The concentrations of naturally occurring $^{210}Po$ and $^{7}Be$ were in the naturally occurring background range. These radionuclides are not process related.

In 1994 effluent emissions continued to be monitored for the RMDF, Hot Lab and Building T059 with Building 4059 being omitted from the environmental reports beginning in 1995. Emissions from the RMDF and Hot Lab continued to be reported in the 1996 and 1997 reports prior to its removal with the RMDF and T024 being included in reports from 1998 report. Effluents to unrestricted areas continued to be reported within the same range as ambient air concentrations. In 1999 emissions were assessed for the RMHF and T024. Emissions monitoring was then limited to the RMHF for the period 2000 to 2006.

## 4.8.2 Ambient Air Data

Historical ambient air monitoring data are available for the SSFL from June, 1957, to the present. This data originally consisted of "Long Lived Air Activity at Santa Susana" in 1957, the basis of which is not known, and "Ambient Air Radioactivity Data" which derived average beta concentrations from 1957 to present and average alpha concentrations from 1971 to present. (Prior to 1971, ambient air alpha radioactivity values were included in the beta values and not reported separately.) From 1957 to 1963, air sampling consisted of an average of 200 samples per year with reported concentrations averaging from $4.4\times10^{-13}$ to $5.6\times10^{-12}$ µCi/mL. From 1965 to 1985 an average of about 2,300 samples were collected and analyzed per year with the reported concentrations averaging from $2.2\times10^{-14}$ to $4.1\times10^{-13}$ and $1.0\times10^{-15}$ to $8.6\times10^{-15}$ µCi/mL for beta and alpha, respectively, over those time periods.

Air monitoring stations were established at specific locations within SSFL Area IV. These locations varied to some extent over the years of operation within Area IV, both in terms of the number of monitoring stations and their respective locations.

In the mid-1970s SSFL air monitoring stations were located at Buildings 009, 011, 012, 040, 074, 143 and 363 with the stations at Building 012 and 040 being relocated to Rocketdyne Buildings 600 and 207, respectively, in August, 1977. Two additional stations were located on the roofs of Atomics International Headquarters Buildings 001 and 004. These samplers operated continuously on 24-hour cycles with filter media being "automatically changed daily at the end of the sampling period". The reported average ambient air concentrations for the SSFL were less than $6.6 \pm 7.7\times10^{-15}$ and $1.7 \pm 0.2\times10^{-13}$ µCi/mL for alpha and beta, respectively (95 percent confidence level) with maximum daily concentrations of $3.9\times10^{-14}$ and $3.0\times10^{-12}$ µCi/mL for alpha and beta, respectively. These results were noted as being "due primarily to the dominance of naturally occurring radionuclides in the environment and longer-lived fission product radioactivity from fallout" (Atomics International Environmental Monitoring and Facility Effluent Annual Report, 1977, Rockwell International).

In the early 1980s sampling station locations at the SSFL included the roofs of Buildings 001 and 004 and areas adjacent to Buildings 074, 143 and 363 with samples operating on a 24-hour sampling cycle and filters being automatically changed daily

at the end of each sampling period. The samples were subsequently counted for alpha and beta radiation following a minimum 120-hour decay period. The air data were mathematically smoothed by a program that calculated a moving weekly average of daily data for the year. Weekly averages were on the order of $6\times10^{-16}$ to $3\times10^{-15}$ and $1.5\times10^{-14}$ to $3\times10^{-14}$ µCi/mL, for alpha and beta, respectively, with reported minimum detection levels of $6.4 \pm 3.8\times10^{-15}$ and $1.3 \pm 0.6\times10^{-14}$ µCi/mL for alpha and beta, respectively.

Beginning about 1988, as with the effluent air monitoring filters, filters from each ambient air sampling location were aggregated for the entire year and analyzed such that gamma emitting radionuclides were measured by high-resolution gamma spectrometers and all others were "measured by chemical separations followed by alpha or beta counting". Specific analytes are as listed above for effluent air monitoring. Results exceeding detection limits were reported in environmental reports in terms of "activity detected", "annual release", "average exhaust concentration" and "DCG" (derived concentration guides from DOE Order 5400.5). Reported concentrations of radionuclides were commonly two or more orders of magnitude lower than the applicable DCGs.

By 1990 the monitoring locations included stations adjacent to the RMHF, RMHF Pond, former RI Hot Laboratory (RIHL) and Buildings 4100 and 4886. Four of the five samplers operated for a period of 24-hours while the fifth sampler operated on a 7-day cycle. Gross alpha and beta radiation were measured with a thin-window gas-flow proportional counter after a delay of at least 120 hours to allow decay of the short-lived naturally-occurring radon daughters. Alpha results were compared to a DCG value of $6\times10^{-14}$ µCi/mL as work involved unencapsulated plutonium. For beta they were compared to $3\times10^{-11}$ µCi/mL based on the presence of $^{90}Sr$ in fission product contamination from previous work with irradiated nuclear fuel. In 1991 locations were reduced to include the RMHF, RMHF Pond, RIHL and Building 4886 with gross radioactivity results reflecting annual averages of $2.2 \pm 3.2\times10^{-15}$ to $2.6 \pm 10^{-15}$ and $4.6 \pm 2.9\times10^{-14}$ to $4.9 \pm 3.0\times10^{-14}$ µCi/mL for alpha and beta, respectively.

Ambient monitoring locations listed for the period from 1992 to 1996 consisted of Buildings 4020 (Hot Lab), 4034 (RMDF), 4886 (Former Sodium Disposal Facility), 4100 and the RMDF Pond with the Building 4100 sampler being on a 7-day cycle and the other samplers being on a daily cycle. In 1997 all monitoring was converted to a weekly cycle with a total of nine monitoring stations being utilized within the SSFL Site during 1997 and 1998. Specific monitoring locations included Buildings 4020 (southwest side), 4034 (RMDF main gate), 4886 (Former Sodium Disposal Facility), RMHF Pond (north side), 4100, and 4020 (each of the four sides of the building). In 1997 gross alpha and beta radioactivity ranged from 5.2 percent to 39 percent and 0.04 percent to 0.62 percent, respectively, of the exposure guides established in DOE Order 5400.5. In addition, the report notes that "On four occasions the north and west Hot Lab samples exceeded the alpha DCG limits" based on the conservative use of the Pu-239 concentration guide. The report concludes that "The activity detected in ambient air is attributed to naturally occurring radioactive materials."

Five monitoring stations (RMHF, RMHF Pond, former RI Hot Laboratory (RIHL) and Buildings 4100 and 4886) were utilized from 1999 to 2006. The RHMF Pond monitoring station was discontinued in 2006, resulting in a total of four stations for 2007. Results were compared to "Derived Concentration Guides for Air and Water" which are contained within Chapter III, DOE Order 5400.5.

Similar to results from 1997 as indicated above, Table 5-5 of the *Site Environment Report for Calendar Year 2006* reflects gross alpha radioactivity concentrations of 13, 26, 9.7, and 44 percent of the guideline value from DOE Order 5400.5 for Building 4100, 4010, RMHF, and 4886, respectively. The supporting text notes that "The naturally occurring radionuclides, Po-210, Ra-226, Ra-228, are the sources of the gross alpha and gross beta activities detected on air samples. During year 2006, the average gross alpha activities on the environmental air samples are less than that on the background sample."

## 4.8.3 NESHAPs

The EPA regulates airborne releases of radioactivity from DOE facilities under 40 *Code of Federal Regulations* (CFR) 61, Subpart H and from NRC licensed facilities under 40 CFR 61, Subpart I. The DOE site limit is 10 millirem (mrem) per year. To demonstrate compliance with this requirement, dose calculations are performed to assess the effective dose equivalent to the maximally exposed individual. Review of NESHAPs reports reflects that exposures have generally been estimated to be several orders of magnitude or more lower than the NESHAPs dose standard. As an example, Table 5-2 of the *Site Environment Report for Calendar Year 2006* reflects downwind exposure doses of $9.1\times10^{-8}$ and $6.0\times10^{-8}$ mrem per year for individuals present at the site boundary and for the nearest residence.

## 4.8.4 Conclusions

Large amounts of data on airborne concentrations of radionuclides have been obtained for the SSFL. Available information indicates that high-efficiency particulate air filters were used to control the emissions of radionuclides from facilities with a significant potential for airborne releases to the environment and that the releases to the environment were subject to constant monitoring to assure compliance with applicable standards. Review of available information to include both ambient air and effluent air data suggests that airborne emissions to the environment were not likely a major contributor to onsite contamination dispersed within SSFL Area IV. Further, review of NESHAPs data suggests that exposure to airborne emissions from SSFL Area IV has not been a major contributor to doses to offsite receptors.

The list of analytes for radiological air data in the final list of COIs for which there is no existing air data includes $^{14}C$, $^{134}Cs$, $^{125}Sb$, $^{152}Eu$, $^{154}Eu$, $^{55}Fe$, $^{54}Mn$, $^{22}Na$, $^{59}Ni$, $^{63}Ni$, $^{237}Np$, $^{226}Ra$, $^{228}Ra$, and $^{99}Tc$.

The review of air monitoring data indicates that sufficient operational and existing conditions data exist for Area IV. To assess risks for the EIS relative to decommissioning and demolishing of buildings and removal of soil, building data

and soil data collected during the field sampling investigation will be used. Therefore collection of additional air sampling data is not proposed. This finding does not include the possible need to sample air in the breathing zone of site workers involved in the field sampling investigation.

## 4.9 Buildings

A gap analysis was performed to assess the adequacy of radiological contamination information for existing structures (i.e., those that have not been demolished) for the risk assessment and off-site release estimates for the EIS, evaluation of transportation impacts, and final disposition of wastes. **Table 4-17** presents the results of this analysis including the referenced site name, the remaining surveys to be performed based on the 2005 *Historical Site Assessment* (and actions taken since that time), the projected MARSSIM classification, a summary of historical data and the specific data gap to be addressed. This comparison indicates that limited data gaps exist. The existing data gaps consist of the lack of building surface contamination data (i.e., fixed point measurements, radiological scan surveys, and removable contamination data) for about 17 structures, or limited portions thereof. In addition, isotopic ratios to be applied to contaminant levels as an integral part of the preparation of human health risk assessments are not generally available for remaining buildings. Unless these data gaps are addressed by interim site radiological survey efforts, they will be addressed during field investigation efforts in which case, additional detail will be incorporated into the sampling and analysis plan for the field effort.

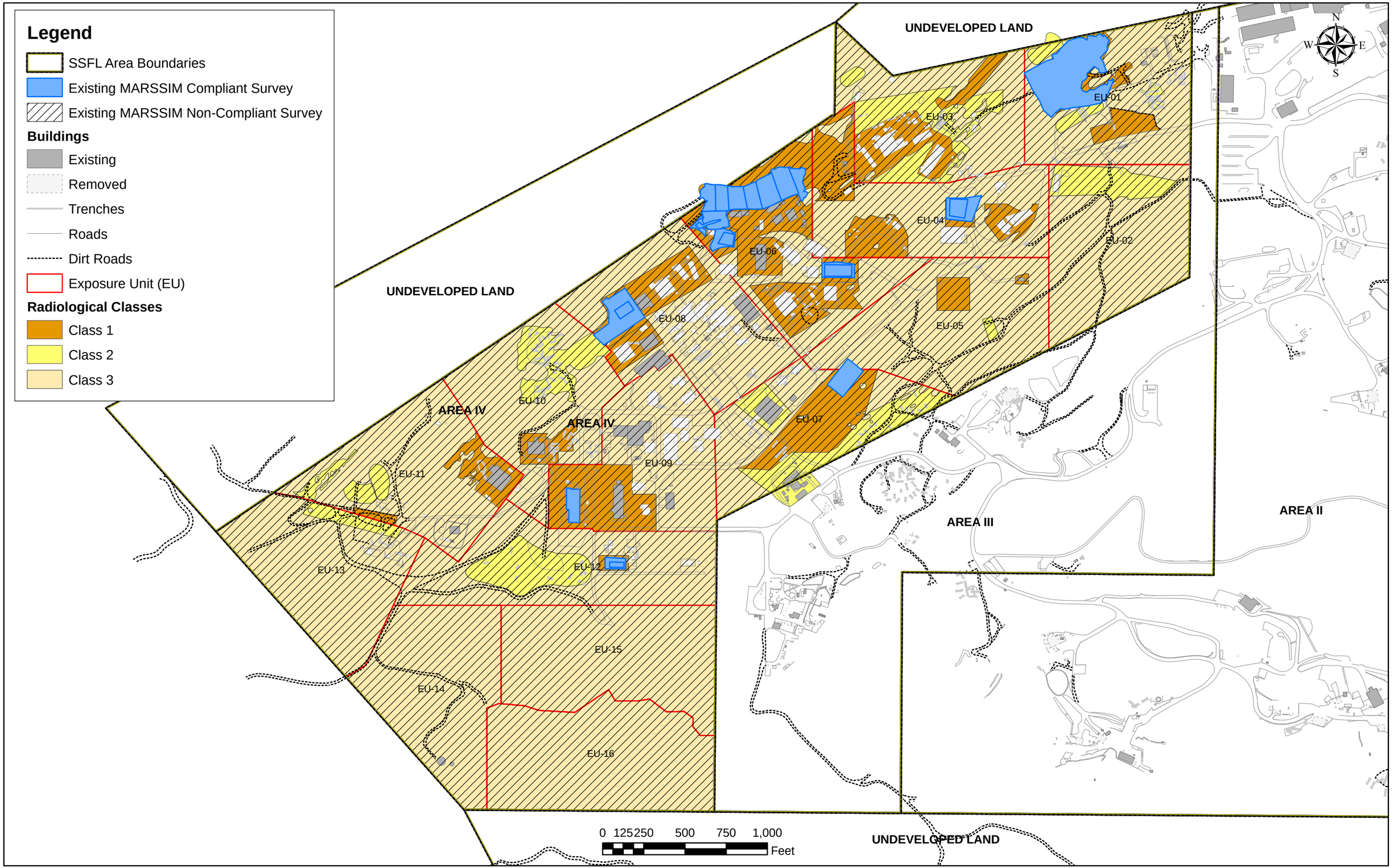
## 4.10 Surface Soil, Subsurface Soil, and Bedrock Background

Background values for metals and dioxin have been agreed upon by regulatory agencies for SSFL. The radionuclide background used for this data gap report was based on existing offsite surface soil data. These data may be useful for establishment of agreed upon future radionuclide background values. However, establishment of separate background values for each of the two geological formations is desirable and additional surface soil data may be useful for that purpose. Also, there currently is no background data for radionuclides at depth for near surface and subsurface soils, sediment, rocks, surface water, and groundwater. Therefore, the data gap includes additional background sample analysis for radionuclides for these matrices. MARSSIM statistical tests require the same number of background samples as areas samples for comparison. This number can be approximated by calculation of the number of samples necessary for the Wilcoxon Rank Sum Test using the decision rule DQOs established in Section 3.2 and assuming a relative shift of 1.5. The resulting minimum number of background samples necessary for each media type and each geological formation is 14.

## 4.11 Bedrock

The data gap analysis of bedrock samples determined that very little bedrock data has been collected to date for chemical and radionuclide COI characterization. In

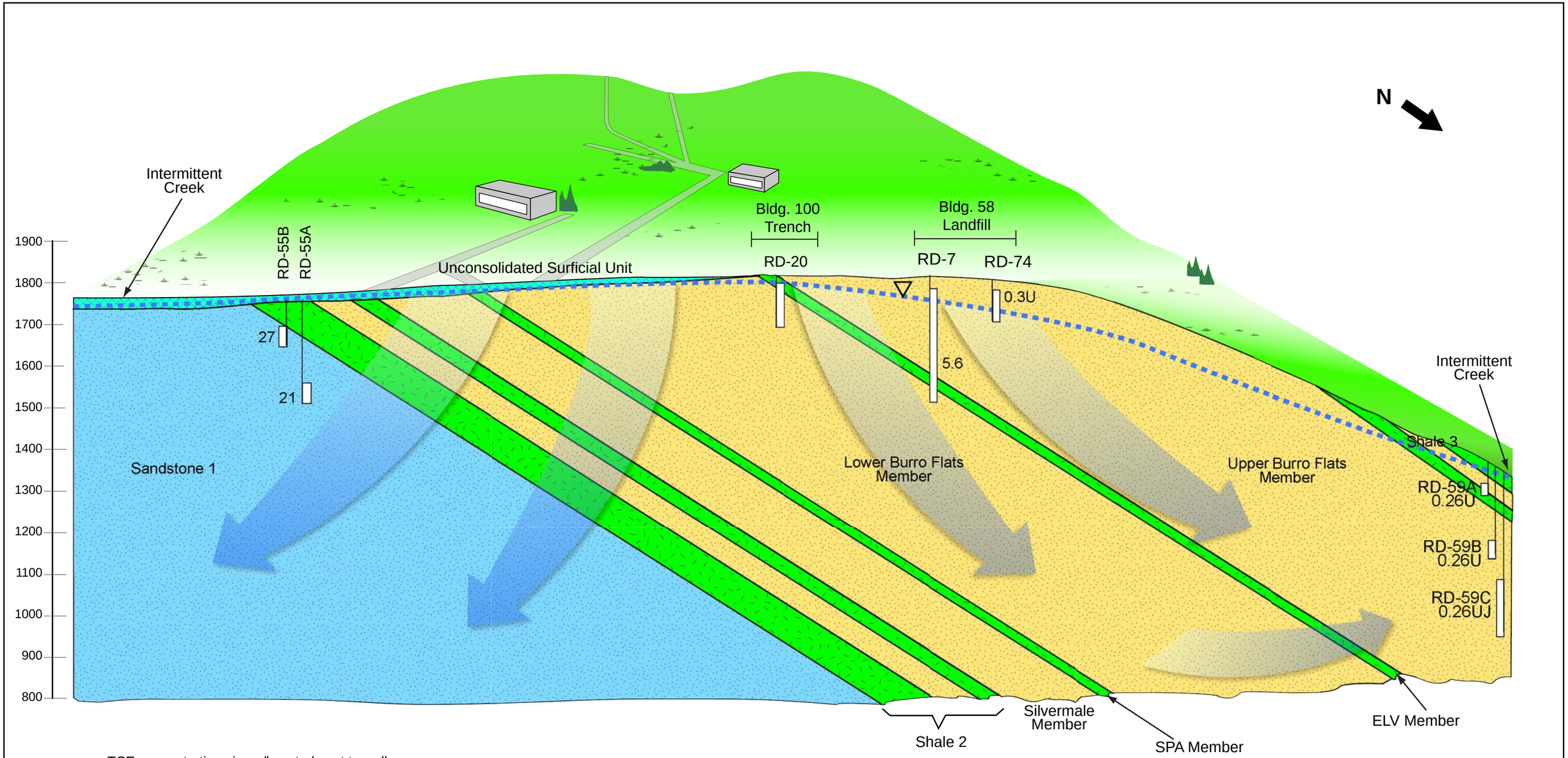
addition, bedrock aquifer properties are needed for groundwater cleanup remedy evaluations. Therefore bedrock data are a data gap for completing Area IV site characterization. Bedrock samples will be required at locations where chemical and radionuclide vertical extent of contamination is needed and from borings for wells drilled into bedrock. The locations and purposes of bedrock samples will be described in the FSAP.




CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

Figure 4-1
Locations of Existing Gamma Walkover Surveys




- TCE concentrations in ug/l posted next to well.
- TCE concentrations at RD-59 from Annual Groundwater Monitoring Report 2006 (H&A 2007)

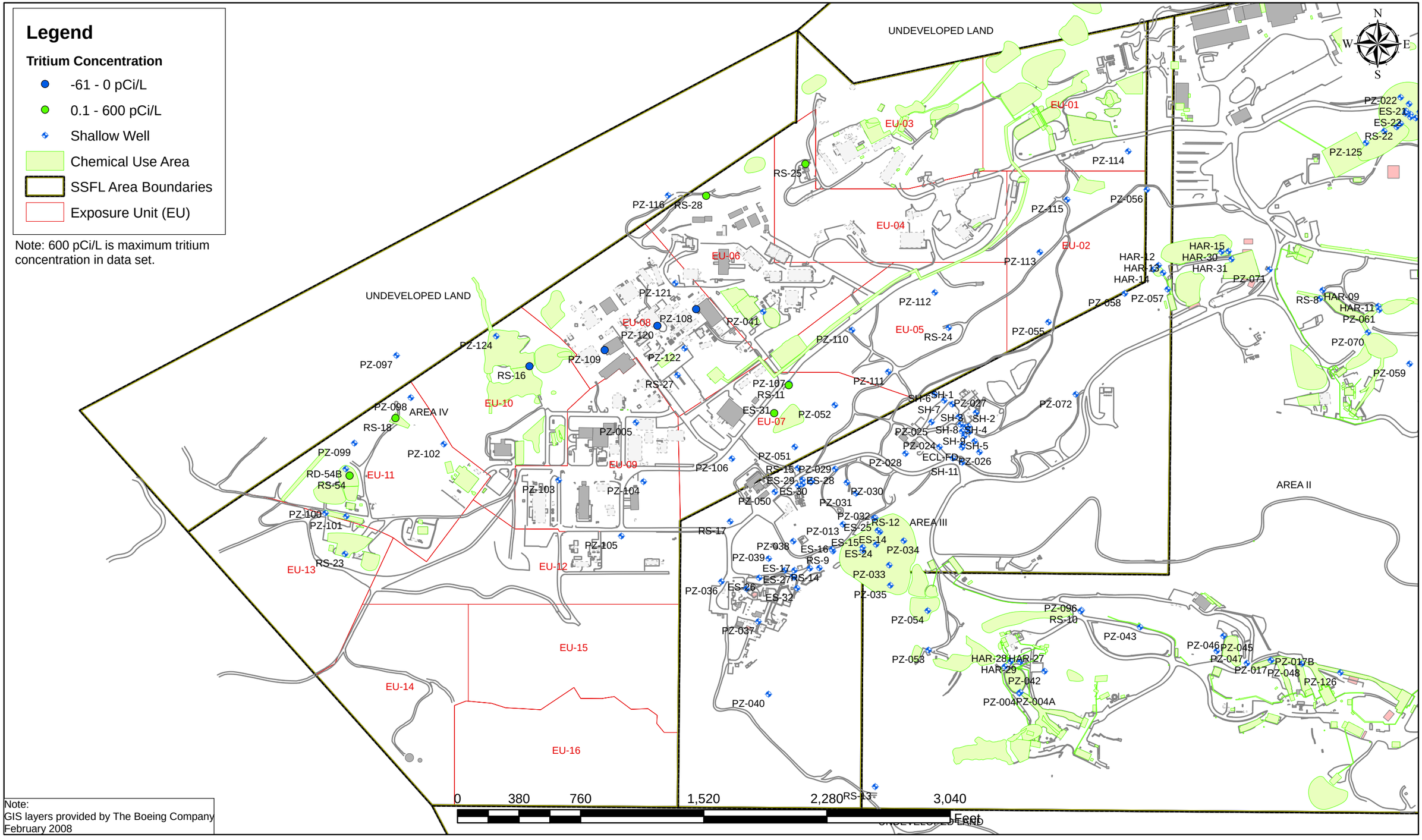
FEET
0 100 200 300 400 500
scale

Modified from Section H-H' of MWH-Work Plan Sitewide Groundwater Characterization 2008

CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

Figure 4-2
Groundwater Conceptual Site Model

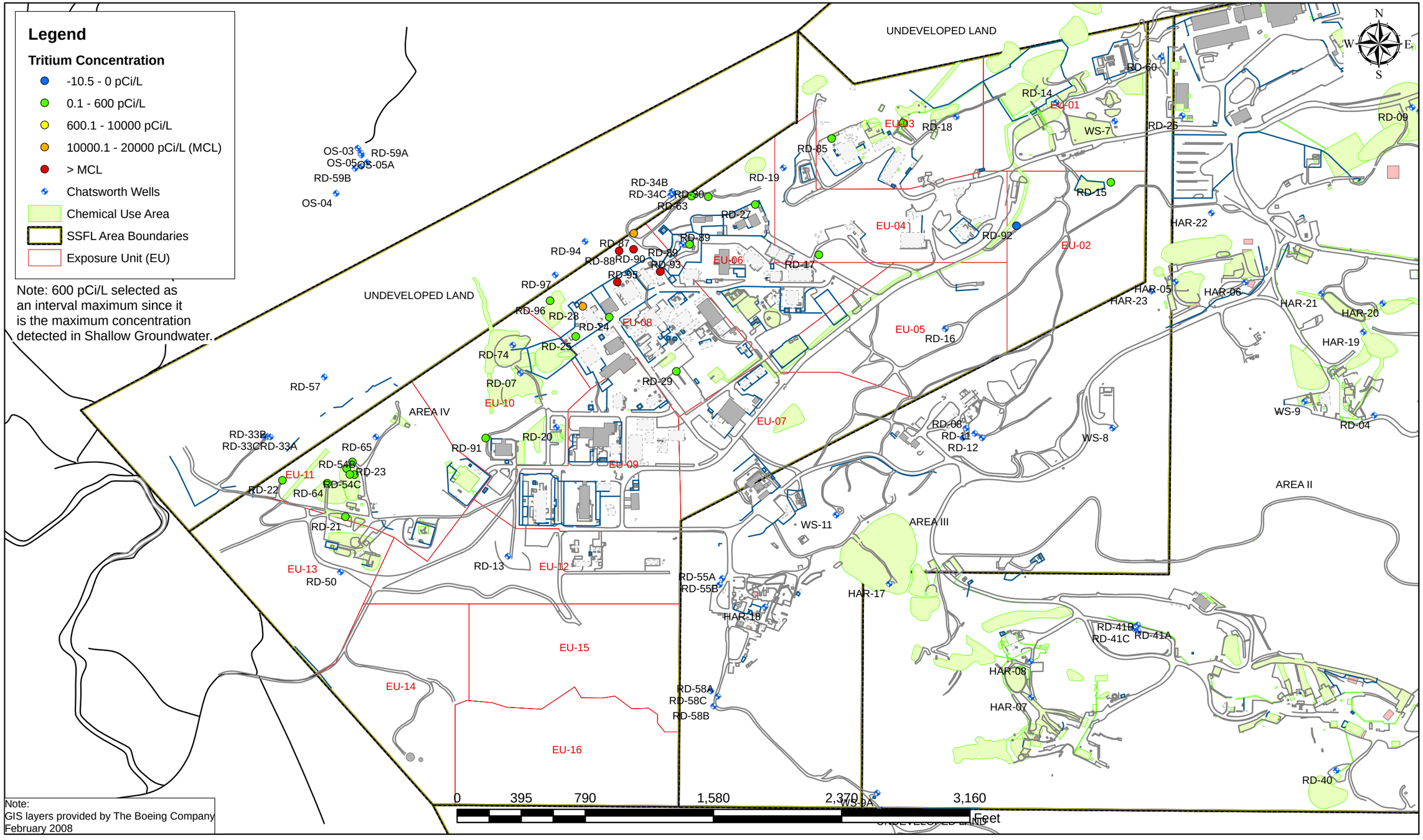



Note:
GIS layers provided by The Boeing Company
February 2008

CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

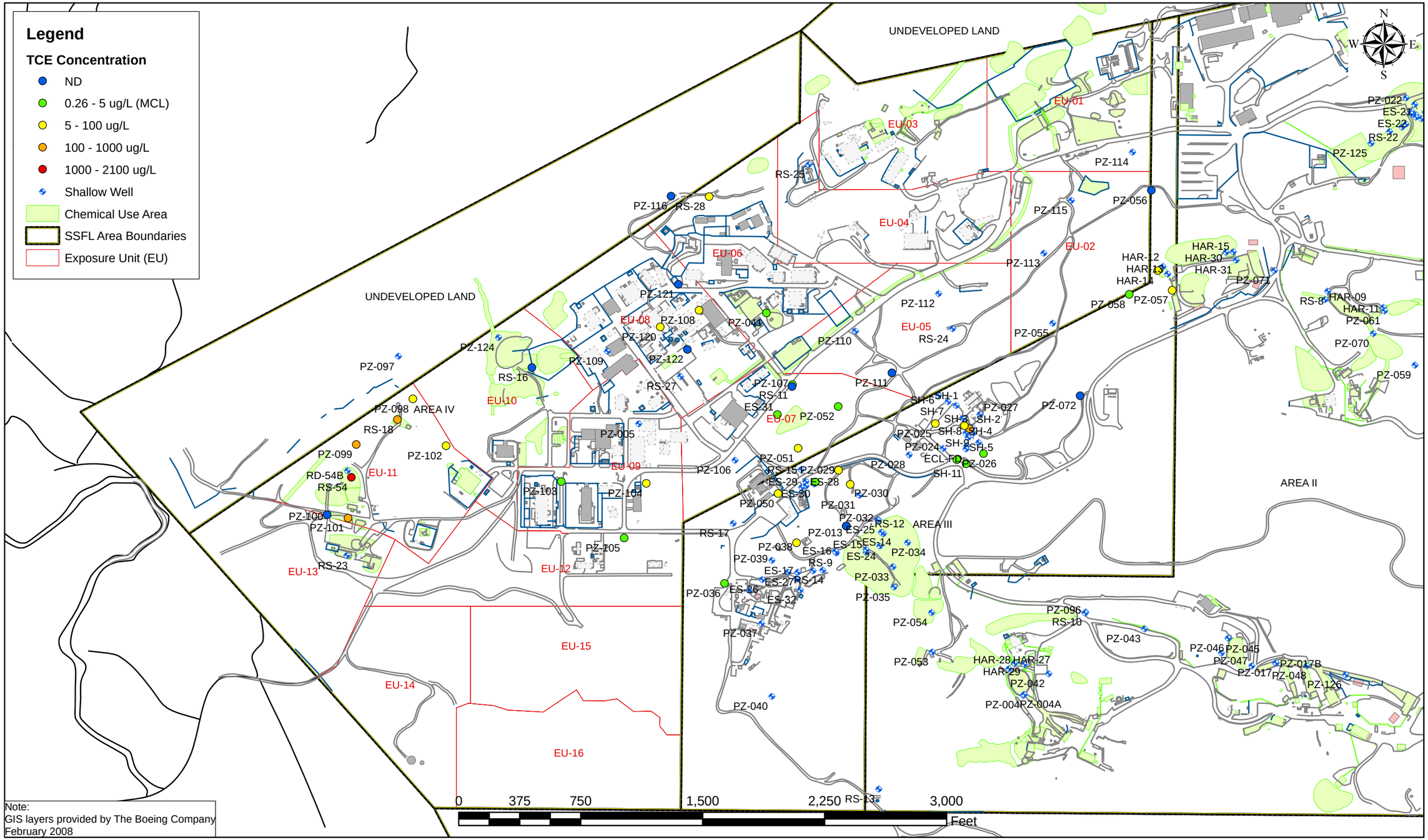
Figure 4-3
Maximum Tritium Concentrations
in Shallow Groundwater
2003-2007




CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

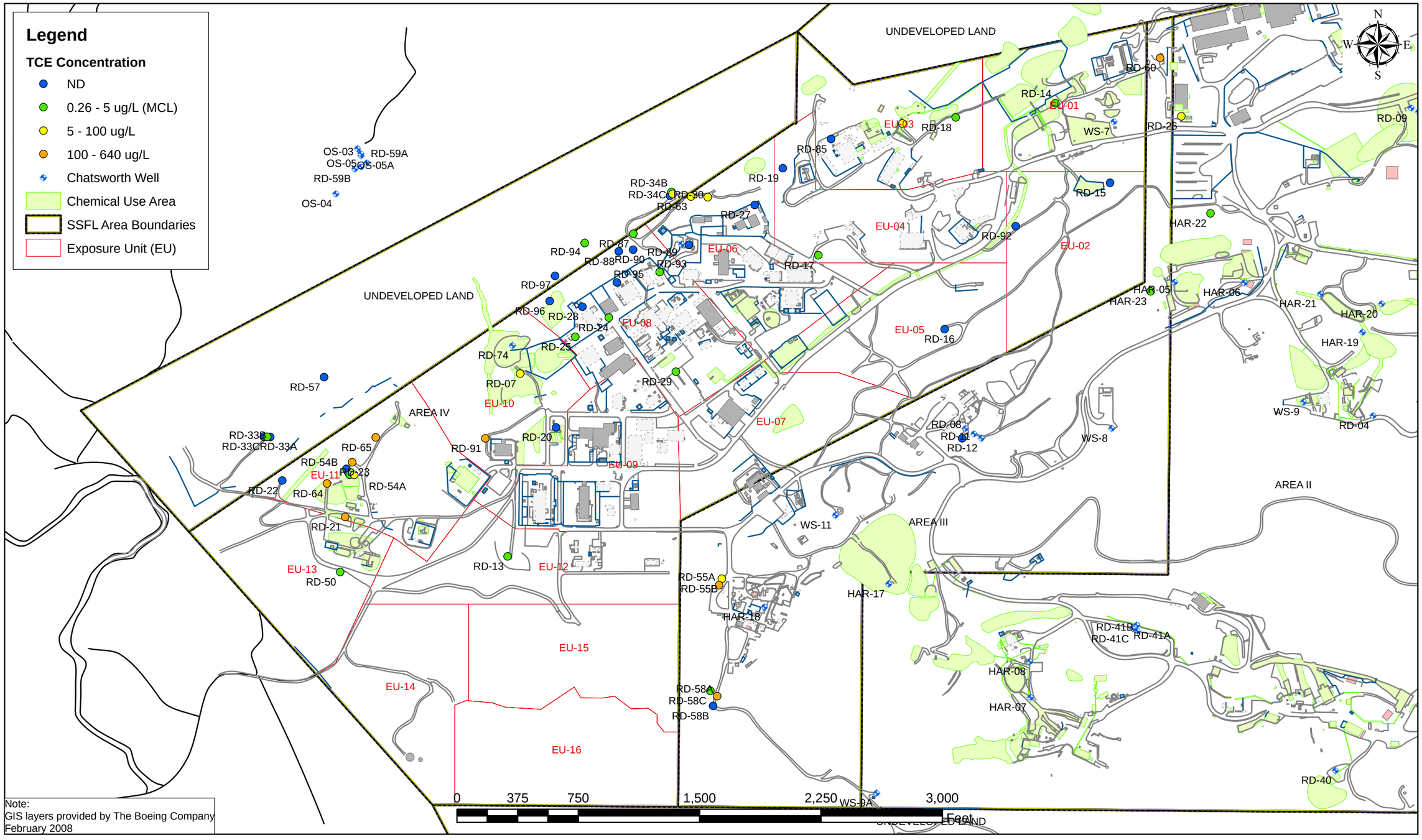
Figure 4-4
Maximum Tritium Concentrations
in Chatsworth Formation
2003-2007




CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

Figure 4-5
Maximum TCE Concentrations
in Shallow Groundwater
2003-2007

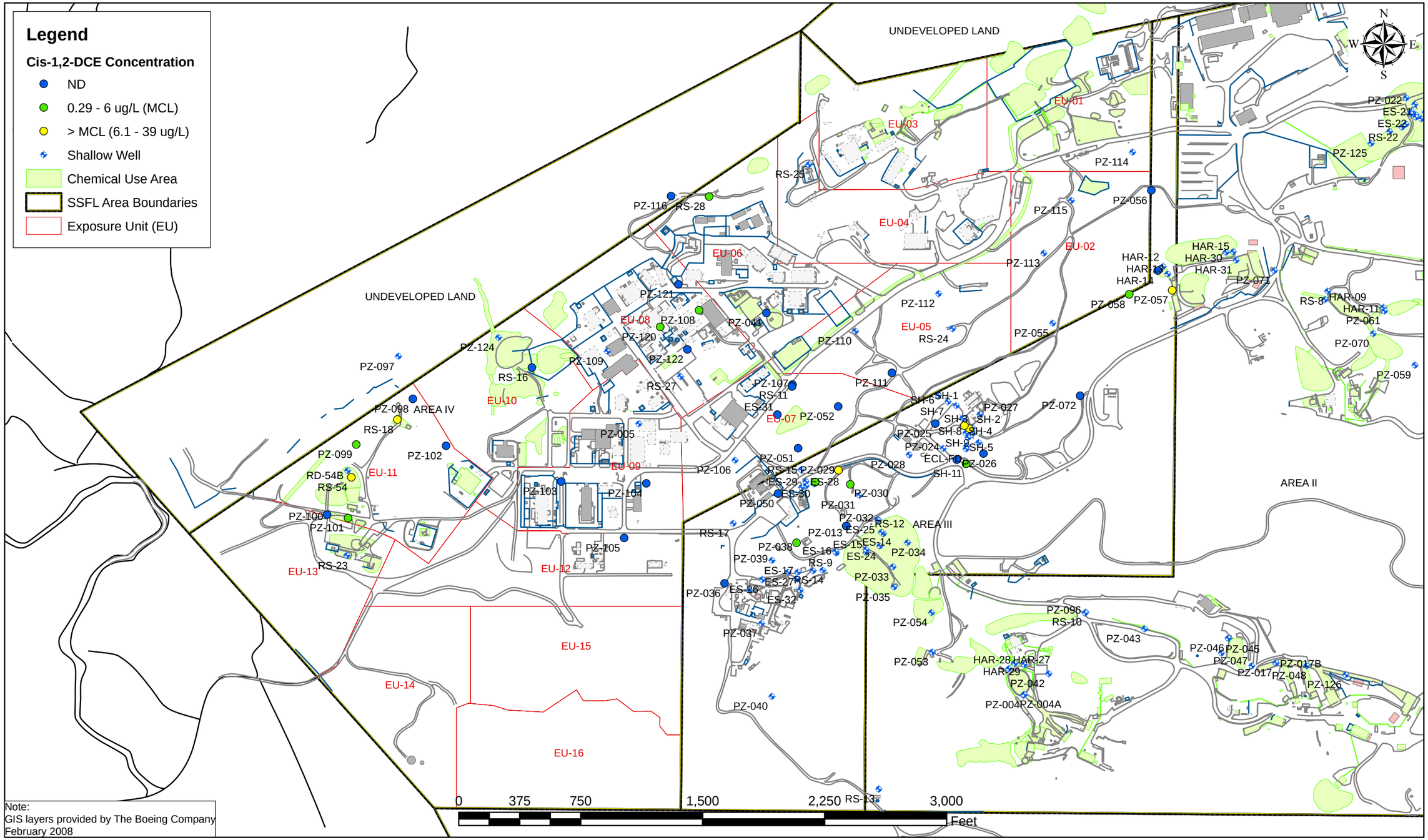



Note:
GIS layers provided by The Boeing Company
February 2008

CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

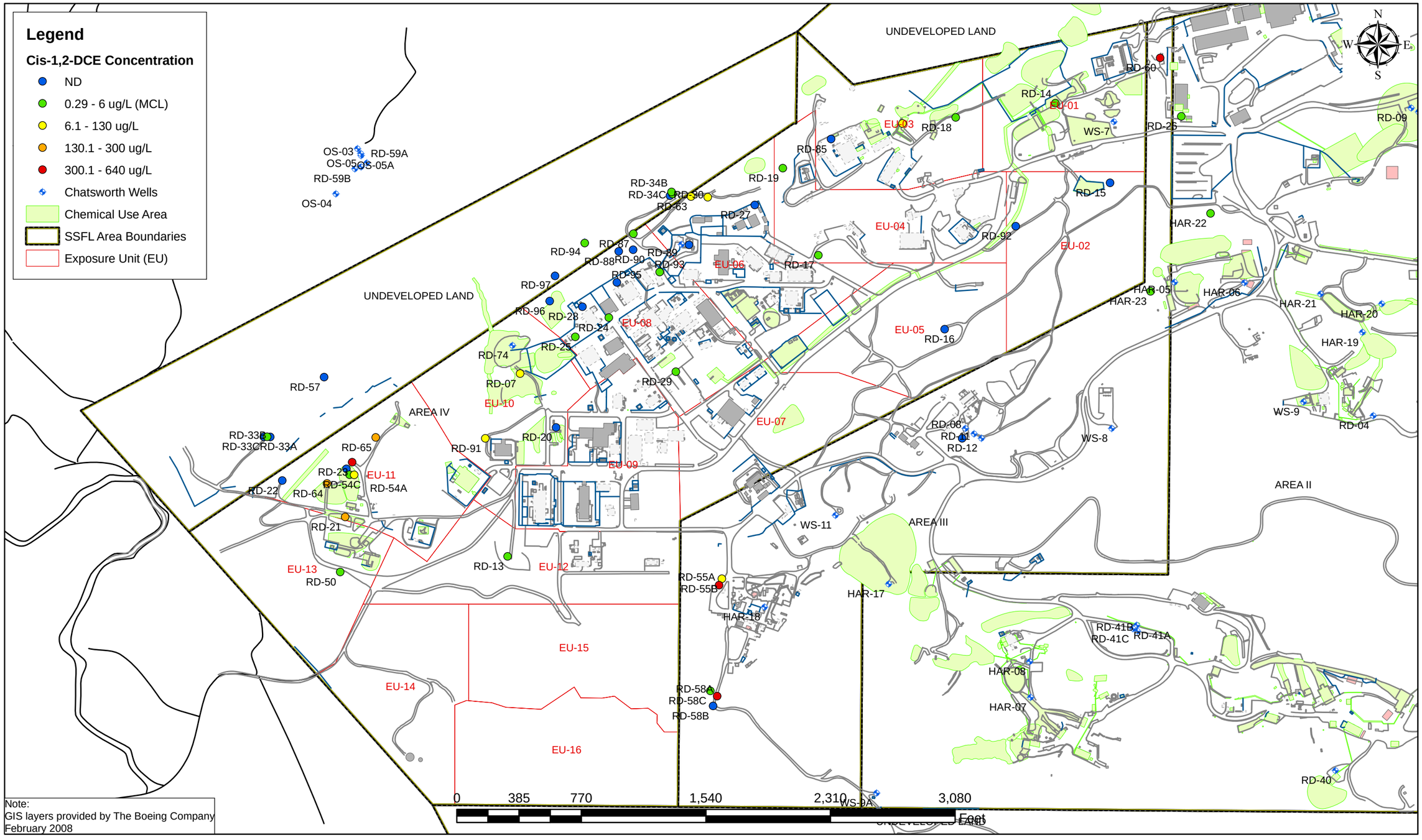
Figure 4-6
Maximum TCE Concentrations
in Chatsworth Formation
2003-2007




CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

Figure 4-7
Maximum Cis-1,2-DCE Concentrations
in Shallow Groundwater
2003-2007

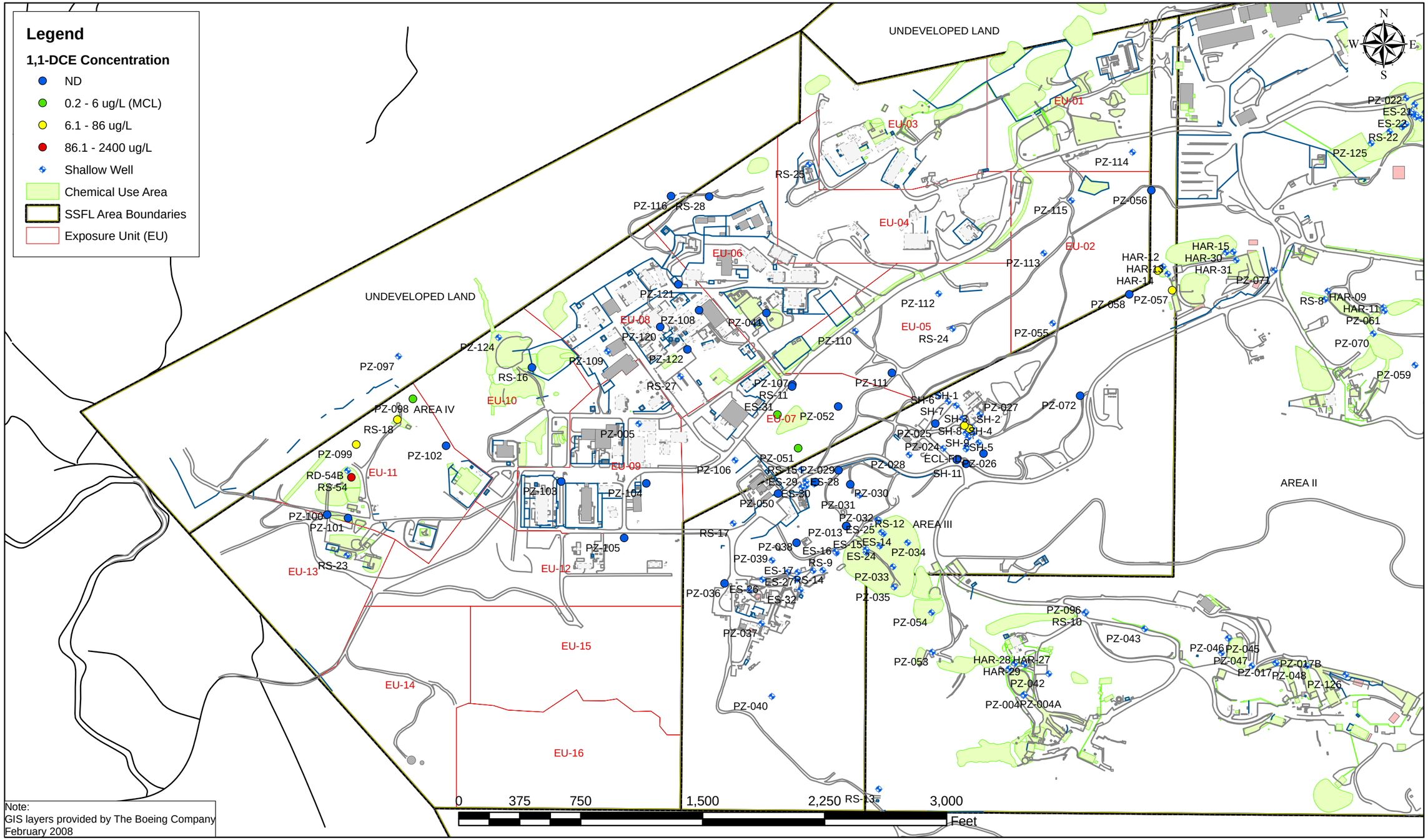



Note:
GIS layers provided by The Boeing Company
February 2008

CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

Figure 4-8
Maximum Cis-1,2-DCE Concentrations
in Chatsworth Formation
2003-2007

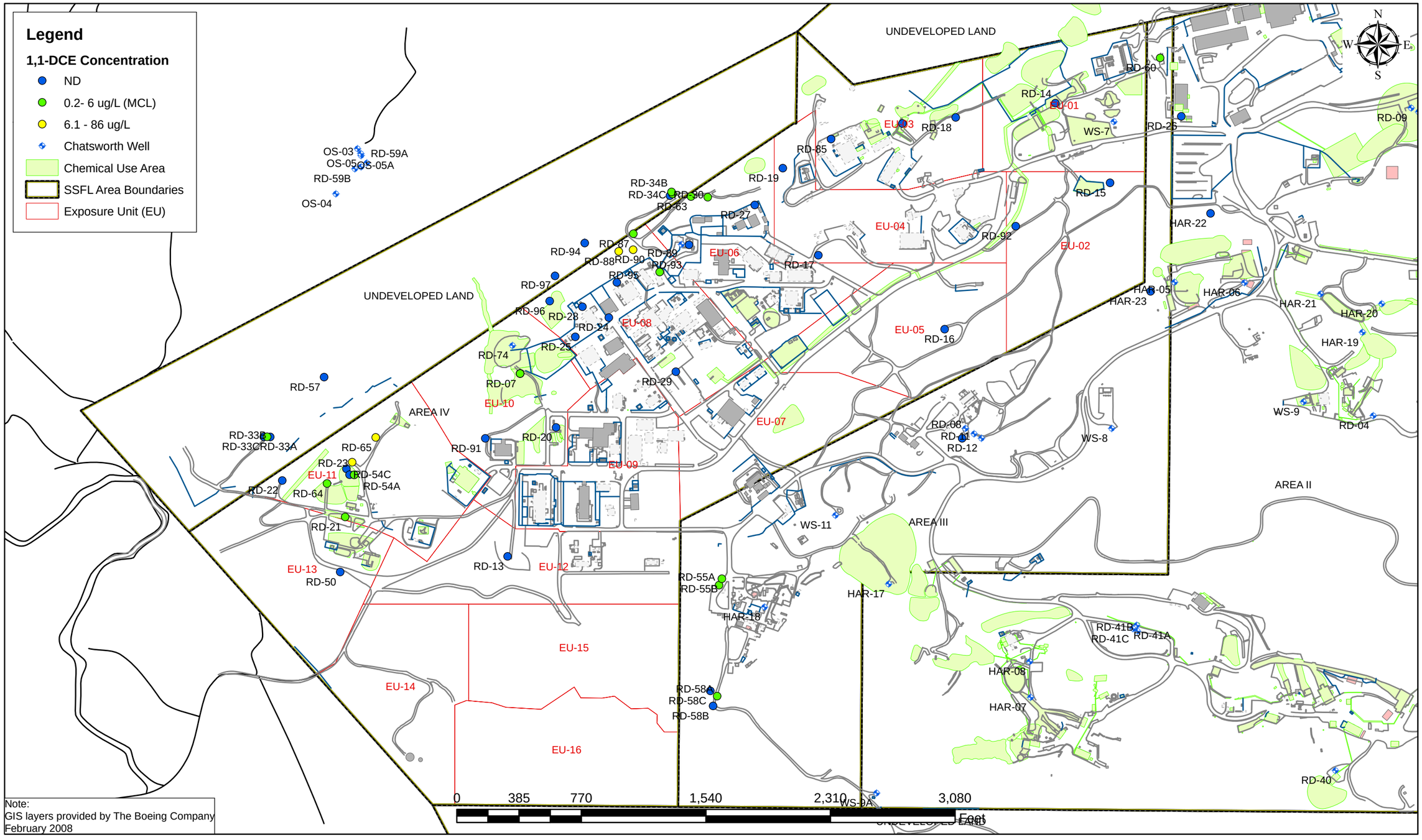



Note:
GIS layers provided by The Boeing Company
February 2008

CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

Figure 4-9
Maximum 1,1-DCE Concentrations
in Shallow Groundwater
2003-2007




Note:
GIS layers provided by The Boeing Company
February 2008

CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

Figure 4-10
Maximum 1,1-DCE Concentrations
in Chatsworth Formation
2003-2007

**Legend**

- Result > DCGL
- Result < DCGL or ND
- Trenches
- Dirt Roads
- Roads
- Exposure Unit (EU)
- SSFL Area Boundaries

**Buildings**

- Existing
- Removed

Notes:
DCGL = Derived Concentration Guideline Level
ND = Not Detected
COI = Contaminant of Interest

UNDEVELOPED LAND
EU-01
EU-03
EU-04
EU-02
EU-06
EU-08
EU-05
EU-10
EU-07
EU-09
EU-11
AREA IV
AREA III
AREA II
EU-13
EU-12
EU-15
EU-14
EU-16
UNDEVELOPED LAND

N W E S

0 250 500 1,000 1,500 2,000 Feet

Note:
GIS layers provided by The Boeing Company
February 2008

CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

**Figure 4-11**
**Non-Radiological COIs Exceeding DCGL in Soils (0-2 ft bgs)**

**Legend**

- Result > DCGL
- Result < DCGL or ND
- Trenches
- Dirt Roads
- Roads
- Exposure Unit (EU)
- SSFL Area Boundaries

**Buildings**

- Existing
- Removed

Notes:
DCGL = Derived Concentration Guideline Level
ND = Not Detected
COI = Contaminant of Interest

UNDEVELOPED LAND
UNDEVELOPED LAND
AREA IV
AREA III
AREA II
UNDEVELOPED LAND
EU-01
EU-02
EU-03
EU-04
EU-05
EU-06
EU-07
EU-08
EU-09
EU-10
EU-11
EU-12
EU-13
EU-14
EU-15
EU-16

N
W
E
S

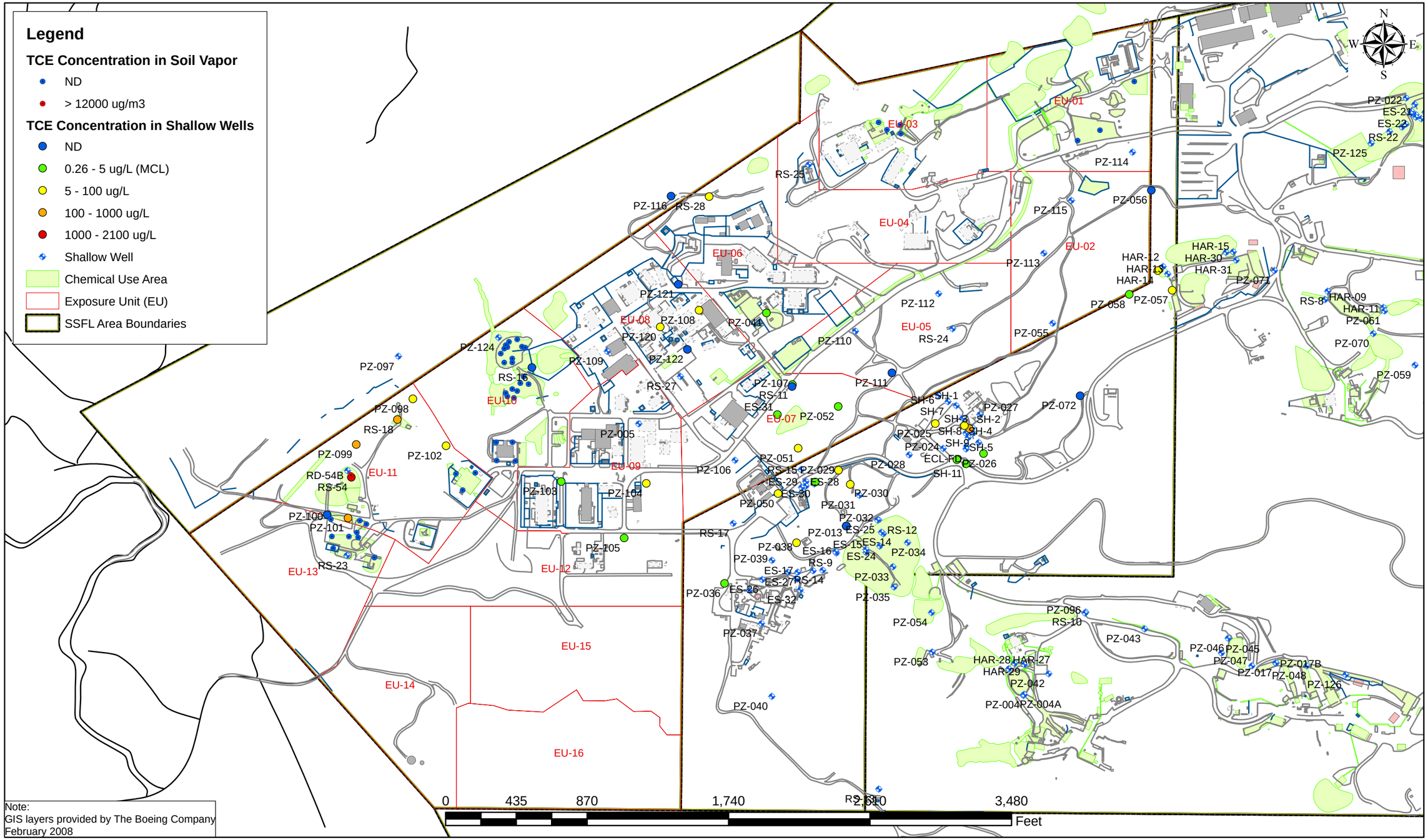
0 250 500 1,000 1,500 2,000
Feet

Note:
GIS layers provided by The Boeing Company
February 2008

CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

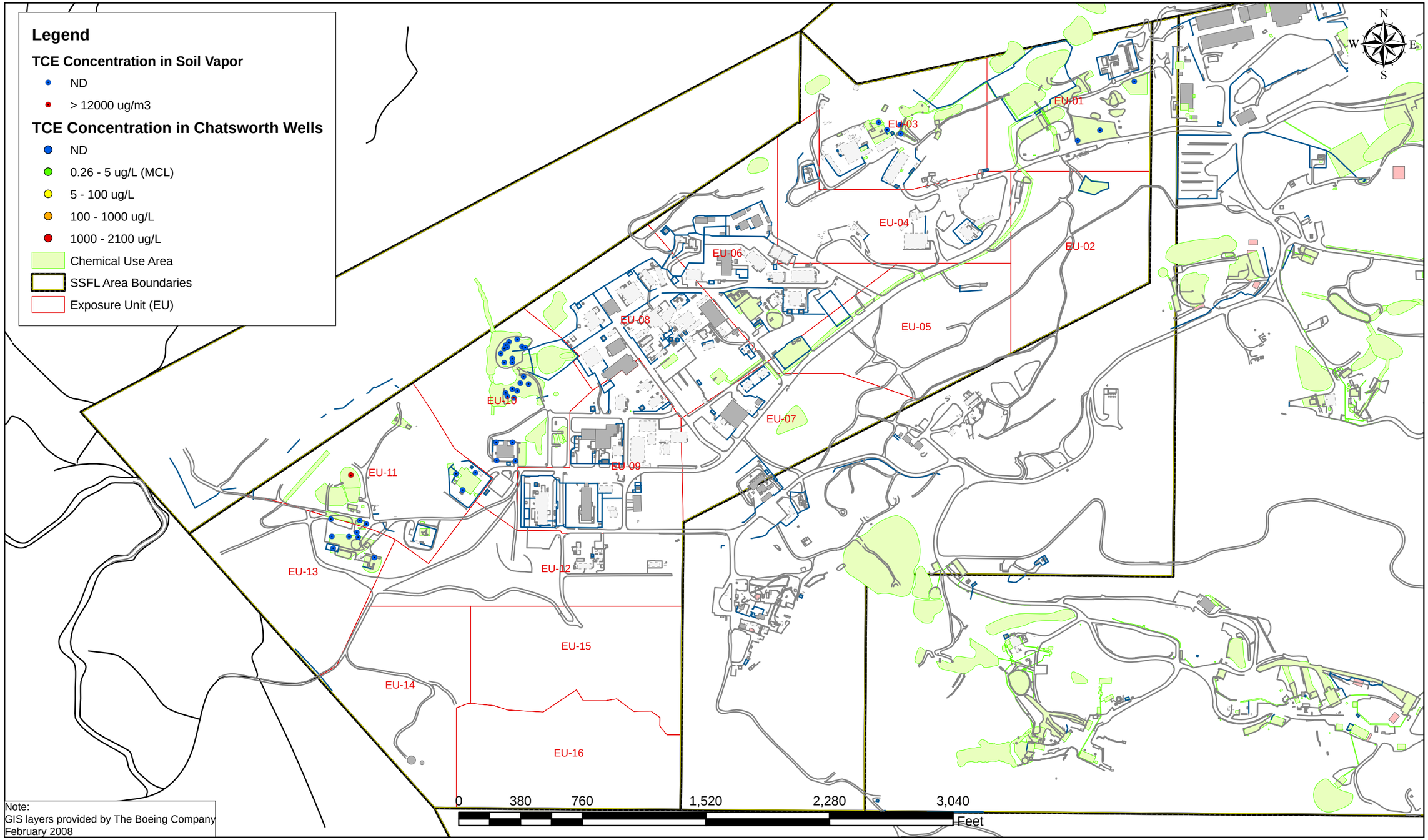
**Figure 4-12**
**Non-Radiological COIs Exceeding DCGL in Soils (2-10 ft bgs)**




CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

Figure 4-13
Maximum TCE Concentrations
in Soil Vapor and Shallow Groundwater
2003-2007




CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

Figure 4-14
Maximum TCE Concentrations
in Soil Vapor and Chatsworth Formation Wells
2003-2007

DRAFT - FOR PUBLIC REVIEW AND COMMENT

## Legend

- Proposed Multi-Channel Bedrock Well
- Proposed Shallow Well (First Water Encountered Whether In Unconsolidated Unit Or Rock) With Possible Deep Multi-Channel Bedrock Well
- Existing Shallow Groundwater Well
- Existing Chatsworth Formation Well
- SSFL Area Boundaries

UNDEVELOPED LAND

AREA IV

AREA III

AREA II

DOE1 DOE2 DOE3 DOE4 DOE5 DOE6 DOE7 DOE8 DOE9 DOE10 DOE11 DOE12 DOE13 DOE14

N W E S

0 250 500 Feet

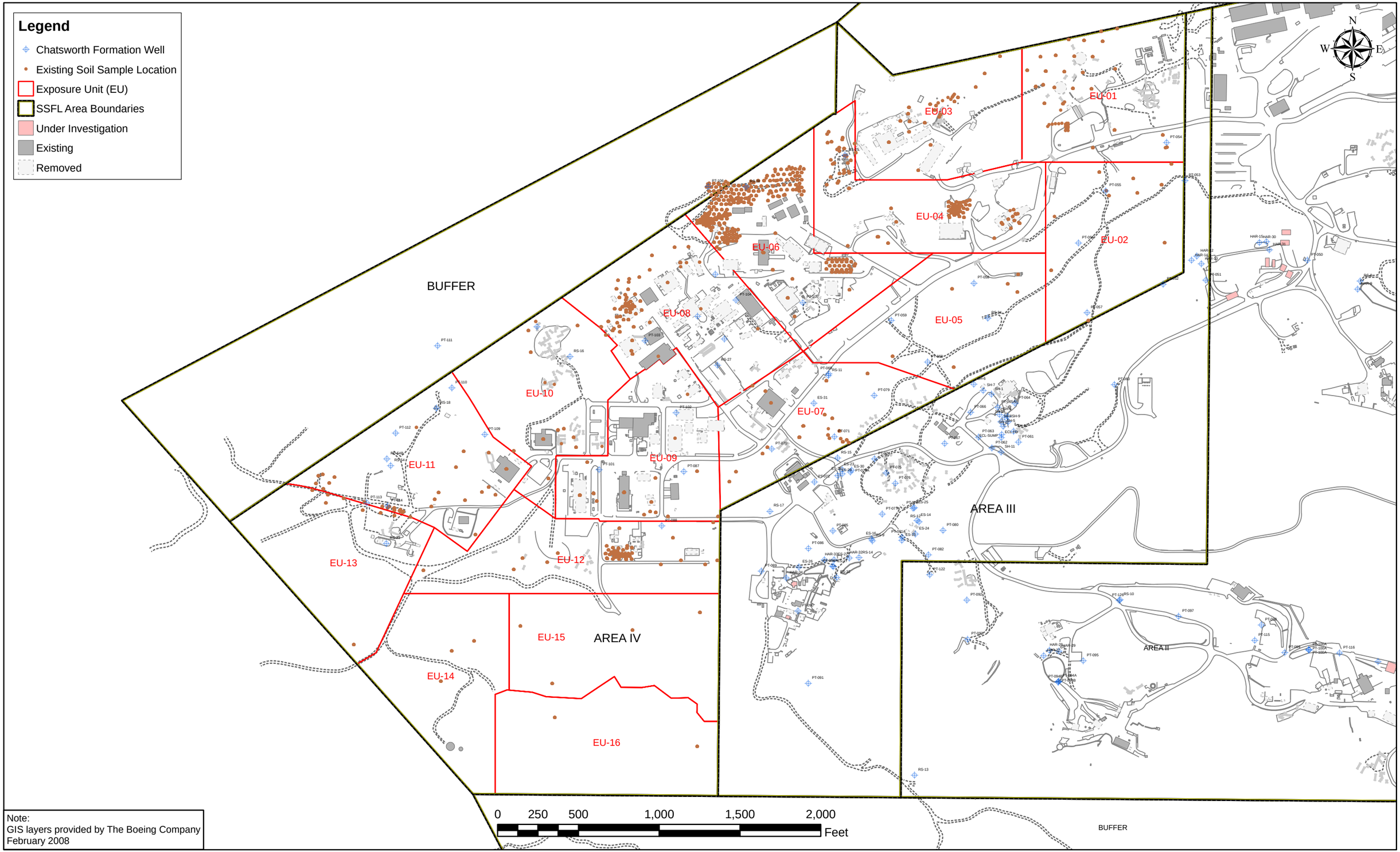
Note:
GIS layers provided by The Boeing Company
February 2008

CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

**Figure 4-15**
**Proposed Monitoring Well Locations**

DRAFT - FOR PUBLIC REVIEW AND COMMENT

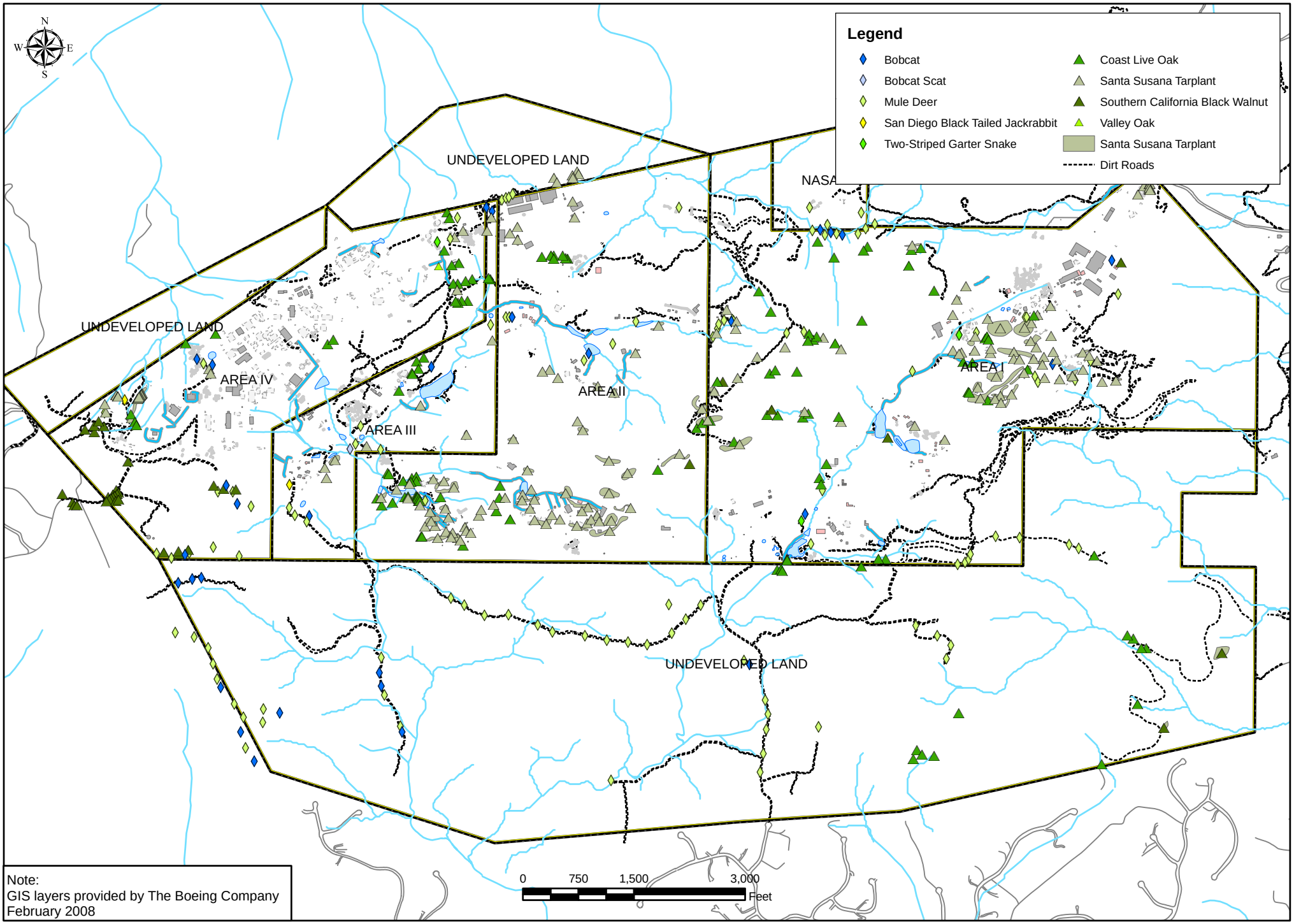



Note:
GIS layers provided by The Boeing Company
February 2008

CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

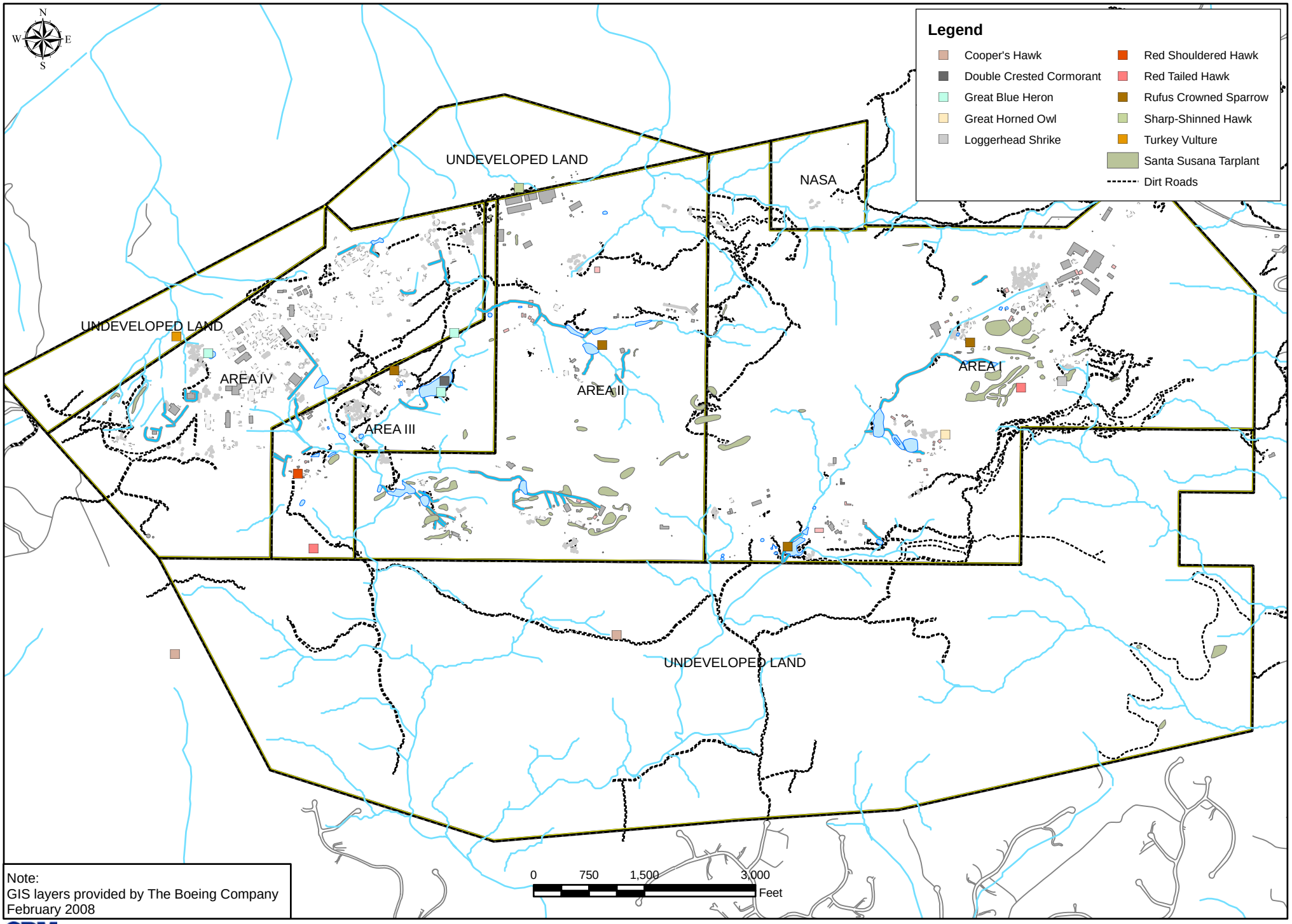
**Figure 4-16**
**Location of Existing Radiological Samples**




CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

Figure 4-17
Plant and Ground Animal Observations




Note:
GIS layers provided by The Boeing Company
February 2008

CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

Figure 4-18
Avian Observations

**Table 4-1**
**Summary of Chemical Data Gaps for Soil Media**

| Methodology or Approach | Additional Number of Samples Required by Exposure Scenario | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Residential Use | | | | Rural Residential | | | |
| | Surface Soil (0-2 ft.) | Subsurface Soil (2-10 ft.) | Deep Soil (>10 ft.) | Total Number of Samples | Surface Soil (0-2 ft.) | Subsurface Soil (2-10 ft.) | Deep Soil (>10 ft.) | Total Number of Samples |
| **Risk-based** | 223 | 236 | 0 | 459 | 237 | 242 | 0 | 479 |
| **EIS Nature and Extent** | 1,060 | 1,060 | 61 | 2,181 | 1,060 | 1,060 | 61 | 2,181 |

NOTE: Each sample may not be required to be analyzed for each chemical/analyte group.

## Table 4-2
## Radiological Soil Data Gap Summary

| Exposure Scenario | Radiological Sample Requirements as Determined by MARSSIM | Radiological Samples Required for CERCLA Risk Assessment |
|---|---|---|
| Surface | 1981 | 658 |
| Near Surface (0.5 to 2 ft) | 491 | 491 |
| Subsurface (2 to 10 ft) | 151 | 151 |

**Table 4-3**
**Radionuclide Soil Data Gap Summary By Survey Unit**

| EU | SU | SU Acreage | SU Class | Risk Assessment Radiological Samples per SU required |
|---|---|---|---|---|
| EU-01 | IVEU01RC101 | 3.39 | 1 | 26 |
| EU-01 | IVEU01RC102 | 1.14 | 1 | 9 |
| EU-01 | IVEU01RC201 | 0.53 | 2 | 1 |
| EU-01 | IVEU01RC202 | 0.37 | 2 | 1 |
| EU-01 | IVEU01RC203 | 0.08 | 2 | 1 |
| EU-01 | IVEU01RC204 | 0.17 | 2 | 1 |
| EU-01 | IVEU01RC301 | 13.13 | 3 | 12 |
| EU-02 | IVEU02RC201 | 2.68 | 2 | 5 |
| EU-02 | IVEU02RC301 | 14.96 | 3 | 14 |
| EU-03 | IVEU03RC101 | 3.76 | 1 | 27 |
| EU-03 | IVEU03RC102 | 0.83 | 1 | 7 |
| EU-03 | IVEU03RC201 | 4.48 | 2 | 7 |
| EU-03 | IVEU03RC202 | 0.26 | 2 | 1 |
| EU-03 | IVEU03RC301 | 8.80 | 3 | 8 |
| EU-04 | IVEU04RC101 | 2.53 | 1 | 19 |
| EU-04 | IVEU04RC102 | 0.64 | 1 | 5 |
| EU-04 | IVEU04RC103 | 1.15 | 1 | 9 |
| EU-04 | IVEU04RC104 | 1.98 | 1 | 15 |
| EU-04 | IVEU04RC301 | 11.97 | 3 | 11 |
| EU-05 | IVEU05RC101 | 0.10 | 1 | 1 |
| EU-05 | IVEU05RC102 | 0.92 | 1 | 7 |
| EU-05 | IVEU05RC201 | 0.20 | 2 | 1 |
| EU-05 | IVEU05RC301 | 17.66 | 3 | 16 |
| EU-06 | IVEU06RC101 | 4.99 | 1 | 38 |
| EU-06 | IVEU06RC102 | 3.00 | 1 | 23 |
| EU-06 | IVEU06RC103 | 3.46 | 1 | 26 |
| EU-06 | IVEU06RC104 | 0.77 | 1 | 6 |
| EU-06 | IVEU06RC301 | 5.86 | 3 | 6 |
| EU-07 | IVEU07RC101 | 4.77 | 1 | 36 |
| EU-07 | IVEU07RC201 | 1.24 | 2 | 2 |
| EU-07 | IVEU07RC202 | 3.66 | 2 | 6 |
| EU-07 | IVEU07RC301 | 6.45 | 3 | 6 |
| EU-08 | IVEU08RC101 | 2.54 | 1 | 20 |
| EU-08 | IVEU08RC102 | 1.44 | 1 | 11 |
| EU-08 | IVEU08RC103 | 1.23 | 1 | 10 |
| EU-08 | IVEU08RC301 | 14.64 | 3 | 13 |
| EU-09 | IVEU09RC101 | 5.36 | 1 | 41 |
| EU-09 | IVEU09RC301 | 11.82 | 3 | 11 |
| EU-10 | IVEU10RC101 | 1.30 | 1 | 10 |
| EU-10 | IVEU10RC201 | 3.20 | 2 | 5 |
| EU-10 | IVEU10RC301 | 12.89 | 3 | 12 |
| EU-11 | IVEU11RC101 | 1.97 | 1 | 15 |
| EU-11 | IVEU11RC102 | 0.30 | 1 | 3 |
| EU-11 | IVEU11RC201 | 0.46 | 2 | 1 |
| EU-11 | IVEU11RC202 | 0.51 | 2 | 1 |
| EU-11 | IVEU11RC203 | 0.45 | 2 | 1 |
| EU-11 | IVEU11RC301 | 14.05 | 3 | 13 |
| EU-12 | IVEU12RC101 | 0.38 | 1 | 3 |
| EU-12 | IVEU12RC201 | 3.64 | 2 | 6 |
| EU-12 | IVEU12RC301 | 15.29 | 3 | 14 |

## Table 4-3
## Radionuclide Soil Data Gap Summary By Survey Unit

| EU | SU | SU Acreage | SU Class | Risk Assessment Radiological Samples per SU required |
|---|---|---|---|---|
| EU-13 | IVEU13RC201 | 1.09 | 2 | 2 |
| EU-13 | IVEU13RC301 | 16.03 | 3 | 15 |
| EU-14 | IVEU14RC301 | 17.08 | 3 | 16 |
| EU-15 | IVEU15RC301 | 18.68 | 3 | 17 |
| EU-16 | IVEU16RC301 | 19.65 | 3 | 18 |
| NA-01 | NEBNA01RC201 | 0.10 | 2 | 1 |
| NA-02 | IIINA02RC201 | 0.68 | 2 | 2 |
| WBNA-01 | WBNA01RC101 | 0.21 | 1 | 2 |

Notes: EU = exposure unit. SU = survey unit.

## Table 4-4
## Gamma Walkover Survey Coverage Summary

| | | | GWS Acreage | | | | |
|---|---|---|---|---|---|---|---|
| EU Name | Unit Designator | Class | Total | % | Planned | Complete | Remaining to Survey |
| EU-01 | EU-01 Rad Class 1-01 | 1 | 3.39 | 100% | 3.39 | 2.84 | 0.55 |
| | EU-01 Rad Class 1-02 | 1 | 1.14 | 100% | 1.14 | 0 | 1.14 |
| | EU-01 Rad Class 2-01 | 2 | 0.53 | 100% | 0.53 | 0.05 | 0.48 |
| | EU-01 Rad Class 2-02 | 2 | 0.37 | 100% | 0.37 | 0 | 0.37 |
| | EU-01 Rad Class 2-03 | 2 | 0.08 | 100% | 0.08 | 0 | 0.08 |
| | EU-01 Rad Class 2-04 | 2 | 0.17 | 100% | 0.17 | 0 | 0.17 |
| | EU-01 Rad Class 3-01 | 3 | 13.13 | 100% | 13.13 | 0.58 | 12.55 |
| | Totals | | 18.82 | 100% | 18.82 | 3.47 | 15.34 |
| EU-02 | EU-02 Rad Class 2-01 | 2 | 2.68 | 100% | 2.68 | 0 | 2.68 |
| | EU-02 Rad Class 3-01 | 3 | 14.96 | 100% | 14.96 | 0 | 14.96 |
| | Totals | | 17.64 | 100% | 17.64 | 0 | 17.64 |
| EU-03 | EU-03 Rad Class 1-01 | 1 | 3.76 | 100% | 3.76 | 0 | 3.76 |
| | EU-03 Rad Class 1-02 | 1 | 0.83 | 100% | 0.83 | 0 | 0.83 |
| | EU-03 Rad Class 2-01 | 2 | 4.48 | 100% | 4.48 | 0 | 4.48 |
| | EU-03 Rad Class 2-02 | 2 | 0.26 | 100% | 0.26 | 0 | 0.26 |
| | EU-03 Rad Class 3-01 | 3 | 8.80 | 100% | 8.80 | 0 | 8.80 |
| | Totals | | 18.12 | 100% | 18.12 | 0.00 | 18.12 |
| EU-04 | EU-04 Rad Class 1-01 | 1 | 2.53 | 100% | 2.53 | 0 | 2.53 |
| | EU-04 Rad Class 1-02 | 1 | 0.64 | 100% | 0.64 | 0.45 | 0.19 |
| | EU-04 Rad Class 1-03 | 1 | 1.15 | 100% | 1.15 | 0 | 1.15 |
| | EU-04 Rad Class 1-04 | 1 | 1.98 | 100% | 1.98 | 0 | 1.98 |
| | EU-04 Rad Class 3-01 | 3 | 11.97 | 100% | 11.97 | 0.14 | 11.83 |
| | Totals | | 18.26 | 100% | 18.26 | 0.59 | 17.67 |
| EU-05 | EU-05 Rad Class 1-01 | 1 | 0.10 | 100% | 0.10 | 0 | 0.10 |
| | EU-05 Rad Class 1-02 | 1 | 0.92 | 100% | 0.92 | 0 | 0.92 |
| | EU-05 Rad Class 2-01 | 2 | 0.20 | 100% | 0.20 | 0 | 0.20 |
| | EU-05 Rad Class 3-01 | 3 | 17.66 | 100% | 17.66 | 0.10 | 17.56 |
| | Totals | | 18.87 | 100% | 18.87 | 0.10 | 18.77 |
| EU-06 | EU-06 Rad Class 1-01 | 1 | 4.99 | 100% | 4.99 | 3.01 | 1.98 |
| | EU-06 Rad Class 1-02 | 1 | 3.00 | 100% | 3.00 | 0 | 3.00 |
| | EU-06 Rad Class 1-03 | 1 | 3.46 | 100% | 3.46 | 0.001 | 3.46 |
| | EU-06 Rad Class 1-04 | 1 | 0.77 | 100% | 0.77 | 0.40 | 0.37 |
| | EU-06 Rad Class 3-01 | 3 | 5.86 | 100% | 5.86 | 0.021 | 5.84 |
| | Totals | | 18.08 | 100% | 18.08 | 3.43 | 14.65 |
| EU-07 | EU-07 Rad Class 1-01 | 1 | 4.77 | 100% | 4.77 | 0.45 | 4.31 |
| | EU-07 Rad Class 2-01 | 2 | 1.24 | 100% | 1.24 | 0 | 1.24 |
| | EU-07 Rad Class 2-02 | 2 | 3.66 | 100% | 3.66 | 0 | 3.66 |
| | EU-07 Rad Class 3-01 | 3 | 6.45 | 100% | 6.45 | 0 | 6.45 |
| | Totals | | 16.12 | 100% | 16.12 | 0.45 | 15.67 |

## Table 4-4
## Gamma Walkover Survey Coverage Summary

| | | | GWS Acreage | | | | |
|---|---|---|---|---|---|---|---|
| EU Name | Unit Designator | Class | Total | % | Planned | Complete | Remaining to Survey |
| EU-08 | EU-08 Rad Class 1-01 | 1 | 2.54 | 100% | 2.54 | 0.005 | 2.53 |
| | EU-08 Rad Class 1-02 | 1 | 1.44 | 100% | 1.44 | 1.12 | 0.32 |
| | EU-08 Rad Class 1-03 | 1 | 1.23 | 100% | 1.23 | 0 | 1.23 |
| | EU-08 Rad Class 3-01 | 3 | 14.64 | 100% | 14.64 | 0 | 14.64 |
| | Totals | | 19.85 | 100% | 19.85 | 1.13 | 18.72 |
| EU-09 | EU-09 Rad Class 1-01 | 1 | 5.36 | 100% | 5.36 | 0.35 | 5.01 |
| | EU-09 Rad Class 3-01 | 3 | 11.82 | 100% | 11.82 | 0 | 11.82 |
| | Totals | | 17.18 | 100% | 17.18 | 0.35 | 16.83 |
| EU-10 | EU-10 Rad Class 1-01 | 1 | 1.30 | 100% | 1.30 | 0 | 1.30 |
| | EU-10 Rad Class 2-01 | 2 | 3.20 | 100% | 3.20 | 0.015 | 3.19 |
| | EU-10 Rad Class 3-01 | 3 | 12.89 | 100% | 12.89 | 0 | 12.89 |
| | Totals | | 17.39 | 100% | 17.39 | 0.015 | 17.38 |
| EU-11 | EU-11 Rad Class 1-01 | 1 | 1.97 | 100% | 1.97 | 0 | 1.97 |
| | EU-11 Rad Class 1-02 | 1 | 0.30 | 100% | 0.30 | 0 | 0.30 |
| | EU-11 Rad Class 2-01 | 2 | 0.46 | 100% | 0.46 | 0 | 0.46 |
| | EU-11 Rad Class 2-02 | 2 | 0.51 | 100% | 0.51 | 0 | 0.51 |
| | EU-11 Rad Class 2-03 | 2 | 0.45 | 100% | 0.45 | 0 | 0.45 |
| | EU-11 Rad Class 3-01 | 3 | 14.05 | 100% | 14.05 | 0 | 14.05 |
| | Totals | | 17.73 | 100% | 17.73 | 0 | 17.73 |
| EU-12 | EU-12 Rad Class 1-01 | 1 | 0.38 | 100% | 0.38 | 0.19 | 0.19 |
| | EU-12 Rad Class 2-01 | 1 | 3.64 | 100% | 3.64 | 0 | 3.64 |
| | EU-12 Rad Class 3-01 | 2 | 15.29 | 100% | 15.29 | 0 | 15.29 |
| | Totals | | 19.30 | 100% | 19.30 | 0.19 | 19.11 |
| EU-13 | EU-13 Rad Class 2-01 | 2 | 1.09 | 100% | 1.09 | 0 | 1.09 |
| | EU-13 Rad Class 3-01 | 3 | 16.03 | 100% | 16.03 | 0 | 16.03 |
| | Totals | | 17.12 | 100% | 17.12 | 0 | 17.12 |
| EU-14 | EU-14 Rad Class 3-01 | 3 | 17.08 | 100% | 17.08 | 0 | 17.08 |
| EU-15 | EU-15 Rad Class 3-01 | 3 | 18.68 | 100% | 18.68 | 0 | 18.68 |
| EU-16 | EU-16 Rad Class 3-01 | 3 | 19.65 | 100% | 19.65 | 0 | 19.65 |
| NA-01 | NA-01 Rad Class 2-01 | 2 | 0.10 | 100% | 0.10 | 0 | 0.10 |
| NA-02 | NA-02 Rad Class 2-01 | 2 | 0.68 | 100% | 0.68 | 0 | 0.68 |
| NA-03 | NA-03 Rad Class 1-01 | 1 | 0.213 | 100% | 0.68 | 0.19 | 0.49 |

