PNNL-13589



D. G. Horton V. G. Johnson

August 2001



Pacific Northwest National Laboratory

Operated by Battelle for the U.S. Department of Energy

Prepared for the U.S. Department of Energy under Contract DE-AC06-76RL01830

DISCLAIMER

This report was prepared as an account of work sponsored by an agency of the United States Government. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof, or Battelle Memorial Institute.

PACIFIC NORTHWEST NATIONAL LABORATORY operated by BATTELLE for the UNITED STATES DEPARTMENT OF ENERGY under Contract DE-AC06-76RL01830



PNNL-13589

Borehole Data Package for Calendar Year 2000-2001 RCRA Wells at Single-Shell Tank Waste Management Area S-SX

D. G. Horton V. G. Johnson

August 2001

Prepared for the U.S. Department of Energy under Contract DE-AC06-76RL01830

Pacific Northwest National Laboratory Richland, Washington 99352

Contents

1.0	Intro	oduction	1
2.0	Wel	1 299-W22-80	3
	2.1	Drilling and Sampling	3
	2.2	Well Construction	4
	2.3	Well Development and Pump Installation	5
3.0	Wel	1 299-W22-81	6
	3.1	Drilling and Sampling	6
	3.2	Well Construction	6
	3.3	Well Development and Pump Installation	7
4.0	Wel	1 299-W22-82	7
	4.1	Drilling and Sampling	7
	4.2	Well Construction	8
	4.3	Well Development and Pump Installation	8
5.0	Wel	1 299-W22-83	9
	5.1	Drilling and Sampling	9
	5.2	Well Construction	9
	5.3	Well Development and Pump Installation	10
6.0	Wel	1 299-W23-20	10
	6.1	Drilling and Sampling	10
	6.2	Well Construction	11
	6.3	Well Development and Pump Installation	11

7.0	Wel	I 299-W23-21	12
	7.1	Drilling and Sampling	12
	7.2	Well Construction	13
	7.3	Well Development and Pump Installation	13
8.0	Refe	prences	13
App	endix	A – Well Construction and Completion Documentation	A.1
App	endix	B – Physical Properties Data	B .1
App	endix	C – Borehole Geophysical Logs	C.1

Figure

1	Map of Waste Management Area S-SX and Locations of Wells in the Groundwater	
	Monitoring Network	2

Tables

1	Well Names and Well Numbers for Wells Drilled in Calendar Year 2000-2001	1
2	Analytical Results from Groundwater Samples from New Wells at Waste Management Area S-SX	4
3	Survey Data for New Wells at Waste Management Area S-SX	5

1.0 Introduction

Six new Resource Conservation and Recovery Act (RCRA) groundwater monitoring wells were installed at the single-shell tank farm Waste Management Area (WMA) S-SX in July 2000 through March 2001 in partial fulfillment of Tri-Party Agreement (Ecology et al. 1998) milestones M-24-00L and M-24-00M. The wells are 299-W22-80, 299-W22-81, 299-W22-82, 299-W22-83, 299-W23-20, and 299-W23-21. Table 1 correlates the well name with the well number. Well 299-W22-80 is located outside the southeast corner of SX tank farm and is a new downgradient well in the monitoring network. Well 299-W22-81 is a new downgradient well located east of the S and SX tank farm. Well 299-W22-82 is located downgradient of the WMA at approximately 100 m east of the southeast corner of tank farm SX and well 299-W22-83 is located approximately 100 m southeast of the southeast corner of tank farms SX. Wells 299-W23-20 and 299-W23-21 are located just outside the west S and SX fences respectively and are new upgradient wells in the monitoring network. The locations of all wells in the WMA S-SX monitoring network are shown on Figure 1.

