PZ-001C

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-040C
JOB NO. / SITE: RD-09 area	PREPARED BY: E. SARAO

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

INITIAL WATER LEVEL N/A

FINAL WATER LEVEL _____

REMARKS: CANNOT GET DEPTH OF WATER. PROBE GETS STUCK @ 10'

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

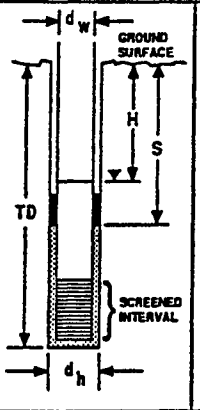
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
4-18-01	1513		0 (BEGIN)		0					NO DTW; PROBE STUCK BEGAN Hand pump.
	1515				8 oz	7.10	~~1.169~~	High	71.5	
	1526				48 oz	6.7	0.651	moderate	66.5	
	1537				92 oz	6.85	0.586	moderate	68.9	Pumped DRY
4-19-01	1545				0					Began hand pumping
	1547				8 oz	6.94	0.69	MODERATE	60.9	
	1600				80 oz	6.68	0.51	LOW	58.9	SLIGHTLY CLOUDY
	1625				160 oz	6.61	0.49	LOW	58.6	CEASED PUMPING
4-20-01	0937				0					Began hand pumping, DTW=?
	0939				8 oz	7.11	0.93	LOW	53.5	
	0952				80 oz	7.11	0.90	LOW	56.0	
	1007				160 oz	7.01	0.89	LOW	55.4	CEASED PURGING, DTW=?

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-012F

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne /SSFL	PT-020F
JOB NO. / SITE: Area I Rd	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 11.37 ft (TOC)

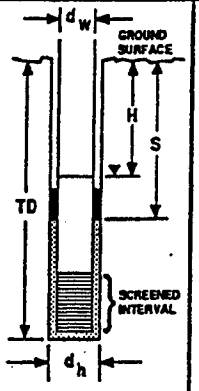
FINAL WATER LEVEL _____

REMARKS: TD = 37.47 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ ft.^{3} × 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/13/01	1554		0 (BEGIN)		0					DTW = 11.37 ft (TOC)
	1556				4 oz	6.92	0.76	High	60.1	Dk Brown color
							~~0.66~~			Bad odor (not H_2S)
	1601				34 oz	6.83	0.66	High	60.9	Pumped dry
										DTW = 36.81
3/20/01	1142				~~0~~					STARTED PUMPING
	i									DTW = 10.83 ft (TOC)
	1144				4 oz	7.14	0.65	HIGH	66.7	
	1151				34 oz	7.33	0.68	HIGH	71.2	PUMPED DRY
										DTW - 37.41
3/26/01	1610				~~0~~					STARTED PURGING
										DTW = 10.88 ft (TOC)
	1613				8 oz		0.72	HIGH	63.4	VERY SILTY
	1621				30 oz		0.72	HIGH	63.6	PURGED DRY
										DTW = 37.22 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-013B

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PZ-013B
JOB NO.	SITE: Comp A
	PREPARED BY: B. Stewart

METHOD:
- OVERPUMPAGE: _____
- BAILER: _____
- SURGE BLOCK: _____
- AIR LIFT: _____
- OTHER: Inertial Lift

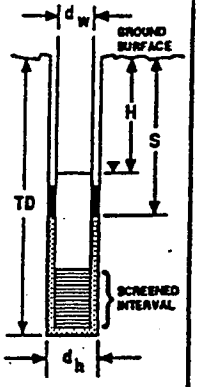
INITIAL WATER LEVEL: 12.77 ft (TOC)
FINAL WATER LEVEL: _____

REMARKS: TD = 14.89 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} × 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/15/01	1408		0 (BEGIN)		0					DTW = 12.77 ft (TOC)
	1409				4 oz	7.41	2.50	Mod	69.2	Cloudy, Lt brown
	1410				16 oz					Pumped dry
										- DTW = 14.86 ft (TOC)
3/16/01	1008				0					Started hand-pumping
										- DTW = 13.16 ft (TOC)
	1009				2 oz	7.20	2.26	Low	65.4	
	1010				6 oz			Low		Pumped dry
										- DTW = 14.75 ft (TOC)
3/23/01	0950				0					STARTED PUMPING
					4 oz					DTW = 13.95 ft (TOC)
	0953				~~133~~	7.23	1.44	LOW	61.5	PURGED DRY
										DTW = 14.72 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-013C

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-013C
JOB NO. / SITE: Comp A	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 14.16 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 20.82 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

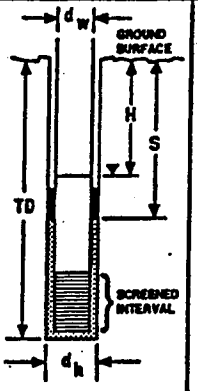
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*If S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.³ × 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/15/01	1422		0 (BEGIN)		0					DTW = 14.16 ft (TOC)
	1423				4 oz	7.22	2.39	High	67.9	Dk gray color
	1424				16 oz			High		Pumped dry
										- DTW = 20.62 ft (TOC)
3/16/01	1014				0					Started pumping
										- DTW = 14.83 ft (TOC)
	1015				2 oz	7.10	2.10	Mod	66.1	
	1016				8 oz			Mod		Pumped dry
										- DTW = 20.66 ft (TOC)
3/21/01	1000				0					STARTED PURGING
										DTW = 15.21 Ft (TOC)
	1002				3 oz	7.33	1.55	LOW	63.4	PURGED DRY
	1005				10 oz					DTW = 20.74 Ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-013D

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-013D
JOB NO. / SITE: Comp A	PREPARED BY: B. Stewart

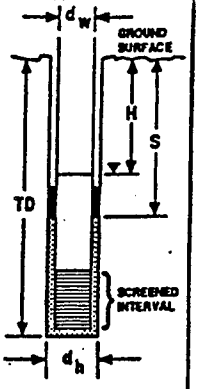
METHOD: OVERPUMPAGE ____ BAILER ____ SURGE BLOCK ____ AIR LIFT ____ OTHER Inertial Lift

INITIAL WATER LEVEL 14.87 ft (TOC)
FINAL WATER LEVEL ____

REMARKS: TD = 28.81 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ $ft.^3 \times 7.48 =$ ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/15/01	1434		0 (BEGIN)		0					DTW = 14.87 ft (TOC)
	1435				4 oz	7.17	1.26	~~Mod~~ High	67.7	Light brown color
	1437				30 oz			Mod		Pumped dry
										- DTW = 27.80 ft (TOC)
3/16/01	1018				0					Started pumping
					5					- DTW = 14.95 ft (TOC)
	1019				3 oz	6.75	1.32	Mod	66.3	Cloudy, light brown
	1021				20 oz			Mod		Pumped dry
										- DTW = 27.79 ft (TOC)
3/23/01	1010				0					STARTED PURGING
										DTW = 15.63 Ft (TOC)
	1012				4 oz	7.28	0.85	LOW	64.9	
	1015				16 oz	7.32	0.88	LOW	66.3	PUMPED DRY
										DTW = 27.70 Ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-013E

WELL DEVELOPMENT

PROJECT	WELL NO.
RocketDyne /SSFL	PZ-077E
JOB NO. / SITE: Comp A	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 17.17 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 39.70 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

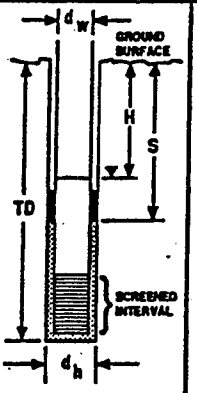
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*If S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} × 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/15/01	1448		0 (BEGIN)		0					DTW = 17.17 ft (TOC)
	1449				2 oz	7.01	1.81	High	66.4	Dk-gray color, bad odor
	1454				16 oz	6.92	1.56	High	67.1	
	1504				32 oz	7.22	1.27	High	66.4	
	1514				56 oz	7.25	1.38	High	67.1	
	1519				72 oz			High		Pumped dry
										- DTW = 35.61 ft (TOC)
3/16/01	1026				Ø					Started pumping
										- DTW = 17.45 ft (TOC)
	1027				2 oz	6.82	1.64	High	65.8	Dk brown color,
	1052				22 oz	7.19	1.94	High	65.2	Fixed valve
	1058				38 oz			High		Pumped dry
										- DTW = 38.10 ft (TOC)
3/23/01	1022				0					STARTED PURGING
										DTW = 17.92 ft (TOC)
	1024				8 oz	7.36	0.98	HIGH	65.4	
	1034				32 oz	7.49	0.99	MOD	64.1	MILKY
	1038				52 oz	7.47	0.99	MOD	65.1	PURGED DRY

DTW 38.33 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-013F

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-013F
JOB NO. / SITE: Comp A	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 17.67 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 53.49 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

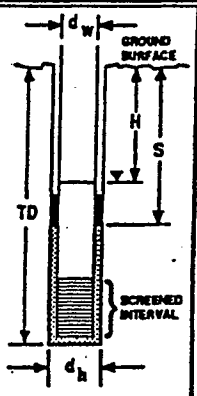
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG: DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/15/01	1532		0 (BEGIN)		0					DTW = 17.67 ft (TOC)
	1535				3 oz	7.11	1.68	Low	66.2	Clear discharge
	1537				8 oz	6.92	2.07	High	66.7	Dk gray color, slight odor
	1547				16 oz					Stopped pumping - valve clogged
	~~1553~~ 1600									Restarted pumping
	1607				24 oz	7.34	1.65	Low	67.1	Pump won't work
					32 oz					DTW = 35.89 ft
3/16/01	1106				0					Started pumping
										- DTW = 37.87 ft (TOC)
	1107				4 oz	7.27	2.29	Low	64.7	Clear discharge
	1108				8 oz	7.22	2.59	High	66.5	Dk gray-olive color, slight odor
	1118				37 oz	7.42	2.17	High	64.7	
	1127				55 oz			High		Pumped dry
										- DTW = 51.65 ft (TOC)
3/23/01	1048				0					STARTED PURGING
	1050				6 oz	6.78	2.04	HIGH	65.2	DTW = 18.22 ft (TOC)
	1100				34 oz	6.81	1.95	HIGH	66.2	DK. GRAY & SILTY,
	1108				58 oz	6.65	2.14	HIGH	66.5	PURGED DRY

DTW = 52.48 ft (TOC)

PZ-014C

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PT-08i C
JOB NO. / SITE: Comp A	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 14.49 ft (TOC)

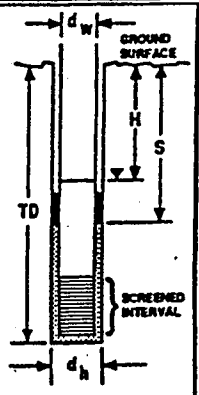
FINAL WATER LEVEL _____

REMARKS: TD = 19.84 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} × 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/15/01	1658		0 (BEGIN)		0					DTW = 14.49 ft (TOC)
	1659				4 oz	7.20	1.93	Mod	64.3	
	1700				13 oz					Pumped dry
										- DTW = 19.05 ft (TOC)
3/16/01	0815				0					Started pumping
										- DTW = 14.98 ft (TOC)
	0816				2 oz	6.94	2.83	Low	61.6	
	0820				16 oz			Low		Pumped dry
										- DTW = 18.54 ft (TOC)
3/23/01	1127				0					STARTED PUMPING
										DTW = 14.54 Ft (TOC)
	1128				3 oz	6.91	1.49	Low	66.7	
	1135				20 oz	6.86	1.31	Low	68.9	PURGED DRY
										DTW = 19.45 Ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-014D

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-014D
JOB NO. / SITE: Comp A	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 14.56 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 29.33 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

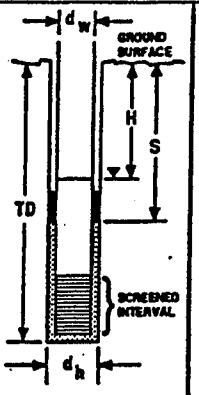
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/15/01	1705		0 (BEGIN)		0					DTW = 14.56 ft (TOC)
	1706				5 oz	7.02	2.96	High	65.5	Dk brown, no odor
	1710				20 oz			High		Pumped dry
										- DTW = 29.10 ft (TOC)
3/16/01	0826				0					Started pumping
										- DTW = 14.48 ft (TOC)
	0827				3 oz		2.58	Mod	63.2	Problem w/ pH meter
	0835									Started pumping again
	0837				45 oz	7.39	3.00	Mod	65.0	
	0840				36 oz			Mod		Pumped dry
										- DTW = 28.97 ft (TOC)
3/23/01	11:45				0					STARTED PUMPING
										DTW = 14.55 ft (TOC)
	1147				8 oz	7.14	1.76	LOW	70.1	
	1153				32 oz	7.13	1.89	LOW	68.1	PURGED DRY
										DTW = 29.12 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

P2-014E

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	P2-081E
JOB NO. / SITE: Comp A	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE ____ BAILER ____ SURGE BLOCK ____ AIR LIFT ____ OTHER Inertial Lift

INITIAL WATER LEVEL ~~14.72~~ 15.50 ft (TOC)

FINAL WATER LEVEL ____

REMARKS: TD = 38.83 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____

WELL CASING INSIDE DIAMETER d_w ID = ____

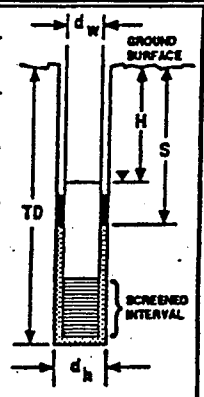
OUTSIDE DIAMETER d_w OD = ____

DEPTH TO: WATER LEVEL H = ____

BASE OF SEAL S = ____

BASE OF WELL TD = ____

EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ $ft.^3 \times 7.48 =$ ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/16/01	0845		0 (BEGIN)		0		~~2K~~			~~15.50~~ DTW = ~~14.72~~ ft (TOC)
	0848				3 oz	6.56	~~2.13~~ 2.91	Low	62.8	
	0900				16 oz	6.88	2.76	High	64.9	Dk brown color, no odor
	0905				32 oz	6.54	2.65	High	64.7	
	0916				48 oz		2.77	High	63.5	Problem w/ pH meter
	0945				80 oz	6.68	2.23	High	67.2	
	0951				104 oz					Pumped dry
										-DTW = 38.10 ft (TOC)
3/23/01	1202				0					STARTED PURGING
										DTW = 14.69 ft (TOC)
	1205				8 oz	1.16	1.64	MOD	66.9	
	1215				44 oz	1.24	1.69	MOD	68.2	H_2O MILKY
	1223				80 oz	1.28	1.67	MOD	67.2	PURGED DRY
										DTW 38.26 ft (TOC)
3/27/01	1300			0						DTW 14.66
	1305			6 oz			2.55	low	72.5	
	1315			38 oz			2.63	Mod	74.7	
	1320			72 oz			2.74	Mod	82.3	DTW 37.87 PUMPED DRY

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

P2-015A

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	P1-084A
JOB NO. / SITE: SSFL-IV	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 6.85 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 8.56 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

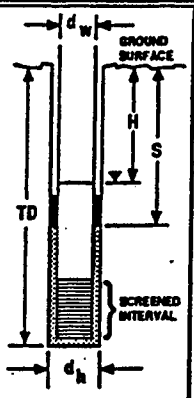
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*If S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} × 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED (GALLONS)	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/16/01	1315		0 (BEGIN)		0					DTW = 6.85 ft (TOC)
	1316				2 oz	8.07	1.88	Mod	72.8	Cloudy, Lt brown
	1318				7 oz			Mod		Pumped dry
										- DTW = 8.45 ft (TOC)
3/21/01	1418				0					STARTED PUMPING
										DTW = 7.31 ft (TOC)
	1419				2 oz	7.48	1.10	Mod	69.5	PURGED DRY
					4 oz					DTW = 8.03 ft (TOC)
3/27/01	1333				0					DTW = 7.68
	1335				2 oz		1.59		74.1	
	1337				4 oz		1.59		73.7	Purged dry
										DTW = 8.49 TOC

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

P2-015B

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	P2-084B
JOB NO.	SITE: STL-IV
	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 7.24 ft (TOC)

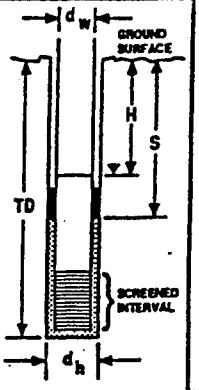
FINAL WATER LEVEL _____

REMARKS: TD = 16.59 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} × 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS
3/16/01	1324		0 (BEGIN)		0					DTW = 7.24 ft (TOC)
	1325				5 oz	8.09	1.11	Mod	65.7	Cloudy, lt brown color
	1335				60 oz	7.92	0.97	Low	65.6	
	1345				120 oz	7.86	0.93	Low	65.8	Ceased pumping
										DTW = 10.52 ft (TOC)
										Discharge clear
3/21/01					0					STARTED PUMPING
										DTW = 7.77 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-015C

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PZ-084C
JOB NO. / SITE: STL-IV	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 7.77 ft(TOC)

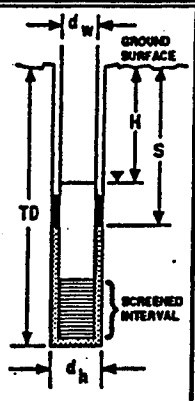
FINAL WATER LEVEL _____

REMARKS: TD = 27.13 ft(TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} × 7.48 = _____ gal.

DEVELOPMENT LOG: DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/16/01	1352		0 (BEGIN)		0					DTW = 7.77 ft (TOC)
	1354				4 oz	8.17	1.31		66.5	Cloudy, dk brown
	1404				36 oz	7.95	1.17		66.3	
	1414				66 oz	7.88	1.14		66.3	Ceased pumping
										DTW = 15.08 ft (TOC)
										Discharge slightly
										cloudy but clean
3/21/01	1430				0					STARTED PUMPING
										DTW = 8.08 ft (TOC)
	1431				2 oz	7.63	0.72	LOW	69.3	
	1441				36 oz	7.17	0.79	LOW	68.5	DISCHARGE CLEAR
	1451				64 oz	7.10	0.76	LOW	67.9	CEASED PURGING
										DTW = 15.61 ft (TOC)
3/30/01	1225				0					DTW = 8.44'
	1235				120 oz		1.65	LOW	73.7	DISCHARGE VERY LOW TURB.
	1245				400 oz		1.52	LOW	71.4	
	1255				800 oz		1.55	LOW	72.3	CEASED PURGING

DTW = 14.67'

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-015D

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-084D
JOB NO. / SITE: ST2-IV	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 8.47 ft (TOC)

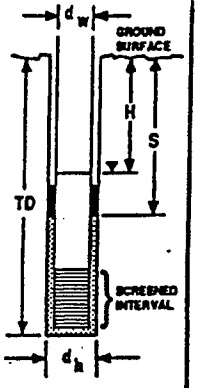
FINAL WATER LEVEL _____

REMARKS: TD = 35.65 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/16/01	1430		0 (BEGIN)		0					DTW = 8.47 ft (TOC)
	1431				4 oz	8.19	2.59	High	67.8	
	1432				14 oz	8.19	2.54	High	67.3	Cloudy, dk brown
	1442				60 oz	8.17	2.39	Mod	66.0	
	1445				72 oz			Mod		~~Ceased Purging~~ D.RY
										- DTW = 34.77 ft (TOC)
										Discharge still cloudy
										but clearing up
3/23/01	~~0658~~	0658			0					START TO PURGE
										DTW = 8.87 Ft (TOC)
	0700				8 oz	7.52	1.35	MOD	58.6	
	0710				48 oz	7.46	1.30	MOD	56.4	
	0720				64 oz	7.37	1.38	MOD	61.1	CHECK VALVE STUCK
	0730				88 oz	7.40	1.39	MOD	60.5	PURGED DRY
										DTW = 33.89 Ft (TOC)

2 of 2
PZ-015D

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PZ-084D
JOB NO. / SITE: SSFL-IV	PREPARED BY

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

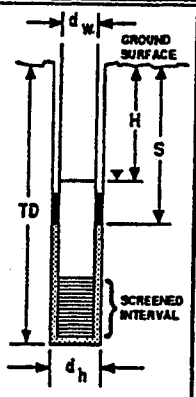
INITIAL WATER LEVEL 8.47 ft (TOC)
FINAL WATER LEVEL _____

REMARKS: TD = 35.65 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/27/01	1340		0 (BEGIN)		0					DTW 9.02 (TOC)
	1545			60z	6.0z		2.56	Mod	74.5	
	1355				24.0z		2.61	Mod	76.2	
	1402				30.0z		2.65	Mod	78.5	Purged dry DTW 34.76

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-015E

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-084E
JOB NO. / SITE: STL-IV	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 9.44 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 40.65 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

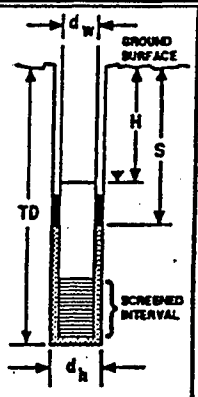
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} × 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/16/01	1449		0 (BEGIN)		0					DTW = 9.44 ft (TOC)
	1451				8 oz	8.26	2.91	High	65.0	Cloudy, dk brown
	1457				40 oz			Mod		Pumped dry
										-DTW = 39.64 ft (TOC)
										Discharge still cloudy
										but clearing up
3/23/01	0740				0					START TO PURGING
										DTW = 9.61 ft (TOC)
	0742				8 oz	7.52	1.70	MOD	61.7	
	0747				28 oz	7.57	1.59	MOD	63.2	
	0752				40 oz	7.54	1.40	MOD	59.2	PURGED DRY
										DTW = 40.33 ft (TOC)
3/27/01	1410				0					DTW = 9.77
	1417				8 oz		2.31	MOD	76.0	PUMPED DRY
	1421				40 oz		2.35	MOD	75.9	DTW = 39.95 (TOC)

page 1 of 2

PZ-015F

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
RocketDyne/SSFL	PZ-084F
JOB NO. / SITE: STL-IV	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 9.43 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 46.13 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

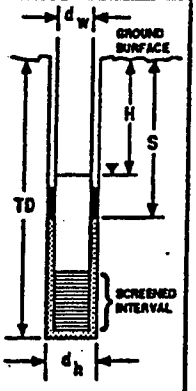
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.³ x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/16/01	1504		0 (BEGIN)		0					DTW = 9.43 ft (TOC)
	1506				8 oz	8.51	2.10	High	66.2	Cloudy, dk brown
	1516				52 oz	8.21	1.58	Mod	67.2	CLOUDY - MOD
	1525									Problem w/ valve
										- DTW = 38.75
	1536				88 oz	8.33	1.59	Mod	66.1	
	1547				124 oz	8.07	1.46	Mod	66.0	Pumped dry
										- DTW = 44.55 ft (TOC)
										Discharge cloudy but
										clearing up
3/23/01	0804				ø					STARTED PURGING
										DTW = 7.42 Ft (TOC)
	0806				8 oz	7.47	0.85	MOD	61.4	
	0816				48 oz	7.37	1.02	MOD	64.6	CHECK VALVE STUCK REPLACED PART 0836
	0843				124 oz	7.61	1.09	MOD	65.1	PURGED DRY
									~~65~~	DTW 44.60 Ft (TOC)
					SEE	NEXT	PAGE			

PZ-015F

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	JOB NO.	SITE	WELL NO.	PREPARED BY
Rocketdyne/SSFL		STL-IV	PT-084 F	ED SARAO

METHOD:
- OVERPUMPAGE ______
- BAILER ______
- SURGE BLOCK ______
- AIR LIFT ______
- OTHER Inertial Lift

INITIAL WATER LEVEL ______

FINAL WATER LEVEL ______

REMARKS: TD = 46.13 ft. (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ______

WELL CASING INSIDE DIAMETER d_w ID = ______

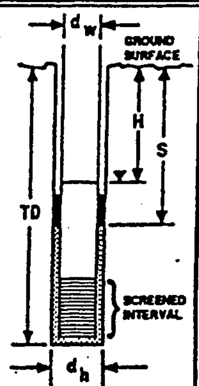
OUTSIDE DIAMETER d_w OD = ______

DEPTH TO: WATER LEVEL H = ______

BASE OF SEAL S = ______

BASE OF WELL TD = ______

EST. FILTER PACK POROSITY P = ______



WELL VOLUME CALCULATION:

CASING VOLUME $= V_c = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_c =$ ____ + ____ = ______ ft.^{3} x 7.48 = ______ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS
3/30/01	1305		0 (BEGIN)		0					DTW = 10.03'
	1309				16 Oz		1.85	MOD	71.8	SLIGHTLY CLOUDY
	1318				72 Oz		2.13	HIGH	72.4	Pumped DRY
										TURBIDITY → CLOUDY
										DTW = 43.86'

PZ-D156

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PZ-1846
JOB NO. / SITE: STL-IV	PREPARED BY: B Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 19.98 Ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 50.85 Ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

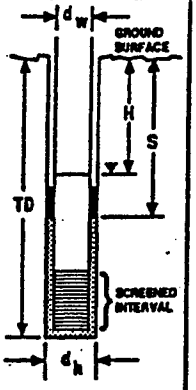
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*If S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} × 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/16/01	1606		0 (BEGIN)		0					DTW = 19.98 ft (TOC)
	1608				8 oz	8.38	1.63	High	65.1	Cloudy, dk brown
	1614				38 oz	8.19	1.70	High	66.4	
	1615							Mod		Pumped dry
	1623									Restarted pumping
	1626				66 oz	8.26	1.60	Mod	64.6	
	1633							Mod		Pumped dry
										- DTW = 24.1 Ft
										probe stuck
3/23/01	0906				0					STARTED PURGING
										DTW = 12.20 Ft (TOC)
	0908				8 oz	7.54	0.97	MOD	62.2	
	0913				24 oz	7.64	1.01	MOD	64.3	
	0920				46 oz	7.68	0.99	MOD	60.7	PURGED DRY
										COULDN'T GET SOUNDER DOWN POINT. ?
					NEXT PAGE					

Page 2 of 2
PZ-015G

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PT-084G
JOB NO. / SITE: STL-IV	PREPARED BY: ED SARAO

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

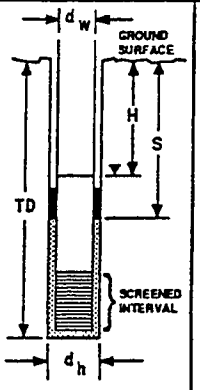
INITIAL WATER LEVEL _____ FINAL WATER LEVEL _____

REMARKS: TD = 50.85 ft (TOE)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

~~DATE~~ TIME	~~TIME BEGIN/END~~ DATE	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
1328	3/23/01		0 (BEGIN)		0					DTW = 11.64'
1335					16 oz		2.39	MOD	74.2	
1350					72 oz		2.54	HIGH	75.6	pumped DRY
										TURB. ROSE from
										moderate To HIGH
										SOUNDER GETS STUCK
										at 30 ft. CANNOT
										MEASURE DTW

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-016E

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PZ-019E
JOB NO. / SITE: Canyon	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 36.93 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 47.04 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

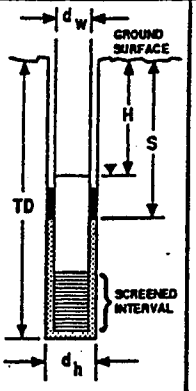
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ $ft.^3 \times 7.48$ = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/13/01	1623		0 (BEGIN)		0					DTW = 36.93 ft (TOC)
	1625				2 oz	6.91	2.64	High	61.0	Bad odor
	1635				32 oz	7.11	2.61	Mod	61.1	
	1645				60 oz	6.82	2.30	Mod	61.9	
	1655				156 oz	6.74	1.98	Mod	61.6	
	1705				184 oz	6.81	1.75	Mod	60.8	
	1715				204 oz	6.74	1.46	Low	60.6	Ceased pumping
										DTW = 41.17 ft (TOC)
										Discharge clear
3/20/01	0844				206 oz	6.43	2.13	Low	67.3	DTW = 37.10 ft (TOC)
	0954				216 oz	6.40	1.67	Low	64.7	
	1085				238 oz	6.55	2.23	Low	66.7	Ceased pumping
										DTW = 38.64 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-016F

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PZ-016F
JOB NO. / SITE: Canyon	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 36.98 ft(TOC)

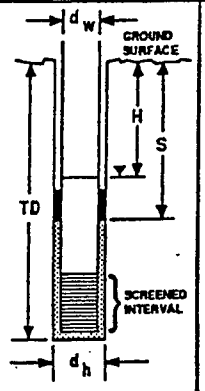
FINAL WATER LEVEL _____

REMARKS: TD = 59.76 ft(TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.³ x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/14/01	0747		0 (BEGIN)		0					DTW = 36.98 ft(TOC)
	0749				4 oz	6.77	2.53	High	52.6	
	0754				32 oz	6.93	1.30	Mod	55.0	Pumped dry
										DTW = 56.28
3/20/01	0914				34 oz	6.39	2.58	Low	68.4	DTW = 37.07 ft(TOC)
	0924				40 oz	6.22	2.57	Low	68.8	
	0934				81 oz	6.03	2.60	Low	67.6	
	0944				180 oz	6.68	2.61	Low	68.6	DRY 56.82 ft(TOC)
										DISCHARGE SLIGHTLY CLOUDY LOW
3/26/01	1325				Ø					STARTED PURGING
										DTW = 37.18 ft(TOC)
	1327				6 oz		1.68	Low	68.7	
	1337				40 oz		1.72	Low	66.8	DISCHARGE CLEAR-
	1347				72 oz		1.74	Low	67.2	
	1350	-1409								CHANGED HOSE & CHECK VALVE.
	1411				100 oz		1.78	Low	68.6	
	1424				138 oz		1.76	Low	68.2	PURGED DRY

DTW = 53.42 ft(TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-D16G

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-D16G
JOB NO. / SITE: Canyon	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 36.98 ft(TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 66.73 ft(TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

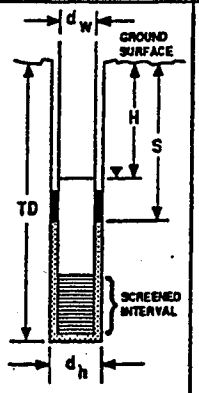
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS: ODOR
3/14/01	0810		0 (BEGIN)		0					DTW = 36.98 ft(TOC)
	0813		~~4 oz~~		8 oz	6.51	1.29	High	58.8	
	0818				20 oz	6.74	1.35	Low	60.3	
	0823				36 oz	6.21	1.35	Low	60.1	
	0828				64 oz	6.88	1.16	Low	61.1	
	0858				112 oz	7.22	0.96	Mod	62.3	
	0908				138 oz	7.01	0.98	Mod	61.5	
	0918				172 oz	6.52	1.09	Mod	81.4	Ceased pumping
										DTW = 36.88
										Discharge slightly cloudy
					See NEXT PAGE					

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-016G

WELL DEVELOPMENT

PROJECT	WELL NO.
ROCKETDYNE	PZ-019-G
JOB NO. / SITE: Canyon	PREPARED BY: S. RUFFIN

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

INITIAL WATER LEVEL 36.98 FT (TOC)

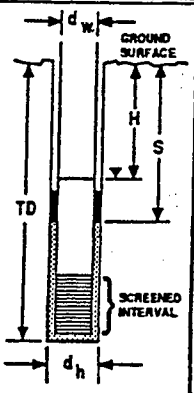
FINAL WATER LEVEL _____

REMARKS: TD = 66.73 FT (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
										ODOR
3/26/01	1433		0 (BEGIN)		Ø					STARTED PURGING
										DTW = 37.15 FT (TOC)
	1435				4 OZ		0.60	HIGH	65.8	GRAYISH COLOR
	1445				16 OZ		0.63	MOD	65.6	↓
	1500				32 OZ		0.68	MOD	66.7	↓
										HARD TO PUMP MOVED TO NEW POINT.
3/28/01	0955				Ø					DTW = 37.20'
	1007				10 OZ		1.17	HIGH	68.8	GRAYISH COLOR
	1018				22 OZ		1.08	~~HIGH~~ MOD	67.1	BLACK SPECKS
	1030				36 OZ		1.19	MOD	68	+ TURBIDITY CLEARING
	1047				64 OZ		1.28	MOD	70.3	CEASED PUMPING
										TURBIDITY MODERATE
										WITH BLACK SPECS
										DTW = 37.80'

