.
2. Ensure the crane is level 360^{o} and maintained during operation.
3. Extend outriggers fully or set per the manufacturer's recommendation for a particular lift configuration. Weight must be off the tires.
4. Cribbing or mats under outrigger pads should be of sufficient size and properly placed to ensure adequate soil bearing Tonnage of the crane ÷ by 5 = Square feet of cribbing required for the crane.
5. Before a lift, determine the load weight and load capacity. Crane capacity charts are the ideal gross capacity of the crane at certain boom lengths, boom angles and load radius from the crane center pin.
    - Deductions to the net capacity should be made per manufacturer's load chart or operating manual for attachments such as jibs (stowed or attached), headache balls, wind, less than ideal setups, etc. to determine the load that can be safely lifted.
    - Additional deductions to the net capacity are the weight of the cranes load block, rigging and amount of load line required to make the lift. Some manufacturers include the load line in their load charts but others like Manitowoc do not.
6. A designated, qualified person will determine the load weight. Note: OEM drawings listing the equipment or machinery assemblies are not always accurate. Refer to the shipping weight or have the equipment or machinery assembly weighed. Calculate all structural loads and determine the center of gravity. **Cranes equipped with systems that provide weight of a load as it is lifted will not be used to weigh equipment or machinery assemblies.**
7. Determine the radius from the center pin of the crane to the load using a steel ruler. **This is required for capacity- and near-capacity lifts.**
8. Determine the boom length, counterweight and crane configuration to determine the correct load chart required.
9. Position the hook over the "Center of Gravity" of the load before starting the lift.
10. Position the crane so there is a minimum swing and load path clearance of two feet. Distance from overhead electrical will be a minimum of ten feet. When working near electrical sources (overhead lines or lighting), the crane should be grounded and a safety spotter required.

Crane operators are to know the weight of the load they are lifting.

A Pre-lift Checklist (Appendix U) is required to be completed on any lift 5 ton (10,000 lbs) or greater.

A written critical lift or rigging plan is required for any lift where:

1. The load is greater than 75% of the crane capacity as configured for the lift or as defined by the crane manufacturer
2. Two cranes are used
3. Any non-routine or critical equipment lift as defined in the project Crane Management Policy (The Project Manager/Superintendent or Safety Coordinator determines any lift to be non-routine)

The written critical lift or rigging plan will be submitted to the project HSSE Department for review and approval.

TOWER CRANES

Tower crane(s) will be equipped with and visible at all times, a substantial and durable load chart both in the operator cab and/or on the remote control console.

No employee will work or travel on any part of the crane boom without proper personal fall arrest equipment. No worker will be allowed to climb the tower or get on the boom when the crane is in operation.

Crane operators will perform daily tower crane safety inspections. Project management will ensure all tower crane operators are trained, experienced and competent.

Tower cranes that remain erected for twelve (12) months or longer, a qualified person will inspect all structural components annually.

Hoisting ropes must be shortened by the removal of ten (10) feet at the dead end after every three (3) months of use unless otherwise specified by the manufacturer.

No load will be swung over any public street that is occupied by the general public.

Prior to a load being swung over other workers, the designated crane supervisor using the crane will provide a lookout that shall sound an alarm as the load is moved across the work area.

A written crane-dismantling plan is required for the dismantling of any crane.

FORKLIFTS

Only qualified and authorized operators shall be permitted to operate powered forklift trucks. Operator trainees may operate powered forklift trucks under the direct supervision of a qualified operator or trainer and only where such operation does not endanger the trainee or other employees.

Forklift operators that are required to move suspended loads will also meet the qualifications of a qualified crane operator.

Forklift operators will meet all requirements contained in SAPPHIRE ENERGY CONSTRUCTION MANAGER Crane Management Procedure.

Forklifts shall not carry any material or equipment suspended from the tines of the forks. Suspension of a load can only be performed with a specialty crane lifting device attached to the forklift. Articulating boom forklifts (Lull type) that may carry suspended material or equipment will meet the same requirements as a mobile crane.

An articulating boom forklift (Lull type) shall not travel with any load where the operator does not have a clear vision in front without a spotter. The spotter must remain in the operators vision at all times that the equipment is moving.

Forklifts operations shall meet the requirements contained in the SAPPHIRE ENERGY CONSTRUCTION MANAGER Crane Management Procedure and OSHA 29 CFR 1910.178.

Forklift operators will perform daily safety inspections of their equipment and document on the Daily Forklift Safety Inspection Report (Appendix L)

CRANE SIGNAL PERSON

No worker will signal or be assigned to signal ANY CRANE who is not certified and qualified as required by Federal OSHA Crane and Derrick Standard Subpart CC.

Qualified Signal Person must meet the following requirements:

1. Be at least 18 years of age.
2. Know and understand the Standard Method of crane hand signals (Figure-1: Standard hand signals for controlling crane operation).
3. Been evaluated by a third party evaluator that documents the individual has met the requirements of this section and OSHA requirements.
4. Know and understand basic safe rigging techniques and practices.
5. Have basic understanding of crane operations and limitations including the crane dynamics involved in swinging and stopping loads and boom deflection from hoisting loads.
6. Know and understand the relevant requirements for hand, radio, audible, and voice signaling.
7. Demonstrate to appropriate management the personal skills required through a written and practical test.

RIGGING

No contractor or subcontractor worker will rig material or equipment lifted by a crane, forklift or other device unless under the direction of a Qualified Rigger who meets all requirements and certifications described in the Sapphire Energy IABR project IPP and NMOSHA.

Qualified Riggers shall meet the following requirements:

1. Be at least 18 years of age.
2. Has a minimum of four years documented experience as a rigger
3. Understand spoken and written English.
4. Have basic knowledge and understanding of crane-operating characteristics, capabilities and limitations. Understand rigging principles as applied to the job for which they are to be qualified.
5. Demonstrate to appropriate management personnel skills in using rigging principles.
6. Complete an Operator Medical Physical (Exhibit 13.2 Equipment Operator and Rigger Physical Examination)
    - Must be free of any detectable or known disease or physical restriction that would render them incapable of safe operation or rigging duties. Where any loss of function of an upper or lower extremity exists, the acceptability of the candidate shall be the decision of the supervisor, after consulting with the designated physician.
    - Have normal depth perception, field of vision, color vision reaction time, manual dexterity and coordination.

Contractors or subcontractors Qualified Rigger will monitor all rigging. When the rigging does not fall within the expertise of the designated person, the load will not be lifted until a more qualified person has reviewed the rigging.

Rigging from the tines of a forklift is prohibited unless equipped with specialty crane lifting device.

Hooks will be equipped with safety latches. Moused and/or cargo/shakeout hooks will not be allowed.

All rigging equipment and spreader bars shall have a manufacturer's tag or otherwise marked noting its safe working load. Rigging slings, chokers and spreader bars will have the safe lifting capacity displayed by means of a tag or other marking. Rigging equipment not properly tagged or marked will be immediately removed from the project.

A qualified rigger will rig all critical lifts.

All rigging to be used will be inspected daily before each shift by the qualified rigger and documented in writing.

The Daily Rigging Safety Inspection Form (Appendix O) is to be used or an equivalent. Inspection reports will be made available to the project HSSE Department for review.

The color coded tape will be applied in a visible location on each piece of rigging or hook. Rigging or hooks not in compliance with the current color will be taken out of service immediately.

Month	Color		Month	Color	
January	Orange		July	Red	
February	Blue		August	Yellow	
March	Red		September	Orange	
April	Yellow		October	Blue	
May	Orange		November	Red	
June	Blue		December	Yellow	

LASERS

Precautions will be taken to ensure all workers that will use a laser are trained in proper use and the hazards associated with lasers. Each worker is to be issued a qualification card, which must be carried by the worker and available upon request by the Sapphire Energy Construction Manager.

No worker will install, adjust, or operate any laser equipment without a valid qualification card.

Standard" Laser" warning signs will be placed around the perimeter of the area the laser is being used.

No laser equipment will be used that does not contain a label, indicating make, maximum output, and beam spread.

Whenever a laser is not in use, shudders or caps will be will be used and the laser turned off.

When performing internal alignment, lasers will only be guided by mechanical or electronic means.

No laser beam will be directed at any worker.

When environmental conditions exist such as rain, fog, snow or extremely dusty conditions, use of lasers will not be permitted.

Workers using lasers will have appropriate laser safety goggles available.

QUALITY OF LIFE REQUIREMENTS

SMOKING POLICY

The Sapphire Energy IABR project is established as a Smoke-Free Workplace. No worker will smoke any tobacco product within any building or structure on this project designated as Smoke-Free. In Smoke-Free workplaces, smoking is only authorized in designated areas or inside your personal vehicle. Chew or other types of chewing tobacco will not be discarded on the floor or other working surface but disposed of in proper containers. Workers that violate this rule will be subject to disciplinary action to include removal from the project.

The Sapphire Energy Construction Manager will post where the designated smoking areas are within the project..

SANITATION

Toilet Facilities

Contractors will ensure adequate chemical toilets are available on the jobsite for the use of workers. Toilets should be located on or within two hundred (200) feet of each work area within the project. The following is the minimum requirement for toilets on this project:

Adequate chemical toilets will be made available for the female workforce.

Chemical toilets shall be serviced often enough to prevent overflowing, creation of an unsanitary condition, a health hazard or nuisance, and shall be maintained in good repair so as to prevent leakage of the contents to the surrounding ground or onto the floor or other portions of the structure.

Hand Wash Stations

Adequate hand wash stations will be provided at key locations such as break locations for use by workers. The hand wash stations should contain adequate soap and water or hand sanitizer for the number of workers.

Drinking Water

Contractors will provide daily, fresh clean drinking water to their employees. Drinking water will be dispensed in containers with a tight sealing lid and labeled as Drinking Water. Drinking water containers are to be cleaned daily.

Adequate cups will be made available at each drinking water container. Cups will be stored in a durable clean dispenser. A trash can or other type receptacle will be provided to collect used cups. Contractors are responsible for cleaning up around the water container area.

The use of a common cup, soda cans and bottles, drinking directly from the spout, and the placing of hands or material into drinking water is prohibited.

HEAT STRESS

Workers who are exposed to extreme heat or work in hot environments may be at risk of heat stress. Exposure to extreme heat can result in occupational illnesses and injuries. Heat stress can result in heat stroke, heat exhaustion, heat cramps, or heat rashes. Heat can also increase the risk of injuries in workers as it may result in sweaty palms, fogged-up safety glasses, and dizziness.

Common heat stress disorders:

Heat Stroke

Heat stroke is the most serious heat-related disorder. It occurs when the body becomes unable to control its temperature: the body's temperature rises rapidly, the sweating mechanism fails, and the body is unable to cool down. When heat stroke occurs, the body temperature can rise to 106 degrees Fahrenheit or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not given.

Symptoms

Symptoms of heat stroke include:

- Hot, dry skin (no sweating)
- Hallucinations
- Chills
- Throbbing headache
- High body temperature
- Confusion/dizziness
- Slurred speech

First Aid

Take the following steps to treat a worker with heat stroke:

- Call 911 and notify their supervisor.
- Move the sick worker to a cool shaded area.
- Cool the worker using methods such as:
  - Soaking their clothes with water.
  - Spraying, sponging, or showering them with water.
  - Fanning their body.

Heat Exhaustion

Heat exhaustion is the body's response to an excessive loss of the water and salt, usually through excessive sweating. Workers most prone to heat exhaustion are those that are elderly, have high blood pressure, and those working in a hot environment.

Symptoms

Symptoms of heat exhaustion include:

- Heavy sweating
- Extreme weakness or fatigue
- Dizziness, confusion
- Nausea
- Clammy, moist skin
- Pale or flushed complexion
- Muscle cramps
- Slightly elevated body temperature
- Fast and shallow breathing

First Aid

Treat a worker suffering from heat exhaustion with the following:

- Have them rest in a cool, shaded or air-conditioned area.
- Have them drink plenty of water or other cool, nonalcoholic beverages.
- Have them take a cool shower, bath, or sponge bath.

Heat Syncope

Heat syncope is a fainting (syncope) episode or dizziness that usually occurs with prolonged standing or sudden rising from a sitting or lying position. Factors that may contribute to heat syncope include dehydration and lack of acclimatization.

Symptoms

Symptoms of heat syncope include:

- Light-headedness
- Dizziness
- Fainting

First Aid

Workers with heat syncope should:

- Sit or lie down in a cool place when they begin to feel symptoms.
- Slowly drink water, clear juice, or a sports beverage.

Heat Cramps

Heat cramps usually affect workers who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture levels. Low salt levels in muscles causes painful cramps. Heat cramps may also be a symptom of heat exhaustion.

Symptoms

Muscle pain or spasms usually in the abdomen, arms, or legs.

First Aid

Workers with heat cramps should:

- Stop all activity, and sit in a cool place.
- Drink clear juice or a sports beverage.

- Do not return to strenuous work for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke.
- Seek medical attention if any of the following apply:
  - The worker has heart problems.
  - The worker is on a low-sodium diet.
  - The cramps do not subside within one hour.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather.

Symptoms

Symptoms of heat rash include:

- Heat rash looks like a red cluster of pimples or small blisters.
- It is more likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases.

First Aid

Workers experiencing heat rash should:

- Try to work in a cooler, less humid environment when possible.
- Keep the affected area dry.
- Dusting powder may be used to increase comfort.

Prevention of heat stress in workers is important. Employers should provide training to workers so they understand what heat stress is, how it affects their health and safety, and how it can be prevented.

Recommendations for Workers

Workers should avoid exposure to extreme heat, sun exposure, and high humidity when possible. When these exposures cannot be avoided, workers should take the following steps to prevent heat stress: Refer to Appendix Z

- Wear light-colored, loose-fitting, breathable clothing such as cotton.
  - Avoid non-breathing synthetic clothing.
- Gradually build up to heavy work.
- Schedule heavy work during the coolest parts of day.
- Take more breaks in extreme heat and humidity.
  - Take breaks in the shade or a cool area when possible.
- Drink water frequently. Drink enough water that you never become thirsty.
- Avoid drinks with caffeine, alcohol, and large amounts of sugar.
- Be aware that protective clothing or personal protective equipment may increase the risk of heat stress.
- Monitor your physical condition and that of your coworkers.

HAZARDOUS MATERIALS

SILICA

Workers that perform any of the following work tasks will be protected from exposure to silica dust:

- Chipping, hammering, or mixing of refractory
- Abrasive blasting using silica sand as a blasting medium
- Abrasive blasting of concrete regardless of the type of medium
- Sawing, hammering, drilling, grinding, or chipping of concrete or masonry products
- Chipping, hammering, or mixing of concrete grout
- Demolition of concrete or masonry structures
- Dry sweeping or compressed air blowing of concrete, masonry, rock or sand dust

Workers performing any of the above tasks or could be exposed to silica dust will receive hazard communication training on silica.

Acceptable engineering controls will be used when exposure to silica is likely. Examples of acceptable engineering controls are:

- Substitute blasting medium for less hazardous material with less than 1-% silica
- Maintain an effective dust control program
- Use internal blast-cleaning machines
- Wet saw
- Use water through the drill stem

When acceptable engineering controls cannot be used, workers will wear respiratory protection, protective coveralls and gloves. Respirators equipped with a NIOSH N-95, R-95, or P-100 are approved for silica. **Note:** ***The common dust mask is not permitted for silica protection.***

Workers will follow these safe work rules when exposed to silica:

- Do not eat, drink or use tobacco products in areas where silica dust is present
- Always wash hands and face before eating, drinking or using tobacco products

First-line supervisors should consult their safety representative or the project HSSE Department for further assistance.

LEAD

When welding, cutting, burning, grinding, chipping, abrasive blasting or rivet busting on painted or coated surfaces, a pre-assessment will be required to determine if the surface(s) contain lead-based paint. If sampling results indicate lead-based paint 0.02% lead by weight, NMOSHA Standard s will be followed.

An initial hazard assessment is required and will be performed to determine worker exposure levels. The assessment will involve personal sampling of a representative group of workers performing different tasks. During the initial exposure assessment, workers will wear protective clothing and the proper respiratory protection until the results of the assessment are known.

Copies of sampling results will be made available to the Sapphire Energy Construction Manager. Area sampling of a work area will not to be used for determining worker exposure levels.

If sampling results indicate the exposure limits are above 30 $\mu g/m^3$ but below 50 $\mu g/m^3$, the following are required:

- Written compliance plan
- Medical surveillance (Blood Lead and ZPP)
- Personal monitoring
- Hazard communication training for lead

If sampling results are above 50 $\mu g/m^3$, the following are required:

- Written compliance plan
- Engineering controls
- Respiratory protection
- Protective clothing
- Medical surveillance
- Clean change rooms and showers
- Clean lunchrooms
- Warning signs
- Training

Each worker is to be notified in writing of their blood and/or personal monitoring results within five working days after the results are known.

INCIDENTAL EXPOSURE TO PRESUMED ASBESTOS CONTAINING MATERIAL (PACM)

If presumed asbestos-containing material (PACM) is found during performance of the work, the following procedure will be followed:

- Workers observing PACM should immediately stop work
- Warn other workers nearby of the disturbed or damaged material
- Contact your immediate supervisor
- Barricade the immediate area around the disturbed or damaged material
- Do not enter the barricaded area until the area is deemed safe by the Sapphire Energy Construction Manager or abatement subcontractor

Contractor will investigate and develop an action plan that may include testing PACM and/or abating suspected material.

ONLY A LICENSED CONTRACTOR WILL REPAIR AND CLEANUP DISTURBED OR DAMAGED MATERIAL.hexavalent chromium

When workers are exposed to any of the following, the contractor must assume Hexavalent Chromium is present and above the action level of 5µg/m^3 and follow the contents of OSHA 29 CFR 1926.1126.

- Exposure to Portland Cement
- Working with dyes, paints, inks, or plastic that contains chromium VI
- Application of pesticides regulated by the EPA
- Welding, grinding, or cutting of stainless steel or nonferrous chromium alloys
- Welding, grinding, or cutting of chrome plated metals

Contractors will be responsible to conduct an exposure assessment to determine the level of concentration for Chromium IV.

When the result of the exposure assessment is:

- Below 2.5 µg/m^3 chromium IV – No further sampling is required, no protective measures required.
- At or above 2.5 µg/m^3 chromium IV but below 5 µg/m^3 – Employee monitoring continues a minimum of once a month or until new engineering controls reduce the concentration below 2.5 µg/m^3. A written compliance plan is required.
- Greater than 5 µg/m^3 – Employee exposure monitoring is required as a minimum every three weeks. The full requirements of OSHA 29 CFR 1926.1126 are required to be followed.

ENVIRONMENTAL MANAGEMENT PLAN

This project is committed to providing high standards of quality in its construction activities and doing so in an environmentally responsible and safe manner. The ultimate goal of this environmental management program is to maintain a project that is compliant with all environmental agency permits and governmental regulations, is free from negative environmental records and financial interest of Sapphire Energy IABR Project.