**Table 4-5**
**Groundwater Summary and COI Screening Value Comparison**

| Analyte | Analyte Group | Units | Frequency of Detection | | | Maximum Concentration Detected | Sample ID of Maximum Concentration | Well ID of Maximum Concentration | Minimum Concentration Detected | Sample ID of Minimum Concentration | Well ID of Minimum Concentration | MCL (1/10 value) | Frequency of MCL Exceedance | | | PRG (1/10 value) | Frequency of PRG Exceedance | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,1,1-Trichloroethane | VOC | ug/L | 373 | / | 2868 | 15000 | 9608544*22-8260 | RS-54 | 0.13 | RD-7 | RD-07 | 20 | 182 | / | 2868 | 173.22033898 | 65 | / | 2868 |
| 1,1,2,2-Tetrachloroethane | VOC | ug/L | 2 | / | 2870 | 1.5 | D1283004-8260B | RD-54A | 0.65 | 9602147*4-8260 | RD-28 | | | / | 2 | 0.005239864 | 2 | / | 2 |
| 1,1,2-Trichloro-1,2,2-trifluoroethane | VOC | ug/L | 383 | / | 1799 | 12000 | 1877 | SH-01 | 0.3 | RD-63_082107_01_L | RD-63 | 120 | 163 | / | 383 | 5917.985748 | 8 | / | 383 |
| 1,1,2-Trichloroethane | VOC | ug/L | 17 | / | 2869 | 4.5 | L67005-004-8260B | RS-54 | 0.28 | SH-04 (5/7/1997)-V | SH-04 | 0.5 | 10 | / | 17 | 0.018637778 | 17 | / | 17 |
| 1,1-Dichloroethane | VOC | ug/L | 527 | / | 2868 | 2800 | 9608544*22-8260 | RS-54 | 0.1 | VOC-2530 | RD-55B | 0.05 | 527 | / | 2868 | 0.19446411285 | 526 | / | 2868 |
| 1,1-Dichloroethene | VOC | ug/L | 642 | / | 2869 | 4600 | 9608544*22-8260 | RS-54 | 0.2 | VOC-753 | HAR-26 | 0.6 | 613 | / | 2869 | 13.518518519 | 279 | / | 2869 |
| 1,2,3-Trichloropropane | VOC | ug/L | 23 | / | 193 | 0.04 | RD-60_081505_01_D | RD-60 | 0.0011 | SH-02_090705_01_D | SH-02 | | | / | 23 | 0.000554223 | 23 | / | 23 |
| 1,2,3-Trichloropropene | VOC | ug/L | 1 | / | 1 | 80 | 1995 | SH-04 | 80 | 1995 | SH-04 | | | / | 1 | 0.217693837 | 1 | / | 1 |
| 1,2-Dibromo-3-chloropropane | VOC | ug/L | 1 | / | 214 | 0.0032 | SH-04_041205_01_D | SH-04 | 0.0032 | SH-04_041205_01_D | SH-04 | 0.02 | | / | 1 | 0.000158349 | 1 | / | 1 |
| 1,2-Dichloroethane | VOC | ug/L | 455 | / | 2869 | 250000 | VOC-3080 | SH-04 | 0.25 | SH-11 | SH-11 | | | / | 455 | 0.016329905 | 455 | / | 455 |
| 1,2-Dichloroethene | VOC | ug/L | 14 | / | 68 | 76 | PF005 | PZ-006E | 1 | PF313 | PZ-120 | | | / | 68 | | | / | 68 |
| 1,2-Dichloropropane | VOC | ug/L | 1 | / | 2815 | 2.3 | RD-60_030107_01_T | RD-60 | 2.3 | RD-60_030107_01_T | RD-60 | 0.5 | 1 | / | 1 | 0.030790151 | 1 | / | 1 |
| 1,4-Dichlorobenzene | VOC | ug/L | 7 | / | 2708 | 2 | VOC-2493 | RD-54A | 0.12 | RD-67_110702_01 | RD-67 | 0.5 | 3 | / | 7 | 0.032320432 | 7 | / | 7 |
| Acetone | VOC | ug/L | 128 | / | 2024 | 36000 | RD-55A_110702_03 | RD-55A | 1 | VOC-1593 | RD-08 | | | / | 2024 | 547.5 | 6 | / | 2024 |
| Acrylonitrile | VOC | ug/L | 1 | / | 727 | 42 | 9708476*8-8260A | RD-64 | 42 | 9708476*8-8260A | RD-64 | | | / | 1 | 0.001108445 | 1 | / | 1 |
| Benzene | VOC | ug/L | 105 | / | 2328 | 15 | VOC-3140 | SH-07 | 0.18 | RD-56B_082902_01 | RD-56B | 0.1 | 105 | / | 2328 | 0.01108445443 | 105 | / | 2328 |
| Bromodichloromethane | VOC | ug/L | 16 | / | 2866 | 170 | VOC-3078 | SH-03 | 0.31 | SSFL-RD54A-P7 | RD-54A | | | / | 16 | 0.008526503 | 16 | / | 16 |
| Bromoform | VOC | ug/L | 1 | / | 2869 | 41 | VOC-3078 | SH-03 | 41 | VOC-3078 | SH-03 | | | / | 1 | 0.85103208 | 1 | / | 1 |
| Bromomethane | VOC | ug/L | 3 | / | 2867 | 4 | VOC-1619 | RD-08 | 0.7 | L84516-002 | SH-04 | | | / | 3 | 0.866101695 | 2 | / | 3 |
| Carbon Tetrachloride | VOC | ug/L | 299 | / | 2869 | 29000 | VOC-3088 | SH-04 | 0.1 | VOC-2587 | RD-63 | 0.05 | 299 | / | 299 | 0.007389636 | 299 | / | 299 |
| Chloroethane | VOC | ug/L | 6 | / | 2867 | 6 | 9505346*2-8010 | RD-21 | 0.1 | VOC-2587 | RD-63 | | | / | 6 | 0.382222567 | 4 | / | 6 |
| Chloroform | VOC | ug/L | 431 | / | 2869 | 71000 | VOC-3083 | SH-04 | 0.1 | VOC-2587 | RD-63 | | | / | 431 | 0.052837367 | 431 | / | 431 |
| cis-1,2-Dichloroethene | VOC | ug/L | 901 | / | 2524 | 810 | RD-55A_110702_02 | RD-55A | 0.13 | RD-67_110702_01 | RD-67 | 0.6 | 801 | / | 2524 | 6.0833333333 | 450 | / | 2524 |
| Dibromochloromethane | VOC | ug/L | 12 | / | 2812 | 190 | VOC-3078 | SH-03 | 0.28 | SSFL-RD7-P9 | RD-07 | | | / | 12 | 0.011791973 | 12 | / | 12 |
| Ethylbenzene | VOC | ug/L | 13 | / | 2332 | 43 | VOC-3025 | RS-54 | 0.14 | 9611501*1-8260 | RD-16 | 30 | 4 | / | 2332 | 0.12208623637 | 13 | / | 2332 |
| Methyl ethyl ketone | VOC | ug/L | 27 | / | 1991 | 1300 | PF043 | PZ-013F | 2 | RD-58B_081202_03 | RD-58B | | | / | 1991 | 696.81818182 | 1 | / | 1991 |
| Methylene chloride | VOC | ug/L | 235 | / | 2871 | 440000 | VOC-3080 | SH-04 | 0.086 | HAR-14_050702_01 | HAR-14 | 0.5 | 204 | / | 2871 | 0.21189392532 | 234 | / | 2871 |
| m-Xylene | VOC | ug/L | 3 | / | 42 | 60 | 1975 | SH-04 | 4 | 1968 | SH-04 | | | / | 3 | 20.57337221 | 2 | / | 3 |
| m-Xylene & p-Xylene | VOC | ug/L | 10 | / | 1492 | 250 | 1961 | SH-04 | 0.21 | RD-58C_111902_01 | RD-58C | | | / | 1492 | | | / | 1492 |
| o-Xylene | VOC | ug/L | 8 | / | 1488 | 110 | 1762 | RS-54 | 0.1 | RD-67_110702_01 | RD-67 | | | / | 8 | 20.57337221 | 3 | / | 8 |
| Tetrachloroethene | VOC | ug/L | 369 | / | 2868 | 2100 | VOC-3080 | SH-04 | 0.1 | VOC-2587 | RD-63 | 0.5 | 339 | / | 2868 | 0.01040134961 | 369 | / | 2868 |
| Tetrahydrofuran | VOC | ug/L | 3 | / | 3 | 10 | 2729 | HAR-12 | 6 | 2736 | HAR-13 | | | / | 3 | 0.159905091 | 3 | / | 3 |
| Toluene | VOC | ug/L | 187 | / | 2332 | 1900 | VOC-3080 | SH-04 | 0.1 | RD-67_081707_01_L | RD-67 | 15 | 56 | / | 2332 | 57.631578947 | 35 | / | 2332 |
| trans-1,2-Dichloroethene | VOC | ug/L | 271 | / | 2863 | 410 | VOC-3182 | SH-09 | 0.1 | VOC-2587 | RD-63 | 1 | 190 | / | 271 | 12.16666667 | 102 | / | 271 |
| Trichloroethene | VOC | ug/L | 1594 | / | 2866 | 5000 | VOC-3079 | SH-04 | 0.1 | VOC-1791 | RD-16 | 0.5 | 1493 | / | 2866 | 0.13874264949 | 1593 | / | 2866 |
| Trichlorofluoromethane | VOC | ug/L | 19 | / | 2370 | 560 | 2108 | SH-07 | 0.37 | RD-58A_081506_01_T | RD-58A | 15 | 6 | / | 19 | 128.8235294 | 1 | / | 19 |
| Vinyl chloride | VOC | ug/L | 151 | / | 2866 | 3900 | VOC-3080 | SH-04 | 0.1 | VOC-2530 | RD-55B | 0.05 | 151 | / | 2866 | 0.00410535349 | 151 | / | 2866 |
| Xylenes, Total | VOC | ug/L | 11 | / | 691 | 3900 | 1727 | RS-54 | 0.59 | SH-04 (5/7/1997)-V | SH-04 | 175 | 5 | / | 691 | 121.66666667 | 5 | / | 691 |
| 1,2,4-Trichlorobenzene | SVOC | ug/L | 2 | / | 344 | 1.2 | SSFL-RD65-P6 | RD-65 | 1.2 | SSFL-RD65-P6 | RD-65 | 0.5 | 2 | / | 2 | 0.715686275 | 2 | / | 2 |
| 1,3,5-Trimethylbenzene | SVOC | ug/L | 1 | / | 170 | 2 | PF201 | PZ-122 | 2 | PF201 | PZ-122 | | | / | 1 | 1.232618196 | 1 | / | 1 |
| 1,4-Dioxane | SVOC | ug/L | 95 | / | 691 | 600 | HAR-14 (6/8/1993) | HAR-14 | 0.3 | SSFL-RD7-P9 | RD-07 | | | / | 95 | 0.249005683 | 95 | / | 95 |
| 2,4,6-Trichlorophenol | SVOC | ug/L | 3 | / | 260 | 1.7 | L69101-010 | SH-04 | 0.7 | SH-04 (2/8/1999)-C | SH-04 | | | / | 3 | 0.096045049 | 3 | / | 3 |
| 2-Chlorophenol | SVOC | ug/L | 1 | / | 262 | 10 | ACID-281 | WS-11 | 10 | ACID-281 | WS-11 | | | / | 1 | 3.041666667 | 1 | / | 1 |
| 2-Methylnaphthalene | SVOC | ug/L | | / | 63 | | | | | | | | | / | 63 | | | / | 63 |
| 4,6-Dinitro-o-cresol | SVOC | ug/L | 1 | / | 260 | 5 | RD-58B_051606_01_D | RD-58B | 5 | RD-58B_051606_01_D | RD-58B | | | / | 1 | 0.365 | 1 | / | 1 |
| Acenaphthene | SVOC | ug/L | | / | 275 | | | | | | | | | / | 275 | 36.5 | | / | 275 |
| Anthracene | SVOC | ug/L | | / | 273 | | | | | | | | | / | 273 | 182.5 | | / | 273 |
| Benzo(a)anthracene | SVOC | ug/L | | / | 275 | | | | | | | | | / | 275 | 0.00560262786 | | / | 275 |
| Benzo(a)pyrene | SVOC | ug/L | | / | 275 | | | | | | | 0.02 | | / | 275 | 0.00056026278 | | / | 275 |
| Benzo(b)fluoranthene | SVOC | ug/L | | / | 256 | | | | | | | | | / | 256 | 0.00560262786 | | / | 256 |
| Benzo(k)fluoranthene | SVOC | ug/L | 1 | / | 263 | 0.07 | PF229 | PZ-122 | 0.07 | PF229 | PZ-122 | | | / | 263 | 0.00560262786 | 1 | / | 263 |
| bis(2-Chloroethyl) ether | SVOC | ug/L | 12 | / | 266 | 540 | 2656 | RD-60 | 1 | BASE-295 | HAR-26 | | | / | 12 | 0.000443378 | 12 | / | 12 |
| bis(2-Ethylhexyl) phthalate | SVOC | ug/L | 28 | / | 269 | 390 | BASE-3 | SH-02 | 0.34 | HAR-14_050807_01_T | HAR-14 | 0.4 | 27 | / | 269 | 2.2410511451 | 23 | / | 269 |
| Chrysene | SVOC | ug/L | | / | 275 | | | | | | | | | / | 275 | 0.02117193935 | | / | 275 |
| Dibenzo(a,h)anthracene | SVOC | ug/L | | / | 275 | | | | | | | | | / | 275 | 0.00163979352 | | / | 275 |
| Diethyl phthalate | SVOC | ug/L | 9 | / | 269 | 5 | G94-11-178-24 | RD-13 | 0.06 | PF232 | PZ-099 | | | / | 269 | 2920 | | / | 269 |
| Di-n-butyl phthalate | SVOC | ug/L | 19 | / | 267 | 36 | BASE-28 | SH-05 | 0.1 | PF232 | PZ-099 | | | / | 267 | 365 | | / | 267 |
| Fluoranthene | SVOC | ug/L | | / | 275 | | | | | | | | | / | 275 | 146 | | / | 275 |

**Table 4-5**
**Groundwater Summary and COI Screening Value Comparison**

| Analyte | Analyte Group | Units | Frequency of Detection | | | Maximum Concentration Detected | Sample ID of Maximum Concentration | Well ID of Maximum Concentration | Minimum Concentration Detected | Sample ID of Minimum Concentration | Well ID of Minimum Concentration | MCL (1/10 value) | Frequency of MCL Exceedance | | | PRG (1/10 value) | Frequency of PRG Exceedance | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fluorene | SVOC | ug/L | | / | 275 | | | | | | | | | / | 275 | 24.333333333 | | / | 275 |
| Indeno(1,2,3-cd)pyrene | SVOC | ug/L | | / | 267 | | | | | | | | | / | 267 | 0.00560262786 | | / | 267 |
| Kepone | SVOC | ug/L | 1 | / | 32 | 0.11 | L84362-001 | HAR-14 | 0.11 | L84362-001 | HAR-14 | | | / | 1 | 0.000420197 | 1 | / | 1 |
| Naphthalene | SVOC | ug/L | 11 | / | 363 | 16 | PF001 | PZ-006A | 0.06 | PF096 | PZ-037 | | | / | 363 | 0.00923704536 | 11 | / | 363 |
| Nitrobenzene | SVOC | ug/L | 25 | / | 258 | 380 | BASE-14 | SH-04 | 2.6 | BASE-39 | SH-08 | | | / | 25 | 0.339534884 | 25 | / | 25 |
| Pentachlorophenol | SVOC | ug/L | 2 | / | 276 | 3 | 9502312*42 | RD-13 | 2 | L9902185-009 | RD-13 | 0.1 | 2 | / | 2 | 0.083001894 | 2 | / | 2 |
| Pyrene | SVOC | ug/L | | / | 212 | | | | | | | | | / | 212 | 18.25 | | / | 212 |
| Aldrin | Pesticides | ug/L | 1 | / | 32 | 0.37 | SH-04 (2/8/1999)-A | SH-04 | 0.37 | SH-04 (2/8/1999)-A | SH-04 | | | / | 1 | 0.00039548 | 1 | / | 1 |
| Aroclor 1242 | PCBs | ug/L | | / | 34 | | | | | | | | | / | 34 | | | / | 34 |
| Aroclor 1248 | PCBs | ug/L | | / | 34 | | | | | | | | | / | 34 | | | / | 34 |
| Aroclor 1254 | PCBs | ug/L | | / | 34 | | | | | | | | | / | 34 | 0.00336157671 | | / | 34 |
| Aroclor 1260 | PCBs | ug/L | | / | 34 | | | | | | | | | / | 34 | | | / | 34 |
| Aluminum, Dissolved | Inorganic | ug/L | | / | 11 | | | | | | | 100 | | / | 11 | 3650 | | / | 11 |
| Aluminum, Total | Inorganic | ug/L | 12 | / | 28 | 4400 | RD-55A_021207_01H_T | RD-55A | 115 | PF084 | PZ-041 | 100 | 12 | / | 28 | 3650 | 1 | / | 28 |
| Antimony | Inorganic | ug/L | 12 | / | 35 | 16 | PF229 | PZ-122 | 0.04 | HAR-14 (2/9/1999)-A | HAR-14 | 0.6 | 1 | / | 35 | 1.46 | 1 | / | 35 |
| Antimony, Dissolved | Inorganic | ug/L | 65 | / | 272 | 5.4 | RS-18_050203_01 | RS-18 | 0.051 | RD-54C_021207_01_T | RD-54C | 0.6 | 23 | / | 272 | 1.46 | 12 | / | 272 |
| Arsenic | Inorganic | ug/L | 11 | / | 35 | 8.9 | PF143 | PZ-056 | 0.72 | RD-34A_081507_01_TOT_T | RD-34A | 1 | 4 | / | 35 | 0.000711444800 | 11 | / | 35 |
| Arsenic, Dissolved | Inorganic | ug/L | 63 | / | 409 | 19 | L69251-008 | RS-18 | 0.27 | RD-34C | RD-34C | 1 | 31 | / | 409 | 0.000711445 | 63 | / | 409 |
| Barium | Inorganic | ug/L | 31 | / | 35 | 130 | RD-55A_021207_01H_T | RD-55A | 8.4 | PF182 | PZ-114 | 100 | 1 | / | 35 | 255.5 | | / | 35 |
| Barium, Dissolved | Inorganic | ug/L | 375 | / | 410 | 340 | SH-04_041403_01 | SH-04 | 5.9 | Trace-193 | RD-54C | 100 | 27 | / | 410 | 255.5 | 4 | / | 410 |
| Beryllium | Inorganic | ug/L | 4 | / | 37 | 0.5 | SH-04 (2/8/1999)-A | SH-04 | 0.01 | HAR-14 (2/9/1999)-A | HAR-14 | 0.4 | 2 | / | 37 | 7.3 | | / | 37 |
| Beryllium, Dissolved | Inorganic | ug/L | 11 | / | 286 | 1.8 | 9708553*7 | RD-57 | 0.042 | RD-34B_021505_01_D | RD-34B | 0.4 | 1 | / | 286 | 7.3 | | / | 286 |
| Boron | Inorganic | ug/L | 22 | / | 26 | 1840 | PF227 | PZ-120 | 0 | WS-11 (9/6/1956) | WS-11 | | | / | 26 | 730 | 2 | / | 26 |
| Boron, Dissolved | Inorganic | ug/L | 45 | / | 77 | 580 | RS-54_021507_01_T | RS-54 | 20 | COMMON-83 | RD-34C | | | / | 77 | 730 | | / | 77 |
| Cadmium | Inorganic | ug/L | 13 | / | 39 | 2.5 | RS-54_052407_01_TOT_T | RS-54 | 0.06 | HAR-14 (2/9/1999)-A | HAR-14 | 0.5 | 6 | / | 39 | 1.825 | 3 | / | 39 |
| Cadmium, Dissolved | Inorganic | ug/L | 62 | / | 409 | 6.1 | Trace-31 | RS-54 | 0.015 | RD-54C_110504_01_D | RD-54C | 0.5 | 25 | / | 409 | 1.825 | 16 | / | 409 |
| Chromium | Inorganic | ug/L | 23 | / | 35 | 85 | RD-55A_021207_01H_T | RD-55A | 0.73 | PF179 | PZ-104 | 5 | 4 | / | 35 | | | / | 35 |
| Chromium, Dissolved | Inorganic | ug/L | 80 | / | 412 | 88 | Trace-81 | RD-21 | 0.23 | RD-54B_082102_01 | RD-54B | 5 | 34 | / | 412 | | | / | 412 |
| Cobalt | Inorganic | ug/L | 20 | / | 35 | 170 | RS-54_021507_01H_T | RS-54 | 0.18 | RD-55A_081407_01_TOT_T | RD-55A | | | / | 35 | 73 | 2 | / | 35 |
| Cobalt, Dissolved | Inorganic | ug/L | 129 | / | 149 | 230 | RS-54_090605_01_D | RS-54 | 0.058 | RD-08_112002_01 | RD-08 | | | / | 149 | 73 | 6 | / | 149 |
| Copper | Inorganic | ug/L | 25 | / | 35 | 250 | RD-60_030107_01H_T | RD-60 | 0.7 | HAR-14 (2/9/1999)-A | HAR-14 | 130 | 1 | / | 35 | 146 | 1 | / | 35 |
| Copper, Dissolved | Inorganic | ug/L | 148 | / | 275 | 150 | RD-60_052406_01_D | RD-60 | 0.19 | L81117-004 | RD-33C | 130 | 1 | / | 275 | 146 | 1 | / | 275 |
| Cyanides | Inorganic | ug/L | 10 | / | 195 | 360 | L9802582-001 | RS-54 | 4.2 | RD-58C_111902_01 | RD-58C | 15 | 6 | / | 10 | 73 | 1 | / | 10 |
| Iron | Inorganic | ug/L | 55 | / | 110 | 27000 | RD-55A_021207_01H_T | RD-55A | 20 | Trace-131 | RD-34B | | | / | 55 | 1095 | 10 | / | 55 |
| Iron, Dissolved | Inorganic | ug/L | 100 | / | 136 | 5100 | RD-60_052406_01_D | RD-60 | 3.9 | L81065-003 | RD-15 | | | / | 100 | 1095 | 26 | / | 100 |
| Lead | Inorganic | ug/L | 25 | / | 39 | 18 | RD-60_030107_01H_T | RD-60 | 0.073 | HAR-14_050806_01_D | HAR-14 | 1.5 | 15 | / | 39 | | | / | 39 |
| Lead, Dissolved | Inorganic | ug/L | 215 | / | 415 | 120 | 9608399*11 | RD-56A | 0.04 | RD-92_031606_01_D | RD-92 | 1.5 | 141 | / | 415 | | | / | 415 |
| Manganese | Inorganic | ug/L | 29 | / | 30 | 3100 | RD-55A_021207_01H_T | RD-55A | 4.1 | RD-34A_022807_01H_T | RD-34A | | | / | 30 | 87.6 | 8 | / | 30 |
| Manganese, Dissolved | Inorganic | ug/L | 194 | / | 214 | 18400 | Trace-1 | SH-04 | 0.13 | L69251-008 | RS-18 | | | / | 214 | 87.6 | 51 | / | 214 |
| Mercury | Inorganic | ug/L | 3 | / | 38 | 0.43 | SH-04 (5/6/2000)-B | SH-04 | 0.06 | PF085 | PZ-041 | 0.2 | 2 | / | 38 | 1.095 | | / | 38 |
| Mercury, Dissolved | Inorganic | ug/L | 10 | / | 410 | 0.8 | Trace-193 | RD-54C | 0.069 | SH-04_041403_01 | SH-04 | 0.2 | 7 | / | 410 | 1.095 | | / | 410 |
| Molybdenum | Inorganic | ug/L | 20 | / | 25 | 78 | PF227 | PZ-120 | 0.71 | RD-86_082907_01_TOT_T | RD-86 | | | / | 25 | 18.25 | 8 | / | 25 |
| Molybdenum, Dissolved | Inorganic | ug/L | 127 | / | 235 | 88 | PZ-114_052307_01_T | PZ-114 | 0.31 | RD-34A_022106_01_D | RD-34A | | | / | 235 | 18.25 | 13 | / | 235 |
| Nickel | Inorganic | ug/L | 24 | / | 39 | 700 | RS-54_021507_01H_T | RS-54 | 0.52 | HAR-14_050806_01_D | HAR-14 | 10 | 9 | / | 39 | 73 | 2 | / | 39 |
| Nickel, Dissolved | Inorganic | ug/L | 129 | / | 275 | 990 | RS-54_090605_01_D | RS-54 | 0.27 | RD-33B_021103_01 | RD-33B | 10 | 26 | / | 275 | 73 | 18 | / | 275 |
| Perchlorate | Inorganic | ug/L | 59 | / | 401 | 56 | SSFL-RD54A-P3 | RD-54A | 0.562 | PF237 | PZ-051 | | | / | 59 | 0.365 | 59 | / | 59 |
| Selenium | Inorganic | ug/L | 17 | / | 35 | 18 | PF232 | PZ-099 | 0.57 | RD-86_052407_01_TOT_T | RD-86 | 5 | 6 | / | 35 | 18.25 | | / | 35 |
| Selenium, Dissolved | Inorganic | ug/L | 112 | / | 410 | 80 | L69251-008 | RS-18 | 0.27 | L73106-006 | RD-56B | 5 | 11 | / | 410 | 18.25 | 2 | / | 410 |
| Silver | Inorganic | ug/L | 16 | / | 37 | 3.9 | WS-07 (2/6/1984)-FD | WS-07 | 0.07 | SH-04 (5/6/2000)-B | SH-04 | | | / | 37 | 18.25 | | / | 37 |
| Silver, Dissolved | Inorganic | ug/L | 16 | / | 410 | 23 | 9702696*10 | RD-22 | 0.032 | RD-54B_082205_01_D | RD-54B | | | / | 410 | 18.25 | 3 | / | 410 |
| Strontium, Dissolved | Inorganic | ug/L | 54 | / | 54 | 2200 | Trace-117 | RD-33B | 178 | Trace-105 | RD-27 | | | / | 54 | 2190 | 1 | / | 54 |
| Thallium | Inorganic | ug/L | 4 | / | 34 | 0.24 | HAR-14_050806_01_D | HAR-14 | 0.02 | SH-04 (2/8/1999)-A | SH-04 | 0.2 | 1 | / | 34 | 0.2409 | | / | 34 |
| Thallium, Dissolved | Inorganic | ug/L | 28 | / | 274 | 3.7 | RD-91_032504_01_DM | RD-91 | 0.062 | RD-34C | RD-34C | 0.2 | 16 | / | 274 | 0.2409 | 14 | / | 274 |
| Vanadium | Inorganic | ug/L | 16 | / | 34 | 37 | PF232 | PZ-099 | 0.95 | RD-86_052407_01_TOT_T | RD-86 | 2 | 8 | / | 34 | 3.65 | 4 | / | 34 |
| Vanadium, Dissolved | Inorganic | ug/L | 59 | / | 149 | 6.3 | L84516-002 | SH-04 | 0.11 | RD-58A (11/02/2001) | RD-58A | 2 | 10 | / | 149 | 3.65 | 4 | / | 149 |
| Zinc | Inorganic | ug/L | 22 | / | 35 | 2000 | RD-60_080607_01_TOT_T | RD-60 | 3 | HAR-14 (2/9/1999)-A | HAR-14 | | | / | 35 | 1095 | 3 | / | 35 |
| Zinc, Dissolved | Inorganic | ug/L | 257 | / | 279 | 9800 | RD-60_052406_01_D | RD-60 | 2.7 | PZ-056_031606_01_D | PZ-056 | | | / | 279 | 1095 | 95 | / | 279 |
| 1,3-Dinitrobenzene | Explosive | ug/L | 8 | / | 122 | 43 | 3019 | SH-04 | 30 | 3175 | SH-04 | | | / | 8 | 0.365 | 8 | / | 8 |

**Table 4-5**
**Groundwater Summary and COI Screening Value Comparison**

| Analyte | Analyte Group | Units | Frequency of Detection | | | Maximum Concentration Detected | Sample ID of Maximum Concentration | Well ID of Maximum Concentration | Minimum Concentration Detected | Sample ID of Minimum Concentration | Well ID of Minimum Concentration | MCL (1/10 value) | Frequency of MCL Exceedance | | | PRG (1/10 value) | Frequency of PRG Exceedance | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| n-Nitrosodimethylamine | Explosive | ug/L | 49 | / | 408 | 1300 | HAR-14_041503_01 | HAR-14 | 0.0121 | HAR-22_081605_01_P | HAR-22 | | | / | 49 | 0.000420197 | 49 | / | 49 |
| n-Nitrosodi-n-propylamine | Explosive | ug/L | 2 | / | 256 | 34 | BASE-291 | HAR-23 | 6 | G94-11-178-24 | RD-13 | | | / | 2 | 0.00096045 | 2 | / | 2 |
| n-Nitrosodiphenylamine | Explosive | ug/L | 2 | / | 257 | 70 | BASE-9 | SH-03 | 22 | BASE-112 | HAR-30 | | | / | 2 | 0.747017048 | 2 | / | 2 |
| 1,2,3,4,6,7,8-Heptachlorodibenzofuran | Dioxins | ug/L | 4 | / | 33 | 0.0046 | HAR-26_112002_01 | HAR-26 | 0.00047 | HAR-14_082807_36_SK | HAR-14 | | | / | 33 | 5.1716564887E | 4 | / | 33 |
| 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin | Dioxins | ug/L | 6 | / | 33 | 0.0116 | PZ-056_031606_01_D | PZ-056 | 0.00198 | HAR-14_082807_03_T | HAR-14 | | | / | 33 | | | / | 33 |
| 1,2,3,4,7,8,9-Heptachlorodibenzofuran | Dioxins | ug/L | 1 | / | 33 | 0.0051 | RD-58A_112102_01 | RD-58A | 0.0051 | RD-58A_112102_01 | RD-58A | | | / | 33 | 5.1716564887E | 1 | / | 33 |
| 1,2,3,4,7,8-Hexachlorodibenzofuran | Dioxins | ug/L | 5 | / | 33 | 0.006 | HAR-26_112002_01 | HAR-26 | 0.00096 | RD-58C_111902_01 | RD-58C | | | / | 33 | 5.1716564887E | 5 | / | 33 |
| 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin | Dioxins | ug/L | 2 | / | 33 | 0.0056 | HAR-26_112002_01 | HAR-26 | 0.0034 | RD-08_112002_01 | RD-08 | | | / | 33 | 5.1716564887E | 2 | / | 33 |
| 1,2,3,6,7,8-Hexachlorodibenzofuran | Dioxins | ug/L | 4 | / | 33 | 0.0049 | HAR-26_112002_01 | HAR-26 | 0.00044 | HAR-14_050807_03_SK | HAR-14 | | | / | 33 | 5.1716564887E | 4 | / | 33 |
| 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin | Dioxins | ug/L | 2 | / | 33 | 0.0059 | HAR-26_112002_01 | HAR-26 | 0.0033 | RD-08_112002_01 | RD-08 | | | / | 33 | 5.1716564887E | 2 | / | 33 |
| 1,2,3,7,8,9-Hexachlorodibenzofuran | Dioxins | ug/L | 2 | / | 33 | 0.0053 | HAR-26_112002_01 | HAR-26 | 0.0049 | RD-08_112002_01 | RD-08 | | | / | 33 | 5.1716564887E | 2 | / | 33 |
| 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin | Dioxins | ug/L | 2 | / | 33 | 0.0064 | HAR-26_112002_01 | HAR-26 | 0.0046 | RD-08_112002_01 | RD-08 | | | / | 33 | 5.1716564887E | 2 | / | 33 |
| 1,2,3,7,8-Pentachlorodibenzofuran | Dioxins | ug/L | 3 | / | 33 | 0.0068 | HAR-26_112002_01 | HAR-26 | 0.0046 | RD-58A_112102_01 | RD-58A | | | / | 33 | 1.0343312977E | 3 | / | 33 |
| 1,2,3,7,8-Pentachlorodibenzo-p-dioxin | Dioxins | ug/L | 1 | / | 33 | 0.005 | RD-08_112002_01 | RD-08 | 0.005 | RD-08_112002_01 | RD-08 | | | / | 33 | 5.1716564887E | 1 | / | 33 |
| 2,3,4,6,7,8-Hexachlorodibenzofuran | Dioxins | ug/L | 2 | / | 33 | 0.0048 | HAR-26_112002_01 | HAR-26 | 0.0025 | RD-58A_112102_01 | RD-58A | | | / | 33 | 5.1716564887E | 2 | / | 33 |
| 2,3,4,7,8-Pentachlorodibenzofuran | Dioxins | ug/L | 2 | / | 31 | 0.0058 | HAR-26_112002_01 | HAR-26 | 0.0054 | RD-08_112002_01 | RD-08 | | | / | 31 | 1.0343312977E | 2 | / | 31 |
| 2,3,7,8-TCDD | Dioxins | ug/L | 5 | / | 45 | 0.0045 | RD-58A_112102_01 | RD-58A | 0.0000018 | RD-58B (10/30/2001) | RD-58B | 0.000003 | 4 | / | 5 | 5.17166E-08 | 5 | / | 5 |
| 2,3,7,8-TCDD TEQ | Dioxins | ug/L | 5 | / | 45 | 0.0045 | RD-58A_112102_01 | RD-58A | 0.0000018 | RD-58B (10/30/2001) | RD-58B | 0.000003 | 4 | / | 45 | | 5 | / | 45 |
| 2,3,7,8-TCDD TEQ - Total | Dioxins | ug/L | 4 | / | 24 | 0.00055 | HAR-14 (5/16/1995)-A | HAR-14 | 0.000000723 | SH-04_041205_01_D | SH-04 | 0.000003 | 3 | / | 24 | 5.17166E-08 | 4 | / | 24 |
| 2,3,7,8-Tetrachlorodibenzofuran | Dioxins | ug/L | 1 | / | 33 | 0.0024 | HAR-26_112002_01 | HAR-26 | 0.0024 | HAR-26_112002_01 | HAR-26 | | | / | 33 | 5.1716564887E | 1 | / | 33 |
| Heptachlorodibenzo-p-dioxins | Dioxins | ug/L | 4 | / | 22 | 0.0204 | PZ-056_031606_01_D | PZ-056 | 0.0012 | SH-04_120705_01_D | SH-04 | | | / | 22 | 5.1716564887E | 4 | / | 22 |
| Hexachlorodibenzo-p-dioxins | Dioxins | ug/L | 1 | / | 22 | 0.00136 | PZ-056_031606_01_D | PZ-056 | 0.00136 | PZ-056_031606_01_D | PZ-056 | | | / | 1 | 5.17166E-07 | 1 | / | 1 |
| Octachlorodibenzofuran | Dioxins | ug/L | 2 | / | 33 | 0.0114 | HAR-26_112002_01 | HAR-26 | 0.00844 | PZ-056_031606_01_D | PZ-056 | | | / | 33 | 0.00051716564 | 2 | / | 33 |
| Octachlorodibenzo-p-dioxin | Dioxins | ug/L | 10 | / | 34 | 0.55 | HAR-14 (5/16/1995)-A | HAR-14 | 0.00055 | HAR-14 (5/16/1995)-A | HAR-14 | | | / | 34 | 0.00051716564 | 10 | / | 34 |
| Pentachlorodibenzo-p-dioxins | Dioxins | ug/L | 1 | / | 22 | 0.0433 | RS-54_021507_01_T | RS-54 | 0.0433 | RS-54_021507_01_T | RS-54 | | | / | 22 | | | / | 22 |
| Actinium-228, Dissolved | Radionuclide | pCi/L | 237 | / | 241 | 354 | RD-27_20020822_F | RD-27 | -47 | Unknown | RD-24 | 0.5 | 205 | / | 241 | 2.39 | 196 | / | 241 |
| Actinium-228, Total | Radionuclide | pCi/L | 4 | / | 4 | 7.57 | RS-18_050203_01 | RS-18 | -9 | Unknown | RD-24 | 0.5 | 3 | / | 4 | 2.39 | 2 | / | 4 |
| Americium-241, Dissolved | Radionuclide | pCi/L | 5 | / | 5 | 16.4 | RD-23_19931106_F | RD-23 | 10.4 | RS-28_19931106_F | RS-28 | 1.5 | 5 | / | 5 | 0.0458 | 5 | / | 5 |
| Antimony-125, Dissolved | Radionuclide | pCi/L | 5 | / | 5 | 6.28 | RS-28_19931106_F | RS-28 | 2.35 | RS-18_19931106_F | RS-18 | 30 | | / | 5 | 0.928 | 5 | / | 5 |
| Cesium-134, Dissolved | Radionuclide | pCi/L | 328 | / | 332 | 109 | RD-27_20020822_F | RD-27 | -19 | RD-28_19940817_F | RD-28 | 8 | 107 | / | 332 | 0.113 | 274 | / | 332 |
| Cesium-134, Total | Radionuclide | pCi/L | 8 | / | 8 | 1.97 | RS-18_050203_01 | RS-18 | -1.4 | 349 | RD-27 | 8 | | / | 8 | 0.113 | 5 | / | 8 |
| Cesium-137, Dissolved | Radionuclide | pCi/L | 459 | / | 511 | 104 | RD-23_19910311_FD_F | RD-23 | -18 | RD-24_19890912_SS_F | RD-24 | | | / | 511 | | | / | 511 |
| Cesium-137, Total | Radionuclide | pCi/L | 22 | / | 22 | 4.7 | RD-25_19891031 | RD-25 | -11 | 354 | RD-28 | | | / | 22 | | 11 | / | 22 |
| Cobalt-60, Dissolved | Radionuclide | pCi/L | 348 | / | 352 | 83.5 | RD-27_20020822_F | RD-27 | -9 | RD-28_19940817_F | RD-28 | | | / | 352 | | | / | 352 |
| Cobalt-60, Total | Radionuclide | pCi/L | 11 | / | 11 | 5.9 | 141 | RD-07 | -1.6 | 160 | RD-13 | | | / | 11 | | 6 | / | 11 |
| Europium-152, Dissolved | Radionuclide | pCi/L | 84 | / | 84 | 7.52 | RD-21_19931106_F | RD-21 | -2.26 | RS-54_022306_03_S | RS-54 | 6 | 5 | / | 84 | 0.784 | 79 | / | 84 |
| Europium-152, Total | Radionuclide | pCi/L | 1 | / | 1 | 3.03 | RD-96_050906_01_UNFILTER | RD-96 | 3.03 | RD-96_050906_01_UNFILTER | RD-96 | 6 | | / | 1 | 0.784 | 1 | / | 1 |
| Europium-154, Dissolved | Radionuclide | pCi/L | 84 | / | 84 | 7.48 | RD-95 | RD-95 | -1.37 | RD-30_082905_03_S | RD-30 | 20 | | / | 84 | 0.462 | 80 | / | 84 |
| Europium-154, Total | Radionuclide | pCi/L | 1 | / | 1 | 3.51 | RD-96_050906_01_UNFILTER | RD-96 | 3.51 | RD-96_050906_01_UNFILTER | RD-96 | 20 | | / | 1 | 0.462 | 1 | / | 1 |
| Europium-155, Dissolved | Radionuclide | pCi/L | 5 | / | 5 | 7.68 | RD-21_19931106_F | RD-21 | 3.2 | RS-18_19931106_F | RS-18 | 60 | | / | 5 | 2.51 | 5 | / | 5 |
| Gross alpha, Decanted | Radionuclide | pCi/L | 3 | / | 3 | 8.3 | WS-07_19890723 | WS-07 | 6.6 | RD-07_19890722 | RD-07 | 1.5 | 3 | / | 3 | | | / | 3 |
| Gross alpha, Dissolved | Radionuclide | pCi/L | 730 | / | 732 | 100 | RD-19_19950215_F | RD-19 | -2.58 | RD-54C_022306_01_E | RD-54C | 1.5 | 669 | / | 730 | | | / | 730 |
| Gross alpha, Total | Radionuclide | pCi/L | 32 | / | 35 | 42.3 | RS-28_19890927 | RS-28 | -1 | RD-29_19890920 | RD-29 | 1.5 | 31 | / | 32 | | | / | 32 |
| Gross beta, Decanted | Radionuclide | pCi/L | 3 | / | 3 | 6.7 | ES-31_19890723 | ES-31 | 4.7 | WS-07_19890723 | WS-07 | 1.5 | 3 | / | 3 | | | / | 3 |
| Lead-210, Dissolved | Radionuclide | pCi/L | 178 | / | 179 | 3850 | RD-27_20020822_F | RD-27 | -130 | Unknown | RD-24 | | | / | 179 | 0.00375 | 176 | / | 179 |
| Lead-210, Total | Radionuclide | pCi/L | 6 | / | 6 | 320 | Unknown | RD-24 | -60 | Unknown | RD-24 | | | / | 6 | 0.00375 | 3 | / | 6 |
| Manganese-54, Dissolved | Radionuclide | pCi/L | 84 | / | 84 | 2.48 | RD-95 | RD-95 | -0.998 | RD-15_021606_03_S | RD-15 | 30 | | / | 84 | 2.09 | 6 | / | 84 |
| Plutonium-238, Dissolved | Radionuclide | pCi/L | 1 | / | 1 | -0.00077 | RD-13_19891031_F | RD-13 | -0.00077 | RD-13_19891031_F | RD-13 | 1.5 | | / | 1 | 0.0364 | | / | 1 |
| Plutonium-239/240, Dissolved | Radionuclide | pCi/L | 1 | / | 1 | 0.00239 | RD-13_19891031_2_F | RD-13 | 0.00239 | RD-13_19891031_2_F | RD-13 | 1.5 | | / | 1 | 0.0353 | | / | 1 |
| Potassium-40, Dissolved | Radionuclide | pCi/L | 325 | / | 327 | 1430 | RD-27_20020822_F | RD-27 | -110 | RD-28_19940817_F | RD-28 | 29.6 | 169 | / | 327 | 0.193 | 280 | / | 327 |
| Potassium-40, Total | Radionuclide | pCi/L | 7 | / | 7 | 75 | Unknown | RD-24 | -36 | Unknown | RD-24 | 29.6 | 3 | / | 7 | 0.193 | 6 | / | 7 |
| Radium-226, Dissolved | Radionuclide | pCi/L | 317 | / | 320 | 1340 | RD-27_20020822_F | RD-27 | -550 | RD-28_19940817_F | RD-28 | 0.5 | 240 | / | 320 | 0.0000816 | 290 | / | 320 |
| Radium-226, Total | Radionuclide | pCi/L | 10 | / | 10 | 32.5 | RS-18_050203_01 | RS-18 | -40 | Unknown | RD-24 | 0.5 | 5 | / | 10 | 0.0000816 | 7 | / | 10 |
| Radium-228, Dissolved | Radionuclide | pCi/L | 120 | / | 120 | 4.01 | RD-54B_082205_01_E | RD-54B | -0.104 | RS-11_022807_01_E | RS-11 | 0.5 | 89 | / | 120 | 0.00458 | 118 | / | 120 |
| Radium-228, Total | Radionuclide | pCi/L | 5 | / | 5 | 1.61 | RD-29_19891208 | RD-29 | 0.726 | RS-28_19891101 | RS-28 | 0.5 | 5 | / | 5 | 0.00458 | 5 | / | 5 |
| Ruthenium-106, Dissolved | Radionuclide | pCi/L | 5 | / | 5 | 34 | RD-22_19931121_F | RD-22 | 7.91 | RS-18_19931106_F | RS-18 | 3 | 5 | / | 5 | | | / | 5 |
| Sodium-22, Dissolved | Radionuclide | pCi/L | 79 | / | 79 | 2.54 | RD-95 | RD-95 | -0.559 | RD-30_082905_03_S | RD-30 | 40 | | / | 79 | 0.495 | 72 | / | 79 |
| Sodium-22, Total | Radionuclide | pCi/L | 1 | / | 1 | 1.18 | RD-96_050906_01_UNFILTER | RD-96 | 1.18 | RD-96_050906_01_UNFILTER | RD-96 | 40 | | / | 1 | 0.495 | 1 | / | 1 |

**Table 4-5**
**Groundwater Summary and COI Screening Value Comparison**

| Analyte | Analyte Group | Units | Frequency of Detection | | | Maximum Concentration Detected | Sample ID of Maximum Concentration | Well ID of Maximum Concentration | Minimum Concentration Detected | Sample ID of Minimum Concentration | Well ID of Minimum Concentration | MCL (1/10 value) | Frequency of MCL Exceedance | | | PRG (1/10 value) | Frequency of PRG Exceedance | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Thorium-228, Dissolved | Radionuclide | pCi/L | 50 | / | 54 | 0.6 | RS-18_19921215_F | RS-18 | -0.098 | RD-07_20000316_2_F | RD-07 | 1.5 | | / | 54 | 0.0159 | 27 | / | 54 |
| Thorium-228, Total | Radionuclide | pCi/L | 2 | / | 2 | 0.586 | RS-28_19891101 | RS-28 | 0.0404 | RD-14_19891031 | RD-14 | 1.5 | | / | 2 | 0.0159 | 2 | / | 2 |
| Thorium-230, Dissolved | Radionuclide | pCi/L | 48 | / | 54 | 1.28 | RS-54_20000315_F | RS-54 | -0.038 | RS-54_022306_01_E | RS-54 | 1.5 | | / | 54 | 0.0523 | 25 | / | 54 |
| Thorium-230, Total | Radionuclide | pCi/L | 2 | / | 2 | 0.147 | RS-28_19891101 | RS-28 | 0.00388 | RD-14_19891031 | RD-14 | 1.5 | | / | 2 | 0.0523 | 1 | / | 2 |
| Thorium-232, Dissolved | Radionuclide | pCi/L | 38 | / | 53 | 0.6 | RS-18_19921215_F | RS-18 | -0.0441 | RD-28-022304_03 | RD-28 | 1.5 | | / | 53 | 0.0471 | 7 | / | 53 |
| Thorium-232, Total | Radionuclide | pCi/L | 2 | / | 2 | 0.662 | RS-28_19891101 | RS-28 | 0.0136 | RD-14_19891031 | RD-14 | 1.5 | | / | 2 | 0.0471 | 1 | / | 2 |
| Total uranium, Dissolved | Radionuclide | pCi/L | 89 | / | 90 | 30.8 | RD-29_19891208_F | RD-29 | 0.018 | RD-54C_19990209_F | RD-54C | | | / | 90 | 0.73 | 87 | / | 90 |

**Table 4-6**
**Preliminary Selection of Surface Water CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Inorganic Chemicals** | | | | | | | | | | |
| 7440-02-0 | Nickel | ug/L | 52 | 1 | 1 | 7500 | 7500 | -- | 1 | a | Y |
| 7440-22-4 | Silver | ug/L | 0.1 | 1 | 1 | 9600 | 9600 | -- | 1 | a | Y |
| 7440-36-0 | Antimony | ug/L | 30 | 1 | 1 | 83 | 83 | -- | 1 | b | Y |
| 7440-38-2 | Arsenic | ug/L | 150 | 1 | 1 | 70 | 70 | -- | -- | a | N |
| 7440-39-3 | Barium | ug/L | 4 | 1 | 1 | 8000 | 8000 | -- | 1 | b | Y |
| 7440-42-8 | Boron | ug/L | 1.6 | 1 | 1 | 270 | 270 | -- | 1 | b | Y |
| 7440-43-9 | Cadmium | ug/L | 1.1 | 1 | 1 | 82 | 82 | -- | 1 | a | Y |
| 7440-47-3 | Chromium | ug/L | 74 | 1 | 1 | 12000 | 12000 | -- | 1 | a | Y |
| 7440-48-4 | Cobalt | ug/L | 23 | 1 | 1 | 220 | 220 | -- | 1 | b | Y |
| 7440-50-8 | Copper | ug/L | 9 | 1 | 1 | 35000 | 35000 | -- | 1 | a | Y |
| 7440-62-2 | Vanadium | ug/L | 20 | 1 | 1 | 100 | 100 | -- | 1 | b | Y |
| 7440-66-6 | Zinc | ug/L | 110 | 1 | 1 | 16000 | 16000 | -- | 1 | a | Y |
| 7487-94-7 | Mercury | ug/L | 0.012 | 1 | 1 | 24000 | 24000 | -- | 1 | a | Y |
| 7429-90-5 | Aluminum | ug/L | 87 | 1 | 1 | 32000 | 32000 | -- | 1 | b | Y |
| 7439-92-1 | Lead | ug/L | 2.5 | 1 | 1 | 1500 | 1500 | -- | 1 | a | Y |
| 7439-98-7 | Molybdenum | ug/L | 73 | 1 | 1 | 2100 | 2100 | -- | 1 | b | Y |
| | **Volatile Organic Compounds (VOCs)** | | | | | | | | | | |
| 100-41-4 | Ethylbenzene | ug/L | 90 | 1 | 1 | 7.4 | 7.4 | -- | -- | b | N |
| 108-88-3 | Toluene | ug/L | 2 | 1 | 1 | 16 | 16 | -- | 1 | b | Y |
| 1330-20-7 | Xylenes, Total | ug/L | 13 | 1 | 1 | 19 | 19 | -- | 1 | b | Y |
| 156-59-2 | cis-1,2-Dichloroethene | ug/L | 590 | 1 | 1 | 3 | 3 | -- | -- | b | N |
| 71-55-6 | 1,1,1-Trichloroethane | ug/L | 11 | 1 | 1 | 44 | 44 | -- | 1 | b | Y |
| 75-34-3 | 1,1-Dichloroethane | ug/L | 47 | 1 | 1 | 370 | 370 | -- | 1 | b | Y |
| 75-35-4 | 1,1-Dichloroethene | ug/L | 25 | 1 | 1 | 3.2 | 3.2 | -- | -- | b | N |
| 79-01-6 | Trichloroethene | ug/L | 2190 | 1 | 1 | 5.5 | 5.5 | -- | -- | a | N |
| | **Total Petroleum Hydrocarbons (TPH)** | | | | | | | | | | |
| C14C20 | Diesel Range Organics (C14-C20) | ug/L | NV | 1 | 1 | 3300 | 3300 | -- | 1 | -- | Y |
| C20C30 | Diesel Range Organics (C20-C30) | ug/L | NV | 1 | 1 | 2200 | 2200 | -- | 1 | -- | Y |
| UKN046 | Kerosene Range Organics (C11-C14) | ug/L | NV | 1 | 1 | 720 | 720 | -- | 1 | -- | Y |

Notes:

ug/L: micrograms per liter

ESL: Ecological Screening Level

CPEC: Chemical of Potential Ecological Concern

MCV Sources:

a: MWH. 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan. Santa Susana Field Laboratory. Ventura County, California. Revision 2 – Final. September. Prepared for: The Boeing Company, National Aeronautics and Space Administration, U.S. Department of Energy. Table 3-2. September.

b: EPA. 2006. Region 3 BTAG Freshwater Screening Benchmarks. July. Accessed at: http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fw/R3_BTAG_FW_Benchmarks_07-06.pdf

NV: No value available

Reported average concentration includes the full detection limit for non-detected analytes.
When no ESL is available, any detection is considered an exceedence for the purpose of CPEC selection.