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
NASA	PZ 017A
JOB NO. 313150005 / SITE COCA PT-100 A	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ✓ ; BAILER ✓ ; SURGE BLOCK ✓ ; AIR LIFT ; OTHER

INITIAL WATER LEVEL 5.77 - 5.80

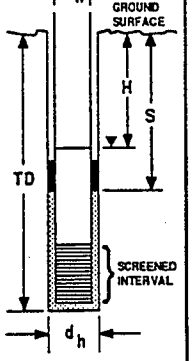
FINAL WATER LEVEL 6.64

REMARKS: H_2O from highest + lowest part of casing (cut at angle) Recharge: 0.5'/30sec

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 0.66'
WELL CASING INSIDE DIAMETER d_w ID =
OUTSIDE DIAMETER d_w OD =
DEPTH TO: WATER LEVEL H =
BASE OF SEAL S =
BASE OF WELL TD =
EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY NTU	TEMP. °F	COMMENTS: Very sandy (vf-fine); Turbidity estimated
1/30/01	0851	Bail	0 (BEGIN)	—	0					dark brown, silty
	0853	"	2	—	1.5	7.03	~~7.14~~ TB	>500	~~51.0~~ TB	more olive brown
	0858	"	7	—	5.5	7.30	~~5.73~~ TB	>500	~~40.3~~ TB	H_2O = 9.52' b TOC
	0903	"	12	—	9.75	7.22	~~5.91~~ TB	>500	~~46.6~~ TB	V. fine + fine sand
	0905	Recharge Test	1 ft/minute		Bailed H_2O to buckets					9.72' - 9.22' in 30 sec.
	0914	Pump	0	0.25	Purge H_2O to 55-gal drum					Pump intake @ TD
	0917	↓	3	↓		6.74	1930	>100	60.1	clearing up lt. brn
	0920	↓	6	↓	11.5	7.12	1230	>25	62.8	lighter, still cloudy
	0925	↓	↓	↓	12.75	6.90	1120	<25	64.8	slightly cloudy
	0926	↓	↓	0.75		7.19	1070	>25	64.6	Cloudier as @ 0920
	0930	↓	↓	↓	16	↓	↓	↓	↓	↓
	0935	↓	21	5.0		↓				
	0937	↓	↓	↓	26	6.94	1090	>500	64.4	Stir up silt + sand, ↓ dark
	0937	↓	23		>25	according to drum contents				(well overpumped to dry)
	0940	↓	↓	1.0						
	0943	↓	29	↓						
	0948	Bail	0							Olive, silty vf-fines
	1009	↓	21							Sheen visible in purge H_2O

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
NASA	PZ017A
JOB NO. 313158005 / SITE COCA-PT 108A	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ✓ | BAILER ✓ | SURGE BLOCK ✓ | AIR LIFT | OTHER

INITIAL WATER LEVEL See p.1

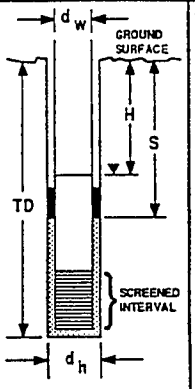
FINAL WATER LEVEL

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h =
WELL CASING INSIDE DIAMETER d_w ID =
OUTSIDE DIAMETER d_w OD =
DEPTH TO: WATER LEVEL H =
BASE OF SEAL S =
BASE OF WELL TD =
EST. FILTER PACK POROSITY P =



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY NTU	TEMP. °F	COMMENTS: Turbidity estimated qualitatively
1/30/01	1013	Pump	0 (BEGIN)	0.5	0					intake is 2-3" off bottom
	1018	"	"	0.5	≈50					flow dropped to 0.25
	1024	"	" Head	loss	due to	low H_2O level – pump off. – let recharge				
	1043	Pump	0	0.5						
	1045	↓	2	↓		7.32	1080	<25	68.9	slightly cloudy
	1057	↓	14	↓	≈60					
	1238		H_2O level		= 6.06'					
	1239	Surge	0	—						
	1254	↓	15	—						
	1255	Bail	0	—						very sandy (vf + fine)
	1302	↓	7	—	65	6.49	1530	>500	67.1	silty olive brown
	1316	↓	21							clearing – lt. brown
	1321	Pump	0	0.5	77					
	1327	↓	6	0.5	80	7.11	1080	<25	68.3	slightly cloudy
	1342	↓	21	0.5	87	7.33	1,160	<500	67.7	CLOUDY (INCREASED LAST 5 min)
	1343	↓	22	0.5	88					PUMPED TO DRY!!
	1412	Surge	0	—						H_2O = 6.80' b TOC
	1425	↓	13	—						

8490-9

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
NASA	PZ017A
JOB NO. 313150005 / SITE EDCA PT 100A	PREPARED BY T. Burton

METHOD:
- OVERPUMPAGE ✓
- BAILER ✓
- SURGE BLOCK ✓
- AIR LIFT
- OTHER

INITIAL WATER LEVEL See p.1

FINAL WATER LEVEL

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

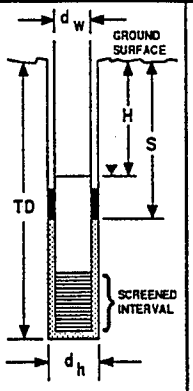
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY NTU	TEMP. °F	COMMENTS: LaMotte Turb. Meter Used
1/30/01	1429	Bail	0 (BEGIN)	—	90					
	1436	↓	7	—	95	7.17	1020	>500	65.2	
	1440	Pump	0	0.5						
	1452		12	025	101	7.07	1020	152	66.0	clearing up
	1458		18			7.28	1060	24.7	64.8	
	1510	↓	30	↓	106	7.12	1050	10.1	66.2	
	1545									H_2O = 6.64

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ017B

WELL DEVELOPMENT

PROJECT	WELL NO.
# NASA	~~PT-100B~~
JOB NO. 313150005 / SITE COCA PT-100B	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 15.63

FINAL WATER LEVEL ____

REMARKS: Slow Recharge

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____

WELL CASING INSIDE DIAMETER d_w ID = ____

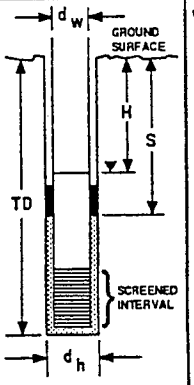
OUTSIDE DIAMETER d_w OD = ____

DEPTH TO: WATER LEVEL H = ____

BASE OF SEAL S = ____

BASE OF WELL TD = ____

EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\ -\ ) =$ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\ -\ )(\ ) =$ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ $ft.^3 \times 7.48 =$ ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP. °F	COMMENTS:
										Fuel odor + black organics on H_2O fuel meter
1/30/01	0808-0830	Bail	0 (BEGIN)	—	4.75	7.23	1250	>500	65.1	Bailed nearly dry
	0945	H_2O level = 26.02' bTOC								very silty, olive, dark
	1000	H_2O level = 25.23' bTOC								
	1030	"	"	= 23.48						
	1045	"	"	= 22.78 ↓						
	1300	"	"	= 19.92						
	1355	BAIL		—						dark olive gray, fuel odor
	1403	↓		—	7.25	7.57	1,380	>500	68.0	VERY CLOUDY, BUT, CLEANER THAN BEFORE
	1435									H_2O = 27.68' bTOC
	1545									H_2O = 24.12'
1/31/01	0731	Surge	0							H_2O = 17.56 TD = 29.90
	0806	↓	35							
	0807	Bail	0							dark olive, v. silty + sandy
	0815	↓	8		10.5					Bailed dry - 3gals
2/6/01	0905									DTW = ~~19.25'~~ 17.25 (T
	0910	BAIL	0	—	~~11.0~~					
	0912				11.0	6.86	1150	HIGH	65.8	
	0915				12.5	6.99	1180		66.6	
	0918	↓			13.5	7.18	1220	HIGH	65.8	DTW = ~~31.22'~~ 29.22

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-018B

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PT-073B
JOB NO. / SITE: EEL	PREPARED BY: B. Stewart

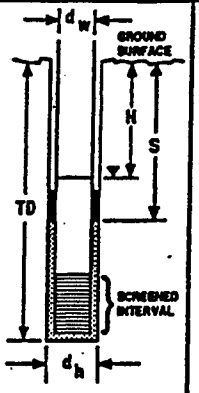
METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 8.96 ft(TOC) FINAL WATER LEVEL _____

REMARKS: 14.09 TD = ~~14.95~~ ft(TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ ft.³ x 7.48 = _____ gal.

DEVELOPMENT LOG: DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/19/01	0921		0 (BEGIN)		0					DTW = 8.96 ft(TOC)
	0922				1 oz	6.84	1.50	High	66.3	Dk gray, strong odor
	0928							High		Pumped dry
										DTW = 13.95
3/21/01	1116				0					STARTED PUMPING
										DTW = 8.48 FT(TOC)
	1118				2 oz	7.00	1.75	HIGH	60.7	
	1123				24 oz	6.97	1.69	HIGH	63.4	PURGED DRY
										DTW = 11.90 FT(TOC)
3/30/01	1040				0					DTW = 9.14'
	1046				6 oz		3.53	HIGH	69.3	GRAYISH COLOR
	1053				14 oz		3.52	HIGH	67.5	Pumped DRY
										DTW = 13.79'

1 of 2

PZ-018L

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocketdyne /SSFL		PI-073L
JOB NO.	SITE	PREPARED BY
	EEL	B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 9.29 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 18.59 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

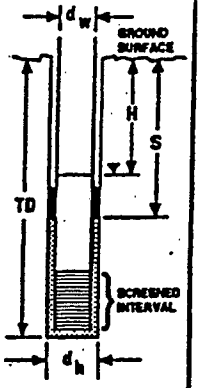
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/19/01	0940		0 (BEGIN)		0					DTW = 9.29 ft (TOC)
	0942				4 oz	7.06	0.97	High	64.8	Dk olive color,
	0947				32 oz	7.10	1.06	High	65.5	Strong sewage odor
	0957				52 oz	7.14	0.98	High	65.4	
	1007				100 oz	7.08	0.94	High	65.1	
	1008				112 oz			High		Ceased pumping
										- DTW = 13.89 ft (TOC)
										Still cloudy but
										less sediment in discharge.
3/21/01	1132				0					STARTED PUMPING
										DTW = 11.84 Ft (TOC)
	1134				4 oz	7.01	0.86	HIGH	64.6	
	1144				72 oz	6.96	0.77	HIGH	64.9	
	1154				120 oz	6.97	0.80	HIGH	65.1	CEASED PUMPING
										DTW = 10.48 Ft (TOC)

See Page #2

2 of 2
PZ-018C

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PT-073C
JOB NO. / SITE: EEL	PREPARED BY: ED STARKO

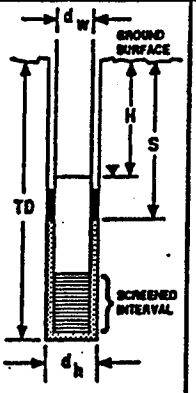
METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL See p.1
FINAL WATER LEVEL _____

REMARKS: TD = 18.59 ft. (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} × 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/27/01	1458		0 (BEGIN)		0					DTW = 9.15 ft
	~~1305~~	1505			16 oz		1.53	HIGH	66.9	GREY COLORED
	~~1315~~	1515			80 oz		1.23	HIGH	64.3	
	~~1325~~	1525			136 oz		1.19	HIGH	64.6	CEASED PUMPING
										DTW = 10.19 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-018D

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-073D
JOB NO.	SITE: EEL
	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 9.63 ft (TOC)

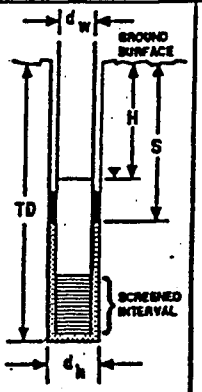
FINAL WATER LEVEL _____

REMARKS: TD = 22.37 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*If S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ $ft^3 \times 7.48$ = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/19/01	1031		0 (BEGIN)		0					DTW = 9.63 ft (TOC)
	1040				4 oz	7.44	1.04	High	71.7	Problem w/ tube
										Well will not pump - no water
										DTW = 22.00 ft (TOC)
										Water is dk olive color -
										strong odor
3/21/01	1255				0					STARTED PUMPING
										DTW = 9.47 ft (TOC)
	1256				6 oz	6.98	1.02	HIGH	67.6	
	1306				44 oz	7.02	0.99	HIGH	64.5	CHECK VALVE STICKING
	1326				64 oz	7.05	0.99		66.5	
	1330				80 oz					PURGED DRY
										DTW = 21.03 ft (TOC)
3/27/01	1537				0					DTW = 9.61 (TOC)
	1541				8 oz		1.61	HIGH	65.4	
	1547				32 oz		1.90	HIGH	66.3	PUMPED DRY
										DTW = 21.06 (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-D18E

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PT-073E
JOB NO. / SITE: EEL	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 11.12 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 27.11 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

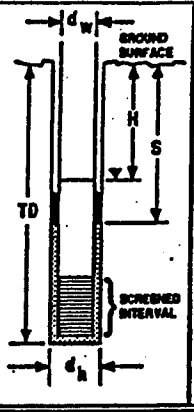
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*If S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} × 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/19/01	1051		0 (BEGIN)		0					DTW = 11.12 ft (TOC)
	1052				2 oz	7.18	0.99	High	69.8	Dk olive color strong sewage odor
	1058				24 oz	7.11	0.76	Mod	68.8	Discharge decreased pump
	1100				26 oz			Mod		Pumped dry
										-DTW = 26.35 ft (TOC)
										Discharge cloudy but clearing up
3/21/01	1338				0					STARTED PUMPING
										DTW = 11.23 ft (TOC)
	1350				24 oz	7.15	0.67	HIGH	67.8	PURGED DRY
										DTW = 25.99 ft (TOC)
3/27/01	1557				0					STARTED PUMPING
										DTW = 10.41
	1600				8 oz		1.03	HIGH	64.7	
	1605				20 oz		1.12	HIGH	65.6	PUMPED DRY
										DTW = 26.95 (TOC)

1 of 2
PZ-019

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne (NASA)	PT041/PZ19
JOB NO. 31315000S / SITE RD9	PREPARED BY E. Gathercart

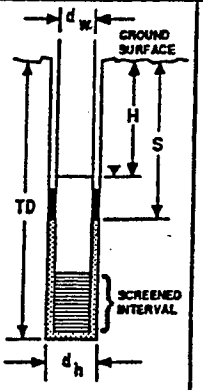
METHOD: OVERPUMPAGE ____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 13.74 - 8:55AM (TOC)
FINAL WATER LEVEL ____

REMARKS: 3/29/01 Sunny 70° H_2O Level from TOC

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = 13.74
BASE OF SEAL S = 17
BASE OF WELL TD = 29.4
EST. FILTER PACK POROSITY P = 40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} × 7.48 = ____ gal.

(13.74 - 29.4)(0.16) + 12.3(0.52) = 8.9 gal = 1 w/v

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	WATER QUALITY CONDUCTIVITY µS/cm X 100	WATER QUALITY TURBIDITY	WATER QUALITY TEMP. F	COMMENTS:
3/29/01	1430	BAIL	0 (BEGIN)		0					-Low turbidity - Very Little Sediment at base of well
	1431	Surge	1		0.5					
	1500	BAIL	29		0.5	8.03	7.68	High	63.9	~~Turb.~~
	1508	↓	8		~~0.6~~	-			~~63.9~~	
	1510	↓	~~8~~ 1		8	8.13	6.59	High	60.7	
	1514	↓	4		11	8.11	7.04	high	59.8	
	1519							high		BAILED DRY DTW = 31.15 (TOC)
	WAIT FOR RECHARGE									Mostly Fines w/ turbidity
										Very Little Sand
	1554									DTW = 18.30 (TOC)
3										
~~3/29/01~~	~~1639~~	~~Surge~~								~~DTW = 14.32 (TOC)~~
3/29/01	1639	Surge	0							DTW = 14.32 (TOC)
	1709	BAIL	30							
	1710	BAIL	1		~~0.5~~ 11.5	8.23	~~4.40~~	high	59.0	
	1715		5		15.0					
	1716		3		18.5	7.63	5.42	high	58.5	
	1728		10		23.0	7.57	5.37	high	58.4	BAILED DRY DTW = 30.85 (TOC)

2012
PZ-019

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocket Dyne (NASA)		PT041/PZ19
JOB NO. 313150005	SITE RD9	PREPARED BY E. Cathcart

METHOD:		
OVERPUMPAGE ______	INITIAL WATER LEVEL ______	REMARKS:
BAILER ✓	FINAL WATER LEVEL ______	
SURGE BLOCK ✓	CAPACITY OF CASING (GALLONS / LINEAR FOOT) 2" - 0.16 4" - 0.65 6" - 1.47	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY) 2" CASING AND 6" HOLE = 0.52 2" CASING AND 8" HOLE = 0.98 4" CASING AND 10" HOLE = 1.37 4" CASING AND 12" HOLE = 2.09
AIR LIFT ______		
OTHER ______		

HOLE DIAMETER d_h = 6

WELL CASING INSIDE DIAMETER d_w ID = ______

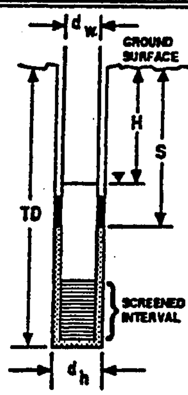
OUTSIDE DIAMETER d_w OD = 2

DEPTH TO: WATER LEVEL H = 13.74

BASE OF SEAL S = 17

BASE OF WELL TD = 29.4

EST. FILTER PACK POROSITY P = 40



WELL VOLUME CALCULATION:

CASING VOLUME $= V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_C =$ ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	pH	µS/cm CONDUCTIVITY x1000	TURBIDITY	°F TEMP.	COMMENTS:
			0 (BEGIN)		0					
3/30/01	0655	Surge								13.74-DTW (TOC)
	0730	BAil	35		23.0					
	0732	↓	2		24.0	7.99	4.85	High	59.8	
	0735	↓	3		27.0	7.90	4.72	High	59.8	
	0740	↓	5		30.0	7.99	5.00	high	59.6	
	0745	↓	5		34.0	7.99	5.23	high	59.6	
	0745									-Bailed Dry
	WAIT FOR RECHARGE									DTW - 30.99 (toc)
	1255									DTW - 14.70 (toc)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
RIASA	PZ 021
JOB NO. 313150005	SITE KD-9 PT-036
	PREPARED BY T. Burton

METHOD:
- OVERPUMPAGE: ____
- BAILER: ✓
- SURGE BLOCK: ✓
- AIR LIFT: ____
- OTHER: ____

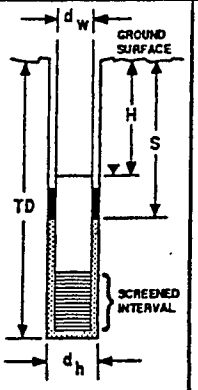
INITIAL WATER LEVEL 25.37
FINAL WATER LEVEL ____

REMARKS:
TD_o = 30.91
TD = 31.00

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ $ft.^3 \times 7.48$ = ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY ms/cm	TURBIDITY NTU	TEMP. °F	COMMENTS
2/9/01	1334	Bail ~~Surge~~	0 (BEGIN)	—	0.5					No sands, some silt
	1359	Surge	0	—						olive brown
	1404	↓	5							
	1425	Bail		—	4.5					Bailed dry
2/15/01	0811	Surge	0	—						DTW = 22.44
	0826	↓	15							
	0828	Bail	0	—						
	0830	|	|		5.5		995	V.High	61.4	olive brown, silty
	0833	|	|		8.5		1510	>1000	60.1	
	0835	|	|		Recharge: 28.90-28.79 in/min					F = 0.11'/min = 0.12 gals/min
	0840	↓	12		11					Bailed Dry

PZ-022

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Raytheon/NASA	PT 038/PZ22
JOB NO. 31315005 / SITE AD-9	PREPARED BY E Cathcart

METHOD: OVERPUMPAGE ____ BAILER ✓ SURGE BLOCK X AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 19.91 (TOC)

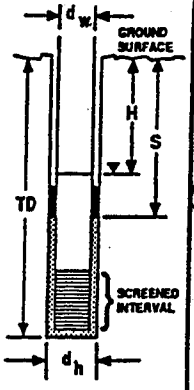
FINAL WATER LEVEL ____

REMARKS: TD = 31.72 (TOC) Sunny
= 29.40 (BGS)
2.32

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = 17
BASE OF WELL TD = 29.5
EST. FILTER PACK POROSITY P = 40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(toc) 22.3 = 80%

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ $ft.^3 \times 7.48$ = ____ gal.

12.5(0.52) + 11.81(0.16) = 8.4 gal w/v

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	WATER QUALITY CONDUCTIVITY µS/cm X100	WATER QUALITY TURBIDITY	WATER QUALITY TEMP. F	COMMENTS:
3/29/01	1540	bail	0 (BEGIN)	GW	0					
	1541	↓	1		0.5	7.67	15.96	Low	67.1	
	1545	Surge	4							
	1620	bail	35		1	7.77	12.89	High	66.0	
	1625	↓	5		4.5	7.76	14.36	High	66.1	
	1630	↓	5		6.5	7.73	14.26		66.2	
	1632	↓			7.0					BAILED DRY DTW = 30.60 (TOC)
	1737	RECHARGE								DTW = 28.14 (TOC)
~~3/29/01~~	~~1639~~									~~DTW = 14.32 (TOC)~~
3/30/01	0755	Surge								DTW = 20.21 (TOC)
	0825	bail	30		7.5	7.89	13.24	high	62.3	
	0829	↓	4		10	7.89	15.04	high	63.7	
	0834	↓	5		12					
	0838	↓	4		13.5	7.89	13.91	medium	69.7	BAILED DRY DTW = 28.00 (TOC)
	1254	RECHARGE								DTW = 21.18 (TOC)
4/2/01	1100									DTW = 20.50 (TOC)
	1325	Surge								

Page 2 of 2

PZ-022

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

Ø

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocketdyne/NASA		PT038/PZ22
JOB NO. 31315000S	SITE Rd-9	PREPARED BY E. Cathcart

METHOD:

- OVERPUMPAGE ______
- BAILER X
- SURGE BLOCK X
- AIR LIFT ______
- OTHER ______

INITIAL WATER LEVEL ______

FINAL WATER LEVEL ______

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)

2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)

2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ______

WELL CASING INSIDE DIAMETER d_w ID = ______

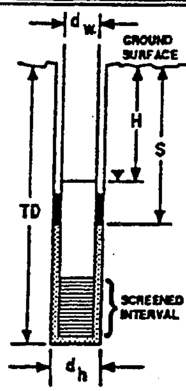
OUTSIDE DIAMETER d_w OD = ______

DEPTH TO: WATER LEVEL H = ______

BASE OF SEAL S = ______

BASE OF WELL TD = ______

EST. FILTER PACK POROSITY P = ______



WELL VOLUME CALCULATION:

CASING VOLUME $= V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_C =$ ____ + ____ = ______ $ft.^3 \times 7.48$ = ______ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	pH	CONDUCTIVITY µS/cm	TURBIDITY	TEMP. °F	COMMENTS:
4/2/01	1355	Bail	30 (BEGIN)		14	7.76	9.92	High	69.4	Lt Brown Color
	1404	↓	9		18	7.82	11.02	Mod	63.7	-much clearer turbidity
	1410	↓	6		20	7.80	11.73	Mod	62.8	Bailed Dry DTW=27.60 (toc)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ023
JOB NO. 313150005 / SITE ECL PT-062	PREPARED BY T. Burton

METHOD: OVERPUMPAGE _____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT _____ OTHER _____

INITIAL WATER LEVEL 10.65

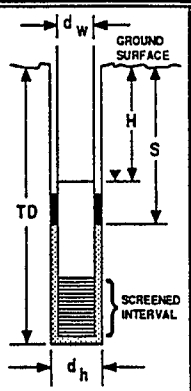
FINAL WATER LEVEL _____

REMARKS: TD_o = 19.43

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

= (1.14)(8.78) = 9.7 gal

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS: Mostly silt
2/1/01	0936	Surge	0 (BEGIN)	—	0					
	0952	↓	16							very little silt &
	0958	Bail	0							of sand in bottom
	1008	↓	10		Recharge:	16.98-16.90	in 1 min	=		12.5 min/ft
	1016	↓	18							well bailed dry
2/6/01	1048									DTW = ~~13.02'~~ 11.02' (TOC)
	1050	SURGE	0							SURGED 15 min
	1107	BAIL			0.5	7.19	1730	HIGH	67.5	
	1110	↓			3.5	7.29	1980		67.4	
	1113	↓			5.0	7.29	2030	HIGH	67.2	
	1117	↓			6.5	7.35	2040	HIGH	66.6	TURBIDITY DECREASED
	1120	[redacted]								DTW = ~~20.64'~~ 18.64' (TOC)
2/13/01	1225	Bail		—						DTW = 8.36'
	1246	↓			15.5		Bailed Dry			grayish brown

PZ-024
PAGE 1 of 2

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

88

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocket Pyne		PTOC3/PZ024
JOB NO. 31315 0006	SITE ECL	PREPARED BY E. CATHCART

METHOD: OVERPUMPAGE _____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT _____ OTHER _____

INITIAL WATER LEVEL 10.65 (TOC)

FINAL WATER LEVEL _____

REMARKS: Sump 70% 80% = 13.80 (TOC) 8.25 (bgs)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6

WELL CASING INSIDE DIAMETER d_w ID = _____

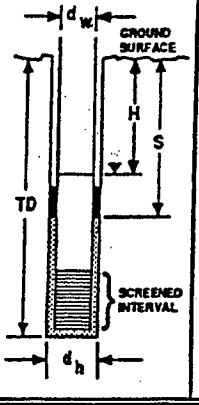
OUTSIDE DIAMETER d_w OD = 2

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = 9.8

BASE OF WELL TD = 25.6

EST. FILTER PACK POROSITY P = 40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\ -\ ) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

Total Depth 26.59 (TOC) 24.21 (bgs)

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\ -\ )(\ ) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ $ft.^3 \times 7.48$ = _____ gal.

(25.0-8.25)(0.16) + 0.52(12.5) = 9.17 gal/well

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	WATER QUALITY CONDUCTIVITY (x1000)	WATER QUALITY TURBIDITY	WATER QUALITY TEMP. °F	COMMENTS:
3/30/01	0907	BAIL	0 (BEGIN)		0			LOW		- Very low turbidity
	0908	Surge	1							
	0930	BAIL	22		0.5	7.89	8.19	high	69.0	- Some Sand
	0936	↓	6		4.5					
	0938		2		6.5	7.93	12.29	High	69.1	- Lite Grey Color
	0943	↓	5		9.5	7.93	14.06	High	69.1	Bailed Dry DTW 25.10 (TOC)
	1107	RECHARGE								DTW 24.30 (TOC)
	1245									DTW 23.48 (TOC)
4/2/01	1052									DTW: 10.60 (TOC)
	1225	Surge	0							
	12:55	Bail	30		10	7.98	5.12	high	67.5	
	1300		5		15			high		Very Sandy
	1301		1		15.5	7.68	9.53	high	63.7	
	1306				20.0	7.62	11.50	high	63.0	Bailed Dry DTW: 20.65 (TOC)
	1500	RECHARGE								DTW: 24.10 (TOC)
4/3/01	0725									DTW: 19.95 (TOC)
	1204									DTW: 18.37 (TOC)
	1455									DTW: 17.45 (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PT063/PZ024
JOB NO. 313150006 / SITE ECL	PREPARED BY E. Cathcart

METHOD:
- OVERPUMPAGE: ____
- BAILER: X
- SURGE BLOCK: X
- AIR LIFT: ____
- OTHER: ____

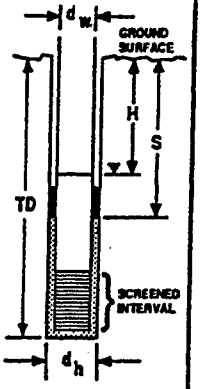
INITIAL WATER LEVEL: ____
FINAL WATER LEVEL: ____

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	WATER QUALITY CONDUCTIVITY µS/cm	WATER QUALITY TURBIDITY	WATER QUALITY TEMP. °F	COMMENTS:
4/4/01	0830		0 (BEGIN)		0					DTW: 11.50 (TOC)
	1230	Surge						High Dark Gray		
	1300	BA:1	30		20.5	7.20	8.13 (x100)	High	63.6	Fine Sand
	1307		7		25	7.28	10.27 (x100)	High	64.4	
	1315	BA:1	8		29	7.23	10.55 (x100)	High	63.9	Bailer Dry DTW: 26.00

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	RZ 025
JOB NO. 313150005	SITE ECL PT-064
	PREPARED BY T. Burton

METHOD:
- OVERPUMPAGE ✓
- BAILER ✓
- SURGE BLOCK ✓
- AIR LIFT
- OTHER

INITIAL WATER LEVEL 16.03

FINAL WATER LEVEL

REMARKS: TD_o = 25.10

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h =

WELL CASING INSIDE DIAMETER d_w ID =

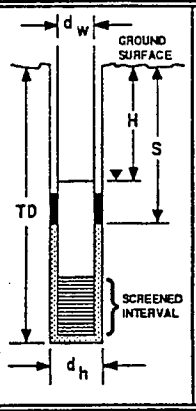
OUTSIDE DIAMETER d_w OD =

DEPTH TO: WATER LEVEL H =

BASE OF SEAL S =

BASE OF WELL TD =

EST. FILTER PACK POROSITY P =



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

= (9.07)(1.14) = 10 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY NTU	TEMP. °F	COMMENTS: Silty/sandy @ bottom
2/1/01	Surge	1036	0 (BEGIN)	←	0					
	1051	↘	15	—						
	1054	Bail	0							Mostly vf-fine sand
	1108	↓	18		7.5					in water
	1110	~				Recharge: 19.37-18.76 in 1min = 0.61'/min = 166 min/ft.				
	1121	Pump	0	0.4						= 0.7 gpm
	1139	↓				6.88	1830	>500	69.4	
	1143	↓	22	0.75	17	6.92	1730	>200	66.7	Increase drawdown
	1149	↓	27	0.5	20	Flow slows as sediment thickens - H_2O				DTW = 22.6
	1155	↓		↓		7.10	1670	>100	68.7	clearing up
	1205	↓		↓	28	6.99	1640	950	69.4	v. cloudy, silty
	1232	↓	71	↓	42	6.88	1580	22	69.5	DTW = 22.77
										clear

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ 026
JOB NO. 313150005 / SITE ECL PT-061	PREPARED BY T. Burtoon

METHOD: OVERPUMPAGE ✓ ; BAILER ✓ ; SURGE BLOCK ✓ ; AIR LIFT ____ ; OTHER ____

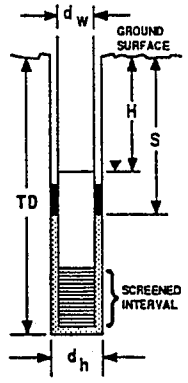
INITIAL WATER LEVEL 5.57
FINAL WATER LEVEL 5.71

REMARKS: TD_o = 27.42

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} × 7.48 = ____ gal.