The contractor is responsible to administer and enforce this Environmental Management Plan as well as ensure the day to day oversight and management of environmental issues and enforcements of provisions of the Environmental Management Plan.

Contractors will ensure all work that may impact the environment will be coordinated with the Sapphire Energy Construction Manager and assure the Sapphire Energy policies, procedures, and regulations are maintained.

INSPECTIONS AND ASSESSMENTS

Weekly project self assessments using the Weekly Environmental Self Assessment Form (Appendix U) will be conducted by each contractor and documented or as may otherwise be required by permits, regulations, or Sapphire Energy. During these assessments, any problem or discrepancy will be documented and corrected by the responsible supervisor. Potential non-compliance will be immediately reported to the Sapphire Energy Construction Manager. All documentation of daily assessments should be provided to the Sapphire Energy Construction Manager.

AGENCY PERMITS AND REGULATORY COMPLIANCE

Permits:

Sapphire Energy is responsible for obtaining all environmental permits and registrations necessary for the construction of the Sapphire Energy IABR project. In addition if applicable, Sapphire Energy will obtain approval of its Sediment and Erosion Plan from the State of New Mexico. Additional permits that may arise will be coordinated with Sapphire Energy.

Scheduling/Tracking of Environmental Notifications:

Contractors will incorporate environmental and regulatory notifications and submittals in the on-site project schedule. Any environmental or regulatory schedule activities are to be available upon request and reviewed during the weekly project schedule reviews as well as during the monthly project review meetings.

Notice of Violation (NOV):

At any time a Notice of Violation is received from a governmental or regulatory agency, the contractor will report the NOV to the Sapphire Energy Construction Manager immediately. Notices of Violation are written notifications of a regulatory or legal non-compliance or deficiency.

All Notice of Violation's will be reported to the Sapphire Energy Construction Manager, documented, investigated, root causes determined, and a corrective action plan developed and implemented.

ENVIRONMENTAL AWARENESS TRAINING

All contractor and subcontractor personnel will be instructed in the requirements of the Environmental Management Plan (EMP) and the project environmental practices through training and discussions at the daily Task/Job Hazard Analysis meetings.

Topics to be discussed at a minimum are:

- Spill prevention and control
- Emergency response procedures
- Collection and storage of waste material
- Protection of storm water sediment controls
- Petroleum product dispensing best practices
- Handling and disposal of welding rod
- Location of spill kits

Contractors, subcontractor, or vendor employees that may perform environmentally sensitive or potentially damaging activities will be specifically trained in that particular task. Training on such subjects but not limited to:

- Chemical handling and storage
- Spill prevention and control
- Fuel and lube truck operations
- Waste Management
- Storm water controls
- Maintenance operations
- Emergency response

Environmental topics will be routinely part of daily and weekly project safety meetings.

RECORDKEEPING

All records pertaining to environmental issues such as waste management, storm water management, any spills, and other environmental issues will be maintained by the contractor as required by Sapphire Energy or by permits and regulations.

Contractor will further maintain records of weekly environmental inspections and other non-permit related issues and made available to the Sapphire Energy Construction Manager upon request.

PROJECT SPECIFIC SPILL RESPONSE PLAN

Each contractor will develop a Spill Response Plan in the event of an accidental spill or environmental incident. The plan will detail directions for spill containment, accidental release of a chemical or hazardous material, and emergency evacuation.

The following are the minimum items that will be contained in the project Spill Response Plan:

- The phone contact numbers of key project personnel, Sapphire Energy personnel, and emergency response agencies.
  - Fire Department
  - Sheriff's Department
  - USCG
  - Emergency clean-up contractor
  - State EPA
  - US EPA
  - National Response Center
- An inventory of spill containment material on the project.
  - Booms large enough to contain the volume of the largest quantity of chemical or hazardous material.
  - Pillows
  - Pads
  - Gloves
  - Tyvek coveralls
  - Hazardous material disposal bags
- Identification of areas where spills may likely occur

- Detail action plan listing the steps to be performed by the first worker discovering a leak or spill. The action plan is to include such items as assessing the hazards, stopping or controlling the release or flow of the chemical or hazardous material, and the reporting of the release or spill.
- Description of controls in place to prevent spills from reaching navigable water
- Inspection program to ensure leaks are detected
- Fueling procedures to ensure reduction of spills

The Spill Response Plan is to be communicated to all workers during the safety orientation and frequently during project safety meetings. The Spill Response Plan will be clearly communicated to each first-line supervisor along with their responsibilities to prevent spills or leaks.

SPILL PREVENTION

No petroleum products in quantities larger than individual five (5) gallons US containers will be stored on the Sapphire Energy IABR project without approval of the Sapphire Energy Construction Manager. Petroleum product quantities will be reported to the Sapphire Energy Construction Manager so they can be added to the plant Spill Prevention Control Plan (SPCC). If a contractor or subcontractor exceeds 1320 gallons, a separate Spill Prevention Control Plan will be prepared and approved by a licensed engineer.

The Sapphire Energy IABR project annual goal is no reportable spill or release of a hazardous chemical or substance to include any oil or chemical.

HAZARDOUS AND REGULATED MATERIAL MANAGEMENT

Minimization:

Non-hazardous materials will always be purchased whenever possible. Non-hazardous substitutes will meet all requirements of equipment manufacturers and have properties that assure quality construction is maintained.

Approval:

Any hazardous or regulated material that may be purchased or transported onto the project must have a material safety data sheet on file in the HSSE Department prior to the material arriving at the project. If urgency occurs, same day purchases may be authorized but will be handled on a case by case basis.

Inventories:

Contractor will maintain current inventories of regulated substances stored on Sapphire Energy property. Inventories will be conducted during environmental assessments and reports transmitted monthly to the Sapphire Energy Construction Manager.

Hazard Communications (HAZCOM)

Material Safety Data Sheets (MSDS) for all purchased chemical products will be submitted to the Sapphire Energy Construction Manager along with the Contractor Chemical Control Form. The storage and handling of any chemical or hazardous material will follow the project Hazard Communication Program contained in this Incident Prevention Program. All chemicals or hazardous materials on the project will be listed on the Master Chemical and Substance Inventory List (Appendix H).

Inventory Control:

Purchases of regulated substances or chemicals will be limited to quantities required for the use in near future. Excess purchases may result in environmental notifications and unused material which can become hazardous or regulated wastes and result in high cost of disposal and increased hazardous waste generator compliance requirements.

Contractor is to notify the Sapphire Energy Construction Manager each time regulated substances or chemicals must be replenished including gasoline or diesel fuel.

Material Handling and Storage:

Regulated substances or chemicals will be stored in containers approved by the EPA and compatible with the materials stored. Any regulated substances or chemicals in storage will be properly sealed and secured to prevent damage, spillage, and minimization of vapor release. All containers used to store regulated substances or chemicals will be properly labeled for product identification and appropriate hazard signage when applicable. Any material with temperature or flammable/combustible storage requirements shall be stored as required in approved storage facilities.

Any waste materials, if generated, will be stored in a location that is separate from storage of useable, non-waste materials to prevent mixing and contamination of non-waste material. Regulated substances or chemicals will be temporarily stored so as to prevent contamination of rainwater runoff. All containers will be properly sealed when not in use and inspected daily to ensure no leakage.

ANY SPILL NO MATTER HOW SLIGHT WILL BE CLEANED UP IMMEDIATELY AND REPORTED TO THE SAPPHIRE ENERGY CONSTRUCTION MANAGER. Any spill of 25 gallons or less will be stored in proper labeled containers. Waste resulting from the cleanup will be stored temporarily according to Sapphire Energy policies and procedures until it can be properly disposed of.

Flammable materials will be stored according to NMOSHA, NFPA, and this Incident Prevention Program requirement. All flammable storage areas will be properly signed and fire protection immediately available. Material requiring controlled temperature or flammable storage requirements shall be stored as required.

EROSION AND SEDIMENTATION

Erosion and Sediment Control Plan Approval, Storm Water Permitting, and excavating permits for the project have been obtained by Sapphire Energy. Contractor is to be familiar with the Erosion and Sediment Control Plan developed by Sapphire Energy. Erosion and sediment controls and BMP's will be inspected twice a week or after any rain of ½ inch or greater to assure effective erosion and sediment controls are maintained. Special attention to drainage and run-off from temporary roads, parking areas, lay-down areas, de-watering, and final grading activities at the end of construction must also be considered.

Contractor will maintain an after hour contact list and provided to the Sapphire Energy Construction Manager in case of an emergency. Contractors performing any work where land will be disturbed will be familiar with the Erosion and Sediment Control and Excavation Plan requirements and will remain in compliance of the plans during the work activity.

DUST CONTROL

Contractors will control dust on and around the project using water trucks or designated fire hydrants.

CONTAMINATED SOIL OR GROUNDWATER

Contaminated soil and groundwater will be quickly identified to prevent environmental problems, as well as potential health and safety problems. Environmentally, once contaminated soil or water is transported and deposited at another location, the new location automatically becomes contaminated.

Evidence that soil or groundwater may be contaminated include: unusual or unnatural soil coloration or consistency, foul or chemical odors, floating oil or chemical residue, buried containers (such as 55 gallon drums), and dead vegetation. Knowledge of the site's history, as well as that of neighboring sites, may also be an indicator. Underground storage tanks, piping systems and drainage systems on the property are possible sources of contamination.

CONCRETE

The effluent from washing out concrete trucks can pose an environmental threat, especially near streams, lakes, ponds, or wetland areas. Wash out operations will only be performed at locations designated by the Sapphire Energy Construction Manager. When possible, concrete waste material will be recycled and used on-site as directed by the Sapphire Energy Construction Manager or otherwise hauled off site to a local landfill as waste.

No concrete wash water or other process water discharges will be allowed to enter any storm sewer system or other conveyances which will allow the water to leave the project.

SOLID WASTE DISPOSAL (HAZARDOUS AND REGULATED WASTE MATERIALS)

In the event that an unplanned hazardous waste is incurred, the Sapphire Energy Construction Manager will be notified immediately. The Sapphire Energy Construction Manager may provide direction or instruction on temporary storage of the hazardous waste.

Any work task that may generate a hazardous waste will require a Waste Minimization Plan, prior to start of work. The Waste Minimization Plan will describe how the contractor plans to control the hazardous waste including storage and disposal.

All waste oil will be placed in properly identified storage containers until it can be disposed of.

All hazardous waste will be disposed of as soon as practical. Hazardous waste stored on the project will not exceed 2200 pounds in any calendar month.

Containers used to store hazardous or regulated waste will be maintained in good condition at all times. Containers will be inspected weekly and that inspection documented to ensure no leaks have occurred.

Oily rags will be collected and properly stored on a daily basis.

Used oil will be tested for halogens prior to being placed in storage containers for disposal.

SPENT WELDING ROD IS TO BE CONSIDERED A HAZARDOUS OR REGULATED MATERIAL. Spent welding rod is to be collected in scrap metal containers. Spent welding rod is not to be allowed to accumulate in work areas at any time.

Cutting oil used on pipe threading machines will be contained in catch basins.

Any absorbent used will be collected separately and disposed of with construction debris as long as there is no free flowing material visible.

LITTER AND CONSTRUCTION DEBRIS (NON-HAZARDOUS MATERIALS)

General construction debris that is a non-hazardous solid waste material are (examples include lumber, metal, concrete, paper, and plastics). Non-hazardous materials generally do not pose a health problem, in normal use, and do not contaminate soil, water, or the atmosphere in their normal applied state.

Litter and construction debris will be contained in adequate containers or roll-off boxes. The containers or boxes will be properly labeled as to the contents. Containers or boxes will be inspected regularly to ensure unsuitable material was not wrongfully deposited.

Contractor will dispose of litter and construction debris on a regular basis.

The vendor that transports the litter and construction debris from the project shall cover the container or box to prevent possible spillage. Off-site disposal will only be at authorized Sapphire Energy facilities.

On-site burning may or may not be legal, depending on the area, and may or may not require a temporary air permit.

Sapphire Energy prohibits open burning on all projects.

MAINTENANCE AND FUELING OF EQUIPMENT

Storage of fluids used for equipment maintenance will be in designated areas approved by the Sapphire Energy Construction Manager.

On-site maintenance is only allowed on large equipment that remains on the Sapphire Energy IABR project for a specific period of time.

No vehicle will have any service performed on the project with the exception of a vehicle breakdown.

Used oil will be placed in containers and stored in a location approved by the Sapphire Energy Construction Manager. Accumulated oil is to be removed from the project by an approved vendor. All used oil will be tested for halogens.

Maintenance of equipment on the project will be limited to routine fluid and filter servicing. Minor change out or repairs that are not considered major may be allowed to get the equipment back into operation.

Oil from equipment will be drained into catch basins. When fluids are changed on equipment, plastic sheeting or visqueen shall be placed on the ground prior to start of maintenance to ensure fluids do not migrate to surrounding soil.

Any spilled fluid on the ground will be immediately cleaned up, collected, properly stored in approved containers, and disposed of in accordance of this EMP and Sapphire Energy procedures.

All equipment used on this project will be inspected daily for leaks and drips. Any drip observed on a piece of equipment will be repaired immediately. Absorbent will be placed on the ground to ensure fluids do not contaminate the ground.

Equipment that has a leak will be removed from the project immediately or parked in a designated lined area if repairs cannot be made immediately.

Subcontractor or vendor equipment will be inspected at time of delivery and any equipment that is in poor condition or have signs of leaks will be removed from the project immediately until repairs have been made.

There will be no stationary fuel storage tanks allowed on the project without prior approval of the Sapphire Energy Construction Manager.

When fueling of equipment is being performed, catch pans and spill kits will be required on each truck or fueling location.

No fueling of equipment will occur near any storm drain or catch basin.

Portable fuel containers will meet NMOSHA and NFPA standards. Portable fuel containers will only be stored at approved flammable storage locations.

Equipment will be properly grounded when fueling. No equipment will be allowed to be running while fueling.

FORMS APPENDIX

APPENDIX A:	SUBCONTRACTOR MONTHLY INCIDENT SUMMARY REPORT
APPENDIX B:	INCIDENT NOTIFICATION & INVESTIGATION FORM
APPENDIX C:	SAFETY TRAINING ROSTER
APPENDIX D:	DAILY TASK/JOB SAFETY ANALYSIS PLAN
APPENDIX E:	PRE-WORK TASK PLAN
APPENDIX F:	NOTICE OF SAFETY, HEALTH OR ENVIRONMENTAL NONCONFORMANCE
APPENDIX G:	SAFETY, HEALTH, OR ENVIRONMENTAL CORRECTIVE ACTION REPORT
APPENDIX H:	MASTER CHEMICAL & SUBSTANCE INVENTORY LIST
APPENDIX I:	HOT WORK PERMIT
APPENDIX J:	CONFINED SPACE ENTRY PERMIT
APPENDIX K:	EXCAVATION PERMIT
APPENDIX L:	DAILY FORKLIFT SAFETY INSPECTION CHECKLIST
APPENDIX M:	DAILY CRANE SAFETY INSPECTION CHECKLIST
APPENDIX N:	MONTHLY CRANE SAFETY INSPECTION CHECKLIST
APPENDIX O:	DAILY TOWER CRANE SAFETY INSPECTION CHECKLIST
APPENDIX P:	DAILY RIGGING SAFETY NSPECTION CHECKLIST
APPENDIX Q:	NOTICE TO COMMENCE STEEL ERECTION
APPENDIX R:	DAILY SCAFFOLD SAFETY INSPECTION REPORT
APPENDIX S:	DAILY WORK SITE SAFETY INSPECTION
APPENDIX T:	VOLUNTARY USE OF A DISPOSABLE RESPIRATOR
APPENDIX U:	MEDICAL QUESTIONNAIRE FOR RESPIRATOR USE
APPENDIX V:	PRE-LIFT CHECKLIST
APPENDIX W	DAILY EQUIPMENT CHECKLIST
APPENDIX X:	WEEKLY ENVIRONMENTAL SELF ASSESSMENT REPORT
APPENDIX Y:	BLUE VEST PROGRAM
APPENDIX Z:	HEAT INDEX AND PHYSICAL ACTIVITY CHART

SUBCONTRACTOR MONTHLY INCIDENT SUMMARY REPORT

AMEC Job Number: (COMPLETED BY AMEC PROJECT)

Subcontractor Name:

Project Name:

Reporting Period: **Month:** **Year:**

This form must be submitted to AMEC Project Manager, Site Manager, or SHE Manager with monthly pay application. It is to be submitted even if no accidents occurred.

DIRECTIONS: Report OSHA recordable medical cases. Report number of OSHA recordable medical cases that had lost work days, and number of calendar days away from work (Do not count first day of injury, but the weekends must be counted). Carry-over Days are for a previously reported lost time case where the worker is still off work in this reporting period. Report the number of OSHA recordable medical cases that had restricted or light duty work and the total number of calendar days on restricted or light duty (Do not count the first day of injury, but the weekend must be counted). Carry-over Days are for a previously reported restricted or light duty case where the worker is still on restricted or light duty. Report number of first aid only cases for period as well.

	Man-hours Worked	First Aid Injuries	Medical Treatment Only	Lost Time Injuries	Days Lost	Restricted Work Injuries	Days of Restricted Work
Month							
YTD							

Attach copy of employer First Report of Injury or OSHA 301 Report for each recordable injury case reported.

Person Making Report: Phone Number:

Sapphire Energy

INCIDENT INVESTIGATION FORM

INCIDENT INFORMATION

Crew or Subcontractor: _____ Job Name: _____

Check Applicable: Injury/Illness ☐ Traffic/Auto ☐ Property Damage ☐ Near-Miss

EMPLOYEE INVOLVED

Name: _____ Address: _____

City: _____ State: _____ Zip: _____ Home Phone No: _____

Social Security Number: _____ Date of Birth: _____ Sex: _____

Marital Status: _____ Number of Dependents: _____

JOB INFORMATION

Date of Hire: _____ Craft: _____ Position: _____

Wage: _____ Shift: ☐ Day ☐ Evening ☐ Night

Hours Worked Per Day: _____ Days Worked Per Week: _____ Hours Worked Per Week: _____

INCIDENT INVESTIGATION

Directions: Answer all questions as complete and detailed as possible.

Date of Incident: _____ Date Incident Reported: _____

Time of Incident: _____ Exact Location Where Incident Occurred: _____

What job/task was employee(s) doing when incident occurred?