The original assessment monitoring plan for WMA S-SX was issued in 1996 (Caggiano 1996). That plan was updated for the continued assessment at WMA S-SX in 1999 (Johnson and Chou 1999). The updated plan provides justification for the new wells. The new wells were constructed to the specifications and requirements described in Washington Administrative Code (WAC) 173-160 and WAC 173-303, the updated assessment plan for WMA S-SX (Johnson and Chou 1999), and the description of work for well drilling and construction^(a).

This document compiles information on the drilling and construction, well development, pump installation, and sediment sampling applicable to the installation of the six new wells. Appendix A contains the Well Summary Sheets (as-built diagrams), the Well Construction Summary Reports, and the geologist's logs; Appendix B contains results of physical properties testing; and Appendix C contains borehole geophysical logs. Additional documentation concerning well construction is on file with Bechtel Hanford, Inc., Richland, Washington.

Well Name	Well Number
299-W22-80	C3115
299-W22-81	C3123
299-W22-82	C3124
299-W22-83	C3126
299-W23-20	C3112
299-W23-21	C3113

Table 1.	Well Names and Well Numbers for Wells Drilled During
	Calendar Year 2000-2001

⁽a) Letter from J. S. Fruchter, Pacific Northwest National Laboratory, to G. C. Henckel, Bechtel Hanford, Inc., "Description of Work for Drilling CY 2000 RCRA Groundwater Monitoring Wells," dated May 12, 2000.



Figure 1. Map of Waste Management Area S-SX and Locations of Wells in the Groundwater Monitoring Network

English units are used in this report because that is the system of units used by drillers to measure and report depths and well construction details. To convert feet to meters, multiply by 0.3048; to convert inches to centimeters multiply by 2.54.

2.0 Well 299-W22-80

Well 299-W22-80 is located outside the southeast corner of the SX tank farm. The well was drilled in September 2000.

2.1 Drilling and Sampling

Well 299-W22-80 was drilled with an air rotary drill rig from the surface to a total depth of 251 ft below ground surface (bgs). Temporary 9-in.-outside-diameter, carbon steel casing was used for the entire depth. Approximately 500 gal of water were added to the borehole at 250 ft bgs to suppress flowing sand.

The sediments encountered during drilling were predominantly sand and silty sand of the Hanford formation from the surface to about 128 ft bgs; Plio-Pliestocene sand with minor silty sandy gravel from about 128 to about 158 ft bgs; and Ringold Formation sandy gravel and gravelly sand from about 158 ft to total depth (251 ft bgs). The geologist's log is included in Appendix A.

Grab samples for geologic description and archive were collected every five feet throughout the borehole. Also, three split spoon samples were taken from 213.3 to 215.8 ft, 232.0 to 234.5 ft, and from 241.0 to 243.5 ft bgs for analysis of particle size distribution in support of screen slot and filter pack selection. The deepest split spoon sample contained considerable flowing sand. Particle size distribution data are in Appendix B.

Five groundwater samples were collected during drilling. The samples were air lifted slurries of cuttings and water obtained during air rotary drilling. The slurries were filtered using a peristaltic pump and a 0.4-µm filter cartridge prior to analysis in the field. The samples were tested for nitrate and specific conductance as a screen for contamination. All analyzed nitrate levels are below the 45 mg/L maximum contaminant level. The analytical results are shown in Table 2.

The borehole and drill cuttings were monitored regularly for organic vapors and radionuclide contaminants. No contamination was found.

Well	Depth to Water (ft)	Sample Depth (ft)	Nitrate (mg/L) ^(a)	Specific Conductance (µS/cm)
299-W22-80	205	213	8.7	290
		227	8.4	198
		232	8.1	220
		242	8.1	220
		259	4.2	235
299-W23-21	216	259	1.0	213
(a) Nitrate is (Method 8	mg/L as NO ₃ ⁻ . Analyse 8039) using a DR/2010	es were done by the H portable spectrophote	IACH cadmium red ometer. Reagent bla	uction method ink corrected.