~~220~~ = 10(1.14) + 12(0.16) = 11.4 + 1.9 = ~~13.3~~ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY NTU	TEMP. °F	COMMENTS:
2/6/01	1424	Bail	0 (BEGIN)	—	0					Dark gray, silty
	1431	↓	7		5	Recharge: 13.00	11.90 in	30 sec		= 22'/min = 2.5 gpm
	1439	Surge	0	—						
	1454	↓	15							
	1458	Bail	0	—			~~[illegible]~~	>1000		Dark gray, very
	1500	↓	2		7.5					little sand
	1509	Pump	0	2.0	Flow	Test: 2 gpm in	bucket	@ 120 Hz		
	1512	↑	3							Very dark gray
	1515		6	0.9	20					Reduce speed to 110 Hz
	1519		10	1.0		6.11	1090	>1000	64.8	Color is lighter gray
	1523		14		28	6.07	1040	150	62.4	Clearing (cloudy)
	1530		21	1.5-2.0	35	Draw in silt from FP. - Very Turbulent dK. gray				
	1532		23	0.4	38			550		Reduce speed to 110 Hz
	1536		27	0.5	40	6.04	1070	120	60.0	Clearing
	1540	↓	31	↓	42			85		Stop
	1551									DTW = 5.73

P2-028

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PTOC7 / P2028
JOB NO. 313150006 / SITE ECI	PREPARED BY E. Cathcart

METHOD: OVERPUMPAGE ____ BAILER ✓ SURGE BLOCK X AIR LIFT ____ OTHER ____

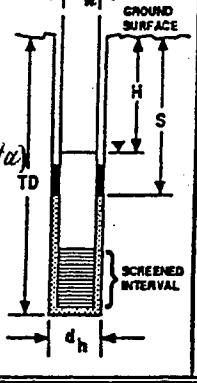
INITIAL WATER LEVEL 28.30 (TOC)
FINAL WATER LEVEL ____

REMARKS: 26.10 (BGS)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = 28.30 (TOC)
BASE OF SEAL S = 25
BASE OF WELL TD = 35.4
EST. FILTER PACK POROSITY P = 40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

TD = 37.44 (TOC) / 35.24 (MSL) (*if S>H use S, if S<H use H.)

30.12 = 80% (TOC) $3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

(26.10 - 35.4)(0.16) + 0.52(15.5) = 9.6 gal / WV

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	WATER QUALITY CONDUCTIVITY (µS/cm x10^6)	WATER QUALITY TURBIDITY	WATER QUALITY TEMP. F	COMMENTS:
3/30/01	1001	BAIL	0 (BEGIN)		0			high		Very fine (Clay)
	1005	Surge	4							
	1035	BAIL	30		2.5	7.80	19.39 (x100)	high	70.8	
	1040	|	5		4	7.98	2.11 (x1000)	high	68.1	
	1047	↓	7		7.5	7.92	2.77 (x1000)	high	69.0	Bailed Dry DTW = 35.00 (TOC)
	1242	RECHARGE								DTW = 34.00 (TOC)
4/2/01	1045		0							DTW = 28.78 (TOC)
	1047	Surge	2							
	1117	BAIL	30		8	7.90	18.62 (x100)	high	~~60.~~	
	1126	|	9		11	7.91	17.15 (x100)	moderate	63.3	
	1130	|	4		12.5	7.98	1.99 (x1000)	mod.	63.6	
	1132	↓			13.0					Bailed Dry DTW = 34.35 (TOC)
	1240	RECHARGE								DTW: 33.82 (TOC)
	1455									DTW: 33.40 (TOC)
4/3/01	0725	Surge								DTW: 30.10 (TOC)
	0800	BAIL	35		13.5	7.97	17.99 (x100)	mod	55.8	Lite Brown Color GRAY
	0805	|			15.5	7.90	17.93 (x100)	mod	58.8	
	0815	↓			20.5	7.90	2.39 (x1000)	mod	58.8	Bailed Dry DTW: 34.35 (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ-029
JOB NO. 313150005	SITE P2 South PT-074
	PREPARED BY TBurton

METHOD:
- OVERPUMPAGE: ____
- BAILER: ✓
- SURGE BLOCK: ✓
- AIR LIFT: ____
- OTHER: ____

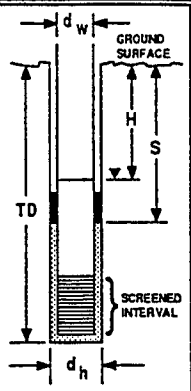
INITIAL WATER LEVEL: 20.03
FINAL WATER LEVEL: ____

REMARKS: TD_o = 32.8 TD = 32.28' to cup

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = ____ $ft.^3 \times 7.48 =$ ____ gal.

= 2 (0.16) + 10 (1.14) = 11.4 + .32 = 11.7 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY NTU	TEMP. °C	COMMENTS:
2/7/01	1726	Bail	0 (BEGIN)	—	0					Clear, some fine sand
	1730	↓			2.5	Slow Recharge ≈ 0.1'/min @ 23.03'				
	1735	↓	9		8.5					Bailed Dry
2/8/01	0830	Surge	0	—						DTW = 22.97'
	0845	↓	15							
	0848	Bail	0	—	15.5					Silty, no sand.
	0850	↓	2							Bailed Dry
2/15/01	1058	Bail	0							DTW = 19.35'
	1104	↓				7.12	772	>1000	64.2	
	1108	↓				6.62	804	>1000	62.7	Olive gray/brown
	1111	↓	13			6.52	772	>1000	62.8	Bailed Dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

94

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne (Boeing)	PZ075 / PZ030
JOB NO. 31315O006 / SITE Compound A / PREPARED BY E. Cathcart	

METHOD: OVERPUMPAGE ____ BAILER X SURGE BLOCK X AIR LIFT ____ OTHER ____

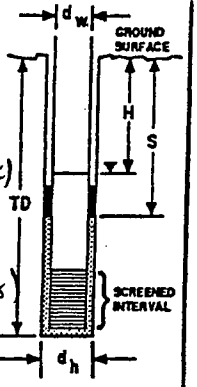
INITIAL WATER LEVEL 9.51 (toc)
FINAL WATER LEVEL ____

REMARKS: DTW - 9.51 (TOC) TD 29.9 (TOC)
7.03 (BGS) 27.4 (BGS)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = 9.51 (toc)
BASE OF SEAL S = ____
BASE OF WELL TD = 27.4 bgs
EST. FILTER PACK POROSITY P = 40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

13 ft (toc) = 80% recharge
13.6
16.0 (BGS) = top of screen

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

(7.03 - 27.4) 0.16 + 10(0.52) = 8.5 gal/wv

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY (uS/cm)	TURBIDITY	TEMP.	COMMENTS:
3/30/01	1025	BAIL	0 (BEGIN)		0			very char		
	1030	Surge	5							
	1200	BAIL	30		0.5	8.09	12.50 (x100)	high	69.0	Grey color
	1206	BAIL	6		5	8.03	13.69 (x100)	high	64.8	
	1212	↓	6		10	7.98	14.75 (x100)	high	63.3	
	1215	↓	3		11	7.95	14.73 (x100)	high	63.5	Before Purge DTW = 29.20 (toc)
4/2/01	0825		0							DTW = ~~10.03~~ 10.45 (toc)
	0940	Surge								
	1010	BAIL	30		11.5	7.74	12.65 (x100)	high	57.5	
	1015	↓	5		16			high		
	1020	↓	5		20	7.96	13.44 (x100)	high	59.6	
	1021	↓	1		21			high		
	1025	↓	~~1~~ 4		23	7.85	17.85 (x100)	high	57.8	DTW = 29.23 toc
	1227	RECHARGE								DTW = 25.10 (toc)
	1440	↓								DTW = 23.48 (toc)
4/3/01	0748	↓								DTW = 16.90 (toc)
	1218	↓								DTW = 14.18 (toc)
	1500	↓								DTW = 13.23 (toc)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocketdyne (Boeing)		PT075/PZ030
JOB NO. 31315000G	SITE Compound A	PREPARED BY E. Cathcart

METHOD:
- OVERPUMPAGE _____
- BAILER X
- SURGE BLOCK X
- AIR LIFT _____
- OTHER _____

INITIAL WATER LEVEL See p.1

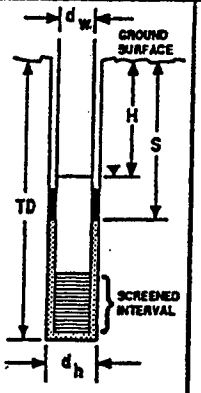
FINAL WATER LEVEL _____

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY	TEMP. °F	COMMENTS:
			0 (BEGIN)		0					
4/4/01	1330	Surge								DTW: 11.16 (TOC)
	1400	Bail	30		23.5	7.39	10.59(x100)	High	59.6	Light Grey Color
	1405	↓	5		28	7.47	10.59(x100)	High	60.4	
	1407		2		29	7.50	10.93(x100)	High	60.4	
	1415	↓	8		33	7.56	11.78(x100)	High	60.1	Bailed Dry DTW: 29.00 (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

96

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne (Boeing)	RT026 / PZ031
JOB NO. 313150006	SITE Compound A
	PREPARED BY E. Cathcart

METHOD: OVERPUMPAGE ____ BAILER X SURGE BLOCK X AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 9.45 (TOC)

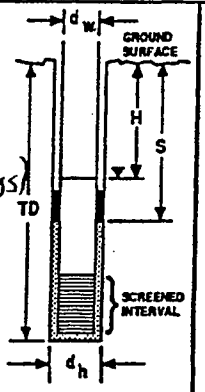
FINAL WATER LEVEL ____

REMARKS: DTW-9.54 (TOC) 6.55 (BGS) TD = 25.99 (TOC) 23.05 (BGS)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = 6.55 (BGS)
BASE OF SEAL S = 9
BASE OF WELL TD = 23.4
EST. FILTER PACK POROSITY P = 40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

12.29 : 80% recharge

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

15 (0.52) + 0.16 (23.4 - 6.55) = 10.5 gal / wv

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	WATER QUALITY CONDUCTIVITY µS/cm (µ/0)	WATER QUALITY TURBIDITY	WATER QUALITY TEMP.	COMMENTS:
~~1/3~~			0 (BEGIN)		0					
3/30/01	1230	Bail	0		0.5			Low		-Clear H_2O
	1235	Surge	5							
	1305	Bail	30		1	7.95	17.02	High	71.8	Some Sand
	1310	↓	5		5					
	1315		5		10	7.93	15.62	High	64.50	
	1320	↓	5		15	8.07	19.06		66.6	Bailed Dry DTW = 23.0 (TOC)
4/2/01	0820									DTW = 10.08 (TOC)
	0845	Surge	25							
	0915	Bail	30		15.5	7.77	14.92	high	57.8	
	0922	Bail	7		20					
	0925	Bail	3		22	7.93	13.53	high	58.7	Fine Sediment / no Sand
	0931	Bail	6		25	7.97	18.32	high	58.6	Bailed Dry DTW = 23.00 (TOC)
	1010	↓								DTW = 18.20 (TOC)
	1031									DTW 16.30 (TOC)
	1230	↓								DTW 11.33 (TOC)
	1434	Surge								
	1503	Bail			25.5					

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocket Dyne (Boeing)	P4076 / PZ031
JOB NO. 313150806 / SITE Compound A / PREPARED BY E. Cathcart	

METHOD: OVERPUMPAGE _____ BAILER X SURGE BLOCK X AIR LIFT _____ OTHER _____

INITIAL WATER LEVEL See p.1

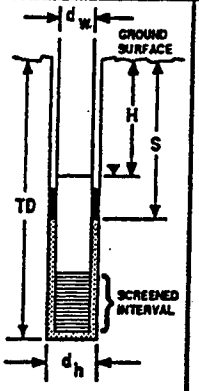
FINAL WATER LEVEL _____

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ $ft.^3 \times 7.48$ = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY X100	TURBIDITY	TEMP. °F	COMMENTS:
4/2/01	1505	BA.1	0 (BEGIN)		26	7.77	9.79	high	63.4	Sandy turbidity
	1510	BA.1	5		30					
	1513	↓			33	7.71	10.58	high	61.4	
	1520	↓			35	7.78	13.39	high	60.1	Bailed Dry @ 3.00 (+0C) - DTW

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ 033
JOB NO. 313150005	SITE Comp A, PT-082
	PREPARED BY T. Burton

METHOD:
- OVERPUMPAGE: _____
- BAILER: ✓
- SURGE BLOCK: ✓
- AIR LIFT: _____
- OTHER: _____

INITIAL WATER LEVEL 20.80'

FINAL WATER LEVEL _____

REMARKS:
TD_0 = 24.02
Only 3.2' saturated.

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

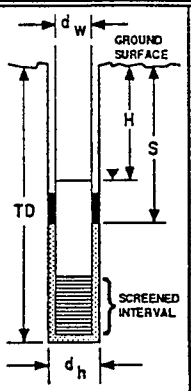
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS
2/1/01	1330	Bail	0 (BEGIN)	—	1.5					DK. gray, silty
	1331	Surge	0	—						
	1338	↓	7							
	1340	Bail			4					Bailed dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ 034
JOB NO. 313150005 / SITE Comp A RT-080	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ✓ ; BAILER ✓ ; SURGE BLOCK ✓ ; AIR LIFT ____ ; OTHER ____

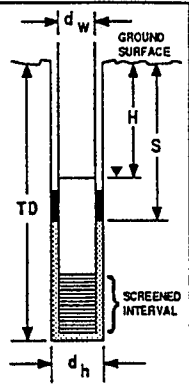
INITIAL WATER LEVEL 8.79
FINAL WATER LEVEL 9.11

REMARKS: TD_0 = 13.50 silty bottom TD = 15.05 sandy
Screen interval is 7'

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ ft.^{3} × 7.48 = ____ gal.

= 6.25(1.14) = 7 gallons

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY NTU	TEMP. °F	COMMENTS: Olive gray Very sandy initially
2/7/01	1004	Bail	0 (BEGIN)	—	0	Fast Recharging				TD = 14.05 after 1st bail
	1016	↓			8					TD = 15.04 to cap
	1019	Surge	0	—						
	1034	↓	15							TD = 14.5 (6" sand)
	1042	Bail		—	17					DTW = 9.15
	1119	Pump	0	1.75		~~6.69~~	—			light olive gray
	1121	|	2			6.64	779	270	51.9	Cloudy
	1126	|	7			6.40	771	50	52.3	clear
	1129	↓	10	2.5	35	Pumped dry				
	1133	Pump	0	0.25						cloudy, silty
	1140	|	7	1.40	37					
	1141	|	8	0.3	39					clearing
	1146	↓	13	0.75				100		
	1149		16		42			50		clear

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ036
JOB NO. 313150005 / SITE STL IV PT-089	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ✓ ; BAILER ✓ ; SURGE BLOCK ✓ ; AIR LIFT ____ ; OTHER ____

INITIAL WATER LEVEL 19.67

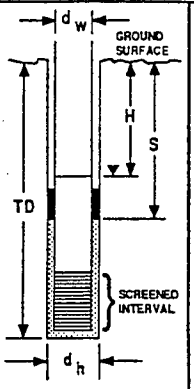
FINAL WATER LEVEL ____

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ $ft.^3 \times 7.48 =$ ____ gal.

= (28.21 - 19.67)(1.14) = (8.54 + .85) = 9.4 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY	TEMP. °F	COMMENTS:
										TD_o = 28.21
1/31/01	1253	Surge	0 (BEGIN)	—	0					
	1313	↓	20	—						Dark olive, v. silty,
	1315	Bail	0	—				v. high		very little vf sand
	1324	↓	9	—	5	Recharge: 21.60-21.50 in		14 sec =		2.33 min/ft. TD=29.06
	1339	Pump	0	≈ 1.0	Artificial due to fluid thickness					Very silty, olive brn.
	1346	|	7	0.75						Flow test: 0.87 gpm
	1407	|	26	|	25	7.18	1100	>500	70.4	Less silt, very cloudy
	1417	|	36	|	33	7.17	1130	726	65.4	clearing @ 1420
	1422	|	41	↓	37	7.17	1050	126	66.8	suspended silt, cloudy
	1428-1430			2.0	41	Increase flow to draw in fines Dark, silty				
	1430-1440	|		0.75	49	Turbidity returns to just cloudy susp. silt				
	1440	|		1.5		<30 seconds high flow draws in dark silty water				
	1441	|		0.75						
	1454	|		0.5	58	Lower flow to allow recharge + lower turbidity				
	1458	|	72	1.5		Increase pump rate again				
	1503	↓	77	↓	66	Well pumped dry				
	1555	—								DTW = 21.08
	1627-55	Pump	28	0.75	80			250→65		low susp. silt

P2-001D

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	P2-040D
JOB NO. / SITE: RD-09 area	PREPARED BY: B. Stewart

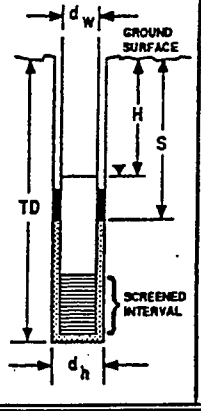
METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 24.36 (TOC)
FINAL WATER LEVEL ~~33.34~~ ~~38.05 (TOC)~~ TD = 39.13 ft (TOC)

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/12/01	1423		0 (BEGIN)		0					
	1425				8 oz	7.42	2.01	High	65.4	High Turbidity
	1430				16 oz					Problem w/ check valve
	1442									Restarted pumping
	1445				32 oz	7.42	1.73	High	64.3	High Turbidity
	1450				40 oz	7.30	2.14	High	66.3	Bailed dry
										Still High Turbidity
3/13/01	0736				0					WL = 23.72 (TOC)
	0741				14 oz	7.26	1.37	Mod	57.9	Moderate Turbidity
	0746				32 oz	7.30	1.22	Mod	57.2	Bailed dry - wl = 37.48 (Sw)
3/19/01	1501				0					Started hand-pumping
										- DTW = 21.80 ft (TOC)
	1503				2 oz	~~7.52~~ ~~8.80~~	0.96	Mod	75.1	
	1508			22	~~22~~ oz	7.38	0.89	Mod	66.3	
	1515							Mod		Pumped dry
										- DTW = 38.00 ft (TOC)
										Discharge slightly cloudy but clear

PZ-001E

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PT-040E
JOB NO. / SITE: RD-09 area	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 35.87 (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 52.21 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

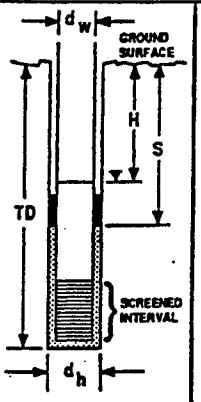
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ $ft.^3 \times 7.48$ = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/13/01	0757		0 (BEGIN)		0					DTW = 35.87 ft (TOC)
	0802				2 oz	7.22	1.12	High	53.0	High Turbidity
	0805				16 oz	7.09	0.90	High	55.5	Bailed dry
										DTW = 51.43 ft (TOC)
										TD = 52.21 ft (TOC)
3/19/01	1532				0					Started hand-pumping
										- DTW = 41.76 ft (TOC)
	1534				2 oz	7.11	2.80	Mod	65.3	
	1537				4 oz			Mod		Pumped dry
										- DTW = 47.25 ft (TOC)
										Discharge slightly cloudy but clean
3/26/01	1103				0					STARTED PUMPING
	1105				4 oz	6.88	2.71	High	61.9	DTW = 38.49 ft (TOC)
	1109				24 oz	7.01	2.87	High	62.8	PURGED DRY
										DTW = 49.05 ft (TOC)
										DISCHARGE HIGHLY
										SILTY

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PT-040F
JOB NO. / SITE: RD-09 area	PREPARED BY: B. Stewart

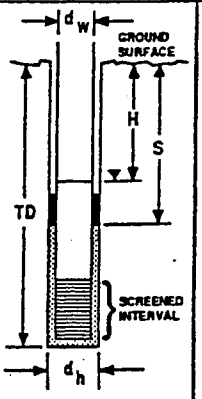
METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

INITIAL WATER LEVEL 25.10 ft (TOC)
FINAL WATER LEVEL _____

REMARKS: TD = 58.98 ft

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/13/01	0821		0 (BEGIN)		0					DTW = 25.10 ft (TOC)
	0823				2 oz	7.08	1.83	Low	54.7	Low Turbidity
	0827				4 oz	7.78	3.84	High	54.6	High Turbidity
	0834				12 oz	7.78	4.30	High	54.9	High Turbidity
	0843				18 oz	8.08	3.72	High	55.5	High Turbidity
	0845									~~DTW~~ Pumped dry
										DTW = 45.08 ft
	0850									Valve clogged
	0905				24 oz			High		Began pumping again
										-valve clogged again
3/13/01	0915				28 oz			High		~~TOD~~ DTW = 47.08 ft
3/14/01	1117				Ø					START OF PURGING
										DTW = 21.14 ft (TOC)
	1120				4 oz	6.55	1.95	High	62.5	VERY SILTY
	1130				24 oz	6.63	3.21	Mod	62.1	DISCHARGE CLOUDY
	1136				56 oz	7.03	2.72		62.0	CHANGED BACK TO SILTY
										DTW = 57.44 ft (TOC)

PURGED DRY

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

13

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PT-040F
JOB NO. / SITE: RD-09 area	PREPARED BY: ED SARAO

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

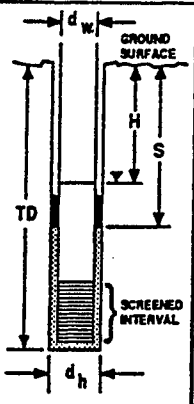
INITIAL WATER LEVEL _____
FINAL WATER LEVEL _____

REMARKS: TD = 58.98 ft.

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS	TURBIDITY	TEMP.	COMMENTS:
3/28/01	0850		0 (BEGIN)		0					DTW = 23.94' (TOC)
	0900				14 oz		4.23	MOD.	60.8	
	0912				32 oz		4.28	MOD	60.7	
	0918				48 oz		4.38	MOD	61.9	PURGED DRY
										DTW = 57.22' (TOC)
										DISCHARGE → @ SLIGHTLY
										CLOUDY
4-23-01										PULLED SOLINST PROBE TIP, PREVIOUSLY LOST
										ON 3-19-01
4-24-01	1330				0					DTW = 21.96' (TOC)
	1335				8 oz.	7.07	2.66	High	70	BROWN SILTY
	1400				56 oz.	7.56	2.77	High	72.2	Purged DRY, DTW = 57.70'
										SILTY
~~4-25-01~~ 4-24-01	1413				0					DTW = 28.62'
	1424				8 oz	7.68	2.55	MODERATE	74.6	CLOUDY SILTY
	1500				44 oz	7.66	2.61	HIGH	77.9	PURGED DRY, VALVES KEPT PLUGGING

DTW = 57.32' VERY SILTY

Error

PZ-002B

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne /SSFL	PZ-026B
JOB NO. / SITE: CTL-III	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

INITIAL WATER LEVEL 11.77 ft (TOC)

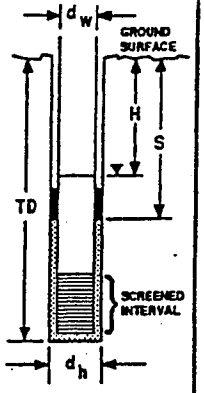
FINAL WATER LEVEL _____

REMARKS: TD = 14.72 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ $ft.^3 \times 7.48$ = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/14/01	0953		0 (BEGIN)		0					DTW = 11.77 ft (TOC)
	0954				2 oz	6.89	2.05	Mod	62.2	Problem w/ Hydac
	1004				6 oz			Mod		Pumped dry
										DTW = 12.50 ft
3/20/01	1307				∅					STARTED PUMPING
										DTW = 11.41 ft (TOC)
	1309				3 oz	7.64	1.85	MOD	71.4	
	1319				32 oz	7.53	1.74	Low	68.5	
	1329				62 oz	7.35	1.75	Low	70.7	Pumped dry
										DTW = 14.67 ft (TOC)
3/26/01	1635				∅					STARTED PURGING
	~~1636~~									DTW = 11.34 ft (TOC)
	1636				8 oz		1.41		65.4	DISCHARGE CLOUDY
	1645				24 oz		1.45		66.1	DTW = 14.32 ft ~~FG~~
										PURGED DRY

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-026C
JOB NO. / SITE: CTL-III	PREPARED BY: B. Stewart

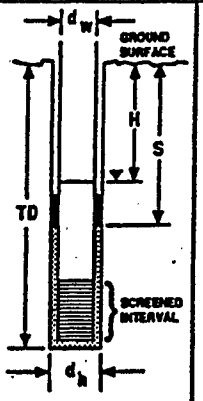
METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 11.86 ft (TOC)
FINAL WATER LEVEL _____

REMARKS: TD = 26.75 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG: DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/14/01	1012		0 (BEGIN)		0					DTW = 11.86 ft (TOC)
	1014				4 oz	5.96	1.96	High	66.7	Strong H_2S odor
										- Dk gray color
	1019				48 oz	7.01	1.95	High	66.2	
	1029				92 oz	7.02	1.83	High	65.6	
	1039				120 oz	7.58	1.73	High	86.7	
	1041				128 oz			High		Ceased pumping
										- DTW = 12.34 ft (TOC)
3/15/01	0812						1.66		64.6	DTW = 13.36 ft (TOC)
	0815				4 oz		1.66	High	64.6	Dark grey color
	0825				28 oz		1.66	High	63.7	
	0835				64 oz		1.60	High	64.8	
	0852				130 oz		1.83	High	65.4	Ceased pumping
										DTW = 11.38 ft (TOC)

PZ-002C

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

16

WELL DEVELOPMENT

PROJECT	WELL NO.
RocketDyne /SSFL	PZ-026C
JOB NO. / SITE: CTL-III	PREPARED BY: ED SARAO

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

INITIAL WATER LEVEL 11.28 ft

FINAL WATER LEVEL _____

REMARKS: TD = 26.75 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

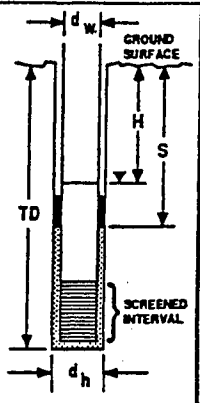
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\ -\ ) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\ -\ )(\ ) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/28/01	1231		0 (BEGIN)		0					DTW = 11.28' (TOC)
	1235				12 Oz		2.15	HIGH	70.2	GREYISH COLOR
	1245				72 Oz		2.07	HIGH	68.1	
	1255				128 Oz		2.11	HIGH	69.7	CEASED PUMPING
										DTW = 11.55'

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-002D

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-026D
JOB NO.	SITE
	CTL-III
	PREPARED BY
	B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 12.05 Ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 36.58 Ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

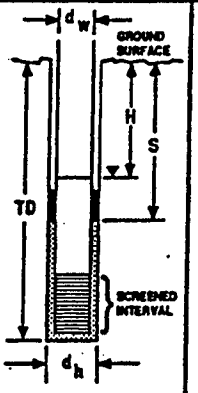
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/14/01	1055		0 (BEGIN)		0					DTW = ~~1055~~ 12.05 ft (TOC)
	1057				4 oz.	7.18	3.37	High	66.1	Strong H_2S odor
	1102				64 oz	7.47	1.65	High	67.2	
	1112				108 oz	7.50	1.55	High	67.4	
	1122				128 oz	7.58	1.49	High	67.0	Ceased pumping
										- 12.39 ft (TOC)
										Discharge dk gray
3/27/01	0858				~~0~~					DTW = 12.34 ft (TOC)
	0902				60z		2.07	High	66.5	
	0908				50z		2.17	High	66.2	
	0918				112oz		1.95	Mod	66.9	
	0929				160oz		1.81	Mod	68.0	DTW = 12.20 ft (TOC)
										Ceased pumping
3/28/01	1310				~~0~~					DTW = 11.31'
	1315				16 oz		3.08	HIGH	67.8	GREYISH COLOR
	1325				48oz		2.13	HIGH	67.8	
	1340				112oz		2.60	MOD	66.9	"SILTY" DTW = 11.52

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-002E

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne /SSFL	PZ-026E
JOB NO. / SITE: CTL-III	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 11.85 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 51.51 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

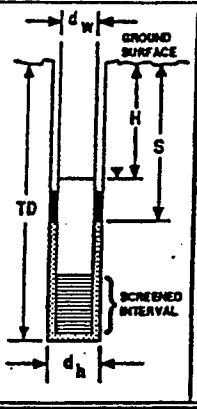
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/14/01	1239		0 (BEGIN)		0					DTW = 11.85 ft (TOC)
	1242				4 oz	8.38	1.62	High	71.0	Strong H_2S odor
	1247				32 oz	7.52	0.93	High	69.0	
	1253				48 oz	8.29	1.11	High	69.8	Pumped dry
										- DTW = 50.85 ft (TOC)
3/20/01	1345				0					STARTED PUMPING
										DTW = 11.44
	1347				6 oz	6.85	1.42	HIGH	71.2	
	1357				32 oz	7.06	1.28	HIGH	72.8	
	1415				68 oz	7.09	1.15	MOD	73.7	PUMPED DRY
										DTW = 50.10
3/27/01	0934				0					DTW = 18.34 ft TOC
	0935				4 oz		1.73	low	66.7	
	0948				4 1/2 oz		1.80	High	66.4	
	0953				58 oz		1.78	High	72.3	pumped dry
										DTW = 48.68 ft TOC

1 of 2

PZ-002F

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne - SSFL	PZ-026F
JOB NO. / SITE: CTL-TM	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 12.13 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 64.70 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

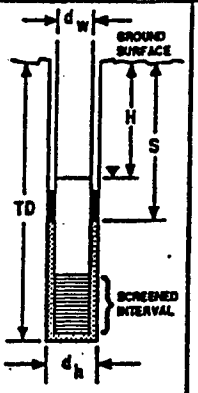
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*If S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.³ x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/14/01	1305		0 (BEGIN)		0					DTW = 12.13 ft (TOC)
	1307				8 oz	8.58	1.40	High	68.1	Dk brown - no odor
	1312				30 oz	8.17	1.32	High	67.9	
	1322				64 oz	7.93	1.06	High	67.7	
	1332				110 oz	8.02	1.04	High	67.2	HIGH TURBIDITY
	1342				158 oz	8.05	0.99	High	67.2	
	1352				180 oz	7.81	0.94	High	66.6	Ceased pumping
										- DTW = 12.14 ft (TOC)
										Discharge dk brown
3/21/01	0756				0					STARTED PUMPING
										DTW 11.48 ft (TOC)
	0759				4 oz	6.92	0.76	HIGH	64.4	
	0809				44 oz	6.92	0.75	HIGH	65.5	
	0819				80 oz	6.86	0.76	MOD	66.1	CEASED PUMPING
	0821									DTW = 11.68 ft (TOC)
					See Next Page					

2 of 2

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-002F

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-026F
JOB NO. / SITE: CTL-III	PREPARED BY

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial lift

INITIAL WATER LEVEL 12.13 ft TOC

FINAL WATER LEVEL _____

REMARKS: TD = 64.70 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

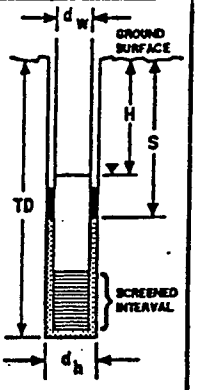
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} × 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/27/01 ~~1008~~	1008		0 (BEGIN)		0					DTW = 11.36
~~1010~~	1010									started pumping
	1012				8oz		1.33	High	67.8	
	1021				42oz		1.36	High	68.7	
	1033				88oz		1.36	High	69.7	DTW 11.42
3/28/01 ~~1350~~	1350				~~0~~					DTW = 11.31' (TOC)
	1355				16 oz		1.56	High	69.5	
	1410				48 oz		1.53	High	68.8	
	1425				96 oz		1.63	High	68.2	"SILTY" CEASED
										PUMPING, DTW = 11.62

Page #2

1 of 2

PZ-002G

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PZ-026G
JOB NO. / SITE: CTL-III	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 11.66 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 69.36 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

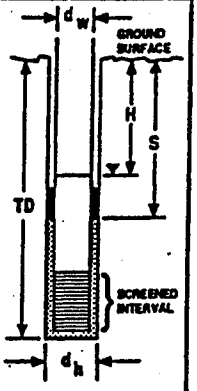
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/14/01	1410		0 (BEGIN)		0					DTW = 11.66 ft (TOC)
										Problem - tube clogged
	1427				0					Restarted pumping
	1429				8 oz	8.20	0.98	High	72.2	
	1434				44 oz	7.82	0.86	High	69.2	
	1439				64 oz	7.75	0.72	High	68.1	
	1449									Tube clogged
										- DTW = 12.05 ft
3/15/01	0951				0					DTW = 12.21 ft
	1006				8 oz	6.95	0.93	Mod	64.1	Started pumping
	1012				↓	↓	↓	↓	↓	Dk brown color - no odor
	1017				16 oz	6.81	0.97	High	65.4	
	1033				32 oz	6.93	0.97	High	65.1	HIGH TURBIDITY
	1045				48 oz	6.97	1.06	Mod	66.9	Ceased pumping
										DTW = 14.61 ft (TOC)
										Discharge stabilizing