What tool/equipment was involved? _____ Any defects? _____

What was employee doing exactly at the time of the incident? _____

Describe in detail the incident: _____

What actually caused the incident? _____

Why did that cause the incident? _____

Could there have been other factors that contributed to the incident? _____

The probable cause of the incident: _____

INJURY INFORMATION

Nature of Injury: _____ Part of Body Injured: _____

Name of Physician or Hospital: _____

Address: _____ City: _____ State: _____ Zip: _____

Phone Number: _____ Diagnosis: _____

Any work restrictions? _____ Any prescriptions given? _____

INVESTIGATION TEAM

First-Line Supervisor Name: _____ SHE Coordinator Name: _____

Witnesses Names: _____

SOLUTIONS

Solutions developed to prevent similar future occurrences: _____

SOLUTION IMPLEMENTATION

Activity Required	Who Assigned	Due Date

APPROVAL

Project Manager/Superintendent Signature: _____ Date: _____

NOTE: ON-LINE INCIDENT INVESTIGATION FORMS ARE AVAILABLE ON AMEC COMPANY INTRANET

APPENDIX B

SAFETY TRAINING ROSTER

	Project Name:	**Project Location:**
	Course:	
	Date:	**Presented by:**

	Name	Social Security Number	Signature
This is to certify that I, the undersigned, have attended this AMEC or subcontractor Safety Training course and understand the contents presented during the program.			
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			
20			

Superintendent for this crew is _____

DAILY TASK/JOB HAZARD ANALYSIS

DIRECTIONS: Complete the Daily Task/Job Hazard Analysis each day and each time a task changes

FOREMAN NAME:		**TASK DESCRIPTION:**	
WORK LOCATION:		**SPECIFIC MATERIALS, TOOLS, OR EQUIPMENT REQUIRED TO COMPLETE THE TASK:**	
DATE:			

LIST ALL THE STEPS OF THE JOB (Use additional paper if needed)		**IDENTIFY ALL SPECIFIC HAZARDS FOUND**		**HOW WILL *YOU* CONTROL THE HAZARDS?**
1	1		1	
2	2		2	
3	3		3	
4	4		4	
5	5		5	
6	6		6	
7	7		7	

EVACUATION ROUTE	**EMERGENCY NUMBERS**	**ADDITIONAL NOTES or COMMENTS:**
What is your evacuation route and assembly point?	Emergency Phone:	
	Radio Channel	
	Fire:	
THIS JOB/TASK HAZARD ANALYSIS PLAN IS COMPLETE	Medical:	
Foreman:	SAFETY AND HEALTH REVIEW	
SUPERVISION REVIEW and APPROVAL	Safety:	
1. Can Foreman maintain continuous eye contact with crew? Yes ☐ No ☐ 2. Can crew perform this task safely? Yes ☐ No ☐ 3. Is the crew trained to perform this task? Yes ☐ No ☐ **If any answer is no, do not proceed with the work and reassignment is required**	Safety Comments:	
THIS PLAN HAS BEEN REVIEWED IS SAFE AND IS ADEQUATE		
GF or Superintendent:		

CREW SIGNATURES	**By your signature you agree that your supervisor has informed you of all hazards associated with the task; that you are aware of the hazards; and you are comfortable in performing the task.**

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

_____ _____ _____ _____ _____

PLAN THE WORK – COMMUNICATE THE PLAN – WORK THE PLAN

Appendix D

NOTE: ***This checklist is only a guide to assist in the identification of possible hazards during a component installation. It is in no way an all-inclusive listing of all hazards present.***

SUBJECT	REQUIRED		TYPE (IF APPLICABLE)	TRAINING		PROCURED		COMMENTS
	YES	NO		YES	NO	YES	NO	
PERSONAL PROTECTIVE EQUIPMENT:								
• Will any special personal protective equipment be required for the component installation?	☐	☐		☐	☐	☐	☐	
• Will workers need training for the equipment?	☐	☐		☐	☐	☐	☐	
• Will any special services be needed for the equipment? (i.e. fit testing, etc.)	☐	☐		☐	☐	☐	☐	
LADDERS/SCAFFOLDING:								
• Will ladders and/or scaffolding be required for the installation?	☐	☐		☐	☐	☐	☐	
• Will fall protection be required for these items?	☐	☐		☐	☐	☐	☐	
PERMITS/TAGS:								
• Will any hot work permits be needed during the installation?	☐	☐		☐	☐	☐	☐	
• Will any confined space permits be needed?	☐	☐		☐	☐	☐	☐	
• Will lockout/tagout tags be needed?	☐	☐		☐	☐	☐	☐	
CONFINED SPACES:								
• Will any confined space work be performed?	☐	☐		☐	☐	☐	☐	
• Will ventilation be needed?	☐	☐		☐	☐	☐	☐	
• Will air monitoring be required?	☐	☐		☐	☐	☐	☐	
• Have workers been trained for confined space entry?	☐	☐		☐	☐	☐	☐	
FLAMMABLE GASES/LIQUIDS:								
• Will any flammable gases and/or liquids be used during the installation?	☐	☐		☐	☐	☐	☐	
• Will fire extinguishers be available, if needed?	☐	☐		☐	☐	☐	☐	
SIGNS, SIGNALS, AND BARRICADES								
• Will yellow caution tape be needed?	☐	☐		☐	☐	☐	☐	
• Will red danger tape be needed?	☐	☐		☐	☐	☐	☐	
• Will perimeter barricades be needed?	☐	☐		☐	☐	☐	☐	
• Will any caution/danger signs be needed?	☐	☐		☐	☐	☐	☐	
• Will a guard be needed?	☐	☐		☐	☐	☐	☐	
LOCKOUT/TAGOUT:								
• Will lockout/tagout be conducted?	☐	☐		☐	☐	☐	☐	
• Has a responsible person been assigned for locking/tagging out?	☐	☐		☐	☐	☐	☐	
TOXIC/HAZARDOUS CHEMICALS:								
• Will any work activities involve toxic/hazardous chemicals?	☐	☐		☐	☐	☐	☐	
• Will a compliance plan be needed?	☐	☐		☐	☐	☐	☐	
• Will exposure monitoring be needed?	☐	☐		☐	☐	☐	☐	
• Will worker training be needed?	☐	☐		☐	☐	☐	☐	
• Will any medical clearances/medical surveillance be needed?	☐	☐		☐	☐	☐	☐	
HOT WORK:								
• Are hot work activities to be performed during installation?	☐	☐		☐	☐	☐	☐	
• Will any special PPE be needed?	☐	☐		☐	☐	☐	☐	
• Will fire blankets be needed?	☐	☐		☐	☐	☐	☐	
• Will a fire watch be required for any hot work activities?	☐	☐		☐	☐	☐	☐	
MOBILE EQUIPMENT:								
• Will any mobile equipment be required for the installation?	☐	☐		☐	☐	☐	☐	
• If so, have all required safety inspections been completed?	☐	☐		☐	☐	☐	☐	
• Have equipment operators been properly trained?	☐	☐		☐	☐	☐	☐	
CRANES & RIGGING:								
• Will any special lifting devices be needed?	☐	☐		☐	☐	☐	☐	
• Have shackles/rigging been inspected?	☐	☐		☐	☐	☐	☐	

PRE-WORK TASK SAFETY PLAN

PROJECT: _____ **DATE:** _____
LOCATION: _____ **RESPONSIBLE SUPERINTENDENT:** _____
DISCIPLINE: _____ **GENERAL FOREMAN/FOREMAN:** _____
WORK AREA _____ **SHE REPRESENTATIVE** _____

WORK DESCRIPTION	RISK/HAZARDS	RISK/HAZARD PREVENTION ACTION	DATE OF ACTION	RESPOSBILE PARTY

Prepared By: _____ Supervisor _____ Other: _____ Other:

Approved By: _____ Site Manager _____ Safety _____ Other:

Appendix E

NOTICE OF SAFETY, HEALTH, OR ENVIRONMENTAL NONCONFORMANCE

ASSESSMENT #: **NONCONFORMANCE #:**

PROJECT LOCATION: **JOB NUMBER:**

DATE OF NONCONFORMANCE: **TIME OF NONCONFORMANCE:**

LOCATION OF NONCONFORMANCE:

FIRST-LINE SUPERVISOR or SUBCONTRACTOR NAME:

During an inspection of your work operations, the following safety, health, or environmental nonconformance was observed:

Reference:

☐ **MAJOR**
SERIOUS INJURY, DEATH, PROPERTY DAMAGE, OR ENVIRONMENTAL ASPECT LIKELY

Written corrective action plan is required
Written corrective action plan due date:

☐ **MINOR**
SERIOUS INJURY, DEATH, PROPERTY DAMAGE OR ENVIRONMENTAL ASPECT UNLIKELY

Corrective action plan **not** required

☐ **Opportunity For Improvement**
ISOLATED LAPSE OF A RULE OR PROCEDURE OR AN OPPORTUNITY FOR IMPROVEMENT.

To be corrected by:

☐ **WORK IS SUSPENDED AND A SAFETY AND HEALTH ASSURANCE ASSESSMENT MEETING IS REQUIRED**

Date: Time:

Assessor(s): _____ Date: _____

Sapphire Energy

SAFETY, HEALTH, OR ENVIRONMENTAL CORRECTIVE/PREVENTIVE ACTION REPORT

Report or Assessment No: **Corrective/Preventive Action Plan Due Date:**

NONCONFORMANCE

NONCONFORMANCE NUMBER

Describe Nonconformance:

Action Team Assigned:

ROOT CAUSE

Root Cause Analysis:

CORRECTIVE or PREVENTIVE ACTIONS

(Use Additional Paper if Needed)

Describe Immediate Action(s) **ACTION TAKEN IMMEDIATELY TO CORRECT NONCONFORMANCE:**

Describe Intermediate Action(s) ACTION TAKEN UNTIL A PERMANENT FIX IS IN PLACE:

Describe Permanent Action(s) **PERMANENT ACTION TO ELIMINATE FUTURE NONCONFORMANCE:**

APPROVALS

Safety, Health, and Environmental	Project Manager	Project Vice President

MASTER CHEMICAL & SUBSTANCE INVENTORY LIST

PROJECT NUMBER: **PROJECT LOCATION:**

DATE	BRAND NAME	MANUFACTURER	CHEMICAL NAME

Permit #	Date

HOT WORK PERMIT

HOT WORK INFORMATION

Location: _____

Company Name: _____ Shift: ☐1st ☐2nd ☐3rd

Location of Work: _____

Floor/Level/Elevation: _____

Description of Work: _____

Any Special Precautions: _____

Employees Performing Work:

Name:	Signature:

Fire Watch:

Name: _____ Signature: _____

HOT WORK REQUIREMENTS

Hot Work Activities:

1. Hot work activities include any spark-producing activity that includes welding, burning, and grinding.

Requirements:

1. Each foreman will complete permit and have authorized prior to performing any hot work activities.
2. Foreman will instruct employees as to work being performed, precautions to be taken, how to use a fire extinguisher correctly, emergency procedures in case of fire, and the duties of a fire watch.
3. Work area must be clear of combustible and/or flammable material within a 35' radius. If these materials are immovable, then fire blankets or other fire-resistive material must protect them.
4. A twenty-pound, or larger, dry-chemical fire extinguisher must be in immediate vicinity of work area.
5. Sparks and slag shall be confined to the work area. When working in elevated areas, protect areas below from sparks and slag.

Fire Watch Duties:

1. Continually check work area and all adjacent areas (above, below, around) to ensure free of fire during work activities, during breaks and for ½ hour after completed activities.
2. Trained in the proper use of a fire extinguisher and how to summon fire department or brigade.

Fire Extinguisher Use - Follow the P.A.S.S. method:

1. **P**ull the pin on the extinguisher.
2. **A**im the extinguisher nozzle at the base of the fire.
3. **S**queeze the handle.
4. **S**weep the base of the fire.

APPROVAL

AMEC Project/Site Manager or Safety Representative: _____ Date: _____

CONFINED SPACE ENTRY PERMIT

DESCRIPTION

Permit #: _____ Crew/ Subcontractor: _____

Supervisor: _____ Location: _____

Type: ☐ Non-Permit ☐ Permit Date and Time of Entry: / / AM/PM

Location of Confined Space: _____

Type of Confined Space: ☐ Tank ☐ Pipe ☐ Manhole ☐ Tunnel ☐ Vault ☐ Other: _____

Work Description/Purpose of Entry: _____

_____

Hazards: _____

VERIFICATIONS

	Date	Entry Supervisor's Initials
Lockout/Tagout (electrical, mechanical, hydraulic, etc.)		
Purged, Cleaned, Drained, and Ventilated		
Employee Training		

SPECIAL REQUIREMENTS (Completed and Reviewed Prior to Entry)

	Required	Verified		Required	Verified
Safety Department Notified	☐	☐	Hot Work Permit Required	☐	☐
Adequate Access	☐	☐	Fire Extinguisher Available	☐	☐
Adequate Lighting (low voltage)	☐	☐	Lifelines Required	☐	☐
Attendant Required	☐	☐	Harnesses Required	☐	☐
Warning Signs Posted at Access	☐	☐	Respirators Required (Type :)	☐	☐
Ventilation Required	☐	☐	Air Supplied Respirators Required	☐	☐
Authorized Entry Log at Access	☐	☐	Protective Clothing Required	☐	☐
Rescue Equip./Services Available	☐	☐	Communications Equipment	☐	☐
Rescue Team Required	☐	☐	Continuous Air Monitoring	☐	☐
Other:	☐	☐	Other:	☐	☐

Attendant(s) Name(s): _____ _____

AIR MONITORING

Make: _____ Model: _____ ID# _____

Field Calibration Date: _____ Calibrated By: _____

Atmosphere Checked By: _____

Contaminants	Permissible Levels	1st Check*	Time	2nd Check*	Time	3rd Check*	Time
% Oxygen (O2)	19.5% to 23.5%						
LEL	Less than 10%						
Carbon Monoxide (CO)	Less than 35 ppm						
Hydrogen Sulfide (H2S)	Less than 10 ppm						
Other:							

*** 1ST CHECK TO BE COMPLETED PRIOR TO ENTRY**

IN CASE OF EMERGENCY, CALL: _____ OR _____

AUTHORIZATION

Entry Supervisor: _____ Date: _____

Permit #	Date

EXCAVATION PERMIT

EXCAVATION INFORMATION

Location: _____

Permit #: _____ Date: _____

Company Name: _____ Shift: _____

Excavation Location: _____

Excavation Length
Width & Depth: _____

Soil Classification:
- ☐ Type A
- ☐ Type B
- ☐ Type C

NOTE: Trenches over 4 feet deep will use a protective system.

Excavations > 4 feet deep are considered Confined Spaces. Follow Confined Space Entry procedures.

Protective System Used: ☐ Yes ☐ No

Type:
- ☐ **Shielding (Box)**
- ☐ **Sloping**
- ☐ **Shoring**
- ☐ **Benching**
- ☐ **Other:**

Weather: _____

Competent Person: _____ Person Completing Report _____

EXCAVATION REQUIREMENTS

YES	NO	N/A	GENERAL
☐	☐	☐	Protective system used in any trench/excavation greater than 4 feet deep
☐	☐	☐	Spoils, materials & equipment set back ≥ 2 feet from the edges of the excavation
☐	☐	☐	Engineering designs for sheeting &/or manufacturer's data on trench box capabilities on site
☐	☐	☐	Adequate signs posted and barricades provided
☐	☐	☐	Employee training conducted prior to beginning work
YES	**NO**	**N/A**	**UTILITIES**
☐	☐	☐	Utility company contacted & given 24 hours notice &/or utilities already located & marked
☐	☐	☐	Utility locations (overhead & underground) reviewed with operator & employees
☐	☐	☐	Utilities protected, supported or removed when excavation opened
YES	**NO**	**N/A**	**WET CONDITIONS**
☐	☐	☐	Employees protected from water accumulations (continuous dewatering)
☐	☐	☐	Inspection made after every rainstorm
YES	**NO**	**N/A**	**HAZARDOUS ATMOSPHERES**
☐	☐	☐	Air monitored for methane gas prior to entering trench/excavation
☐	☐	☐	Air monitoring & ventilation provided for potentially hazardous atmospheres
☐	☐	☐	Emergency equipment available where hazardous atmospheres could or do exist
YES	**NO**	**N/A**	**ENTRY & EXIT**
☐	☐	☐	Ladders no further than 25 feet from ANY employee in ANY direction
☐	☐	☐	Ladders extend 3 feet above excavation edge and secured
☐	☐	☐	Wood ramps constructed of uniform material thickness & cleated together at bottom
☐	☐	☐	Employees protected from cave-ins where entering/exiting the excavation

NOTE: Items marked NO below MUST be corrected prior to any employee entering the excavation.