**Table 4-7**
**Preliminary Selection of Groundwater Seep CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **General Chemistry** | | | | | | | | | | |
| UKN025 | Bicarbonate Alkalinity as CaCO3 | ug/L | NV | 60 | 60 | 1200000 | 378233 | 170360 | 60 | -- | Y |
| 24959-67-9 | Bromide | ug/L | NV | 60 | 37 | 8600 | 549 | 1088 | 37 | -- | Y |
| ALKC | Carbonate Alkalinity as CaCO3 | ug/L | NV | 60 | 8 | 24000 | 3500 | 4336 | 8 | -- | Y |
| 16887-00-6 | Chloride | ug/L | NV | 60 | 59 | 430000 | 81514 | 64530 | 59 | -- | Y |
| 16984-48-8 | Fluoride | ug/L | NV | 60 | 60 | 6400 | 998 | 1212 | 60 | -- | Y |
| 14797-55-8 | Nitrate-N | ug/L | NV | 59 | 11 | 940 | 144 | 198 | 11 | -- | Y |
| 14797-65-0 | Nitrite-N | ug/L | NV | 59 | 3 | 1600 | 114 | 205 | 3 | -- | Y |
| 14808-79-8 | Sulfate | ug/L | NV | 60 | 60 | 2200000 | 472551 | 452169 | 60 | -- | Y |
| E-10173 | Total Dissolved Solids | ug/L | NV | 17 | 17 | 2200000 | 1182941 | 480583 | 17 | -- | Y |
| | **Inorganic Chemicals** | | | | | | | | | | |
| 7440-70-2 | Calcium | ug/L | 116000 | 59 | 59 | 390000 | 136886 | 84427 | 30 | b | Y |
| 7439-95-4 | Magnesium | ug/L | 82000 | 59 | 59 | 250000 | 72663 | 55529 | 19 | b | Y |
| 7440-09-7 | Potassium | ug/L | 53000 | 59 | 59 | 23000 | 6083 | 4005 | -- | b | N |
| 7440-23-5 | Sodium | ug/L | 680000 | 59 | 59 | 430000 | 133136 | 80226 | -- | b | N |
| | **Volatile Organic Compounds (VOCs)** | | | | | | | | | | |
| 75-35-4 | 1,1-Dichloroethene | ug/L | 25 | 50 | 6 | 1.1 | 0.48 | 0.17 | -- | b | N |
| 67-64-1 | Acetone | ug/L | 1500 | 42 | 4 | 8.6 | 4.73 | 1.16 | -- | b | N |
| 71-43-2 | Benzene | ug/L | 370 | 49 | 1 | 13 | 0.545 | 1.82 | -- | b | N |
| 108-90-7 | Chlorobenzene | ug/L | 5 | 50 | 1 | 58 | 1.52 | 8.15 | 1 | a | Y |
| 156-59-2 | cis-1,2-Dichloroethene | ug/L | 590 | 50 | 12 | 440 | 59 | 133 | -- | b | N |
| 75-09-2 | Methylene chloride | ug/L | 98.1 | 50 | 3 | 1.5 | 1.02 | 0.229 | -- | b | N |
| 127-18-4 | Tetrachloroethene | ug/L | 84 | 49 | 1 | 1.4 | 0.347 | 0.161 | -- | a | N |
| 108-88-3 | Toluene | ug/L | 2 | 50 | 2 | 2.89 | 0.465 | 0.484 | 2 | b | Y |
| 156-60-5 | trans-1,2-Dichloroethene | ug/L | 970 | 50 | 10 | 18 | 2.85 | 5.64 | -- | b | N |
| 79-01-6 | Trichloroethene | ug/L | 2190 | 50 | 9 | 200 | 17 | 44 | 7 | a | Y |
| 75-01-4 | Vinyl chloride | ug/L | 930 | 50 | 6 | 1.1 | 0.358 | 0.159 | -- | b | N |

Notes:

ug/L: micrograms per liter

ESL: Ecological Screening Level

CPEC: Chemical of Potential Ecological Concern

MCV Sources:

a: MWH. 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan. Santa Susana Field Laboratory. Ventura County, California. Revision 2 – Final. September. Prepared for: The Boeing Company, National Aeronautics and Space Administration, U.S. Department of Energy. Table 3-2. September.

b: EPA. 2006. Region 3 BTAG Freshwater Screening Benchmarks. July. Accessed at: http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fw/R3_BTAG_FW_Benchmarks_07-06.pdf

NV: No value available

Reported average concentration includes the full detection limit for non-detected analytes.

When no ESL is available, any detection is considered an exceedence for the purpose of CPEC selection.

**Table 4-8**
**Preliminary Selection of Sediment CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Dioxins** | | | | | | | | | | |
| 1746-01-6 | TCDD-TEQ (Total all) | mg/kg | NV | 12 | 11 | 3.17864E-05 | 1.24E-05 | 1.26E-05 | 11 | -- | Y |
| 19408-74-3 | 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin | mg/kg | NV | 6 | 5 | 2.34E-05 | 1.91E-05 | 5.70E-06 | 5 | -- | Y |
| 30402-15-4 | Pentachlorodibenzofurans | mg/kg | NV | 1 | 1 | 3.90E-05 | 3.90E-05 | -- | 1 | -- | Y |
| 3268-87-9 | Octachlorodibenzo-p-dioxin | mg/kg | NV | 6 | 6 | 0.0124 | 9.15E-03 | 3.28E-03 | 6 | -- | Y |
| 35822-46-9 | 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin | mg/kg | NV | 6 | 6 | 9.57E-04 | 7.39E-04 | 2.39E-04 | 6 | -- | Y |
| 37871-00-4 | Heptachlorodibenzo-p-dioxins | mg/kg | NV | 1 | 1 | 8.77E-04 | 8.77E-04 | -- | 1 | -- | Y |
| 38998-75-3 | Heptachlorodibenzofurans | mg/kg | NV | 1 | 1 | 4.23E-04 | 4.23E-04 | -- | 1 | -- | Y |
| 39001-02-0 | Octachlorodibenzofuran | mg/kg | NV | 6 | 6 | 3.14E-04 | 2.52E-04 | 7.85E-05 | 6 | -- | Y |
| 39227-28-6 | 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin | mg/kg | NV | 6 | 5 | 1.13E-05 | 1.08E-05 | 5.81E-06 | 5 | -- | Y |
| 40321-76-4 | 1,2,3,7,8-Pentachlorodibenzo-p-dioxin | mg/kg | NV | 6 | 5 | 6.04E-06 | 5.94E-06 | 3.04E-06 | 5 | -- | Y |
| 51207-31-9 | 2,3,7,8-Tetrachlorodibenzofuran | mg/kg | NV | 6 | 5 | 1.33E-05 | 8.65E-06 | 2.65E-06 | 5 | -- | Y |
| 55673-89-7 | 1,2,3,4,7,8,9-Heptachlorodibenzofuran | mg/kg | NV | 6 | 5 | 1.49E-05 | 1.25E-05 | 4.16E-06 | 5 | -- | Y |
| 57117-31-4 | 2,3,4,7,8-Pentachlorodibenzofuran | mg/kg | NV | 6 | 5 | 5.48E-06 | 3.97E-06 | 8.90E-07 | 5 | -- | Y |
| 57117-41-6 | 1,2,3,7,8-Pentachlorodibenzofuran | mg/kg | NV | 6 | 5 | 5.50E-06 | 4.90E-06 | 2.62E-06 | 5 | -- | Y |
| 57117-44-9 | 1,2,3,6,7,8-Hexachlorodibenzofuran | mg/kg | NV | 6 | 5 | 4.50E-06 | 6.43E-06 | 6.80E-06 | 5 | -- | Y |
| 57653-85-7 | 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin | mg/kg | NV | 6 | 5 | 4.23E-05 | 3.26E-05 | 9.76E-06 | 5 | -- | Y |
| 60851-34-5 | 2,3,4,6,7,8-Hexachlorodibenzofuran | mg/kg | NV | 6 | 5 | 6.45E-06 | 8.05E-06 | 6.95E-06 | 5 | -- | Y |
| 67562-39-4 | 1,2,3,4,6,7,8-Heptachlorodibenzofuran | mg/kg | NV | 6 | 6 | 1.20E-04 | 9.68E-05 | 3.00E-05 | 6 | -- | Y |
| 70648-26-9 | 1,2,3,4,7,8-Hexachlorodibenzofuran | mg/kg | NV | 6 | 5 | 5.33E-06 | 7.26E-06 | 7.25E-06 | 5 | -- | Y |
| 72918-21-9 | 1,2,3,7,8,9-Hexachlorodibenzofuran | mg/kg | NV | 6 | 5 | 1.78E-06 | 6.04E-06 | 1.12E-05 | 5 | -- | Y |
| | **General Chemistry** | | | | | | | | | | |
| 14797-55-8 | Nitrate-N | mg/kg | NV | 6 | 6 | 6 | 3.4 | 1.89 | 6 | -- | Y |
| 16887-00-6 | Chloride | mg/kg | NV | 3 | 3 | 23 | 15 | 7.50 | 3 | -- | Y |
| 16984-48-8 | Fluoride | mg/kg | NV | 3 | 3 | 0.5 | 0.3 | 0.2 | 3 | -- | Y |
| E-10195 | Total Organic Carbon | mg/kg | NV | 8 | 8 | 62800 | 36154 | 24854 | 8 | -- | Y |
| | **Inorganic Chemicals** | | | | | | | | | | |
| 63705-05-5 | Molecular Sulfur | mg/kg | NV | 5 | 5 | 4 | 2.74 | 1.41 | 5 | -- | Y |
| 7429-90-5 | Aluminum | mg/kg | NV | 5 | 5 | 28800 | 23320 | 4634 | 5 | -- | Y |
| 7439-89-6 | Iron | mg/kg | 20000 | 6 | 6 | 40600 | 32912 | 5678 | 6 | b | Y |
| 7439-92-1 | Lead | mg/kg | 35 | 62 | 58 | 89.6 | 12 | 13 | 2 | a | Y |
| 7439-95-4 | Magnesium | mg/kg | NV | 6 | 6 | 9330 | 7674 | 1230 | 6 | -- | Y |
| 7439-96-5 | Manganese | mg/kg | 460 | 7 | 7 | 668 | 471 | 91 | 2 | b | Y |
| 7439-98-7 | Molybdenum | mg/kg | NV | 34 | 8 | 2.1 | 1.08 | 0.737 | 8 | -- | Y |
| 7440-02-0 | Nickel | mg/kg | 18 | 62 | 62 | 25.8 | 8.65 | 5.42 | 4 | a | Y |
| 7440-22-4 | Silver | mg/kg | 1 | 61 | 17 | 5.9 | 1.66 | 1.30 | 16 | a | Y |
| 7440-28-0 | Thallium | mg/kg | NV | 61 | 5 | 6.3 | 1.49 | 1.79 | 5 | -- | Y |
| 7440-36-0 | Antimony | mg/kg | 2 | 5 | 5 | 1.9 | 1.58 | 0.249 | -- | b | N |
| 7440-38-2 | Arsenic | mg/kg | 5.9 | 63 | 53 | 24 | 3.54 | 3.11 | 5 | a | Y |
| 7440-39-3 | Barium | mg/kg | NV | 34 | 34 | 183 | 70 | 36 | 34 | -- | Y |
| 7440-41-7 | Beryllium | mg/kg | NV | 62 | 28 | 1.2 | 0.415 | 0.231 | 28 | -- | Y |
| 7440-42-8 | Boron | mg/kg | NV | 2 | 2 | 9.4 | 8.1 | 1.84 | 2 | -- | Y |
| 7440-43-9 | Cadmium | mg/kg | 0.6 | 62 | 13 | 4.6 | 0.592 | 0.546 | 7 | a | Y |
| 7440-47-3 | Chromium | mg/kg | 37.3 | 62 | 62 | 45 | 13 | 8.37 | 2 | a | Y |
| 7440-48-4 | Cobalt | mg/kg | 50 | 34 | 34 | 14.8 | 5.71 | 3.14 | -- | b | N |
| 7440-50-8 | Copper | mg/kg | 34 | 62 | 62 | 110 | 21 | 24 | 13 | a | Y |
| 7440-62-2 | Vanadium | mg/kg | NV | 34 | 34 | 63.8 | 25 | 14 | 34 | -- | Y |
| 7440-66-6 | Zinc | mg/kg | 123.1 | 62 | 62 | 1460 | 121 | 200 | 15 | a | Y |
| 7487-94-7 | Mercury | mg/kg | 0.15 | 21 | 14 | 1.3 | 0.352 | 0.373 | 14 | a | Y |
| 7782-49-2 | Selenium | mg/kg | 2 | 55 | 5 | 1 | 0.581 | 0.366 | -- | b | N |

**Table 4-8**
**Preliminary Selection of Sediment CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Polychlorinated Biphenyls (PCBs)** | | | | | | | | | | |
| 11097-69-1 | Aroclor 1254 | mg/kg | 0.023 | 3 | 2 | 0.094 | 6.20E-02 | 3.67E-02 | 2 | a | Y |
| 31508-00-6 | PCB-118 | mg/kg | NV | 6 | 6 | 0.096 | 2.01E-02 | 3.74E-02 | 6 | -- | Y |
| 32598-10-0 | PCB-66 | mg/kg | NV | 6 | 6 | 0.019 | 4.12E-03 | 7.34E-03 | 6 | -- | Y |
| 32598-13-3 | PCB-77 | mg/kg | NV | 6 | 6 | 0.0094 | 1.87E-03 | 3.70E-03 | 6 | -- | Y |
| 35065-27-1 | PCB-153 | mg/kg | NV | 6 | 6 | 0.072 | 1.56E-02 | 2.78E-02 | 6 | -- | Y |
| 35065-29-3 | PCB-180 | mg/kg | NV | 6 | 6 | 0.022 | 5.07E-03 | 8.38E-03 | 6 | -- | Y |
| 35065-30-6 | PCB-170 | mg/kg | NV | 6 | 6 | 0.011 | 2.54E-03 | 4.19E-03 | 6 | -- | Y |
| 35068-28-2 | PCB-138 | mg/kg | NV | 6 | 6 | 0.13 | 2.83E-02 | 5.02E-02 | 6 | -- | Y |
| 35693-99-3 | PCB-52 | mg/kg | NV | 6 | 6 | 0.042 | 8.37E-03 | 1.65E-02 | 6 | -- | Y |
| 37680-65-2 | PCB-18 | mg/kg | NV | 6 | 3 | 0.0025 | 9.40E-04 | 1.35E-03 | 3 | -- | Y |
| 37680-73-2 | PCB-101 | mg/kg | NV | 1 | 1 | 0.0049 | 4.90E-03 | -- | 1 | -- | Y |
| 38380-07-3 | PCB-128 | mg/kg | NV | 6 | 6 | 0.033 | 7.23E-03 | 1.27E-02 | 6 | -- | Y |
| 38380-08-4 | PCB-156 | mg/kg | NV | 6 | 6 | 0.0143 | 3.07E-03 | 5.54E-03 | 6 | -- | Y |
| 39635-31-9 | PCB-189 | mg/kg | NV | 6 | 4 | 0.00077 | 1.75E-04 | 2.95E-04 | 4 | -- | Y |
| 40186-72-9 | PCB-206 | mg/kg | NV | 6 | 6 | 0.0043 | 1.00E-03 | 1.63E-03 | 6 | -- | Y |
| 41464-39-5 | PCB-44 | mg/kg | NV | 6 | 6 | 0.023 | 4.56E-03 | 9.06E-03 | 6 | -- | Y |
| 52663-68-0 | PCB-187 | mg/kg | NV | 6 | 6 | 0.0075 | 1.78E-03 | 2.84E-03 | 6 | -- | Y |
| 52663-72-6 | PCB-167 | mg/kg | NV | 6 | 6 | 0.0058 | 1.55E-03 | 2.20E-03 | 6 | -- | Y |
| 52663-78-2 | PCB-195 | mg/kg | NV | 6 | 6 | 0.001 | 2.50E-04 | 3.76E-04 | 6 | -- | Y |
| 57465-28-8 | PCB-126 | mg/kg | NV | 6 | 6 | 0.0015 | 3.10E-04 | 5.85E-04 | 6 | -- | Y |
| 65510-44-3 | PCB-123 | mg/kg | NV | 6 | 6 | 0.00099 | 2.37E-04 | 3.74E-04 | 6 | -- | Y |
| 69782-90-7 | PCB-157 | mg/kg | NV | 6 | 6 | 0.003 | 6.77E-04 | 1.15E-03 | 6 | -- | Y |
| 7012-37-5 | PCB-28 | mg/kg | NV | 6 | 4 | 0.0027 | 9.00E-04 | 1.20E-03 | 4 | -- | Y |
| 70362-50-4 | PCB-81 | mg/kg | NV | 6 | 6 | 0.00098 | 2.12E-04 | 3.78E-04 | 6 | -- | Y |
| 74472-37-0 | PCB-114 | mg/kg | NV | 6 | 6 | 0.0014 | 3.02E-04 | 5.41E-04 | 6 | -- | Y |
| E-16015 | PCB-90/101 | mg/kg | NV | 5 | 5 | 0.12 | 2.86E-02 | 5.13E-02 | 5 | -- | Y |
| 32598-14-4 | PCB-105 | mg/kg | NV | 6 | 6 | 0.041 | 8.69E-03 | 1.59E-02 | 6 | -- | Y |
| 32774-16-6 | PCB-169 | mg/kg | NV | 6 | 2 | 0.00007 | 2.16E-05 | 2.43E-05 | 2 | -- | Y |
| 34883-43-7 | PCB-8 | mg/kg | NV | 6 | 4 | 0.00032 | 8.57E-05 | 1.18E-04 | 4 | -- | Y |
| | **Pesticides** | | | | | | | | | | |
| 72-54-8 | 4,4'-DDD | mg/kg | 0.002 | 1 | 1 | 0.2 | 0.2 | -- | 1 | a | Y |
| | **Volatile Organic Compounds (VOCs)** | | | | | | | | | | |
| 100-41-4 | Ethylbenzene | mg/kg | 1.1 | 57 | 1 | 0.1 | 0.0234 | 0.0240 | -- | b | N |
| 108-88-3 | Toluene | mg/kg | 1.22 | 57 | 5 | 3.6 | 0.161 | 0.610 | 2 | c | Y |
| 127-18-4 | Tetrachloroethene | mg/kg | 0.468 | 57 | 3 | 0.33 | 0.0318 | 0.0555 | -- | b | N |
| 1330-20-7 | Xylenes, Total | mg/kg | 0.433 | 32 | 3 | 0.52 | 0.0618 | 0.105 | 1 | c | Y |
| 136777-61-2 | m,p-Xylenes | mg/kg | NV | 25 | 1 | 0.001 | 0.0048 | 0.0008 | 1 | -- | Y |
| 540-59-0 | 1,2-Dichloroethene | mg/kg | NV | 26 | 2 | 0.12 | 0.0460 | 0.0220 | 2 | -- | Y |
| 67-64-1 | Acetone | mg/kg | 0.0099 | 8 | 8 | 0.1 | 0.0479 | 0.0357 | 7 | c | Y |
| 71-43-2 | Benzene | mg/kg | 0.142 | 57 | 2 | 0.0083 | 0.0226 | 0.0219 | -- | c | N |
| 71-55-6 | 1,1,1-Trichloroethane | mg/kg | 0.0302 | 37 | 2 | 0.4 | 0.0265 | 0.0905 | 2 | b | Y |
| 75-09-2 | Methylene chloride | mg/kg | 0.159 | 37 | 6 | 4.2 | 0.219 | 0.906 | 2 | c | Y |
| 75-34-3 | 1,1-Dichloroethane | mg/kg | 0.000575 | 2 | 2 | 0.13 | 0.110 | 0.0283 | 2 | c | Y |
| 79-01-6 | Trichloroethene | mg/kg | 0.0969 | 57 | 5 | 1 | 0.0574 | 0.168 | 4 | b | Y |

**Table 4-8**
**Preliminary Selection of Sediment CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Semi-Volatile Organic Compounds (SVOCs)** | | | | | | | | | | |
| 100-42-5 | Styrene | mg/kg | 0.559 | 54 | 1 | 0.004 | 0.0234 | 0.0223 | -- | b | N |
| 106-44-5 | p-Cresol | mg/kg | 0.67 | 49 | 2 | 0.15 | 0.2555 | 0.0926 | -- | b | N |
| 117-81-7 | bis(2-Ethylhexyl) phthalate | mg/kg | 0.18 | 26 | 4 | 0.24 | 0.171 | 0.0205 | 2 | b | Y |
| 120-12-7 | Anthracene | mg/kg | 0.085 | 6 | 5 | 0.011 | 0.00723 | 0.0026 | -- | a | N |
| 129-00-0 | Pyrene | mg/kg | 0.053 | 10 | 10 | 0.59 | 0.184 | 0.172 | 8 | a | Y |
| 191-24-2 | Benzo(ghi)perylene | mg/kg | 0.17 | 28 | 10 | 0.46 | 0.162 | 0.0843 | 4 | b | Y |
| 192-97-2 | Benzo(e)pyrene | mg/kg | NV | 5 | 5 | 0.04 | 0.0278 | 0.00991 | 5 | -- | Y |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | mg/kg | 0.017 | 10 | 10 | 0.43 | 0.132 | 0.138 | 10 | b | Y |
| 205-99-2 | Benzo(b)fluoranthene | mg/kg | 10.4 | 54 | 8 | 0.54 | 0.254 | 0.118 | -- | c | N |
| 206-44-0 | Fluoranthene | mg/kg | 0.111 | 10 | 10 | 0.8 | 0.193 | 0.229 | 5 | a | Y |
| 207-08-9 | Benzo(k)fluoranthene | mg/kg | 0.24 | 27 | 5 | 0.034 | 0.143 | 0.0585 | -- | b | N |
| 218-01-9 | Chrysene | mg/kg | 0.057 | 9 | 9 | 0.42 | 0.111 | 0.140 | 3 | a | Y |
| 50-32-8 | Benzo(a)pyrene | mg/kg | 0.032 | 9 | 9 | 0.24 | 0.0997 | 0.101 | 6 | a | Y |
| 53-70-3 | Dibenzo(a,h)anthracene | mg/kg | 0.033 | 6 | 4 | 0.014 | 0.0095 | 0.0040 | -- | b | N |
| 56-55-3 | Benzo(a)anthracene | mg/kg | 0.032 | 7 | 7 | 0.24 | 0.0541 | 0.0831 | 2 | a | Y |
| 65-85-0 | Benzoic acid | mg/kg | NV | 49 | 1 | 0.052 | 1.26 | 0.456 | 1 | -- | Y |
| 83-32-9 | Acenaphthene | mg/kg | 0.016 | 6 | 3 | 0.0048 | 0.0052 | 0.0015 | -- | a | N |
| 84-74-2 | Di-n-butyl phthalate | mg/kg | 6.47 | 49 | 1 | 0.086 | 0.260 | 0.0943 | -- | b | N |
| 85-01-8 | Phenanthrene | mg/kg | 0.042 | 7 | 7 | 0.28 | 0.0770 | 0.0927 | 4 | a | Y |
| 85-68-7 | Butyl benzyl phthalate | mg/kg | 10.9 | 49 | 4 | 0.22 | 0.241 | 0.0883 | -- | b | N |
| 86-73-7 | Fluorene | mg/kg | 0.019 | 6 | 4 | 0.0075 | 0.0054 | 0.0020 | -- | a | N |
| 91-20-3 | Naphthalene | mg/kg | 0.16 | 6 | 3 | 0.0055 | 0.0048 | 0.0021 | -- | a | N |
| UKN102 | Benzo (b+k) fluoranthene (Total) | mg/kg | NV | 1 | 1 | 0.1 | 0.100 | -- | 1 | -- | Y |
| UKN105 | Unknown | mg/kg | NV | 105 | 105 | 100 | 8.11 | 20 | 105 | -- | Y |
| | **Total Petroleum Hydrocarbons (TPH)** | | | | | | | | | | |
| 68334-30-5 | Petroleum Hydrocarbons | mg/kg | NV | 1 | 1 | 230 | 230 | -- | 1 | -- | Y |
| UKN114 | TRPH | mg/kg | NV | 6 | 6 | 1500 | 553 | 533 | 6 | -- | Y |

Notes:

mg/kg: milligrams per kilogram

ESL: Ecological Screening Level

CPEC: Chemical of Potential Ecological Concern

MCV Sources:

a: MWH. 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan. Santa Susana Field Laboratory. Ventura County, California. Revision 2 – Final. September. Prepared for: The Boeing Company, National Aeronautics and Space Administration, U.S. Department of Energy. Table 3-2. September.

b: EPA. 2006. Region 3 BTAG Freshwater Sediment Screening Benchmarks. August. Accessed at: http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fwsed/R3_BTAG_FW_Sediment_Benchmarks_8-06.pdf

c: EPA. 2003. Region 5 RCRA Ecological Screening Levels. August. Accessed at: http://www.epa.gov/reg5rcra/ca/ESL.pdf

NV: No value available

Reported average concentration includes the full detection limit for non-detected analytes.
When no ESL is available, any detection is considered an exceedence for the purpose of CPEC selection.

**Table 4-9**
**Preliminary Selection of Soil (0-2 ft bgs) CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Human Health DCGL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Dioxins** | | | | | | | | | | | |
| 1746-01-6 | TCDD-TEQ (Total all) | mg/kg | NV | 1.823E-07 | 217 | 104 | 0.000664472 | 1.64E-05 | 8.08E-05 | 104 | -- | Y |
| 19408-74-3 | 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin | mg/kg | 0.000043 | 4.20709E-06 | 120 | 68 | 0.000472 | 1.74E-05 | 6.36E-05 | 5 | a (1) | Y |
| 30402-14-3 | Tetrachlorodibenzofurans | mg/kg | NV | NV | 120 | 75 | 0.000218 | 2.17E-05 | 4.49E-05 | 75 | -- | Y |
| 30402-15-4 | Pentachlorodibenzofurans | mg/kg | NV | NV | 120 | 78 | 0.00135 | 4.76E-05 | 1.68E-04 | 78 | -- | Y |
| 3268-87-9 | Octachlorodibenzo-p-dioxin | mg/kg | 0.12 | 0.00018927 | 120 | 103 | 0.295 | 9.77E-03 | 4.07E-02 | 3 | a (1) | Y |
| 34465-46-8 | Hexachlorodibenzo-p-dioxins | mg/kg | NV | NV | 120 | 86 | 0.00596 | 2.43E-04 | 9.18E-04 | 86 | -- | Y |
| 35822-46-9 | 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin | mg/kg | 0.00096 | 0.000013 | 120 | 90 | 0.0265 | 9.34E-04 | 3.65E-03 | 14 | a (1) | Y |
| 36088-22-9 | Pentachlorodibenzo-p-dioxins | mg/kg | NV | NV | 120 | 51 | 0.00055 | 2.88E-05 | 9.49E-05 | 51 | -- | Y |
| 37871-00-4 | Heptachlorodibenzo-p-dioxins | mg/kg | NV | 1.82943E-05 | 120 | 94 | 0.0553 | 1.86E-03 | 7.05E-03 | 94 | -- | Y |
| 38998-75-3 | Heptachlorodibenzofurans | mg/kg | NV | NV | 120 | 84 | 0.0272 | 6.80E-04 | 3.17E-03 | 84 | -- | Y |
| 39001-02-0 | Octachlorodibenzofuran | mg/kg | 0.097 | 0.00018927 | 120 | 73 | 0.0147 | 4.04E-04 | 1.77E-03 | -- | a (1) | N |
| 39227-28-6 | 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin | mg/kg | **0.000045** | 4.92541E-05 | 120 | 51 | 0.000242 | 1.13E-05 | 3.90E-05 | 4 | a (1) | Y |
| 40321-76-4 | 1,2,3,7,8-Pentachlorodibenzo-p-dioxin | mg/kg | **0.0000044** | 4.92541E-06 | 120 | 40 | 0.0000949 | 5.01E-06 | 1.68E-05 | 10 | a (1) | Y |
| 41903-57-5 | Tetrachlorodibenzo-p-dioxins | mg/kg | NV | NV | 120 | 43 | 0.00014 | 7.16E-06 | 2.24E-05 | 43 | -- | Y |
| 51207-31-9 | 2,3,7,8-Tetrachlorodibenzofuran | mg/kg | 0.0000044 | 1.82943E-06 | 120 | 54 | 0.0000151 | 1.69E-06 | 3.22E-06 | 12 | a (2) | Y |
| 55673-89-7 | 1,2,3,4,7,8,9-Heptachlorodibenzofuran | mg/kg | **0.00043** | 0.000492541 | 120 | 49 | 0.000486 | 1.65E-05 | 6.35E-05 | 1 | a (1) | Y |
| 55684-94-1 | Hexachlorodibenzofurans | mg/kg | NV | NV | 120 | 84 | 0.0105 | 2.61E-04 | 1.21E-03 | 84 | -- | Y |
| 57117-31-4 | 2,3,4,7,8-Pentachlorodibenzofuran | mg/kg | 0.0000098 | 2.74219E-06 | 120 | 48 | 0.0000308 | 2.77E-06 | 6.39E-06 | 6 | a (1) | Y |
| 57117-41-6 | 1,2,3,7,8-Pentachlorodibenzofuran | mg/kg | 0.0001 | 0.00000059 | 120 | 38 | 0.0000113 | 9.95E-07 | 2.31E-06 | -- | a (1) | N |
| 57117-44-9 | 1,2,3,6,7,8-Hexachlorodibenzofuran | mg/kg | 0.000054 | 4.92541E-05 | 120 | 51 | 0.000106 | 5.05E-06 | 1.66E-05 | 3 | a (1) | Y |
| 57653-85-7 | 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin | mg/kg | **0.000046** | 4.92541E-05 | 120 | 74 | 0.00121 | 4.06E-05 | 1.66E-04 | 10 | a (1) | Y |
| 60851-34-5 | 2,3,4,6,7,8-Hexachlorodibenzofuran | mg/kg | **0.000049** | 4.92541E-05 | 120 | 55 | 0.000275 | 9.72E-06 | 3.68E-05 | 3 | a (1) | Y |
| 67562-39-4 | 1,2,3,4,6,7,8-Heptachlorodibenzofuran | mg/kg | **0.00049** | 0.000492541 | 120 | 67 | 0.00568 | 1.64E-04 | 7.14E-04 | 4 | a (1) | Y |
| 70648-26-9 | 1,2,3,4,7,8-Hexachlorodibenzofuran | mg/kg | **0.000047** | 4.92541E-05 | 120 | 54 | 0.00015 | 7.98E-06 | 2.44E-05 | 4 | a (1) | Y |
| 72918-21-9 | 1,2,3,7,8,9-Hexachlorodibenzofuran | mg/kg | **0.000043** | 4.92541E-05 | 120 | 48 | 0.0000339 | 1.69E-06 | 5.05E-06 | -- | a (1) | N |
| | **Explosives** | | | | | | | | | | | |
| 4165-60-0 | Nitrobenzene-d5 | mg/kg | NV | NV | 8 | 8 | 0.017 | 0.0109 | 0.00364 | 8 | -- | Y |
| | **General Chemistry** | | | | | | | | | | | |
| 14797-55-8 | Nitrate-N | mg/kg | NV | NV | 10 | 2 | 1.7 | 5.99 | 5.75 | 2 | -- | Y |
| 14808-79-8 | Sulfate | mg/kg | NV | NV | 1 | 1 | 12 | 12 | -- | 1 | -- | Y |
| 16887-00-6 | Chloride | mg/kg | NV | NV | 10 | 7 | 36 | 12 | 12 | 7 | -- | Y |
| 16984-48-8 | Fluoride | mg/kg | NV | 6.7 | 44 | 40 | 5.69 | 2.02 | 1.21 | 40 | -- | Y |
| | **Inorganic Chemicals** | | | | | | | | | | | |
| 18540-29-9 | Hexavalent Chromium | mg/kg | **0.2** | 17.12442068 | 2 | 1 | 0.21 | 0.205 | 0.00707 | 1 | a (3) | Y |
| 7429-90-5 | Aluminum | mg/kg | **12** | 20000 | 201 | 201 | 31100 | 13704 | 5266 | 201 | a (1) | Y |
| 7439-89-6 | Iron | mg/kg | **200** | 28000 | 51 | 51 | 25100 | 17167 | 3895 | 51 | b | Y |
| 7439-92-1 | Lead | mg/kg | **0.013** | 150 | 264 | 263 | 27000 | 140 | 1677 | 263 | a (2) | Y |
| 7439-93-2 | Lithium | mg/kg | NV | 1560 | 56 | 49 | 35 | 23 | 4.84 | 49 | -- | Y |
| 7439-95-4 | Magnesium | mg/kg | **4.4** | NV | 44 | 44 | 12300 | 4244 | 1714 | 44 | c | Y |
| 7439-96-5 | Manganese | mg/kg | **29** | 689.5047475 | 51 | 51 | 907 | 275 | 119 | 51 | a (1) | Y |
| 7439-98-7 | Molybdenum | mg/kg | **0.11** | 33.80193559 | 136 | 98 | 5.9 | 0.561 | 0.617 | 97 | a (1) | Y |
| 7440-02-0 | Nickel | mg/kg | **0.1** | 144.4403515 | 257 | 252 | 130 | 14 | 12 | 252 | a (1) | Y |
| 7440-09-7 | Potassium | mg/kg | NV | 6400 | 136 | 136 | 11000 | 3369 | 1529 | 136 | -- | Y |
| 7440-22-4 | Silver | mg/kg | **0.54** | 42.75256223 | 187 | 111 | 615 | 12 | 62 | 48 | a (1) | Y |
| 7440-23-5 | Sodium | mg/kg | NV | 110 | 158 | 155 | 6900 | 376 | 1043 | 155 | -- | Y |
| 7440-28-0 | Thallium | mg/kg | **1.4** | 5.16 | 123 | 107 | 3.3 | 0.404 | 0.510 | 6 | a (1) | Y |
| 7440-36-0 | Antimony | mg/kg | **0.095** | 8.7 | 104 | 77 | 870 | 13 | 97 | 72 | a (1) | Y |

**Table 4-9**
**Preliminary Selection of Soil (0-2 ft bgs) CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Human Health DCGL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-38-2 | Arsenic | mg/kg | **1.9** | 15 | 201 | 192 | 350 | 5.33 | 25 | 177 | a (1) | Y |
| 7440-39-3 | Barium | mg/kg | **15** | 1403.775616 | 249 | 248 | 1000 | 95 | 102 | 247 | a (1) | Y |
| 7440-41-7 | Beryllium | mg/kg | **5** | 1.1 | 246 | 199 | 1.4 | 0.564 | 0.209 | -- | a (1) | N |
| 7440-42-8 | Boron | mg/kg | **9.2** | 380.5009236 | 91 | 61 | 31.8 | 5.80 | 4.57 | 7 | a (1) | Y |
| 7440-43-9 | Cadmium | mg/kg | **0.0045** | 5.34708729 | 166 | 146 | 20 | 0.843 | 1.84 | 146 | a (2) | Y |
| 7440-47-3 | Chromium | mg/kg | 930 | 207.9393939 | 259 | 259 | 79.1 | 19 | 8.87 | -- | a (1) | N |
| 7440-48-4 | Cobalt | mg/kg | **8.9** | 159.2344708 | 246 | 245 | 15 | 6.60 | 2.21 | 42 | a (1) | Y |
| 7440-50-8 | Copper | mg/kg | **1.1** | 265.3990807 | 260 | 260 | 634 | 20 | 57 | 260 | a (2) | Y |
| 7440-62-2 | Vanadium | mg/kg | **1.5** | 62 | 246 | 246 | 78 | 33 | 11 | 246 | a (1) | Y |
| 7440-66-6 | Zinc | mg/kg | **21** | 1321.172077 | 260 | 260 | 4630 | 148 | 437 | 259 | a (1) | Y |
| 7440-67-7 | Zirconium | mg/kg | NV | 8.6 | 66 | 50 | 6.6 | 2.87 | 1.38 | 50 | -- | Y |
| 7440-70-2 | Calcium | mg/kg | NV | NV | 44 | 44 | 38300 | 5271 | 6542 | 44 | -- | Y |
| 7487-94-7 | Mercury | mg/kg | **0.1** | 23.5 | 303 | 223 | 35 | 0.675 | 3.21 | 80 | a (3) | Y |
| 7782-49-2 | Selenium | mg/kg | **0.17** | 31.28037389 | 84 | 56 | 5 | 0.798 | 1.08 | 56 | a (1) | Y |
| UKN052 | Methyl Mercury | mg/kg | **0.17** | NV | 3 | 2 | 0.00362 | 0.00174 | 0.00181 | -- | a (2) | N |
| | **Polychlorinated Biphenyls (PCBs)** | | | | | | | | | | | |
| 11096-82-5 | Aroclor 1260 | mg/kg | **0.077** | NV | 252 | 46 | 7.8 | 0.198 | 1.04 | 22 | a (1) | Y |
| 11097-69-1 | Aroclor 1254 | mg/kg | 0.077 | 0.013168988 | 254 | 65 | 2.2 | 0.0610 | 0.216 | 30 | a (1) | Y |
| 12672-29-6 | Aroclor 1248 | mg/kg | **0.016** | NV | 248 | 6 | 0.34 | 0.00681 | 0.0393 | 6 | a (1) | Y |
| 31508-00-6 | PCB-118 | mg/kg | **0.0082** | NV | 1 | 1 | 0.026 | 0.026 | -- | 1 | a (1) | Y |
| 32598-10-0 | PCB-66 | mg/kg | NV | NV | 1 | 1 | 0.0011 | 0.0011 | -- | 1 | -- | Y |
| 32598-13-3 | PCB-77 | mg/kg | **0.00028** | NV | 1 | 1 | 0.0015 | 0.0015 | -- | 1 | a (2) | Y |
| 32598-14-4 | PCB-105 | mg/kg | **0.0085** | NV | 1 | 1 | 0.012 | 0.012 | -- | 1 | a (1) | Y |
| 34883-43-7 | PCB-8 | mg/kg | NV | NV | 1 | 1 | 0.00001 | 0.00001 | -- | 1 | -- | Y |
| 35065-27-1 | PCB-153 | mg/kg | NV | NV | 1 | 1 | 0.023 | 0.023 | -- | 1 | -- | Y |
| 35065-29-3 | PCB-180 | mg/kg | NV | NV | 1 | 1 | 0.0062 | 0.0062 | -- | 1 | -- | Y |
| 35065-30-6 | PCB-170 | mg/kg | NV | NV | 1 | 1 | 0.0037 | 0.0037 | -- | 1 | -- | Y |
| 35068-28-2 | PCB-138 | mg/kg | NV | NV | 1 | 1 | 0.054 | 0.054 | -- | 1 | -- | Y |
| 35693-99-3 | PCB-52 | mg/kg | NV | NV | 1 | 1 | 0.0031 | 0.0031 | -- | 1 | -- | Y |
| 38380-07-3 | PCB-128 | mg/kg | NV | NV | 1 | 1 | 0.014 | 0.014 | -- | 1 | -- | Y |
| 38380-08-4 | PCB-156 | mg/kg | **0.0026** | NV | 1 | 1 | 0.0061 | 0.0061 | -- | 1 | a (1) | Y |
| 39635-31-9 | PCB-189 | mg/kg | **0.02** | NV | 1 | 1 | 0.00029 | 0.00029 | -- | -- | a (1) | Y |
| 40186-72-9 | PCB-206 | mg/kg | NV | NV | 1 | 1 | 0.00011 | 0.00011 | -- | 1 | -- | Y |
| 41464-39-5 | PCB-44 | mg/kg | NV | NV | 1 | 1 | 0.00019 | 0.00019 | -- | 1 | -- | Y |
| 52663-68-0 | PCB-187 | mg/kg | NV | NV | 1 | 1 | 0.0015 | 0.0015 | -- | 1 | -- | Y |
| 52663-72-6 | PCB-167 | mg/kg | **0.12** | NV | 1 | 1 | 0.002 | 0.002 | -- | -- | a (1) | Y |
| 52663-78-2 | PCB-195 | mg/kg | NV | NV | 1 | 1 | 0.00012 | 0.00012 | -- | 1 | -- | Y |
| 53469-21-9 | Aroclor 1242 | mg/kg | **0.079** | NV | 252 | 1 | 0.0234 | 0.00125 | 0.00733 | -- | a (1) | Y |
| 57465-28-8 | PCB-126 | mg/kg | **0.000014** | NV | 1 | 1 | 0.00073 | 0.00073 | -- | 1 | a (1) | Y |
| 65510-44-3 | PCB-123 | mg/kg | **0.0075** | NV | 1 | 1 | 0.00029 | 0.00029 | -- | -- | a (1) | Y |
| 69782-90-7 | PCB-157 | mg/kg | **0.0025** | NV | 1 | 1 | 0.0012 | 0.0012 | -- | -- | a (1) | Y |
| 70362-50-4 | PCB-81 | mg/kg | **0.00014** | NV | 1 | 1 | 0.00029 | 0.00029 | -- | 1 | a (2) | Y |
| 74472-37-0 | PCB-114 | mg/kg | **0.00088** | NV | 1 | 1 | 0.00044 | 0.00044 | -- | -- | a (1) | Y |
| E-16015 | PCB-90/101 | mg/kg | NV | NV | 1 | 1 | 0.022 | 0.022 | -- | 1 | -- | Y |
| | **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | |
| 100-41-4 | Ethylbenzene | mg/kg | 210 | 3.84 | 137 | 4 | 0.008 | 0.00413 | 0.0128 | -- | a (1) | Y |
| 108-88-3 | Toluene | mg/kg | **2.5** | 232 | 137 | 18 | 0.42 | 0.0113 | 0.0440 | -- | a (1) | Y |
| 108-90-7 | Chlorobenzene | mg/kg | **40** | 99.13675196 | 137 | 2 | 0.003 | 0.00403 | 0.0129 | -- | a (3) | N |