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-002 G

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PZ026G
JOB NO. / SITE: CTL-III	PREPARED BY

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 11.66 ft (TOC)

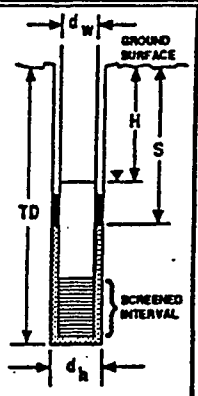
FINAL WATER LEVEL _____

REMARKS: TD = 69.36 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ $ft^3 \times 7.48$ = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/27 2001	1048		0 (BEGIN)		0					DTW = 11.57 ft (TOC)
	1100									started pumping, tube couldn't be pushed completely to bottom ~ 10 ft up line
	1118				20.0Z		1.52	Mod	79.5	
	1138				50.0Z		1.47	High	76.6	stopped pumping
										DTW = 14.42 (TOC)
3/28/01	1435				0					DTW = 11.45'
	1455				16 OZ		1.67	High	73.0	CANNOT GET TUBE TO REACH BOTTOM
	1525				48 OZ		1.56	High	69.4	CEASED PUMPING
										DTW = 11.52'

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Boulder dyne / NASA	PZ-004A
JOB NO. 31350007	SITE COCO/PIF PT-004A
	PREPARED BY E. Cathcart

METHOD: OVERPUMPAGE X; BAILER X; SURGE BLOCK X; AIR LIFT ____; OTHER ____

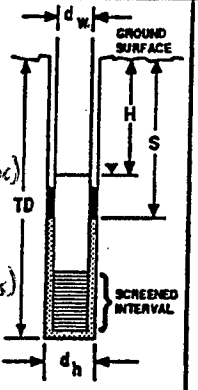
INITIAL WATER LEVEL 10.91 (TOC)

FINAL WATER LEVEL ____

REMARKS: DTW = 5.19 (bgs) 80% = 12.4 (TOC)
18.32 (TOC) total depth 15.60 (bgs) total depth

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = 10.91 (TOC)
BASE OF SEAL S = 4
BASE OF WELL TD = 15.40 (bgs)
EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

0.16(15.4 - 8.19) + 0.52(12) = 7.4 gal / well

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	WATER QUALITY CONDUCTIVITY µS/cm	WATER QUALITY TURBIDITY	WATER QUALITY TEMP. °F	COMMENTS:
4/5/01	1027	BA:1	0 (BEGIN)		0.5			low		clear, very little sediment
1030	~~1030~~	Surge								
	1105	BA:1	38		1	8.14	8.06 (x100)	high	63.5	
	1110	↓	5		5	8.37	6.91 (x100)	high	61.1	
	1113		~~7~~ 3		7			moderate		
	1115		~~8~~ 2		8	8.47	6.84 (x100)	low	59.9	
	1120	↓	~~10~~ 5		10	8.46	5.27 (x100)	cloudy	59.7	BA:1 on Pump DTW: 17.50 (TOC)
	1123		3							DTW: 15.20 (TOC)
	1125		2							DTW: 14.00 (TOC)
	1130		5							DTW: 12.35 (TOC)
	1243									DTW: 11.00 (TOC)
	1249	Pump	0	0.5		8.98	7.62 (x100)	clear	66.5	clear H_2O
	1256	↓	7	0.5	~~13~~ 13.5	8.97	7.84 (x100)	clear	65.5	Pumped Dry
	1300									DTW: 12.85 (TOC)
	1305									DTW 11.98 (TOC)
	1306	Pump		0.25	13.5	8.78	6.01 (x100)	clear	62.4	
	1316		10	0.25	16.0	8.77	6.22 (x100)	clear	63.2	
	1331		15	0.25	19.75	8.79	6.18 (x100)	clear	62.7	
	~~1331~~		~~0~~	~~X~~						

Page 2 of 2

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocketdyne / NASA		PZ-004A
JOB NO.	SITE	PREPARED BY
31350007	COCA/PLF	E. Cathcart

METHOD:
- OVERPUMPAGE: X
- BAILER: X
- SURGE BLOCK: X
- AIR LIFT: ______
- OTHER: ______

INITIAL WATER LEVEL ______

FINAL WATER LEVEL ______

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ______

WELL CASING INSIDE DIAMETER d_w ID = ______

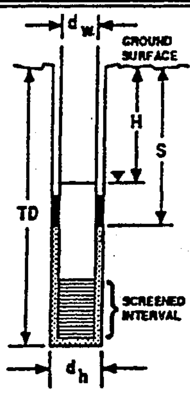
OUTSIDE DIAMETER d_w OD = ______

DEPTH TO: WATER LEVEL H = ______

BASE OF SEAL S = ______

BASE OF WELL TD = ______

EST. FILTER PACK POROSITY P = ______



WELL VOLUME CALCULATION:

CASING VOLUME $= V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_C =$ ____ + ____ = ______ $ft.^3 \times 7.48 =$ ______ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
			0 (BEGIN)		0					
4/5/11	1331	Pump		1	19.75					
	1336	Pump	5	1	24.75	8.76	6.51(x100)	Clear	62.2	DTW= 14.80 (TOC) Pumped dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ005
JOB NO. 313150005 / SITE SHEA PT-102	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ✓ ; BAILER ✓ ; SURGE BLOCK ✓ ; AIR LIFT ____ ; OTHER ____

INITIAL WATER LEVEL 14.50

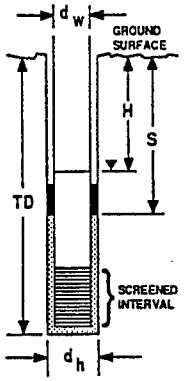
FINAL WATER LEVEL ____

REMARKS: TD_o = 23.50

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = ____ ft.^{3} × 7.48 = ____ gal.

= (9.00)(1.14) = 10.8 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY NTU	TEMP. °F	COMMENTS: Little sand in bottom
2/1/01	1551	Surge	0 (BEGIN)	—	0					
	1607	↓	16	—						Dark brown
	1608	Bail	0							Silt & fine sand
	1619	↓	10		9	Recharge: 16.20 – 15.92 in 30 sec. = ~~.264~~ .56"/min = 0.6 gpm				
	1629	Pump	0	1.25						
	1633		4	1.0	14					Very cloudy, dk. brown
	1650		21		31	6.78	1780	850	70.0	
	1657		28		38	6.89	1710	500	67.5	Less brown; cloudy
	1714	↓	45	↓	55			450		

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-006A

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne /SSFL	PT-065A
JOB NO. / SITE: ECL	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 1.90 ft (TOC)

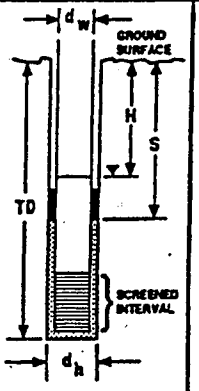
FINAL WATER LEVEL _____

REMARKS: TD = 5.62 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*If S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/15/01	1114		0 (BEGIN)		0					DTW = 1.90 ft (TOC)
	1115				1 oz	6.99	0.81	High	65.8	
	1117				8 oz					Pumped dry
										- DTW = 4.70 ft (TOC)
3/16/01	1254				0					Started pumping
	1255				0.5 oz	7.39	0.81	Low	62.3	- DTW = 1.87 ft (TOC)
	1256				6 oz					Last Pumped dry
										DTW = 5.58 ft (TOC)
3/21/01	0858				0					STARTED PUMPING
	0900				2 oz	7.11	0.01	LOW	63.7	DTW = 2.30 ft (TOC)
	0902				16 oz					PUMPED DRY
										DTW = 5.49 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-006B

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne /SSFL	PZ-006B
JOB NO. / SITE: ECL	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 9.30 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 13.62 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

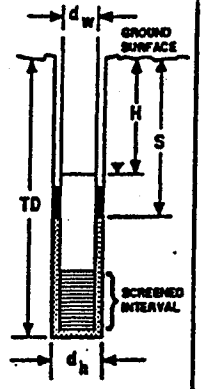
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/15/01	1124		0 (BEGIN)		0					DTW = 9.30 ft (TOC)
	1125				1 oz	7.52	4.52	High	64.3	Dark brown - no odor
	1126				2 oz			High		Pumped dry
										- DTW = 13.55 ft (TOC)
3/28/01	0748				0					DTW = 12.89' (TOC)
	0758				0					CANNOT GET ANY
										WATER OUT
3/30/01	1003				0					DTW = 12.82'
	1010				1 oz		8.20	High	71	PUMPED DRY
										DTW = 13.41'

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-006C

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-065C
JOB NO. / SITE: ECL	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 2.72 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: ~~TD~~ TD = 17.70 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

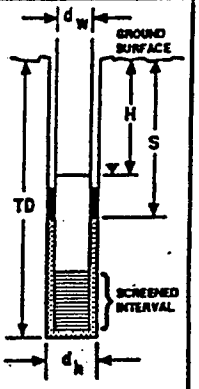
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/15/01	1132		0 (BEGIN)		0					DTW = 2.72 ft (TOC)
	1133				4 oz	7.43	1.34	Mod	63.3	Cloudy, ~~brown~~ gray
	1138				24 oz	7.25	1.26	Low	65.0	Pumped dry
										-DTW = 17.30 ft (TOC)
3/15/01	1304				0 oz					Started pumping
	TD									-DTW = 2.93 ft (TOC)
	1305				4 oz	7.27	1.60	Low	64.8	Discharge clear
	1307				24 oz					Pumped dry
										-DTW = 17.08 ft (TOC)
3/21/01	0915				0					STARTED PUMPING
										DTW = 3.37 ft (TOC)
	0917				5 oz	7.16	1.13	LOW	65.4	DISCHARGE CLEAR
	0922				24 oz	7.24	1.16	LOW	65.9	PUMPED DRY
										DTW = 17.85 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

P2-006D

WELL DEVELOPMENT

PROJECT	WELL NO.
RocketDyne / SSFL	P2-065D
JOB NO. / SITE: ECL	PREPARED BY: JS

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 2.67 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 23.68 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

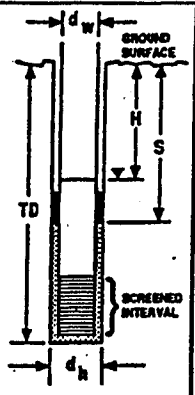
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/15/01	1219		0 (BEGIN)		0	7.73	2.02		70.09	DTW = 2.67 ft (TOC)
	1221				2 oz	↓	↓	Mod	↓	Cloudy, Lt Gray
	1224				32 oz					Pumped dry
										-DTW = 22.53 ft (TOC)
3/15/01	1315				0					Started pumping
										-DTW = 3.39 ft (TOC)
	1316				4 oz	7.35	1.99	Low	65.2	Discharge clear
	1319				32 oz			Mod		Keep Pumped dry
										-DTW = 22.72 ft (TOC)
3/21/01	0930				0					STARTED PUMPING
										DTW = 3.29 ft (TOC)
	0932				8 oz	7.25	1.21	LOW	66.6	DISCHARGE CLEAR
	0937				36 oz	7.33	1.24	LOW	67.2	PUMPED DRY
										DTW = 23.70 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-006E

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-065E
JOB NO.	SITE: ECL
	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 1.49 ft (TOC)

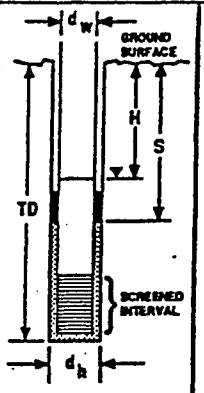
FINAL WATER LEVEL _____

REMARKS: TD = 34.46 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS	TURBIDITY	TEMP.	COMMENTS:
3/15/01	1233		0 (BEGIN)		0					DTW = 1.49 ft (TOC)
	1234				2 oz	7.38	1.20	~~Mod~~ Low	65.0	
	1239				24 oz	7.15	1.86	High	67.2	
	1244				64 oz	7.32	2.57	High	68.3	
	1247				78 oz					Ceased pumping
										DTW = 33.52 ft (TOC)
3/21/01	0952				0					STARTED PUMPING
										DTW = 2.60 ft (TOC)
	0953				8 oz	7.19	2.16	MOD	66.5	
	0958				24 oz	7.31	2.18	MOD	67.6	
	1004				44 oz	7.36	2.21	MOD	68.6	
	1009				76 oz	7.35	2.24	MOD	69.2	CEASED PUMPING
										DTW = 31.79 ft (TOC)
3/28/01	0804				0					DTW = 4.08'
	0808				16 oz		4.99	MOD	63.6	
	0818				56 oz		5.49	MOD	65.1	
	0824				80 oz		5.30	MOD	62.0	PUMPED DRY
										DTW = 33.65' (TOC)

PZ-DD7D

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-042D
JOB NO.	SITE: RD-09 area
	PREPARED BY: E. SARAO

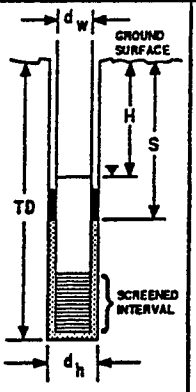
METHOD: OVERPUMPAGE _____
BAILER _____
SURGE BLOCK _____
AIR LIFT _____
OTHER INERTIA LIFT

INITIAL WATER LEVEL 23.30' TOC
FINAL WATER LEVEL _____

REMARKS: TOTAL DEPTH = 27.30' (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ $ft.^3 \times 7.48$ = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY	TEMP.	COMMENTS:
4-17-01	0905		0 (BEGIN)		0					DTW = 23.30', BEGIN HAND PUMP.
	0909				4 oz	–	1.16	HIGH	59.6	SILTY
	0916				24 oz	–	1.14	MOD.	59.4	
	0930				72 oz	–	1.11	LOW	59.5	TURB. - CLEARING
	0950				144 oz	–	1.08	LOW/CLEAR	59.9	DTW = 23.63' (TOC)
										CEASED PUMPING
4-17-01	1305				0					DTW = 23.25' BEG
	1310				0					BEGIN HAND PUMPING
	1315				8 oz	–	1.18	LOW	70.0	
	1330				56 oz	–	1.11	CLEAR	67.6	
	1345				128 oz	–	1.08	CLEAR	67.3	CEASED PUMPING, DTW = 25.45
4-18-01										
DSC	0840				0					DTW = 23.26' (TOC), HAND PUMP
4-18-01	0846				8 oz	–	0.97	MODERATE	56.4	
	0903				72 oz	–	0.97	LOW/CLEAR	58.1	
	0924				160 oz	–	0.84	CLEAR	58.3	CEASED PUMPING
										DTW = 23.49' (TOC)

PZ-007E

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ-042E
JOB NO. 313 / SITE RD-09 area	PREPARED BY B. Stewart

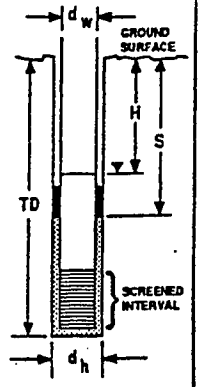
METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 29.32 (TOC)
FINAL WATER LEVEL ~~29.32 (TOC)~~

REMARKS: TD = 32.50 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/12/01	1250		0 (BEGIN)		0					
	1254		~~6 oz~~		12.0 oz	7.03	0.72		70.0	High Turbidity
	1305		~~16 oz~~		32.0 oz	6.70	.0.69		63.2	MOD TURBIDITY
	1315				96 oz	6.70	0.72		63.2	MOD TURBIDITY
	1325				160 oz	6.75	0.70		62.4	Mod Turbidity
	1335				256 oz	6.72	0.84		65.6	Mod Turbidity
	1345				288 oz	6.70	0.83		64.0	Mod Turbidity
	1355				352 oz	6.70	0.83		62.8	Mod Turbidity
3/19/01	1615				0					~~Started hand pumping~~
										~~- DTW = 26.25 ft (TOC)~~
	1617				4 oz	6.72	0.64	Low	64.6	
	1627				64 oz	6.65	0.63	Low	64.2	Ceased pumping
										- DTW = 26.40 ft (TOC)
										Discharge slightly cloudy but clean

PZ-007E

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
ROCKETDYNE	PT-042E
JOB NO. / SITE: RD-09 area	PREPARED BY: S RUFFNER

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

INITIAL WATER LEVEL 29.32

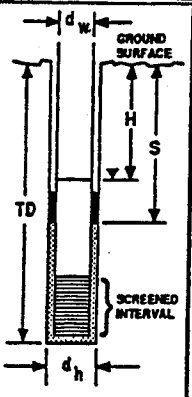
FINAL WATER LEVEL _____

REMARKS: TD = 32.50 Ft. (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\ -\ ) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\ -\ )(\ ) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
			0 (BEGIN)		0					
3/24/01	1240				0					STARTED PUMPING
										DTW=24.92 Ft(TOC)
	1243				6 oz	6.43	1.08	MOD	74.0	
	1253				64 oz	6.47	0.56	LOW	66.2	DISCHARGE CLEAR.
	1303				116 oz		0.56	LOW	65.6	CEASED PURGING
										DTW 24.95 Ft(TOC)
										PH PROBE BROKE.

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-007F

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	~~PZ-095~~ 042F
JOB NO. / SITE: RD-09 alc	PREPARED BY: B. Stewart

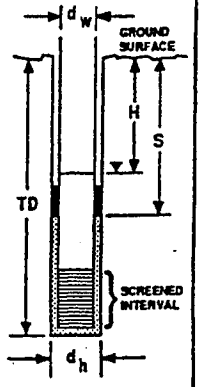
METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 28.95 (TOC)
FINAL WATER LEVEL ~~36.96 (TOC)~~

REMARKS: TD = 38.80 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/12/01	1404		0 (BEGIN)		0					
	1405				2 oz	7.16	1.37		67.2	High Turbidity
	1408				12 oz					Bailed dry
										DTW = 36.96 ft (TOC)
3/13/01	~~1016~~ 1116				0			High		DTW = 28.46 ft (TOC)
	~~1020~~ 1120				4 oz	7.23	1.42	~~Mod~~	66.6	Mod-High Turbidity
	1125				20 oz	7.23	1.38	High	67.9	Pumped dry
										DTW = ~~38.89~~ 36.89 (TOC)
3/19/01	1608				0					Started hand-pumping
										-DTW = 20.02 ft (TOC)
	1609				4 oz	6.85	1.06	Mod	68.6	
	1613				30 oz					Pumped dry
										-DTW = 37.10 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

P2-007G

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	DT-042G
JOB NO. / SITE: RD-09 area	PREPARED BY: E-SARAO

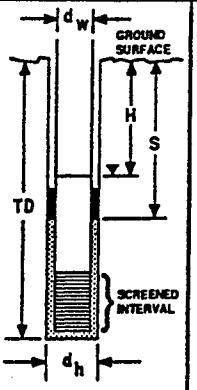
METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL ? FINAL WATER LEVEL _____

REMARKS: NO WATER LEVEL READINGS - PROBE GETS STUCK @ 8.7' (TOC) 4-23-01 TD = 47.62' TOC → NEW SOUNDER

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY	TEMP. °F	COMMENTS:
4-18-01	1405		0 (BEGIN)		0					Began Hand pumping
	1408				8 oz	6.64	0.88	High	74.0	SILTY
	1455				26 oz	7.08	0.901	High	76.0	Pumped DRY
4-19-01	1508				8 oz	6.91	0.70	High	59.9	SILTY, BROWN
	1525				26 oz	7.03	0.73	High	63.0	SILTY BROWN
										PUMPED DRY
4-20-01	0905				0					BEGAN HAND PURGE. DTW=?
	0910				8 oz	7.09	0.97	High	51.0	VERY SILTY
	0930				96 oz	7.23	0.97	High	49.9	PURGED DRY. DTW=?
4-23-01	0850				0					DTW=37.23', TD=47.62' USED NEW SOUNDER
	0855				8 oz	6.98	0.86	High	56.0	BROWN AND SILTY
	0910				24 oz	7.09	0.88	High	58.9	
	0940				42 oz	7.39	0.77	High	62.6	PURGED DRY
										DTW=46.23

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-0088

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PT-016B
JOB NO. / SITE: LETF	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

INITIAL WATER LEVEL 15.42 ft(TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 22.41 ft(TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

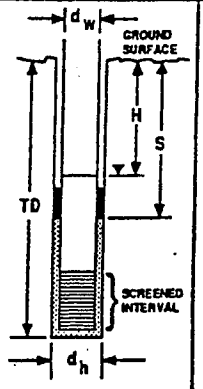
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/13/01	1247		0 (BEGIN)		0					DTW = 15.42 ft(TOC)
	1248				20z	6.90	0.52	Low	67.9	
	1250				14 oz					Pumped dry
										DTW = 18.67
	1322									DTW = 16.23
	1325				220z	6.76	0.46	Low	66.3	~~Began pumping~~
	1328				32 oz					Pumped dry
										DTW = 20.26
	1354									~~Pumped~~ Began pumping
										DTW = 16.50 ft(TOC)
	1406				44.0z	6.80	0.42	Low	63.6	Fixed valve - be cont'd
										pumping
	1410				60 oz			Low		Pumped dry
										DTW = 21.57 ft (TOC)
										Discharge slightly
										cloudy but clear

1 of 2
PZ-008E

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne /SSFL	PT-016E
JOB NO. / SITE: LETF	PREPARED BY: E. SARAO

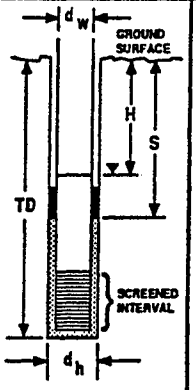
METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

INITIAL WATER LEVEL 46.63' (TOC)
FINAL WATER LEVEL _____

REMARKS: TOTAL DEPTH = 49.65' (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY	TEMP °F	COMMENTS:
4-17-01	0751		0 (BEGIN)		0					DTW = 46.63'
	0808									BEGAN HAND PUMP
	0813				2 Oz	-	1.46	HIGH	55.7	SILTY, BROWN
	0818				10 Oz	-	1.46	HIGH	58.2	PUMPED DRY, DTW = 49.43'
										SILTY BROWN
4-18-01	0745				0					DTW = 47.41' (<80%)
	0800				0					BEGAN HAND PUMPING
	0815				6 Oz		1.15	HIGH	56.5	PUMPED DRY, DTW = 49.34'
										SILTY
4-19-01	1415				0					BEGAN HAND PUMPING DTW = 47.16 TOC
	1440				7 Oz	7.13	1.22	HIGH	58.2	PUMPED DRY, DTW = 49.10'
										TURB. = HIGH, SILTY
4-20-01	0805				0					DTW = 47.37'
	0835				8 Oz	7.30	1.04	HIGH	45.5	PURGED DRY, DTW = 49.35'
										Turb. = High, SILTY

2 of 2
PZ-008E

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
RocketDyne / SSFL	PT-016E
JOB NO. / SITE: LETF	PREPARED BY: E. SAPAC

METHOD:
- OVERPUMPAGE _____
- BAILER _____
- SURGE BLOCK _____
- AIR LIFT _____
- OTHER INERTIAL LIFT

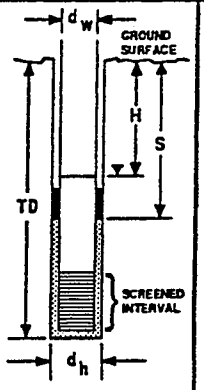
INITIAL WATER LEVEL _____
FINAL WATER LEVEL _____

REMARKS: TD = 49.65' (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY	TEMP. °F	COMMENTS: CONTINUED FROM page 1
4-23-01	0750		0 (BEGIN)		0					DTW = 47.0 (TOC)
	0822				8 oz	7.05	1.10	HIGH	52.6	PURGED DRY
										DTW = 49.45' SILTY

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-0D9C

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PZ-037C
JOB NO.	SITE: E RD-09 area
	PREPARED BY: E. SARNO

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

INITIAL WATER LEVEL 15.58' (TOC)

FINAL WATER LEVEL _____

REMARKS: TOTAL DEPTH = 20.50' (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

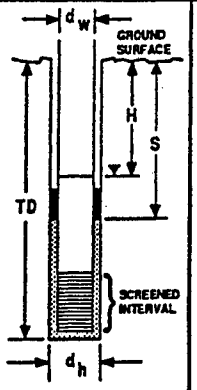
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY	TEMP.	COMMENTS:
4-17-01	1030		0 (BEGIN)		0					~~BEGIN HAND PUMP~~ DTW = 15.58' (TOC)
	1033				8 oz	-	1.54	HIGH	59.5	SILTY, CLOUDY
	1040				40 oz	-	1.55	MOD/LOW	59.0	
	1052				96 oz	-	1.54	LOW	58.3	
	1108				160 oz	-	1.57	LOW	58.4	CEASED PUMPING
										DTW = 17.30' (TOC)
	1405				0					DTW = 15.57, began hand pumping
	1408				8 oz	-	1.64	LOW	64.4	
	1420				72 oz	-	1.57	CLEAR	62.3	
	1433				136 oz	-	1.58	CLEAR	61.7	CEASED PUMPING
										DTW = 17.50' (TOC)
4-18-01	1005				0	-				DTW = 15.56' (TOC)
	1007				8 oz	-	1.35	LOW	58.2	
	1015/1055				-					STOPPED/RESUME HAND PUMPING
	1105				72 oz	-	1.34	CLEAR	58.4	
	1125				144 oz		1.34	CLEAR	58.7	CEASED PUMPING

DTW = 15.79' (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

P2-009D

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PT-037D
JOB NO. / SITE: RD-09 area	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 18.13 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 24.96 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

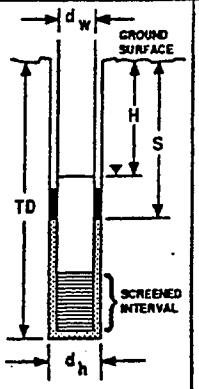
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/13/01	0938		0 (BEGIN)		0					DTW = 18.13 ft (TOC)
	0940				4 oz	7.16	1.34	Low	56.7	Low Turbidity
	0943				8 oz	7.25	1.49	Low	60.3	Pumped dry
										DTW = 24.47
										Low Turbidity
3/19/01	1410				0					Started pumping
										- DTW = 17.06 ft (TOC)
	1411				2 oz	7.16	0.88	Low	71.3	
	1414				8 oz			Low		Pumped dry
										- DTW = 24.83 ft (TOC)
3/24/01	1015				0					STARTED PURGING
	1016				2 oz	7.0	1.07	LOW	61.9	DTW = 16.36 ft (TOC)
	1019				24 oz	6.98	1.08	LOW	61.3	PUMPED DRY
										DTW = 24.60 ft (TOC)
										DISCHARGE CLOTHE

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-009E

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PZ-037E
JOB NO. / SITE: RD-09 area	PREPARED BY: D. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 18.02 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 32.30 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

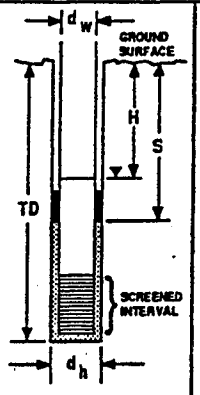
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/13/01	0951		0 (BEGIN)		0					DTW = 18.02 ft (TOC)
	0953				4 oz	7.26	2.12	Low	58.6	Low Turbidity
	0958				16 oz	7.21	2.21	Mod	60.5	Moderate Turbidity
	1000				20 oz	7.19	2.21	Mod	60.3	Mod. Turbidity
	1001				20 oz			Mod		DTW = 31.52 ft (TOC)
										Pumped dry
3/19/01	~~1412~~ 1423				0					Started hand-pumping
										- DTW = 17.02 ft (TOC)
	1424				2 oz	7.46	1.34	Mod	71.0	
	1428				20 oz			Mod		Pumped dry
										- DTW = 31.94 ft (TOC)
										Still cloudy discharge
3/26/01	1026				0					STARTED PURGING
	1028				4 oz	6.91	1.50	MOD	61.0	DTW = 16.45 ft (TOC)
	1032				20 oz	6.97	1.55	MOD	61.1	PURGED DRY
										DTW = 31.96 ft (TOC)
										DISCHARGE CLOUDY

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-009F

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PZ-037F
JOB NO. / SITE: RD-09 area	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 23.03 ft (TOC)

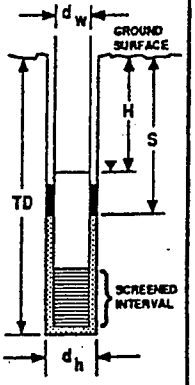
FINAL WATER LEVEL _____

REMARKS: TD = 36.57 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/13/01	1010		0 (BEGIN)		0	7.69				DTW = 23.03 ft
	1015				2 oz.	~~6.04~~	2.12	Low	60.4	Low Turbidity
	1020				18 oz	7.50	2.17	Low	61.4	Pumped dry
										DTW = 35.99 ft (TOC)
3/19/01	1432				0					Started hand-pumping
										- DTW = 25.11 ft (TOC)
	1433				4 oz	7.40	1.34	Mod	68.3	
	1436				9 oz			Mod		Pumped dry
										- DTW = 32.52 ft (TOC)
										Still cloudy discharge
3/26/01	1041				0					STARTED PURGING
										DTW = 22.32 ft (TOC)
	1043				6 oz	~~8.25~~	1.96	MOD	60.8	
	1047				18 oz	6.73	1.94	MOD	61.2	PURGED DRY
										DTW = 33.99 ft (TOC)
										DISCHARGE CLOUDY

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-010D

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ-039D
JOB NO. 31315.0007.4010 TAH	SITE NASA
	PREPARED BY B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

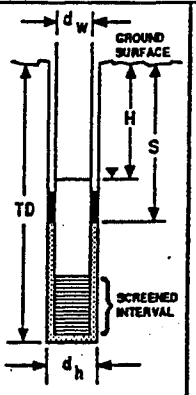
INITIAL WATER LEVEL ~~24.12 (TOC)~~

FINAL WATER LEVEL _____

REMARKS: INITIAL H_2O LVL 22.12 (TOC)
TD = 25.17 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ $ft.^3 \times 7.48$ = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED ~~GALLONS~~	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP. °F	COMMENTS:
3/12/01	0945	BAIL	0 (BEGIN)	N/A	0			TAH		
3/12/01	1010			N/A	12 oz	8.84	0.95	~~0.95~~ Low	69.2	PUMPED DRY
3/13/01	1035				0					DTW = 21.93
	1040				4 oz	8.71	1.16	Low	63.8	
	1045				8 oz			Low		DTW = 24.95 ft (TOC)
										Pumped dry
3/19/01	1255				0					Began hand-pumping
										- DTW = 20.84 ft (TOC)
	1257				4 oz	8.08	0.85	Low	74.6	
	1259				12 oz			Low		Pumped dry
										- DTW = 25.06 ft (TOC)
										Discharge clear

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-010E

WELL DEVELOPMENT

PROJECT	WELL NO.
ROCKETDYNE	PT-039E
JOB NO. 31315.0007.4010 / SITE NASA / PREPARED BY SR & BS	

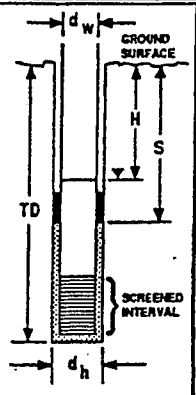
METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