 Table 2. Analytical Results from Groundwater Samples from New Wells at Waste Management Area S-SX

2.2 Well Construction

The permanent casing and screen were installed in well 299-W22-80 in September 2000. A 4-in.inner-diameter, stainless steel, wire wrap, 20 slot screen was set from 240.05 to 205.03 ft bgs. The permanent casing is 4-in.-inner-diameter, stainless steel from 205.03 ft bgs to 2.2 ft above ground surface. A 2-ft-long stainless steel sump is below the screen from 242.05 to 240.05 ft depth.

The filter pack is 10 to 20 mesh silica sand from 248.4 to 194.8 ft bgs. The annular seal is bentonite pellets from 194.8 ft to 187.1 ft, granular bentonite from 187.1 ft to 10.2 ft, and Portland cement grout from 10.2 ft bgs to the surface. A 4 ft by 4 ft by 6 in. concrete pad was placed around the well at the surface. A protective casing with locking cap, four protective steel posts, and a brass marker stamped with the well number were set into the concrete. The protective casing extends 2.86 ft above the concrete pad. The Well Summary Sheet (as-built) and Well Construction Summary Report are included in Appendix A.

The vertical and horizontal coordinates of the well were surveyed in March 2001. The horizontal position of the well was determined by Global Positioning System observations referenced to horizontal control stations established by Rogers Surveying, Inc., Richland, Washington, and the U.S. Army Corps of Engineers. The coordinates are Washington Coordinate System, South Zone, NAD83(91) datum. Vertical datum is NAVD 1988 and is based on existing benchmarks established by the U.S. Army Corps of Engineers. Survey data are included in Table 3.

Well Name	Easting (m)	Northing (m)	Elevation (m)	
	566,842.851	134,125.649		Center of Casing
299-W22-80			200.851	"X" on Rim of Casing
	566.842.923	134,126.030	199.971	Brass Cap
	567,000.263	134,354.189		Center of Casing
299-W22-81			206.644	Top of Casing
	567,000.235	134354.504	205.909	Brass Cap
	567,004.731	134,167.070		Center of Casing
299-W22-82			206.872	Top of Casing
	567,004.714	134,167.407	206.127	Brass Cap
	567,009.082	134,092.576		Center of Casing
299W22-83			207.015	Top of Casing
	567,009.058	134,092.945	206.338	Brass Cap
	566,717.669	134,446.189		Center of Casing
299-W23-20			203.795	"X" on Rim of Casing
	566,717.817	134,446,568	203.095	Brass Cap
	566,707.737	134,293.994		Center of Casing
299-W23-21			203.352	"X" on Rim of Casing
	566,707.718	134,294.273	202.579	Brass Cap

Table 3. Survey Data for New Wells at Waste Management Area S-SX

2.3 Well Development and Pump Installation

Well 299-W22-80 was developed in September 2000. A temporary, 3 hp, submersible pump was used to remove approximately 1,945 gal of formation water. First, about 1,015 gal of water were removed from the well at 29 gal/min with a drawdown of about 2.9 ft. The pump intake was at 236.64 ft bgs (31.04 ft below the water table). Second, about 930 gal of water were removed at 30 gal/min with the pump intake at 215.7 ft bgs resulting in 3 ft drawdown. The final turbidity was 2.75 NTU.

A dedicated Hydrostar sampling pump was installed in well 299-W22-80 in September 2000. The sampling pump intake is at 214.46 ft bgs (or about 8.83 ft below the water table). Static water level was 205.29 ft bgs on September 11, 2000.

3.0 Well 299-W22-81

Well 299-W22-81 is located east of the S-SX tank farm. The well was drilled in January 2001.

3.1 Drilling and Sampling

Well 299-W22-81 was drilled with a cable tool drill rig from the surface to a total depth of 269 ft bgs. Temporary 10 5/8-in.-outside-diameter, carbon steel casing was used for the entire depth. The well was advance using drive barrel from the surface to 131 ft depth and by hard tool from 131 ft to total depth.