APPROVAL

AMEC Project/Site Manager: _____ Date: _____

DAILY FORKLIFT SAFETY INSPECTION REPORT

Inspection by: _____ **Date:** _____
(Licensed Forklift Operator)

Company Name: _____ **Time:** _____

Project Name: _____ **Project #:** _____

Forklift Make & Model: _____

INSPECTION CRITERIA

	M	T	W	TH	F	S	Comments
1. Forks free of damage.	☐	☐	☐	☐	☐	☐	
2. Forks of appropriate capacity and match.	☐	☐	☐	☐	☐	☐	
3. Engine oil.	☐	☐	☐	☐	☐	☐	
4. Hydraulic fluid.	☐	☐	☐	☐	☐	☐	
5. Fuel, engine coolant and brake fluid.	☐	☐	☐	☐	☐	☐	
6. Hydraulic leaks.	☐	☐	☐	☐	☐	☐	
7. Condition of hydraulic hoses.	☐	☐	☐	☐	☐	☐	
8. Tire pressure.	☐	☐	☐	☐	☐	☐	
9. Tire condition.	☐	☐	☐	☐	☐	☐	
10. Tire ballast.	☐	☐	☐	☐	☐	☐	
11. Lugs tight.	☐	☐	☐	☐	☐	☐	
12. Seat belt.	☐	☐	☐	☐	☐	☐	
13. Back-up alarm.	☐	☐	☐	☐	☐	☐	
14. Horn.	☐	☐	☐	☐	☐	☐	
15. Lights and signals.	☐	☐	☐	☐	☐	☐	
16. Load chart visible to operator.	☐	☐	☐	☐	☐	☐	
17. Fire extinguisher.	☐	☐	☐	☐	☐	☐	
18. Mirrors.	☐	☐	☐	☐	☐	☐	
19. Roll Over Protective Structure.	☐	☐	☐	☐	☐	☐	
20. Frame level indicator.	☐	☐	☐	☐	☐	☐	
21. Boom angle indicator.	☐	☐	☐	☐	☐	☐	
22. Operator's Manual available.	☐	☐	☐	☐	☐	☐	
23. Evidence of structural damage.	☐	☐	☐	☐	☐	☐	
24. Floorboard free of debris.	☐	☐	☐	☐	☐	☐	
25. Gauges working properly.	☐	☐	☐	☐	☐	☐	
26. Service brake.	☐	☐	☐	☐	☐	☐	
27. Parking brake.	☐	☐	☐	☐	☐	☐	
28. Steering (All modes).	☐	☐	☐	☐	☐	☐	
29. Transmission.	☐	☐	☐	☐	☐	☐	
30. Hydraulic controls (Function test and cycle):							
Boom/Mast – Up & Down.	☐	☐	☐	☐	☐	☐	
Boom – Extend & Retract.	☐	☐	☐	☐	☐	☐	
Fork Tilt – Forward & Backward.	☐	☐	☐	☐	☐	☐	
Frame Level – Left & Right.	☐	☐	☐	☐	☐	☐	
Carriage Tilt – Left & Right.	☐	☐	☐	☐	☐	☐	
Traverse – Forward & Backward.	☐	☐	☐	☐	☐	☐	
Fork Side Shift – Left & Right.	☐	☐	☐	☐	☐	☐	
Outriggers – Up & Down.	☐	☐	☐	☐	☐	☐	

SIGNATURES

Inspector's Signature: _____ Date: _____

Superintendent's Signature: _____ Date: _____

DAILY CRANE

SAFETY INSPECTION CHECKLIST

Equipment Number: _____ Equipment Type: _____

Subcontractor Name: _____ Contract Location: _____

Operator Name: _____ Shift: _____ Date: _____

CHECKS	OK	N/A	REPAIR
	Check Appropriate Box Below:		
Hoist Cable	☐	☐	☐
Boom Cable	☐	☐	☐
Sheaves	☐	☐	☐
Hook	☐	☐	☐
Limit Switches, Boom Stops, Pins & Keepers	☐	☐	☐
Hydraulic Control & Cylinder	☐	☐	☐
Leaks	☐	☐	☐
Hoist Brakes	☐	☐	☐
Steering Mechanism	☐	☐	☐
Lights	☐	☐	☐
Operating Controls	☐	☐	☐
Windshield	☐	☐	☐
Windshield Wipers	☐	☐	☐
Horn	☐	☐	☐
Back-Up Alarm	☐	☐	☐
Fire Alarm	☐	☐	☐
Mirrors	☐	☐	☐

ADJUSTMENTS OR REPAIRS NEEDED: _____

Operator Signature: _____

TURN IN DAILY TO SUPERVISOR

MONTHLY CRANE
SAFETY INSPECTION CHECKLIST

Date: _____ Inspection Period: _____

Subcontractor Name: _____ Contract Location: _____

Manufacturer: _____ Model: _____

Equipment #: _____ Machine Hours: _____ Capacity: _____

Crane Type: ☐ Crawler ☐ Truck ☐ Hydraulic

Block Code: 4= Satisfactory 8= Not Satisfactory N/A = Not Applicable

GENERAL CHECKS

- ☐ Operators Manual/Configuration Drawings
- ☐ Hand Signals Posted
- ☐ Anti-Two Block Warning Sign
- ☐ High Voltage Warning Sign
- ☐ Capacity Chart in Cab
- ☐ Warning Horn Operational
- ☐ Fire Extinguisher
- ☐ Boom Angle Indicator
- ☐ Back-Up Alarm
- ☐ Anti-Two Block Device, Main
- ☐ Anti-Two Block Device, Auxiliary
- ☐ Load Movement Indicator (If Required)
- ☐ Handholds and Steps
- ☐ Non-Skid Surfaces
- ☐ Catwalk and Handrails
- ☐ Directional Signals
- ☐ Head, Tail, and Brake Lights
- ☐ Lubrication, Fluid Levels, and Fluid Condition

CRANE CONFIGURATION COMPLIES WITH MANUFACTURER DESIGN

- ☐ Counterweights
- ☐ Gantry Position
- ☐ Mast Position
- ☐ Boom Hoist Reeving
- ☐ Maximum Boom Not Exceeded
- ☐ Maximum Jib not Exceeded

LATTICE BOOM/JIB

- ☐ Check Integrity of Boom Stops
- ☐ Check Boom Hoist Kick-Out
- ☐ Check Boom for Alignment with Revolving Frame, Chords, and Lacing for Damage or Improper and Undocumented Repairs. Check for Cracked Welds.
- ☐ Check Jib for Alignment, Damage, or Improper and Undocumented Repairs.
- ☐ Check Jib Backstop NOTE: Cable Type Belly Slings Do Not Comply with 29 CFR 1926.550
- ☐ Check all Boom and Jib Connecting Pins and Locks
- ☐ Check Point Sheaves and Wire Rope Guides
- ☐ Check Jib Suspension

HYDRAULIC BOOM

- ☐ Check Operation by Fully Extending and Retracting
- ☐ Check for Twists and Bends by Viewing Over Top of Boom as it is Being Fully Extended
- ☐ Check for Bends, Fully Extended, Viewing from Side
- ☐ Check Welds and Check for Cracks
- ☐ Check Boom Pivot Shaft and Keepers
- ☐ Check Boom Hoist Cylinders and Pins
- ☐ Check Boom Extension Cables and Sheaves
- ☐ Check Wear Pads and Adjustment

GANTRY/BACK HITCH/COUNTERWEIGHT

- ☐ Check Welds and Check for Cracks
- ☐ Check Sheaves, Shafts, Pins and Keepers
- ☐ Check Counterweight Bolts/Retainers

WIRE ROPE AND PENDANTS

- ☐ Check Condition of Main Hoist Rope
- ☐ Check Condition of Auxiliary Hoist Rope
- ☐ Check Condition of Boom Hoist Rope
- ☐ Check Condition of Pendants, Especially at Sockets
- ☐ Check all Hoisting Rope Dead Ends, Clamps, and Sockets

LOAD BLOCK AND OVERHAUL BALL

- ☐ Check Main Hook for Cracks, Bending, and Safety Latch
- ☐ Check Auxiliary Hook for Cracks, Bending, and Safety Latch
- ☐ Check Sheaves
- ☐ N.D.T. Main Hook. Documentation or Certification by Manufacturer (If Required) N.D.T. Date:

HOIST AND SWING MACHINERY

- ☐ Hydraulic Main Hoist
- ☐ Hydraulic Auxiliary Hoist
- ☐ Hydraulic Swing and Brake
- ☐ Main Hoist Clutch
- ☐ Main Hoist Brake
- ☐ Auxiliary Hoist Clutch
- ☐ Auxiliary Hoist Brake
- ☐ Third Drum Frictions
- ☐ Boom Hoist Clutch and Brake
- ☐ Boom Hoist Dog
- ☐ Power Down Drive and Operation
- ☐ Gear and Drive Guards

MONTHLY CRANE
SAFETY INSPECTION CHECKLIST

CARRIER	LOAD ENHANCEMENT DEVICE
☐ Outrigger Operation and Controls	☐ Ringer Type
☐ Outrigger Structure and Pads	☐ Skyhorse Type
☐ Frame Cracks and Welds	☐ Linkbelt Heavy Lift Type
☐ Wheel Lug Nuts	☐ Configuration Complies with Mfr. Design
☐ Tire Condition and Pressure	☐ Integrity of Device
☐ Cab Seat, Gauges, Horn	**CARBODY AND CRAWLERS**
☐ Engine Operation and Mounts	☐ Check for Structural Cracks
☐ Radiator, Hoses, Belts	☐ Drive Chains
☐ Air Cleaner	☐ Drive Motors
☐ Alternator, Batteries	☐ Lower Jaw Clutch Operation
☐ Service Brakes	☐ Travel Brakes and Dogs
☐ Parking Brake, Safety Brakes	☐ Crawler Extension Mechanism
☐ Steering Apparatus	**MISCELLANEOUS CHECKS**
☐ Check for Blistered Brake Hoses	☐ _____
UPPER ENGINE, TRANSMISSION, AND T.C.	☐ _____
☐ Engine Operation	☐ _____
☐ Belts, Radiator, Hoses	☐
☐ Air Cleaner	**The Mobile, Hydraulic, and Crawler Crane Inspector and Operator**
☐ Air Compressor	**Should be Familiar with the Requirements of:**
☐ Transmission or Converter	**Virginia OSH Standard 1926.550, ANSI Standard B30.5-1968, &**
☐ Electrical System, Batteries	**PCSA Mobile Hydraulic Crane Standard No. 2**

REMARKS

_____

_____

_____

_____

_____

_____

_____

Inspected by: _____ Date: _____

Repairs Completed by: _____ Date: _____

TOWER CRANE

DAILY SAFETY INSPECTION CHECKLIST

Equipment Number: _____ Equipment Type: _____

Subcontractor Name: _____ Job Location: _____

Operator Name: _____ Shift: _____ Date: _____

CHECKS	OK	N/A	REPAIR
	Check Appropriate Box Below:		
Hoist Cable Has Been Shortened as to Manufacturers Recommendation	☐	☐	☐
Sheaves	☐	☐	☐
Hook	☐	☐	☐
Anemometer Functioning	☐	☐	☐
Manufacturers Maximum Safe Operating Wind Speed Posted in Cab	☐	☐	☐
Travel Limit and Overload Protection Switches Functioning	☐	☐	☐
Jib Does Not Cross Over Cab or other Tower Crane	☐	☐	☐
Lateral Clearance of 1 Foot From Any Obstruction	☐	☐	☐
Vertical Clearance of 3 Feet From Any Obstruction	☐	☐	☐
360° Rotation Clearance From Any Obstruction	☐	☐	☐
Hoist Brakes	☐	☐	☐
Counterweights clearly marked and weight entered in Equipment Record	☐	☐	☐
Lights	☐	☐	☐
Operating Controls	☐	☐	☐
Windshield	☐	☐	☐
Windshield Wipers	☐	☐	☐
Horn	☐	☐	☐
Two-Way Communications Tested	☐	☐	☐
Clean and Free of Concrete	☐	☐	☐
Base Free of Debris and Water	☐	☐	☐
Operating Manual and Records	☐	☐	☐
All Ladders and Walkways in Good Condition	☐	☐	☐

ADJUSTMENTS OR REPAIRS NEEDED: _____

Operator Signature: _____

TURN IN DAILY TO SUPERVISOR

DAILY RIGGING

SAFETY INSPECTION CHECKLIST

WIRE ROPE SLING INSPECTION

DATE_____ BY_____

LOCATION:_____

SLING	SLING ID	LOCATION	SIZE	LENGTH REACH	CONDITION CODE	COMMENT	ACTION
1							
2							
3							
4							
5							
6							
7							
8							

CONDITION CODE	CONDITION	ACCEPTABLE	SHOULD BE MONITORED	EXCESSIVE
	WEAR/ABRASION	A	AM	AX
	BROKEN WIRES	B	BM	BX
	HEAT DAMAGE	C	CM	CX
	CORROSION	D	DM	DX
	KINKS/DOG LEGS	E	EM	EX
	EYE DEFORMATION	F	FM	FX
	CONDITION OF END FITTING	G	GM	GX

CHAIN SLING INSPECTION FORM

SLING	SLING ID	LOCATION	SIZE	LENGTH REACH	CONDITION CODE	COMMENT	ACTION
1							
2							
3							
4							
5							
6							
7							
8							

CONDITION CODE	CONDITION	ACCEPTABLE	SHOULD BE MONITORED	EXCESSIVE
	INNER LINK WEAR	A	AM	AX
	BENT LINK	B	BM	BX
	STRETCHED CHAIN	C	CM	CX
	GOUGES	D	DM	DX
	HEAT DAMAGE	E	EM	EX
	CUTS OR NICKS	F	FM	FX

DAILY RIGGING
SAFETY INSPECTION CHECKLIST

SYNTHETIC SLING INSPECTION

SLING	SLING ID	LOCATION	SIZE	LENGTH REACH	CONDITION CODE	COMMENT	ACTION
1							
2							
3							
4							
5							
6							
7							
8							

CONDITION CODE	CONDITION	ACCEPTABLE	SHOULD BE MONITORED	EXCESSIVE
	WEAR	A	AM	AX
	BROKEN STICHES	B	BM	BX
	HEAT DAMAGE	C	CM	CX
	CHEMICAL DAMAGE	D	DM	DX
	HOLES AND TEARS	E	EM	EX
	CUTS OR SNAGS	F	FM	FX
	CONDITION OF END FITTING	G	GM	GX

Comments or Notes:

Qualified Rigger:		Date:	

NOTICE TO COMMENCE STEEL ERECTION

Steel Erector Subcontractor:
Contact Name:
Address:

Sapphire Energy is hereby authorizing you to commence steel erection activities with the following notifications:

Concrete in footings, piers, and walls, and mortar in masonry piers and walls has attained, based on the appropriate ASTM standard test for field cured samples either 75% of the intended minimum compressive strength or sufficient strength to support the loads imposed during steel erection.	Name of testing agency: Attached testing reports:
Repairs or modifications were made to anchor rods/bolts: ☐ Yes ☐ No Locations of repairs/modifications:	Approval by: (Structural Engineer of Record): Approval in writing? ☐ Yes ☐ No (attach) Date approved: As built drawings available? ☐ Yes ☐ No

You are notified of your responsibility to: (Initial each)

Indicate to Sapphire Energy what material lay-down areas are needed, and intended routes of transferring materials. Only those designated laydown areas will be utilized, and Sapphire Energy responsibility to maintain laydown areas will be limited to those that are designated.	Initials:
Preplan all overhead hoisting operations to prevent traveling loads over other contractor personnel, and to coordinate hoisting activities with Sapphire Energy and other contractors to minimize impacts on other operations.	
Provide a written site specific erection plan if any part of your operations will deviate from the published OSHA Standard 29 CFR 1926.752(e.	
Conduct documented daily inspections of all cranes, forklifts, and other hoisting equipment utilized in steel erection activities.	
Designate a qualified trained rigger(s) to inspect all rigging equipment (Submit record of training) Name of qualified rigger:	
Maintain on the project written proof of training for all employees engaged in connecting, bolt-up, multiple lift rigging procedures, exposure to falls, equipment operation, and as required by any other specific standard.	
Assure that all columns are properly anchored by a minimum of 4 anchor bolts.	
Maintain and require the use of fall protection equipment for all employees exposed to fall elevations of 6 feet or greater as directed in the Sapphire Energy project Incident Prevention Program.	
Properly install perimeter guardrail systems on all exterior and interior leading edges consisting of a top rail and mid rail meeting the requirements of OSHA 1926.502 (b)(1-15)	
Maintain required fire protection/prevention equipment appropriate to the type of work operation and hazards involved.	
Meet all other requirements of the Sapphire Energy Project Incident Prevention Program, Published OSHA Standards, and the requirements of local regulations.	

Sapphire Energy Construction Manager

Steel Erector Subcontractor (If required)

DAILY SCAFFOLD SAFETY INSPECTION REPORT

Inspection by: _____ **Date:** _____
(Must Be a Competent Person)

Company Name: _____ **Time:** _____

Project Name: _____ **Project #:** _____

Scaffold Location: _____

INSPECTION CRITERIA

		Yes	No	N/A	Action Taken
1.	Are 2"x10" mud sills and base plates used?	☐	☐	☐	
2.	If CMU piers are used for footings are they poured solid?	☐	☐	☐	
3.	Are all components free of damage?	☐	☐	☐	
4.	Are scaffold frames plumb and level?	☐	☐	☐	
5.	Are scaffold frames pinned together to prevent displacement?	☐	☐	☐	
6.	Are cross braces used at all locations?	☐	☐	☐	
7.	Are frames and braces compatible?	☐	☐	☐	
8.	Are all working levels fully planked (Max. 1" gap between planks)?	☐	☐	☐	
9.	Are all platforms at least 18" wide?	☐	☐	☐	
10.	Is the work platform not more than 14" from the wall?	☐	☐	☐	
11.	Do all planks overlap their end supports 6"-12"?	☐	☐	☐	
12.	Are scaffold planks free of damage, splits, etc.?	☐	☐	☐	
13.	Are scaffolds secured to the structure once the scaffold is 4 times as high as it is wide including guardrails?	☐	☐	☐	
14.	Are scaffold ties repeated every 26' vertically after the first set of ties?	☐	☐	☐	
15.	Where scaffold ties are required are they installed at both ends of the scaffold and at 30' max. intervals between ends?	☐	☐	☐	
16.	Is a safe means of access provided to all scaffold platforms more than 2' high? (Extension ladders, attachable ladders, stairs or integral ladder access frames must be used.)	☐	☐	☐	
17.	Does the ladder extend 3' above the platform?	☐	☐	☐	
18.	Are ladders secured to prevent displacement?	☐	☐	☐	
19.	Are ladders installed as scaffold is erected to provide access for erectors?	☐	☐	☐	
20.	Are scaffolds at safe distances from power lines?	☐	☐	☐	
21.	Are tag lines used when hoisting loads onto scaffolds with cranes?	☐	☐	☐	
22.	Are guardrails installed on all platforms over 6' high?	☐	☐	☐	
23.	Is the top rail between 38"–45" high and capable of supporting 200 lbs?	☐	☐	☐	
24.	Are mid-rails capable of supporting 150 lbs.?	☐	☐	☐	
25.	Where cross bracing is used as a mid-rail is the crossing point of the brace between 20" –30" above the work platform?	☐	☐	☐	
26.	Where cross bracing is used as a top rail is the crossing point of the brace between 38" –48" above the work platform? (cross bracing cannot serve as both top rail and mid-rail)	☐	☐	☐	
27.	Are platforms kept clear of unnecessary material and debris?	☐	☐	☐	
28.	Are all material platforms equipped w/ toeboards?	☐	☐	☐	
29.	Are all areas below and around scaffolds barricaded to prevent workers from walking under scaffolds?	☐	☐	☐	
30.	Are canopies erected when workers must pass under scaffolds?	☐	☐	☐	
31.	Are all scaffolds that are incomplete tagged "Danger Do Not Use"?	☐	☐	☐	
32.	Are all damaged components removed from service and tagged "Danger Do Not Use"?	☐	☐	☐	

SIGNATURES

Competent Person's Signature: _____ Date: _____

Superintendent's Signature: _____ Date: _____

DAILY WORK SITE SAFETY INSPECTION

SUPERINTENDENT'S NAME: _____

SPECIFIC AREA(S) INSPECTED: _____

INSTRUCTIONS: Performed daily by superintendent/foreman of work area responsible for. Daily Work Site Safety Inspections will be maintained at project location and available for inspection by Sapphire Energy HSSE.
Y=Yes, N= No, NA=Not applicable

Pre-Work											
Y	N	NA		Y	N	NA					
☐	☐	☐	Pre-task safety plan communicated, understood and signed by each worker?	☐	☐	☐	All required permits obtained				
☐	☐	☐	Pre-task safety plan posted in conspicuous place at work site?	☐	☐	☐	Lockout/Tryout performed				
☐	☐	☐	Workers physically ready for work?	☐	☐	☐	All training completed for work to be performed?				
☐	☐	☐	MSDS Sheets obtained and available?	☐	☐	☐					

Personal Protective Equipment											
Y	N	NA		Y	N	NA		Y	N	NA	
☐	☐	☐	Hardhat bills forward	☐	☐	☐	Safety glasses with side shields	☐	☐	☐	Leatherwork Boot
☐	☐	☐	Face shields	☐	☐	☐	Burning goggles	☐	☐	☐	Welding hood and gloves
☐	☐	☐	Gloves	☐	☐	☐	Hearing Protection	☐	☐	☐	Reflective Vests