**Table 4-9**
**Preliminary Selection of Soil (0-2 ft bgs) CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Human Health DCGL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 109-66-0 | n-Pentane | mg/kg | NV | NV | 1 | 1 | 0.025 | 0.025 | -- | 1 | -- | Y |
| 110-62-3 | Pentanal | mg/kg | **2400** | NV | 1 | 1 | 0.019 | 0.019 | -- | -- | a (1) | N |
| 111-71-7 | Heptanal | mg/kg | NV | NV | 1 | 1 | 0.006 | 0.006 | -- | 1 | -- | Y |
| 123-72-8 | Butanal | mg/kg | NV | NV | 1 | 1 | 0.006 | 0.006 | -- | 1 | -- | Y |
| 127-18-4 | Tetrachloroethene | mg/kg | 2.1 | 0.026456244 | 137 | 1 | 0.1 | 0.00506 | 0.0162 | -- | a (1) | N |
| 1330-20-7 | Xylenes, Total | mg/kg | **64** | 757.5567265 | 41 | 11 | 0.08 | 0.0157 | 0.0219 | -- | a (1) | Y |
| 208-96-8 | Acenaphthylene | mg/kg | **750** | NV | 213 | 3 | 0.007 | 0.0232 | 0.0472 | -- | a (1) | Y |
| 540-59-0 | 1,2-Dichloroethene | mg/kg | **0.784** | NV | 17 | 1 | 0.12 | 0.0120 | 0.0379 | -- | d | N |
| 5989-27-5 | d-Limonene | mg/kg | NV | NV | 1 | 1 | 0.017 | 0.0170 | -- | 1 | -- | Y |
| 66-25-1 | Hexanal | mg/kg | **2400** | NV | 3 | 3 | 0.06 | 0.0313 | 0.0251 | -- | a (1) | N |
| 67-64-1 | Acetone | mg/kg | **43** | 206.9239934 | 106 | 14 | 5.2 | 0.208 | 0.870 | -- | a (1) | N |
| 71-43-2 | Benzene | mg/kg | 4.3 | 0.091478738 | 137 | 2 | 0.001 | 0.0040 | 0.0129 | -- | a (1) | Y |
| 71-55-6 | 1,1,1-Trichloroethane | mg/kg | 4300 | 469 | 139 | 2 | 2 | 0.0448 | 0.284 | -- | a (1) | N |
| 75-09-2 | Methylene chloride | mg/kg | 4.05 | 0.526319863 | 137 | 15 | 0.28 | 0.0246 | 0.0768 | -- | d | N |
| 75-69-4 | Trichlorofluoromethane | mg/kg | **300** | 302.4637741 | 96 | 1 | 0.9 | 0.0113 | 0.0976 | -- | a (1) | N |
| 76-22-2 | Camphor | mg/kg | NV | NV | 1 | 1 | 0.006 | 0.006 | -- | 1 | -- | Y |
| 78-93-3 | Methyl ethyl ketone | mg/kg | 7600 | 257.0050987 | 91 | 10 | 120 | 2.67 | 18 | -- | a (1) | N |
| 79-01-6 | Trichloroethene | mg/kg | 3 | 0.032629733 | 137 | 2 | 0.22 | 0.00756 | 0.0282 | -- | a (1) | N |
| 79-92-5 | Camphene | mg/kg | NV | NV | 1 | 1 | 0.006 | 0.006 | -- | 1 | -- | Y |
| 80-56-8 | .alpha.-Pinene | mg/kg | NV | NV | 1 | 1 | 0.005 | 0.005 | -- | 1 | -- | Y |
| 98-01-1 | 2-Furancarboxaldehyde | mg/kg | NV | 19.64263047 | 3 | 3 | 0.007 | 0.00667 | 0.000577 | 3 | -- | Y |
| 99-87-6 | p-Cymene | mg/kg | NV | NV | 47 | 2 | 0.0019 | 9.2E-05 | 0.000378 | 2 | -- | Y |
| UKN002 | 1,2,4-Methenoazulene, Decahydro-1,5,5,8A | mg/kg | NV | NV | 1 | 1 | 0.014 | 0.014 | -- | 1 | -- | Y |
| | **Semi-Volatile Organic Compounds (SVOCs)** | | | | | | | | | | | |
| 117-81-7 | bis(2-Ethylhexyl) phthalate | mg/kg | 4.9 | 1.975626174 | 141 | 39 | 0.72 | 0.0505 | 0.113 | -- | a (2) | N |
| 117-84-0 | Di-n-octyl phthalate | mg/kg | **39** | 328.8690985 | 84 | 1 | 0.06 | 0.0219 | 0.0548 | -- | a (2) | N |
| 120-12-7 | Anthracene | mg/kg | **2.4** | 2324.043337 | 213 | 16 | 8.2 | 0.0676 | 0.616 | 1 | a (2) | Y |
| 129-00-0 | Pyrene | mg/kg | **18** | 241.8092704 | 213 | 55 | 27 | 0.376 | 2.85 | 2 | a (3) | Y |
| 14167-59-0 | Tetratriacontane | mg/kg | NV | NV | 1 | 1 | 0.457 | 0.457 | -- | 1 | -- | Y |
| 191-24-2 | Benzo(ghi)perylene | mg/kg | **6.4** | NV | 212 | 30 | 90 | 0.708 | 7.07 | 2 | a (1) | Y |
| 192-97-2 | Benzo(e)pyrene | mg/kg | NV | NV | 1 | 1 | 0.172 | 0.172 | -- | 1 | -- | Y |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | mg/kg | 5.8 | 0.035353094 | 212 | 31 | 77 | 0.623 | 6.09 | 2 | a (1) | Y |
| 198-55-0 | Perylene | mg/kg | NV | NV | 1 | 1 | 0.0981 | 0.0981 | -- | 1 | -- | Y |
| 205-99-2 | Benzo(b)fluoranthene | mg/kg | 5.6 | 0.035353094 | 212 | 42 | 26 | 0.294 | 2.38 | 2 | a (1) | Y |
| 206-44-0 | Fluoranthene | mg/kg | **38** | 318.6035903 | 213 | 50 | 32 | 0.367 | 2.79 | -- | a (3) | Y |
| 207-08-9 | Benzo(k)fluoranthene | mg/kg | 5.8 | 0.191970103 | 211 | 32 | 15 | 0.204 | 1.55 | 2 | a (1) | Y |
| 218-01-9 | Chrysene | mg/kg | 2.4 | 1.91180638 | 213 | 49 | 22 | 0.229 | 1.81 | 2 | a (1) | Y |
| 24887-75-0 | Androstane | mg/kg | NV | NV | 1 | 1 | 1.52 | 1.52 | -- | 1 | -- | Y |
| 3386-33-2 | Octadecane, 1-chloro- | mg/kg | NV | NV | 1 | 1 | 0.428 | 0.428 | -- | 1 | -- | Y |
| 50-32-8 | Benzo(a)pyrene | mg/kg | 5.6 | 0.003535309 | 212 | 37 | 31 | 0.337 | 2.81 | 2 | a (1) | Y |
| 53-70-3 | Dibenzo(a,h)anthracene | mg/kg | 5.6 | 0.003767219 | 212 | 18 | 0.14 | 0.0225 | 0.0438 | -- | a (1) | Y |
| 55193-56-1 | Eicosane, 10-methyl- | mg/kg | NV | NV | 1 | 1 | 3.55 | 3.55 | -- | 1 | -- | Y |
| 56-55-3 | Benzo(a)anthracene | mg/kg | 5.6 | 0.035353094 | 213 | 34 | 16 | 0.156 | 1.26 | 1 | -- | Y |
| 57-10-3 | Palmitic acid | mg/kg | NV | NV | 1 | 1 | 0.503 | 0.503 | -- | 1 | -- | Y |
| 593-45-3 | Octadecane | mg/kg | NV | NV | 2 | 2 | 0.326 | 0.291 | 0.0502 | 2 | -- | Y |
| 601-53-6 | Cholestan-3-one, (5.beta.)- | mg/kg | NV | NV | 1 | 1 | 0.792 | 0.792 | -- | 1 | -- | Y |
| 629-93-6 | Octadecane, 1-iodo- | mg/kg | NV | NV | 1 | 1 | 1.09 | 1.09 | -- | 1 | -- | Y |
| 630-02-4 | n-Octacosane | mg/kg | NV | NV | 3 | 3 | 0.448 | 0.292 | 0.145 | 3 | -- | Y |

**Table 4-9**
**Preliminary Selection of Soil (0-2 ft bgs) CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Human Health DCGL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 83-32-9 | Acenaphthene | mg/kg | **2.5** | 455.6453917 | 213 | 4 | 0.049 | 0.0236 | 0.0472 | -- | a (2) | Y |
| 83-46-5 | .beta.-Sitosterol | mg/kg | NV | NV | 1 | 1 | 0.193 | 0.193 | -- | 1 | -- | Y |
| 84-66-2 | Diethyl phthalate | mg/kg | 6900 | 3439.64711 | 141 | 9 | 0.017 | 0.0149 | 0.0508 | -- | a (1) | N |
| 84-74-2 | Di-n-butyl phthalate | mg/kg | **0.49** | 799.6070108 | 141 | 41 | 0.27 | 0.0312 | 0.0619 | -- | a (2) | N |
| 85-01-8 | Phenanthrene | mg/kg | **1.3** | NV | 213 | 43 | 14 | 0.180 | 1.23 | 4 | a (2) | Y |
| 85-68-7 | Butyl benzyl phthalate | mg/kg | 340 | 14 | 84 | 1 | 0.13 | 0.0232 | 0.0566 | -- | a (1) | N |
| 86-73-7 | Fluorene | mg/kg | **1.6** | 310.4470503 | 213 | 4 | 0.013 | 0.0209 | 0.0431 | -- | a (2) | Y |
| 87-86-5 | Pentachlorophenol | mg/kg | **6** | NV | 76 | 1 | 0.058 | 0.00311 | 0.0101 | -- | a (3) | N |
| 90-12-0 | 1-Methyl naphthalene | mg/kg | NV | NV | 74 | 4 | 0.39 | 0.0372 | 0.0601 | 4 | -- | Y |
| 91-20-3 | Naphthalene | mg/kg | 210 | 1.65 | 230 | 22 | 0.64 | 0.0110 | 0.0502 | -- | a (1) | Y |
| 91-57-6 | 2-Methylnaphthalene | mg/kg | **210** | NV | 159 | 16 | 0.78 | 0.0315 | 0.0793 | -- | a (1) | N |
| UKN001 | (1R,2R,8S,8Ar)-8-hydroxy-1-(2-hydroxyeth | mg/kg | NV | NV | 1 | 1 | 0.442 | 0.442 | -- | 1 | -- | Y |
| UKN003 | 1,2-Benzisothiazole, 3-(hexahydro-1H-aze | mg/kg | NV | NV | 1 | 1 | 0.341 | 0.341 | -- | 1 | -- | Y |
| UKN004 | 11,13-Dimethyl-12-tetradecen-1-ol acetat | mg/kg | NV | NV | 1 | 1 | 0.159 | 0.159 | -- | 1 | -- | Y |
| UKN005 | 1-Bromo-4-bromomethyldecane | mg/kg | NV | NV | 1 | 1 | 0.584 | 0.584 | -- | 1 | -- | Y |
| UKN006 | 1H-Indene, 2-butyl-5-hexyloctahydro- | mg/kg | NV | NV | 2 | 2 | 0.425 | 0.405 | 0.0276 | 2 | -- | Y |
| UKN007 | 1H-Indene, 5-butyl-6-hexyloctahydro- | mg/kg | NV | NV | 3 | 3 | 1.58 | 0.847 | 0.654 | 3 | -- | Y |
| UKN008 | 1-Isopropenyl-4,5-dimethylbicyclo[4.3.0] | mg/kg | NV | NV | 1 | 1 | 0.8343 | 0.834 | -- | 1 | -- | Y |
| UKN009 | 1-Naphthalenecarboxaldehyde, Oxime, (e)- | mg/kg | NV | NV | 2 | 2 | 0.022 | 0.016 | 0.00849 | 2 | -- | Y |
| UKN010 | 2,2,6-Trimethyl-1-(2-methyl-cyclobut-2-e | mg/kg | NV | NV | 1 | 1 | 0.41 | 0.41 | -- | 1 | -- | Y |
| UKN011 | 2,6,10,14,18,22-Tetracosahexaene, 2,6,10 | mg/kg | NV | NV | 1 | 1 | 0.219 | 0.219 | -- | 1 | -- | Y |
| UKN013 | 2-Dodecen-1-yl(-)succinic anhy, 1 | mg/kg | NV | NV | 4 | 4 | 0.483 | 0.37 | 0.0955 | 4 | -- | Y |
| UKN016 | 4,4,6a,6b,8a,11,12,14b-Octamethyl-1,4,4a | mg/kg | NV | NV | 2 | 2 | 1.15 | 0.670 | 0.680 | 2 | -- | Y |
| UKN018 | 5.alpha.-Cholest-22-ene, (Z)- | mg/kg | NV | NV | 1 | 1 | 0.49629 | 0.496 | -- | 1 | -- | Y |
| UKN019 | 6-Isopropenyl-4,8a-dimethyl-4a,5,6,7,8,8 | mg/kg | NV | NV | 3 | 3 | 0.50833 | 0.340 | 0.148 | 3 | -- | Y |
| UKN020 | 7-(1,3-Dimethylbuta-1,3-dienyl)-1,6,6-tr | mg/kg | NV | NV | 1 | 1 | 0.50298 | 0.503 | -- | 1 | -- | Y |
| UKN021 | 8-Fluoro-1-Benzosuberone | mg/kg | NV | NV | 1 | 1 | 0.21 | 0.21 | -- | 1 | -- | Y |
| UKN023 | Androstane, (5.beta.)- | mg/kg | NV | NV | 2 | 2 | 1.58 | 1.03 | 0.774 | 2 | -- | Y |
| UKN024 | Benzene, 1-Fluoro-4-[(4-Methylphenyl)sul | mg/kg | NV | NV | 2 | 2 | 0.018 | 0.0155 | 0.00354 | 2 | -- | Y |
| UKN026 | Bicyclo[2.2.1]heptane-2,5-dione, 1,7,7-t | mg/kg | NV | NV | 1 | 1 | 0.319 | 0.319 | -- | 1 | -- | Y |
| UKN032 | Cyclopropane carboxamide, 2-cyclopropyl- | mg/kg | NV | NV | 1 | 1 | 1.29 | 1.29 | -- | 1 | -- | Y |
| UKN033 | Cyclotetradecane, 1,7,11-trimethyl-4-(1- | mg/kg | NV | NV | 2 | 2 | 0.366 | 0.341 | 0.0354 | 2 | -- | Y |
| UKN034 | Decahydro-8a-ethyl-1,1,4a,6-tetramethyln | mg/kg | NV | NV | 1 | 1 | 0.196 | 0.196 | -- | 1 | -- | Y |
| UKN035 | D-Homoandrostane, (5.alpha.,13.alpha.)- | mg/kg | NV | NV | 4 | 4 | 2.29 | 0.983 | 0.891 | 4 | -- | Y |
| UKN037 | Ethaneperoxoic Acid, 1-cyano-2-phenyl-1- | mg/kg | NV | NV | 2 | 2 | 0.013 | 0.012 | 0.00141 | 2 | -- | Y |
| UKN038 | Heptadecane, 9-octyl-, 1 | mg/kg | NV | NV | 2 | 2 | 2.09 | 1.40 | 0.980 | 2 | -- | Y |
| UKN039 | Hexadecane, 2-methyl- | mg/kg | NV | NV | 1 | 1 | 0.96 | 0.96 | -- | 1 | -- | Y |
| UKN049 | Methanone, (3-Chlorophenyl)(4-chlorophen | mg/kg | NV | NV | 1 | 1 | 0.007 | 0.007 | -- | 1 | -- | Y |
| UKN051 | Methyl 5-methyl-2-ethenyl-cyclohexane-1- | mg/kg | NV | NV | 1 | 1 | 0.45713 | 0.457 | -- | 1 | -- | Y |
| UKN053 | Naphthalene, decahydro-1,6-dimethyl-4-(1 | mg/kg | NV | NV | 1 | 1 | 0.83568 | 0.836 | -- | 1 | -- | Y |
| UKN056 | n-Eicosane | mg/kg | NV | NV | 10 | 10 | 0.80143 | 0.471 | 0.165 | 10 | -- | Y |
| UKN062 | Oxalic acid, isobutyl heptadecyl ester | mg/kg | NV | NV | 1 | 1 | 0.392 | 0.392 | -- | 1 | -- | Y |
| UKN063 | Pentadec-7-ene, 7-bromomethyl- | mg/kg | NV | NV | 1 | 1 | 0.395 | 0.395 | -- | 1 | -- | Y |
| UKN064 | Pentadecane, 8-heptyl- | mg/kg | NV | NV | 1 | 1 | 0.343 | 0.343 | -- | 1 | -- | Y |
| UKN065 | Pentadecane, 8-hexyl- | mg/kg | NV | NV | 1 | 1 | 0.868 | 0.868 | -- | 1 | -- | Y |
| UKN068 | Phosphinous Chloride, (2,2-Dimethylpropy | mg/kg | NV | NV | 2 | 2 | 0.053 | 0.035 | 0.0255 | 2 | -- | Y |
| UKN070 | Pyridine, 4-[5-(2-methoxyphenyl)-[1,3,4] | mg/kg | NV | NV | 2 | 2 | 0.95804 | 0.794 | 0.233 | 2 | -- | Y |
| UKN071 | Pyridine-3-carboxamide, oxime, N-(2-trif | mg/kg | NV | NV | 2 | 2 | 1.0363 | 0.865 | 0.243 | 2 | -- | Y |

**Table 4-9**
**Preliminary Selection of Soil (0-2 ft bgs) CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Human Health DCGL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UKN073 | Spiro[4.5]decan-7-one, 1,8-dimethyl-8,9- | mg/kg | NV | NV | 1 | 1 | 0.254 | 0.254 | -- | 1 | -- | Y |
| UKN074 | Stigmast-4-en-3-one | mg/kg | NV | NV | 2 | 2 | 0.593 | 0.463 | 0.184 | 2 | -- | Y |
| UKN075 | Stigmastane | mg/kg | NV | NV | 1 | 1 | 0.368 | 0.368 | -- | 1 | -- | Y |
| UKN076 | tetratetracontane, 1 | mg/kg | NV | NV | 1 | 1 | 0.377 | 0.377 | -- | 1 | -- | Y |
| UKN086 | Tritetracontane | mg/kg | NV | NV | 3 | 3 | 0.783 | 0.581 | 0.218 | 3 | -- | Y |
| UKN105 | Unknown | mg/kg | NV | NV | 609 | 608 | 10 | 0.333 | 0.746 | 608 | -- | Y |
| UKN106 | Heptacosane | mg/kg | NV | NV | 2 | 2 | 0.74168 | 0.667 | 0.105 | 2 | -- | Y |
| UKN107 | Heptadecane | mg/kg | NV | NV | 2 | 2 | 0.271 | 0.224 | 0.0665 | 2 | -- | Y |
| UKN108 | Nonadecane | mg/kg | NV | NV | 1 | 1 | 0.154 | 0.154 | -- | 1 | -- | Y |
| UKN109 | Heneicosane | mg/kg | NV | NV | 1 | 1 | 1.28 | 1.28 | -- | 1 | -- | Y |
| UKN110 | Tricosane | mg/kg | NV | NV | 1 | 1 | 0.351 | 0.351 | -- | 1 | -- | Y |
| | **Total Petroleum Hydrocarbons (TPH)** | | | | | | | | | | | |
| 68334-30-5 | Petroleum Hydrocarbons | mg/kg | NV | NV | 1 | 1 | 36 | 36 | -- | 1 | -- | Y |
| C14C20 | Diesel Range Organics (C14-C20) | mg/kg | NV | NV | 97 | 12 | 1200 | 55 | 185 | 12 | -- | Y |
| C15C20 | Diesel Range Organics (C15-C20) | mg/kg | NV | NV | 66 | 7 | 16.5 | 5.79 | 4.17 | 7 | -- | Y |
| C20C30 | Diesel Range Organics (C20-C30) | mg/kg | NV | NV | 97 | 41 | 8300 | 181 | 916 | 41 | -- | Y |
| C21C30 | Diesel Range Organics (C21-C30) | mg/kg | NV | NV | 36 | 20 | 107 | 10 | 18 | 20 | -- | Y |
| C8C11 | Diesel Range Organics (C8-C11) | mg/kg | NV | NV | 36 | 1 | 1.71 | 3.55 | 2.06 | 1 | -- | Y |
| E-10140 | Oil content | mg/kg | NV | NV | 3 | 3 | 1100 | 406 | 601 | 3 | -- | Y |
| GRO | Gasoline Range Organics | mg/kg | NV | NV | 1 | 1 | 5 | 5 | -- | 1 | -- | Y |
| GRO8-11 | Gasoline Range Organics (C8-C11) | mg/kg | NV | NV | 127 | 7 | 42 | 22 | 54 | 7 | -- | Y |
| GRO9-22 | Gasoline Range Organics (C9-C22) | mg/kg | NV | NV | 12 | 11 | 64 | 12 | 24 | 11 | -- | Y |
| UKN030 | C21-C30 Lubricant | mg/kg | NV | NV | 30 | 13 | 71 | 18 | 20 | 13 | -- | Y |
| UKN040 | High Boiling Petroleum Hydrocarbon | mg/kg | NV | NV | 11 | 5 | 75 | 20 | 31 | 5 | -- | Y |
| UKN046 | Kerosene Range Organics (C11-C14) | mg/kg | NV | NV | 97 | 2 | 89 | 26 | 62 | 2 | -- | Y |
| UKN057 | Oil Range Organics (C22-C40) | mg/kg | NV | NV | 2 | 1 | 5 | 2.55 | 3.46 | 1 | -- | Y |
| UKN077 | Total Extractable Hydrocarbons C15-C28 | mg/kg | NV | NV | 1 | 1 | 30 | 30 | -- | 1 | -- | Y |
| UKN079 | Total Extractable Hydrocarbons C16-C28 | mg/kg | NV | NV | 1 | 1 | 80 | 80 | -- | 1 | -- | Y |
| UKN080 | Total Extractable Hydrocarbons C18-C28 | mg/kg | NV | NV | 1 | 1 | 30 | 30 | -- | 1 | -- | Y |
| UKN114 | TRPH | mg/kg | NV | NV | 6 | 5 | 120 | 59 | 47 | 5 | -- | Y |

Notes:

mg/kg: milligrams per kilogram
ESL: Ecological Screening Level
CPEC: Chemical of Potential Ecological Concern
DCGL: Derived Concentration GuideLine

MCV Sources:

a: MWH. 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan. Santa Susana Field Laboratory. Ventura County, California. Revision 2 – Final. September. Prepared for: The Boeing Company, National Aeronautics and Space Administration, U.S. Department of Energy. Tables 3-3 through 3-5. SRAM terrestrial mammal, terrestrial avian, terrestrial invertebrate ecological screening values. September.
  a (1): Mammal
  a (2): Avian
  a (3): Invertebrate

b: EPA. 2001. Region 4 Recommended Ecological Screening Values for Soil. WSRC-TR-98-00110. Accessed at: http://www.epa.gov/region4/waste/ots/epatab4.pdf

c: EPA. 1995. Revised Region 3 BTAG Screening Values. August 9.

d: EPA. 2003. Region 5 RCRA Ecological Screening Levels. August. Accessed at: http://www.epa.gov/reg5rcra/ca/ESL.pdf

NV: No value available

Reported average concentration includes the full detection limit for non-detected analytes.

When no ESL is available, any detection is considered an exceedence for the purpose of CPEC selection.

For the selection of detection limits during future sampling, the human health DCGL should be used unless the ESL is lower. The bolded ESLs are lower than the corresponding DCGLs.

In general, the DCGL (human health risk assessment) was selected as the lower of the agricultural or residential values. However, if background was higher than the lower of the agricultural or residential values, it was selected as the DCGL.

**Tabe 4-10**
**Preliminary Selection of Soil (2-4 ft bgs) CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Human Health DCGL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Dioxins** | | | | | | | | | | | |
| 19408-74-3 | 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin | mg/kg | 4.30E-05 | 4.20709E-06 | 20 | 5 | 0.000031 | 2.32E-06 | 7.33E-06 | -- | a (1) | N |
| 30402-14-3 | Tetrachlorodibenzofurans | mg/kg | NV | NV | 20 | 8 | 0.000027 | 3.26E-06 | 6.93E-06 | 8 | -- | Y |
| 30402-15-4 | Pentachlorodibenzofurans | mg/kg | NV | NV | 20 | 7 | 0.000032 | 5.13E-06 | 1.01E-05 | 7 | -- | Y |
| 3268-87-9 | Octachlorodibenzo-p-dioxin | mg/kg | 1.20E-01 | 1.89E-04 | 20 | 10 | 0.0064 | 0.000674 | 0.00162 | -- | a (1) | N |
| 34465-46-8 | Hexachlorodibenzo-p-dioxins | mg/kg | NV | NV | 20 | 6 | 0.00056 | 3.96E-05 | 0.000130 | 6 | -- | Y |
| 35822-46-9 | 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin | mg/kg | 9.60E-04 | 1.30E-05 | 20 | 10 | 0.000657 | 6.99E-05 | 0.000186 | -- | a (1) | N |
| 36088-22-9 | Pentachlorodibenzo-p-dioxins | mg/kg | NV | NV | 20 | 4 | 0.00011 | 7.37E-06 | 2.65E-05 | 4 | -- | Y |
| 37871-00-4 | Heptachlorodibenzo-p-dioxins | mg/kg | NV | 1.82943E-05 | 20 | 10 | 0.0014 | 1.50E-04 | 3.96E-04 | 10 | -- | Y |
| 38998-75-3 | Heptachlorodibenzofurans | mg/kg | NV | NV | 20 | 10 | 0.000527 | 4.09E-05 | 1.21E-04 | 10 | -- | Y |
| 39001-02-0 | Octachlorodibenzofuran | mg/kg | 9.70E-02 | 1.89E-04 | 20 | 8 | 0.000267 | 2.63E-05 | 6.74E-05 | -- | a (1) | N |
| 39227-28-6 | 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin | mg/kg | **4.50E-05** | 4.92541E-05 | 20 | 3 | 0.000027 | 1.96E-06 | 6.75E-06 | -- | a (1) | N |
| 40321-76-4 | 1,2,3,7,8-Pentachlorodibenzo-p-dioxin | mg/kg | **4.40E-06** | 4.92541E-06 | 20 | 4 | 0.000011 | 7.81E-07 | 2.67E-06 | 1 | a (1) | Y |
| 41903-57-5 | Tetrachlorodibenzo-p-dioxins | mg/kg | NV | NV | 20 | 4 | 0.000022 | 1.62E-06 | 5.32E-06 | 4 | -- | Y |
| 51207-31-9 | 2,3,7,8-Tetrachlorodibenzofuran | mg/kg | 4.40E-06 | 1.82943E-06 | 20 | 3 | 0.0000013 | 1.86E-07 | 4.25E-07 | -- | a (2) | N |
| 55673-89-7 | 1,2,3,4,7,8,9-Heptachlorodibenzofuran | mg/kg | **4.30E-04** | 4.93E-04 | 20 | 3 | 0.00001 | 1.25E-06 | 3.22E-06 | -- | a (1) | N |
| 55684-94-1 | Hexachlorodibenzofurans | mg/kg | NV | NV | 20 | 6 | 0.000216 | 2.00E-05 | 5.37E-05 | 6 | -- | Y |
| 57117-31-4 | 2,3,4,7,8-Pentachlorodibenzofuran | mg/kg | 9.80E-06 | 2.74219E-06 | 20 | 3 | 0.0000049 | 4.53E-07 | 1.27E-06 | -- | a (1) | N |
| 57117-41-6 | 1,2,3,7,8-Pentachlorodibenzofuran | mg/kg | 1.00E-04 | 5.90E-07 | 20 | 4 | 0.0000014 | 1.72E-07 | 4.15E-07 | -- | a (1) | N |
| 57117-44-9 | 1,2,3,6,7,8-Hexachlorodibenzofuran | mg/kg | 5.40E-05 | 4.92541E-05 | 20 | 3 | 0.00000185 | 2.48E-07 | 5.61E-07 | -- | a (1) | N |
| 57653-85-7 | 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin | mg/kg | **4.60E-05** | 4.92541E-05 | 20 | 6 | 0.000031 | 3.21E-06 | 8.59E-06 | -- | a (1) | N |
| 60851-34-5 | 2,3,4,6,7,8-Hexachlorodibenzofuran | mg/kg | **4.90E-05** | 4.92541E-05 | 20 | 5 | 0.0000063 | 8.37E-07 | 1.93E-06 | -- | a (1) | N |
| 67562-39-4 | 1,2,3,4,6,7,8-Heptachlorodibenzofuran | mg/kg | **4.90E-04** | 4.93E-04 | 20 | 9 | 0.0000949 | 9.52E-06 | 2.41E-05 | -- | a (1) | N |
| 70648-26-9 | 1,2,3,4,7,8-Hexachlorodibenzofuran | mg/kg | **4.70E-05** | 4.92541E-05 | 20 | 5 | 0.000023 | 1.72E-06 | 5.39E-06 | -- | a (1) | N |
| 1746-01-6 | TCDD-TEQ (Total all) | mg/kg | NV | 1.823E-07 | 29 | 10 | 0.000033662 | 2.25E-06 | 7.19E-06 | 10 | -- | Y |
| 72918-21-9 | 1,2,3,7,8,9-Hexachlorodibenzofuran | mg/kg | **4.30E-05** | 4.92541E-05 | 20 | 4 | 0.0000034 | 3.05E-07 | 8.35E-07 | -- | a (1) | N |
| | **Explosives** | | | | | | | | | | | |
| 4165-60-0 | Nitrobenzene-d5 | mg/kg | NV | NV | 4 | 4 | 0.013 | 0.0105 | 0.00311 | 4 | -- | Y |
| | **General Chemistry** | | | | | | | | | | | |
| 16984-48-8 | Fluoride | mg/kg | NV | 6.7 | 6 | 6 | 3.4 | 2.41 | 0.685 | 6 | -- | Y |
| | **Inorganic Chemicals** | | | | | | | | | | | |
| 18540-29-9 | Hexavalent Chromium | mg/kg | **0.2** | 17.12442068 | 2 | 1 | 0.3 | 0.161 | 0.197 | 1 | a (3) | Y |
| 7429-90-5 | Aluminum | mg/kg | **12** | 20000 | 46 | 46 | 27000 | 13727 | 5369 | 46 | a (1) | Y |
| 7439-89-6 | Iron | mg/kg | **200** | 28000 | 15 | 15 | 26700 | 16394 | 6454 | 14 | b | Y |
| 7439-92-1 | Lead | mg/kg | **0.013** | 150 | 54 | 54 | 260 | 17.4 | 45.1 | 54 | a (2) | Y |
| 7439-93-2 | Lithium | mg/kg | NV | 1560 | 1 | 1 | 23 | 23.0 | -- | 1 | -- | Y |
| 7439-95-4 | Magnesium | mg/kg | **4.4** | NV | 15 | 15 | 10800 | 4309 | 2325 | 15 | c | Y |
| 7439-96-5 | Manganese | mg/kg | **29** | 689.5047475 | 15 | 15 | 526 | 265 | 114 | 14 | a (1) | Y |
| 7439-98-7 | Molybdenum | mg/kg | **0.11** | 33.80193559 | 25 | 13 | 7.5 | 1.18 | 1.92 | 13 | a (1) | Y |
| 7440-02-0 | Nickel | mg/kg | **0.1** | 144.4403515 | 54 | 50 | 65.4 | 12.4 | 8.63 | 50 | a (1) | Y |
| 7440-09-7 | Potassium | mg/kg | NV | 6400 | 22 | 21 | 6200 | 2678 | 1266 | 21 | -- | Y |
| 7440-22-4 | Silver | mg/kg | **0.54** | 42.75256223 | 38 | 12 | 13 | 2.55 | 3.69 | 9 | a (1) | Y |
| 7440-23-5 | Sodium | mg/kg | NV | 110 | 26 | 26 | 629 | 194 | 167 | 26 | -- | Y |
| 7440-28-0 | Thallium | mg/kg | **1.4** | 5.16 | 24 | 15 | 2.1 | 0.835 | 0.734 | 4 | a (1) | Y |
| 7440-36-0 | Antimony | mg/kg | **0.095** | 8.7 | 14 | 8 | 3.3 | 0.875 | 1.03 | 8 | a (1) | Y |
| 7440-38-2 | Arsenic | mg/kg | **1.9** | 15 | 46 | 44 | 14 | 4.37 | 2.74 | 38 | a (1) | Y |
| 7440-39-3 | Barium | mg/kg | **15** | 1403.775616 | 55 | 55 | 190 | 86.4 | 30.4 | 54 | a (1) | Y |
| 7440-41-7 | Beryllium | mg/kg | 5 | 1.1 | 55 | 36 | 0.96 | 0.633 | 0.219 | -- | a (1) | N |
| 7440-42-8 | Boron | mg/kg | **9.2** | 380.5009236 | 12 | 10 | 14 | 9.41 | 2.61 | 5 | a (1) | Y |

**Tabe 4-10**
**Preliminary Selection of Soil (2-4 ft bgs) CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Human Health DCGL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-43-9 | Cadmium | mg/kg | **0.0045** | 5.34708729 | 25 | 9 | 1.9 | 0.593 | 0.628 | 9 | a (2) | Y |
| 7440-47-3 | Chromium | mg/kg | 930 | 207.9393939 | 55 | 55 | 43.5 | 18.0 | 7.71 | -- | a (1) | N |
| 7440-48-4 | Cobalt | mg/kg | **8.9** | 159.2344708 | 54 | 54 | 12 | 6.77 | 2.10 | 10 | a (1) | Y |
| 7440-50-8 | Copper | mg/kg | **1.1** | 265.3990807 | 55 | 54 | 130 | 13.5 | 16.8 | 54 | a (2) | Y |
| 7440-62-2 | Vanadium | mg/kg | **1.5** | 62 | 55 | 55 | 61 | 32.5 | 11.0 | 54 | a (1) | Y |
| 7440-66-6 | Zinc | mg/kg | **21** | 1321.172077 | 56 | 56 | 140 | 53.7 | 20.9 | 55 | a (1) | Y |
| 7440-67-7 | Zirconium | mg/kg | NV | 8.6 | 2 | 2 | 4 | 3.15 | 1.20 | 2 | -- | Y |
| 7440-70-2 | Calcium | mg/kg | NV | NV | 15 | 14 | 6870 | 2488 | 1517 | 14 | -- | Y |
| 7487-94-7 | Mercury | mg/kg | **0.1** | 23.5 | 59 | 30 | 2.7 | 0.187 | 0.438 | 10 | a (3) | Y |
| 7782-49-2 | Selenium | mg/kg | **0.17** | 31.28037389 | 21 | 7 | 2.2 | 1.13 | 0.741 | 7 | a (1) | Y |
| | **Polychlorinated Biphenyls (PCBs)** | | | | | | | | | | | |
| 11096-82-5 | Aroclor 1260 | mg/kg | **0.077** | NV | 24 | 3 | 0.2 | 0.0191 | 0.0559 | 2 | a (1) | Y |
| 11097-69-1 | Aroclor 1254 | mg/kg | 0.077 | 0.013168988 | 24 | 2 | 0.11 | 0.00605 | 0.0252 | 1 | a (1) | Y |
| | **Volatile Organic Hydrocarbons (VOCs)** | | | | | | | | | | | |
| 100-41-4 | Ethylbenzene | mg/kg | 210 | 3.84 | 45 | 1 | 0.1 | 0.0116 | 0.0257 | -- | a (1) | Y |
| 108-88-3 | Toluene | mg/kg | **2.5** | 232 | 45 | 3 | 3.6 | 0.252 | 0.883 | 2 | a (1) | Y |
| 127-18-4 | Tetrachloroethene | mg/kg | 2.1 | 0.026456244 | 45 | 2 | 0.33 | 0.0289 | 0.0782 | -- | a (1) | N |
| 1330-20-7 | Xylenes, Total | mg/kg | **64** | 757.5567265 | 14 | 4 | 0.52 | 0.110 | 0.181 | -- | a (1) | Y |
| 540-59-0 | 1,2-Dichloroethene | mg/kg | **0.784** | NV | 7 | 1 | 0.05 | 0.0250 | 0.0354 | -- | d | N |
| 67-64-1 | Acetone | mg/kg | **43** | 206.9239934 | 32 | 4 | 0.032 | 0.0822 | 0.182 | -- | a (1) | N |
| 71-55-6 | 1,1,1-Trichloroethane | mg/kg | 4300 | 469 | 45 | 2 | 0.41 | 0.0375 | 0.107 | -- | a (1) | N |
| 75-09-2 | Methylene chloride | mg/kg | 4.05 | 0.526319863 | 45 | 4 | 4.2 | 0.328 | 1.03 | 1 | d | Y |
| 75-34-3 | 1,1-Dichloroethane | mg/kg | 210 | 2.75 | 45 | 2 | 0.13 | 0.0156 | 0.0331 | -- | a (1) | N |
| 79-01-6 | Trichloroethene | mg/kg | 3 | 0.032629733 | 45 | 2 | 1 | 0.0745 | 0.241 | -- | a (1) | N |
| UKN067 | Phenol, 4-(Aminomethyl)-2-Methoxy- | mg/kg | NV | NV | 1 | 1 | 0.058 | 0.0580 | -- | 1 | -- | Y |
| | **Semi-Volatile Organic Compounds (SVOCs)** | | | | | | | | | | | |
| 120-12-7 | Anthracene | mg/kg | **2.4** | 2324.043337 | 60 | 4 | 4 | 0.161 | 0.638 | 1 | a (2) | Y |
| 129-00-0 | Pyrene | mg/kg | **18** | 241.8092704 | 60 | 12 | 21 | 1.18 | 3.71 | 1 | a (3) | Y |
| 132-64-9 | Dibenzofuran | mg/kg | 62 | 15.21894258 | 14 | 1 | 0.28 | 0.0953 | 0.117 | -- | a (3) | N |
| 191-24-2 | Benzo(ghi)perylene | mg/kg | **6.4** | NV | 60 | 7 | 4.7 | 0.292 | 0.859 | -- | a (1) | Y |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | mg/kg | 5.8 | 0.035353094 | 60 | 4 | 6.4 | 0.359 | 1.08 | 1 | a (1) | Y |
| 205-99-2 | Benzo(b)fluoranthene | mg/kg | 5.6 | 0.035353094 | 60 | 8 | 16 | 1.01 | 3.16 | 3 | a (1) | Y |
| 206-44-0 | Fluoranthene | mg/kg | **38** | 318.6035903 | 60 | 10 | 25 | 1.27 | 4.23 | -- | a (3) | Y |
| 207-08-9 | Benzo(k)fluoranthene | mg/kg | 5.8 | 0.191970103 | 60 | 7 | 15 | 0.875 | 2.96 | 2 | a (1) | Y |
| 218-01-9 | Chrysene | mg/kg | 2.4 | 1.91180638 | 60 | 6 | 13 | 0.621 | 2.37 | 3 | a (1) | Y |
| 2216-33-3 | 3-Methyloctane | mg/kg | NV | NV | 1 | 1 | 0.29 | 0.290 | -- | 1 | -- | Y |
| 2489-86-3 | Naphthalene, 1-(2-Propenyl)- | mg/kg | NV | NV | 2 | 2 | 1.1 | 0.572 | 0.747 | 2 | -- | Y |
| 50-32-8 | Benzo(a)pyrene | mg/kg | 5.6 | 0.003535309 | 60 | 7 | 15 | 0.748 | 2.45 | 2 | a (1) | Y |
| 53-70-3 | Dibenzo(a,h)anthracene | mg/kg | 5.6 | 0.003767219 | 60 | 4 | 2.2 | 0.201 | 0.659 | -- | a (1) | Y |
| 56-55-3 | Benzo(a)anthracene | mg/kg | 5.6 | 0.035353094 | 60 | 8 | 14 | 0.796 | 2.46 | 2 | a (1) | Y |
| 83-32-9 | Acenaphthene | mg/kg | **2.5** | 455.6453917 | 60 | 5 | 0.9 | 0.0795 | 0.162 | -- | a (2) | Y |
| 85-01-8 | Phenanthrene | mg/kg | **1.3** | NV | 60 | 12 | 11 | 0.651 | 1.92 | 6 | a (2) | Y |
| 86-73-7 | Fluorene | mg/kg | **1.6** | 310.4470503 | 60 | 5 | 0.92 | 0.079 | 0.161 | -- | a (2) | Y |
| 872-50-4 | 1-Methyl-2-Pyrrolidinone | mg/kg | NV | NV | 1 | 1 | 0.3 | 0.300 | -- | 1 | -- | Y |
| 91-20-3 | Naphthalene | mg/kg | 210 | 1.65 | 60 | 6 | 0.14 | 0.0119 | 0.0253 | -- | a (1) | Y |
| 91-57-6 | 2-Methylnaphthalene | mg/kg | 210 | NV | 35 | 5 | 0.04 | 0.0482 | 0.0771 | -- | a (1) | Y |
| UKN017 | 4-Picoline, 2-(ethylthio)- | mg/kg | NV | NV | 1 | 1 | 0.029 | 0.0290 | -- | 1 | -- | Y |
| UKN056 | n-Eicosane | mg/kg | NV | NV | 1 | 1 | 0.276 | 0.276 | -- | 1 | -- | Y |
| UKN068 | Phosphinous Chloride, (2,2-Dimethylpropy | mg/kg | NV | NV | 1 | 1 | 2.7 | 2.70 | -- | 1 | -- | Y |

## Tabe 4-10
## Preliminary Selection of Soil (2-4 ft bgs) CPECs for Ecological Receptors

| CAS Number | Analyte | Units | Most Conservative ESL | Human Health DCGL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UKN086 | Tritetracontane | mg/kg | NV | NV | 1 | 1 | 0.287 | 0.287 | -- | 1 | -- | Y |
| UKN105 | Unknown | mg/kg | NV | NV | 302 | 302 | 400 | 2.37 | 23.4 | 302 | -- | Y |
| | **Total Petroleum Hydrocarbons (TPH)** | | | | | | | | | | | |
| C14C20 | Diesel Range Organics (C14-C20) | mg/kg | NV | NV | 33 | 6 | 480 | 227 | 1165 | 6 | -- | Y |
| C20C30 | Diesel Range Organics (C20-C30) | mg/kg | NV | NV | 31 | 14 | 82000 | 2688 | 14720 | 14 | -- | Y |
| GRO | Gasoline Range Organics | mg/kg | NV | NV | 1 | 1 | 4000 | 4000 | -- | 1 | -- | Y |
| GRO8-11 | Gasoline Range Organics (C8-C11) | mg/kg | NV | NV | 38 | 2 | 10 | 185 | 1086 | 2 | -- | Y |
| GRO9-22 | Gasoline Range Organics (C9-C22) | mg/kg | NV | NV | 1 | 1 | 0.2 | 0.2 | -- | 1 | -- | Y |
| UKN029 | C21 - C22 | mg/kg | NV | NV | 1 | 1 | 78 | 78 | -- | 1 | -- | Y |
| UKN030 | C21-C30 Lubricant | mg/kg | NV | NV | 6 | 3 | 76 | 17.6 | 28.6 | 3 | -- | Y |
| UKN043 | Hydrocarbons C22-C30 | mg/kg | NV | NV | 2 | 2 | 300 | 188 | 159 | 2 | -- | Y |
| UKN046 | Kerosene Range Organics (C11-C14) | mg/kg | NV | NV | 31 | 2 | 94 | 227 | 1201 | 2 | -- | Y |
| UKN057 | Oil Range Organics (C22-C40) | mg/kg | NV | NV | 1 | 1 | 4000 | 4000 | -- | 1 | -- | Y |
| UKN114 | TRPH | mg/kg | NV | NV | 1 | 1 | 25 | 25 | -- | 1 | -- | Y |

Notes:

mg/kg: milligrams per kilogram

ESL: Ecological Screening Level

CPEC: Chemical of Potential Ecological Concern

DCGL: Derived Concentration GuideLine

MCV Sources:

a: MWH. 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan. Santa Susana Field Laboratory. Ventura County, California. Revision 2 – Final. September. Prepared for: The Boeing Company, National Aeronautics and Space Administration, U.S. Department of Energy. Tables 3-3 through 3-5. SRAM terrestrial mammal, terrestrial avian, terrestrial invertebrate ecological screening values. September.

a (1): Mammal

a (2): Avian

a (3): Invertebrate

b: EPA. 2001. Region 4 Recommended Ecological Screening Values for Soil. WSRC-TR-98-00110. Accessed at: http://www.epa.gov/region4/waste/ots/epatab4.pdf

c: EPA. 1995. Revised Region 3 BTAG Screening Values. August 9.

d: EPA. 2003. Region 5 RCRA Ecological Screening Levels. August. Accessed at: http://www.epa.gov/reg5rcra/ca/ESL.pdf

NV: No value available

Reported average concentration includes the full detection limit for non-detected analytes.
When no ESL is available, any detection is considered an exceedence for the purpose of CPEC selection.

For the selection of detection limits during future sampling, the human health DCGL should be used unless the ESL is lower. The bolded ESLs are lower than the corresponding DCGLs.

In general, the DCGL (human health risk assessment) was selected as the lower of the agricultural or residential values. However, if background was higher than the lower of the agricultural or residential values, it was selected as the DCGL.