INITIAL WATER LEVEL 22.27
FINAL WATER LEVEL 28.78

REMARKS: TD = 29.07 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED ~~GALLONS~~	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/12/01	1015	BAIL	0 (BEGIN)	N/A	OUNCES 0	67.8	1.54	LOW	8.50	
3/12/01	1040	BAIL		N/A	14	↓	↓	↓	↓	PUMP DRY
3/13/01	1047				0					DTW = 21.95 ft (TOC)
	1050				2 oz	8.60	1.93	Low	67.9	Low Turbidity
	1053				16 oz	8.63	2.03	Low	68.4	Pumped dry
										DTW = 28.90 ft (TOC)
3/19/01	1303				0			Low		Started pumping
										- DTW = 20.80 ft (TOC)
	1305				2 oz	8.06	1.43	Low	77.5	
	1310				18 oz			Low		Pumped dry
										- DTW = 28.92 ft (TOC)
3/26/01	0938				0					STARTED PURGING
										DTW = 20.14 ft (TOC)
	0939				2 oz	7.44	1.43	LOW	66.5	
	~~0935~~	0945			20 oz	7.51	1.43	LOW	67.2	PURGED DRY
										DTW = 28.89 FT (TOC)
										DISCHARGE CLEAR

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-010 F

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PT-039 F
JOB NO. / SITE: RD-Ø9 area	PREPARED BY

METHOD: OVERPUMPAGE ______
BAILER ______
SURGE BLOCK ______
AIR LIFT ______
OTHER INERTIAL LIFT

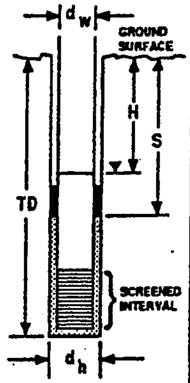
INITIAL WATER LEVEL 23.73 (TOC)
FINAL WATER LEVEL 23.90 (TOC)

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ______
WELL CASING INSIDE DIAMETER d_w ID = ______
OUTSIDE DIAMETER d_w OD = ______
DEPTH TO: WATER LEVEL H = ______
BASE OF SEAL S = ______
BASE OF WELL TD = ______
EST. FILTER PACK POROSITY P = ______



WELL VOLUME CALCULATION:

CASING VOLUME $= V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_C =$ ____ + ____ = ______ ft.^{3} x 7.48 = ______ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	TEMP (~~pH~~)	CONDUCTIVITY	TURBIDITY	PH (~~TEMP.~~)	COMMENTS:
3/12/01	01044	INERTIAL LIFT	0 (BEGIN)	—	0					H2S (??) ODOR, SILTY
	1050	↓		—		64.4	1.25	LOW	7.25	
	1057			—		65.5	1.24		7.18	
3/12/01	1111	↓		—	96oz	63.8	1.19	CLEAR	6.97	CLEAR, DTW = 23.90 ft

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-010G

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PT-039G
JOB NO. / SITE: RD-09 area	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 24.23 (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 41.34 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

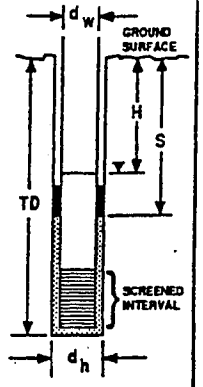
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
~~3/12/01~~	1120		0 (BEGIN)		0					
3/12/01	1124			8	~~16 oz~~	7.50	1.54	MOD	64.8	BAILED DRY DTW = 40.76 (TOC)
	1137			24	~~48 oz~~	7.64	1.53	MOD	64.5	TURBIDITY WAS UNCHANGED
3/19/01	1318				0					DTW = 27.89 ft (TOC)
										Started hand-pumping
	1319				4 oz	7.56	1.52	Low	75.6	
	1324				24 oz			Low		Pumped dry
										DTW = 40.61 ft (TOC)
										Discharge almost clear
3/26/01	0956				0					START TO PURGING
										DTW = ? STUCK @ 5'
	0958				4 oz	7.27	1.61	LOW	67.1	
	1000				24 oz	7.38	1.64	LOW	67.3	PURGED DRY
										DTW = ? STUCK @ 5'
										DISCHARGE CLOUDY

PZ-012B

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PZ-020B
JOB NO. / SITE: Area I Rd	PREPARED BY: E. SARAO

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER INERTIAL LIFT

INITIAL WATER LEVEL 9.09' TOC

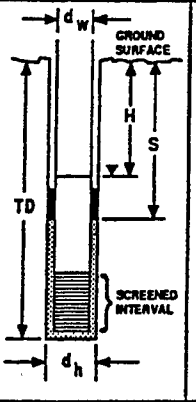
FINAL WATER LEVEL _____

REMARKS: T.D. = 13.61 ft. (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY	TEMP.	COMMENTS:
4-24-01	1503		0 (BEGIN)		0					START HAND PUMPING, DTW=9.09
	1505				4 oz.	7.16	1.78	High	70.3	SILTY
	1509				12 oz	7.28	1.70	High	66.2	CLOUDY
	1513				18 oz	7.32	1.75	MODERATE	66.5	PURGED DRY, DTW = 13.35'
4-25-01	0750				0	~~6.47~~			~~56~~	DTW=9.13', START PURGE
	0752				4 oz.	6.47	1.54	MODERATE	56.9	
	0755				12 oz	6.91	1.55	MODERATE	56.8	
	0758				18 oz.	7.13	1.52	MODERATE	56.6	PURGED DRY, DTW = 13.28'
										STILL CLOUDY
4-25-01	1258				0					DTW = 9.30', START PURGE
	1303				4 oz.	7.48	1.83	LOW	72.2	SLIGHTLY CLOUDY
	1307				12 oz	7.51	1.67	LOW	66.5	SLIGHTLY CLOUDY
	1311				18 oz	7.35	1.75	LOW	69.6	SLIGHTLY CLOUDY
										PURGED DRY, DTW = 13.26'

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-012C

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PT-020C
JOB NO.	SITE: Area I Rd.
	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 6.05 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 19.52 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

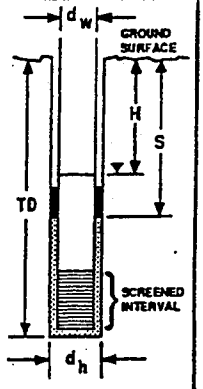
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/13/01	1426		0 (BEGIN)		0					DTW = 6.05 ft (TOC)
	1428				1 oz	7.00	0.55	Moderate	63.4	
	1431				16 oz	6.96	0.53	High	63.0	
	1441				64 oz	6.84	0.49	Moderate	61.1	
	1451				120 oz	7.05	0.46	Low	61.0	
	1501				188 oz	6.77	0.43	Low	61.3	Ceased pumping
										DTW = 6.35 ft (TOC)
3/26/01	1510				0					STARTED PURGING
										DTW = 7.66 ft (TOC)
	1514				8 oz		0.32	LOW	63.2	
	1524				64 oz		0.26	LOW	62.5	
	1534				136 oz		0.25	LOW	62.0	CEASED PURGING
										DISCHARGES CLEAR.
										DTW = 7.82 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-012D

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / SSFL	PT-020D
JOB NO. / SITE: Area I Rd	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 8.33 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 24.02 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

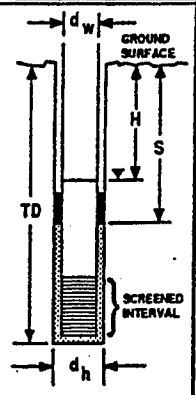
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/13/01	1507		0 (BEGIN)		0					DTW = 8.33 ft (TOC)
	1509				2 oz	6.64	2.52	High	61.9	Dk Gray color
	1514				24 oz	6.48	2.50	High	62.6	
	1518				34 oz	7.40	2.36	High	63.0	Pumped dry
										DTW = 23.58
3/20/01	1005				[illegible]					STARTED PUMPING DTW = 8.72 ft (TOC)
	1010				38 oz	6.38	2.32	HIGH	67.7	
	1016				70 oz	6.33	2.30	HIGH	68.3	PUMPED DRY
										DTW = 23.81 ft (TOC)
3/24/01	1541				0					STARTED PURGING
	,									DTW = 9.94 ft (TOC)
	1543				8 oz		1.88	HIGH	61.2	VERY SILTY
	1548				40 oz		1.85	HIGH	61.9	PURGED DRY
										DTW = 23.83 ft (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-012E

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/SSFL	PT-020E
JOB NO. / SITE: Area I Rd	PREPARED BY: B. Stewart

METHOD: OVERPUMPAGE _____ BAILER _____ SURGE BLOCK _____ AIR LIFT _____ OTHER Inertial Lift

INITIAL WATER LEVEL 10.02 ft (TOC)

FINAL WATER LEVEL _____

REMARKS: TD = 29.32 ft (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

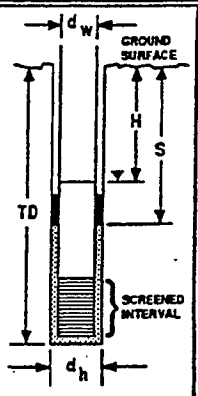
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
3/13/01	1530		0 (BEGIN)		0					DTW = 10.02 ft (TOC)
	1532				2 oz	6.74	1.17	High	60.3	Dk gray color
	1542				44 oz	6.84	1.03	High	63.5	Pumped dry
										DTW = 27.70
3/20/01	1106				0					STARTED PUMPING
										DTW = 9.95 Ft (TOC
	1108				3 oz	7.17	1.03	HIGH	73.1	
	1113/1125									CHECK VALVE STUCK CHANGED
	1127				40 oz	7.08	0.79	MOD	73.0	
	1133				72 oz	7.2	0.79	MOD	73.7	PUMPED DRY
										DTW = 29.35 Ft (TOC
3/26/01	1555				0					STARTED PURGING
										DTW = 9.02 Ft (TOC)
	1557				8 oz		0.70	MOD	62.7	
	1604				48 oz		0.71	MOD	62.5	PURGED DRY
										DTW = 29.05 FT (TOC
										PURGED WATER GRAYISH

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ P37
JOB NO. 313150005	SITE STL II PT-090
	PREPARED BY T. Burton

METHOD:
- OVERPUMPAGE: _____
- BAILER: ✓
- SURGE BLOCK: ✓
- AIR LIFT: _____
- OTHER: _____

INITIAL WATER LEVEL 20.33

FINAL WATER LEVEL _____

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

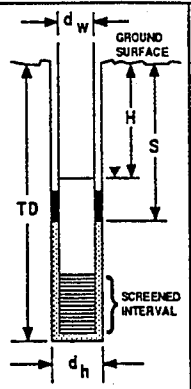
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

Well volume = (7.3 x 1.14 x 1) = 8 gals.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
										TD₀ = 27.65
1/31/01	1537	Surge	0 (BEGIN)	—	0					
	1555	↓	18	—						
	1556	Bail	0	—						Dark olive, abundant
	1610	↓	14		Bailed	Dry → TD = 27.65 (still)				vf + fine sand
2/6/01	1337									DTW = 20.76' (TOC)
	1340	SURGE	0							
	1355	↓	15						~~74.9~~	
	1357	BAIL	0		0.5	7.60	1050	HIGH	74.9	
	1400	|			2.5	7.69	1010		72.6	
	1406	↓			6.0	7.88	1030	HIGH	71.2	BAILED DRY
	1412									DTW = ~~29.16'~~ 27.16
2/13	1449	Bail	0	—						DTW = 20.49
	1500	↓	11		13		Bailed Dry			

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocketdyne		PZ 038
JOB NO. 31315 0005	SITE Comp A PT-085	PREPARED BY T. Burton

METHOD:
- OVERPUMPAGE: ____
- BAILER: ✓
- SURGE BLOCK: ✓
- AIR LIFT: ____
- OTHER: ____

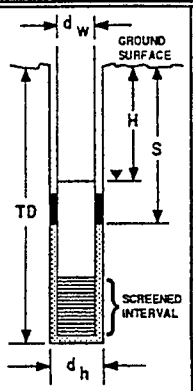
INITIAL WATER LEVEL: 17.38
FINAL WATER LEVEL: ____

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ ft.^{3} × 7.48 = ____ gal.

≈ (12.84)(1.14) = 14.5 gal

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS: TD_o = 30.22 Very little sand/silt in bottom cap initially
1/31/01	1059	Surge	0 (BEGIN)	—	0					
	1119	↓	20	—						Dark olive gray
	1121	Bail	0		0					Mostly fine sand + silt
	1135	↓			5	Recharge: 26.15-26.05			in 1.75	min = 17.5 min/ft.
	1150	↓	29		8.5					Bailed dry - silt only
2/6/01	1420									DTW = ~~19.35~~ 17.35 (TOC)
	1425	SURGE	0							
	1445	↓	20							
	1445	BAIL			9.0	7.32	1660	HIGH	71.1	SILT & SAND
	1449				11.5	7.42	1590		69.9	
	1453				14.5	7.46	1620	HIGH	69.5	
	1457				16.5	7.51	1650		69.3	
	1500	↓			17.0			HIGH		BAILED DRY
	1502									~~31.73~~ TOC
2/13/01	~~1355~~ 1355	Bail		←			DTW = 13.07'			DTW = 29.73'
	1420	↓			26		Turbid	brown		Bailed Dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	JOB NO.	SITE	WELL NO.	PREPARED BY
Rocketdyne	313150005	Comp A/ PT-086	PZ 039	T. Burton

METHOD:
- OVERPUMPAGE ✓
- BAILER ✓
- SURGE BLOCK ✓
- AIR LIFT ______
- OTHER ______

INITIAL WATER LEVEL 16.63

FINAL WATER LEVEL ______

REMARKS: STL IV

TD₀ = 31.30' silty TD = 31.55' bottom cap

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ______

WELL CASING INSIDE DIAMETER d_w ID = ______

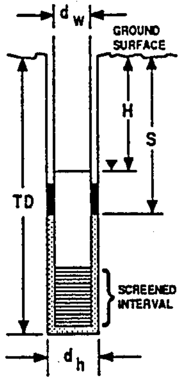
OUTSIDE DIAMETER d_w OD = ______

DEPTH TO: WATER LEVEL H = ______

BASE OF SEAL S = ______

BASE OF WELL TD = ______

EST. FILTER PACK POROSITY P = ______



WELL VOLUME CALCULATION:

CASING VOLUME $= V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S\,or\,H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_C = \quad + \quad =$ ______ $ft.^3 \times 7.48 =$ ______ gal.

~~[illegible]~~ = 4.92 (0.16) + 10 (~~.98~~ 1.14) = ~~9.8~~ 11.4 + .75 = ~~10.5~~ 12.1 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	pH	CONDUCTIVITY µS/cm	TURBIDITY NTU	TEMP. °F	COMMENTS: Snowing at site. Silt + vf sand
2/7/01	1430	Bail	0 (BEGIN)	—	4.5					DK. grayish brown
	1442	Surge	0	—						
	1457	↓	15							
	1500	Bail			12					
	1519	Pump	0	≈.4		110 Hz				
	1531	↓		~~[illegible]~~ 1.2	17	130 Hz				very turbid; olive brn.
	1536				23	6.65	1220	>1000	62.0	
	1538	↓		1.5	25	135 Hz	Pumped dry	in 15		sec. Allow Recharge
	1544		Recharge: 24.18 - 23.74 in 1 min = 0.44'/min →							0.5 gpm
	1554	Pump	0	0.4	25	110 Hz				
	1557	↓	3	~~0.3~~		6.05	1210	>1000	59.4	
	1608		14	~~0.25~~		6.07	1280	>1000	64.1	clearing, lt. olive
	1625		31	↓	38	5.83	~~650~~ 1160	650	61.4	cloudy, gray
	1640	↓	46	↓	44	5.90	1170	600	62.7	

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ041

WELL DEVELOPMENT

PROJECT	WELL NO.
DOE	~~PT 105~~
JOB NO. 313150005	SITE PDU PT-105
	PREPARED BY T. Burton

METHOD:
- OVERPUMPAGE ~~pump~~
- BAILER ✓
- SURGE BLOCK ✓
- AIR LIFT
- OTHER

INITIAL WATER LEVEL 8.30'

FINAL WATER LEVEL

REMARKS: TD_o = 28.97'

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

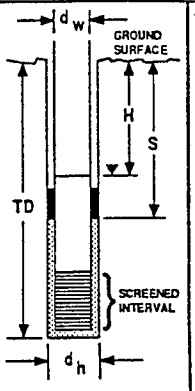
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

= 21 (1.14) = 23.5 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
2/1/00	1415	Surge	0 (BEGIN)	—	0					
	1435	↓	20	—						
	1437	Bail	0	—						Recharge: 26.95-26.88 in 1 min = .07"/min
	1507	↓	30	—	11.5					Bailed Dry
~~2/13~~	~~1523~~	~~Bail~~	~~0~~	—						~~DTW = 7.47'~~
	~~1540~~	↓	~~17~~		~~21.5~~					~~Bailed Dry~~
2/6/01	1520	Surge	0							DTW = 10.24'
	1540	↓	20							
	1542	Bail	0		7.5	7.46	1150	V. High	67.9	
	1548				10	7.55	1020	↓	67.5	
	1551				14	7.56	1060		66.5	
	1555				16	7.59	1130	↓	66.1	
	1557		15		17			V. High		Bailed Dry
	1600									DTW = 30.13'
2/13 2001	1523	Bail	0							DTW = 7.47'
	1540	↓	17		27.5					Bailed Dry

PZ-043
Page 1 of 2

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / NASA	PT097/PZ43
JOB NO. 31350017	SITE PLF
	PREPARED BY C. Cathcart

METHOD: OVERPUMPAGE _____ BAILER X SURGE BLOCK X AIR LIFT _____ OTHER _____

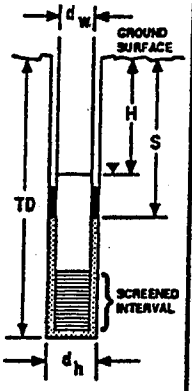
INITIAL WATER LEVEL 29.45 (TOC) 0720
FINAL WATER LEVEL _____

REMARKS: DTW: 26.25 (bgs) 80% = 32.32 (toc)
TOTAL depth: 43.81 (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = 25
BASE OF WELL TD = 40.4
EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ $ft.^3 \times 7.48$ = _____ gal.

(25-41)0.52 + 0.16 (43.81 - 29.45) = 10.6 gal/MW

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	WATER QUALITY CONDUCTIVITY µS/cm	WATER QUALITY TURBIDITY	WATER QUALITY TEMP. °F	COMMENTS:
4/5/01	0841	Bail	0 (BEGIN)		0.5					measured
	0845	Surge	4							
	0915	Surge	30							
	0935	Bail	35		1	7.22	13.23 (X100)	high	65.0	1/2 ft mud in bottom of Bailer
	0940	↓	5		5	8.43	12.96 (X100)	high	66.6	
	0950	↓	10		10	8.58	13.18 (X100)	high	67.1	43.85 - DTW (TOC) Bailed Dry
	1045	RECHARGE								40.15 DTW (TOC)
	1345	↓								36.39 DTW (TOC)
	1730	↓								33.82 DTW (TOC)
4/6/01	0929	↓								29.91 DTW (TOC)
4/10/01	0740	↓								29.39 DTW (TOC)
	0850	Surge								
	0920	Bail	30		10.5	9.39	10.62 (X100)	High	64.2	
	0930	↓			15.0	9.55	12.51 (X100)	High	64.1	
	0940	↓			20.0	9.54	13.14 (X100)	high	64.6	Bailed Dry DTW: 43.80 (TOC)
	1423	RECHARGE								DTW 31.79 (TOC)
	1510	Surge								

PZ-043
PAGE 2 of 2

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/NASA	Pto97/PZ43
JOB NO. 375 3/350007 / SITE PLF	PREPARED BY E.Cathcart

METHOD: OVERPUMPAGE ____ BAILER X SURGE BLOCK X AIR LIFT ____ OTHER ____

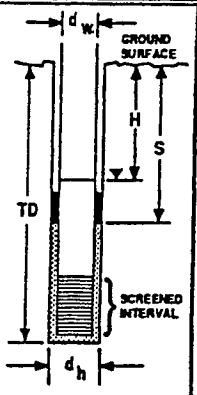
INITIAL WATER LEVEL See p.1
FINAL WATER LEVEL ____

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\ - \ ) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\ - \ )(\ ) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ $ft.^3 \times 7.48 =$ ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY	°F TEMP.	COMMENTS:
			0 (BEGIN)		0					
4/10/01	1540	bail			20.5	9.44	6.68 (X100)	Hrgh	68.5	Lt. Brown -Some fine Sand
	1546	↓	6		25	9.47	13.42 (X100)	Hrgh	67.1	
	1555	↓	9		30	9.45	15.19 (X100)	Hrgh	66.7	Bailed Dry DTW: 43.81

PZ-044

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocket Dyne/NASA	PT096/PZ44
JOB NO. 31356007 / SITE PLF	PREPARED BY E. Cathcart

METHOD: OVERPUMPAGE _____ BAILER X SURGE BLOCK X AIR LIFT _____ OTHER _____

INITIAL WATER LEVEL 33.12 (toc) FINAL WATER LEVEL _____

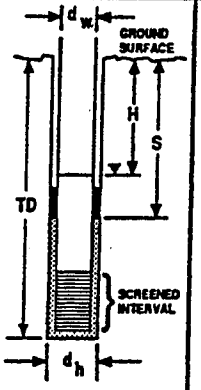
REMARKS: DTW 30.18 (bgs) 4/4/01 1451
↑Total Depth: 47.41 (toc) 80% = 35.98

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

33.12 − 30.18 = 2.94
47.41 − 2.94 = 44.47

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = 30.18
BASE OF SEAL S = 31.0
BASE OF WELL TD = 44.4
EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ $ft.^3 \times 7.48$ = _____ gal.

(0.16) 14.22 + 0.52(13.5) = 9.3 gal/wv

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
4/4/01	1451		0 (BEGIN)		0					DTW: 33.12 (toc)
4/5/01	0709	Bail			0.5			clear		clear - no sediment
	0715	Surge								Sand Pack in bailer
	0745	Bail			1	2.56?	9.76 (x100)	high	53.0	DTW: 37.30
						↑ Problem w/ hydac				Total depth: 37.9 (toc)
										well filling w/
										Sand pack
	~~0820~~									~~31.55 (toc) 3.470~~
	1040									Total depth = 37.10 (toc) DTW = 31.85 (toc)

Page 1 of 2
PZ-045

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/NASA	PT115/PZ45
JOB NO. 313500007 / SITE COLA	PREPARED BY E. Cathcart

METHOD: OVERPUMPAGE _____ BAILER X SURGE BLOCK X AIR LIFT _____ OTHER _____

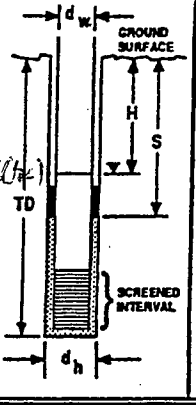
INITIAL WATER LEVEL 34.46 (toc)
FINAL WATER LEVEL _____

REMARKS: DTW: 31.87 (CB&S) 1055
Total depth: 43.10 (toc) 80% = 36.19 (toc)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = 34.46 (toc)
BASE OF SEAL S = _____
BASE OF WELL TD = 40.4
EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = _____ + _____ = _____ $ft.^3 \times 7.48$ = _____ gal.

(28-43) 0.52 + 0.16 (8.53) = 9.16 gal/well

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	WATER QUALITY CONDUCTIVITY uS/cm	WATER QUALITY TURBIDITY	WATER QUALITY TEMP. °F	COMMENTS:
4/5/01	1354	bail	0 (BEGIN)		0.5			High		Strong Sulphur odor
	1355	Surge								
	1425	bail	30		1	9.41	9.72 (x100)	High	62.2	Dark Brown
	1435	↓	10		5	9.46	9.07 (x100)	High	60.7	
	1445	↓	10		8	9.34	7.94 (x100)	high	61.5	42.40 (DTW) TOC
										Bailed Dry
	1735									40.07 (toc)
4/6/01	0927									35.28 (toc)
4/10/01	0730									34.55 (toc)
	0950	Surge								
	1020	bail	30		8.5	9.36	5.36 (x100)	High	63.9	Red/brown Fine Sand
	1025	↓	5		13	9.43	9.64 (x100)	high	63.5	
	1030	↓	5		15.5	9.44	8.77 (x100)	High	63.4	Bailed Dry 42.40 (DTW) TOC
	1430									39.00 (DTW) TOC
4/11/01	0748									35.13 (toc)
	1020	Surge								

Page 2 of 2
PZ-045

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocketdyne/NASA		PH15/PZ45
JOB NO. 3135000 7	SITE COCA	PREPARED BY E. Cathcart

METHOD: OVERPUMPAGE ______
BAILER X
SURGE BLOCK X
AIR LIFT ______
OTHER ______

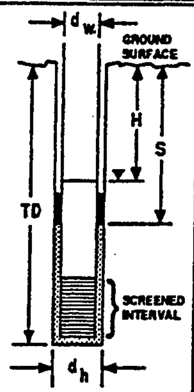
INITIAL WATER LEVEL ______
FINAL WATER LEVEL ______

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ______
WELL CASING INSIDE DIAMETER d_w ID = ______
OUTSIDE DIAMETER d_w OD = ______
DEPTH TO: WATER LEVEL H = ______
BASE OF SEAL S = ______
BASE OF WELL TD = ______
EST. FILTER PACK POROSITY P = ______



WELL VOLUME CALCULATION:

CASING VOLUME $= V_c = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_c =$ ______ + ______ = ______ $ft.^3 \times 7.48 =$ ______ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	pH	CONDUCTIVITY µS/Cm	TURBIDITY	TEMP. °F	COMMENTS
			0 (BEGIN)		0					
4/11/01	1050	Stop Surge	30		15.5			~~High~~	~~62.0~~	Lt Brown
	1050	Bail	0		16.0	9.39	6.90(x100)	High	62.0	
	1057	↓	7		20.0	9.42	7.96(x100)	High	62.7	
	1102	↓	5		23.5	9.43	7.58(x100)	High	62.1	Bailed Dry DTW= 42.39

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
NASA	PZ 048
JOB NO. 313150005 / SITE COCA PT-116	PREPARED BY T. Burton

METHOD:
- OVERPUMPAGE: ____
- BAILER: ✓
- SURGE BLOCK: ✓
- AIR LIFT: ____
- OTHER: ____

INITIAL WATER LEVEL 14.28 - 14.33

FINAL WATER LEVEL ____

REMARKS: Casing cut at angle
TD = 19.25

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____

WELL CASING INSIDE DIAMETER d_w ID = ____

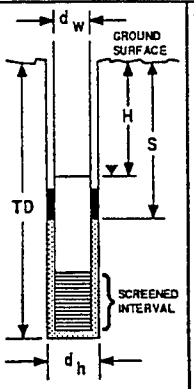
OUTSIDE DIAMETER d_w OD = ____

DEPTH TO: WATER LEVEL H = 14.3

BASE OF SEAL S = ____

BASE OF WELL TD = 19.12

EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ $ft.^3 \times 7.48 =$ ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
1/30/01	1550	Bail	0 (BEGIN)		0			>500		Lowsilt, vf & fine sand,
	1559	↓	9		4.5	Well bailed		dry		dark olive color
2/6/01	0800									DTW = 16.23 TD = 21.35
	0830	SURGE								
	0845	BAIL			5.0	7.03	1550	HI	66.3	
	0850	↓			8.0	6.98	1620	HI	66.8	DTW = ~~20.35~~ TOC 18.35
2/13/01	1602	Bail			DTW = 14.21 - 14.26					
	1610	↓			18					Bailed dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
NASA	PZ 049
JOB NO. 313150005 / SITE Alfa PT-044	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 7.59

FINAL WATER LEVEL ____

REMARKS: TD_o = 19.25' TD = 19.27'

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____

WELL CASING INSIDE DIAMETER d_w ID = ____

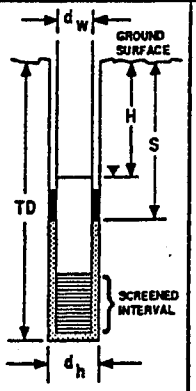
OUTSIDE DIAMETER d_w OD = ____

DEPTH TO: WATER LEVEL H = ____

BASE OF SEAL S = ____

BASE OF WELL TD = ____

EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\ -\ ) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\ -\ )(\ ) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

= 10(1.14) + 1.4(0.16) = 11.4 + 0.22 = 11.6 gals

DEVELOPMENT LOG: DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY NTU	TEMP. °F	COMMENTS:
2/9/01	1102	Bail	0 (BEGIN)	—	1					Low silt + sand (start)
	1109	Surge	0	—						
	1124	↓	15							
	1126	Bail	0	—						DK. brown silty
	1131	↓	5		8.5					very fine sand
						Recharge: 18.30 − 18.05 = .25'/min = 0.3 gpm (Bail Dry)				
	1304	Bail	0	—						DTW = 14.30
	1316	↓	12		14.5		Bailed	Dry		very silty, brown
2/13/01	0945									DTW = 6.65'
2/15/01	1240	Bail	0		16	7.12	723	>1000	58.7	DTW = 7.58'
	1252				22.5	6.98	739	>1000	59.5	silty, brown
	1255	↓	15							No fines @ bottom
2/16/01	1120	Bail	0				light brown			DTW = 7.60
	1131	↓	11		30		darker	brown		Bailed Dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocketdyne		PZ050
JOB NO.	SITE	PREPARED BY
313150005	EEL PT-072	T. Burton

METHOD: OVERPUMPAGE _____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT _____ OTHER _____

INITIAL WATER LEVEL 7.82

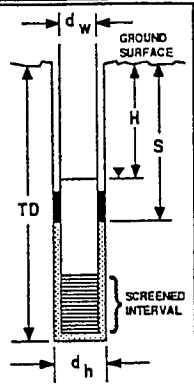
FINAL WATER LEVEL _____

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

$= (7.72)(1.14) =$

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS
										TD_o = 15.54'
2/1/01	0724	Surge	0 (BEGIN)	—	0					
	0729	↓	5							Fe W seds in bottom
	0747	Surge	0							cap - silt + vf sand
	0759	↓	12							
	0804	Bail	0		Recharge: 14.32 → 14.27 in 30 sec =					10 min/ft.
	0820	↓	16		7.5		13.82 - 13.80 in 30 sec =			7.98
2/6/01	1132									DTW = ~~9.98~~ (TOC)
	1135	SURGE	0							
	1150	↓	15							
	1153	BAIL	0			7.31	1350	HIGH	73.3	
	1157	|	4		10.5	7.57	1480		70.5	
	1201	|	8		13.5	7.63	1520		69.2	
	1205	↓	12.		14.5	7.68	1480		68.4	BAILED DRY DTW = 15.04'
	1258	=	WAIT FOR REBOUND		≈ 4'/hr					≠DTW = ~~13.12~~ 11.12'
	1300	BAIL	0		15.0	7.77	1600	MOD	72.5	
	1305	|	5		17.0	7.64	1490		70.3	
	1310	↓	10		19.5	7.58	1490	MOD	69.8	
	1313									DTW = 15.16'

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ 051
JOB NO. 313150005 / SITE EEL PT-071	PREPARED BY T. Burton

METHOD: OVERPUMPAGE _____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT _____ OTHER _____

INITIAL WATER LEVEL 9.31

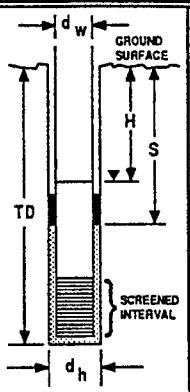
FINAL WATER LEVEL _____

REMARKS: TD_0 = 16.65 TD = 18.90

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

= 9.6 (~~0.998~~ 1.34) = ~~9.6~~ 10.5 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY mS/cm	TURBIDITY NTU	TEMP. °F	COMMENTS: Very silty w/ vf-fine sands
2/6/01	1622	Bail	0 (BEGIN)	—	0					Dark olive gray
	1624	Surge	0	—	0.5					
	1639	↓	15							
	1644	Bail	0	—	.7	Recharge: 17.28 - 16.67 in 1 min. = .61'/min = 0.7 gpm				
2/7/01	0705	Surge	0	—						(Bailed dry)
	0720	↓	15							
	0725	Bail		—	14					Bailed dry
2/15/01	0904	Bail	0	—						DTW = 7.20'
		↓			16.5	8.01	1020	>1000	56.1	silty, brown
	0913	↓	9		22	8.48	1040	>1000	59.0	Bailed dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ 052
JOB NO. 313150005 / SITE EEL/P2 PT-079	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 23.37

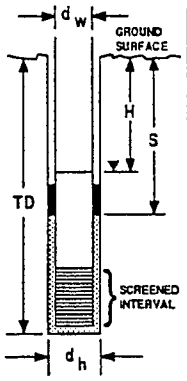
FINAL WATER LEVEL ____

REMARKS: TD_o = 31.26 (to bottom cap - no seds)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

= 7.89 (1.14 ~~0.98~~) = 8.7 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY	TEMP.	COMMENTS: No sand; silty but not "choked"
2/7/01	0810	Bail	0 (BEGIN)	—	1.5		Jet recharge	DTW=26.5'		Olive gray
	0840	Surge	0	—			DTW=25.10			
	0855	↓	15	—						
	0858	Bail		—						More silt, with vf sand
	0900	↓		—	4.5	6.83	1370		61.7	= 0.1'/min = 0.11 gpm
	0905	↓		— 6.5	Recharge:	30.45-30.35 in 1 min				Bailed Dry
2/15/01	1015	Bail	0	—		6.87	1170	>1000	60.9	DTW=22.28'
		↓			10.5	6.66	1100	>1000	62.8	
	1030	↓	15		13					Bailed Dry
2/16/01	1029	Bail	0	—						DTW=22.23'
	1039	↓	10		19					Bailed Dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
NASA	PZ 053
JOB NO. 313150005	SITE CDFF PT-093
	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 19.72, 18.07 2/13

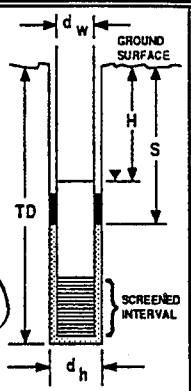
FINAL WATER LEVEL ____

REMARKS: well not completed; all depths from TOC ≈ 4' above ground sfc. for 1/31/01

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = 30.15 / 30.20 ← 2/13 29.25'
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = ____ ft.^{3} x 7.48 = ____ gal.