Fall Protection (100% Fall Protection Required at six feet or greater)											
Y	N	NA		Y	N	NA		Y	N	NA	
☐	☐	☐	Guardrail system checked	☐	☐	☐	Harness and lanyards checked	☐	☐	☐	Horizontal lifeline checked
☐	☐	☐	Floor Openings covered	☐	☐	☐	Roof Opening guarded	☐	☐	☐	Wall openings guarded
☐	☐	☐	Blue fencing up	☐	☐	☐	Netting checked	☐	☐	☐	

Ladders and Scaffolding											
Y	N	NA		Y	N	NA		Y	N	NA	
☐	☐	☐	Ladder tied off	☐	☐	☐	Ladder extended three feet	☐	☐	☐	Stepladders in open position
☐	☐	☐	Scaffold inspected and tagged	☐	☐	☐	Sections properly pinned	☐	☐	☐	Components not damaged
☐	☐	☐	Ladder access	☐	☐	☐	Handrail in place	☐	☐	☐	Planking secured

Housekeeping											
Y	N	NA		Y	N	NA		Y	N	NA	
☐	☐	☐	Material stacked orderly	☐	☐	☐	Trash cans in work area	☐	☐	☐	Debris removed
☐	☐	☐	Cords and hoses off floor	☐	☐	☐	Access maintained	☐	☐	☐	

Hoisting and Rigging Equipment											
Y	N	NA		Y	N	NA		Y	N	NA	
☐	☐	☐	Daily crane inspection	☐	☐	☐	One-eye per hook	☐	☐	☐	Sling/chokers stored
☐	☐	☐	Qualified rigger named	☐	☐	☐	Safety latch on hook checked	☐	☐	☐	Cranes flagged off
☐	☐	☐	Slings/chokers inspected	☐	☐	☐	Knowledge of crane signals	☐	☐	☐	Lift zone designated

Mobile Equipment											
Y	N	NA		Y	N	NA		Y	N	NA	
☐	☐	☐	Seatbelts used	☐	☐	☐	Workers trained	☐	☐	☐	Equipment inspected
☐	☐	☐	Backup alarms working	☐	☐	☐	Spotters used when needed	☐	☐	☐	

Excavations											
Y	N	NA		Y	N	NA		Y	N	NA	
☐	☐	☐	Competent person named	☐	☐	☐	Shore/shield/slope/bench proper	☐	☐	☐	Excavation checked daily
☐	☐	☐	Proper access/egress	☐	☐	☐	Spoil pile 2' from edge	☐	☐	☐	Workers trained

Temporary Barricades											
Y	N	NA		Y	N	NA		Y	N	NA	
☐	☐	☐	Proper tape used (Red-Danger, Yellow-Caution)	☐	☐	☐	All sides of work area barricaded	☐	☐	☐	Barricade removed or disposed of properly

Electrical											
Y	N	NA		Y	N	NA		Y	N	NA	
☐	☐	☐	Cords checked for damage	☐	☐	☐	Current inspection color on cords	☐	☐	☐	GFCI working

Comments

INSPECTION PERFORMED BY:	TITLE:	DATE

VOLUNTARY USE OF A RESPIRATOR

I _____ am requesting to use a disposable paper filter respirator, also known as a Dust Mask for my personal comfort.

I will be performing the following work task: (Example Sweeping Floor, etc.)

_____

_____

I clearly described the task I am to perform to my supervisor or safety coordinator and upon evaluating the task they determined I should not be exposed to a hazardous chemical or substance.

I have been supplied the following Dust Mask:

Brand: Model:

I understand that the disposable dust mask is for personal comfort and not intended to protect me from a hazardous chemical or substance. I further understand the voluntary use is limited to the task described above.

Please read the following:

Appendix D to Section 1910.134 (Mandatory) Information for Employees Using Respirators. When Not Required Under the Standard

Respirators are an effective method of protection against designated hazards when properly selected and worn. Respirators use is encouraged, even when exposures are below the exposure limit, to provide an additional level of comfort and protection for workers. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. Sometimes, workers may wear respirators to avoid exposures to hazards, even if the amount of hazardous substances does not exceed the limits set by OSHA standards. If your employer provides respirators for your voluntary use, or if you provide your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard.

You should do the following:

1. Read and heed all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirators limitations.
2. Choose respirators certified for use to protect against the contaminant of concern, NIOSH, the National Institute for Occupational Safety and Health of the U.S. Department of Health and Human Services certifies respirators. A label or statement of certification should appear on the respirator or respirator packaging. It will tell you what the respirator is designed for and how much it will protect you.
3. Do not wear your respirator into atmospheres containing contaminants for which your respirator is not designed to protect against. For example, a respirator designed to filter dust particles will not protect you against gases, vapors, or very small solid particles of fumes or smoke.
4. Keep track of your respirator so that you do not mistakenly use someone else's respirator.

I HAVE READ THE ABOVE SECTION FROM THE OSHA STANDARD FOR RESPIRATORY PROTECTION AND UNDERSTAND ITS CONTENT. I FURTHER UNDERSTAND THAT I AM RESPONSIBLE FOR THE CARE, MAINTENANCE/UPKEEP, AND PROPER STORAGE OF THIS RESPIRATOR. INSTRUCTIONS ON THE PROPER WEAR WERE MADE AVAILABLE TO ME.

_____

Signature: Date:

MEDICAL QUESTIONNAIRE FOR RESPIRATOR USE

Today's Date: _____ Subcontractor & Location: _____
Name: _____ Age: _____ Sex: _____
Height: ____Ft. ____ In. Weight: ____ Lbs. Job Title: _____
Home Telephone No: _____ Best Time to Call: _____
Has your company instructed you on how to contact the health care professional who will review your medical questionnaire? ____ Yes ____ No

Type respirator to be used:

☐ Disposable ☐ 1/2 Face ☐ Full Face ☐ PAPR ☐ Supplied Air ☐ SCBA
☐ Other:
Have you worn a respirator before? ___ Yes ___ No If yes, list type:

You must answer the following questions:

1	**Do you know how to read and write?**	___ Yes ___ No
2	**Are you a smoker?**	___ Yes ___ No
3	**Do you have trouble smelling odors?**	___ Yes ___ No
4	**Have you ever had any of the following conditions?:**	
	a. Seizures	___ Yes ___ No
	b. Diabetes	___ Yes ___ No
	c. Allergic reactions that interfere with your breathing	___ Yes ___ No
	d. Claustrophobia (fear of closed-in places)	___ Yes ___ No
5	**Have you ever had any of the following pulmonary or lung problems?:**	
	a. Asbestosis	___ Yes ___ No
	b. Asthma	___ Yes ___ No
	c. Chronic bronchitis	___ Yes ___ No
	d. Emphysema	___ Yes ___ No
	e. Pneumonia	___ Yes ___ No
	f. Tuberculosis	___ Yes ___ No
	g. Silicosis	___ Yes ___ No
	h. Pneumothorax	___ Yes ___ No
	i. Lung cancer	___ Yes ___ No
	j. Broken ribs	___ Yes ___ No
	k. Any chest injuries or surgeries	___ Yes ___ No
	l. Any other lung problem that you've been told about	___ Yes ___ No
6	**Do you currently have any of the following symptoms of pulmonary or lung illness?:**	
	a. Shortness of breath	___ Yes ___ No
	b. Shortness of breath when walking fast on level ground or up a slight incline	___ Yes ___ No
	c. Shortness of breath when walking with other people at an ordinary pace	___ Yes ___ No
	d. Have to stop for breath when walking at your own pace on level ground	___ Yes ___ No
	e. Shortness of breath when washing or dressing yourself	___ Yes ___ No
	f. Shortness of breath that interferes with your job	___ Yes ___ No
	g. Coughing that produces phlegm	___ Yes ___ No
	h. Coughing that wakes you early in morning	___ Yes ___ No
	i. Coughing that occurs mostly when you are lying down	___ Yes ___ No
	j. Coughing up blood in the last month	___ Yes ___ No
	k. Wheezing	___ Yes ___ No
	l. Wheezing that interferes with your job	___ Yes ___ No
	m. Chest pain when you breathe deeply	___ Yes ___ No
	n. Any other symptoms that you think may be related to lung problems	___ Yes ___ No
7	**Have you ever had any of the following cardiovascular or heart problems?:**	
	a. Heart attack	___ Yes ___ No
	b. Stroke	___ Yes ___ No
	c. Angina	___ Yes ___ No
	d. Heart failure	___ Yes ___ No
	e. Swelling in your legs or feet	___ Yes ___ No
	f. Heart arrhythmia	___ Yes ___ No
	g. High blood pressure	___ Yes ___ No
	h. Any other heart problem that you've been told about	___ Yes ___ No

MEDICAL QUESTIONNAIRE FOR RESPIRATOR USE cont

8	**Have you ever had any of the following cardiovascular or heart symptoms?:**	
	a. Frequent pain or tightness in your chest	___ Yes ___ No
	b. Pain or tightness in your chest during physical activity	___ Yes ___ No
	c. Pain or tightness in your chest that interferes with your job	___ Yes ___ No
	d. In the past two years, have you noticed your heart skipping or missing a beat	___ Yes ___ No
	e. Heartburn or indigestion that is not related to eating	___ Yes ___ No
	f. Any other symptoms that you think may be related to heart or circulation	___ Yes ___ No
9	**Do you currently take medication for any of the following problems?:**	
	a. Breathing or lung problems	___ Yes ___ No
	b. Heart trouble	___ Yes ___ No
	c. Blood pressure	___ Yes ___ No
	d. Seizures	___ Yes ___ No
10	**If you've used a respirator, have you experienced any of the following problems?:**	
	a. Eye irritation	___ Yes ___ No
	b. Skin allergies or rashes	___ Yes ___ No
	c. Anxiety	___ Yes ___ No
	d. General weakness or fatigue	___ Yes ___ No
	e. Any other problems that interfere with your use of a respirator	___ Yes ___ No
11	**Would you like to talk to the health professional who will review this questionnaire about your answers to this questionnaire?**	___ Yes ___ No
Answer the following questions, if required, to wear a full-face respirator or self-contained breathing apparatus (SCBA)		
1	**Have you ever lost vision in either eye?**	___ Yes ___ No
2	**Do you currently have any of the following vision problems?:**	
	a. Wear contact lenses	___ Yes ___ No
	b. Wear glasses	___ Yes ___ No
	c. Color blindness	___ Yes ___ No
	d. Any other eye or vision problems	___ Yes ___ No
3	**Have you ever had an injury to your ears, including a broken eardrum?**	___ Yes ___ No
4	**Do you currently have any of the following hearing problems?:**	
	a. Difficulty hearing	___ Yes ___ No
	b. Wear a hearing aid	___ Yes ___ No
	c. Any other hearing or ear problem	___ Yes ___ No
5	**Have you ever had a back injury?**	___ Yes ___ No
6	**Do you currently have any of the following musculoskeletal problems?:**	
	a. Weakness in any of your arms, hands, legs or feet	___ Yes ___ No
	b. Back pain	___ Yes ___ No
	c. Difficulty fully moving your arms and legs	___ Yes ___ No
	d. Pain or stiffness when you lean forward or backwards at the waist	___ Yes ___ No
	e. Difficult fully moving your head up or down	___ Yes ___ No
	f. Difficulty fully moving your head side to side	___ Yes ___ No
	g. Difficulty bending at your knees	___ Yes ___ No
	h. Difficulty squatting to the ground	___ Yes ___ No
	i. Difficulty climbing a flight of stairs or a ladder carrying more than 25 lbs.	___ Yes ___ No
	j. Any other muscle or skeletal problem that interferes with using a respirator	___ Yes ___ No

I certify that I answered the questions accurately and to the best of my knowledge and understand the training for the respiratory protection that has been provided.

Employee Signature _____ Date _____

I have reviewed this employee questionnaire and:

- ☐ Approve wearing of a respirator
- ☐ Approved, but with the following conditions:
- ☐ Do not approve this employee to wear a respirator

PLHCP Signature _____ Date _____

PRE-LIFT CHECKLIST

Required for lifts between 5 tons (10,000 lbs) up to but not including 25 tons (49999 lbs). All lifts 25 tons and over (50,000 lbs) or over 75% of cranes configured capacity, or require multiple (Tandem) crane lifts still require a critical lift plan.

Job No.:_____ Date:_____ Lift Description_____

Set up / Site Conditions

Soil Condition:

Weather Conditions: Suitable_____ Unsuitable_____ Explain_____

Are there underground hazards?	**Yes____**	**No__**
Will blocking or crane mats be used?	**Yes____**	**No__**
Are there fire or explosive hazards in the area?	**Yes____**	**No__**
Are there power lines within boom's length?	**Yes____**	**No__**
Are softeners required?	**Yes____**	**No__**

Reeving/parts of line_____ Center of Gravity Known_____

Load/Rigging/Attachments *Rigging Checked and Inspected*

Spreader Weight	_____ ***Lbs.***		***Type of Sling*** _____
Jib Weight	_____ ***Lbs.***		***Size of Sling*** _____
Load Weight	_____ Lbs.	Type of Hitch	_____
Block Weight	_____ Lbs.	Number Required	_____
Rigging Weight	_____ Lbs.	Angle of Slings	_____
Jib Ball Weight	_____ Lbs.	Shackle of Size	_____
Hoist Line Weight	_____ Lbs.	Hand Flagging	_____
Auxiliary Line Weight	_____ Lbs.	Radios	_____
Total Load	_____ Lbs.	Tag Line Quantity	_____
		Tag Line Length	

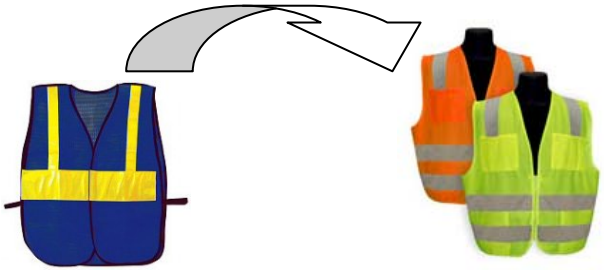
Crane Information

Crane Manufacturer	_____	Model No.	_____
Boom Length	_____	***On Outriggers***	_____
Boom Angle	_____	On Tires	_____
Boom Tip Height	_____	On Crawlers-Extended	_____
Jib Length	_____	On Crawlers-Retracted	_____
Maximum Load Radius	_____	Crane Level	_____
		Rated Capacity	_____

Lift will be: On Boom_____ On Jib_____ Over Side_____ Over End_____ 360°_____

Operator_____ Lift Supervisor_____

Blue Safety Vest Program



History

The reason for the development of the Blue Vest Program is to help Sapphire Energy identify "new" personnel on our jobsites. The Blue Vest Program emerged when there was a noticeable increase in, or a high number of, incidents occurring with "new" personnel. New personnel are identified as ANYONE who is NEW to a project, regardless of their tenure with the company or level of work experience.

While the vest colors (high visible yellow) will remain as our primary color of choice, we wanted to make it easy for everyone on site to recognize someone that was on the project for thirty (30) days or less. That being said, we considered the feasibility of issuing orientation decals or stripes on hardhats, and/or different colored hardhats, but came to the conclusion that these directives are not easily recognizable, are too varied to initiate and are believed to be somewhat ineffective. Hence, the concept of the Blue high-visibility Safety Vests was initiated.

The Program:

Initial Classification:

Sapphire Energy is aware that workers will range from brand new workers to those that have been employed in the construction industry for years but are just new to this project.

Level 1 Worker – New to this Sapphire Energy project or a former worker with greater than six month's separation.

a. Wear the Blue Safety Vest for a minimum of thirty (30) days, and

b. Complete the initial project HSSE Orientation

c. Complete specified On-line University training modules or through an assigned training vendor (or specified training such as, OSHA 10-hour, OSHA 30-hour and so on)

d. Assigned a mentor by their superintendent

e. Not assigned to work with another Blue Vest person alone

2. **Level 2 Worker** – All former workers with six months or less separation that are an AMEC "long-term" employee or journeyman classification.

a. Wear an Orange Safety Vest for a minimum of two (2) weeks, and

b. Complete the initial project HSSE Orientation

c. Complete specified On-line University training or through an assigned training vendor (or specified training such as, OSHA 10-hour, OSHA 30-hour and so on)

d. Assigned a mentor by their superintendent

Superintendent Interview:

1. The individual's superintendent sits down with the individual privately and completes a quick New Worker Questionnaire. From the questionnaire, the superintendent should have a basic understanding of:
    a. Years in construction
    b. Types of construction projects the individual worked on
    c. Specific types of job or craft classifications they have worked
    d. Whether they worked on this Sapphire Energy project before
    e. What their basic safety beliefs might be.
2. At the time of the interview, the superintendent will assign the individual training modules such as:
    a. Six Safety Essentials
    b. Safety Watch training
    c. OSHA 10 or 30 hour training
    d. First Aid/CPR
    e. NFPA 70E Arc Flash Training
    f. Competent Person training
    g. Rigging and/or Crane Signaling training
    h. And any three training modules located on the On-line University
3. The superintendent would at the conclusion of the initial interview assign the individual to a mentor within his work crew.
4. Superintendent will not assign two blue vested workers to work together without direct supervision.

Mentor:

1. A mentor is an individual within a work crew that the superintendent has assigned one or more new employees to.
2. The primary responsibility of a mentor is to educate new workers on Sapphire Energy safety culture and the necessary safety policies and procedures to follow when performing the work on this project.
3. The mentor monitors the new workers work with specific concentration on safety behavior. When at-risk behavior was observed take appropriate action to correct and counsel the new worker on how to change that behavior.

Evaluation:

1. At the end of the required wearing of the blue vest, the superintendent and mentor will meet to discuss whether the individual meets their expectations.
2. If the superintendent and mentor determine the individual has completed all training and demonstrates a good safety attitude, the new worker will be allowed to progress to the yellow/orange vest.
3. If the superintendent and mentor determine that the individual has not completed the training or demonstrates a good safety attitude, the new worker will remain in the blue vest until completion of training and/or demonstrates a good safety attitude.

NEW WORKER QUESTIONNAIRE

Employee Name: _____

Job Title: _____

Contractor: _____

Supervisor: _____ Date: _____

Supervision must interview each new worker assigned to them in an effort to determine the level of experience and skill the individual has; determine their personal safety culture; and determine any additional training the individual may be required to complete.

How many years has the individual worked in construction?

What type of construction has the individual worked on? (Industrial, Commercial, Residential, Road)

What specific job titles has the individual held in the past?

Has the individual worked on this Sapphire Energy project before? **Yes** **No**

Safety Beliefs Questions		Yes	No
1	Does strict compliance to corporate safety rules slow down production?		
2	Do you think that AMEC is serious about safety?		
3	Is the HSE professional responsible for safety?		
4	Do you believe you should be held accountable for your safety performance?		
5	Would you intervene and stop another worker that is working unsafe?		
6	Do you think safety training is overall a waste of time?		