**Table 4-11**
**Preliminary Selection of Soil (4-6 ft bgs) CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Human Health DCGL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Dioxins** | | | | | | | | | | | |
| 1746-01-6 | TCDD-TEQ (Total all) | mg/kg | NV | 1.823E-07 | 41 | 22 | 0.000051733 | 2.92E-06 | 9.33E-06 | 22 | -- | Y |
| 19408-74-3 | 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin | mg/kg | 0.000043 | 4.20709E-06 | 22 | 9 | 0.000026 | 3.21E-06 | 6.67E-06 | -- | a (1) | N |
| 30402-14-3 | Tetrachlorodibenzofurans | mg/kg | NV | NV | 20 | 10 | 0.00025 | 5.43E-05 | 8.13E-05 | 10 | -- | Y |
| 30402-15-4 | Pentachlorodibenzofurans | mg/kg | NV | NV | 20 | 10 | 0.0002 | 3.36E-05 | 5.58E-05 | 10 | -- | Y |
| 3268-87-9 | Octachlorodibenzo-p-dioxin | mg/kg | 0.12 | 0.00018927 | 22 | 19 | 0.0099 | 0.000580 | 0.00210 | -- | a (1) | N |
| 34465-46-8 | Hexachlorodibenzo-p-dioxins | mg/kg | NV | NV | 20 | 13 | 0.00053 | 6.08E-05 | 1.37E-04 | 13 | -- | Y |
| 35822-46-9 | 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin | mg/kg | 0.00096 | 0.000013 | 22 | 15 | 0.00087 | 6.75E-05 | 1.98E-04 | -- | a (1) | N |
| 36088-22-9 | Pentachlorodibenzo-p-dioxins | mg/kg | NV | NV | 20 | 9 | 0.00012 | 1.70E-05 | 3.36E-05 | 9 | -- | Y |
| 37871-00-4 | Heptachlorodibenzo-p-dioxins | mg/kg | NV | 1.82943E-05 | 20 | 19 | 0.0029 | 0.000213 | 0.000661 | 19 | -- | Y |
| 38998-75-3 | Heptachlorodibenzofurans | mg/kg | NV | NV | 20 | 14 | 0.00038 | 3.15E-05 | 9.10E-05 | 14 | -- | Y |
| 39001-02-0 | Octachlorodibenzofuran | mg/kg | 0.097 | 0.00018927 | 22 | 14 | 0.00023 | 1.65E-05 | 5.25E-05 | -- | a (1) | N |
| 39227-28-6 | 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin | mg/kg | **0.000045** | 4.92541E-05 | 22 | 7 | 0.000016 | 1.76E-06 | 4.12E-06 | -- | a (1) | N |
| 40321-76-4 | 1,2,3,7,8-Pentachlorodibenzo-p-dioxin | mg/kg | **0.0000044** | 4.92541E-06 | 22 | 5 | 0.000012 | 1.50E-06 | 3.37E-06 | 1 | a (1) | Y |
| 41903-57-5 | Tetrachlorodibenzo-p-dioxins | mg/kg | NV | NV | 20 | 9 | 0.000092 | 1.25E-05 | 2.65E-05 | 9 | -- | Y |
| 51207-31-9 | 2,3,7,8-Tetrachlorodibenzofuran | mg/kg | 0.0000044 | 1.82943E-06 | 22 | 10 | 0.000012 | 2.38E-06 | 4.03E-06 | 2 | a (2) | Y |
| 55673-89-7 | 1,2,3,4,7,8,9-Heptachlorodibenzofuran | mg/kg | **0.00043** | 0.000492541 | 22 | 7 | 0.0000018 | 3.25E-07 | 4.96E-07 | -- | a (1) | N |
| 55684-94-1 | Hexachlorodibenzofurans | mg/kg | NV | NV | 20 | 14 | 0.00031 | 2.77E-05 | 7.41E-05 | 14 | -- | Y |
| 57117-31-4 | 2,3,4,7,8-Pentachlorodibenzofuran | mg/kg | 0.0000098 | 2.74219E-06 | 22 | 8 | 0.000017 | 2.49E-06 | 4.76E-06 | 1 | a (1) | Y |
| 57117-41-6 | 1,2,3,7,8-Pentachlorodibenzofuran | mg/kg | 0.0001 | 0.00000059 | 22 | 8 | 0.000014 | 1.89E-06 | 3.83E-06 | -- | a (1) | N |
| 57117-44-9 | 1,2,3,6,7,8-Hexachlorodibenzofuran | mg/kg | 0.000054 | 4.92541E-05 | 22 | 7 | 0.000017 | 2.18E-06 | 4.72E-06 | -- | a (1) | N |
| 57653-85-7 | 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin | mg/kg | **0.000046** | 4.92541E-05 | 22 | 9 | 0.000044 | 5.09E-06 | 1.13E-05 | -- | a (1) | N |
| 60851-34-5 | 2,3,4,6,7,8-Hexachlorodibenzofuran | mg/kg | **0.000049** | 4.92541E-05 | 22 | 12 | 0.000022 | 2.14E-06 | 5.29E-06 | -- | a (1) | N |
| 67562-39-4 | 1,2,3,4,6,7,8-Heptachlorodibenzofuran | mg/kg | **0.00049** | 0.000492541 | 22 | 12 | 0.00014 | 1.24E-05 | 3.36E-05 | -- | a (1) | N |
| 70648-26-9 | 1,2,3,4,7,8-Hexachlorodibenzofuran | mg/kg | **0.000047** | 4.92541E-05 | 22 | 9 | 0.000024 | 2.81E-06 | 6.32E-06 | -- | a (1) | N |
| 72918-21-9 | 1,2,3,7,8,9-Hexachlorodibenzofuran | mg/kg | **0.000043** | 4.92541E-05 | 22 | 9 | 0.0000082 | 7.49E-07 | 1.97E-06 | -- | a (1) | N |
| | **Explosives** | | | | | | | | | | | |
| 4165-60-0 | Nitrobenzene-d5 | mg/kg | NV | NV | 3 | 3 | 0.012 | 0.0103 | 0.00153 | 3 | -- | Y |
| | **General Chemistry** | | | | | | | | | | | |
| 16984-48-8 | Fluoride | mg/kg | NV | 6.7 | 5 | 5 | 4.4 | 3.08 | 1.13 | 5 | -- | Y |
| | **Inorganic Chemicals** | | | | | | | | | | | |
| 7429-90-5 | Aluminum | mg/kg | **12** | 20000 | 43 | 42 | 27800 | 14553 | 6029 | 42 | a (1) | Y |
| 7439-89-6 | Iron | mg/kg | **200** | 28000 | 14 | 13 | 25900 | 15979 | 6231 | 13 | b | Y |
| 7439-92-1 | Lead | mg/kg | **0.013** | 150 | 71 | 68 | 1900 | 182 | 443 | 68 | a (2) | Y |
| 7439-93-2 | Lithium | mg/kg | NV | 1560 | 2 | 2 | 24 | 20.4 | 5.16 | 2 | -- | Y |
| 7439-95-4 | Magnesium | mg/kg | **4.4** | NV | 13 | 13 | 6250 | 3984 | 973 | 13 | c | Y |
| 7439-96-5 | Manganese | mg/kg | **29** | 689.5047475 | 14 | 14 | 567 | 230 | 128 | 13 | a (1) | Y |
| 7439-98-7 | Molybdenum | mg/kg | **0.11** | 33.80193559 | 11 | 8 | 4.3 | 1.16 | 1.32 | 8 | a (1) | Y |
| 7440-02-0 | Nickel | mg/kg | **0.1** | 144.4403515 | 49 | 49 | 100 | 16.8 | 15.4 | 49 | a (1) | Y |
| 7440-09-7 | Potassium | mg/kg | NV | 6400 | 20 | 19 | 3150 | 1976 | 754 | 19 | -- | Y |
| 7440-22-4 | Silver | mg/kg | **0.54** | 42.75256223 | 22 | 6 | 169 | 14.4 | 43.5 | 4 | a (1) | Y |
| 7440-23-5 | Sodium | mg/kg | NV | 110 | 29 | 28 | 645 | 265 | 191 | 28 | -- | Y |
| 7440-28-0 | Thallium | mg/kg | **1.4** | 5.16 | 10 | 8 | 4 | 1.12 | 1.30 | 2 | a (1) | Y |
| 7440-36-0 | Antimony | mg/kg | **0.095** | 8.7 | 15 | 14 | 22 | 7.45 | 8.63 | 14 | a (1) | Y |
| 7440-38-2 | Arsenic | mg/kg | **1.9** | 15 | 47 | 47 | 11 | 4.87 | 2.01 | 47 | a (1) | Y |
| 7440-39-3 | Barium | mg/kg | **15** | 1403.775616 | 45 | 44 | 918 | 149 | 180 | 44 | a (1) | Y |
| 7440-41-7 | Beryllium | mg/kg | 5 | 1.1 | 39 | 32 | 1.9 | 0.665 | 0.355 | -- | a (1) | N |
| 7440-42-8 | Boron | mg/kg | **9.2** | 380.5009236 | 6 | 6 | 11.8 | 7.2 | 2.8 | 1 | a (1) | Y |
| 7440-43-9 | Cadmium | mg/kg | **0.0045** | 5.34708729 | 16 | 15 | 630 | 55.9 | 167 | 15 | a (2) | Y |

**Table 4-11**
**Preliminary Selection of Soil (4-6 ft bgs) CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Human Health DCGL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7440-47-3 | Chromium | mg/kg | 930 | 207.9393939 | 48 | 45 | 367 | 26.2 | 51.8 | -- | a (1) | N |
| 7440-48-4 | Cobalt | mg/kg | **8.9** | 159.2344708 | 39 | 37 | 12.2 | 6.76 | 2.14 | 4 | a (1) | Y |
| 7440-50-8 | Copper | mg/kg | **1.1** | 265.3990807 | 56 | 55 | 3500 | 169 | 653 | 55 | a (2) | Y |
| 7440-62-2 | Vanadium | mg/kg | **1.5** | 62 | 47 | 46 | 900 | 70.7 | 147 | 46 | a (1) | Y |
| 7440-66-6 | Zinc | mg/kg | **21** | 1321.172077 | 51 | 50 | 67000 | 1412 | 9369 | 50 | a (1) | Y |
| 7440-67-7 | Zirconium | mg/kg | NV | 8.6 | 3 | 2 | 5.2 | 4.20 | 1.18 | 2 | -- | Y |
| 7440-70-2 | Calcium | mg/kg | NV | NV | 14 | 14 | 8620 | 3157 | 2207 | 14 | -- | Y |
| 7487-94-7 | Mercury | mg/kg | **0.1** | 23.5 | 38 | 12 | 0.25 | 0.0573 | 0.0528 | 1 | a (3) | Y |
| 7782-49-2 | Selenium | mg/kg | **0.17** | 31.28037389 | 12 | 12 | 4.7 | 1.77 | 1.35 | 12 | a (1) | Y |
| | **Polychlorinated Biphenyls (PCBs)** | | | | | | | | | | | |
| 11096-82-5 | Aroclor 1260 | mg/kg | **0.077** | NV | 31 | 3 | 49 | 2.13 | 10.2 | 1 | a (1) | Y |
| 11097-69-1 | Aroclor 1254 | mg/kg | 0.077 | 0.013168988 | 31 | 4 | 0.66 | 0.0566 | 0.166 | 3 | a (1) | Y |
| 12672-29-6 | Aroclor 1248 | mg/kg | **0.016** | NV | 31 | 6 | 1.9 | 0.178 | 0.478 | 6 | a (1) | Y |
| | **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | |
| 127-18-4 | Tetrachloroethene | mg/kg | 2.1 | 0.026456244 | 152 | 2 | 2.2 | 0.683 | 0.484 | 1 | a (1) | Y |
| 1330-20-7 | Xylenes, Total | mg/kg | **64** | 757.5567265 | 10 | 1 | 0.0006 | 0.0144 | 0.0243 | -- | a (1) | N |
| 136777-61-2 | m,p-Xylenes | mg/kg | **640** | NV | 146 | 1 | 0.0006 | 1.35 | 0.869 | -- | a (1) | N |
| 67-63-0 | Isopropanol | mg/kg | NV | NV | 4 | 3 | 427.5 | 107 | 214 | 3 | -- | Y |
| 67-64-1 | Acetone | mg/kg | **43** | 206.9239934 | 22 | 4 | 0.66 | 0.116 | 0.233 | -- | a (1) | N |
| 71-55-6 | 1,1,1-Trichloroethane | mg/kg | 4300 | 469 | 152 | 3 | 15 | 0.812 | 1.44 | -- | a (1) | N |
| 75-09-2 | Methylene chloride | mg/kg | 4.05 | 0.526319863 | 84 | 3 | 0.062 | 0.540 | 0.492 | -- | d | N |
| 75-69-4 | Trichlorofluoromethane | mg/kg | **300** | 302.4637741 | 148 | 2 | 4.5 | 0.727 | 0.565 | -- | a (1) | N |
| 79-01-6 | Trichloroethene | mg/kg | 3 | 0.032629733 | 158 | 9 | 210.97 | 3.32 | 20.4 | 4 | a (1) | Y |
| | **Semi-Volatile Organic Compounds (SVOCs)** | | | | | | | | | | | |
| 117-81-7 | bis(2-Ethylhexyl) phthalate | mg/kg | 4.9 | 1.975626174 | 32 | 7 | 0.089 | 0.0507 | 0.0608 | -- | a (2) | N |
| 129-00-0 | Pyrene | mg/kg | **18** | 241.8092704 | 54 | 7 | 0.59 | 0.398 | 1.73 | -- | a (3) | Y |
| 191-24-2 | Benzo(ghi)perylene | mg/kg | **6.4** | NV | 53 | 4 | 0.23 | 0.0954 | 0.347 | -- | a (1) | Y |
| 193-39-5 | Indeno(1,2,3-cd)pyrene | mg/kg | 5.8 | 0.035353094 | 53 | 4 | 0.2 | 0.0944 | 0.347 | -- | a (1) | Y |
| 205-99-2 | Benzo(b)fluoranthene | mg/kg | 5.6 | 0.035353094 | 53 | 4 | 0.54 | 0.106 | 0.355 | -- | a (1) | Y |
| 206-44-0 | Fluoranthene | mg/kg | **38** | 318.6035903 | 54 | 7 | 0.8 | 0.405 | 1.73 | -- | a (3) | Y |
| 207-08-9 | Benzo(k)fluoranthene | mg/kg | 5.8 | 0.191970103 | 53 | 2 | 0.021 | 0.0917 | 0.352 | -- | a (1) | Y |
| 218-01-9 | Chrysene | mg/kg | 2.4 | 1.91180638 | 53 | 5 | 0.042 | 0.0933 | 0.352 | -- | a (1) | Y |
| 24887-75-0 | Androstane | mg/kg | NV | NV | 1 | 1 | 0.199 | 0.199 | -- | 1 | -- | Y |
| 3386-33-2 | Octadecane, 1-chloro- | mg/kg | NV | NV | 1 | 1 | 0.188 | 0.188 | -- | 1 | -- | Y |
| 4860-03-1 | Hexadecane, 1-chloro- | mg/kg | NV | NV | 1 | 1 | 0.341 | 0.341 | -- | 1 | -- | Y |
| 50-32-8 | Benzo(a)pyrene | mg/kg | 5.6 | 0.003535309 | 52 | 4 | 0.24 | 0.0362 | 0.0627 | -- | a (1) | Y |
| 56-55-3 | Benzo(a)anthracene | mg/kg | 5.6 | 0.035353094 | 53 | 4 | 0.24 | 0.0958 | 0.347 | -- | a (1) | Y |
| 593-45-3 | Octadecane | mg/kg | NV | NV | 1 | 1 | 0.392 | 0.392 | -- | 1 | -- | Y |
| 83-32-9 | Acenaphthene | mg/kg | **2.5** | 455.6453917 | 53 | 2 | 0.003 | 0.0911 | 0.352 | -- | a (2) | Y |
| 84-66-2 | Diethyl phthalate | mg/kg | 6900 | 3439.64711 | 34 | 1 | 0.002 | 0.950 | 2.77 | -- | a (1) | N |
| 84-74-2 | Di-n-butyl phthalate | mg/kg | **0.49** | 799.6070108 | 32 | 5 | 0.068 | 0.0394 | 0.0620 | -- | a (2) | N |
| 85-01-8 | Phenanthrene | mg/kg | **1.3** | NV | 52 | 5 | 0.28 | 0.0377 | 0.0671 | -- | a (2) | Y |
| 91-20-3 | Naphthalene | mg/kg | 210 | 1.65 | 52 | 3 | 0.032 | 0.00574 | 0.00888 | -- | a (1) | Y |
| 91-57-6 | 2-Methylnaphthalene | mg/kg | **210** | NV | 28 | 1 | 0.002 | 0.122 | 0.414 | -- | a (1) | Y |
| UKN012 | 28-Nor-17.alpha.(H)-hopane | mg/kg | NV | NV | 1 | 1 | 0.2 | 0.2 | -- | 1 | -- | Y |
| UKN014 | 2-Methyl-3-(3-methyl-but-2-enyl)-2-(4-me | mg/kg | NV | NV | 1 | 1 | 0.282 | 0.282 | -- | 1 | -- | Y |
| UKN019 | 6-Isopropenyl-4,8a-dimethyl-4a,5,6,7,8,8 | mg/kg | NV | NV | 1 | 1 | 0.252 | 0.252 | -- | 1 | -- | Y |
| UKN035 | D-Homoandrostane, (5.alpha.,13.alpha.)- | mg/kg | NV | NV | 2 | 2 | 0.296 | 0.225 | 0.100 | 2 | -- | Y |

## Table 4-11
## Preliminary Selection of Soil (4-6 ft bgs) CPECs for Ecological Receptors

| CAS Number | Analyte | Units | Most Conservative ESL | Human Health DCGL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| UKN050 | Methanone, bis(2-Chlorophenyl)- | mg/kg | NV | NV | 1 | 1 | 0.004 | 0.004 | -- | 1 | -- | Y |
| UKN051 | Methyl 5-methyl-2-ethenyl-cyclohexane-1- | mg/kg | NV | NV | 1 | 1 | 0.223 | 0.223 | -- | 1 | -- | Y |
| UKN056 | n-Eicosane | mg/kg | NV | NV | 1 | 1 | 0.193 | 0.193 | -- | 1 | -- | Y |
| UKN073 | Spiro[4.5]decan-7-one, 1,8-dimethyl-8,9- | mg/kg | NV | NV | 1 | 1 | 0.202 | 0.202 | -- | 1 | -- | Y |
| UKN105 | Unknown | mg/kg | NV | NV | 146 | 146 | 4.8 | 0.163 | 0.539 | 146 | -- | Y |
| | **Total Petroleum Hydrocarbons (TPH)** | | | | | | | | | | | |
| 124-18-5 | Decane | mg/kg | NV | NV | 1 | 1 | 1.3 | 1.3 | -- | 1 | -- | Y |
| C14C20 | Diesel Range Organics (C14-C20) | mg/kg | NV | NV | 33 | 7 | 1500 | 62.0 | 261 | 7 | -- | Y |
| C20C30 | Diesel Range Organics (C20-C30) | mg/kg | NV | NV | 33 | 10 | 1000 | 61.8 | 193 | 10 | -- | Y |
| C21C30 | Diesel Range Organics (C21-C30) | mg/kg | NV | NV | 3 | 1 | 13.5 | 7.0 | 5.6 | 1 | -- | Y |
| E-10140 | Oil content | mg/kg | NV | NV | 1 | 1 | 500 | 500 | -- | 1 | -- | Y |
| GRO8-11 | Gasoline Range Organics (C8-C11) | mg/kg | NV | NV | 37 | | | 7.65 | 3.88 | -- | | N |
| UKN030 | C21-C30 Lubricant | mg/kg | NV | NV | 4 | 1 | 19 | 8.70 | 6.87 | 1 | -- | Y |
| UKN040 | High Boiling Petroleum Hydrocarbon | mg/kg | NV | NV | 5 | 1 | 11 | 11 | -- | 1 | -- | Y |
| UKN114 | TRPH | mg/kg | NV | NV | 4 | 3 | 192 | 60.3 | 87.9 | 3 | -- | Y |

Notes:

mg/kg: milligrams per kilogram

ESL: Ecological Screening Level

CPEC: Chemical of Potential Ecological Concern

DCGL: Derived Concentration GuideLine

MCV Sources:

a: MWH. 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan. Santa Susana Field Laboratory. Ventura County, California. Revision 2 – Final. September. Prepared for: The Boeing Company, National Aeronautics and Space Administration, U.S. Department of Energy. Tables 3-3 through 3-5. SRAM terrestrial mammal, terrestrial avian, terrestrial invertebrate ecological screening values. September.

a (1): Mammal

a (2): Avian

a (3): Invertebrate

b: EPA. 2001. Region 4 Recommended Ecological Screening Values for Soil. WSRC-TR-98-00110. Accessed at: http://www.epa.gov/region4/waste/ots/epatab4.pdf

c: EPA. 1995. Revised Region 3 BTAG Screening Values. August 9.

d: EPA. 2003. Region 5 RCRA Ecological Screening Levels. August. Accessed at: http://www.epa.gov/reg5rcra/ca/ESL.pdf

NV: No value available

Reported average concentration includes the full detection limit for non-detected analytes.
When no ESL is available, any detection is considered an exceedence for the purpose of CPEC selection.

For the selection of detection limits during future sampling, the human health DCGL should be used unless the ESL is lower. The bolded ESLs are lower than the corresponding DCGLs.

In general, the DCGL (human health risk assessment) was selected as the lower of the agricultural or residential values. However, if background was higher than the lower of the agricultural or residential values, it was selected as the DCGL.

**Table 4-12**
**Preliminary Selection of Sump Soil CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Inorganic Chemicals** | | | | | | | | | | |
| 7429-90-5 | Aluminum | mg/kg | 12 | 2 | 2 | 10000 | 5900 | 5798 | 2 | a (1) | Y |
| 7439-92-1 | Lead | mg/kg | 0.013 | 3 | 3 | 510 | 287 | 193 | 3 | a (2) | Y |
| 7439-98-7 | Molybdenum | mg/kg | 0.11 | 3 | 3 | 1000 | 438 | 505 | 3 | a (1) | Y |
| 7440-02-0 | Nickel | mg/kg | 0.1 | 3 | 3 | 2000 | 714 | 1114 | 3 | a (1) | Y |
| 7440-22-4 | Silver | mg/kg | 0.54 | 2 | 2 | 1100 | 630 | 665 | 2 | a (1) | Y |
| 7440-36-0 | Antimony | mg/kg | 0.095 | 3 | 3 | 37 | 21 | 16 | 3 | a (1) | Y |
| 7440-38-2 | Arsenic | mg/kg | 1.9 | 3 | 3 | 27 | 22 | 5 | 3 | a (1) | Y |
| 7440-39-3 | Barium | mg/kg | 15 | 3 | 3 | 4100 | 1490 | 2261 | 3 | a (1) | Y |
| 7440-43-9 | Cadmium | mg/kg | 0.0045 | 3 | 3 | 35 | 14 | 19 | 3 | a (2) | Y |
| 7440-47-3 | Chromium | mg/kg | 930 | 3 | 3 | 2800 | 1116 | 1471 | 1 | a (1) | Y |
| 7440-48-4 | Cobalt | mg/kg | 8.9 | 3 | 3 | 71 | 36 | 31 | 3 | a (1) | Y |
| 7440-50-8 | Copper | mg/kg | 1.1 | 3 | 3 | 10000 | 4400 | 4887 | 3 | a (2) | Y |
| 7440-62-2 | Vanadium | mg/kg | 1.5 | 3 | 3 | 33 | 21 | 10 | 3 | a (1) | Y |
| 7440-66-6 | Zinc | mg/kg | 21 | 3 | 3 | 6300 | 4023 | 3196 | 3 | a (1) | Y |
| 7487-94-7 | Mercury | mg/kg | 0.1 | 3 | 3 | 260 | 111 | 129 | 3 | a (3) | Y |
| 7782-49-2 | Selenium | mg/kg | 0.17 | 1 | 1 | 15 | 15 | -- | 1 | a (1) | Y |
| | **Volatile Organic Compounds (VOCs)** | | | | | | | | | | |
| 100-41-4 | Ethylbenzene | mg/kg | 210 | 3 | 1 | 0.48 | 0.160 | 0.277 | -- | a (1) | N |
| 108-88-3 | Toluene | mg/kg | 2.5 | 3 | 1 | 0.77 | 0.257 | 0.445 | -- | a (1) | N |
| 1330-20-7 | Xylenes, Total | mg/kg | 64 | 2 | 1 | 1.4 | 0.700 | 0.990 | -- | a (1) | N |
| 156-59-2 | cis-1,2-Dichloroethene | mg/kg | 68 | 3 | 1 | 0.06 | 0.0200 | 0.0346 | -- | a (1) | N |
| 67-64-1 | Acetone | mg/kg | 43 | 3 | 1 | 0.35 | 0.117 | 0.202 | -- | a (1) | N |
| 71-55-6 | 1,1,1-Trichloroethane | mg/kg | 4300 | 3 | 1 | 3 | 1.00 | 1.73 | -- | a (1) | N |
| 75-00-3 | Chloroethane | mg/kg | 73 | 3 | 1 | 0.014 | 0.00467 | 0.00808 | -- | a (1) | N |
| 75-01-4 | Vinyl chloride | mg/kg | 0.73 | 3 | 1 | 0.07 | 0.0233 | 0.0404 | -- | a (1) | N |
| 75-34-3 | 1,1-Dichloroethane | mg/kg | 210 | 3 | 1 | 3.8 | 1.27 | 2.19 | -- | a (1) | N |
| 75-35-4 | 1,1-Dichloroethene | mg/kg | 0.29 | 3 | 1 | 0.38 | 0.127 | 0.219 | 1 | a (1) | Y |
| 79-01-6 | Trichloroethene | mg/kg | 3 | 3 | 1 | 0.42 | 0.140 | 0.242 | -- | a (1) | N |
| | **Semi-Volatile Organic Compounds (SVOCs)** | | | | | | | | | | |
| 117-81-7 | bis(2-Ethylhexyl) phthalate | mg/kg | 4.9 | 2 | 1 | 0.38 | 0.191 | 0.267 | -- | a (2) | N |
| 95-63-6 | 1,2,4-Trimethylbenzene | mg/kg | 640 | 3 | 1 | 0.012 | 0.00401 | 0.00692 | -- | a (1) | N |
| | **Total Petroleum Hydrocarbons (TPH)** | | | | | | | | | | |
| C14C20 | Diesel Range Organics (C14-C20) | mg/kg | NV | 1 | 1 | 1600 | 1600 | -- | 1 | -- | Y |
| C20C30 | Diesel Range Organics (C20-C30) | mg/kg | NV | 1 | 1 | 1400 | 1400 | -- | 1 | -- | Y |

Notes:

mg/kg: milligrams per kilogram

ESL: Ecological Screening Level

CPEC: Chemical of Potential Ecological Concern

MCV Sources:

a: MWH. 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan. Santa Susana Field Laboratory. Ventura County, California. Revision 2 – Final. September. Prepared for: The Boeing Company, National Aeronautics and Space Administration, U.S. Department of Energy. Tables 3-3 through 3-5. SRAM terrestrial mammal, terrestrial avian, terrestrial invertebrate ecological screening values. September.

a (1): Mammal

a (2): Avian

a (3): Invertebrate

NV: No value available

Reported average concentration includes the full detection limit for non-detected analytes.

When no ESL is available, any detection is considered an exceedence for the purpose of CPEC selection.

**Table 4-13**
**Preliminary Selection of Sump Water CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Dioxins** | | | | | | | | | | |
| 1746-01-6 | TCDD-TEQ (Total all) | ug/L | NV | 12 | 6 | 0.025042 | 0.00556 | 0.00943 | 6 | -- | Y |
| 3268-87-9 | Octachlorodibenzo-p-dioxin | ug/L | NV | 6 | 6 | 0.471 | 0.162 | 0.155 | 6 | -- | Y |
| 35822-46-9 | 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin | ug/L | NV | 6 | 3 | 0.0404 | 0.0137 | 0.0165 | 3 | -- | Y |
| 37871-00-4 | Heptachlorodibenzo-p-dioxins | ug/L | NV | 3 | 1 | 0.028 | 0.00934 | 0.0162 | 1 | -- | Y |
| 39001-02-0 | Octachlorodibenzofuran | ug/L | NV | 6 | 1 | 0.00726 | 0.00183 | 0.00362 | 1 | -- | Y |
| 67562-39-4 | 1,2,3,4,6,7,8-Heptachlorodibenzofuran | ug/L | NV | 6 | 1 | 0.00969 | 0.00162 | 0.00395 | 1 | -- | Y |
| | **General Chemistry** | | | | | | | | | | |
| E-10195 | Total Organic Carbon | ug/L | NV | 2 | 2 | 19000 | 17000 | 2828 | 2 | -- | Y |
| E-11778 | Hardness | ug/L | NV | 2 | 2 | 180000 | 165000 | 21213 | 2 | -- | Y |
| E-14506 | Alkalinity | ug/L | NV | 3 | 3 | 288000 | 264000 | 20881 | 3 | -- | Y |
| UKN025 | Bicarbonate Alkalinity as CaCO3 | ug/L | NV | 1 | 1 | 340000 | 340000 | -- | 1 | -- | Y |
| UKN090 | Nitrate-NO3 | ug/L | NV | 3 | 2 | 30000 | 10973 | 16517 | 2 | -- | Y |
| 14808-79-8 | Sulfate | ug/L | NV | 10 | 10 | 210000 | 137100 | 70276 | 10 | -- | Y |
| 16887-00-6 | Chloride | ug/L | NV | 11 | 11 | 54000 | 35473 | 11861 | 11 | -- | Y |
| 16984-48-8 | Fluoride | ug/L | NV | 5 | 3 | 600 | 500 | 71 | 3 | -- | Y |
| 71-52-3 | Bicarbonate | ug/L | NV | 7 | 7 | 350000 | 256000 | 78960 | 7 | -- | Y |
| E-10106 | BOD | ug/L | NV | 2 | 2 | 5300 | 4500 | 1131 | 2 | -- | Y |
| E-10128 | Nitrate/Nitrite as N | ug/L | NV | 2 | 2 | 1400 | 1400 | 0.00 | 2 | -- | Y |
| E-10162 | Total Suspended Solids | ug/L | NV | 2 | 1 | 16000 | 13000 | 4243 | 1 | -- | Y |
| E-10173 | Total Dissolved Solids | ug/L | NV | 8 | 8 | 2100000 | 600125 | 625547 | 8 | -- | Y |
| | **Inorganic Chemicals** | | | | | | | | | | |
| 7429-90-5 | Aluminum | ug/L | 87 | 6 | 5 | 32000 | 6746 | 14123 | 4 | b | Y |
| 7439-89-6 | Iron | ug/L | 1000 | 13 | 12 | 1060 | 488 | 306 | 1 | a | Y |
| 7439-92-1 | Lead | ug/L | 2.5 | 9 | 5 | 14 | 3.00 | 4.57 | 2 | a | Y |
| 7439-95-4 | Magnesium | ug/L | 82000 | 11 | 11 | 32000 | 18913 | 9249 | -- | b | N |
| 7439-96-5 | Manganese | ug/L | 120 | 13 | 11 | 580 | 124 | 160 | 3 | b | Y |
| 7439-98-7 | Molybdenum | ug/L | 73 | 9 | 4 | 2.7 | 6.06 | 3.70 | -- | b | N |
| 7440-02-0 | Nickel | ug/L | 52 | 18 | 6 | 15 | 11 | 6.64 | -- | a | N |
| 7440-09-7 | Potassium | ug/L | 53000 | 8 | 6 | 4300 | 3078 | 1487 | -- | b | N |
| 7440-22-4 | Silver | ug/L | 0.1 | 5 | 1 | 0.14 | 0.120 | 0.0283 | 1 | a | Y |
| 7440-23-5 | Sodium | ug/L | 680000 | 8 | 8 | 106000 | 56313 | 26387 | -- | b | N |
| 7440-28-0 | Thallium | ug/L | 4 | 4 | 1 | 0.6 | 0.350 | 0.354 | -- | a | N |
| 7440-36-0 | Antimony | ug/L | 30 | 11 | 3 | 2.6 | 3.39 | 3.83 | -- | b | N |
| 7440-38-2 | Arsenic | ug/L | 150 | 11 | 5 | 4.8 | 3.67 | 1.54 | -- | a | N |
| 7440-39-3 | Barium | ug/L | 4 | 15 | 15 | 200 | 50 | 44 | 15 | b | Y |
| 7440-41-7 | Beryllium | ug/L | 0.5 | 10 | 2 | 1.4 | 0.533 | 0.378 | 1 | a | Y |
| 7440-42-8 | Boron | ug/L | 1.6 | 8 | 7 | 170 | 121 | 26 | 7 | b | Y |
| 7440-43-9 | Cadmium | ug/L | 1.1 | 5 | 1 | 0.27 | 0.157 | 0.098 | -- | a | N |
| 7440-47-3 | Chromium | ug/L | 74 | 19 | 7 | 28 | 7.14 | 6.48 | -- | a | N |
| 7440-48-4 | Cobalt | ug/L | 23 | 9 | 1 | 7.2 | 5.97 | 3.51 | -- | b | N |
| 7440-50-8 | Copper | ug/L | 9 | 11 | 8 | 17 | 5.78 | 4.46 | 1 | a | Y |
| 7440-62-2 | Vanadium | ug/L | 20 | 9 | 5 | 60 | 13 | 18 | 1 | b | Y |
| 7440-66-6 | Zinc | ug/L | 110 | 18 | 12 | 91 | 26 | 21 | -- | a | N |
| 7440-70-2 | Calcium | ug/L | 116000 | 8 | 8 | 87000 | 56725 | 28104 | -- | b | N |
| 7782-49-2 | Selenium | ug/L | 5 | 5 | 2 | 1.45 | 1.38 | 0.106 | -- | a | N |

**Table 4-13**
**Preliminary Selection of Sump Water CPECs for Ecological Receptors**

| CAS Number | Analyte | Units | Most Conservative ESL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples Above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Polychlorinated Biphenyls (PCBs)** | | | | | | | | | | |
| 31508-00-6 | PCB-118 | ug/L | NV | 4 | 4 | 0.64 | 0.480 | 0.131 | 4 | -- | Y |
| 32598-10-0 | PCB-66 | ug/L | NV | 4 | 2 | 0.26 | 0.200 | 0.0849 | 2 | -- | Y |
| 32598-14-4 | PCB-105 | ug/L | NV | 4 | 4 | 0.3 | 0.215 | 0.0592 | 4 | -- | Y |
| 32774-16-6 | PCB-169 | ug/L | NV | 4 | 1 | 0.17 | 0.0425 | 0.0850 | 1 | -- | Y |
| 34883-43-7 | PCB-8 | ug/L | NV | 4 | 2 | 0.16 | 0.0725 | 0.0846 | 2 | -- | Y |
| 35065-27-1 | PCB-153 | ug/L | NV | 4 | 4 | 0.68 | 0.453 | 0.162 | 4 | -- | Y |
| 35065-29-3 | PCB-180 | ug/L | NV | 4 | 1 | 0.21 | 0.210 | -- | 1 | -- | Y |
| 35065-30-6 | PCB-170 | ug/L | NV | 4 | 2 | 0.16 | 0.0700 | 0.0824 | 2 | -- | Y |
| 35068-28-2 | PCB-138 | ug/L | NV | 4 | 4 | 1.2 | 0.765 | 0.294 | 4 | -- | Y |
| 35693-99-3 | PCB-52 | ug/L | NV | 4 | 1 | 0.33 | 0.330 | -- | 1 | -- | Y |
| 37680-73-2 | PCB-101 | ug/L | NV | 1 | 1 | 0.44 | 0.440 | -- | 1 | -- | Y |
| 38380-07-3 | PCB-128 | ug/L | NV | 4 | 4 | 0.3 | 0.193 | 0.0741 | 4 | -- | Y |
| 38380-08-4 | PCB-156 | ug/L | NV | 4 | 2 | 0.14 | 0.0558 | 0.0684 | 2 | -- | Y |
| 40186-72-9 | PCB-206 | ug/L | NV | 4 | 1 | 0.062 | 0.0155 | 0.0310 | 1 | -- | Y |
| 41464-39-5 | PCB-44 | ug/L | NV | 4 | 1 | 0.15 | 0.150 | -- | 1 | -- | Y |
| 52663-68-0 | PCB-187 | ug/L | NV | 4 | 2 | 0.12 | 0.0495 | 0.0597 | 2 | -- | Y |
| 52663-72-6 | PCB-167 | ug/L | NV | 4 | 1 | 0.17 | 0.0425 | 0.0850 | 1 | -- | Y |
| 7012-37-5 | PCB-28 | ug/L | NV | 4 | 2 | 0.14 | 0.104 | 0.0516 | 2 | -- | Y |
| | **Volatile Organic Compounds (VOCs)** | | | | | | | | | | |
| 107-06-2 | 1,2-Dichloroethane | ug/L | 100 | 54 | 30 | 3200 | 211 | 539 | 14 | b | Y |
| 127-18-4 | Tetrachloroethene | ug/L | 84 | 54 | 30 | 50 | 6.25 | 7.75 | -- | a | N |
| 156-59-2 | cis-1,2-Dichloroethene | ug/L | 590 | 50 | 29 | 140 | 27 | 35 | -- | b | N |
| 156-60-5 | trans-1,2-Dichloroethene | ug/L | 970 | 53 | 1 | 0.5 | 2.30 | 2.51 | -- | b | N |
| 306-83-2 | 2,2-Dichloro-1,1,1-trifluoroethane | ug/L | NV | 3 | 3 | 82 | 55 | 32 | 3 | -- | Y |
| 56-23-5 | Carbon Tetrachloride | ug/L | 13.3 | 54 | 30 | 620 | 76 | 126 | 29 | b | Y |
| 67-64-1 | Acetone | ug/L | 1500 | 45 | 2 | 38 | 12 | 12 | -- | b | N |
| 67-66-3 | Chloroform | ug/L | 124 | 42 | 30 | 3500 | 292 | 605 | 22 | a | Y |
| 71-55-6 | 1,1,1-Trichloroethane | ug/L | 11 | 54 | 28 | 90 | 10 | 15 | 16 | b | Y |
| 75-09-2 | Methylene chloride | ug/L | 98.1 | 54 | 15 | 66 | 7.70 | 13 | -- | b | N |
| 75-27-4 | Bromodichloromethane | ug/L | NV | 54 | 2 | 1.8 | 2.40 | 2.45 | 2 | -- | Y |
| 75-34-3 | 1,1-Dichloroethane | ug/L | 47 | 54 | 29 | 60 | 16 | 16 | 4 | b | Y |
| 75-35-4 | 1,1-Dichloroethene | ug/L | 25 | 54 | 28 | 40 | 8.85 | 9.71 | 4 | b | Y |
| 7601-90-3 | Perchlorate | ug/L | NV | 47 | 1 | 6.9 | 3.15 | 2.91 | 1 | -- | Y |
| 76-13-1 | 1,1,2-Trichloro-1,2,2-trifluoroethane | ug/L | NV | 42 | 29 | 600 | 90 | 124 | 29 | -- | Y |
| 79-01-6 | Trichloroethene | ug/L | 2190 | 54 | 32 | 290 | 48 | 62 | -- | a | N |
| | **Semi-Volatile Organic Compounds (SVOCs)** | | | | | | | | | | |
| 206-44-0 | Fluoranthene | ug/L | 0.04 | 9 | 1 | 0.33 | 0.0980 | 0.155 | 1 | b | Y |
| 95-50-1 | 1,2-Dichlorobenzene | ug/L | 76.3 | 41 | 4 | 2.6 | 0.514 | 0.587 | -- | a | N |

Notes:

ug/L: micrograms per liter

ESL: Ecological Screening Level

CPEC: Chemical of Potential Ecological Concern

MCV Sources:

a: MWH. 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan. Santa Susana Field Laboratory. Ventura County, California. Revision 2 – Final. September. Prepared for: The Boeing Company, National Aeronautics and Space Administration, U.S. Department of Energy. Table 3-2. September.

b: EPA. 2006. Region 3 BTAG Freshwater Screening Benchmarks. July. Accessed at: http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fw/R3_BTAG_FW_Benchmarks_07-06.pdf

NV: No value available

Reported average concentration includes the full detection limit for non-detected analytes.

When no ESL is available, any detection is considered an exceedence for the purpose of CPEC selection.

## Table 4-14
## Preliminary Selection of Soil Gas CPECs for Ecological Receptors

| CAS Number | Analyte | Units | Most Conservative ESL | Number of Usable Samples | Number of Detects | Maximum Detected Concentration | Average Concentration | Standard Deviation | Number of Samples above MCV | MCV Source | CPEC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Volatile Organic Compounds (VOCs)** | | | | | | | | | | | |
| 107-06-2 | 1,2-Dichloroethane | ug/m$^3$ | 42000 | 185 | 1 | 1500 | 0.835 | 0.356 | -- | a | N |
| 127-18-4 | Tetrachloroethene | ug/m$^3$ | 24000 | 187 | 6 | 3400 | 1.307 | 3.765 | -- | a | N |
| 156-59-2 | cis-1,2-Dichloroethene | ug/m$^3$ | 1900 | 115 | 3 | 15000 | 21.90 | 122.92 | 1 | a | Y |
| 156-60-5 | trans-1,2-Dichloroethene | ug/m$^3$ | 1900 | 114 | 2 | 157.55 | 4.59 | 22.98 | -- | a | N |
| 67-63-0 | Isopropanol | ug/m$^3$ | NV | 3 | 1 | 427.5 | 314.5 | 97.92 | 1 | -- | Y |
| 71-55-6 | 1,1,1-Trichloroethane | ug/m$^3$ | 38000 | 185 | 3 | 15000 | 0.947 | 1.26 | -- | a | N |
| 74-82-8 | Methane | ug/m$^3$ | NV | 44 | 12 | 27000 | 11.44 | 4.70 | 12 | -- | Y |
| 75-01-4 | Vinyl chloride | ug/m$^3$ | 560 | 74 | 1 | 26.47 | 1.52 | 5.29 | -- | a | N |
| 75-35-4 | 1,1-Dichloroethene | ug/m$^3$ | 600 | 78 | 6 | 10000 | 67.8 | 263.4 | 5 | a | Y |
| 75-69-4 | Trichlorofluoromethane | ug/m$^3$ | 90900 | 185 | 1 | 4500 | 0.876 | 0.440 | -- | a | N |
| 75-71-8 | Dichlorodifluoromethane | ug/m$^3$ | 91000 | 184 | 1 | 1100 | 0.838 | 0.348 | -- | a | N |
| 76-13-1 | 1,1,2-Trichloro-1,2,2-trifluoroethane | ug/m$^3$ | NV | 185 | 4 | 3500 | 3.95 | 1.97 | 4 | -- | Y |
| 79-01-6 | Trichloroethene | ug/m$^3$ | 6400 | 188 | 9 | 66000 | 172.2 | 1420.4 | 5 | a | Y |

Notes:

ug/m$^3$: micrograms per cubic meter

ESL: Ecological Screening Level

CPEC: Chemical of Potential Ecological Concern

MCV Sources:

a: MWH. 2005. Standardized Risk Assessment Methodology (SRAM) Work Plan. Santa Susana Field Laboratory. Ventura County, California. Revision 2 – Final. September. Prepared for: The Boeing Company, National Aeronautics and Space Administration, U.S. Department of Energy. Table 3-3. SRAM terrestrial mammal inhalation ecological screening values. September.

NV: No value available

Reported average concentration includes the full detection limit for non-detected analytes.

When no ESL is available, any detection is considered an exceedence for the purpose of CPEC selection.

**Table 4-15**
**Comparison of Ecological Terrestrial and Aquatic Radionuclide Preliminary Remediation Goals to Human Health Preliminary Remediation Goals**

| Radionuclide of Potential Concern | Terrestial Water (pCi/L) | Aquatic Water (pCi/L) | Human Health Groundwater (pCi/L) | Terrestrial Soil (pCi/g) | Aquatic Sediment (pCi/g) | Human Health Rural Resident (pCi/g) | Human Health Resident (pCi/g) |
|---|---|---|---|---|---|---|---|
| Am-241 | 2.00E+05 | 4.38E+02 | **4.58E-01** | 4.00E+03 | 7.04E+05 | **2.0E+00** | **2.0E+00** |
| Ba-133 | 1.20E+03 | 6.76E+01 | **6.99E+00** | 6.67E+02 | 8.57E+04 | **1.8E-01** | **1.8E-01** |
| Cm-243/244 | 1.84E+05 | 6.63E+01 | **5.03E-01** | 4.06E+03 | 4.01E+06 | **3.5E-01** | **3.5E-01** |
| Co-60 | 1.00E+06 | 3.76E+03 | **3.03E+00** | 7.00E+02 | 1.49E+04 | **3.6E-02** | **3.6E-02** |
| Cs-134 | 3.26E+05 | 5.18E+02 | **1.13E+00** | 1.13E+01 | 2.28E+04 | **1.6E-01** | **1.6E-01** |
| Cs-137 | 6.00E+05 | 1.05E+03 | **1.57E+00** | 2.00E+01 | 4.93E+04 | **6.0E-02** | **6.0E-02** |
| Eu-152 | 2.55E+06 | 2.55E+04 | **7.84E+00** | 1.52E+03 | 3.06E+04 | **4.2E-02** | **4.2E-02** |
| Eu-154 | 2.00E+06 | 2.16E+04 | **4.62E+00** | 1.00E+03 | 2.59E+04 | **5.0E-02** | **5.0E-02** |
| Eu-155 | 3.00E+07 | 2.64E+05 | **2.51E+01** | 2.00E+04 | 3.18E+05 | **3.8E+00** | **3.8E+00** |
| Fe-55 | 1.00E+05 | 8.00E+02 | **5.52E+01** | 5.53E+04 | 6.51E+06 | **2.8E+03** | 2.9E+03 |
| H-3 | 2.00E+08 | 4.99E+09 | **1.44E+02** | 2.00E+05 | 7.04E+06 | **2.7E+00** | **2.7E+00** |
| I-129 | 5.70E+06 | 1.00E+06 | **3.22E-01** | 5.67E+03 | 4.93E+05 | **1.9E+00** | 2.5E+00 |
| K-40 | 1.93E+06 | 2.90E+03 | **1.93E+00** | 1.19E+02 | 5.80E+04 | **1.1E-01** | 1.4E-01 |
| Na-22 | 2.53E+01 | **3.56E+00** | 4.95E+00 | 1.64E+01 | 1.64E+04 | **8.7E-02** | **8.7E-02** |
| Ni-59 | 1.51E+05 | 3.58E+04 | **1.74E+02** | 2.68E+05 | 5.88E+06 | **2.1E+02** | 1.1E+03 |
| Ni-63 | 6.25E+04 | 1.47E+04 | **7.11E+01** | 1.04E+05 | 2.27E+06 | **9.5E+01** | 4.9E+02 |
| Np-237 | 6.49E+06 | 6.85E+01 | **7.07E-01** | 3.86E+03 | 7.86E+04 | **1.3E-01** | 1.4E-01 |
| Pb-210 | 2.92E+05 | 6.01E+02 | **3.75E-02** | 1.39E+03 | 9.18E+04 | **1.5E-01** | 4.5E-01 |
| Pu-238 | 1.89E+05 | 1.76E+02 | **3.64E-01** | 5.27E+03 | 3.95E+06 | **3.3E+00** | **3.3E+00** |
| Pu-239 | 2.00E+05 | 1.87E+02 | **3.53E-01** | 6.00E+03 | 7.04E+06 | **2.9E+00** | **2.9E+00** |
| Pu-240 | 5.13E+02 | **1.89E-01** | 3.53E-01 | 1.85E+01 | 4.00E+06 | **2.9E+00** | **2.9E+00** |
| Pu-241 | 1.07E+07 | 3.90E+03 | **2.71E+01** | 1.90E+05 | 7.69E+06 | **4.5E+02** | **4.5E+02** |
| Ra-226 | 8.00E+03 | 1.02E+01 | **8.16E-04** | 5.00E+01 | 1.45E+04 | **1.3E-02** | **1.3E-02** |
| Ra-228 | 7.00E+03 | 8.49E+00 | **4.58E-02** | 4.00E+01 | 2.90E+04 | **8.0E-02** | 8.5E-02 |
| Sb-125 | 6.97E+06 | 3.67E+05 | **9.28E+00** | 3.52E+03 | 7.04E+04 | **4.4E-01** | 4.6E-01 |
| Sr-90 | 5.00E+04 | 5.39E+04 | **6.44E-01** | 2.00E+01 | 3.52E+04 | **3.2E-01** | 3.9E+00 |
| Tc-99 | 2.00E+07 | 2.47E+06 | **1.73E+01** | 4.00E+03 | 4.69E+05 | **6.0E-03** | 9.6E+01 |
| Th-228 | 6.33E+04 | 3.74E+02 | **1.59E-01** | 5.30E+02 | 1.64E+04 | **1.5E-01** | **1.5E-01** |

**Table 4-15**
**Comparison of Ecological Terrestrial and Aquatic Radionuclide Preliminary Remediation Goals to Human Health Preliminary Remediation Goals**

| Radionuclide of Potential Concern | Terrestial Water (pCi/L) | Aquatic Water (pCi/L) | Human Health Groundwater (pCi/L) | Terrestrial Soil (pCi/g) | Aquatic Sediment (pCi/g) | Human Health Rural Resident (pCi/g) | Human Health Resident (pCi/g) |
|---|---|---|---|---|---|---|---|
| Th-230 | 4.52E+05 | 2.57E+03 | **5.23E-01** | 9.98E+03 | 2.74E+06 | **3.8E+00** | **3.8E+00** |
| Th-232 | 5.00E+04 | 3.04E+02 | **4.71E-01** | 2.00E+03 | 3.29E+06 | **3.4E+00** | **3.4E+00** |
| U-233/234 | 4.00E+05 | 2.02E+02 | **6.74E-01** | 5.00E+03 | 3.08E+06 | **4.7E+00** | 5.0E+00 |
| U-235 | 4.00E+05 | 2.17E+02 | **6.63E-01** | 3.00E+03 | 1.05E+05 | **2.0E-01** | **2.0E-01** |
| U-238 | 4.00E+05 | 2.23E+02 | **5.47E-01** | 2.00E+03 | 4.28E+04 | **7.5E-01** | 7.8E-01 |

Notes:
pCi/L: picoCuries per liter
pCi/g: picoCuries per gram
All data are QA complete.
For the selection of detection limits during future sampling, the lower of the ecological and human health PRGs should be used and are bolded.