The sediments encountered during drilling were dominantly sand with lesser amounts of silty sandy gravel and slightly silty sand of the Hanford formation from the surface to about 140 ft bgs; Plio-Pliestocene silty sand from about 140 to about 163 ft bgs; and Ringold Formation silty sandy gravel and sandy gravel with minor silty sand from about 163 ft to total depth (269 ft bgs). The geologist's log is included in Appendix A.

Grab samples for geologic description and archive were collected every five feet throughout the borehole. Also, three split spoon samples were taken from 238 to 240 ft, 246.3 to 248.3 ft, and from 260.5 to 262.5 ft bgs for analysis of particle size distribution in support of screen slot and filter pack selection. Particle size distribution data are in Appendix B.

The borehole and drill cuttings were monitored regularly for organic vapors and radionuclide contaminants. No contamination was found. The borehole was geophysically logged with spectral gamma-ray and neutron moisture tools on January 22, 2001. No manmade radionuclides were identified.

3.2 Well Construction

The permanent casing and screen were installed in well 299-W22-81 in January 2001. A 4-in.-innerdiameter, stainless steel, wire wrap, 20 slot screen was set from 261.72 to 226.75 ft bgs. The permanent casing is 4-in.-inner-diameter, stainless steel from 226.75 ft bgs to 2.2 ft above ground surface. A 2-ftlong stainless steel sump is below the screen from 263.72 to 261.72 ft depth.

The filter pack is 10 to 20 mesh silica sand from 270.0 to 216.7 ft bgs. The annular seal is bentonite pellets from 216.7 ft to 209.9 ft, granular bentonite from 209.9 ft to 11.0 ft, and Portland cement grout from 11.0 ft bgs to the surface. A 4 ft by 4 ft by 6 in. concrete pad was placed around the well at the surface. A 6-in. stainless steel protective casing with locking cap, four protective steel posts, and a brass marker stamped with the well number were set into the concrete. The protective casing extends 2.37 ft above the concrete pad. The Well Summary Sheet (as-built) and Well Construction Summary Report are included in Appendix A.

The vertical and horizontal coordinates of the well were surveyed in May 2001. The horizontal position of the well was determined by Global Positioning System observations referenced to horizontal control stations established by Rogers Surveying, Inc., Richland, Washington, and the U.S. Army Corps of Engineers. The coordinates are Washington Coordinate System, South Zone, NAD83(91) datum. Vertical datum is NAVD 1988 and is based on existing benchmarks established by the U.S. Army Corps of Engineers. Survey data are included in Table 3.

3.3 Well Development and Pump Installation

Well 299-W22-81 was developed in March 2001. A temporary, 1 hp, submersible pump was used to remove approximately 2,325 gal of formation water. First, about 1,805 gal of water were removed from the well at 8.5 gal/min with a drawdown of about 22 ft. The pump intake was at 260.3 ft bgs (34.04 ft below the water table). Second, about 520 gal of water were removed at 8 gal/min with the pump intake at 240.33 ft bgs resulting in 12.9 ft of drawdown. The final turbidity was 1.81 NTU.

A dedicated, Redi Flo-2 submersible sampling pump was installed in well 299-W22-81 in March 2001. The sampling pump intake is at 237 ft bgs (or about 11.1 ft below the water table). Static water level was 225.9 ft bgs on March 26, 2001.

4.0 Well 299-W22-82

Well 299-W22-82 is located east of the southeast corner of SX tank farm. The well was drilled during January and February 2001.

4.1 Drilling and Sampling

Well 299-W22-82 was drilled with a cable tool drill rig from the surface to a 270 ft bgs. Temporary 10 3/4-in.-outside-diameter, carbon steel casing was placed from the surface to 270 ft during drilling. The borehole was advanced by drive barrel from the surface to 110 ft bgs and by hard tool from 110 ft to total depth (270 ft). Two gal of water were added at 110 to 112 ft, 10 gal at 152 ft and 10 to 15 gal at 260 ft depths to improve sample returns. About 400 gal of water were added at total depth to prevent sand heave.