Assign Safety Training (Does not include job specific training)

☐	Six Safety Essentials	☐	NFPA 70E Arc Flash Training
☐	Safety Watch	☐	Competent Person Training
☐	Supervisor Training	☐	
☐	OSHA 10 Hour	☐	
☐	OSHA 30 Hour	☐	
☐	Safety Trained Supervisor (STS) Course	☐	
☐	First Aid/CPR	☐	

Assigned Mentor(s)

Comments

HEAT INDEX AND PHYSICAL ACTIVITY:

Obtain from the local weather or internet weather site(s) what the current heat index is for the project.

Once the WBGT heat index has been determine, the following chart can be used as a guide when planning work:

AIR TEMPERATURE/RELATIVE HUMIDITY TO HEAT CATEGORY CONVERSION CHART

TEMPERATURE	RELATIVE HUMIDITY (Round up)														
	25	30	35	40	45	50	55	60	65	70	75	85	90	95	100
98	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
97	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
96	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
95	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
94	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
93	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
92	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
91	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
90	4	5	5	5	5	5	5	5	5	5	5	5	5	5	5
89	3	4	5	5	5	5	5	5	5	5	5	5	5	5	5
88	3	4	4	5	5	5	5	5	5	5	5	5	5	5	5
87	3	3	3	4	5	5	5	5	5	5	5	5	5	5	5
86	2	3	3	4	4	4	5	5	5	5	5	5	5	5	5
85	2	2	2	3	3	4	4	5	5	5	5	5	5	5	5
84	2	2	2	3	3	3	3	4	4	5	5	5	5	5	5
83	1	1	2	2	2	3	3	3	3	4	5	5	5	5	5
82	1	1	1	2	2	2	2	3	3	4	4	5	5	5	5
81	1	1	1	1	1	2	2	2	2	3	4	4	5	5	5
80	0	1	1	1	1	1	1	2	2	3	3	3	4	4	5
79	0	0	0	1	1	1	1	1	1	2	2	3	3	3	4
78	0	0	0	0	1	1	1	1	1	2	2	2	3	3	3
77	0	0	0	0	0	1	1	1	1	1	1	2	2	2	3
76	0	0	0	0	0	0	0	1	1	1	1	1	1	1	2
75	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
74	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
73	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
72	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
71	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Once the Heat Category has been determined use the below chart to assist in determining the time a worker should normally work and res. The chart further recommends the amount of water the worker should consume to maintain hydration.

WORK REST CYCLES/WATER CONSUMPTION TABLE

Heat Category	WBGT Index. F°	Easy Work		Moderate Work		Hard Work	
		Work/Rest	Water Intake (Qt/hr)	Work/Rest	Water Intake (Qt/hr)	Work/Rest	Water Intake (Qt/hr)
0	77 Below	NL	NL	NL	NL	NL	NL
1	78 – 81.9	NL	1/2	NL	3/4	40/20 min	3/4
2	82 – 84.9	NL	1/2	50/10 min	3/4	30/30	1
3	85 – 87.9	NL	3/4	40/20 min	3/4	30/30 min	1
4	88 – 89.9	NL	3/4	30/30	3/4	20/40 min	1
5	>90	50/10 min	1	20/40 min	1	10/50 min	1

The work-rest times and fluid replacement volumes will sustain performance and hydration for at least 4 hours of work in the specified heat category. Fluids needs can vary based on individuals differences and exposures to full sun or full shade

CAUTION: ***HOURLY FLUID INTAKE SHOULD NOT EXCEED 1.5 QUARTS.***

DAILY FLUID INTAKE SHOULD NOT EXCEED 12 QUARTS.

Category 5 is considered a “Black Flag” and extreme caution must be taken when work is being performed in this condition.

Sapphire Energy

Risk Management Plan
Integrated Algal Bio-Refinery (IABR)
Columbus, New Mexico

July 2011

Risk Management Plan for the IABR

This plan serves as the framework and provides the general guidelines for identifying, assessing, and mitigating risks associated with the development and deployment of Sapphire Energy's Integrated Algal Biorefinery Project (IABR) located in Columbus, New Mexico.

Additionally, the plan outlines approaches and triggers for contingency planning and actions, assignment of responsibilities and management of the ongoing maintenance and communication of the plan and its associated risk register.

General Project Description and Purpose

Sapphire Energy Company (Sapphire) is currently constructing an Integrated Algal Bio-Refinery Facility (IABR) to produce oil from algae, ultimately refining the oil into various types of transportation fuel. Sapphire's IABR is located southwest of the community of Columbus in Luna County, New Mexico. (Figures 1 and 2)

Figure 1: Map of IABR Project Site and Surrounding Area

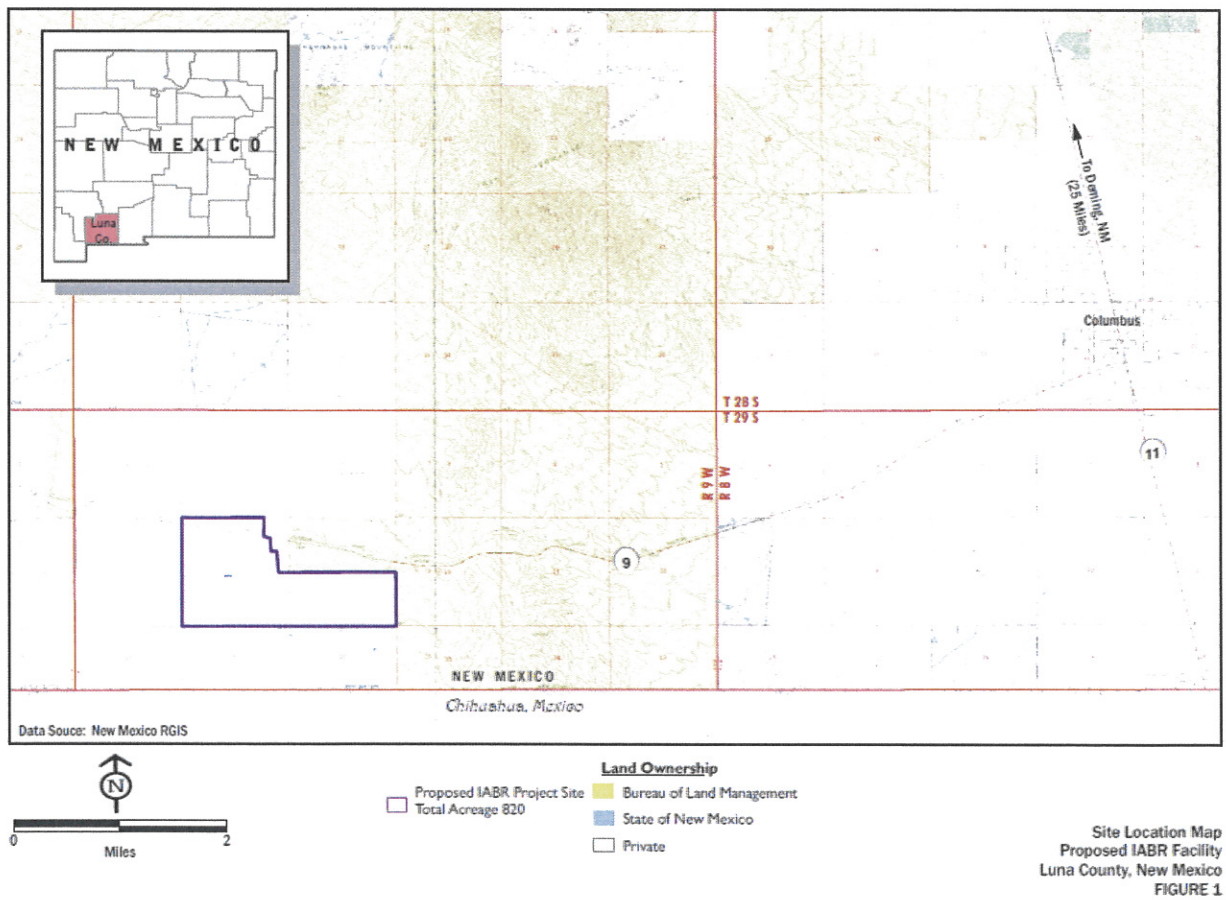
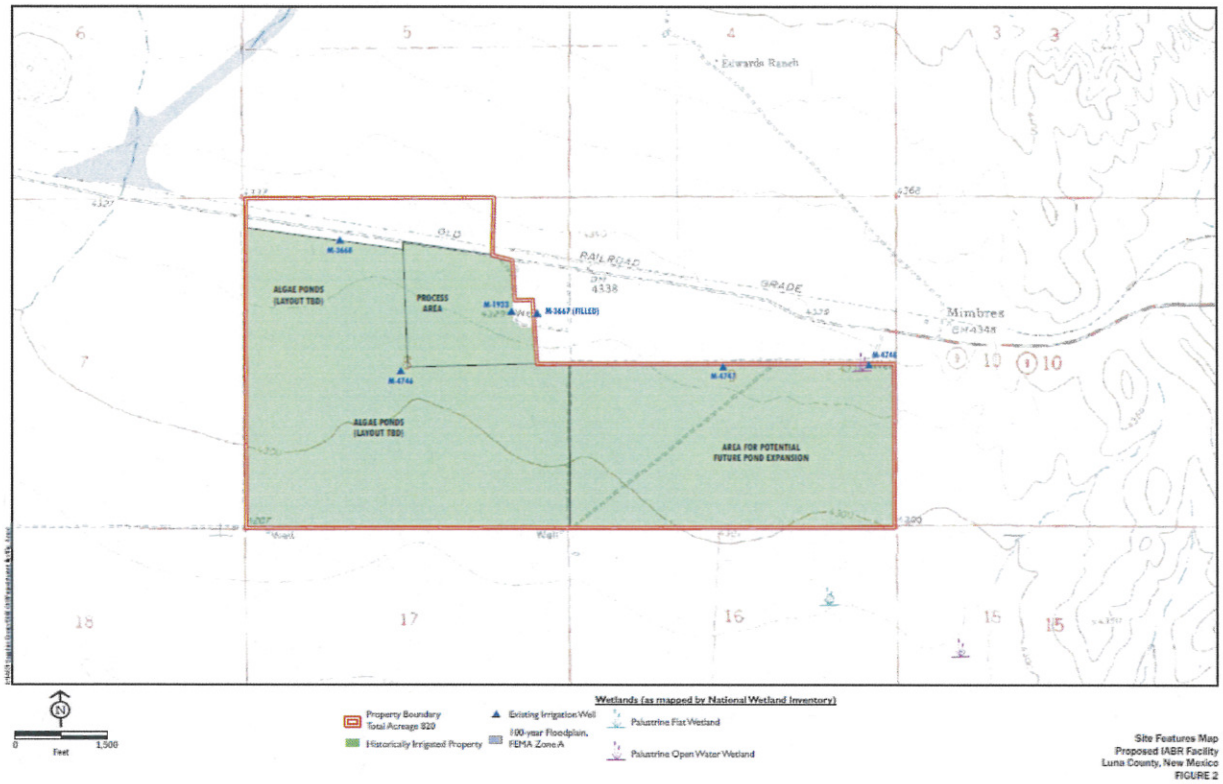


Figure 2: Detailed Map of Western Parcel for IABR Project



The purpose of the project is to construct and operate a demonstration-scale facility in the United States (US) that results in the ultimate production of transportation fuels, derived from renewable algae sources, effectively reducing our country's dependence on foreign oil and fossil fuels. The IABR facility will be constructed in phases and in full deployment will be capable of producing 100 barrels (bbl) of refined algal oil per day. The algae used in the proposed project do not meet the definition of "genetically modified organisms" as identified by the US Environmental Protection Agency and, thus, the project is not subject to review by the Animal and Health Inspection Service (APHIS) Biotechnology Regulatory Service.

Algal oil extracted from the biomass at the IABR will be refined at the existing Dynamic Fuels facility in Geismar, Louisiana. Dynamic Fuels is an independent company that operates its Louisiana facility under separate environmental and operating permits.

Risk Identification

General Description and Categories

The IABR project is a multidisciplinary undertaking that involves the aggregation of a wide range of specialties and technologies. These include the engineering and design and development of engineered unit operations; technology integration; process and stain development and optimization; project

execution and construction, start-up, monitoring and operations; and project schedule, financing, technical and performance goals.

Each of these general areas are in turn directly connected to all others and have direct effect on status and in the aggregate represent a whole spectrum of combinations that generate the project's overall risk profile.

A successful Risk Management Plan needs to be integrated into the larger project plan. In that manner it serves as a powerful tool to help gauge, guide, inform and disseminate important project details to all stakeholders and participants. The following are integrated processes that will be used in conjunction with and in support of the RMP.

Project Management for a Developing Technology

Effective project management is the key to the integration of the diverse elements needed for successful project delivery. At the highest level the overall management of the work must ensure that the project maintains its focus on its stated goals.

Given the first in kind nature of the IABR Project requires a flexible project management strategy that is interactive and responsive to feedback from the ongoing concurrent science programs, partner collaborations and the interest of other project stakeholders. Three areas of particular attention that serve to guide the decision and risk management process are discussed below:

Short and Long Term Drivers – Inherent in the development of the IABR project a careful balance is needed between short term and long term drivers. These can include technical, financial, policy, permitting, constructability and many other specific items. Risk management and project management discipline will be aligned to maintain these matters in service of the overall stated project goals.

Good Decision Making – An obvious requirement, but the specific need to remain disciplined and focused as project risks are diagnosed and corresponding decisions are made is an essential element for proper risk management. Decisions will be made to first seek and then reflect the best available information; process and introduce changes proactively; apply best practices to consult, decide and inform all stakeholders; identify and maintain the ability to mobilize needed resources; maintain and respect feedback and adjustment mechanisms; and work to earn the trust as responsible stewards of the project and committed resources.

Gaps – All projects can be expected to contain any matter of practical gaps between baseline plans and expectations. It is accepted that the nature of the IABR project will yield the consistent identification of gaps and the need for corresponding redress. As each gap is identified, the diagnosis and analysis of the inherent conflict between data, schedule and cost and the resulting project impacts becomes the key priority. These conditions require the mobilization of the needed experience and subject matter expertise; the development of clear priorities and a clear understanding of impact to other matters, followed by an ability to track outcomes and retain flexibility to make adjustments or apply further contingencies.

Categories

In addition to the formal and continued input from the Independent Engineer and IPA, a risk register will serve as a consolidation document for documenting and categorizing identified risks, their status, responsible parties and potential project impact. The risk register will contain the following general categories:

- IPA Recommendations
- Project Management and Engineering
- Technology
- Operations
- Financing
- Timeline

Risk Assessment

Once a risk is identified, accepted, and placed into the risk register, it is essential to establish the potential project impact(s) that can be expected to result. The following are used as summary descriptions that provide a general rating of the risk and its potential impact.

None – A risk that is understood to have little to no impact in terms of project performance, costs or schedule. Typically, this description is not applicable to an identified risk when it is originally entered into the risk register, rather a subsequent adjustment after analysis or corrective action has been implemented and results established; or after the risk has been fully mitigated and can be considered a closed item.

Low – A risk that is understood to have the potential to impact elements of project performance, costs or schedule but will not affect the project's overall timeline, budget and performance requirements.

Medium – A risk that is understood to have the potential to impact elements of project performance, costs or schedule and a subsequent consequential effect on any one of the project's key metrics; overall timeline, budget and performance requirements.

High – A risk that is understood to have the potential to impact elements of project performance, costs or schedule and a subsequent consequential effect on any two of the project's key metrics; overall timeline, budget and performance requirements.

Severe - A risk that is understood to have the potential to impact elements of project performance, costs or schedule and a subsequent consequential effect on all three of the project's key metrics; overall timeline, budget and performance requirements. This category is also applied to situations where the potential impact to any single key project metric is so serious as to potentially fail the overall project.

Methodologies and Diagnostic Tools

Risks will be assigned and reviewed and adjusted as appropriate by the IABR Project Team under the direction of the IABR Project Manager and the Responsible Party assigned custody of each risk item. The process by its very nature will, in part, need to rely on the subject matter expertise, judgment and experience of the individuals involved as well as the totaled project condition at the time of decision. The whole process will be complimented with the use of practical diagnostic tools and mechanisms at the team's disposal and will include an overall, task and logic linked project schedule; an overall project techno-economic model; and decision/impact methods like decision trees, extreme and exceedance analyses.

Risk Mitigation

A companion activity to the risk assessment is the development of the corresponding risk mitigation strategy and response. In general this process involves the appointment of a Responsible Party (RP) to serve as the leader in the development and implementation of the risk mitigation strategies.

The range and scale associated with these efforts will be very broad. It may be a straightforward and obvious plan forward, or for situations generally associated with higher risk profiles, require the development of several mitigation options and involve a decision process to include other project collaborators and stakeholders. For these conditions a formal RACI methodology may be applied. In general this approach assigns each interested or affected stakeholder with specific roles, each associated by task or subtask in the decision and implementation mechanisms associated with the mitigation strategy and response. The following summarizes the roles associate with the RACI methodology:

R = Responsible

A = Accountable

C = Consult (prior to decision)

I = Inform (promptly after decision is made)

Contingency Planning

Contingency planning is an important supplement to the risk management process. Contingency plans serve as the back-up response to mitigation measures that are not successful in addressing the identified risk.

Contingency planning can start as early as necessary in the risk mitigation process. For higher risk matters, where multiple mitigation options are developed, the options that are not selected as primary can often serve as, " in-hand" contingency plans. Additionally at the time an initial mitigation is selected, the decision methodologies and available diagnostic tools will purposefully indicate the likelihood for complete or partial success and ascertain the implications associated with partial or lack of success.

Project management, results tracking and overall mitigation execution will be closely monitored as a part of an interactive plan, implement, analyze and adjust cycle for each mitigation. In events where mitigation results are not as desired, modification and contingency options will be considered and implemented as appropriate.

Any resulting adjustments will be formally developed and resourced for incorporation into project planning with the needed due diligence and impact analysis required of any risk mitigation.

Responsibilities

As the individual with overall project responsibility, the Principal Investigator for the project has the duty to ensure that risks are properly identified, managed and resolved. The balance of the Sapphire

enterprise and project team are at the Principal Investigator's disposal to mobilize as needed to address project requirements in any manner needed.

The day to day project leaders; the Project Manager and Project Engineer are in close contact with all project detail, information and participants. They serve as the Principal Investigator's primary leads in project execution and reporting. Together with the Principal Investigator, the Project Manager and Project Engineer will serve as the working group that will organize the required risk assessments, mitigation planning, resource assignment and development of project tasks and formal RACI responsibilities.

Maintenance

Risk Mitigation is an ongoing project activity and is statused at weekly project review meetings and weekly project construction meetings. Supplemental maintenance and reviews are conducted as needed for each individual mitigation plan.

In addition to these specific reviews, the overall risk impacts as well as any individual risk impact to the overall IABR performance goals are reviewed at regularly scheduled project reviews internal to Sapphire as well as with other project stakeholders.