**Table 4-16**
**Proposed Sampling Areas for Ecological Risk Assessment**

| | Terrestial Habitats | | | | | Aquatic Habitats | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | SS | Soil Gas | Soil Invert | Terr Plant | Small Mammal | SW | SED | Aquatic Invert | Fish | Aquatic Plant |
| **EU 1-16 (for each)** | RAD/C | C | RAD/C | RAD/C | RAD/C | RAD/C | *NA* | *NA* | *NA* | *NA* |
| **Pond NE of Sodium Reactor Experimentall complex** | *NA* | *NA* | *NA* | *NA* | *NA* | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C |
| **"cattail area" in EU 3** | *NA* | *NA* | *NA* | *NA* | *NA* | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C |
| **Other Area IV locations** | *NA* | *NA* | *NA* | *NA* | *NA* | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C |
| **Buffer Area south of SRE** | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C |
| **Buffer Area north of SRE** | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C |
| **Arroyo Simi Area 1** | *NA* | *NA* | *NA* | *NA* | *NA* | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C |
| **Arroyo Simi Area 2** | *NA* | *NA* | *NA* | *NA* | *NA* | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C |
| **R-2 Pond (Area II)** | *NA* | *NA* | *NA* | *NA* | *NA* | RAD/C | RAD/C | RAD/C | RAD/C | RAD/C |

**Assumptions:** Each of the 16 EUs is sufficiently unique and large to support independent sampling

Aquatic sampling assumes presence of standing water for sufficient duration to support aquatic life

Sampling for specific receptor group (e.g., fish) assumes presence of of that group (e.g., fish)

Arroyo Simi Area 1 = integrator of watersheds draining EUs 6, 8, 10, and 11 (if water body present)

Arroyo Simi Area 2 = integrator of watersheds draining EUs 1 and 2 (if water body present)

Samples from the two buffer areas will be terrestrial only unless persistent aquatic conditions are present (e.g., stormwater or seep retention)

**Definitions:** RAD - radionuclide sampling

C - chemicals for ERA (full suite of analytes unless specified otherwise)
(bioaccumulative for biota; include hardness for SW (dissolved + total metals); include TOC for SS and SED)

SS - surface soil

Soil Gas - soil gas analyses from each of the three soil depth horizons, at each soil sampling location

Soil Invert - soil dwelling invertebrates (most likely earthworms)

Terr Plant - (above ground, unwashed; two sample types: (1) seeds & fruits and (2) leaves of dominant taxa (multiple taxa OK)

Small Mammal - deer mouse (or other mid-trophic level omnivore)

SW - surface water (includes stormwater and shallow groundwater that surfaces as seeps)

SED - sediment

Aq Invert - aquatic invertebrate - note taxa and relative dominance but composite all taxa for chemical analyis (to be used as "prey")

Fish - whole body small (<6 in. TL) omnivorous or invertivorous fish, multiple taxa OK but note taxa, composite of 3 fish/sample

Aq Plant - submerged, emergent, or floating macrophyte (most abundant taxa)

**Sample Numbers:** SS - up to 10 samples, depending on size of area/EU (at each location, collect samples from each of three depth intervals per SRAM)
One sample per soil depth horizon (e.g., 10 in 0-2'; 10 in 2-4'; 10 in 4-6')

Soil Gas - up to 10 samples, depending on size of area/EU (at each location, collect samples from each of three depth intervals per SRAM)
One sample per soil depth horizon (e.g., 10 in 0-2'; 10 in 2-4'; 10 in 4-6')

SED - up to 10 samples, depending on size of area (0 - 6 in depth)

SW - 3 depth integrated samples if lotic (e.g., flowing stormwater) or up to 10 depth-integrated samples if lentic (depending on size)

Soil Invert - up to 10 composite samples (depending on size of area) of same taxon, sufficient individuals to allow chemcial and rad analyses

Small Mammal - up to 10 composite samples (depending on size of area) of 3 individuals per composite, mixed taxa OK

Terr Plant (seeds/fruits) - up to 10 composite (seeds and fruits) samples (depending on size of area) of common taxa, sufficient volume to allow chemcial and rad analyses

Terr Plant (leaves) - up to samples (depending on size of area) of same taxon, sufficient volume to allow chemcial and rad analyses

Fish - up to 10 composite samples (depending on size of area), multiple taxa OK, sufficient individuals to allow chemcial and rad analyses (e.g., 3 fish per composite)

Aq Invert - up to 10 composite samples (depending on size of area) of mixed taxa, sufficient volume to allow chemcial and rad analyses

Aq Plant - up to 10 samples (depending on size of area) of common taxa, sufficient volume to allow chemcial and rad analyses

## Table 4-17
## Remaining Buildings Data Gap Analysis

| Site | MARSSIM Class | Summary of Historical Radiological Survey Information | Data Gap |
|---|---|---|---|
| Radioactive Material Handling Facility (RMHF) General | Class 1 | Existing concrete foundations data are necessary to evaluate potential future use. | Radiological surface characterization of building concrete foundations. |
| 4006 (Includes 4616) | Class 3 | No known existing building radiological characterization information. | Collect final set of swipe and fixed measurement data plus dose rate results. Volumetric samples not considered unless contamination identified. |
| 4009 Critical Experiments Building | Class 1 | Rockwell International performed a 1988 survey collecting total and removable beta and alpha measurements plus external gamma radiation levels, and performed gamma spec on some volumetric samples. These data are supplemented by followup surveys in 1990 and 1995, again including beta, alpha, and gamma spec analysis. Speciation for non-gamma-emitting radionuclides was not performed. | Quantification of non-gamma emitters represents a data gap. Existing data are adequate for risk analysis of identified contaminants, though transfer of of hard-copy results to useable format may be necessary. |
| 4011 Radiation Instrument Calibration Laboratory | Class 3 | Rockwell International performed a 1998 survey collecting total and removable beta and alpha measurements plus external gamma radiation levels, and performed gamma spec on some volumetric samples. Speciation for non-gamma-emitting radionuclides was not performed. | Quantification of non-gamma emitters represents a data gap. Existing data are adequate for risk analysis of identified contaminants, though transfer of of hard-copy results to useable format may be necessary. |

## Table 4-17
## Remaining Buildings Data Gap Analysis

| Site | MARSSIM Class | Summary of Historical Radiological Survey Information | Data Gap |
|---|---|---|---|
| 4019 SNAP System Nuclear Qualification Test Facility | Class 1 | The 1999 report by Boeing summarizes finding of prior investigations and documents results of total and removable beta and alpha measurements plus external gamma radiation levels. Gamma spec or speciation for non-gamma-emitting radionuclides was not performed. | Volume of existing gross data are adequate for risk analysis, though transfer of of hard-copy results to useable format may be necessary. Speciation of contaminants required. |
| 4021 (RMHF); Laundry and Hot and Cold Change Room | Class 1 | Structure be surveyed and decontaminated at the time of RMHF closure and data unavailable for risk analysis. | Collect swipe and fixed measurement data plus dose rate results. Also target ductwork, where accessible. Can use other RMHF data to estimate isotopic distributions. |
| 4022 (RMHF); Nuclear Fuel and Radioactive Waste Storage | Class 1 | The 2007 investigation included measurement of beta and alpha total and removable activity, external gamma radiation levels, and volumetric sampling for a broad range of analytes (see detailed result sin Cabrera 2007). However, the total beta/alpha survey was limited to certain areas given the high level of residual gamma radiation near the west wall (up to 140 mR/hr). Regardless of this limitation in "statis measurements", the available data are sifficient for risk analysis. | No additional data required for the data gap analysis. |
| 4024 SNAP Environmental Test Facility | Class 1 | Areva 2008 confirmation report summarized data from direct beta, contact gamma, and 1 meter exposure rate measurements in addition to smear samples for removable contamination on surfaces and material samples for isotopic analysis. A MARSSIM-based final status survey plan and subsequent report will be developed separately to demonstrate successful decommisisoning of identified residual contamination (AREVA 2008). | No additional data required for the data gap analysis. |

## Table 4-17
## Remaining Buildings Data Gap Analysis

| Site | MARSSIM Class | Summary of Historical Radiological Survey Information | Data Gap |
|---|---|---|---|
| 4044 (RMHF) Clean shop and support lab | Class 3 | Served various roles including that of a clean shop, a health physics office, and a break room. The health physics office has been used as a counting area for removable contamination measurements and storage and use of calibration sources. Although no other regulated radiological materials were managed specifically in this building it is considered radiologically impacted (ontamination potenital considered low). Swipe data available from routine health physics operations (2008 e-mail from Philip Rutherford). | Collect final set of swipe and fixed measurement data plus dose rate results. Also target ductwork, where accessible. Volumetric samples not considered unless contamination identified. |
| 4055 Nuclear Material Development Facility | Class 1 | ORAU 1997 final status survey report presents total and removable verification data for comparison to NRC license requirements. Volumetric data were collected from paint and soils adjacent to the building, though for a limited list of analytes. | Isotopic distributions must be estimated given limited analytical results representing increased uncertainty for risk analysis and potential data gap |
| 4075 (RMHF); radioactive waste storage | Class 1 | The 2007 investigation included measurement of beta and alpha total and removable activity, external gamma radiation measurements, and volumetric sampling for a broad range of analytes (see detailed results in Cabrera 2007). There is a large volume of systematic data suitable for risk analysis. | No additional data required for the data gap analysis. |
| 4100 Fast Critical Experiment Laboratory | Class 1 | Systematic fixed and removable activity for beta and apha radiation, plus gamma radiation measuremets identified no contaimination, as summarized in the 1980 Rockwell International report. Subsequent quarterly surveys suppliment this dataset though reuse necessitates resurvey (Rutherford 2008). | Collect final set of swipe and fixed measurement data plus dose rate results. Also target ductwork, where accessible. Volumetric samples not considered unless contamination identified. |
| 4563 (RMHF); Open-walled Storage Area | Class 1 | The 2007 investigation included measurement of beta and alpha total and removable activity, external gamma radiation measurements, and volumetric (smear) sampling for tritium analysis (see detailed results in Cabrera 2007). Non-tritium speciation was not performed though data from other RMHF buildings may be used to estimate isotopic distributions. Available data are sufficient for risk analysis. | No additional data required for the data gap analysis. |

## Table 4-17
## Remaining Buildings Data Gap Analysis

| Site | MARSSIM Class | Summary of Historical Radiological Survey Information | Data Gap |
|---|---|---|---|
| 4621 (RMHF); Contaminated Equipment Storage | Class 1 | The 2007 investigation included measurement of beta and alpha total and removable activity, external gamma radiation measurements, and volumetric sampling for a broad range of analytes (see detailed results in Cabrera 2007). There is a large volume of systematic data suitable for risk analysis. | No additional data required for the data gap analysis. |
| 4658 (RMHF); Former Guard Shack | Class 3 | The 2007 investigation included measurement of beta and alpha total and removable activity, external gamma radiation measurements, and volumetric (smear) sampling for tritium analysis (see detailed results in Cabrera 2007). Non-tritium speciation was not performed though data from other RMHF buildings may be used to estimate isotopic distributions. Available data are sufficient for risk analysis. | No additional data required for the data gap analysis. |
| 4665 (RMHF); Oxidation Facility and Non-radiactive Waste Storage | Class 3 | The 2007 investigation included measurement of beta and alpha total and removable activity, external gamma radiation measurements, and volumetric sampling for a broad range of analytes (see detailed results in Cabrera 2007). There is a large volume of systematic data suitable for risk analysis. | No additional data required for the data gap analysis. |
| 4688 (RMHF); Open-walled Cleaning Station and Radioactive Materials Storage | Class 1 | A limited number of static measurements identified significant beta activity. No smear data were collected though on metal sample was colelcted from the roof (see results in Cabrera 2007). The limited dataset represents a datagap for risk analysis. ` | Fixed and removable beta and alpha data plus gamma radiation level data are required for risk analysis. |

# Section 5
# Summary of Data Gap Findings

This section provides an overall summary of the findings of the data gap analysis for Area IV. The data gap analysis was based on the GIS data base and reports developed by Boeing and its contractors through January 2008. It is recognized that investigations of some locations of Area IV are ongoing with proposed sampling under the RFI. Those efforts will be considered as part of the development of the FSAP for the proposed field sampling investigation resulting from this gap analysis. However, data collected through the ongoing RCRA sampling efforts will be recognized as data gaps until that data is demonstrated to meet the data requirements described in this gap report.

**Table 5-1** provides a summary of the data gap analysis findings. The text that follows provides summary details of the data needs.

**Table 5-1 Summary of Data Gap Analysis Findings**

| Media Evaluated | Data Gap |
|---|---|
| Soil | Additional chemical and radionuclide data are required for determining risks to human health and ecological receptors. Data are also required for characterization and delineation of the extent of contamination for analysis of risk-based alternatives in the *SSFL Area IV EIS*. |
| Gamma Walkover Survey | The data gap proposal is to conduct a 100% gamma walkover survey of all accessible portions of Area IV, adjacent areas identified to be impacted, drainages down gradient of Area IV, and groundwater seeps. |
| Groundwater | Data are needed to define horizontal and vertical extent of contamination, both for areas where extent is not adequately defined and in areas with no groundwater sampling data. Data on the hydrologic properties of the aquifers are also needed for evaluation of alternatives in the EIS. |
| Groundwater Seeps | Radionuclide and chemical data are needed to understand the fate and transport of groundwater contaminants and assess human and ecological receptor exposure pathways. Seeps will be sampled if water is available during the field sampling program. Regardless of the presence of water during the field effort, a gamma walkover survey will be performed. |
| Soil Vapor | While additional data are not required for the EIS per se, additional soil gas data may be considered in the Field Sampling Program to optimize the location of groundwater monitoring wells and to support the human health and ecological risk assessments. |
| Surface Water | Surface water quality for Area IV is currently |

**Table 5-1 Summary of Data Gap Analysis Findings**

| Media Evaluated | Data Gap |
|---|---|
| | being assessed under the SSFL's National Pollutant Discharge Elimination System (NPDES) permit. For the most part, this data is adequate for EIS purposes. Surface water chemical and radionuclide data from ponds and drainages internal to Area IV are required for assessment of risk to ecological receptors. Surface water characterization and confirmation samples will be collected during field sampling, if it is present. |
| Sediment | Sediment chemical and radionuclide data from ponds and drainages internal to Area IV are required for assessment of risk to ecological receptors. |
| Ecological Receptors | Biological tissue chemical and radionuclide data are required for assessment of risk to ecological receptors. |
| Air | No data gaps for air were identified. |
| Buildings | Radionuclide data for building surfaces are incomplete. Additional data for buildings are required for human health risk assessment. |
| Bedrock | Chemical and radionuclide analytical data, including aquifer physical and natural chemistry data are required. |
| Background | Accepted background data for radionuclides are needed for surface soil, near surface soil, and subsurface soil; metals and dioxin in subsurface soil; and radionuclides, metals and dioxin in sediment, surface water, groundwater and bedrock. These data should be collected from media in both geologic formations found at the site. |

# 5.1 Soil

## 5.1.1 Chemical Analysis Data Gap

Two approaches were used to evaluate the data requirements for conducting risk-based alternative evaluations in the *SSFL Area IV EIS*. These include the evaluation of data needed to perform a human health risk assessment consistent with CERCLA and determination of the data necessary to define the nature and extent of contamination for alternatives evaluation.

The risk assessment data gap evaluation was based on the statistical evaluation of the data required for a CERCLA risk assessment for each of the 16 EUs. As with the entire soil data gap approaches, the data gap was determined to be the difference between the statistically determined requirement and the existing data that met screening criteria.

The nature and extent evaluation of soil data requirements focused on delineation requirements for the approximately 250 chemical use areas identified for Area IV. Existing data were plotted for the chemical use areas and color coded as to where the results exceeded screening criteria. A review of the distribution of the sample results was used to identify the required additional samples. The data gap is the difference between the data needs and the existing data meeting screening criteria. Because this approach involved evaluating a large number of use areas, this approach resulted in identification of a greater number of samples than did the risk assessment approach.

The screening of the existing data by the screening criteria was performed on an individual constituent (e.g., COI) by constituent basis. Existing data for many constituents at each study location were found to be adequate for the purpose of use of the individual constituents in either a risk assessment or defining contamination extent. However, because some individual constituents did not pass screening criteria, many of the locations evaluated required some additional sampling due to the "data gap" introduced by specific COIs. In addition, because there is limited subsurface soil data, defining vertical contamination depth is a gap for locations with identified surface soil contamination.

The specific requirements for collecting samples to fill the data gap will be specified in the FSAP for the proposed field sampling investigation of Area IV. It is expected as part of development of the FSAP, proposed sample locations and depths will be refined. Sample numbers are also expected to change as part of sampling investigation development as refinements between chemical use and SU data needs are identified, overlaps in data requirements between adjacent areas are determined, and the final evaluation of data to define extent of contamination is made.

### 5.1.2 Radionuclides Gap Analysis Approach

For radionuclides, MARSSIM principles were adapted to determine statistically, the number of samples required for a human risk assessment and determining extent of contamination. For surface soil, the MARRSIM delineation used EUs and SUs as a basis for determining the number of required samples. Under MARSSIM, the total number of samples required per SU was statistically calculated based on SU classification. The screening of the existing data determined what portions of the existing data were usable to address the sample needs and the difference between the required data and available data became the data gap. To verify that the existing data were properly located for purposes of the EIS analyses, the distribution of the results was also reviewed. The MARSSIM analysis determined that approximately 600 samples would be required to define the extent of contamination for all SUs. Screening of samples and data gap determination for radionuclides was similar to that of the chemical COIs. The actual number of samples and the locations where the samples will be collected will be determined during development of the FSAP.

## 5.2 SSFL Area IV Gamma Walkover Survey

Gamma walkover surveys (GWS) are a part of the MARSSIM recommended site investigation approach for radionuclides. The GWS involves passing over the ground an instrument capable of detecting gamma emissions from radioactive materials. A GWS is performed as a field screening tool to locate areas with radionuclide contamination above background levels that then can be target areas for soil sampling. Nearly 100% of the accessible portions of Area IV have been subject to some level of ground survey in support of building removals. However, several of the surveys were not performed to MARSSIM guidelines or using recommended detection instrumentation. As part of the evaluation of existing data, reports describing the prior GWS were reviewed for compliance with MARSSIM principles. Areas with completed and acceptable surveys were identified. The data gap analysis then focused on the location of process areas where radioactive materials were used that lacked or had insufficient coverage. To date, MARSSIM-compliant walkover surveys have been completed for a total of about 10 acres. Although MARSSIM guidelines specify 100% coverage of impacted areas only (impacted areas are defined as locations with known or suspected radionuclide contamination), due to a level of uncertainty regarding past activities within Area IV overall, the recommendation from the data gap study is to perform a 100% GWS of all accessible portions of Area IV that lack MARSSIM compliant surveys.

## 5.3 Groundwater

To determine groundwater COIs, existing groundwater data were sorted by detected COIs and screened against human health MCLs (background data for groundwater do not exist) and analytical detection limits compared to the MCLs. Based on the data base screening, tritium was the most frequently observed radionuclide and the solvents TCE, 1,2-DCE, and 1,1-DCE the chemicals most frequently observed.

The groundwater data gap evaluation then focused on the current extent of groundwater contamination, both vertically and horizontally. Included in this evaluation was a review of process and chemical use areas and locations where solvents were reported in soil gas. Locations where groundwater contamination extent did not appear to be bounded by the existing well network or where no wells are present to identify groundwater contamination were targeted as potential data gaps. Existing hydrolgeologic data were also reviewed for use in completing groundwater characterization for both nature and extent and for understanding aquifer properties necessary to evaluate groundwater cleanup alternatives in the EIS. Based on the reviews, the data gap analysis supported recommendations for site investigative well point, new monitoring wells, and collection of aquifer properties (bedrock and water chemistry) data. The proposed groundwater investigation will be refined during development of the FSAP.

## 5.4 Groundwater Seeps

Data collected at groundwater seeps can aid in determining the fate and transport of contaminants in groundwater and to assess the potential human health and ecological exposure pathways for the respective risk assessments. However, most seeps exhibit water during and immediately following the rainy season and thus data for seeps are limited. The requirement to sample seeps will be incorporated into the field sampling investigation designed to address the overall data gaps presented in this report. Therefore, all identified seep locations will be visited during the field program and sampled for radionuclide and chemical COIs should sufficient water be present. All seep locations will also be subject to a gamma walkover survey to assess the presence of any radionuclides above background.

## 5.5 Soil Vapor

Collection of additional soil vapor data will be a consideration for the field sampling investigation, particularly for the potential placement of monitoring wells. It is recognized that under the RFI program collection of additional soil gas samples is proposed. These data coupled with the overall needs for the data gap investigation as refined during the development of the FSAP will be used to determine specific needs for additional soil gas samples.

## 5.6 Surface Water

Surface water sampling for most site drainages is being conducted under the SSFL NPDES permit program. Data collected under the NPDES program is deemed sufficient for site characterization for the discharge points of Area IV. As noted under Section 5.8 – Ecological Receptors, there are internal Area IV drainages leading to ponds in other SSFL areas with limited or no data. If present during the field sampling program, surface water will be collected and analyzed for radionuclide and chemical COIs. Also, to collect data on the complete list of the data gap program COIs, NPDES monitoring points will also be sampled should sufficient rainfall occur during the field sampling investigation.

## 5.7 Sediment

Contamination extent associated with NPDES monitored drainages appears to be bounded by existing sample results. However, as discussed in Section 4.7, there are internal drainages to Area IV that lack sediment data. These drainages become a data gap and will require sampling for radionuclide and chemical COIs.

## 5.8 Ecological Receptors

Similar to the approach applied to soils for the human health risk assessment data evaluation, the existing data base was reviewed for chemical and radionuclide data collected from soil (0 to 2 feet, 2 to 4 feet, 4 to 6 feet), sediment, surface water, groundwater seep, sump soil, sump water, and soil gas. These data were screened by ecological receptor ESLs to determine if they were acceptable for use in the ERA. Laboratory detection limits for chemicals and radionuclides in a given medium were

screened to identify data meeting requirements for the ERA. Ecological EPECs were determined for any COI whose maximum concentration exceeded an ESL.

The ecological ESLs were also compared with human health PRGs to determine whether data proposed to be collected for the human health risk assessment would also be applicable to the ERA. This comparison was performed to prevent collection of duplicate data. This evaluation determined that the sampling effort proposed for the human health risk assessment would be sufficient for use and the ERA and the ERA data gap evaluation focused on data requirements for other media.

The evaluation of the other media for ERA purposes indicated chemical and radionuclide data are needed for on site drainages (water and sediment) and ponds that received runoff leaving Area IV (See **Figure 5-1**). Data for radionuclides are also needed from groundwater seeps downgradient from Area IV to assess this pathway and risk to ecological receptors.

Biological tissue data does not exist for Area IV. To address the ERA evaluation of COI uptake and bioaccumulation, the ecological data gap analysis identified a need to collect biological tissue samples. This includes the need to analyze biota tissue samples with a full range of chemical and radionuclide COIs. At total of 10 samples per biological media are recommended. These include terrestrial and aquatic plant, terrestrial and aquatic invertebrate, fish, and small mammal samples.

As with the proposed soil and groundwater field sampling investigation to address their respective data gaps, the data requirements for the ERA will be described in the FSAP. Refinements to the data needs for the ERA will be identified during the development of the FSAP.

## 5.9 Air

The review of air monitoring data indicates that sufficient ambient data exist for Area IV. To assess risks for the EIS relative to decommissioning and demolishing of buildings and removal of soil, building data and soil data collected during the proposed field sampling investigation will be used. Therefore no additional air sampling is proposed at this time. This finding does not include the possible need to sample air in the breathing zone of site workers involved in the field sampling investigation.

## 5.10 Buildings

Existing reports were reviewed to evaluate the history of use and investigation of remaining site buildings. This review determined that a limited data gap exists. This data gap consists of a need for building surface contamination data (i.e., fixed point measurements, radiological scan surveys, and removable contamination data) for about 12 buildings. In addition, isotopic ratios to be applied to contaminant levels as an integral part of the preparation of human health risk assessments are not generally

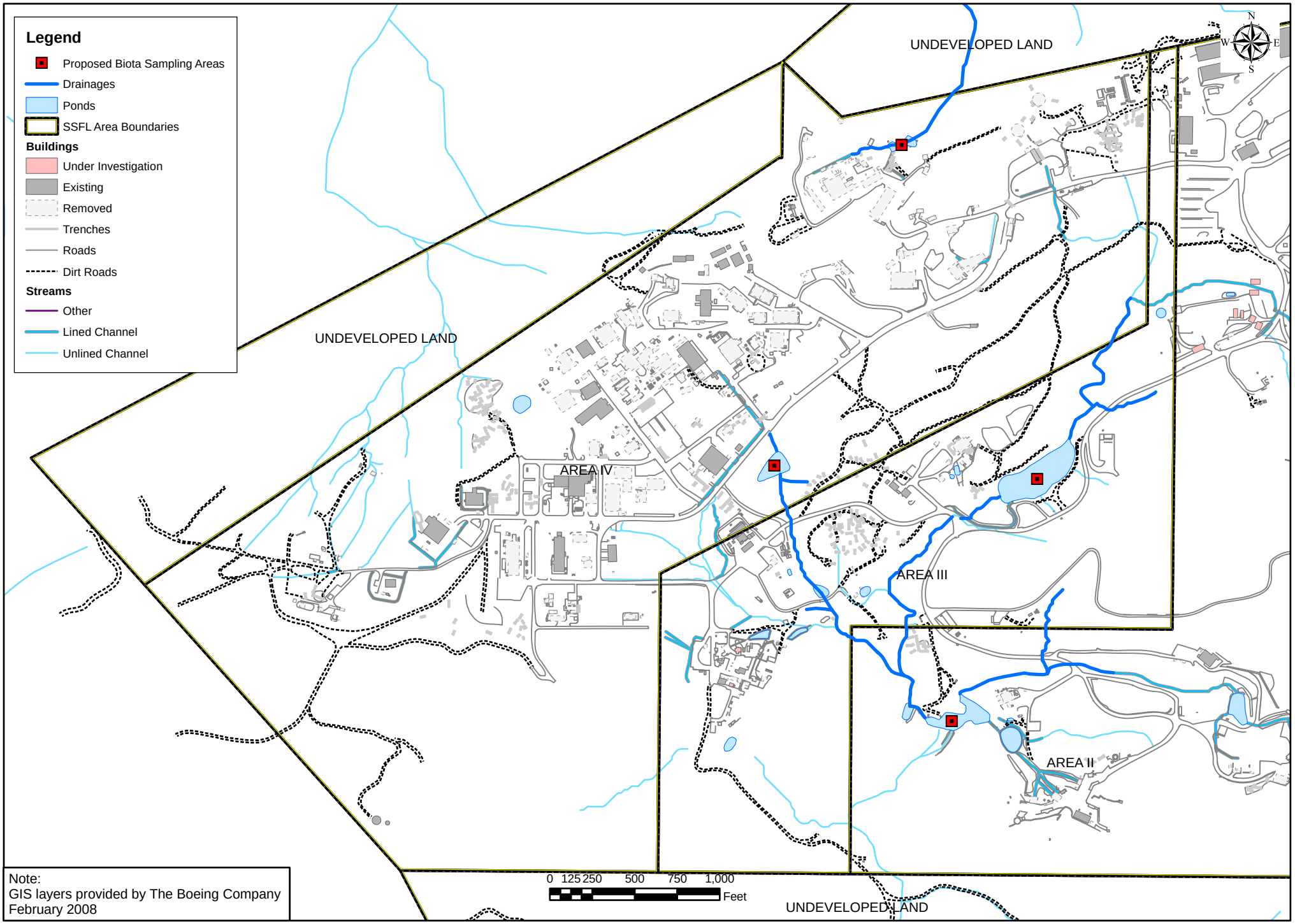
available for remaining buildings. The buildings to be sampled and sampling protocols will be specified in the FSAP.

## 5.11 Background Values

Background values for metals and dioxin in soil have been agreed upon by regulatory agencies for SSFL, although there is not a similar set of background values for subsurface soil. The radionuclide background used for this data gap analysis was based on existing offsite surface soil data. These data may be useful for establishment of agreed upon future radionuclide background values. However, establishment of separate background values for each of the two geological formations is desirable and additional surface soil data may be useful for that purpose. Also, there currently is no background data for radionuclides at depth for near surface and subsurface soils, sediment, rocks, surface water, and groundwater. Therefore, the data gaps include additional background sample analysis for radionuclides and chemicals for these matrices.

## 5.12 Bedrock

The data gap analysis of bedrock samples determined that very little bedrock data has been collected to date for chemical and radionuclide COI characterization. In addition, bedrock aquifer properties are needed for groundwater cleanup remedy evaluations. Therefore bedrock data are a data gap for completing Area IV site characterization. Bedrock samples will be required at locations where chemical and radionuclide vertical extent of contamination is needed and from borings for wells drilled into bedrock. The locations and evaluations of bedrock samples will be described in the FSAP.




CDM

Santa Susana Field Laboratory Area IV
Ventura County, California

Figure 5-1
Internal Drainages and Ponds Considered
for Biota Sampling Program

# Section 6
# References

### Section 1 References

California State Senate, 2007. Hazardous Waste: Santa Susana Field Laboratory. SB 990, Chapter 729, October 14.

CAOHP (California Office of Historic Preservation), 2008, *Burro Flats Painted Cave*, Accessed at: http://ohp.parks.ca.gov/listed_resources/default.asp?num=N412, April 2.

DOE (U.S. Department of Energy), 2002. *Draft Environmental Assessment for Cleanup and Closure of the Energy Technology Engineering Center,* DOE/EA-1345, Oakland Operations Office, Oakland, CA, January.

DOE (U.S. Department of Energy), 2003. *Final Environmental Assessment for Cleanup and Closure of the Energy Technology Engineering Center,* DOE/EA-1345, National Nuclear Security Administration Service Center, Oakland, CA, March.

DOE (U.S. Department of Energy), 2006. *American Indian & Alaska Native Tribal Government Policy*, DOE Notice 144.1, October 20.

DOE/EPA/NRC/DOD (U.S. Department of Energy, U.S. Environmental Protection Agency, U.S. Nuclear Regulatory Commission, and U.S. Department of Defense), 2000. *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) Rev. 1*, DOE/EH-0624, Rev. 1; EPA 402-R-97-016, Rev. 1; NUREG-1575, Rev. 1; Washington, DC, August.

DTSC (California Department of Toxic Substances Control), 2008, *Draft Department of Toxic Substances Control Santa Susana Field Laboratory Ventura County, California Public Participation Plan*, *California Environmental Protection Agency, Chatsworth, CA.*

DTSC/Boeing/NASA/DOE (California Department of Toxic Substances Control, The Boeing Company, National Aeronautics and Space Administration, U.S. Department of Energy), 2007. Santa Susana Field Laboratory, Simi Hills, Ventura County, California. Consent Order for Corrective Action, Docket No. P3-07-08-003, August 16.

MWH (Montgomery Watson Harza Americas, Inc.), 2005a. "Soil Background Report, Santa Susana Field Laboratory, Ventura County, California," Appendix D in *Standardized Risk Assessment Methodology (SRAM) Work Plan, Santa Susana Field Laboratory, Ventura County, California, Revision 2, Final*, Pasadena, CA, September.

MWH (Montgomery Watson Harza Americas, Inc.), 2005b. *Standardized Risk Assessment Methodology (SRAM) Work Plan, Santa Susana Field Laboratory, Ventura County, California, Revision 2, Final*, Pasadena, CA, September.

NMFS (National Marine Fisheries Service), 2008, *Endangered Species Act (ESA)*, Office of Protected Resources, Accessed at: http://www.nmfs.noaa.gov/pr/laws/esa/.

Rowe, C., 2008, *Burro Flats and other Chumash Sites*, Email to B. Jameson, The Boeing Company, March 28.

USFWS (U.S. Fish and Wildlife Service), 2008, *Digest of Federal Resource Laws of Interest to the U.S. Fish and Wildlife Service*, Accessed at: http://www.fws.gov/laws/lawsdigest/esact.html.

***Federal Register***

U.S. Department of Energy, 2003. "Finding of No Significant Impact: Cleanup and Closure of the Energy Technology Engineering Center," March 31.

***United States Code***

16 U.S.C. 1531 *et seq.*, Endangered Species Act of 1973.

33 U.S.C. 1251 *et seq.*, Clean Water Act of 1972.

42 U.S.C. 300(f) *et seq.*, Safe Drinking Water Act of 1974.

42 U.S.C. 2011 *et seq.*, Atomic Energy Act of 1954.

42 U.S.C. 4321 *et seq.*, National Environmental Policy Act of 1969.

42 U.S.C. 6901 *et seq.*, Resource Conservation and Recovery Act of 1976.

42 U.S.C. 9601 *et seq.*, Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980.

## Section 2 References

Cherry, J., D. McWhorter and B. Parker, 2007, *Overview of the Site Conceptual Model for the Migration and Fate of Contaminants in Groundwater at the Santa Susana Field Laboratory, Simi California*.

Boeing 2008, Groups 5 and 7 RFI Planning Documents provided electronically January 28, 2008.

CH2M Hill 2008, *Sampling and Analysis Plan for RFI Group 5, Santa Susana Field Laboratory, Ventura County, California*, February.

GRC (Groundwater Resource Consultants, Inc.), 1995. *Well Compendium*, 8640M-89C, Tucson, AZ, September 20.

GRC (Groundwater Resource Consultants, Inc.), 1999. *Annual Groundwater Monitoring Report, Santa Susana Field Laboratory, 1998*, Tucson, AZ, February 24.

MWH (Montgomery Watson Harza Americas, Inc.) 2004. *RCRA Facility Investigation Program Report, Surficial Media Operable Unit, Santa Susana Field Laboratory,* Ventura County, California, July.

MWH (Montgomery Watson Harza Americas, Inc.), 2004. *Report of Results: Phase I of Northeast Investigation Area Groundwater Characterization, Santa Susana Field Laboratory, Ventura County, California*, Pasadena, CA, September.

MWH (Montgomery Watson Harza Americas, Inc.), 2005. *Standardized Risk Assessment Methodology (SRAM) Work Plan, Santa Susana Field Laboratory, Ventura County, California, Revision 2, Final*, Pasadena, CA, September.

MWH (Montgomery Watson Harza Americas, Inc.), 2006. *Group 6 – Northeastern Portion of Area IV RCRA Facility Investigation Report, Santa Susana Field Laboratory, Ventura County, California*, Pasadena, CA, September.

MWH (Montgomery Watson Harza Americas, Inc.), 2007. *Geologic Characterization of the Central Santa Susana Field Laboratory, Ventura County, CA*, Walnut Creek, CA, August.

MWH (Montgomery Watson Harza Americas, Inc.), 2007. *Group 8 – Western Portion of Area IV, RCRA Facility Investigation Report, Santa Susana Field Laboratory, Ventura County, California,* Arcadia, California, September.

MWH/AMEC (Montgomery Watson Harza Americas, Inc. AMEC Earth & Environmental, Inc.), *Addendum to the Biological Conditions Report, Santa Susana Field Laboratory, Ventura County, California*, July 2003/September 2005.

Ogden (Ogden Environmental and Energy Services Co., Inc.), 1998. *Biological Conditions Report, Santa Susana Field Laboratory, Ventura County, California,* April.

Ogden (Ogden Environmental and Energy Services Co., Inc.), 2000. *Validation Sampling and Analysis Plan, Santa Susana Field Laboratory, Ventura County, California. Prepared for The Boeing Company, Rocketdyne Propulsion and Power, National Aeronautics and Space Administration, U.S. Department of Energy.* May

SAIC (Science Applications International Corporation), 1994. *Final RCRA Facility Assessment Report for Rockwell International Corporation, Rocketdyne Division, Santa Susana Field Laboratory, Ventura County, California*, TZ4-R09015-RN-M21460, San Francisco, CA, May.

**Section 3 References**

AI (Atomics International), 1960a, *Environmental Monitoring Report April 1, 1960 to June 30, 1960.*

AI (Atomics International), 1960b, *Environmental Monitoring Annual Report – 1959.*

AI (Atomics International), 1961a, *Environmental Monitoring Report January 1, 1961 to March 31, 1961.*

AI (Atomics International), 1961b, *Environmental Monitoring Report April 1, 1961 to June 30, 1961.*

AI (Atomics International), 1961c, *Environmental Monitoring Report July 1, 1961 to September 30, 1961.*

AI (Atomics International), 1961d, *Environmental Monitoring Report October 1, 1960 to December 31, 1960.*

AI (Atomics International), 1961e, *Environmental Monitoring Report Annual Summary – 1960.*

AI (Atomics International), 1962a, *Environmental Monitoring Report October 1, 1961 to December 31, 1961.*

AI (Atomics International), 1962b, *Environmental Monitoring Report Annual Summary – 1961.*

AMEC (AMEC Earth & Environmental, Inc.), 2005, Soil Background Report *Santa Susana Field Laboratory Ventura County, California - Final*

Baes, C. F., III, R.D. Sharp, A.L. Sjoreen, and R.W. Shor, 1984, *A Review and Analysis of Parameters for Assessing Transport of Environmentally Released Radionuclides through Agriculture*, ORNL-5786, Oak Ridge National Laboratory, Oak Ridge, Tennessee.

Boeing Company, 1999, *Site Environmental Report for Calendar Year 1998 DOE Operations at Rocketdyne Propulsion & Power.*

Boeing Company, 2000, *Site Environmental Report for Calendar Year 1999 DOE Operations at The Boeing Company Rocketdyne.*

Boeing Company, 2001, *Site Environmental Report for Calendar Year 2000 DOE Operations at The Boeing Company Rocketdyne Propulsion & Power.*

Boeing Company, 2002, *Site Environmental Report for Calendar Year 2001 DOE Operations at The Boeing Company Rocketdyne Propulsion & Power.*

Boeing Company, 2003, *Site Environmental Report for Calendar Year 2002 DOE Operations at The Boeing Company, Rocketdyne Propulsion & Power*.

Boeing Company, 2004, *Site Environmental Report for Calendar Year 2003 DOE Operations at The Boeing Company, Rocketdyne Propulsion & Power*.

Boeing Company, 2005, *Site Environmental Report for Calendar Year 2004 DOE Operations at The Boeing Company Santa Susana Field Laboratory*.

Boeing Company, 2006, *Site Environmental Report for Calendar Year 2005 DOE Operations at The Boeing Company Santa Susana Field Laboratory*.

Boeing Company, 2007, *Site Environmental Report for Calendar Year 2006 DOE Operations at The Boeing Company Santa Susana Field Laboratory*.

Cherry, J., D. McWhorter and B. Parker, 2007, *Overview of the Site Conceptual Model for the Migration and Fate of Contaminants in Groundwater at the Santa Susana Field Laboratory, Simi California*.

DOE Order 5400.1, *General Environmental Protection Program*, January 15, 1990.

DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, January 7, 1993.

DOE (U.S. Department of Energy), 2002, *A Graded Approach for Evaluating Radiation Doses to Aquatic and Terrestrial Biota*, DOE-STD-1153-2002, July.

DOE/EPA/NRC/DOE (U.S. Department of Energy, U.S. Environmental Protection Agency, U.S. Nuclear Regulatory Commission, and U.S. Department of Defense), 2000. *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) Rev. 1, DOE/EH-0624, Rev.1; EPA 402-R-97-016, Rev. 1; NUREG-1575, Rev. 1;* Washington, DC, August.

Eckerman, K.F. and J.C. Ryman, 1993, *External Exposure to Radionuclides in Air, Water, and Soil.* Federal Guidance Report No. 12, U.S. Environmental Protection Agency, Washington, DC.

Eckerman, K.F., A.B. Wolbarst and A.C.B. Richardson, 1988, *Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors for Inhalation, Submersion, and Ingestion*, Federal Guidance Report No. 11, U.S. Environmental Protection Agency, Washington, DC.

EPA (U.S Environmental Protection Agency), 1991, *Risk Assessment Guidance for Superfund: Volume I, Human Health Evaluation Manual (Part B, Development of Risk-based Preliminary Remediation Goals)*, EPA 540-R-92-003, December.

EPA (U.S. Environmental Protection Agency), 1994a, *Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, EPA 540-R-94-013, February.

EPA (U.S Environmental Protection Agency), 1994b, *Radiation Site Cleanup Regulations: Technical Support Document for the Development of Radiation Cleanup Levels for Soil*, EPA 402-R-96-011 A, September.

EPA (U.S. Environmental Protection Agency), 1995, *Revised Region 3 BTAG Screening Values*.

EPA (U.S Environmental Protection Agency), 1999a, *Cancer Slope Coefficients for Environmental Exposure to Radionuclides*, Federal Guidance Report No. 13, EPA 402-R-99-001, Air and Radiation, September.

EPA (U.S. Environmental Protection Agency), 1999b, *Contract Laboratory National Functional Guidelines for Organic Data Review*, EPA 540-R-99-008, October.

EPA (U.S. Environmental Protection Agency), 1999c, *Screening-Level Ecological Risk Assessment Protocol for Hazardous Waste Combustion Facilities, Vol. III*, EPA 530-D-99-001C, November.

EPA (U.S. Environmental Protection Agency), 2001, *Supplemental Guidance to RAGS: Region 4 Bulletins, Ecological Risk Assessment*, Accessed at: http://www.epa.gov/region4/waste/ots/ecolbul.htm#tbl1.

EPA (U.S. Environmental Protection Agency), 2003a, *Guidance for Developing Ecological Soil Screening Levels,* Office of Solid Waste and Emergency Response Directive 9285.7-55, November.

EPA (U.S. Environmental Protection Agency), 2003b, *Region 5 RCRA Ecological Screening Levels*, Accessed at: http://www.epa.gov/reg5rcra/ca/ESL.pdf.

EPA (U.S. Environmental Protection Agency), 2006a, *National Recommended Water Quality Criteria 2006,* Office of Water, Office of Science and Technology (4304T), May.

EPA (U.S. Environmental Protection Agency), 2006b, *Region 3 BTAG Freshwater Screening Benchmarks*, Accessed at: http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fw/R3_BTAG_FW_Benchmarks_07-06.pdf, April 3.

EPA (U.S. Environmental Protection Agency), 2006c, *Region 3 BTAG Freshwater Sediment Screening Benchmarks*, Accessed at: http://www.epa.gov/reg3hwmd/risk/eco/btag/sbv/fwsed/R3_BTAG_FW_Sediment_Benchmarks_8-06.pdf, April 3.

EPA (U.S Environmental Protection Agency), 2008, *Preliminary Remediation Goals for Radionuclides*, Accessed at: http://epa-prgs.ornl.gov/cgi-bin/radionuclides/rprg_search, April 3.

Friday, G.P., 1998, *Ecological Screening Values for Surface Water, Sediment, and Soil*, WSRC-TR-98-00110.

Garcia, R.R. and C.J. Schwering, 1965, *Environmental Monitoring Semiannual Report January 1, 1965 to June 30, 1965.*

Garcia, R.R., J.D. Moore, and C.J. Schwering, 1964, *Environmental Monitoring Semiannual Report January 1, 1964 to June 30, 1964.*

Garcia, R.R., J.D. Moore, and C.J. Schwering, 1965, *Environmental Monitoring Semiannual Report July 1, 1964 to December 31, 1964 and Annual Report 1964.*

IAEA (International Atomic Energy Agency), 1992, *Effects of Ionizing Radiation on Plants and Animals at Levels Implied by Current Radiation Protection Standards*, Report 332.

ICF (ICF Kaiser Engineers), 1997, *Former Sodium Disposal Facility Santa Susana Field Laboratory Characterization Report*.

ICRP (International Commission on Radiological Protection), 1991, *Recommendations of the International Commission on Radiological Protection*. ICRP Publication 60, Pergamon Press, New York.

McLaren/Hart, 1993, *Multi-Media Sampling Report for the Brandeis-Bardin Institute and the Santa Monica Mountains Conservancy.*

Moore, J.D., 1966, *Environmental Monitoring Semiannual Report January 1, 1966 to June 30, 1966.*

Moore, J.D., 1967a, *Environmental Monitoring Semiannual Report July 1, 1966 to December 31, 1966 and Annual Report 1966.*

Moore, J.D., 1967b, *Environmental Monitoring Semiannual Report January 1, 1967 to June 30, 1967.*

Moore, J.D., 1968a, *Environmental Monitoring Semiannual Report July 1, 1967 to December 31, 1967 and Annual Report 1967.*

Moore, J.D., 1968b, *Environmental Monitoring Semiannual Report January 1, 1968 to June 30, 1968.*

Moore, J.D., 1969a, *Environmental Monitoring Semiannual Report July 1, 1968 to December 31, 1968 and Annual Report 1968.*

Moore, J.D., 1969b, *Environmental Monitoring Semiannual Report January 1, 1969 to June 30, 1969.*

Moore, J.D., 1970a, *Environmental Monitoring Semiannual Report July 1, 1969 to December 31, 1969 and Annual Report 1969.*

Moore, J.D., 1970b, *Environmental Monitoring Semiannual Report January 1, 1970 to June 30, 1970.*

Moore, J.D., 1971a, *Environmental Monitoring Semiannual Report July 1, 1970 to December 31, 1970 and Annual Report 1970.*

Moore, J.D., 1971b, *Environmental Monitoring Semiannual Report January 1, 1971 to June 30, 1971.*

Moore, J.D., 1972, *Environmental Monitoring Semiannual Report July 1, 1972 to December 31, 1972 and Annual Report 1972.*

Moore, J.D., 1973, *Environmental Monitoring Annual Report – 1972.*

Moore, J.D., 1974, *Environmental and Radioactive Effluent Monitoring Annual Report – 1973.*

Moore, J.D., 1975 *Atomics International Environmental Monitoring and Facility Effluent Annual Report – 1974.*
Moore, J.D., 1976 *Atomics International Environmental Monitoring and Facility Effluent Annual Report – 1975.*

Moore, J.D., 1977 *Atomics International Environmental Monitoring and Facility Effluent Annual Report – 1976*.