= 10(1.14) + .15(0.16) = 11.5 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS: Slow Recharging (initially)
1/31/01	0905	Bail	0 (BEGIN)	—	0					Silty at bottom 1-2"
	0906	↓	1	—	1.0					Remove; DTW = 20.60
	0915	Surge	0							Silty vf sand only
	0935	↓	20							Very little sand in well
	0940	Bail	0							after surging
		↓			Recharge: 1"/minute 26.09 - 26.00 = 12 min/ft.					Olive brown (dark)
	1005	↓	25		9	Let recharge				Bailed dry
2/6/01	0935	SURGE			(Well has been completed)					DTW = ~~20.36~~ 18.36' (TOC)
	0955	↓	20							
	0958	BAIL	0	—	9.5	6.98	1120	HIGH	66.0	
	1002	|	4		11.0	7.01	1210		67.3	
	1005	|	7		13.0	7.05	1270	HIGH	67.2	
	1008	|	10		15.5	7.04	1270		67.8	
	1012	|	14		18.0	6.98	1250	HIGH	67.9	TURBIDITY UNCHANGED
	1016	↓	18		19.0	6.96	1240	HIGH	67.4	BAILED DRY
	1020	RECHARGE	0							DTW = ~~30.71'~~ 28.71
	1030	↓	10		10min / 0.23' ≈ 40min/ft					DTW = ~~30.48'~~ 28.48
2/13/01	1300	Bail		—	26.5		Bailed Dry			

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
NASA	PZ #54
JOB NO. 313150005	SITE CDF/AF PT-092
	PREPARED BY T. Burton

METHOD:
- OVERPUMPAGE _____
- BAILER ✓
- SURGE BLOCK ✓
- AIR LIFT _____
- OTHER _____

INITIAL WATER LEVEL 6.64'

FINAL WATER LEVEL _____

REMARKS: TD_o = 15.8 muddy

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

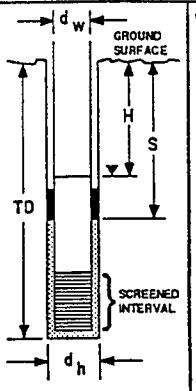
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ $ft.^3 \times 7.48 =$ _____ gal.

=

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
2/6/01	1329	Bail	0 (BEGIN)	—	0					Very silty, w/vf sand + some fine sand
	1347	↓	18		9					
2/15	1500	Bail		—						
	1515	↓			24					DTW = 3.44
										Bailed Dry

PZ-056

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/Boeing	PTOS 3/PZ56
JOB NO. 3/3150056	SITE A-SPA ## -SPA
	PREPARED BY E Cathcart

METHOD: OVERPUMPAGE ____ BAILER X SURGE BLOCK X AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 22.95 toc

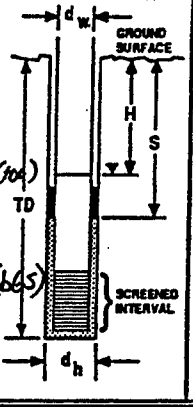
FINAL WATER LEVEL ____

REMARKS: 3.55(casing)(3.16 pvc) 8 ft H_2O in well
~~19.44 ft~~ (bgs) H_2O = 19.79

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = 22.95(toc)
BASE OF SEAL S = 13
BASE OF WELL TD = 27.4(bgs)
EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

7.61 ft H_2O in well (*if S>H use S, if S<H use H.)

80% = 21.3 (bgs) 24.46 (toc) $3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

(13-27.4) 0.52 + 7.61(0.16) = 8.7 gallons/well

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY	°TEMP.	COMMENTS:
4/2/01	1545	BAIL	0 (BEGIN)		0.5		(X100)			
	1555	Surge	10							
	1625	BAIL	30		1	7.77	11.64	high	62.3	Sandy
	1635	BAIL	10		5	7.72	12.96	high	63.6	
	1640	BAIL	5		7	7.56	14.16	high	62.3	Bailed Dry 29.65 (toc) - DTW
4/3/01	0705	RECHARGE								27.70 (toc)
	1212									27.37 (toc)
4/4/01	0840									26.40 (toc)
4/5/01	0735									25.55 (toc)
	1412									25.47 (toc)
4/9/01	0835									24.22 (toc)
4/10/01	1051	BAIL			9.0	9.53	18.75	Low	68.5	no sediment at base of
	1055				11.0	9.71	17.04	Low	67.5	well
	1100				14.0	9.74	17.70	Low	67.6	Bailed Dry 29.80 (toc) DTW

PAGE 1 OF 2
PZ-057

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocket Pyro / DASA	PTOS1 / PZ57
JOB NO. 313500.07	SITE SPA
	PREPARED BY E. CATHCART

METHOD:
- OVERPUMPAGE: X
- BAILER: X
- SURGE BLOCK: X
- AIR LIFT:
- OTHER:

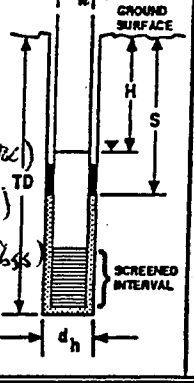
INITIAL WATER LEVEL: 12.75 (TOC)
FINAL WATER LEVEL:

REMARKS: DTW: 10.10 (BGS) 80% = 15.22
Total depth = 25.10 (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 36
WELL CASING INSIDE DIAMETER d_w ID =
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = 12.75 (TOC)
BASE OF SEAL S = 8 (BGS)
BASE OF WELL TD = 22.5 (BGS)
EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

0.16(12.4) + 0.52(24-8) = 10.3 GAL/WV

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY	TEMP. °F	COMMENTS:
4/4/01	1435	BAIL	0 (BEGIN)		0.5			clear		very clear
	1437	surge								
	1510	BAIL	33		1	7.49	6.99 (x100)	high	60.9	Lt. Brown color
	1513	BAIL	3		5	7.43	7.47 (x100)	high	62.3	
	1517	BAIL	4		10	7.13	5.95 (x100)	high	61.9	very Lt. Brown
	1525	BAIL	8		15	6.92	5.38 (x100)	mod/low	62.1	cloudy Brown
	1527	RECHARGE	2							DTW: 20.35 (TOC)
	1529	↓	2							DTW: 19.40 (TOC)
	1544	↓	15							DTW: 15.40 (TOC)
	1546	Pump	1	0.25	15.25	7.05	4.15 (x100)	Low	64.1	cloudy
	1550	|	4	0.25	16.25					
	1550	|	0	0.5	16.25	6.79	3.73 (x100)	Low	66.1	cloudy
	1555	|	5	0.5	18.75	6.78	3.86 (x100)	Low	66.5	cloudy
	1600	|	5	0.5	21.25	6.77	3.86 (x100)	clear	66.5	clear
	1600	|	0	1.0	21.25			clear		
	1606	|	6	1.0	27.25	6.84	4.15 (x100)	cloudy	65.0	
	1608	✓	2	1.0	29.25			High		pump Dry
	1611	RECH.	3	1.0	32.25					DTW 20.0 (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

119

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/DASA	PTO51/PZ57
JOB NO. 31350007 / SITE SPA	PREPARED BY E. CATHCART

METHOD: OVERPUMPAGE X; BAILER X; SURGE BLOCK X; AIR LIFT ____; OTHER ____

INITIAL WATER LEVEL See p.1

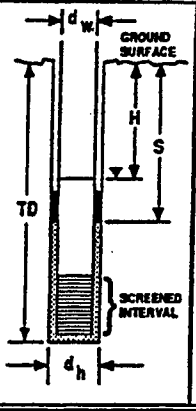
FINAL WATER LEVEL ____

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ $ft.^3 \times 7.48 =$ ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY	TEMP. °F	COMMENTS:
			0 (BEGIN)		0					
4/4/01	1622	RECHARGE			32.25					DTW: 16.88 (TOC)
	1630	↓								DTW: 15.22 (TOC)
	1630	Pump		1	32.25	6.92	3.75 (X100)	clear	65.6	
	1635	↓	5	1	37.25	6.79	3.50 (X100)	Cloudy	65.3	
	1640	↓	5	1	42.25	6.79	3.50 (X100)	clear	65.2	
	1640	↓	0	2						
	1641	↓	1	2	44.25					Pumped Dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
NASA	PZ058
JOB NO. 313150005 / SITE SPA PT-052	PREPARED BY T. Burton

METHOD: OVERPUMPAGE _____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT _____ OTHER _____

INITIAL WATER LEVEL 7.91

FINAL WATER LEVEL _____

REMARKS: TD_o = 18.16, TD = 18.17

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

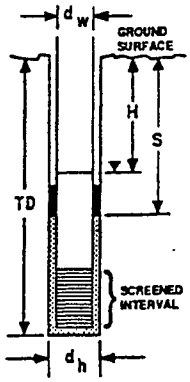
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

= 10 (1.14) + 0 (0.16) = 11.4 + 0 = 11.4 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS: Organic silt, odor Little sand (fine)
2/8/01	1445	Bail	0 (BEGIN)		5					Dk. olive brown
	1510	Surge	0	—						organic odor
	1525	↓	15							
	1535	Bail		—	10					Bail dry, silty
	1545					Recharge: 15:50 - 15:36 in				1 min = .14'/min = 1.2 gpm
2/9/01	0750									DTW = 8.64
	0755	Bail		—	19		Silty, Gray, little vf sand			Bailed Dry
2/15/01	1420	Bail								DTW = 6.13
	1435	↓			28					Bailed Dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
NASA	PZ060
JOB NO. 313150005 / SITE Alfa PT-045	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 34.53'

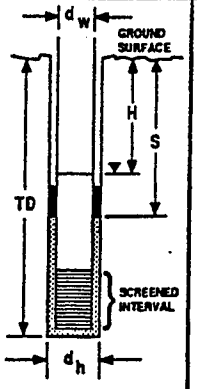
FINAL WATER LEVEL ____

REMARKS: TD_o = 52.32' to cap silt; TD = 52.38' to cap

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ $ft.^3 \times 7.48 =$ ____ gal.

$= 10(1.14) + 7.5(0.16) = 11.4 + 1.2 < 12.6$ gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP °F	COMMENTS
										Organic silt, odor. Few fines in well
2/9/01	0940	Bail	0 (BEGIN)	—	0					
	0949	↓	9		2					Dark gray, silty
	1000	Surge	0	—						
	1015	↓	15							
	1018	Bail	0	—	5	Recharge: 45.00-44.91' in				1 min = 0.1 gpm
	1029	↓	11							Still dk. gray
	1042	↓	24		11					Bailed dry
2/13/01	0905	Bail	0	—						DTW = 30.46
	0932	↓	27		23		Slow recharge			gray, silty, organic
2/15/01	1320	Bail	0	—						Bailed Dry
	1323						1030	clear	64.3	DTW = 32.12
	0138					6.49	1050		63.1	
	0139		19		32	5.95	1010		59.9	
	1342	↓	22							Bailed Dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
NASA	PZ061
JOB NO. 313150005 / SITE Bravo Pond PT-047	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 14.13

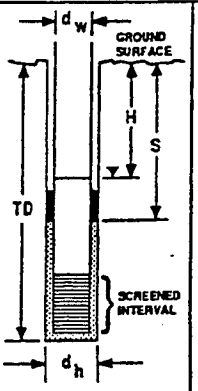
FINAL WATER LEVEL ____

REMARKS: TD_0 = 18.55 TD = 18.56

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\ - \ ) =$ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\ - \ )(\ ) =$ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ $ft.^3 \times 7.48 =$ ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS
2/9/01	0910	Bail	0 (BEGIN)	—	3					Dark brown, silty, some vf sand
	0918	↓	8	—		Recharge - 17.90' - 17.88' in 1 min				Very slow

1 of 2

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ 067 A
JOB NO. 313150005	SITE B359 PT-009A
	PREPARED BY T. Burton

METHOD:
- OVERPUMPAGE: _____
- BAILER: ✓
- SURGE BLOCK: ✓
- AIR LIFT: _____
- OTHER: _____

INITIAL WATER LEVEL: 31.74

FINAL WATER LEVEL: _____

REMARKS: TD_o = 42.35

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____

WELL CASING INSIDE DIAMETER d_w ID = _____

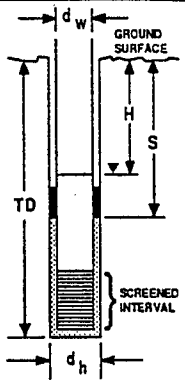
OUTSIDE DIAMETER d_w OD = _____

DEPTH TO: WATER LEVEL H = _____

BASE OF SEAL S = _____

BASE OF WELL TD = _____

EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS: Little sediment
2/2/01	1406	Surge	0 (BEGIN)	—	0					
	1416	↓	10	—						Dark yellowish brown
	1417	Bail	0	—						Bailed dry
	1432	↓	15	—	7	Recharge: 40.23 - 40.20 in 30 sec.				= .06'/min
2/6/01	1520									DTW = ~~10.24'~~ (TOC)
	1520	SURGE	0							
	1540	~~BAIL~~	20							
	1542	BAIL	0		~~0.75~~	7.46	1150	HIGH	67.9	SILT & SAND
	1548		6		10.0	7.55	1020		67.5	
	1551		9		14.0	7.56	1060		66.5	
	1555		13		16.0	7.59	1130		66.1	
	~~1557~~	↓	15		17.0			HIGH		BAILED DRY
	1600									DTW = ~~30.13'~~ (TOC)
2/7/01	0723									28.14 (bgs)
	0730	Surge	0							
	0746	↓	16							
	0750	Bail	0			7.58	560	High	60.1	
	0755	↓	5			7.48	630	High	63.8	

PT-105

2 of 2

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ 067a
JOB NO. 313150005	SITE RB59 PT-009a
	PREPARED BY B. Stowe

METHOD:
- OVERPUMPAGE: ____
- BAILER: ✓
- SURGE BLOCK: ✓
- AIR LIFT: ____
- OTHER: ____

INITIAL WATER LEVEL: See p. 1

FINAL WATER LEVEL: ____

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____

WELL CASING INSIDE DIAMETER d_w ID = ____

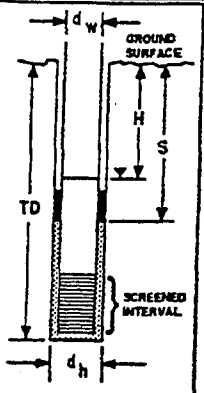
OUTSIDE DIAMETER d_w OD = ____

DEPTH TO: WATER LEVEL H = ____

BASE OF SEAL S = ____

BASE OF WELL TD = ____

EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} × 7.48 = ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
2/7/01	0800	Bail	10 (BEGIN)	—	0	7.50	620	High	63.1	
	0805	↓	15	—	8	7.64	680	High	63.2	Bailed well dry —
2/14/01	0752	Bail	0							
	0802	↓	10							

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT: Rocketdyne | WELL NO.: PZ-067B
JOB NO.: 31315000 5 | SITE: PT-009B | PREPARED BY: T. HALL

METHOD: OVERPUMPAGE ____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT ____ OTHER ____

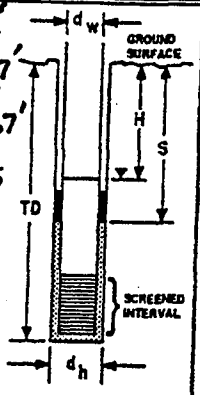
INITIAL WATER LEVEL: 52.27
FINAL WATER LEVEL: ____

REMARKS: ALL DEPTH BELOW TOC (PVC) STICKUP ≈ 2.70'

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 0.5'
WELL CASING INSIDE DIAMETER d_w ID ≈ 0.167'
OUTSIDE DIAMETER d_w OD ≈ 0.167'
DEPTH TO: WATER LEVEL H = 49.5
BASE OF SEAL S = 46
BASE OF WELL TD ≈ 60
EST. FILTER PACK POROSITY p ≈ 0.3



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.³ x 7.48 = ____ gal.

= 8.5'(0.16 + 0.98) gal/ft = 9.7 gal

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP. °F	COMMENTS
2/6/01	1625		0 (BEGIN)	—	0					TD = 62.01'
	1630	SURGE	0							DTW = 52.27' TOC
	1650	↓	20							
	1654	BAIL	0	—	0.5	7.67	690	HIGH	64.3	
	1700		6		2.5	7.62	760		64.8	
	1706		12		4.5	7.63	800		65.2	
	1712		18		7.5	7.70	850	HIGH	64.8	
	1720		26		9.5	7.82	880		64.4	
	1727	↓	33		11.5	7.86	950	HIGH	63.9	BAILED DRY
	1730									DTW = 61.40' TOC
2/13/01	1710	Bail	0	—						DTW = 50.69
	1726	↓	16							Bailed Dry
2/14/01	0729	Bail	0	—						DTW = 53.08
	0740	↓	11			Light Brown,	silty			Bailed Dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
NASA	PZ-071
JOB NO. 313150005 / SITE SSA PT-050	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ✓ ; BAILER ✓ ; SURGE BLOCK ✓ ; AIR LIFT ____ ; OTHER ____

INITIAL WATER LEVEL 11.00

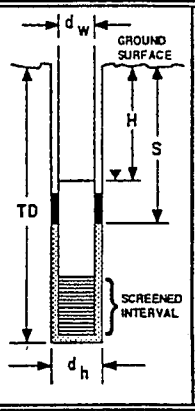
FINAL WATER LEVEL ____

REMARKS: TD_o = 24.44; TD = 31.22

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = ____ $ft.^3 \times 7.48 =$ ____ gal.

= 10(0.16) + 10(1.14) = 1.6 + 11.4 = 13 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS: Organic odor Very silty
2/8/01	1135	Bail	0 (BEGIN)	—	2					
	1159	Surge	0	—						
	1214	↓	15	—						
	1248	Bail	0	—						Less mud, very silty
	1306	↓	18	—	7 Recharge	·25.83×24	77 in 1 min.			(suspended)
	1317	Pump	0	0.4	Speed	114 Hz				= 1.06 l/min = 1.15 gpm
	1332		15		13	6.20	1070	>1000	63.7	olive gray, cloudy
	1336		19					550		less color, cloudy
	1350		33		20	6.52	1050	220	62.6	
	1402		45	↓	25	6.90	1010	100	62.4	clearing
	1403			0.5		Increase Flow, draw in silt				Very turbid
	1417		60		32					cloudy, clearing
	1425		68			7.07	1030	450	62.2	clearing
	1442	↓	85	↓	44			190		

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocketdyne		PZ 072
JOB NO. 313150005	SITE Silvernale PT-060	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ✓ | BAILER ✓ | SURGE BLOCK ✓ | AIR LIFT | OTHER

INITIAL WATER LEVEL 2.73

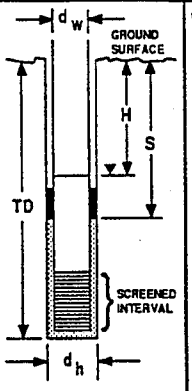
FINAL WATER LEVEL

REMARKS:
TD_0 = 18.01' sandy
TD = 20.24' to cup bottom

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ ft.^{3} × 7.48 = _____ gal.

$= 7.3(0.16) + 10\left(\frac{1.14}{0.98}\right) = 11.4 + .85 = 12.3$ gals.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
										Silty, dk. brown
2/8/01	0915	Bail	0 (BEGIN)	—	0					very sandy, vf-fine
	0940	↓			10	Recharge: 15.70 - 14.64			in 30 sec	= 24" /min = 2.4 gpm
	0943	Surge	0	—						
	0958	↓	15							
	1004	Bail		—	19.5					Little sand; silty
	1033	Pump	0	0.4						96 Hz olive brown
	1041			1.0→0.4				>1000		105 Hz very silty
	1047		14	0.4	25		1670	~~95~~	63.3	clearing (cloudy)
	1052				27	5.45		95		
	1057		24		29	5.17	1460		61.3	clear
	1058			1.0		Increase Flow to pump			dry	silty, cloudy
	1059		26	0.4		Re-start @ 106 Hz				
	1104				31	5.13	1470	100	63.1	clearing
	1109		36					14		clear
	1114	↓			35					stop

PZ-074 Page 1 of 2

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / Boeing	PT021/PZ74
JOB NO. 313150006 / SITE	PREPARED BY E. CAMPBELL

METHOD: OVERPUMPAGE ____ BAILER X SURGE BLOCK X AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 12.06 (TOC)

FINAL WATER LEVEL ____

REMARKS: 4/3/01 80% = 14.79 (TOC) 6.76 (BGS) - DTW 23.35 total depth 20.74 (BGS) (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6

WELL CASING INSIDE DIAMETER d_w ID = ____

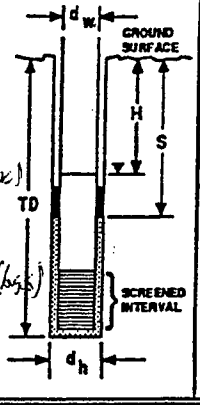
OUTSIDE DIAMETER d_w OD = 2

DEPTH TO: WATER LEVEL H = 12.06 (TOC)

BASE OF SEAL S = 8

BASE OF WELL TD = 20.74 (BGS)

EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} × 7.48 = ____ gal.

0.52(16) + 0.16(12.06 - 25.7) = 10.5 gal/wk

DEVELOPMENT LOG: DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY	TEMP. °F	COMMENTS:
4/5/01	1510	BAIL	0 (BEGIN)		0.5			High		DTW = 12.18 - Dark Brown H2O
	1515	Surge	5							Surge rising over fill Sediment in casing
	1530	BAIL	15		1	9.59	6.95 (X100)	High	63.1	Switched to bailer
										Very fine Sediment in Base of well
	1535		5		3			Very High		Dark brown W/ Silt
										Fine Sand/SILT
	1539		4		5	9.64	7.75 (X100)	Very High	60.9	Fine Brown Sand/Silt
	1543		4		8	9.62	8.06 (X100)	High	59.8	
	1545		2		9	9.67	7.79 (X100)	High	60.6	Bailed Dry DTW: 21.74 (TOC)
										total depth: 23.00 (TOC)
										Muddy At base but
										Enough H2O to Surge
	1550	RECHARGE								DTW: 21.55 (TOC)
	1600									DTW: 21.10 (TOC)
4/6/01	0655									DTW: 16.50 (TOC)
4/10/01	1730									DTW: 12.94 (TOC)
	1335									DTW: 12.68 (TOC)

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocket Dyne / Boeing	PT021/PZ74
JOB NO. 313150006 / SITE	PREPARED BY E. Cathcart

METHOD: OVERPUMPAGE _____ BAILER X SURGE BLOCK X AIR LIFT _____ OTHER _____

INITIAL WATER LEVEL See p.1

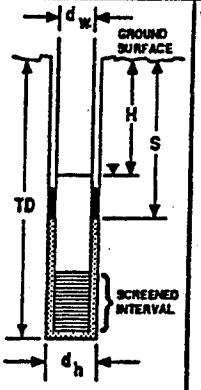
FINAL WATER LEVEL _____

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ ft.^{3} x 7.48 = _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY us/cm	TURBIDITY	TEMP. °F	COMMENTS:
			0 (BEGIN)		0					
4/10/01	1337	Bail			10	9.66	9.16 (x100)	Moderate	67.4	very muddy At Base of well
	1342	↓			13	9.84	8.29 (x100)	High	64.7	
	1350				17	9.79	9.11 (x100)	High	65.8	Base of well encountered
	1355	↓			18	9.82	9.03 (x100)	High	67.0	Bailed Dry DTW: 22.80 (TOC)
4/11/01	1620	RECHARGE								DTW: 14.81 (TOC)
4/12/01	1300									DTW = 14.00 (TOC)
	1308	Surge								
	1330	Bail			18.5	9.64	9.34 (x100)	High	72.2	Sediment on Bottom
	1335	↑			21					Sediment removed
	1337	↓			23	9.37	7.32 (x100)	high	69.5	
	1340	↓			26	8.85	7.83 (x100)	High	66.5	Bailed Dry DTW: 22.80 (TOC)
4/16/01	1000	Surge								DTW 13.45 (TOC)
	1030	Bail			26.5	9.72	7.33 (x100)	High	70.0	no Sediment on Bottom
	1035	↓			31.0	9.75	7.80 (x100)	High	64.5	Light Brown Color
	1037	↓			33.0	9.83	7.64 (x100)	High	62.9	
	1040	↓			35.0	9.84	7.63 (x100)	High	62.3	Bailed Dry DTW: 22.81 (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-075

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocket Dyne / Boeing		RT04/PZ75
JOB NO. 31315000G	SITE IEL	PREPARED BY E. Cathcart

METHOD: OVERPUMPAGE ______ BAILER X SURGE BLOCK X AIR LIFT ______ OTHER ______

INITIAL WATER LEVEL 41.21 (TOC)

FINAL WATER LEVEL ______

REMARKS: ~~37.71 (bgs)~~ 37.71 (bgs) Top of Screen 33.00 (bgs) 80% = 42.3 (toc)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6

WELL CASING INSIDE DIAMETER d_w ID = ______

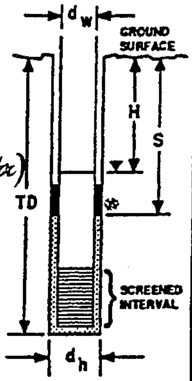
OUTSIDE DIAMETER d_w OD = 2

DEPTH TO: WATER LEVEL H = 41.21 (toc)

BASE OF SEAL S = 27

BASE OF WELL TD = 43.40

EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME $= V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_c =$ ____ + ____ = ______ $ft.^3 \times 7.48 =$ ______ gal.

0.16(37.71 - 43.40) + 0.52(37.45) = ~~10.779~~ 5 gal/wv

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	pH	CONDUCTIVITY µS/cm	TURBIDITY	TEMP. °F	COMMENTS
4/16/01	1300	Bail	0 (BEGIN)		0					Clear
	1303	↓	3		1	9.76	8.26 (x100)	Clear	74.8	
	1305		2		3	9.59	7.09 (x100)	Clear	71.1	
	1310		5		4.5	9.70	7.82 (x100)	Clear	71.4	
	1315	↓	5		5	9.85	7.60 (x100)	Clear	71.1	Bailed Dry DTW: 45.74 (toc)
	1555	RECHARGE								DTW: 45.23 (toc)
4/17/01	0800									DTW: 44.20 (toc)
4/18/01	0835	↓								DTW: 42.20 (toc)
	0840	Bail	5		5.5	9.44	7.75 (x100)	Clear	63.4	
	0848		8		8	9.68	8.52 (x100)	Clear	65.0	
	0855	↓	7		9.5	9.85	8.60 (x100)	Clear	64.6	Bailed Dry DTW: 45.70 (toc)
4/19/01	1355	RECHARGE								DTW 42.98 (toc)
4/20/01	0745	↓								DTW 42.16 (toc)
	0745	Bail	0		10	6.87	5.50 (x1000)	Clear	57.5	Calibrated Hydac & Retested - Same Result
	0755		10		12.5	7.17	1.37 (x1000)	Clear	58.2	
	0803	↓	8		14.0	7.24	9.21 (x100)	Cloudy	60.0	Bailed Dry 44.99

[redacted]

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocketdyne CTL-III		PZ-076
JOB NO. 313150005	SITE PF-031	PREPARED BY B. Stewart / T. Burton

METHOD:
- OVERPUMPAGE ✓
- BAILER ✓
- SURGE BLOCK ✓
- AIR LIFT ______
- OTHER ______

INITIAL WATER LEVEL 27.57 bgs

FINAL WATER LEVEL ______

REMARKS: TD = 49.80' bTOC

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ______

WELL CASING INSIDE DIAMETER d_w ID = ______

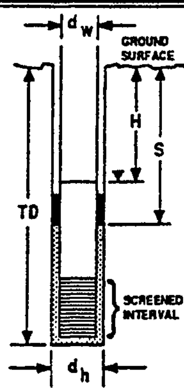
OUTSIDE DIAMETER d_w OD = ______

DEPTH TO: WATER LEVEL H = ______

BASE OF SEAL S = ______

BASE OF WELL TD = ______

EST. FILTER PACK POROSITY P = ______



WELL VOLUME CALCULATION:

CASING VOLUME $= V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_C =$ ______ + ______ = ______ ft.^{3} x 7.48 = ______ gal.

= ~~(1.14)~~ = (.16)(9.5) + ~~(0.98)~~ 1.14 (10) = ~~9.8~~ 11.4 + 1.5 = ~~13~~ 13 gal

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	pH	CONDUCTIVITY µS/cm	TURBIDITY	TEMP. °F	COMMENTS
2/5/01	1450	Surge	0 (BEGIN)	—	0					TD = 46 ft bgs
	1500	Bail	10	—						Depth H_2O = 27 ft bgs
	1515	↓		—		8.50	1840		73.7	
	1520			-						After bailing WL
										@ 41.32 bgs
	1540	↓	50	-	16.5	8.09	1570		66.4	Bailed well dry -
2										high turbidity
										WL = 45.52 ft
2/6/01	0927	Bail	0	—	DTW = 30.33' bTOC		TD = 49.80' bTOC			
	0839		12		24.5	Recharge: ~~43~~ 43.15 - 42.98' in 1 min = .17/min = 0.2 gpm				
	0846					6.82*	1870		60.2	Dark Olive gray,
	0857	↓	30		30					silty - no sands
										Bailed dry
2/15/01	1615	Bail	0	—						DTW = 30.25'
	1630	↓	15		43		(Bailed by hand)			silty, olive gray
										Bailed, ~~dry~~ not
										drawing down

2 hrs dev't or bail ~~dry~~ twice if low yield

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ076
JOB NO.	SITE: CTL III PT-031
	PREPARED BY: T. Burton

METHOD:
- OVERPUMPAGE ✓
- BAILER ✓
- SURGE BLOCK ✓
- AIR LIFT
- OTHER

INITIAL WATER LEVEL See p.1

FINAL WATER LEVEL

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____

WELL CASING INSIDE DIAMETER d_w ID = ____

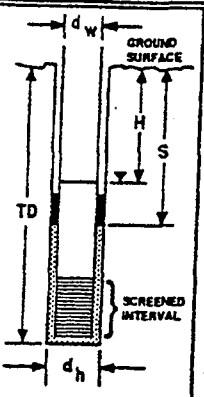
OUTSIDE DIAMETER d_w OD = ____

DEPTH TO: WATER LEVEL H = ____

BASE OF SEAL S = ____

BASE OF WELL TD = ____

EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ $ft.^3 \times 7.48 =$ ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY NTU	TEMP. °F	COMMENTS:
2/16/01	0805	—	0 (BEGIN)		0					
	0847	Pump	0	0.25						DTW = 30.25'
	0851		4		44.5	6.91	1540	>1000	58.2	
	0900		13	↓	47	—	1590	>1000	62.3	silty, olive
	0910		23	0.15	49	6.16	1680	380	59.6	clearing
	0926		39	0.10	51	6.80	1570	500	65.9	
	0936		49	0.2	51.5	7.38	1610	390	67.5	
	0946		59	↓	54	7.60	1640	550	67.0	
	0947	↓	60	1.5	55.5					Pumped Dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ077
JOB NO. 313150005	SITE CTL III PT-030
	PREPARED BY T. Burton

METHOD: OVERPUMPAGE _____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT _____ OTHER _____

INITIAL WATER LEVEL 19.14

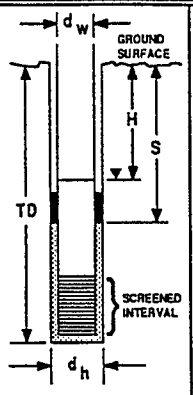
FINAL WATER LEVEL _____

REMARKS: TD = 28.40

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = _____ ft.^{3} × 7.48 = _____ gal.