Preliminary evaluation shows that the sediments encountered during drilling were Hanford formation sand with lesser amounts of silty sand gravelly sand from the surface to 111 ft depth. Plio-Pleistocene silt was encountered from 111 to 112 ft and silty sand from 112 to 137.5 ft bgs. The sediments between 138 ft and 270 ft were dominantly silty sandy gravel with minor gravelly silty sand and silty sand of the Ringold Formation. The geologist's log is in Appendix A.

Sediment samples were collected at approximately 5-ft intervals for geologic description and archive throughout the entire borehole. Three split spoon samples were collected from 230 to 232.5 ft, 243.5 to 246 ft, and 260 to 262.5 ft bgs for analysis of grain size distribution. Data are in Appendix B.

The borehole and drill cuttings were monitored regularly for organic vapors and radionuclide contaminants. No contamination was noted. The borehole was geophysically logged with spectral gamma-ray and neutron moisture tools on February 13, 2001. No manmade radioisotopes were found. The geophysical logs are in Appendix C.

4.2 Well Construction

The permanent casing and screen were installed in well 299-W22-82 in February 2001. A 4-in.inner-diameter, stainless steel, continuous wire wrap (20 slot) screen was set from 261.2 to 226.1 ft bgs. The permanent casing is 4-in.-inner-diameter stainless steel from 226.1 ft bgs to 2.0 ft above ground surface. A 2-ft-long sump from 263.2 to 261.2 ft is attached to the bottom of the screen.

The filter pack is 10 to 20 mesh silica sand from 263.1 to 215.7 ft bgs. The annular seal is bentonite pellets from 215.7 to 209.4 ft bgs, granular bentonite from 209.4 to 10 ft bgs, and Portland cement with bentonite powder from 10 ft to the surface. A 4 ft by 4 ft by 6 in. concrete pad was placed around the well at the surface. A 6-in. stainless steel protective casing with locking cap, four protective steel posts, and a brass marker stamped with the well number were set into the concrete. The inner casing extends 1.41 ft above the concrete pad and the protective casing extends 2.43 ft above the concrete pad. The Well Summary Sheet (as-built) and Well Construction Summary Report are included in Appendix A.

The vertical and horizontal coordinates of the well were surveyed in May 2001. The horizontal position of the well was determined by Global Positioning System observations referenced to horizontal control stations established by Rogers Surveying, Inc., Richland, Washington and the U.S. Army Corps of Engineers. The coordinates are Washington Coordinate System, South Zone, NAD83(91) datum. Vertical datum is NAVD 1988 and is based on existing benchmarks established by the U.S. Army Corps of Engineers. Survey data are included in Table 3.

4.3 Well Development and Pump Installation

Well 299-W22-82 was developed in March 2001. A temporary, 1 hp, submersible pump was used to remove approximately about 2,770 gal of formation water. First, about 2,258 gal of water were removed at 8 to 10 gal/min with the pump intake at 263.2 ft bgs resulting in 18.8 ft of drawdown. Second, about 512 gal of water were removed at 8 gal/min with the pump intake at 243.15 ft bgs; drawdown was 15.5 ft. The final turbidity was 4.3 NTU.

A dedicated, Redi Flo-2 submersible sampling pump was installed in well 299-W22-82 in March 2001. The sampling pump intake is at 237.4 ft bgs (or 11.1 ft below the water table). Static water level in the well was 226.27 ft bgs on February 23, 2001.

5.0 Well 299-W22-83

Well 299-W22-83 is located ~100 m southeast of the southeast corner of the SX tank farm. The well was drilled in February and March 2001.