Plan to Date

Since the IABR project was originally proposed in June 2009, Sapphire has been very proactive in the management of risks that have focused as the progress of the project has advanced. The fundamental driver in Sapphire's approach has remained consistent in the stated requirement that the IABR must deliver on its original goals and remain focused on its overall purpose.

The original project execution plan for constructing and deploying a single phase 300 acre facility reliant on first generation designs and technology has been significantly de-risked and cost controlled by an overall mitigation strategy where the project will be phased. The phased approach allows for the incorporation of technology improvements, operational experience and a more purposeful deployment and commitment of project funds that provide a higher likelihood for overall project success.

Additionally, Sapphire has incorporated all of IPA's formal recommendations and will continue to be proactive, informed and engaged in risk mitigation for the project.

Risk Register

A copy of the project's risk register is attached.

Risk Register – IPA Recommendations

IPA Recommendations	Action	Status
Redacted Exemption 4		

Risk Register – Project Management and Engineering

Tracking Number		Project Area	Project Risk	RMP	RP	Status	Risk Probability	Potential Impact
PME.1	Redacted Exemption 4							
PME.2								
PME.3								
PME.4								
PME.5								
PME.6								
PME.7								
PME.8								
PME.9								
PME.10								
PME.11								
PME.12								
PME.13								
PME.14								
PME.15								
PME.16								
PME.17								
PME.18								
PME.19								
PME.20								
PME.21								

Risk Register - Technology

Tracking Number		Project Area	Project Risk	RMP	RP	Status	Risk Probability	Potential Impact
TECH.1	Redacted Exemption 4							
TECH.2								
TECH.3								
TECH.4								
TECH.5								
TECH.6								
TECH.7								
TECH.8								
TECH.9								
TECH.10								
TECH.11								
TECH.12								
TECH.13								
TECH.14								

Risk Register - Operations

Tracking Number		Project Area	Project Risk	RMP	RP	Status	Risk Probability	Potential Impact
OP.1	Redacted Exemption 4							
OP.2								
OP.3								
OP.4								

Risk Register - Financing

Tracking Number		Project Area	Project Risk	RMP	RP	Status	Risk Probability	Potential Impact
FIN.1	Redacted Exemption 4							
FIN.2								
FIN.3								
FIN.4								
FIN.5								
FIN.6								

Risk Register - Timeline

Tracking Number		Project Area	Project Risk	RMP	RP	Status	Risk Probability	Potential Impact
TL.1	Redacted Exemption 4							
TL.2								
TL.3								
TL.4								
TL.5								
TL.6								
TL.7								
TL.8								
TL.9								
TL.10								
TL.11								
TL.12								
TL.13								

Main Summary Sheet

AMEC

6/22/2011
12:42 PM

PROJECT: Integrated Algal Biorefinery Project
CUSTOMER: Sapphire Energy
LOCATION: Columbus, NM
SENIOR VP:

FOR REVIEW - Phase 1

DURATION MONTHS: 15.5
BID DATE: 20-Jun-11
BID TIME: 12:00 AM
ESTIMATE # : 0
ESTIMATING:

BID ITEM	DESCRIPTION	MH	LABOR	MATERIAL	EQUIPMENT	SUBCONTRACT	TOTAL
1	Div 1 - General Requirements						
2	Div 2 - Site Construction						
3	Div 3 - Concrete						
4	Div 4 - Masonry						
5	Div 5 - Metals						
6	Div 6 - Woods & Plastics						
7	Div 7 - Thermal & Moisture Protection						
8	Div 8 - Windows						
9	Div 9 - Finishes						
10	Div 10 - Specialties						
11	Div 11 - Equipment						
12	Div 12 - Furnishings						
13	Div 13 - Special Construction						
14	Div 14 - Conveying Systems						
15	Div 15 - Mechanical						
16	Div 16 - Electrical						
17	Div 17- Instrumentation						
18	ADJUSTMENT #1 (Well Systems)						
	TOTAL DIRECT COSTS:						
19.0	CONTRACTOR PROJECT INDIRECT COSTS		% OF SUBTOTAL				
20.0	CONSTRUCTION MANAGEMENT SERVICES						
	SUBTOTAL COST:						
21.0	BUILDERS RISK INSURANCE		% OF SUBTOTAL				
22.0	PERFORMANCE & PAYMENT BOND						
	SUBTOTAL COST:						
23.0	MARGIN		% OF SUBTOTAL				
	SUBTOTAL COST:						
24.0	GROSS RECEIPTS TAX ALLOWANCE		% OF SUBTOTAL				
	SUBTOTAL COST:						
25.0	Pretreatment Allowance		% OF SUBTOTAL				
26.0	Project Development Allowance						
	TOTAL CONSTRUCTION COST:						

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

TRANSMITTAL

amec

TO	Sapphire Energy **27102 Puerta Real Suite 280,** **Mission Viejo, CA 92691-8009**	DATE	June 21, 2011
		TRANSMITTAL NO.	Tm005
		PROJECT NO.	165768
		PROJECT TITLE	Sapphire
ATTN:	Ron Kluwe	FILE NO.	
VIA	Fed Ex **(949) 202-4706**	REFERENCE NO.	

REASON FOR TRANSMITTAL:

☒ FOR INFORMATION	☐ FOR CONSTRUCTION	☐ FOR DESIGN	☐ FOR PURCHASE
☐ FOR YOUR APPROVAL	☐ FOR FABRICATION	☐ FOR DETAILING	☐ AS REQUESTED
☐ FOR YOUR REVIEW	☐ FOR COMMENT	☐ RETURNED FOR CORRECTIONS	☐ OTHER: _____

ACTION REQUIRED:

☐ APPROVAL/COMMENTS NEEDED BY _____	☐ RESUBMIT _____ COPIES	☒ NONE	☐ OTHER: _____

ITEMS BEING TRANSMITTED:

☐ PRINTS OF DRAWINGS	☐ SHOP DRAWINGS	☐ SPECIFICATIONS	☐ COMPUTER DISKS
☐ ORIGINAL DRAWINGS	☐ CHANGE ORDER(S)	☐ CUT SHEETS	☒ OTHER: _____Bond_____

QTY	DOCUMENT NO.	REV.	TITLE	REMARKS
1	1 June 2011		New Bond	
			Principal:	AMEC E&C Services, Inc.
			Obligee:	Sapphire Energy, Inc
			Performance and Payment:	Project No. PR.110205.100 Sapphire Energy IABR, IABR Facility, Luna County, New Mexico, 1500 hwy 9 SW, Deming, NM 88030
			Bond Amount:	$: Redacted Exemption 4
			Bond Number:	Redacted Exemption 4
			Surety Name:	Redacted Exemption 4

David Gatto
Construction Project Manager

cc: File

AMEC E&C Services, Inc.
Midwest Plaza Building
800 Marquette Ave., Suite 1200
Minneapolis, MN 55402
Tel (612) 332-8326
Fax (612) 332-2423

Julia B. Taylor, AFSB
Assistant Vice President

MARSH

Marsh USA Inc.
1255 23rd Street NW
Suite 400
Washington, DC 20037
202 263 7742
Julia.B.Taylor@Marsh.com
www.marsh.com

June 08, 2011

Mr. James A. Bunta
AMEC
10706 Sikes Place
Suite 250
Charlotte, NC 282777

Subject: New Bond

Principal: AMEC E&C Services, Inc.
Obligee: Sapphire Energy, Inc.
Bond Description: Performance and Payment-Project No. PR.110205.100 Sapphire Energy IABR, IABR Facility, Luna County, New Mexico, 1500 Hwy 9 SW, Deming, NM 88030
Bond Amount: $ Redacted Exemption 4
Bond Number: Redacted Exemption 4
Surety Name: Redacted Exemption 4

Dear James:

Enclosed is the above-referenced bond in response to your request dated June 7, 2011. The bond is based on the information we received with the request. Please recheck the bond for accuracy, and have it signed, sealed, and forwarded to the Sapphire Energy, Inc. for acceptance and filing.

In the event that you do not accept and file the bond with the obligee, please return this original document to Marsh so we can notify the surety company that the bond was not accepted and filed; otherwise, the surety company will process a premium billing for the bond.

You will be receiving our invoice for this transaction in the amount of $ Redacted Exemption 4

If you have any questions, please feel free to contact me. Thank you for allowing Marsh to service your surety needs.

Very truly yours,

Julia B. Taylor, AFSB
Assistant Vice President

Copy
David C. Moylan, Marsh
Arlene Gwizd, AMEC

Enclosure

Document A312™ – 2010

Conforms with The American Institute of Architects AIA Document 312

Performance Bond

Bond Number: Redacted Exemption 4

CONTRACTOR:
(Name, legal status and address)
AMEC E&C Services, Inc.
1979 Lakeside Parkway, Suite 500
Tucker, GA 30084

SURETY:
(Name, legal status and principal place of business)
Redacted Exemption 4

OWNER:
(Name, legal status and address)
Sapphire Energy, Inc.
3115 Merryfield Row
San Diego, CA 92121

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT
Date: **June 01, 2011**

Amount: $ Redacted Exemption 4

Description:
(Name and location)
Project No. PR.110205.100 Sapphire Energy IABR, IABR Facility, Luna County, New Mexico, 1500 Hwy 9 SW, Deming, NM 88030

BOND
Date: **June 08, 2011**
(Not earlier than Construction Contract Date)

Amount: $ Redacted Exemption 4

Modifications to this Bond: [X] None [ ] See Section 16

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*
AMEC E&C Services, Inc.

Signature: _____
Name And Title: Phillip Barnes CFO, Power & Process Americas

SURETY
Company: *(Corporate Seal)*
Redacted Exemption 4

Signature: _____
Name And Title: **Julia B. Taylor, Attorney-In-Fact**

(Any additional signatures appear on the last page of this Performance Bond)

(FOR INFORMATION ONLY – Name, address and telephone)
AGENT or BROKER:
Marsh USA Inc.
1255 23rd Street, NW
Washington, DC 20037
202-263-7600

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

Redacted Exemption 4

Redacted Exemption 4

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

Signature:

Name and Title: Philip Barnes CEC, Power & Process Americas

Address

SURETY

Company: *(Corporate Seal)*

Redacted Exemption 4

Signature:

Name and Title: **Julia B. Taylor, Attorney-In-Fact**

Address

Document A312™ – 2010

Conforms with The American Institute of Architects AIA Document 312

Payment Bond

Bond Number: Redacted Exemption 4

CONTRACTOR:
(Name, legal status and address)
AMEC E&C Services, Inc.
1979 Lakeside Parkway, Suite 500
Tucker, GA 30084

SURETY:
(Name, legal status and principal place of business)
Redacted Exemption 4

OWNER:
(Name, legal status and address)
Sapphire Energy, Inc.
3115 Merryfield Row
San Diego, CA 92121

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

CONSTRUCTION CONTRACT
Date: **June 01, 2011**

Amount: $ Redacted Exemption 4

Description:
(Name and location)
Project No. PR.110205.100 Sapphire Energy IABR, IABR Facility, Luna County, New Mexico, 1500 Hwy 9 SW, Deming, NM 88030

BOND
Date: **June 08, 2011**
(Not earlier than Construction Contract Date)

Amount: $ Redacted Exemption 4

Modifications to this Bond: [X] None [ ] See Section 18

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*
AMEC E&C Services, Inc.

Signature:
Name And Title: Philip Barnes
CEO, Power & Process Americas
(Any additional signatures appear on the last page of this Performance Bond)

SURETY
Company: *(Corporate Seal)*
Redacted Exemption 4

Signature:
Name And Title: **Julia B. Taylor, Attorney-In-Fact**

(FOR INFORMATION ONLY – Name, address and telephone)
AGENT or BROKER:
Marsh USA Inc.
1255 23rd Street, NW
Washington, DC 20037
202-263-7600

OWNER'S REPRESENTATIVE:
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Redacted Exemption 4

Redacted Exemption 4

Redacted Exemption 4

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL

Company: *(Corporate Seal)*

Signature:

Name and Title: Philip Barnes, CFO, Power & Process Americas

Address

SURETY

Company: *(Corporate Seal)*

Redacted Exemption 4

Signature:

Name and Title: **Julia B. Taylor, Attorney-In-Fact**

Address

Redacted Exemption 4

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that the Redacted Exemption 4 , a corporation created by and existing under the laws of the State of New York does hereby nominate, constitute and appoint **Julia B. TAYLOR,** Redacted Exemption 4 Redacted Exemption 4 **, all of Washington, District of Columbia,** EACH its true and lawful Attorneys-In-Fact with power and authority hereby conferred to sign, seal, and execute in its behalf, during the period beginning with the date of issuance of this power, : **any and all bonds and undertakings, recognizances or other written obligations in the nature thereof**, and to bind Redacted Exemption 4 thereby, and all of the acts of said Attorney[s]-in-Fact pursuant to these presents are hereby ratified and confirmed . This Power of Attorney is made and executed pursuant to and by the authority of the following By-Law duly adopted by the Board of Directors of the Company which By-Law has not been amended or rescinded.

Article VI, Section 5. "...The President or a Vice President in a written instrument attested by a Secretary or an Assistant Secretary may appoint any person Attorney-In-Fact with authority to execute surety bonds on behalf of the Company and other formal underwriting contracts in reference thereto and reinsurance agreements relating to individual polices and bonds of all kinds and attach the corporate seal. Any such officers may revoke the powers granted to any Attorney-In-Fact."

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of the Redacted Exemption 4 by unanimous consent in lieu of a special meeting dated December 15, 1998

" RESOLVED, that the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the seal of the Company may be affixed by facsimile on any Power of Attorney pursuant to Article VI, Section 5 of the By-Laws, and the signature of a Secretary or an Assistant Secretary and the seal of the Company may be affixed by facsimile to any certificate of any such power. Any such power or any certificate thereof with such facsimile signature and seal shall be valid and binding on the Company. Furthermore, such power so executed, sealed and certified by certificate so executed and sealed shall, with respect to any bond or undertaking to which it is attached, shall continue to be valid and binding on the Company."

IN WITNESS WHEREOF, the Redacted Exemption 4 has caused these presents to be executed in its name and on its behalf and its Corporate Seal to be hereunto affixed and attested by its officers thereunto duly authorized, this **12th day of April, A.D. 2011**.

This power of attorney revokes that issued on behalf of Julia B. TAYLOR, Redacted Exemption 4 Redacted Exemption 4 , dated December 14, 2010.

Redacted Exemption 4

Redacted Exemption 4

STATE OF MARYLAND }
CITY OF BALTIMORE } ss: Redacted Exemption 4

On the 12th day of April, A.D. 2011, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, came the above named Vice President and Secretary of Redacted Exemption 4 , to me personally known to be the individuals and officers described in and who executed the preceding instrument and they each acknowledged the execution of the same and being by me duly sworn, they severally and each for himself deposed and said that they respectively hold the offices in said Corporation as indicated, that the Seal affixed to the preceding instrument is the Corporate Seal of said Corporation, and that the said Corporate Seal, and their respective signature as such officers, were duly affixed and subscribed to the said instrument pursuant to all due corporate authorization.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above.

Constance A. Dunn

Notary Public *My Commission Expires: July 14, 2011*

This Power of Attorney limits the acts of those named therein to the bonds and undertaking specifically named therein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

CERTIFICATE

I, the undersigned, a Secretary of the Redacted Exemption 4 , do hereby certify that the foregoing Power of Attorney is still in full force and effect, and further certify that Article VI, Section 5 of the By-Laws of the Company and the Resolution of the Board of Directors set forth in said Power of Attorney are still in force.

IN TESTIMONY WHEREOF I have hereto subscribed my name and affixed the seal of said Company

Redacted Exemption 4

Redacted Exemption 4

the 08 day of June 2011

POWER OF ATTORNEY

Redacted Exemption 4

Power No. 31549

No. 06-B-37805

KNOW ALL MEN BY THESE PRESENTS:

That Redacted Exemption 4 does hereby appoint

Redacted Exemption 4 , Julia B. Taylor, Redacted Exemption 4 of Washington, D.C.---

its true and lawful Attorney(s)-in-Fact, with full authority to execute on its behalf bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, issued in the course of its business, and to bind the respective company thereby.

IN WITNESS WHEREOF, Redacted Exemption 4 has executed these presents

this 10th day of January, 2011

Redacted Exemption 4

Redacted Exemption 4

STATE OF NEW YORK }

COUNTY OF NEW YORK } ss.

On this 10th day of January, 2011 before me came the above named officer of Redacted Exemption 4 , to me personally known to be the individual and officer described herein, and acknowledged that he executed the foregoing instrument and affixed the seals of said corporation thereto by authority of his office.

Juliana E. Hallenbeck

JULIANA HALLENBECK
Notary Public - State of New York
No. 01HA6125871
Qualified in Bronx County
My Commission Expires April 18, 2013

CERTIFICATE

Exerpts of Resolutions adopted by the Boards of Directors of Redacted Exemption 4 , on May 18, 1976:

"RESOLVED, that the Chairman of the Board, the President, or any Vice President be, and hereby is, authorized to appoint Attorneys-in-Fact to represent and act for and on behalf of the Company to execute bonds, undertakings, recognizances and other contracts of indemity and writings obligatory in the nature thereof, and to attach thereto the corporate seal of the Company, in the transaction of its surety business;

"RESOLVED, that the signatures and attestations of such officers and the seal of the Company may be affixed to any such Power of Attorney or to any certificate relating thereto by facsimile, and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company when so affixed with respect to any bond, undertaking, recognizance and other contract of indemnity and writing obligatory in the nature thereof;

"RESOLVED, that any such Attorney-in-Fact delivering a secretarial certification that the foregoing resolutions still be in effect may insert in such certification the date thereof, said date to be not later than the date of delivery thereof by such Attorney-in-Fact."

I, Redacted Exemption 4 , do hereby certify that the foregoing exerpts of Resolutions adopted by the Boards of Directors of this corporation, and the Power of Attorney issued pursuant thereto, are true and correct, and that both the Resolutions and the Powers of Attorney are in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the facsimile seal of the corporation

this 08 day of June 2011

Redacted Exemption 4

Redacted Exemption 4

23238 (4/02)

TRANSMITTAL

TO	Sapphire Energy 1500 Hwy 9 SW Columbus, NM 88029	DATE	9/8/11
		TRANSMITTAL NO.	
		PROJECT NO.	168423
		PROJECT TITLE	Sapphire IABR
ATTN:	Ron Kluwe	FILE NO.	
VIA		REFERENCE NO.	