= 9.2(1.14) = 10.2 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS: Very little sand
2/2/01	1210	Bail	0 (BEGIN)	—	0					Thick silty mud at
	1238	↓	28	—	7					bottom; bailed dry
					Recharge to 21.9'					
	1259	Surge	0	—						
	1314	↓	15	—						Dark olive, silty
	1315	Bail	0	—						Not clearing up
	1323	↓	8	—	11					Bailed dry
B. Stewart 2/7/01	0923	Surge	0	—	0					15.66 (TOC) = DTW
	0943	↓	20	—						
	0944	Bail	0	—	0	7.21	2750	High	56.1	
	0949	↓	5	—	(5) 16	7.37	3370	High	35.3	
	0954	↓	10	—	(7) 18	7.35	3680	High	57.9	Bailed dry -
										still high turbidity
										26.31 (TOC) @ 0 min
2/15/01	1605	Bail	0	—		DTW = 14.70				25.80 (TOC) @ 1 min
	1615	↓	10			Bailed Dry				↑ 0.51 ft/min
										D

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ 078
JOB NO. 313150005	SITE CTL III PT-029
	PREPARED BY T. Buxton

METHOD: OVERPUMPAGE _____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT _____ OTHER _____

INITIAL WATER LEVEL 19.67

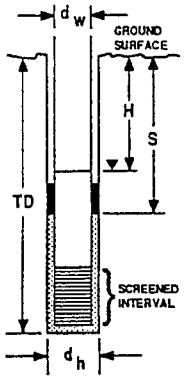
FINAL WATER LEVEL _____

REMARKS: TD_o = 24.73

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = _____
WELL CASING INSIDE DIAMETER d_w ID = _____
OUTSIDE DIAMETER d_w OD = _____
DEPTH TO: WATER LEVEL H = _____
BASE OF SEAL S = _____
BASE OF WELL TD = _____
EST. FILTER PACK POROSITY P = _____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) =$ _____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ _____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ _____ + _____ = _____ $ft.^3 \times 7.48 =$ _____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
2/2/01	1140	Bail	0 (BEGIN)	—	0					Bailed Dry
	1200	↓	20	—	8					
2/7/01	0843	Surge	0	—						16.70 (TOC) = DTW
	0858	↓	15	—	8					
	0900	Bail	0	—	(0) 8	6.74	1170	High	56.4	
	0905	↓	5	—	(5) 13	6.65	1440	High	58.7	
	0910	↓	10	—	(8) 16	6.56	1400		59.2	
	0911	↓	11	—	(9) 17					Bailed dry
										23.62 (TOC) @ 0 min
										23.46 (TOC) @ 1 min
										↑ 0.16 ft/min
										Still high turbidity
2/13/01	1620	Bail	0	—		DTW = 14.62				olive, silty
	1632	↓	12	—	26					Bailed Dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ 079
JOB NO. 313150005 / SITE CTL III PT-028	PREPARED BY T. Burton

METHOD: OVERPUMPAGE ✓ ; BAILER ✓ ; SURGE BLOCK ✓ ; AIR LIFT ____ ; OTHER ____

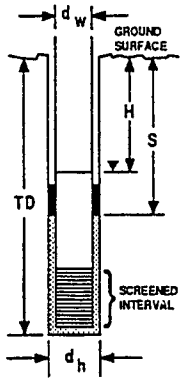
INITIAL WATER LEVEL 17.12'
FINAL WATER LEVEL 17.21'

REMARKS: TD_o = 26.77' (silty) TD = 27.72
Fast recharge at 17.8-17.5'

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H^*))(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = ____ $ft.^3 \times 7.48 =$ ____ gal.

$= (10.6)(\frac{1.14}{0.98}) = \approx \frac{11.7}{10.5}$ gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH*	CONDUCTIVITY mS/cm	TURBIDITY NTU	TEMP. °F	COMMENTS: Silty at bottom; *pH is relative; not cal'd.
2/6/01	0937	Bail	0 (BEGIN)	—	0					Very dark grayish brown
	0947	↓	10		5	6.85	1120	>1000 V. High	62.5	silty vf sands
	0952				6.5	~~Recharge: 23.53 23.51 in 1 min~~				~~0.02'~~/min DTW = 17.4'
	1000	↓	23		11.5					
	1006	Surge	0	—						
	1021	↓	15							
	1031	Bail	0	—		6.52	1110	>1000	64.5	Very silty, little sand
	1051	↓	20		17	6.30	927	>1000	66.0	Some fine + vf sand
	1109	Pump	0	1.0		5.97	983	>1000	66.7	silty, light olive gray
	1115		6	0.6	23					clearing to cloudy olive
	1116		7	0.75		5.77	959	<1000	67.0	clearing to lt. gray
	1121		12	1.0	27	5.74	951	<500	66.5	
	1124		15	1.2	30	5.70	937	<100	67.0	clear
	1129	↓	20	↓	36					

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-080
Page 1 of 2

WELL DEVELOPMENT

PROJECT		WELL NO.
Rocketdyne/Boeing		PT022/PZ080
JOB NO. 313150006	SITE B... Area	PREPARED BY E. Cathcart

METHOD:
- OVERPUMPAGE ______
- BAILER X
- SURGE BLOCK X
- AIR LIFT ______
- OTHER ______

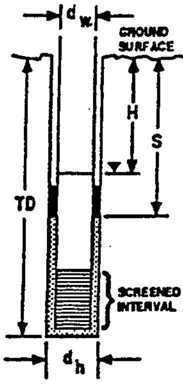
INITIAL WATER LEVEL 20.65 (toc)
FINAL WATER LEVEL ______

REMARKS: Total depth: 27.96 (toc) 25.00 (BGS) (Sediment in casing) Fine gray & brown 4 ft sediment (very soft)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
80% = 21.0
Top of screen 21.9 (toc)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = ______
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = ______
BASE OF SEAL S = 5
BASE OF WELL TD = 29.4
EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME $= V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_C =$ ______ + ______ = ______ ft.^{3} x 7.48 = ______ gal.

0.52(~~29.4~~ 31-5) + 0.16(12.25) = 15.48 gal/vv

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	pH	CONDUCTIVITY µS/cm	TURBIDITY	TEMP. °F	COMMENTS
4/6/01	0733	Bail	0 (BEGIN)		0					Bailing out sediment Sulphur odor
										DTB = 31.70 (toc)
	0737		4		1					Sediment reduced after 2 bails
	0738	Surge	1							
	08[illegible]5	Complete surge								
	0825	Bail			1.5	9.26	7.18 (x100)	High	53.3	Fine sand Dark Brown
	0830	↓			4	9.48	5.54 (x100)	Very high	56.6	
	0832				5	9.33	5.01 (x100)	Very high	56.0	Bailed Dry DTW: 32.00 (toc)
	0915									DTW: 27.03 (toc)
4/10/01	0720									DTW: 19.10 (toc)
	0725	Surge	5							
	0755	Bail	30		5.5	9.54	5.89 (x100)	Very high	53.2	
	0800		5		8.5	9.85	6.54 (x100)	Very high	54.5	
	0805		5		9.0	9.96	6.41 (x100)	Very high	55.9	Bailed Dry DTW: 32.10 (toc)
	0955									DTW: 23.50 (toc)
	1120									DTW: 20.52 (toc)
	1225	Surge								

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/Boeing	P4022/PZ80

JOB NO.	SITE	PREPARED BY
313IS0006	Bowl Area	E. Cathcart

METHOD:
- OVERPUMPAGE ______
- BAILER X
- SURGE BLOCK X
- AIR LIFT ______
- OTHER ______

INITIAL WATER LEVEL see p. 1

FINAL WATER LEVEL ______

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ______

WELL CASING INSIDE DIAMETER d_w ID = ______

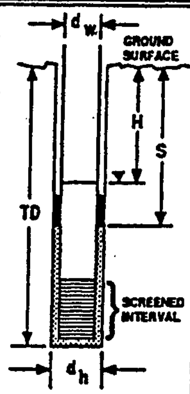
OUTSIDE DIAMETER d_w OD = ______

DEPTH TO: WATER LEVEL H = ______

BASE OF SEAL S = ______

BASE OF WELL TD = ______

EST. FILTER PACK POROSITY P = ______



WELL VOLUME CALCULATION:

CASING VOLUME $= V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_C =$ + = ______ ft.^{3} x 7.48 = ______ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	pH	CONDUCTIVITY µS/cm	TURBIDITY	TEMP. °F	COMMENTS
			0 (BEGIN)		0					
4/10/01	1255	bail			9.5	9.78	4.36 (x100)	very high	67.2	Sandy
	1300	↓			12.0	9.94	4.36 (x100)	very high	65.0	
	1305	↓			15.0	9.98	5.35 (x100)	very high	63.8	Bailed Dry DTW: 32.00

1 of 2
PZ-082

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ-~~084~~ 082
JOB NO. 313150005	SITE PT-024
	PREPARED BY B. Stewart

METHOD:
- OVERPUMPAGE: ____
- BAILER: ✓
- SURGE BLOCK: ✓
- AIR LIFT: ____
- OTHER: ____

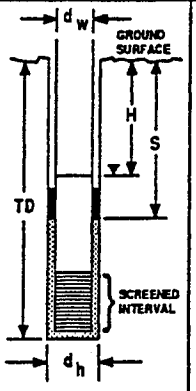
INITIAL WATER LEVEL 8.16 bgs
FINAL WATER LEVEL ____

REMARKS: Water has H_2S odor.

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
- 2" - 0.16
- 4" - 0.65
- 6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
- 2" CASING AND 6" HOLE = 0.52
- 2" CASING AND 8" HOLE = 0.98
- 4" CASING AND 10" HOLE = 1.37
- 4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN	TIME END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
2/5/01	0920		Bail	0 (BEGIN)	–	0					1 H_2O INITIA 11.72 BELOW TOC (steel)
	0930			10	–	2					TD = 16.13 bgs
	0935		Surge	10	–						12.33' (TOC-steel)
	0945		Bail	15	–	13					11.63' (TOC-PVC)
	1005		Bail	10	–	24	8.31	1010		76.9	
	1028		Pump	1	1.0	25					
	1033				1.0						
	1040			15	1.0	40	7.35	910		73.9	
	1043			6	2.0	52					↑ 2.0 gpm
	1049				1		6.99	870		71.3	
	1050			19	4.0	128					↑ 4.0 gpm
	1100						6.65	890		71.6	
	1109		↓		↓						Stopped pump
	1118		Surge		–						
	1150		Bail	10	–	138					
	1203		Pump	13	~~7.5~~						Started pump -
	1210				8.0						flowmeter stuck
											@ 4.5 gpm

2 of 2
PZ-082

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ- ~~084~~ 082
JOB NO. 313150005 / SITE PT-024	PREPARED BY B. Stewar

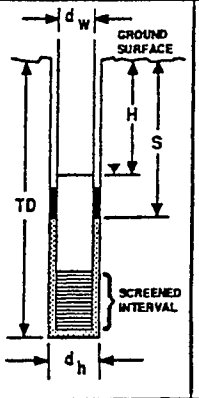
METHOD: OVERPUMPAGE ____ BAILER ✓ SURGE BLOCK ✓ AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL See p. 1
FINAL WATER LEVEL ____

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} × 7.48 = ____ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
			0 (BEGIN)		0					
2/5/01	1210									Air being pushed
										thru flowmeter
	1216		4	1.0		6.81	980		71.6	↓1.0 gpm
	1220		2	4.0						↑4.0 gpm
	1222		5	7.0						↑7.0 gpm
	1227		15	8.0						
	1237					6.86	890		71.0	
	1242									Stopped pump
										Water very clear -
										low turbidity

Pump: 251 hz = 1 min 35 sec = 7 gpm 380 hz = 1 min 15 s = 8 gpm

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/Boeing	117A/85A(PZ)
JOB NO. 313150006 · SITE Bowl	PREPARED BY C. Cathcart

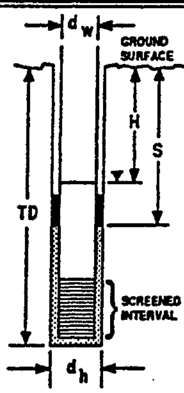
METHOD:		
OVERPUMPAGE		INITIAL WATER LEVEL ______
BAILER	X	FINAL WATER LEVEL ______
SURGE BLOCK	X	
AIR LIFT		
OTHER		

REMARKS:

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ______
WELL CASING INSIDE DIAMETER d_w ID = ______
OUTSIDE DIAMETER d_w OD = ______
DEPTH TO: WATER LEVEL H = ______
BASE OF SEAL S = ______
BASE OF WELL TD = ______
EST. FILTER PACK POROSITY P = ______



WELL VOLUME CALCULATION:

CASING VOLUME $= V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_C =$ ______ + ______ = ______ $ft.^3 \times 7.48$ = ______ gal.

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	pH	CONDUCTIVITY	TURBIDITY	°F TEMP.	COMMENTS:
			0 (BEGIN)		0					
4/16/01	0805	Bail			13	9.67	9.68(x100)	Low	64.5	
	0815	↓			15	9.69	2.58(x1000)	High	65.6	
	0820	↓			17.5	9.67	2.69(x1000)	High	66.2	Bailed Dry DTW: 29.30 (TOC)

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

142

PZ-085B

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/Boeing	PT117 B/PZ 85B
JOB NO. 313150006 / SITE Bowl Area / PREPARED BY E. Cathcart	

METHOD: OVERPUMPAGE ____ BAILER X SURGE BLOCK X AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 24.62 (toc)

FINAL WATER LEVEL ____

REMARKS: 46.95 (toc) total depth - measured

80% recharge = 29.09 ft (toc)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6

WELL CASING INSIDE DIAMETER d_w ID = ____

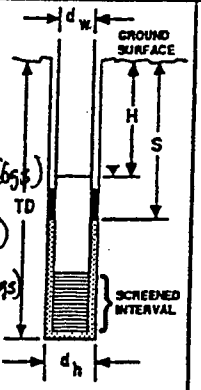
OUTSIDE DIAMETER d_w OD = 2

DEPTH TO: WATER LEVEL H = 24.32 (bgs)

BASE OF SEAL S = 34 (bgs)

BASE OF WELL TD = 47.4 (bgs)

EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ ft.^{3} × 7.48 = ____ gal.

(47.4 - 24.32) 0.16 + 0.52 (34 - 48) = 10.97 gal / well

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	WATER QUALITY CONDUCTIVITY µS/cm	WATER QUALITY TURBIDITY	WATER QUALITY TEMP. °F	COMMENTS:
~~0900~~	~~BAIL~~		0 (BEGIN)		0					
4/3/01	0900	BAIL	0		0.5			LOW		very clear
	0905	Surge	5							
	0935	BAIL	30		1	7.93	17.52 (X100)	High	58.8	Very turbid (mostly clay)
	0940	↓	5		5					
	0945		5		10	7.91	16.79 (X100)	high	57.2	
	0955	↓	10		13	7.98	16.78 (X100)	high	58.0	BAILED DRY 45.35 (toc)
	1105	RECHARGE								PTW: 36.95 (toc)
	1155	↓								DTW: 29.66 (toc)
	1437	Surge			13.5	7.29	15.28 (X100)	high	60.2	DTW 25.15 (toc)
	1520	BAIL			18	7.50	13.54 (X100)	high	60.8	Lt Brown/Clayey ~~Dark~~
	1525	BAIL	5		22	7.95	14.71 (X100)	high	61.9	Slightly clearer turbidity
	1535	BAIL	10		26	7.39	14.24 (X100)	high	60.1	BAILED DRY DTW: 46.10 (toc)
4/4/01	0800	RECHARGE								DTW: 24.60 (toc)
	0820	Surge								
1005	~~0854~~	BAIL			27	7.23	~~8.44~~ 1.84 (X100)	high	~~63.0~~ 57.8	Switched hydac motors
	1010	BAIL			31	7.31	9.21 (X100)	high	62.6	
	1015	↓			35	7.27	9.97 (X100)	high	63.4	
	1025	↓			40	7.19	9.91 (X100)	high	62.9	BAILED DRY PTW: 46.00 (toc)

PZ087A

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/Boeing	~~PZ00~~ PZ023A
JOB NO. 313150006 / SITE BOU Area	PREPARED BY E. Cathcart

METHOD: OVERPUMPAGE ____ BAILER X SURGE BLOCK X AIR LIFT ____ OTHER ____

INITIAL WATER LEVEL 18.60 (toc)

FINAL WATER LEVEL ____

REMARKS: 15.31 (bgs) 0925 (H_2O pumped) 25.05 (toc) - total depth 80% = 19.89 Ft (toc)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)	VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" - 0.16	2" CASING AND 6" HOLE = 0.52
4" - 0.65	2" CASING AND 8" HOLE = 0.98
6" - 1.47	4" CASING AND 10" HOLE = 1.37
	4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6

WELL CASING INSIDE DIAMETER d_w ID = ____

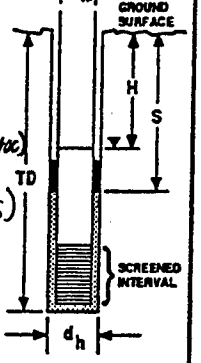
OUTSIDE DIAMETER d_w OD = 2

DEPTH TO: WATER LEVEL H = 18.60 (toc)

BASE OF SEAL S = 7 (bgs)

BASE OF WELL TD = 21.4

EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD - H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD - (S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

(21.4 - 15.31) 0.16 + 0.52 (22.5 - 7) = 9 gal/wv

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY	TEMP. °F	COMMENTS:
4/3/01	1005	BAIL	0 (BEGIN)		0.5			LOW		very clear
	1007	Surge	2							
	1037	BAIL	30		1	6.89	3.98 (x100)	high	52.8	
	1045	↑	8		4	6.75	5.82 (x100)	high	53.6	Sandy turbidity
	1052	↓	7		6.5	6.84	6.37 (x100)	high	53.7	Bailed dry DTW = 24.65 (toc)
	1242	RECHARGE								DTW 20.85 (toc)
	1313	↓								DTW 20.00 (toc)
	1344	↓								DTW 19.54 (toc)
	1350	Surge								
	1420	BAIL	30		7	6.78	5.67 (x100)	high	54.9	
	1426	↓	6		10	6.76	5.79 (x100)	high	56.1	
	1430	↓	4		15	6.73	5.86 (x100)	high	55.7	DTW: (toc) 24.60 Bailed Dry
4/4/01	0810	RECHARGE								DTW: 17.82
	1035	Surge								
	1105	BAIL	30		15.5	6.74	3.76 (x100)	High	55.0	
	1110	↓	5		26	6.53	4.04 (x100)	high	56.8	
	1115	↓	5		22.5	6.51	4.15 (x100)	High	57.4	
	1116	↓			23.0					Bailed Dry DTW: 24.60 (toc)

P2-087B

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocket Dyne	PT023B/P287b
JOB NO. 313150006	SITE Bowl Area
	PREPARED BY E. CATHCART

METHOD: OVERPUMPAGE X; BAILER X; SURGE BLOCK X; AIR LIFT ____; OTHER ____

INITIAL WATER LEVEL 40.00 (TOC)

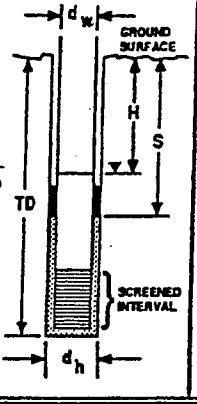
FINAL WATER LEVEL ____

REMARKS: DTW: 37.35 (bgs) 80% = 43.08
Base of well: 55.0 (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = 37.35
BASE OF SEAL S = 36.0
BASE OF WELL TD = 51.9
EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ ____ + ____ = ____ ft.^{3} × 7.48 = ____ gal.

(51.9 - 37.35) 0.16 + 0.52 (36 - 55) = 12.29 gal/wv

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm (x100)	TURBIDITY	TEMP. °F	COMMENTS:
4/3/01	1057	BAIL	0 (BEGIN)		0.5			low		CLEAR - some clay @ base
	1100	Surge	3							
	1130	BAIL	30		1	7.68	11.25	High	56.6	LT. Brown - CLAYEY
	1336	↓	6		5			↓		
	1144	↓	8		10	7.99	10.13	↓	56.2	
	1147	↓	3		12			↓		DTW: 40.01 (TOC)
	1300	Pump				7.99	10.54	Moderate	58.6	DTW: 40.00 (TOC)
	1305	↓	5	1	17	7.22	10.64	High	60.0	
	1308	↓	3	1	20			↓		Pumped dry
	1315	↓	7	1	27			↓		- Flow meter Stuck
	1320	↓	5	1	32	7.22	10.64	Moderate	59.0	* Flow rate Probably not
	1324	↓	4	1	36	7.15	10.53	LOW	60.2	Accurate; however, total
	1327	↓	3	1	39			↓		volume correct
	1328	↓	1	1	40	7.93	10.34	↓	61.2	
	1332	↓	4	1	44	7.97	9.82	Cloudy	61.5	
	1333	↓	1	4	48	7.97	9.93	Cloudy	61.8	
	1335	↓	2	0.5	49			Clear		
	1340	↓	5	—	—			Clear		Pumped Dry

PZ-088

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne/Boeing	PW15/PZ88
JOB NO. 3/3150006 / SITE COCA DRAINAGE	PREPARED BY E. CATHCART

METHOD: OVERPUMPAGE X
BAILER X
SURGE BLOCK X
AIR LIFT
OTHER

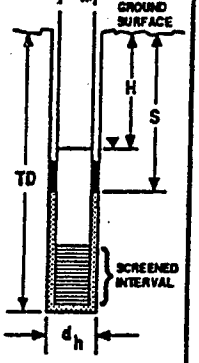
INITIAL WATER LEVEL 31.15 (TOC)
FINAL WATER LEVEL

REMARKS: DTW: 28.51 (BGS)
TOTAL DEPTH: 45.40 (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
80%= 34.00
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID =
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = 28.51
BASE OF SEAL S = 27
BASE OF WELL TD = 42.4
EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

0.16(13.69) + 0.52(16) = 10.5 gal/hr

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY	TURBIDITY	TEMP.	COMMENTS:
4/6/01	0904	BAIL	0 (BEGIN)		0.5			Low		
	0907	Surge	3							
	0937	BAIL	30		1	9.00	17.07 (x100)	High	60.3	Dark Brown
	0941	BAIL	4		5	9.06	16.92 (x100)	high	61.8	
	0948	"	7		10	8.96	18.03 (x100)	high	63.1	
	0958	"	10		15	8.70	15.90 (x100)	high	63.4	DTW: 42.35 (TOC) Baled Dry
	1000	RECH.	2							DTW: 41.50 (TOC)
	1004		4							DTW: 39.80 (TOC)
	1011		7							DTW: 37.00 (TOC)
	1021	~~Surge~~	10	0.5						DTW: 34.00 (TOC)
	1026	Pump	5		15	8.75	14.70 (x100)	moderate	69.0	
	1040		13	0.5	21.5	8.29	15.81 (x100)	moderate	71.2	
	1044		4	0.5	23.5	9.12	13.30 (x100)	clear	71.3	
	1050		6	0.5	26.5	9.14	13.47 (x100)	cloudy	71.4	
	1100		10	0.5	31.5	9.12	13.70 (x100)	clear	70.5	Pumped Dry

PZ-089

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne / Boeing	PT014/PZ89
JOB NO. 31315000G	SITE COCA DRAINAGE
	PREPARED BY E Carlson

METHOD: OVERPUMPAGE X; BAILER X; SURGE BLOCK X; AIR LIFT ____; OTHER ____

INITIAL WATER LEVEL 12.90 (TOC)

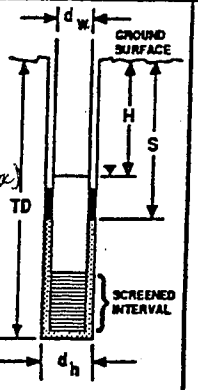
FINAL WATER LEVEL ____

REMARKS: DTW: 10.10 (bgs) 80% = 14.12 (TOC)
Total = 19.00 (TOC)

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = 6
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = 2
DEPTH TO: WATER LEVEL H = 12.90 (TOC)
BASE OF SEAL S = 4.5
BASE OF WELL TD = 16.4
EST. FILTER PACK POROSITY P = 0.40



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = \_\_\_\_$

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = \_\_\_\_$

TOTAL WELL VOLUME = $V_T = V_f + V_C$ = ____ + ____ = ____ ft.^{3} x 7.48 = ____ gal.

0.16(10.10 - 16.4) + 0.52(13.5) = 8.9 Al / WV

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	WATER QUALITY CONDUCTIVITY µS/cm	WATER QUALITY TURBIDITY	WATER QUALITY °F TEMP.	COMMENTS:
4/6/01	1120	BA:1	0 (BEGIN)		0.5			Very Clear		
	1124	Surge	4							
	1154	BA:1	30		1	9.90	4.02 (x100)	High	60.8	LT Brown
	1157	↓	3		4	9.53	3.44 (x100)	High	60.1	
	1200	↓	3		8	9.47	3.06 (x100)	High	60.0	DTW: 18.30 (TOC) Bailed Dry
	1205	RECHARGE	5							DTW: 16.00 (TOC)
	1210	RECHARGE	5							DTW: 14.12 (TOC)
	1211	Pump	1	0.5	8	9.29	3.41 (x100)	moderate	63.4	
	1220	↓	9	0.5	12.5	8.91	3.77 (x100)	moderate	64.9	
	1225	↓	5	0.5	15	9.10	3.17 (x100)	Cloudy	64.8	
	1230	↓	5	0.5	17.5	9.23	3.19 (x100)	Cloudy	65.0	
	1235	↓	5	0.5	20.0	9.26	2.89 (x100)	Clear	63.9	
	1240	↓	5	0.5	22.5	9.26	3.24 (x100)	Clear	64.7	
	1245	↓	5	0.5	25	9.19	3.23 (x100)	Clear	65.2	
	1245	RECHARGE	0	1						
	1246	RECHARGE	1	1	26					Pump Dry

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

WELL DEVELOPMENT

PROJECT	WELL NO.
Rocketdyne	PZ091
JOB NO. 313150005 / SITE CTL III N. PT025	PREPARED BY T-Burton

METHOD:
- OVERPUMPAGE ✓
- BAILER ✓
- SURGE BLOCK ✓
- AIR LIFT
- OTHER

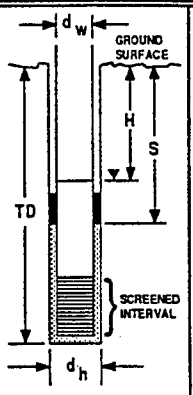
INITIAL WATER LEVEL 17.8
FINAL WATER LEVEL

REMARKS: Slower recharge than when tested

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER d_h = ____
WELL CASING INSIDE DIAMETER d_w ID = ____
OUTSIDE DIAMETER d_w OD = ____
DEPTH TO: WATER LEVEL H = ____
BASE OF SEAL S = ____
BASE OF WELL TD = ____
EST. FILTER PACK POROSITY P = ____



WELL VOLUME CALCULATION:

CASING VOLUME = $V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2 (\quad - \quad) = $ ____

FILTER PACK PORE VOLUME = $V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) = $ ____

TOTAL WELL VOLUME = $V_T = V_f + V_C =$ + = ____ ft.^{3} x 7.48 = ____ gal.

= 11 (0.16) ~~(10)~~ (1.14) = ~~23 gals~~ 11.4 + 1.2 = 12.6 gals

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	WATER QUALITY pH	CONDUCTIVITY µS/cm	TURBIDITY NTU	TEMP. °F	COMMENTS:
2/2/01	0800	Surge	0 (BEGIN)	—	0					casing curved;
	0816	↓	16							lower sect. not reached
	0829	Bail	0	—						by long bailer or surge
	0848	↓	20		5	Recharge: 28.30 - 28.36 in 30 sec				block. Use 2.5' bailer.
	0911	Pump	0	(0.6-			= .24'/.68 min = .75 gal/min			V. Dark gray,
	0928	↓	17	0.5)	13	Pumped dry -	v. silty dark			silty vf-fine sand
	0943	Pump	0	|						
	0956	↓	13	↓	19	Pumped dry -	let recharge			
	1026	Pump	0	0.3						
	1028	|		|		7.01	1340	350	73.2	Cloudy, gray
	1049	↓	23	↓	27		Pumped	dry		
2/7/01	1022	Pump	0	0.5	0	water clear, then cloudy				19.26 ft (TOC) = DTW
	1036	↓	14	↓	~~34~~					Broke suction -
	1052	Pump	0	0.5						pumped dry
	1100	↓	8	0.5	~~39~~					Broke suction -
										water slightly
										turbid

OGDEN ENVIRONMENTAL AND ENERGY SERVICES

PZ-096

WELL DEVELOPMENT

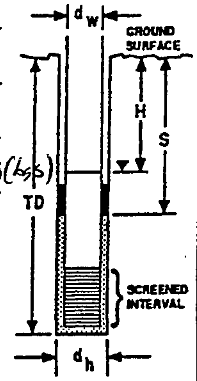
PROJECT		WELL NO.
Rocketdyne / NASA		P+126/P 296
JOB NO. 3131S0007	SITE PIF/COCA	PREPARED BY E. Cathcart

METHOD:		
OVERPUMPAGE		INITIAL WATER LEVEL 28.20 (Bgs)
BAILER	X	FINAL WATER LEVEL
SURGE BLOCK	X	REMARKS: 80% = 31.36
AIR LIFT		
OTHER		

CAPACITY OF CASING (GALLONS / LINEAR FOOT)
2" - 0.16
4" - 0.65
6" - 1.47

VOLUME BETWEEN CASING AND HOLE (GALLONS / LINEAR FOOT) (ASSUMING 40% POROSITY)
2" CASING AND 6" HOLE = 0.52
2" CASING AND 8" HOLE = 0.98
4" CASING AND 10" HOLE = 1.37
4" CASING AND 12" HOLE = 2.09

HOLE DIAMETER	d_h =	6
WELL CASING INSIDE DIAMETER	d_w ID =	
OUTSIDE DIAMETER	d_w OD =	2
DEPTH TO: WATER LEVEL	H =	28.20 (bgs)
BASE OF SEAL	S =	31.00
BASE OF WELL	TD =	44.00
EST. FILTER PACK POROSITY	P =	0.40



WELL VOLUME CALCULATION:

CASING VOLUME $= V_C = \pi\left(\frac{d_w ID}{2}\right)^2 (TD-H) = 3.14\left(\frac{\quad}{2}\right)^2(\quad - \quad) =$ ______

FILTER PACK PORE VOLUME $= V_f = \pi\left[\left(\frac{d_h}{2}\right)^2 - \left(\frac{d_w OD}{2}\right)^2\right](TD-(S \text{ or } H)^*)(P) =$

(*if S>H use S, if S<H use H.)

$3.14\left[\left(\frac{\quad}{2}\right)^2 - \left(\frac{\quad}{2}\right)^2\right](\quad - \quad)(\quad) =$ ______

TOTAL WELL VOLUME $= V_T = V_f + V_C =$ ___ + ___ = ___ ft.^{3} x 7.48 = ___ gal.