5.1 Drilling and Sampling

Well 299-W22-83 was drilled with a cable tool drill rig from the surface to a total depth of 269 ft bgs. Temporary 10 3/4-in.-outside-diameter, carbon steel casing was used for the entire depth. The well was advanced using drive barrel from the surface to 150 ft and by hard tool from 150 ft to total depth. Seven gal of water were added to the borehole at 80 ft and 3 gal at 133 ft to facilitate drilling. One hundred ten gal were added between 150 ft and 268 ft during hard tool drilling. Finally, 100 gal were added at total depth to prevent sand heave.

The sediments encountered during drilling were dominantly sand with lesser amounts of silty sand and gravelly sand of the Hanford formation from the surface to about 134 ft bgs. Plio-Pliestocene silty sand and sandy silt (calcrete) were present from 134 ft to about 144 ft bgs. Sandy gravelly silt, sand, silty sand, and sandy gravelly silt of possible Upper Ringold Formation was encountered between 144 ft and 195 ft and Ringold Formation silty sandy gravel silty sandy gravel of the Lower Ringold Formation occurred between 195 ft and total depth (275 ft bgs). The geologist's log is included in Appendix A.

Grab samples for geologic description and archive were collected every 5 ft throughout the borehole. Also, three split spoon samples were taken from 232 to 234 ft, 247 to 249 ft, and from 262 to 264 ft bgs for analysis of particle size distribution in support of screen slot and filter pack selection. Particle size distribution data are in Appendix B.

The borehole and drill cuttings were monitored regularly for organic vapors and radionuclide contaminants. No contamination was found. The borehole was geophysically logged with spectral gamma-ray and neutron moisture tools on March 7, 2001. No manmade radionuclides were identified.

5.2 Well Construction

The permanent casing and screen were installed in well 299-W22-83 in March 2001. A 4-in.-innerdiameter, stainless steel, wire wrap, 20 slot screen was set from 261.3 to 226.3 ft bgs. The permanent casing is 4-in.-inner-diameter, stainless steel from 226.3 ft bgs to 2.0 ft above ground surface. A 2-ft-long stainless steel sump is below the screen from 263.3 to 261.3 ft depth.

The filter pack is 10 to 20 mesh silica sand from 263.3 to 216.3 ft bgs. The annular seal is bentonite pellets from 216.3 ft to 211.3 ft, bentonite crumbles from 211.3 ft to 10.0 ft, and Portland cement grout from 10.0 ft bgs to the surface. A 4 ft by 4 ft by 6 in. concrete pad was placed around the well at the surface. A 6-in. stainless steel protective casing with locking cap, four protective steel posts, and a brass marker stamped with the well number were set into the concrete. The protective casing extends 2.23 ft

above the concrete pad and the inner 4-in. casing extends 1.24 ft above the pad. The Well Summary Sheet (as-built) and Well Construction Summary Report are included in Appendix A.

The vertical and horizontal coordinates of the well were surveyed in May 2001. The horizontal position of the well was determined by Global Positioning System observations referenced to horizontal control stations established by Rogers Surveying, Inc., Richland, Washington and the U.S. Army Corps of Engineers. The coordinates are Washington Coordinate System, South Zone, NAD83(91) datum. Vertical datum is NAVD 1988 and is based on existing benchmarks established by the U.S. Army Corps of Engineers. Survey data are included in Table 3.

5.3 Well Development and Pump Installation

Well 299-W22-83 was developed in March 2001. A temporary, 3 hp, submersible pump was used to remove approximately 2,250 gal of formation water. First, about 1,520 gal of water were removed from the well at 10 gal/min with a maximum drawdown of about 29 ft and a final drawdown of 9.8 ft. The pump intake was at 260.47 ft bgs (32.7 ft below the water table). Second, about 730 gal of water were removed at 10 gal/min with the pump intake at 250.47 ft bgs (22.7 ft below the water table) resulting in 7.2 ft of drawdown. The final turbidity was 3.11 NTU.