REASON FOR TRANSMITTAL:

☐ FOR INFORMATION	☐ FOR CONSTRUCTION	☐ FOR DESIGN	☐ FOR PURCHASE
☐ FOR YOUR APPROVAL	☐ FOR FABRICATION	☐ FOR DETAILING	☐ AS REQUESTED
☐ FOR YOUR REVIEW	☐ FOR COMMENT	☐ RETURNED FOR CORRECTIONS	☒ OTHER: __For your use_____

ACTION REQUIRED:

☐ APPROVAL/COMMENTS NEEDED BY _____	☐ RESUBMIT _____ COPIES	☐ NONE	☐ OTHER: _____

ITEMS BEING TRANSMITTED:

☐ PRINTS OF DRAWINGS	☐ SHOP DRAWINGS	☐ SPECIFICATIONS	☐ COMPUTER DISKS
☐ ORIGINAL DRAWINGS	☐ CHANGE ORDER(S)	☐ CUT SHEETS	☐ OTHER: _____

QTY	DOCUMENT NO.	REV.	TITLE	REMARKS
1	Redacted Exemption 4		P & P Bond	

David Gatto
~~name~~
Project Manager

Other comments and Notes:

cc:

AMEC E&C Services, Inc
800 Marquette Ave
Suite 1200
Minneapolis, MN 55402
Tel: (612) 332 8328
Fax: (612) 332 2423

SURETY RIDER

To be attached to and form a part of

Bond No. Redacted Exemption 4

Type of Bond: **Performance and Payment-Project No. PR.110205.100 Sapphire Energy IABR, IABR Facility, Luna County, New Mexico, 1500 Hwy 9 SW, Deming, NM 88030**

dated effective **June 01, 2011**
(MONTH-DAY-YEAR)

executed by **AMEC E&C Services, Inc.** , as Principal,
(PRINCIPAL)

and by Redacted Exemption 4 , as Surety,
(SURETY)

in favor of **Sapphire Energy, Inc.**
(OBLIGEE)

in consideration of the mutual agreements herein contained the Principal and the Surety hereby consent to changing

The bond amount

from Redacted Exemption 4

to

Nothing herein contained shall vary, alter or extend any provision or condition of this bond except as herein expressly stated.

This rider is effective **August 08, 2011**
(MONTH-DAY-YEAR)

Signed and Sealed **August 19, 2011**
(MONTH-DAY-YEAR)

AMEC E&C Services, Inc.
(PRINCIPAL)

By: _____
(PRINCIPAL)

CFO

Redacted Exemption 4
(SURETY)

By: _____
Julia B. Taylor, Attorney-In-Fact

Redacted Exemption 4
(SURETY)

By: _____
Julia B. Taylor, Attorney-In-Fact

S-0443/GEEF 10/99

Redacted Exemption 4

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that the Redacted Exemption 4 , a corporation created by and existing under the laws of the State of New York does hereby nominate, constitute and appoint **Julia B. TAYLOR,** Redacted Exemption 4 Redacted Exemption 4 **, all of Washington, District of Columbia,** EACH its true and lawful Attorneys-In-Fact with power and authority hereby conferred to sign, seal, and execute in its behalf, during the period beginning with the date of issuance of this power, : **any and all bonds and undertakings, recognizances or other written obligations in the nature thereof**, and to bind Redacted Exemption 4 thereby, and all of the acts of said Attorney[s]-in-Fact pursuant to these presents are hereby ratified and confirmed **.** This Power of Attorney is made and executed pursuant to and by the authority of the following By-Law duly adopted by the Board of Directors of the Company which By-Law has not been amended or rescinded.

Article VI, Section 5. "...The President or a Vice President in a written instrument attested by a Secretary or an Assistant Secretary may appoint any person Attorney-In-Fact with authority to execute surety bonds on behalf of the Company and other formal underwriting contracts in reference thereto and reinsurance agreements relating to individual polices and bonds of all kinds and attach the corporate seal. Any such officers may revoke the powers granted to any Attorney-In-Fact."

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of the Redacted Exemption 4 by unanimous consent in lieu of a special meeting dated December 15, 1998

" RESOLVED, that the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the seal of the Company may be affixed by facsimile on any Power of Attorney pursuant to Article VI, Section 5 of the By-Laws, and the signature of a Secretary or an Assistant Secretary and the seal of the Company may be affixed by facsimile to any certificate of any such power. Any such power or any certificate thereof with such facsimile signature and seal shall be valid and binding on the Company. Furthermore, such power so executed, sealed and certified by certificate so executed and sealed shall, with respect to any bond or undertaking to which it is attached, shall continue to be valid and binding on the Company."

IN WITNESS WHEREOF, the Redacted Exemption 4 has caused these presents to be executed in its name and on its behalf and its Corporate Seal to be hereunto affixed and attested by its officers thereunto duly authorized, this **12th day of April, A.D. 2011**.

This power of attorney revokes that issued on behalf of Julia B. TAYLOR, Redacted Exemption 4 Redacted Exemption 4 , dated December 14, 2010.

Redacted Exemption 4

Redacted Exemption 4

STATE OF MARYLAND }
CITY OF BALTIMORE } ss: Redacted Exemption 4

On the 12th day of April, A.D. 2011, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, came the above named Vice President and Secretary of Redacted Exemption 4 , to me personally known to be the individuals and officers described in and who executed the preceding instrument and they each acknowledged the execution of the same and being by me duly sworn, they severally and each for himself deposed and said that they respectively hold the offices in said Corporation as indicated, that the Seal affixed to the preceding instrument is the Corporate Seal of said Corporation, and that the said Corporate Seal, and their respective signature as such officers, were duly affixed and subscribed to the said instrument pursuant to all due corporate authorization.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above.

Constance A. Dunn

Notary Public *My Commission Expires: July 14, 2011*

This Power of Attorney limits the acts of those named therein to the bonds and undertaking specifically named therein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

CERTIFICATE

I, the undersigned, a Secretary of the Redacted Exemption 4 , do hereby certify that the foregoing Power of Attorney is still in full force and effect, and further certify that Article VI, Section 5 of the By-Laws of the Company and the Resolution of the Board of Directors set forth in said Power of Attorney are still in force.

IN TESTIMONY WHEREOF I have hereto subscribed my name and affixed the seal of said Company

the 19 day of August 2011

Redacted Exemption 4

Redacted Exemption 4

POWER OF ATTORNEY

Redacted Exemption 4

Power No. 20446

Principal Bond Office: 175 Water Street, New York, NY 10038

No. 06-B-37805

KNOW ALL MEN BY THESE PRESENTS:

That Redacted Exemption 4 , does hereby appoint

Redacted Exemption 4 , Julia B. Taylor, Redacted Exemption 4 of Washington, D.C.---

its true and lawful Attorney(s)-in-Fact, with full authority to execute on its behalf bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, issued in the course of its business, and to bind the respective company thereby.

IN WITNESS WHEREOF, Redacted Exemption 4 has executed these presents

this 16th day of June, 2011

Redacted Exemption 4

Redacted Exemption 4

STATE OF NEW YORK }
COUNTY OF NEW YORK } ss.

On this 16th day of June, 2011 before me came the above named officer of Redacted Exemption 4 , to me personally known to be the individual and officer described herein, and acknowledged that he executed the foregoing insturment and affixed the seals of said corporation thereto by authority of his office.

Juliana E. Hallenbeck

JULIANA HALLENBECK
Notary Public - State of New York
No. 01HA8125871
Qualified in Bronx County
My Commission Expires April 15, 2013

CERTIFICATE

Exerpts of Resolutions adopted by the Boards of Directors of Redacted Exemption 4 , on May 18, 1976:

"RESOLVED, that the Chairman of the Board, the President, or any Vice President be, and hereby is, authorized to appoint Attorneys-in-Fact to represent and act for and on behalf of the Company to execute bonds, undertakings, recognizances and other contracts of indemity and writings obligatory in the nature thereof, and to attach thereto the corporate seal of the Company, in the transaction of its surety business;

"RESOLVED, that the signatures and attestations of such officers and the seal of the Company may be affixed to any such Power of Attorney or to any certificate relating thereto by facsimile, and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company when so affixed with respect to any bond, undertaking, recognizance and other contract of indemnity and writing obligatory in the nature thereof;

"RESOLVED, that any such Attorney-in-Fact delivering a secretarial certification that the foregoing resolutions still be in effect may insert in such certification the date thereof, said date to be not later than the date of delivery thereof by such Attorney-in-Fact."

I, Redacted Exemption 4 , do hereby certify that the foregoing exerpts of Resolutions adopted by the Boards of Directors of this corporation, and the Power of Attorney issued pursuant thereto, are true and correct, and that both the Resolutions and the Powers of Attorney are in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the facsimile seal of the corporation

this 9 day of August 2011

Redacted Exemption 4

Redacted Exemption 4

23238 (4/02)

SURETY RIDER

To be attached to and form a part of

Bond No. Redacted Exemption 4

Type of Bond: **Performance and Payment-Project No. PR.110205.100 Sapphire Energy IABR, IABR Facility, Luna County, New Mexico, 1500 Hwy 9 SW, Deming, NM 88030**

dated effective **June 01, 2011**
(MONTH-DAY-YEAR)

executed by **AMEC E&C Services, Inc.** , as Principal,
(PRINCIPAL)

and by Redacted Exemption 4 , as Surety,
(SURETY)

in favor of **Sapphire Energy, Inc.**
(OBLIGEE)

in consideration of the mutual agreements herein contained the Principal and the Surety hereby consent to changing

The bond amount from $Redacted Exemption 4

from

Redacted Exemption 4

to

Nothing herein contained shall vary, alter or extend any provision or condition of this bond except as herein expressly stated.

This rider is effective **September 16, 2011**
(MONTH-DAY-YEAR)

Signed and Sealed **September 20, 2011**
(MONTH-DAY-YEAR)

AMEC E&C Services, Inc.
(PRINCIPAL)

By: _____
(PRINCIPAL) Philip Barnes, CEO PPA

Redacted Exemption 4
(SURETY)

By: _____
Julia B. Taylor, Attorney-In-Fact

Redacted Exemption 4
(SURETY)

By: _____
Julia B. Taylor, Attorney-In-Fact

3-0443/GEEF 10/99

Redacted Exemption 4

POWER OF ATTORNEY

KNOW ALL MEN BY THESE PRESENTS, that the Redacted Exemption 4 , a corporation created by and existing under the laws of the State of New York does hereby nominate, constitute and appoint **Julia B. TAYLOR,** Redacted Exemption 4 Redacted Exemption 4 **, all of Washington, District of Columbia,** EACH its true and lawful Attorneys-In-Fact with power and authority hereby conferred to sign, seal, and execute in its behalf, during the period beginning with the date of issuance of this power, : **any and all bonds and undertakings, recognizances or other written obligations in the nature thereof**, and to bind Redacted Redacted Exemption 4 thereby, and all of the acts of said Attorney[s]-in-Fact pursuant to these presents are hereby ratified and confirmed . This Power of Attorney is made and executed pursuant to and by the authority of the following By-Law duly adopted by the Board of Directors of the Company which By-Law has not been amended or rescinded.

Article VI, Section 5. "...The President or a Vice President in a written instrument attested by a Secretary or an Assistant Secretary may appoint any person Attorney-In-Fact with authority to execute surety bonds on behalf of the Company and other formal underwriting contracts in reference thereto and reinsurance agreements relating to individual polices and bonds of all kinds and attach the corporate seal. Any such officers may revoke the powers granted to any Attorney-In-Fact."

This Power of Attorney is signed and sealed by facsimile under and by the authority of the following Resolution adopted by the Board of Directors of the Redacted Exemption 4 by unanimous consent in lieu of a special meeting dated December 15, 1998

" RESOLVED, that the signature of the President or a Vice President and the attesting signature of a Secretary or an Assistant Secretary and the seal of the Company may be affixed by facsimile on any Power of Attorney pursuant to Article VI, Section 5 of the By-Laws, and the signature of a Secretary or an Assistant Secretary and the seal of the Company may be affixed by facsimile to any certificate of any such power. Any such power or any certificate thereof with such facsimile signature and seal shall be valid and binding on the Company. Furthermore, such power so executed, sealed and certified by certificate so executed and sealed shall, with respect to any bond or undertaking to which it is attached, shall continue to be valid and binding on the Company."

IN WITNESS WHEREOF, the Redacted Exemption 4 has caused these presents to be executed in its name and on its behalf and its Corporate Seal to be hereunto affixed and attested by its officers thereunto duly authorized, this **12th day of April, A.D. 2011**.

This power of attorney revokes that issued on behalf of Julia B. TAYLOR, Redacted Exemption 4 Redacted Exemption 4 , dated December 14, 2010.

Redacted Exemption 4

Redacted Exemption 4

STATE OF MARYLAND }
CITY OF BALTIMORE } ss: Redacted Exemption 4

On the 12th day of April, A.D. 2011, before the subscriber, a Notary Public of the State of Maryland, duly commissioned and qualified, came the above named Vice President and Secretary of Redacted Exemption 4 , to me personally known to be the individuals and officers described in and who executed the preceding instrument and they each acknowledged the execution of the same and being by me duly sworn, they severally and each for himself deposed and said that they respectively hold the offices in said Corporation as indicated, that the Seal affixed to the preceding instrument is the Corporate Seal of said Corporation, and that the said Corporate Seal, and their respective signature as such officers, were duly affixed and subscribed to the said instrument pursuant to all due corporate authorization.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my Official Seal the day and year first above.

Constance A. Dunn

Notary Public *My Commission Expires: July 14, 2011*

This Power of Attorney limits the acts of those named therein to the bonds and undertaking specifically named therein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

CERTIFICATE

I, the undersigned, a Secretary of the Redacted Exemption 4 , do hereby certify that the foregoing Power of Attorney is still in full force and effect, and further certify that Article VI, Section 5 of the By-Laws of the Company and the Resolution of the Board of Directors set forth in said Power of Attorney are still in force.

IN TESTIMONY WHEREOF I have hereto subscribed my name and affixed the seal of said Company

the 20 day of September 2011

Redacted Exemption 4

Redacted Exemption 4

POWER OF ATTORNEY

Redacted Exemption 4

Power No. 20457

Principal Bond Office: 175 Water Street, New York, NY 10038

No. 06-B-37805

KNOW ALL MEN BY THESE PRESENTS:

That Redacted Exemption 4 , does hereby appoint

Redacted Exemption 4 , Julia B. Taylor, Redacted Exemption 4 of Washington, D.C.---

its true and lawful Attorney(s)-in-Fact, with full authority to execute on its behalf bonds, undertakings, recognizances and other contracts of indemnity and writings obligatory in the nature thereof, issued in the course of its business, and to bind the respective company thereby.

IN WITNESS WHEREOF, Redacted Exemption 4 has executed these presents

this 16th day of June, 2011

Redacted Exemption 4

Redacted Exemption 4

STATE OF NEW YORK }

COUNTY OF NEW YORK } **ss.**

On this 16th day of June, 2011 before me came the above named officer of Redacted Exemption 4 , to me personally known to be the individual and officer described herein, and acknowledged that he executed the foregoing insturment and affixed the seals of said corporation thereto by authority of his office.

Juliana E. Hallenbeck

JULIANA HALLENBECK
Notary Public - State of New York
No. 01HA8125671
Qualified in Bronx County
My Commission Expires April 15, 2013

CERTIFICATE

Exerpts of Resolutions adopted by the Boards of Directors of Redacted Exemption 4 on May 18, 1976:

"RESOLVED, that the Chairman of the Board, the President, or any Vice President be, and hereby is, authorized to appoint Attorneys-in-Fact to represent and act for and on behalf of the Company to execute bonds, undertakings, recognizances and other contracts of indemity and writings obligatory in the nature thereof, and to attach thereto the corporate seal of the Company, in the transaction of its surety business;

"RESOLVED, that the signatures and attestations of such officers and the seal of the Company may be affixed to any such Power of Attorney or to any certificate relating thereto by facsimile, and any such Power of Attorney or certificate bearing such facsimile signatures or facsimile seal shall be valid and binding upon the Company when so affixed with respect to any bond, undertaking, recognizance and other contract of indemnity and writing obligatory in the nature thereof;

"RESOLVED, that any such Attorney-in-Fact delivering a secretarial certification that the foregoing resolutions still be in effect may insert in such certification the date thereof, said date to be not later than the date of delivery thereof by such Attorney-in-Fact."

I, Redacted Exemption 4 do hereby certify that the foregoing exerpts of Resolutions adopted by the Boards of Directors of this corporation, and the Power of Attorney issued pursuant thereto, are true and correct, and that both the Resolutions and the Powers of Attorney are in full force and effect.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed the facsimile seal of the corporation

this 20 day of September 2011

Redacted Exemption 4

Redacted Exemption 4

23238 (4/02)

SAPPHIRE ENERGY, INC.

CERTIFICATE

August ___, 2011

The undersigned, Nathaniel David, Secretary of Sapphire Energy, Inc., a Delaware corporation (the "***Company***"), does hereby certify that:

1. Immediately following this paragraph is a true, correct, and complete excerpt of the official minutes of the regular meeting of the Board of Directors of the Company held on May 26, 2011.

IABR PROJECT PLAN AND MILESTONES

Mr. Kluwe, Senior Director of Projects and IABR Project Manager, then discussed the phases of the IABR project components. Mr. Kluwe provided detail to the Board regarding the IABR with respect to construction strategy, engineering and cost, schedule, work packages, pond and infrastructure work, project team, reporting and controls, installation of pre-treatment process, and the expansion of the PDU facilities. The Board discussed the Company's decision to Redacted Exemption 4 . The Board asked questions and discussion ensued.

2. Immediately following this paragraph is a true, correct, and complete excerpt of the official minutes of the regular meeting of the Board of Directors of the Company held on July 28, 2011.

IABR TECHNOLOGY READINESS

Dr. Alex Aravanis, Vice President of Development and Dr. Xun Wang, Vice President of Research and Development, then led a discussion regarding the goal of the Integrated Algal Biorefinery ("**IABR**") to achieve technological readiness and described specific phase goals and targets and current status. The Board discussed the Company's decision to Redacted Exemption 4

Dr. Aravanis and Dr. Wang then discussed R&D support of the IABR, including a review of 2011 R&D priorities, 2011 R&D highlights, and the R&D project portfolio. Dr. Aravanis and Dr. Wang then led a discussion of 2012 R&D priorities. The Board asked questions and discussion ensued.

IN WITNESS WHEREOF, the undersigned has executed this Certificate as of date first set forth above.

Nathaniel David, Secretary

James H. Lambright
CFO, President Sapphire International
3115 Merryfield Row
San Diego, California 92121
Tel: 858-768-4724
jim.lambright@sapphireenergy.com
www.sapphireenergy.com

September 16, 2011

Ms. Christy Sterner
U.S. Department of Energy
Golden Field Office, Mail Stop 1501
1617 Cole Boulevard
Golden, CO 80401-3393

Dear Ms. Sterner,

I am writing in regards to Sapphire Energy's contingency obligation relating to the following project:

Sapphire Energy, Inc.
Integrated Algal Bio Refinery
Columbus, New Mexico
EE0002884

Sapphire Energy has Redacted Exemption 4

Sincerely,

James H. Lambright
CFO, President - International
Sapphire Energy, Inc.