0.16(15.8) + 0.52(43-31) = 9.8 gal/wv

DEVELOPMENT LOG:

DATE	TIME BEGIN/END	METHOD	ELAPSED TIME	FLOW RATE (gpm)	CUMULATIVE WATER REMOVED GALLONS	pH	CONDUCTIVITY µS/cm	TURBIDITY	°F TEMP.	COMMENTS:
4/12/01	1045	Surge	0 (BEGIN)		0					
	1115	Bail	30		0.5	9.99	10.01 (x100)	High	68.5	
	1120	Bail	5		5	9.91	10.84 (x100)	High	68.7	
	1125	Bail	5		12	9.93	8.59 (x100)	High	68.4	Bailed Dry 43' (Bgs)
	1500	RECHARGE								DTW: 39.00 (Bgs)
4/16/01	0830									DTW: 28.20 (Bgs)
	1450	Surge								
	1515	Bail	25		12.5	9.90	6.02 (x100)	High	78.7	Light Brown Silt (F[illegible])
	1523	↓	8		17	9.95	7.11 (x100)	High	73.0	
	1526		3		19	9.93	10.07 (x100)	High	68.7	
	1530		4		21	9.93	11.84 (x100)	High	67.4	Bailed Dry DTW: 47.00 (toc)
4/17/01	0650	RECHARGE								DTW: 33.65 (bgs)
	0655	Surge	5							
	0725	Bail	30		21.5	9.82	7.67 (x100)	High	58.2	
	0733	↓	8		26	9.80	13.52 (x100)	High	58.6	
	0736		3		28	9.81	13.62 (x100)	High	59.7	
	0740		4		30	9.89	13.00 (x100)	High	59.6	Bailed Dry DTW: 46.70 (toc)

MWH
MONTGOMERY WATSON HARZA

Client: _____
Site: SSFL
Well Number: PZ-020 (PT-043)
Job Number: ~

Total well depth (ft): 32.77 ft
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: ~
Vol. per ft casing (gal): ~
Vol. per ft borehole (gal): ~
(less casing and filter pack)

Gauging Date: 3/26/02
Bailer ID: ~
Sample Date: ~

Static water level (ft): 30.33 ft
Previous static water level (ft): ~
Standing water column (ft): 2.44 ft

Amt. one well vol (gal): ~
Total gal. to be purged: ~

Development method: Surge/Bail
Purging method: Bail
Sampling method: ~

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/26	1155	0	6.53	7.40	64.2	High		Red-Brown	Bailed well	
	1205	3.5 gal							DTW = 31.10	
	1215		6.05	7.51	59.0	High		Red/Brown		
	1219	7.0 gal							Bailed almost dry - DTW = 31.10 ft	
									TD = 32.75	
3/28	1250	0	6.35	7.40	55.9	High		Red/Brn	Bailed well	
	1305	4.0	7.19	7.06	56.5	High		Red/Brn	Bailed almost dry	
3/29	0955	0	6.15	6.73	60.5	Mod		Brown	Bailed well	
	1005	4.0	4.84	6.78	60.7	Mod		Brown	Bailed almost dry	
									- DTW = 31.2 ft	
									- TD = 32.70 ft	

MWH
MONTGOMERY WATSON HARZA

Client: Boeing
Site: SSFL
Well Number: P2-027 (PT-064)
Job Number: —

Total well depth (ft): 25.35 ft
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/27/02
Bailer ID: —
Sample Date: —

Static water level (ft): 18.47 ft
Previous static water level (ft): —
Standing water column (ft): 6.88 ft

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Sub. Pump
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/27	1220	0	12.86	7.64	67.7	High		Brown	Bailed well	
	1225								Surged well	
	1230		10.01	7.33	64.7	High		Brown	Bailed well	
	1245	16.0 gal							Finished bailing - DTW = 23.00 ft	
3/28	1125	0	9.96	7.45	59.8	High		Olive Brown	Bailed well	
	1135	8.0 gal		7.08	60.0	High		Olive Brown		
	1150	12	11.53	6.99	60.2	High		Olive Brown	DTW = ~22 ft	
3/29	1200	0.2 gpm	12.17	6.93	79.6	Mod		Olive Brown	Began pumping well	
	1205	↑0.3 gpm				Low		Clear		
	1208	↑0.4 gpm				Low		Clear		
	1210	↑0.5 gpm	11.20	7.07	76.6	Low		Clear	Surged well	

MWH
MONTGOMERY WATSON HARZA

Client: ~ | Total well depth (ft): ~ | Min. Number Well Volumes to be Purged: ~
Site: ~ | Well Diameter (in): 2 in | Vol. per ft casing (gal): ~
Well Number: PZ-027 (PT-064) | Borehole Diameter (in): 8 in | Vol. per ft borehole (gal): ~
Job Number: ~ | (less casing and filter pack)

Gauging Date: ~ | Static water level (ft): ~ | Amt. one well vol (gal): ~ | Development method: Surge/Bail
Bailer ID: ~ | Previous static water level (ft): ~ | Total gal. to be purged: ~ | Purging method: Sub. Pump
Sample Date: ~ | Standing water column (ft): ~ | Sampling method: ~

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/29 1215	↑0.75 gpm							Starting pump again	55
1217	↑1.0 gpm				Low		Clear		
1221								Broke suction - pumped dry	
1222	↑0.5 gpm				~~Low~~ Mod ~~High~~		~~Clear~~ Brown		
1225		12.22	7.36	77.7	Low		Clear		
1230	↑0.75							Broke suction - shut off pump	
1232	↑0.5 gpm				Mod		Cldy Brn	Started pump	
1234	↑0.6 gpm								
1236	↓0.5 gpm				Mod		Cldy Brn		
1242								Broke suction	
1243	↑0.3 gpm	12.24	7.05	79.4	Low		Clear		17
1249	↑0.4 gpm								
1300	~22 gal				Low		Clear	Ceased pumping	

- DTW = 21.0 ft
- TD = 25.40 ft

MWH
MONTGOMERY WATSON HARZA

Client: NASA
Site: SSFL
Well Number: PZ-047 (PT-099)
Job Number: —

Total well depth (ft): 39.75 ft
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/27/02
Bailer ID: —
Sample Date: —

Static water level (ft): 34.60 ft
Previous static water level (ft): —
Standing water column (ft): 5.15 ft

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Bail
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/27	1310	0	10.14	7.88	65.9	High		Brown	Bailed well ~~TD~~	
	1320		10.06	8.15	61.6	High		Brown		
	1325	8.0 gal							Finished bailing	
					~~7.98~~ 7.78				DTW = 38.30 ft	
3/28	1045	0	7.03	7.52	57.9	High		Brown	Bailed well	
	1050	4.0	7.94	7.57	59.2	High		Brown	Bailed dry = 38.91 ft (DTW)	
3/29	1105	0	10.84	6.89*	65.1	High		Brown	Bailed well	
	1115	4.0				High		Brown	Bailed almost dry	
									DTW = 39.10 ft	

* re-calibrated pH meter

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-055 (PT-057)
Job Number: —

Total well depth (ft): 32.67 ft
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/25/02
Bailer ID: —
Sample Date: —

Static water level (ft): 28.75 ft
Previous static water level (ft): —
Standing water column (ft): 3.92 ft

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Bail
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/25	0800		23.80	6.94	57.5	Mod		Lt Brn	Bailed well	
	0805	2.5 gal	24.80	7.57	59.2	High		Olive Brn	Bailed dry	
3/27	1445	0	25.1	7.92	61.7	High		Olive Brn	Bailed well	
	1450	1 gal	25.2	7.86	63.3	High		Olive Brn	Bailed dry	
3/28	1340	8 oz	17.04	7.61	58.9	Mod		Olive Brn	Bailed well	
	1345	4 oz	—	—	—	Mod		Olive Brn	Bailed dry	

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-100 (PT-113)
Job Number: —

Total well depth (ft): 19.50 ft
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/27/02
Bailer ID: —
Sample Date: —

Static water level (ft): 14.80 ft
Previous static water level (ft): —
Standing water column (ft): 4.70 ft

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Bail
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/27	0915	0	18.93	8.13	57.3	High		Brn	Bailed well	
	0925	4.0 gal	15.73	8.21	55.0	High		Brn	-DTW = 18.60 ft	
	0930								Bailed dry	
									-DTW = 19.10 ft	
3/28	0835	0	13.03	7.28	53.4	High		Brn	Bailed well	
	0840								Bailed ~~dry~~ @8	
									~~-DTW~~ @8	
	0845	0.5 gal	12.93	7.50	55.7	Mod		Brn	~~DTW~~ Bailed dry - DTW = 19.30	
3/29	0830	0	12.90	7.19	60.0	Mod/Low		Brown	Bailed well	
	0835	0.25 gal							Bailed dry	
									-DTW = 19.34 ft	
									TD = 19.50 ft	

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-103 (PT-101)
Job Number: 1890569.0114

Total well depth (ft): 34.00
Well Diameter (in): 2 in.
Borehole Diameter (in): 8 in.

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/27/02
Bailer ID: —
Sample Date: —

Static water level (ft): 22.02
Previous static water level (ft): —
Standing water column (ft): 11.98

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Surge Block
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
1/27	0805	0	12.47	8.59	56.6	Mod		Brn	Bailed well	
	0815								Surged well	
	0820		11.01	8.29	53.0	High		Brn	Bailed well	
	0830	8.0							DTW = 31.80	
	0835	12.0	12.90	7.81	58.9	High		Brown	DTW = 32.70	
	0845	16.0							DTW = 30.10	
1/28	0800	0	12.88	7.13	56.5	High		Brown	Bailed well	
	0805	4.0	12.12	7.24	58.8	High		Brown	DTW = ~32 ft	
	0815	8.0	11.57	7.18	60.2	High		Brown		
	0820	12.0				High		Brown	DTW = ~33 ft	

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-103 (PT-101)
Job Number: 1890569.0114

Total well depth (ft): —
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: —
Bailer ID: —
Sample Date: —

Static water level (ft): —
Previous static water level (ft): —
Standing water column (ft): —

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Sub. Pump
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS	
1355	0							Started pump - pump not working		3/29
1405	1 gal							Bailed well		
1421								Started pump - flowmeter plugged		
1430	~0.4 gpm				High		Brown	Started pump		
1435	0.5 gpm	11.83	7.25	76.2	Mod		Brown/Gry			
1443	↑0.7 gpm				Mod/High		Brown			4
1447	↑0.9 gpm									
1450		11.50	7.18	74.4	Mod		Brown			2.8
1455								Changed flowmeters - stopped pump		9.0
1457	1.5 gpm							Started pump - broke suction		4.5
1500	↓1.0 gpm							Broke suction - switched flowmeters		1.5
1505								↓ ↓ ↓ ↓		
1508	0.9 gpm							Started pump again		

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-103 (PT-101)
Job Number: —

Total well depth (ft): —
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: —
Bailer ID: —
Sample Date: —

Static water level (ft): —
Previous static water level (ft): —
Standing water column (ft): —

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Sub. Pump
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
1510	0.9 gal	12.24	7.31	73.7	Mod		Brown		
1520		12.36	7.27	73.1	Low		Slt. Cldy		
1535		11.68	7.20	73.6	Low		Clear		
1550		11.98	~~7.52~~ 7.11	73.3	Low		Clear	Ceased pumping -DTW = 12.88 ft TD = 38.00 ft	

38

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: P2-104 (PT-087)
Job Number: —

Total well depth (ft): 29.70 ft
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/27/01
Bailer ID: —
Sample Date: —

Static water level (ft): 20.07 ft
Previous static water level (ft): —
Standing water column (ft): 9.63 ft

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Pump / Surge
Purging method: Surge Block
Sampling method: —

* All measurements taken from: ___ Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/27	0715	0	27.8	6.25	51.9	High		Brn	Bailed well	
	0725	4.0	17.59	7.12	55.1	High		Brn	DTW = 23.15	
	0730	8.0							DTW = 26.70	
	0740	12.0				High		Brn	DTW = 29.50 Bailed dry	
3/28	0715	0	18.21	6.90	55.4	High		Brn	Bailed well	
	0720	4.0	13.37	6.87	56.0	High		Brn	DTW = 24.50	
	0725	8.0	13.84	7.07	57.3	High		Brn	DTW = 28.00	
	0730	12.0				High		Brn	DTW = 29.90 ft	
3/29	0730	0	13.12	6.93	64.7	High		Brown	Bailed well	
	0735	4	11.61	7.39	64.7	High		Brown		
	0745	12.0	12.33	7.34	63.7	High		Brown	Bailed dry	

DTW = 29.85 ft
TD = 30.55 ft

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-105 (PT-088)
Job Number: —

Total well depth (ft): 30.55 ft
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/26/02
Bailer ID: —
Sample Date: —

Static water level (ft): 16.95 ft
Previous static water level (ft): —
Standing water column (ft): 13.60 ft

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Bail
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
									Bailed well	
3/26	1430	1 gal							Surged well	
	1435									
	1440		12.34	8.23	61.0	High		Dk Brn	Bailed	
	1450	~0.4 gpm		~~8.21~~		~~High~~		~~Dk Brn~~	Started pumping	
	1455		11.86	8.15	61.4	High		Dk Brn		
	1505								Broke suction - stopped pump	
									Well dry @ 30.55	
3/27	1410	0	11.93	8.05	66.3	High		Dk Brn	Bailed well	
	1415	4.0 gal	9.89	8.00	61.2	High		Dk Brown	DTW = 26.20 ft	
	1420	8.0 gal	10.58	8.02	59.5	High		Dk Brown	Finished bailing - DTW = ~~28.60~~ 29.90 ft	AL
3/29	0800	0	8.12	7.30	62.2	High		Brown	Bailed well	
	0810	8.0	8.26	7.61	63.0	High		Brown	Bailed dry	

-DTW = 29.80 ft
TD = 30.55 ft

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-106 (CPT-070)
Job Number: —

Total well depth (ft): 31.51 ft
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/26/02
Bailer ID: —
Sample Date: —

Static water level (ft): 14.20 ft
Previous static water level (ft): —
Standing water column (ft): 17.31 ft

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Pump
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/26 0840		9.94	7.68	61.4	High		Dk. Bro	Bailed well	
0845								Surged well	
0850	3 gal	9.09	7.41	58.8	High		Brown	Bailed well	
0905	~0.5 gpm	8.17	7.74	59.3	High		Brown	Started pumping	
0915	0.75 gpm	9.39	7.40	59.9	High		Brown		
0922	↑1.0 gpm	8.88	7.50	59.7	High		Brown		
0925		↓	↓	↓	↓		↓		
0935		9.31	7.37	60.3	High		Brown		
0945								shut off pump - switched flow meters	
0950	1.5 gpm	9.44	7.47	59.9	High		Brown	Begun pumping after surging	
1005		9.41	7.62	60.4	High		Brown		
1025		9.88	7.38	62.0	Low		Slt Cldy/Brn		
1035								Surged	

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-106 (PS-070)
Job Number: —

Total well depth (ft): —
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/26/02
Bailer ID: —
Sample Date: —

Static water level (ft): —
Previous static water level (ft): —
Standing water column (ft): —

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Pump
Sampling method: —

* All measurements taken from: ___ Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/26 1040	1.5 gpm	9.93	7.71	62.5	Mod		SH. Cld/Brn	Started pumping	
1055		10.46	7.76	63.2	Low		Clear		
1110		10.46	7.86	62.5	Low		Clear	Ceased pumping	
								Well Developed	

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-108 (PT-104)
Job Number: —

Total well depth (ft): ~~26.30~~ 26.30 ft
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/27/02
Bailer ID: —
Sample Date: —

Static water level (ft): 11.56 ft
Previous static water level (ft): —
Standing water column (ft): 14.74 ft

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Bail
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/27	1125	Ø	19.86	6.41	70.5	High		Brown	Bailed well	
	1130								Surged well	
	1135		13.67	7.25	68.9	High		Brown	Bailed well	
	1150	12.0 gal				High		Brown	Bailed well dry - DTW = 25.20 ft	
3/28	0930	Ø	13.27	7.62	58.5	High		Brown	Bailed well	
	0935	6.0	11.86	7.45	60.3	High		Brown		
	0940	8.0				High		Brown	Bailed well dry - DTW = 25.15 ft	
									~~Bailed well~~ NS	
3/29	0920	Ø	10.81	7.23	64.4	High		Brown	Bailed well	
	0938	8.0	9.42	7.48	66.6	High		Brown	Bailed dry	
									DTW = 25.15	
									TD = 26.30	

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-109 (PT-103)
Job Number: —

Total well depth (ft): 35.40 ft
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/27/02
Bailer ID: —
Sample Date: —

Static water level (ft): 17.52 ft
Previous static water level (ft): —
Standing water column (ft): 17.88 ft

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Bail
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/27	1000		12.84	8.64*	60.1	Mod		Brn	Bailed well	
	1005								Surged well	
	1015	4.0 gal							Bailed well	
	1020	8.0	10.85	9.23	61.6	High		Brn	-DTW = 30.70	
	1030	12.0 gal							Bailed dry - DTW = ~~33.80~~ 34.50 ft	
3/28	0905	0	10.44	7.73	58.3	High		Brown	Bailed well	
	0908	2	10.60	7.91	60.4	High		Brown	DTW = 33.30	
	0912	4				High		Brown	Bailed dry - DTW = 34.70 ft	
3/29	0850	0	9.52	7.47	63.2	High		Brown	Bailed well	
	0855	4.0	9.50	8.03	65.3	High		Brown	Bailed dry	
									-DTW = 35.10 ft	

* pH meter possibly malfunctioning

TD = 35.45 ft

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-112 (CPT-058)
Job Number: —

Total well depth (ft): 36.45 ft
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/25/02
Bailer ID: —
Sample Date: —

Static water level (ft): 25.91 ft
Previous static water level (ft): —
Standing water column (ft): 10.54 ft

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Pump/Bail
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/25	1035	1 gal				High		Dk Brn	Began bailing	
	1045								Surged	
	1050	2.5 gal	13.51	8.07	63.9	~~Clear~~ High		Dk Brn	Bailed	
	1112		15.48	8.04	63.4	High		Dk Brn	Begin pumping	
	1122	~0.1 gpm	15.88	7.55	62.9	High		Dk Brn		
	1132		16.21	7.74	64.8	High		Dk. Brn		
	1138								Broke suction -	
									ceased pumping	
									DTW = 31.65	
									TD = 37.21	
3/26	0710	4 gal	14.06		54.2				Bailed well - DTW =	32.65 ft
	0725	7 gal							Final DTW = 36.80 ft	

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-112 (PS-058)
Job Number: —

Total well depth (ft): —
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: —
Bailer ID: —
Sample Date: —

Static water level (ft): —
Previous static water level (ft): —
Standing water column (ft): —

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge / Bail
Purging method: Pump / Bail
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
1515		13.98	7.96	64.8	High		Brown	Bailed well	
1520	4.0	14.87	7.60	62.8	High		Brown	DTW = 33.15	
1525	6.0				High		Brown	Bailed dry	

1/27

MWH
MONTGOMERY WATSON HARZA

Client: DOE
Site: SSFL
Well Number: PZ-114 (PT-054)
Job Number: —

Total well depth (ft): 50.65' (TOC)
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/25/02
Bailer ID: —
Sample Date: —

Static water level (ft): 49.25 ft
Previous static water level (ft): —
Standing water column (ft): 1.40 ft

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Bail
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/25	0940	2 gt	17.36	7.32	58.6	Dk Brn/Cldy		Brn	Began bailing	
	0953	0.5 gal	13.10	7.70	56.3	Cloudy		Brn	DTW = 49.67 50.65	
									sediment/fine - slight silts, fine sand	
3/27	1545	0	15.58	7.57	65.5	Low		Clear	Bailed well	
	1550	0.5 gal							Bailed dry	
	1415	0	12.71	11.76 *	61.0	Low		Clear	Bailed well	
	1420	0.5 gal				Low		Clear	Bailed dry	

* pH meter malfunctioning

49.70
50.70 50.03

MWH
MONTGOMERY WATSON HARZA

Client: Boeing
Site: SSFL
Well Number: PZ-117 (PT-128)
Job Number: —

Total well depth (ft): 28.10 ft
Well Diameter (in): 2 in
Borehole Diameter (in): 8 in

Min. Number Well Volumes to be Purged: —
Vol. per ft casing (gal): —
Vol. per ft borehole (gal): —
(less casing and filter pack)

Gauging Date: 3/26/02
Bailer ID: —
Sample Date: —

Static water level (ft): 23.45 ft
Previous static water level (ft): —
Standing water column (ft): 4.65 ft

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: Bail
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

	TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
3/26	1305	0	18.59	7.60	67.7	High		Brown	Bailed well	
	1309	3 gal							DTW=26.03 ft	
	1311		18.84	7.56	64.1				DTW = 27.04 ft	
	1315	4 gal							Dry @ 28.10 ft	
3/28	1015	0	15.61	7.52	57.8	Mod		Lt. Brown	Bailed well	
	1020	1.0 gal	15.15	7.38	58.3	High		Brown	Bailed well dry	
3/29	1035	0	13.30	7.72	64.9	High		Brown	Bailed well	
	1040	0.25 gal				High		Brown	Bailed dry	
									- DTW = 27.90	
									- TD = 28.10	

MWH
MONTGOMERY WATSON HARZA

Well Development Log

Client: DOE
Site: SCTI/HMSA
Well Number: PZ-120
Job Number: —

Total well depth (ft): 30.51
Well Diameter (in): 2"
Borehole Diameter (in): 8"

Min. Number Well Volumes to be Purged: NA
Vol. per ft casing (gal): ↓
Vol. per ft borehole (gal): ↓
(less casing and filter pack)

Gauging Date: 3/25/03
Bailer ID: —
Sample Date: ~~3/25/03~~

Static water level (ft): 23.95
Previous static water level (ft): —
Standing water column (ft): 6.56

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: —
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve (well not complete)

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
1412	0							Purged well	
1417					High		Brown	Bailed well	
1423	5				Mod		↓	Bailed dry	
								[Clearing up]	

MONTGOMERY WATSON

WELL DEVELOPMENT LOG

Client: Boeing
Site: SSFL
Well Number: PZ-[redacted]120
Job Number:

Total well depth (ft): 28.40
Well Diameter (in): 2"
Borehole Diameter (in): 8"

Min. Number Well Volumes to be Purged: NA
Vol. per ft casing (gal):
Vol. per ft borehole (gal):
(less casing and filter pack)

Gauging Date: 6/9/03
Bailer ID: —
Sample Date: —

Static water level (ft): 19.90
Previous static water level (ft): —
Standing water column (ft): 8.5

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: surge + bail
Purging method: —
Sampling method: —

* All measurements taken from: ___ Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
1440	5 gal	0.99	6.94	18.60	9/very turbid		brown		
1447	7 gal	0.98	6.89	18.60	999			well went dry.	
6/10/03									
0800	2.5 gal	0.982	6.84	18.1	999		"	return to develop. 6/10/03	
0913	3.5 gal	0.955	6.76	18.0	999		"		
0917	4.0 gal							well went dry / well not fully recharged from yesterday.	
6/10/03									
1115	0.25 gal	1.03	7.33	18.0	73		clear		
1117	0.75 gal	0.94	7.12	17.9	7?← erroneous reading		slightly brown		
1120	1.0 gal	0.91	7.07	18.9	7			well dry @ 1.0 gal	

MWH
MONTGOMERY WATSON HARZA

Well Development Log

Client: DOE
Site: SCTI/HMSA
Well Number: PZ-121
Job Number: —

Total well depth (ft): 24.97
Well Diameter (in): 2-in.
Borehole Diameter (in): 8-in.

Min. Number Well Volumes to be Purged: NA
Vol. per ft casing (gal): |
Vol. per ft borehole (gal): |
(less casing and filter pack) V

Gauging Date: 3/25/03
Bailer ID: —
Sample Date: —

Static water level (ft): 21.92
Previous static water level (ft): —
Standing water column (ft): 3.05

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: —
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
1310	0							Began surging well	
1313					High		Brown	Bailed well	
1315	1				↓		↓	Bailed dry	

MWH
MONTGOMERY WATSON HARZA

Client: Rocketdyne
Site: HMSA/PDV
Well Number: PZ-121
Job Number: —

Total well depth (ft): 25.05
Well Diameter (in): 2"
Borehole Diameter (in): 8"

Min. Number Well Volumes to be Purged: NA
Vol. per ft casing (gal):
Vol. per ft borehole (gal):
(less casing and filter pack)

Gauging Date: 4/2/03
Bailer ID: —
Sample Date: 4/2/03

Static water level (ft): 21.46
Previous static water level (ft): —
Standing water column (ft): 3.59

Amt. one well vol (gal): —
Total gal. to be purged: —
Max allowable drawdown: 21.78

Development method: —
Purging method: Lo Flo
Sampling method: Lo Flo

* All measurements taken from: ✓ Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU) Low	mV (redox) DO	COLOR	COMMENTS	SAMPLER'S INITIALS
8:41	0								
8:44	200ml	0.051	6.27	14.31	Low	9.45	clear		DTW 21.53
8:47	350ml	0.449	5.81	14.11	"	7.32	"		DTW 21.60
8:50	500ml	0.824	6.17	14.58	"	6.35	"		DTW 21.64
8:53	700ml	1.127	6.47	15.25	"	5.62	"		DTW 21.70
8:55	825ml	1.156	6.56	15.23	"	5.36	"		DTW 21.72
8:57	950ml	1.205	6.61	15.12	"	4.88	"		DTW 21.75
9:00								Collected Sample PZ121GW01S01	
								RAD, TPH, SVOCs, VOCs, Metals	
10:17	Pump lowered to collect remaining sample								
10:46	End Sampling								

MONTGOMERY WATSON

WELL DEVELOPMENT LOG

Client: Boeing
Site: SSFL
Well Number: PZ-121
Job Number:

Total well depth (ft): 25.90
Well Diameter (in): 2"
Borehole Diameter (in): 8"

Min. Number Well Volumes to be Purged: NA
Vol. per ft casing (gal):
Vol. per ft borehole (gal):
(less casing and filter pack)

Gauging Date: 6/10/03
Bailer ID: –
Sample Date: –

Static water level (ft): 20.40
Previous static water level (ft): –
Standing water column (ft): 5.5

Amt. one well vol (gal): –
Total gal. to be purged: –

Development method: surge & bail
Purging method: –
Sampling method: –

* All measurements taken from: ✓ Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
6/10/03 0945	1.5 gal	1.27	6.57	19.3	999		brown		
0952	3.5 gal	1.29	6.65	19.7	999		"	dry @ 3.5 gal	
45	0.25 gal	1.45	6.97	19.6	999		"		
6/10/03 1147	0.50 gal	1.40	6.79	20.1	999		"		
1150	0.75 gal	1.42	6.75	19.6	999		"	dry @ 0.75 gal	
6/10/03 1427	0.25 gal	1.48	7.02	19.4	6		"		
1430	0.50 gal	1.49	6.81	19.6	3		"		
1431	0.75 gal						"	dry @ 0.75 gal	

MWH
MONTGOMERY WATSON HARZA

Well Development Log

Client: DOE
Site: ~~DOE~~ SCFS/HMSA
Well Number: PZ-122
Job Number: —

Total well depth (ft): 28.50
Well Diameter (in): 2"
Borehole Diameter (in): 8"

Min. Number Well Volumes to be Purged: NA
Vol. per ft casing (gal):
Vol. per ft borehole (gal):
(less casing and filter pack)

Gauging Date: 3/25/03
Bailer ID: —
Sample Date: —

Static water level (ft): 16.15
Previous static water level (ft): —
Standing water column (ft): 12.35

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: Surge/Bail
Purging method: —
Sampling method: —

* All measurements taken from: X Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
1333	0							Purged well	
1343					High		Brown	Bailed well	
1358	13				↓		↓	Bailed dry	

MONTGOMERY WATSON

WELL DEVELOPMENT LOG

Client: Boeing
Site: SSFL
Well Number: PZ-122
Job Number:

Total well depth (ft): 28.40
Well Diameter (in): 2"
Borehole Diameter (in): 8"

Min. Number Well Volumes to be Purged: NA
Vol. per ft casing (gal):
Vol. per ft borehole (gal):
(less casing and filter pack)

Gauging Date: 6/9/03
Bailer ID: —
Sample Date: —

Static water level (ft): 15.54
Previous static water level (ft): —
Standing water column (ft): 12.86

Amt. one well vol (gal): —
Total gal. to be purged: 25.0 gal

Development method: surge + bail
Purging method: —
Sampling method: —

* All measurements taken from: ✓ Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
1220	1.5 gal	1.04	5.89	19.2	999		brown		
1222	5.0 gal	1.02	6.04	19.2	999		"		
1224	5.2 gal	1.00	6.17	19.3	999		"		
1227	7.0 gal	1.02	6.26	19.2	999		"		
1230	10.0 gal	1.01	6.34	19.3	999		"		
1235								stop/wait for recharge	
1303	12.0 gal	1.01	6.35	19.5	225		"		
1305								setup pump apparatus	
1313								start pumping	
1343	~20.0 gal	1.02	6.52	20.3	999		"	tech. difficulty w/ pump	
1350	21.0 gal	1.01	6.67	19.3	261		↓	back to bailer	
1357	25.0 gal	1.01	6.62	19.8	280				
1405								finish developing PZ-122	

MONTGOMERY WATSON

WELL DEVELOPMENT LOG

Client: Boeing
Site: SSFL
Well Number: PZ-126
Job Number:

Total well depth (ft): 20.25
Well Diameter (in): 2"
Borehole Diameter (in): 8"

Min. Number Well Volumes to be Purged: NA
Vol. per ft casing (gal):
Vol. per ft borehole (gal):
(less casing and filter pack)

Gauging Date: 6/10/03
Bailer ID: —
Sample Date: —

Static water level (ft): 0.68
Previous static water level (ft): —
Standing water column (ft): 19.57

Amt. one well vol (gal): —
Total gal. to be purged: —

Development method: surge + bail
Purging method: —
Sampling method: —

* All measurements taken from: ✓ Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
1025	3.0 gal	1.48	6.83	17.3	999		Brown		
1028	6.0 gal	2.03	6.61	17.1	999		"		
1033	8.0 gal						"	Dry @ 8.0 gal	
1400	3.0 gal	1.49	7.31	17.7	-10		"		
1403	5.0 gal	1.19	7.03	17.7	-10		"		
1405	7.0 gal	1.52	6.87	17.4	-10		"		
1409	8.0 gal	1.91	6.76	17.4	-10		"	Dry @ 8.0 gal	
1530	0.25 gal	0.998	6.93	17.6	31		clear		
1531	1.2 gal	1.12	6.81	17.4	999		brown		
1535	3.0 gal	1.46	6.73	17.5	999		"		
1537	3.2 gal	1.48	6.78	17.7	999		"	DRY @ 3.2 gal	

MONTGOMERY WATSON

WELL DEVELOPMENT LOG

Client: Boeing
Site: SSFL
Well Number: PZ-127
Job Number:

Total well depth (ft): ~70.00'
Well Diameter (in): 2"
Borehole Diameter (in): 8"

Min. Number Well Volumes to be Purged: NA
Vol. per ft casing (gal):
Vol. per ft borehole (gal):
(less casing and filter pack)

Gauging Date: 6/9/03
Bailer ID: -
Sample Date: -

Static water level (ft): 66.15
Previous static water level (ft): -
Standing water column (ft): ~4.0

Amt. one well vol (gal): -
Total gal. to be purged: -

Development method: surge + Bail
Purging method:
Sampling method: -

* All measurements taken from: ✓ Top of casing, ___ Protective casing, ___ Ground leve

TIME	AMOUNT PURGED (gal)	EC (mS/cm)	pH	TEMP (C)	TURBIDITY (NTU)	PID (ppm)	COLOR	COMMENTS	SAMPLER'S INITIALS
1030	0.25 gal	1.31	5.93	18.4	999		brown		
1035	0.50 gal	1.37	6.15	18.0	999		"		
1037	0.60 gal						"	well dry	
6/10/03								return to bail dry.	
0820								dry.	
6/10/03 1325	0.25 gal	1.51	7.15	18.2	221		brown		
1327	0.30 gal						"	dry @ 0.30 gal	