A dedicated, Redi Flo-2 submersible sampling pump was installed in well 299-W22-83 in March 2001. The sampling pump intake is at 237 ft bgs (or about 9.2 ft below the water table). Static water level was 227.77 ft bgs on March 21, 2001.

6.0 Well 299-W23-20

Well 299-W23-20 is located outside the west fence of the S tank farm. The well was drilled during July and August 2000.

6.1 Drilling and Sampling

Well 299-W23-20 was drilled with an air rotary drill rig from the surface to a total depth of 260 ft bgs. Temporary 8 5/8-in.-outside-diameter, carbon steel casing was placed from the surface to 260 ft during drilling. An unknown amount of water was added to the borehole at 142 ft and 195 ft bgs to flush the system and clear plugged lines.

Preliminary evaluation shows that the sediments encountered during drilling were Hanford formation silty sandy gravel, sandy gravel, and gravelly sand from the surface to 36 ft depth and sand with minor gravelly sand from 36 to 117 ft depth. Calcareous, slightly silty sand and silty sand of the Plio-Pleistocene unit were encountered from 117 to 157 ft bgs. There was no recovery between depths of 139 and 148 ft but drilling did not indicate a change in lithology. There also was no recovery between 157 and 169 ft. Sediments from 169 ft to total depth (260 ft bgs) were mostly sandy gravel with some silty sandy gravel of the Ringold Formation. The geologist's log is in Appendix A.

Sediment samples were collected at approximately 5-ft intervals for geologic description and archive throughout the entire borehole. Three split spoon samples were collected from 219.5 to 222.0 ft, 236.0 to 237.5 ft and 250 to 252.6 ft bgs for analysis of grain size distribution. Data are in Appendix B.

The borehole and drill cuttings were monitored regularly for organic vapors and radionuclide contaminants. On July 28, 2000, drilling was suspended because the field radiation screening results collected the previous day were 700 counts per minute above background. The area was posted as a soil contamination zone although the action level was 5,000 decays per minute and laboratory analysis of radiation screening samples collected the previous day did not show the presence of any contamination. No other contamination was noted.

6.2 Well Construction

The permanent casing and screen were installed in well 299-W23-20 in August 2000. A 4-in.-innerdiameter, stainless steel, continuous wire wrap (20 slot) screen was set from 250.5 to 215.5 ft bgs. The permanent casing is 4-in.-inner-diameter stainless steel from 215.5 ft bgs to 2.0 ft above ground surface. A 2-ft-long sump from 252.5 to 250.5 is attached to the bottom of the screen.

The filter pack is 10 to 20 mesh silica sand from 260.5 to 205.0 ft bgs. The annular seal is bentonite pellets from 205 to 200.1 ft bgs, bentonite crumbles from 200.1 to 10 ft bgs, and Portland cement grout from 10 ft to the surface. A 4 ft by 4 ft by 6 in. concrete pad was placed around the well at the surface. A protective casing with locking cap, four protective steel posts, and a brass marker stamped with the well number were set into the concrete. The inner casing extends 1.30 ft above the concrete pad and the protective casing extends 2.23 ft above the concrete pad. The Well Summary Sheet (as-built) and Well Construction Summary Report are included in Appendix A.

The vertical and horizontal coordinates of the well were surveyed in March 2001. The horizontal position of the well was determined by Global Positioning System observations referenced to horizontal control stations established by Rogers Surveying, Inc., Richland, Washington, and the U.S. Army Corps of Engineers. The coordinates are Washington Coordinate System, South Zone, NAD83(91) datum. Vertical datum is NAVD 1988 and is based on existing benchmarks established by the U.S. Army Corps of Engineers. Survey data are included in Table 3.

6.3 Well Development and Pump Installation

Well 299-W23-20 was developed in August 2000. A temporary, 3 hp, submersible pump was used to remove approximately about 2,690 gal of formation water. First, about 1,363 gal of water were removed at 29 gal/min with the pump intake at 248.8 ft bgs resulting in 2 ft drawdown. Second, about 1,325 gal of water were removed at 26 gal/min with the pump intake at 228.8 ft bgs; drawdown was not recorded. The final turbidity was 1.95 NTU.