Moore, J.D., 1978 *Atomics International Environmental Monitoring and Facility Effluent Annual Report – 1977*.

Moore, J.D., 1979 *Energy Systems Group Environmental Monitoring and Facility Effluent Annual Report – 1978*.

Moore, J.D., 1980 *Energy Systems Group Environmental Monitoring and Facility Effluent Annual Report – 1979*.

Moore, J.D., 1981 *Energy Systems Group Environmental Monitoring and Facility Effluent Annual Report – 1980*.

Moore, J.D., 1982 *Energy Systems Group Environmental Monitoring and Facility Effluent Annual Report – 1981*.

Moore, J.D., 1983 *Energy Systems Group Environmental Monitoring and Facility Effluent Annual Report – 1982*.

Moore, J.D., 1984 *Energy Systems Group Environmental Monitoring and Facility Effluent Annual Report – 1983*.

Moore, J.D., 1986, *Rocketdyne Division Environmental Monitoring and Facility Effluent Annual Report De Soto and Santa Susana Field Laboratories Sites – 1985*.

Moore, J.D., 1987, *Rocketdyne Division Environmental Monitoring and Facility Effluent Annual Report De Soto and Santa Susana Field Laboratories Sites – 1986*

Moore, J.D., 1988, *Rocketdyne Division Environmental Monitoring and Facility Effluent Annual Report De Soto and Santa Susana Field Laboratories Sites – 1987*.

Moore, J.D., 1989, *Rocketdyne Division Environmental Monitoring and Facility Effluent Annual Report De Soto and Santa Susana Field Laboratories Sites – 1988*.

Moore, J.D., 1990, *Rocketdyne Division Environmental Monitoring and Facility Effluent Annual Report De Soto and Santa Susana Field Laboratories Sites – 1989*.

Moore, J.D. and P.A. Rowe, 1963, *Environmental Monitoring Semiannual Report July 1, 1962 to December 31, 1962 and Annual Report 1962*.

Moore, J.D. and P.A. Rowe, 1964, *Environmental Monitoring Semiannual Report July 1, 1963 to December 31, 1963 and Annual Report 1963.*

Moore, J.D. and C.J. Schwering, 1966, *Environmental Monitoring Semiannual Report July 1, 1965 to December 31, 1965 and Annual Report 1965.*

Moore, J.D., W.L. Fisher and P.A. Rowe, 1962, *Environmental Monitoring Semiannual Report January 1, 1962 to June 30, 1962.*

Moore, J.D., W.L. Fisher and P.A. Rowe, 1963, *Environmental Monitoring Semiannual Report January 1, 1963 to June 30, 1963.*

MWH (Montgomery Watson Harza Americas, Inc.), 2004, *RCRA Facility Investigation Program Report Surficial Media Operable Unit Santa Susana Field Laboratory Ventura County, California.*

MWH (Montgomery Watson Harza Americas, Inc.), 2005, *Standardized Risk Assessment Methodology (SRAM) Work Plan Santa Susana Field Laboratory Ventura County, California, Revision 2 - Final*.

MWH (Montgomery Watson Harza Americas, Inc.), 2006, *Group 6 – Northeastern Portion of Area IV RCRA Facility Investigation Report Santa Susana Field Laboratory Ventura County, California*.

MWH (Montgomery Watson Harza Americas, Inc.), 2007, *Group 8 – Western Portion of Area IV RCRA Facility Investigation Report Santa Susana Field Laboratory Ventura County, California.*

MWH/AMEC (Montgomery Watson Harza Americas, Inc. and AMEC Earth & Environmental, Inc.), 2005, *Addendum to the Biological Conditions Report Santa Susana Field Laboratory Ventura County, California.*

NCRP (National Council on Radiation Protection and Measurements), 1991, *Effects of Ionizing Radiation on Aquatic Organisms*. NCRP Report No. 109, NCRP, Bethesda, Maryland.

Ogden (Ogden Environmental and Energy Services Co., Inc.), 1996, *RCRA Facility Investigation Work Plan Addendum Santa Susana Field Laboratory Ventura County, California.*

Ogden (Ogden Environmental and Energy Services Co., Inc.), 1998a, *Bell Canyon Area Soil Sampling Report Ventura County, California.*

Ogden (Ogden Environmental and Energy Services Co., Inc.), 1998b, *Biological Conditions Report Santa Susana Field Laboratory Ventura County, California.*

Ogden (Ogden Environmental and Energy Services Co., Inc.), 2000, *Validation Sampling and Analysis Plan Santa Susana Field Laboratory Ventura County, California.*

Rocketdyne Division of Boeing North American, Inc., 1997, *Rocketdyne Propulsion & Power DOE Operations Annual Site Environmental Report – 1996.*

Rocketdyne Division of Boeing North American, Inc., 1998, *Rocketdyne Propulsion & Power DOE Operations Annual Site Environmental Report – 1997.*

Rockwell Aerospace, 1995, *Rocketdyne Division Annual Site Environmental Report Santa Susana Field Laboratory and De Soto Sites 1994.*

Rockwell Aerospace, 1996, *Rocketdyne Division Annual Site Environmental Report Santa Susana Field Laboratory and De Soto Sites 1995.*

Rockwell International, 1985, *Rocketdyne Division Environmental Monitoring and Facility Effluent Annual Report De Soto and Santa Susana Field Laboratories Sites - 1984.*

Rockwell International, 1991, *Rocketdyne Division Environmental Monitoring Annual Report Santa Susana Field Laboratory, De Soto, and Canoga Sites 1990.*

Rockwell International, 1992, *Rocketdyne Division Annual Site Environmental Report Santa Susana Field Laboratory and De Soto Sites 1991.*

Rockwell International, 1993, *Rocketdyne Division Environmental Report Santa Susana Field Laboratory and De Soto Sites 1992.*

Rockwell International, 1994, *Rocketdyne Division Annual Site Environmental Report Santa Susana Field Laboratory and De Soto Sites 1993.*

SAIC (Science Applications International Corporation), 1994, *Final RCRA Facility Assessment (RFA) Report Santa Susana Field Laboratory Ventura County, California.*

Sapere Consulting, Inc., 2005, *Historical Site Assessment of Area IV Santa Susana Field Laboratory Ventura County, California.*

Van den Berg, et al. 1998. Toxic Equivalency Factors (TEFs) for PCBs, PCDDs, PCDFs for Humans and Wildlife. *Environmental Health Perspectives*, 106:775-792.

Zach, R. 1985. Contribution of Inhalation by Food Animals to Man's Ingestion Dose. *Health Physics.* 49: 737-745.

**Section 4 References**

Cabrera (Cabrera Services, Inc.), 2006, *Final Status Survey Report: Characterization and Final Status Survey Radioactive Materials Handling Facility Perimeter*, March.

Cabrera (Cabrera Services, Inc.), 2007, *Final Status Survey Report: Final Status Survey Post Historical Site Assessment Sites, Block 1.*

Cabrera (Cabrera Services, Inc.), 2007, *Characterization and Final Status Survey Report: Radioactive Materials Handling Facility Holdup Pond,* March.

DOE/EPA/NRC/DOE (U.S. Department of Energy, U.S. Environmental Protection Agency, U.S. Nuclear Regulatory Commission, and U.S. Department of Defense), 2000. *Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) Rev. 1, DOE/EH-0624, Rev.1; EPA 402-R-97-016, Rev. 1; NUREG-1575, Rev. 1;* Washington, DC, August.

ETEC (Energy Technology Engineering Center), 1996, *Area IV Radiological Characterization Survey – Final Report*, A4CM-ZR-0011, August.

ETEC (Energy Technology Engineering Center), 1999, *Area 4064 Final Status Survey Report*, A(R21-RF) RS-00003, April.

MWH (Montgomery Watson Harza Americas, Inc.), 2005, *Standardized Risk Assessment Methodology (SRAM) Work Plan Santa Susana Field Laboratory Ventura County, California, Revision 2 – Final*, September.

MWH/AMEC (Montgomery Watson Harza Americas, Inc. and AMEC Earth & Environmental, Inc.), 2005, *Addendum to the Biological Conditions Report Santa Susana Field Laboratory Ventura County, California.*

MWH. 2007. Work Plan Phase 3 Groundwater Site Conceptual Model, Santa Susana Field Laboratory. June.

Ogden (Ogden Environmental and Energy Services Co., Inc.), 1998, *Biological Conditions Report Santa Susana Field Laboratory Ventura County, California.*

ORAU (Oak Ridge Associated Universities), 1986, *Confirmatory Radiological Survey of the L-85 Reactor Facility Final Report Rocketdyne Division Rockwell International Corporation Santa Susana, California*, December.

Sapere Consulting, Inc., 2005, *Historical Site Assessment of Area IV Santa Susana Field Laboratory Ventura County, California*, May.

CDM a Joint Venture with SAIC & DSO

# Area IV Santa Susana Field Laboratory

## Environmental Impact Statement (Area IV SSFL EIS)

### Appendices

Subject: **Task Order: DE-AT30-08CC60021/ET17**
**Draft Gap Analysis Report**

Deliverable Number: 02
Submitting to: Dave Hincks, DCO
Submitted by: John Wondolleck
Submittal Date: June 1, 2008

Prepared by: John Wondolleck
Distributed to: David Hincks, DCO
Stephanie G. Jennings, DCOR

Office Of Environmental Management
safety ❖ performance ❖ cleanup ❖ closure

# Appendix A

# SSFL Area IV
# General Chemical Use Overview

# Appendix A
# SSFL Area IV General Chemical Use Overview

Appendix A contains the table, *SSFL Area IV General Chemical Use Overview*. This table provides a crosswalk of Solid Waste Management Units (SWMUs) and Areas of Concern (AOCs) that are being addressed under the Santa Susana Field Laboratory (SSFL) Resource Conservation and Recovery Act (RCRA) Corrective Action Program and their corresponding exposure unit location, which will be evaluated for the SSFL Area IV Environmental Impact Statement (EIS). A general description of operations and chemical uses for each of the SWMUs/AOCs is also provided, however, the table does not detail all chemical use areas within SSFL Area IV. The reader should refer to specific documents supporting the SSFL RCRA Corrective Action Program (e.g., RCRA Facility Assessment Report [SAIC, 1994], published RCRA Facility Investigation (RFI) reports, etc.) for additional information related to historic operations and chemical uses in SSFL Area IV.

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-01 | SWMU 7.4 | Old Conservation Yard (OCY) [DOE] | <u>Storage Areas</u><br>• Operational from early 1960s to early 1980s; OCY used for storage (five areas) of salvageable materials; storage and pumping of diesel fuel oil; debris areas containing construction debris and empty containers (5-gallon cans and 55-gallon drums) or storage of burned telephone poles; transformers<br>• Former Rocketdyne Conservation Yard<br>• Former Atomics International (AI) Conservation Storage Yard<br>• Former North Slope Storage Area<br>• Former Container Storage Area<br>• Hundreds of drums stored during 1970s<br>• Soil samples collected in 1988 showed up to 4,000 mg/kg hydrocarbons, 6 mg/kg methylene chloride, and 7.1 mg/kg vinyl chloride; $^{137}$Cs found up to 200 pCi/g<br>• Four metal containers of radiologically contaminated dirt excavated in 1989 |
| EU-01 | SWMU 7.4 | Old Conservation Yard (OCY) [DOE] | <u>Fueling Areas</u><br>• Former Fueling Area at Bldg. 4320 (pump house)<br>• 20,000-gallon fuel oil/diesel UST (UT-28); removed in 1988 (clean closure)<br>• Two 1.5-million gallon capacity diesel fuel oil ASTs surrounded by 6- to 13-ft high earthen berms – AST 4731 built in 1977 and AST 4732 built in 1981; both tanks were removed in 1999<br>• 400 gallons of diesel fuel were spilled adjacent to UT-28 in 1982; impacted soils were excavated to a depth of 4-5 ft below ground surface in a natural depression east of Bldg. 4320; soil contaminated with 4,000 ppm hydrocarbons in the heavy oil range (C22 – C40) detected within the excavation<br>• Piping from 1.25 million gallon diesel product tanks was removed; underlying; 100 cu. yards of soil excavated during tank removal |
| EU-01 | SWMU 7.4 | Old Conservation Yard (OCY) [DOE] | <u>Debris Areas (Southeast OCY)</u><br>• Former Telephone Pole Storage Area<br>• Northern and Southern Debris Areas |
| EU-01 | SWMU 7.4 | Old Conservation Yard (OCY) [DOE] | <u>Debris Area (North Slope)</u><br>• North Slope Debris Area “A”; PCBs were detected at 24,000 ppm<br>• North Slope Debris Area “B” |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-01 | SWMU 7.4 | Old Conservation Yard (OCY) [DOE] | Transformer Areas<br>• Southeast Transformer Area<br>• Transformer Area 4737 |
| EU-01 | SWMU 7.4 | Old Conservation Yard (OCY) [DOE] | Downslope Drainage Areas<br>• Former SRE Pond Discharge Pipeline<br>• Topographic Low Spot, Downslope Area |
| EU-02 | SWMU 7.8 | New Conservation Yard (NCY) [Boeing] | New Construction Yard<br>• Began operation in 1978 for storage of used nonhazardous equipment and drums prior to their potential salvage; a low-background alpha/beta counting laboratory; and document incineration<br>• Stained soil and a potential asbestos gasket observed during VSI<br>• May 1988 DOE survey indicated small areas of visible stained soil and dead vegetation<br>• Soil samples collected in 1988 indicated toluene contamination at 0.11 mg/kg at the 1-1.5 ft level |
| EU-02 | SWMU 7.8 | New Conservation Yard (NCY) [Boeing] | Ash Pile |
| EU-03 | Area IV AOC | Sodium Reactor Experiment (SRE) Complex Area [Boeing] | SCE Steam Power Plant<br>• Located approx. 1,000 ft northeast of Bldg. 4143<br>• Site was used for nuclear power reactor and supporting operations; Southern California Edison (SCE) power plant operations; hot oil/sodium component cleaning;<br>• Sampling conducted in 1992 detected $^{137}$Cs (0.24 – 0.30 pCi/g [dry]) and $^{90}$Sr (0.08 – 0.09 pCi/g [dry]); gross beta activity was detected in a surface water sample at 4.9 pCi/L |
| EU-03 | Area IV AOC | Sodium Reactor Experiment (SRE) Complex Area [Boeing] | Building 4003 Leach Field (AI-Z1) |
| EU-03 | Area IV AOC | Sodium Reactor Experiment (SRE) Complex Area [Boeing] | Transformer Areas<br>• Transformer Area 4963<br>• Transformer Area (South of Bldg. 4003) |
| EU-03 | Area IV AOC | Sodium Reactor Experiment (SRE) Complex Area [Boeing] | Oil Stain (at Building 4003) |
| EU-03 | Area IV AOC | Sodium Reactor Experiment (SRE) Complex Area [Boeing] | Downslope Drainage and Pond Areas<br>• SRE Pond Influent Channels (lined)<br>• SRE Pond<br>• Drainage Downslope of SRE Pond |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-04 | SWMU 7.2 | Hazardous Waste Management Facility (HWMF) [DOE] | Buildings 4133 and 4654<br>• Built in 1978 originally as a drum storage yard<br>• Equipment stored in area during 1960s and 1970s<br>• RCRA permit issued by DHS in December 1983<br>• Designed for reaction of waste materials containing metallic sodium as well as wastes containing impurities such as sodium-potassium (NaK) alloys and hydrides and alkali metals<br>• Drainage from scrubber (NaOH) went to a UST that was removed in 1987<br>• Soil samples collected in 1988 showed gross beta up to 51.6 pCi/g, Na up to 6,900 mg/kg, and K up to 11,000 mg/kg; pH high in soil<br>• Groundwater (1990) high in Na and K<br>• Freon and chlorinated solvents |
| EU-04 | Area IV AOC | DOE Leach Fields 1 [DOE] | Buildings 4030/4035<br>• Used as a counting room and workshop, purchasing office, traffic, warehousing, and shipping and receiving; housed the Van de Graff accelerator 1960-1966<br>• Documented spills of diesel, sodium chromate, and nickel chloride<br>• Chemical usage: diesel fuel, metals (incl. hexavalent chromium), and other inorganic compounds |
| EU-04 | Area IV AOC | DOE Leach Fields 1 [DOE] | Building 4030 Leach Field (AI-Z3)<br>• Received sanitary waste from Bldg. 4030/4035<br>• Assumed to have same chemical uses as Bldg. 4030/4035 |
| EU-04 | Area IV AOC | DOE Leach Fields 1 [DOE] | Building 4073 Kinetics Experiment Water Boiler (KEWB) Reactor Test Building<br>• Decontaminated in 1968 and removed in 1975<br>• Chemical usage: uranyl sulfate (fuel) |
| EU-04 | Area IV AOC | DOE Leach Fields 1 [DOE] | Building 4074<br>• Built in 1958 and used as an X-ray film processing facility for KEWB; later used as a storage area; demolished in 1995<br>• Chemical usage: metals |
| EU-04 | Area IV AOC | DOE Leach Fields 1 [DOE] | Building 4083 Reactor Kinetics Control Building |
| EU-04 | Area IV AOC | Building 4064 Leach Field [DOE] | Building 4064 Leach Field (AI-Z2) |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-04 | Area IV AOC | DOE Leach Fields 1 [DOE] | Building 4093<br>• Used as a reactor building between 1956 and 1980 for the L-85 Reactor (also known as the AE-6 Reactor and the Water Boiler Neutron Source Reactor), for reactor operator training, and as a neutron source; later used for storage<br>• Reactor fuel consisted of a highly enriched uranyl sulfate dissolved in water and contained in a spherical graphite-reflected stainless steel core<br>• Three incidents of possible releases: 1959 (fission gas release to air), 1982 (U-235 contaminated rinse water released to floor and concrete shield block), and 1995 (radioactive HEPA filter found in pile of debris) |
| EU-04 | Area IV AOC | DOE Leach Fields 1 [DOE] | Building 4093 Leach Field<br>• Leach field received sanitary waste from Bldg. 4093 until 1961; leach field was removed in 1999<br>• Chemical usage: metals<br>• Previous sampling detected metals at concentrations below screening levels; no further investigation is required for metals |
| EU-04 | Area IV AOC | DOE Leach Fields 1 [DOE] | Building 4103 Reactor Kinetics Lab and Storage |
| EU-04 | Area IV AOC | DOE Leach Fields 1 [DOE] | Building 4123<br>• Used for temporary storage of radiological waste material |
| EU-04 | Area IV AOC | DOE Leach Fields 1 [DOE] | Building 4453 Neutron Radiography<br>• Used for neutron radiography and reactor fuel (uranyl sulfate) handling |
| EU-04 | Area IV AOC | DOE Leach Fields 1 [DOE] | Building 4641<br>• Used for shipping and receiving, including radiological materials through 1985<br>• Very small quantities of mercury (0.1 gal.) were released in 1996 and 1997<br>• Chemical usage: solvents (temporarily stored at bldg. before being delivered to other buildings) and metals |
| EU-04 | Area IV AOC | DOE Unaffiliated Features [DOE] | Building 4037<br>• Chemical usage: 1,4-dioxane, diesel, hydraulic oil, waste oils, and metals |
| EU-04 | Area IV AOC | DOE Leach Fields 1 [DOE] | Substation Area<br>• Located north of Bldg. 4641<br>• Chemical usage: PCBs |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-05 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | Coal Storage Area<br>• Chemical usage: solvents, oil, PCBs, metals, and waste construction debris (incl. asbestos) |
| EU-05 | SWMU 7.11 | Building 4029 Reactive Metal Storage Yard [DOE] | • RCRA-permitted, bermed, and concrete-based container storage area for radioactive, reactive (sodium metal, lithium hydride), and mixed wastes<br>• Underground cold traps contain sodium metal |
| EU-05 | Area IV AOC | Southeast Drum Storage Yard [Boeing] | Southeast Drum Storage Yard<br>• 50-100 drums stored in this area in the early 1960s; remained operational until 1968<br>• Drums may have been associated with the Apollo Program |
| EU-05 | Area IV AOC | DOE Leach Fields 1 [DOE] | Transformer Pole<br>• Three transformers located at the intersection of G and 11 Streets (A305)<br>• Chemical usage: PCBs |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-06 | SWMU 7.6 | Radioactive Materials Handling/Disposal Facility (RMHF) [DOE] | • Handling, treatment, and storage of high-activity and low-level radioactive wastes and materials (U, $^{137}$Cs, $^{90}$Sr, $^{85}$Kr, $^{147}$Pm, and Pu); mixed wastes include mercury, TRU lead, sodium, and ethylene glycol<br>• Bldg. 4021 – 200-gal UST for rinse water removed in 1972 and associated piping removed in 1985/1986; radioactive spill occurred outside Bldg. 21; 5-gal container of metallic sodium in storage during VSI<br>• Bldg. 4022 – storage facility for high-level radioactive materials/waste and mixed waste; contains 8,000-gal UST; revised Part A Appl. submitted in 1989; 2-L container of radioactive Hg and 9-pound container of silicon oil in storage during VSI<br>• Bldg. 4075 – storage of low-level radioactive waste and mixed waste; interim storage of transuranic waste; revised Part A Appl. submitted<br>• Bldg. 4621 – storage of mixed waste; revised Part A Appl. submitted; 700-gal container of waste antifreeze in storage during VSI<br>• Bldg. 4665 – Emergency Decontam. Supplies Storage<br>• Bldg. 4688 – Hazardous Materials Storage Shed<br>• Drainage Pond – collected drainage from RMDF; pond has been sealed with coated asphalt to prevent leakage<br>• Bldg. 4021 Leach Field (AI-Z5) – operated 1959-1961 for sanitary waste water from the radioactive waste processing area located at the west end of Bldg. 4021; RMDF radioactive water processing system leaked to RMDF leach field in 1962/1963; approx. 36,000 ft$^3$ excavated to bedrock in 1978 and cracks in the bedrock sealed with tar and backfilled [radioactive contam. was present down to at least 10 ft below bedrock surface]; subsurface found contaminated with low levels of toluene, methylene chloride, MEK, total xylenes, and ethylbenzene<br>• Documented radiological releases in 1978 (2) and 1979 |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-06 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | Building 4005<br>• Built in 1958 for non-nuclear thermodynamic characteristics testing of proposed coolants for organic moderated reactor experiments and Piqua reactors; converted during mid-1960s for fabrication of enriched uranium carbide fuel; used from 1972-1986 as a pilot plant for molten salt combustion (Molten Salt Test Facility)<br>• Release of contaminated smoke to bldg. from fire in 1967, but no release outside of bldg.<br>• Six spills reported at the facility, which included molten salt in carbonate or slurry form, water-tar solutions, and coal ash in solution with sodium bicarbonate; all releases were to the R-2 Ponds<br>• Chemical usage: VOCs (e.g., benzene), TPH, PCBs, coal dust, coke, metals (e.g., chromium), cyanide, and silica, and sodium carbonate<br>• Previous sampling detected metals at concentrations above screening levels |
| EU-06 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | Building 4027<br>• Used as a vibration and shock test facility beginning in 1961 and then as a nonradiological hazardous waste storage facility (“The Yard”); demolished in 2003<br>• Hydraulic fluid spill (30 gal.) in 1992<br>• Chemical usage: beryllium, waste oil, contaminated waste solids, batteries, paint waste, flammable waste, caustics, corrosives, debris, and wastewater |
| EU-06 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | Building 4032<br>• Constructed in 1962 as a space environmental test facility for a thermal vacuum system and developing the fuel rod control system; used as a Liquid Metal Development Laboratory from 1970s to 1984; demolished in 2003<br>• Tank UT-22 has been removed<br>• Chemical usage: kerosene, PCBs, lead paint, and asbestos |
| EU-06 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | Building 4042<br>• Used as a general test and lithium hybrid shield fabrication building in support of the SNAP program beginning in 1963; also used for sodium-aerosol and related technology tests; used for liquid metal technology work after support work for SNAP tests ceased; demolished in 2003<br>• Chemical usage: alcohol, lithium, and storage of unknown chemicals |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-06 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | <u>Building 4049 and Former Coal Gasification PDU Process Area</u><br>• Bldg. 4049 used as a control center in the 1950s to 1960s to support the SNAP program; hydraulic test facility control center beginning in 1960; Piqua Test Loops control center from 1968-1977; designated as a control and test center for the PDU in 1977; bldg. inactive by 1988<br>• PDU used for testing thermodynamic characteristics of proposed coolants for organic moderated reactors and for designing a coal gasification system to demonstrate the technical feasibility of producing sulfur-free, low-BTU product gas by partial combustion of coal (1977-1981); demolished in 1991<br>• Process generated a "green liquor" wastewater (approx. 80,000 gallons) that contained organics, sulfur compounds, and ash; the green liquor was filtered, the ash was disposed, the sulfur was stripped and removed as sodium sulfate, and the sodium was recycled<br>• In 1979, molten salt with 500-1,000 gallons of water, which contained cyanide and some metals, spilled from a tank into storm channels that drain into the R-2A Discharge Pond<br>• Chemical usage: terphenyl organics, Freon, solvents, surfactants, oil and grease, SVOCs, lead paint, metals (e.g., aluminum, lithium, manganese, iron), boron, cyanide, green liquor, sodium hydroxide, caustics, sulfate, mercaptans, and asbestos<br>• Previous sampling detected metals and PCBs at concentrations above screening levels |
| EU-06 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | <u>Substation 4742</u> |
| EU-06 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | <u>PDU Bag House</u><br>• Chemical usage: benzene, toluene, xylene, aromatic hydrocarbons, chloromines, hexachlorobenzene, coal, coal dust, coke, chromium, heavy metals, PCBs, cyanide, green liquor, silica, calcium carbonate, sodium carbonate, molten salt carbonate<br>• Previous sampling detected VOCs at concentrations above soil gas screening levels |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-06 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | PDU Catchment Basin<br>• Chemical usage: benzene, toluene, xylene, aromatic hydrocarbons, chloromines, hexachlorobenzene, coal, coal dust, coke, chromium, heavy metals, PCBs, cyanide, green liquor, silica, calcium carbonate, sodium carbonate, molten salt carbonate<br>• Previous sampling detected VOCs at concentrations above soil gas screening levels |
| U-06 | Area IV AOC | DOE Leach Fields 1 [DOE] | Building 4023 Liquid Metals and Analytical Chemistry Lab<br>• Supported the SNAP reactor during the 1960s and 1970s; contained a small sodium loop to study radioactive contamination transport (Mn-54 and Co-60); a second section was built in 1976, which was used as storage, a setup room, and an analytical chemistry laboratory; bldg. demolished in 1999<br>• A mercury spill (0.1 gal.) was documented at this bldg. in 1997<br>• Two incidents of possible release of sodium containing Mn-54 in 1980 and 1981<br>• Chemical usage: mercury, cadmium, lithium chloride, and potassium chloride |
| EU-06 | Area IV AOC | Hazardous Materials Storage Area (HMSA) [DOE] | Building 4024<br>• Chemical usage: PCBs and uses associated with a small chemistry laboratory.<br>• SNAP support building. |
| EU-06 | Area IV AOC | Hazardous Materials Storage Area (HMSA) [DOE] | Building 4025<br>• Chemical usage: acetic acid, potassium permanganate, sodium bisulfide, ammonium carbonate, ethylene diamine tetra acetic acid (EDTA), and ferrous sulfate |
| EU-06 | Area IV AOC | DOE Unaffiliated Features [DOE] | Building 4625<br>• Used for component storage |
| EU-07 | SWMU 6.9 | Environmental Effects Laboratory (EEL) [Boeing] | EEL Cryogenic Laboratory and Test Cells (Building 3271)<br>• Constructed in 1964 and used for testing various materials (such as carbon and stainless steel) under high-pressure hydrogen conditions<br>• Previous sampling indicated elevated VOC soil gas concentrations |
| EU-07 | SWMU 6.9 | Environmental Effects Laboratory (EEL) [Boeing] | Hazardous Materials Storage Pad<br>• A small area nearby was excavated (2 to 3 $yd^3$) in 1993 where elevated petroleum hydrocarbons were detected |
| EU-07 | SWMU 6.9 | Environmental Effects Laboratory (EEL) [Boeing] | Tanks<br>• Hydraulic oil and other tanks |
| EU-07 | SWMU 6.9 | Environmental Effects Laboratory (EEL) [Boeing] | Northern Transformer Area<br>• Previous sampling indicated elevated PCB concentrations |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-07 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | 17th Street Drainage Area<br>• Received waste runoff from the entire PDU area<br>• Chemical usage: benzene, toluene, xylene, aromatic hydrocarbons, chloromines, hexachlorobenzene, coal, coal dust, coke, chromium, iron, heavy metals, PCBs, cyanide, green liquor, silica, calcium carbonate, sodium carbonate, molten salt carbonate<br>• Previous sampling detected TPH, SVOCs, PCBs, and metals at concentrations above screening levels |
| EU-07 | Area IV AOC | Boeing Area IV Leach Fields [Boeing] | Buildings 4007 and 4008<br>• Used for chemical and flammable materials storage (1958-1990s) [many of the containers were badly corroded]; Bldg. 4008 also used as a machine shop and Electric Laser Laboratory; transformer located at Bldg. 4008<br>• Chemical usage: acetone, denatured alcohol, oils and lubricants, PCBs, amerzine, morpholine, hydrazine, lithium hydride, sodium hydride powder, salts, limestone, and cement |
| EU-07 | Area IV AOC | Boeing Area IV Leach Fields [Boeing] | Building 4011<br>• Used for non-nuclear programs support, aerospace assembly and component manufacturing, calibration and repair of radiological instrumentation (1984-1996), communications equipment storage, administrative offices, as a machine shop, and as an x-ray development laboratory (1966)<br>• Two ASTs (AT-05 and AT-06), which contained propane and fuel oil, were located near this bldg.<br>• Three radiological incidents occurred (1960, 1985, and 1994)<br>• Chemical usage: VOCs (e.g., acetone), TPH, metals, and acetic acid |
| EU-07 | Area IV AOC | Boeing Area IV Leach Fields [Boeing] | Building 4011 Leach Field (AI-Z9)<br>• Received sanitary waste from Bldg. 4011; leach field removed in 2000<br>• Chemical usage: VOCs (e.g., acetone), TPH, metals, and acetic acid |
| EU-07 | Area IV AOC | Boeing Area IV Leach Fields [Boeing] | Building 4171<br>• Used for electronic equipment storage and as an X-Ray Room (1960s-2000)<br>• Chemical usage: silver and aluminum |
| EU-07 | Area IV AOC | Boeing Area IV Leach Fields [Boeing] | Building 4172<br>• Used as an X-Ray Room and for the storage of sealed sources (1970s-2000)<br>• A tank was located at Bldg. 4172 (contents unknown)<br>• Chemical usage: VOCs, metals, aluminum sulfate, hydroquinone, potassium hydroxide, and sulfuric acid |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-07 | Area IV AOC | Boeing Area IV Leach Fields [Boeing] | Building 4611<br>• Used for spray painting<br>• Chemical usage: VOCs |
| EU-07 | Area IV AOC | Boeing Area IV Leach Fields [Boeing] | Substation 4711 |
| EU-07 | Area IV AOC | Boeing Area IV Leach Fields [Boeing] | Transformer Pole D-5 |
| EU-08 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | Building 4006<br>• Non-nuclear sodium laboratory until 1999<br>• Tetralin fire in 1959; sodium fire in 1987; mercury spill in sink (1992)<br>• Chemical usage: tritium titanium foils, mercury, tetralin, and gasoline storage in USTs |
| EU-08 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | Building 4402<br>• Operated as a nonradiological facility prior to 1967; used for sodium testing and solvent storage; bldg. has been demolished<br>• Chemical usage: solvents |
| EU-08 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | Building 4616<br>• Cooling tower for Bldg. 4006<br>• 2,000 gal. of water treated with sodium nitrate base chemical was drained to a pit located in the coal yard south of Bldg. 4005 due to a power outage in 1986<br>• Chemical usage: coolant (sodium nitrate) |
| EU-08 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | Substation 4706<br>• Substation 4706 is owned by Southern California Edison |
| EU-08 | SWMU 7.10 | Coal Gasification Process Development Unit (PDU) [Boeing] | Building 4005/4006 Leach Field (AI-Z8)<br>• Received sanitary wastes from various laboratories and work areas in Bldgs. 4005 and 4006; disconnected and abandoned in 1960-1961; drain lines and tanks were removed in 2001 at the same time the septic tanks were removed<br>• Contamination not detected during previous sampling; however, VOCs and PCBs not investigated |
| EU-08 | Area IV AOC | Boeing Area IV Leach Fields [Boeing] | Sodium Component Test Installation (SCTI) Pump Station<br>• Fuel oil was pumped from AST 4735<br>• Chemical usage: fuel oil |
| EU-08 | Area IV AOC | Boeing Area IV Leach Fields [Boeing] | Parking Lot 4502<br>• Used for temporary storage/drying of coal<br>• Chemical usage: coal |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-08 | Area IV AOC | Boeing Area IV Leach Fields [Boeing] | AST 4735<br>• 87,000-gal. tank used to store fuel oil between 1977 and 1999<br>• Chemical usage: fuel oil |
| EU-08 | Area IV AOC | DOE Leach Fields 2 [DOE] | Building 4010 (Power Demonstration Test Facility)<br>• Used for SNAP 2 and SNAP 8 Experimental Reactor Tests between 1959 and 1965<br>• Fueled by a hydrided zirconium-uranium alloy and controlled by moveable parts in a beryllium reflector sleeve shielded by lithium hydride; tritium production during operation of experimental reactors and weapons testing; water with hydrazine was used in the cooling water loop to reduce corrosion and scale build-up<br>• Five incidents of possible release: 04/30/61, 07/05/61, 01/01/64 (fission gas release), 06/11/64, and 10/19/65 (Co-60, Mn-54, and Fe-59 released in hi-bay area)<br>• NaK fire in reactor pit beneath the building in 1965<br>• Chemical usage: TCE, metals, and hydrazine |
| EU-08 | Area IV AOC | DOE Leach Fields 2 [DOE] | Building 4010/4012 Leach Field (AI-Z7)<br>• Received sanitary wastes from Bldg. 4010; location of leach field has not been identified<br>• Tritium and 1,1-DCE have been detected in wells downgradient of DOE Leach Fields 2<br>• Chemical usage: TCE, metals, and hydrazine |
| EU-08 | Area IV AOC | DOE Leach Fields 2 [DOE] | Building 4012<br>• Served as the SNAP Critical Test Facility No. 2 (1962-1968), Heavy Metal Reflected Fast Spectrum Reactor (1970-1972), ETEC X-ray Facility and storage (1979-1992); demolished in 2003<br>• Low nuclear power experiments were performed to collect critical data for the design of SNAP reactor cores for higher power operation; operations and control rooms demolished in 1986 to build the ETEC Sodium Component Test Installation Power Pak section of the Cogeneration Project<br>• Chemical usage: metals |
| EU-08 | Area IV AOC | DOE Leach Fields 2 [DOE] | Building 4013<br>• Used for component assembly and packaging of SNAP 10A, SNAP 2, and SNAP 8 flight systems after 1962; thermal transient and mechanical testing and stress testing for seismic events were also performed<br>• Spills of hydraulic oil (200 gal. in 1996) and oil (100 gal. in 1989 and 55 gal. in 1996) were reported<br>• Chemical usage: TPH, PCBs, and metals |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-08 | Area IV AOC | DOE Leach Fields 2 [DOE] | Substation Areas<br>• Five substations: 4708A/4708B, 4713, 4756, eastern side of Bldg. 4010, and western side of Bldg. 4010<br>• Chemical usage: PCBs |
| EU-08 | Area IV AOC | DOE Leach Fields 2 [DOE] | ASTs<br>• EMGEN (fuel oil), EMSTG (oil), T-L01 (oil), TCF-1 (hydrazine), TCF-2 (morpholine), and TCF-3 (sulfuric acid) |
| EU-08 | Area IV AOC | DOE Leach Fields 2 [DOE] | Air Compressor Pad/Cooling Water Pipelines<br>• Water with hydrazine was used in the cooling water loop to reduce corrosion and scale build-up<br>• Chemical usage: hydrazine |
| EU-08 | Area IV AOC | Systems for Nuclear Auxiliary Power (SNAP) [DOE] | Building 4057<br>• Served as the Liquid Metals Engineering Center (LMEC) laboratory, which housed two sodium test rigs from 1961-1998, and became a records room after 1998; contained outdoor chemical storage area<br>• Chemical usage: TCE, alcohol, oil, paint, and Dowanol |
| EU-08 | Area IV AOC | Systems for Nuclear Auxiliary Power (SNAP) [DOE] | Building 4059 (Former SNAP Reactor Facility) and Associated French Drain<br>• Built in 1963 as a test facility for SNAP system reactors and operated until 1964; SNAP Prototype Reactor operated in 1969; converted for the Large Leak Test Rig Sodium Test Program in 1973; demolition activities completed in 2004<br>• In 1983, groundwater that had seeped into the building was found to be contaminated with $^{60}Co$<br>• In 1986, groundwater discharge from the standpipe connected to the building's french drain contained PCE (540 ppb), TCE (19 ppb), and trans-1,2-DCE (68 ppb)<br>• Tritium was detected in groundwater (1,890 pCi/L) from a french drain around the western part of the building<br>• In 1992, sediment samples from the watershed associated with Bldg. 4059 contained tritium, $^{137}Cs$, and $^{238}Pu$<br>• In 1981, a 75-gal. Dowanol (diethylene glycol monoethyl ether) spill occurred<br>• Chemical usage: VOCs (e.g., TCE, PCE, 1,2-DCE, Freon), kerosene, metals (incl. Hg, NaK), and liquid nitrogen |
| EU-08 | Area IV AOC | Systems for Nuclear Auxiliary Power (SNAP) [DOE] | Building 4358<br>• Used as a chemical storage building in support of SCTL, SCTI, and Kalina; bldg. was moved in 1978 from its original location (northwest of Bldg. 4656) to its former location (south of Bldg. 4026); demolished in 2003 |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-08 | Area IV AOC | Systems for Nuclear Auxiliary Power (SNAP) [DOE] | Building 4360<br>• Used as chemical storage for SCTI<br>• Chemical usage: combustible liquids, acids, and bases |
| EU-08 | Area IV AOC | Systems for Nuclear Auxiliary Power (SNAP) [DOE] | Building 4459<br>• Used as an uninterruptible power supply (UPS) from 1963-1992 and contained a large diesel generator; used for non-radiological storage from 1992-2003; also stored R/A (radioactive) waste containers during Bldg. 4059 demolition activities<br>• Chemical usage: flammables |
| EU-08 | Area IV AOC | Systems for Nuclear Auxiliary Power (SNAP) [DOE] | Building 4626<br>• Used to store barrels of radioactive sand |
| EU-08 | Area IV AOC | Systems for Nuclear Auxiliary Power (SNAP) [DOE] | Substation/Transformer Area<br>• Bldgs. 4719 and 4757 transformers<br>• Chemical usage: PCBs |
| EU-08 | Area IV AOC | Hazardous Materials Storage Area (HMSA) [DOE] | Buildings 4026, 4226, 4426, and 4826<br>• Chemical usage: hydrocarbons, ammonia, Deworals sodium, and Dowanol |
| EU-08 | Area IV AOC | Hazardous Materials Storage Area (HMSA) [DOE] | Buildings 4334<br>• Chemical usage: turbine lube oil, compressor oil, greases, lubricants, aqueous ammonia, anhydrous ammonia |
| EU-08 | Area IV AOC | Hazardous Materials Storage Area (HMSA) [DOE] | Buildings 4355<br>• Chemical usage: oils, acids/bases, and general chemical storage |
| EU-08 | Area IV AOC | Hazardous Materials Storage Area (HMSA) [DOE] | Building 4357<br>• Constructed approx. 1958 and used as a supply storage building for SCTI; also used as the Pump Bearing Test Facility Control Building for LMEC and ETEC; demolished in 2002<br>• Propellants for rocket motor tests were mixed and processed at Bldg. 4357<br>• Chemical usage: metals |
| EU-08 | Area IV AOC | Hazardous Materials Storage Area (HMSA) [DOE] | Buildings 4358<br>• Served as storage for igniters that contained ammonium, magnesium, potassium perchlorates, and lube oil<br>• Chemical usage: oil, metals, and perchlorate |

# Appendix A – SSFL Area IV General Chemical Use Overview

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-08 | Area IV AOC | Hazardous Materials Storage Area (HMSA) [DOE] | Building 4457<br>• Used for proof and performance testing of sodium-lubricated bearings used in large sodium pumps through the 1970s<br>• Three concrete sumps beneath the building were backfilled with soil and capped with concrete<br>• Chemical usage: solvents, lubricants, waste oils (TPH), metals, acids, and bases<br>• Lateral and vertical extent of metals above screening levels and vertical extent of VOCs in soil have not been defined |
| EU-08 | Area IV AOC | Hazardous Materials Storage Area (HMSA) [DOE] | Substation 4726<br>• PCBs |
| EU-08 | Area IV AOC | DOE Unaffiliated Features [DOE] | Buildings 4356, 4361, and 4656<br>• Chemical usage: hydrazine, morpholine, diesel, PCBs, metals, and sulfuric acid |
| EU-09 | SWMU 7.7 | Rockwell International Hot Laboratory (RIHL) [DOE] | Building 4020 Rockwell International Hot Laboratory (RIHL) and Leach Field (AI-Z12)<br>• Used for preparation and shipment of irradiated reactor fuel for reprocessing from 1959-1989.<br>• A hydraulic lift/machine shop was located within RIHL<br>• Contamination in the Hot Lab from fuel decladding projects include radionuclide constituents characteristic of spent fuel such as transuranics ($^{239\text{-}241}$Pu, $^{241}$Am, and $^{252}$Cf) and fission products ($^{60}$Co, $^{137}$Cs, and $^{90}$Sr)<br>• Bldg. 4020, the concrete foundation, and surrounding asphalt-covered support areas were removed between 1989-1998<br>• Past practices of outdoor storage and/or dispensing solvents may have resulted in soil contamination; documented TCE release at northwest corner of bldg.<br>• Chemical usage: alcohols, solvents (e.g., TCE), oil-related materials, acids, and metals |
| EU-09 | SWMU 7.7 | Rockwell International Hot Laboratory (RIHL) [DOE] | Substation Area (4720) |

| Exposure Unit ID | RFI SWMU/AOC ID | RFI SWMU/AOC Description | General Areas and Chemical Uses |
|---|---|---|---|
| EU-09 | Area IV AOC | Building 4065 Metals Laboratory Clarifier [DOE] | Building 4065 Vacuum Test Fac./Chemical and Met. Analysis Lab. and Clarifier<br>• Constructed in 1963 as a Vacuum Test Facility; used as a Chemical and Metallographic Analysis Laboratory after 1974; demolished in 1999<br>• Wastes were piped via below-grade pipes in a concrete trench to clarifier (removed in 2000) at southeast side of bldg.; clarifier effluent piped to Area 3 Sewage Treatment Plant via underground pipeline<br>• Chemical usage: solvents (1,1,1,-TCA and TCE), petroleum hydrocarbons (kerosene), metals, acids, and bases<br>• Previous sampling detected mercury at concentrations above screening levels in one shallow soil sample (downslope from former clarifier and former UT-76)<br>• Petroleum hydrocarbon-impacted soil exists at the former metals clarifier and UT-76 (up to 1,500 mg/kg)<br>• VOCs and metals exceed groundwater screening levels in near-surface groundwater (downgradient well PZ-005); upgradient site (SNAP) believed to be potential source |
| EU-09 | Area IV AOC | Building 4065 Metals Laboratory Clarifier [DOE] | Building 4062 Non-Nuclear Reactor Qualification Test Building<br>• Constructed in 1963 and demolished in 1999 |
| EU-09 | Area IV AOC | Building 4065 Metals Laboratory Clarifier [DOE] | Building 4066 Instrument Repair and Calibration Bldg.<br>• Constructed in 1963 and demolished in 1999<br>• A release of battery acid reportedly occurred at bldg. in 1991<br>• Chemical usage: small quantities of hazardous substances were at bldg. |
| EU-09 | Area IV AOC | Building 4065 Metals Laboratory Clarifier [DOE] | UST Areas (UT-70 and UT-76)<br>• Contained fuel oil for emergency generators<br>• Both tanks have been removed |
| EU-09 | Area IV AOC | DOE Leach Fields 3 [DOE] | Building 4055 (Nuclear Materials Development Facility)<br>• Also used as a chemistry laboratory (1967-1979)<br>• Activities included analytical chemistry and research for uranium-plutonium scrap pellet recycling programs; fission research on microscopic dispersion of tungsten in uranium-plutonium fuel; mixed uranium-plutonium oxide pellets for irradiation tests; liquid metal fast breeder reactors; demonstration of reduced transuranic solid waste with the use of a molten salt combustor; non-radiological research; and research, development, and production work with alpha-emitting and/or highly radiotoxic nuclear and radioisotopic fuels<br>• Three incidents of radiological releases<br>• Chemical usage: solvents, metals, adhesives, and coatings |