A dedicated Hydrostar sampling pump was installed in well 299-W23-20 in August 2000. The sampling pump intake is at 220.8 ft bgs (or 5.24 ft below the water table). Static water level in the well was 215.6 ft bgs on August 24, 2000.

7.0 Well 299-W23-21

Well 299-W23-21 is located just outside the west fence of the SX tank farm. The well was drilled during September and October 2000.

7.1 Drilling and Sampling

Well 299-W23-21 was drilled with a cable tool drill rig using a drive barrel from the surface to 70 ft bgs, split spoon sampler from 70 to 140 ft bgs, and hard tool from 140 ft to a total depth of 259 ft bgs. Temporary 11 3/4-in.-outside-diameter, carbon steel casing was placed from the surface to 76.4 ft bgs and 8 5/8-in.-outside-diameter casing from the surface to 253.5 ft bgs. About 80 gal of water are reported to have been used between 235 and 250 ft, but more water may have been added throughout the hard tooled interval.

Preliminary evaluation shows that the sediments encountered during drilling were predominantly sandy gravel, sand and gravelly sand of the Hanford formation from the surface to about 99 ft bgs. Calcareous silty sand, slightly silty sand, and sandy silt of the Plio-Pliestocene unit occur from 99 to 147 ft bgs. Undifferentiated Plio-Pleistocene and/or Upper Ringold Formation sandy silt, sand, and silty gravelly sand exist from 147 ft to about 168 ft bgs. Ringold Formation sandy gravel and silty sandy gravel occur from 168 ft to total depth. The geologist's log is in Appendix A.

The borehole was continuously sampled by split spoon from 70 ft to 140 ft bgs for detailed characterization. Also, three split spoon samples were collected from 217 to 219.5 ft, 232 to 234.5 ft and from 247.5 to 250 ft bgs for determination of particle size distribution. The particle size data are in Appendix B; the results of detailed characterization will be presented elsewhere. Grab samples of sediment were collected at approximately 5-ft intervals throughout the borehole for geologic description and archive.

One groundwater sample was collected at 259 ft bgs with a bailer during drilling. The slurry was filtered using a peristaltic pump and a 0.4- μ m filter cartridge prior to analysis in the field. The sample was tested for nitrate and specific conductance as a screen for contamination. The analyzed nitrate level is below the 45 mg/L maximum contaminant level. The analytical result is shown in Table 2.

The borehole and drill cuttings were monitored regularly for organic vapors and radionuclide contaminants. Values up to 860 ppm CO and 26% lower explosive limit were detected at about 248 ft bgs. Work was temporarily stopped. No other high meter readings and no contamination were noted in the borehole.

The well was geophysically logged with high resolution, spectral gamma-ray and neutron-neutron moisture instrumentation in October 2000. No manmade radionuclides were detected. The geophysical logs are in Appendix C.

7.2 Well Construction

The permanent casing and screen were installed in well 299-W23-21 in November 2000. A 4-in.inner-diameter, stainless steel, continuous wire wrap, 20 slot screen was set from 249.69 to 212.58 ft bgs. The permanent casing is 4-in.-inner-diameter stainless steel from 212.58 bgs to 2.1 ft above ground surface. A 2-ft-long stainless steel sump was placed below the screen from 251.87 to 249.69 ft bgs.

The filter pack is 10 to 20 mesh silica sand from 257.5 to 202.0 ft bgs. The annular seal is bentonite pellets from 202.0 to 193.7 ft bgs, granular bentonite from 193.7 to 10.1 ft bgs, and Portland cement grout from 10.1 ft depth to the surface. A 4 ft by 4 ft by 6 in. concrete pad was placed around the well at the surface. A protective casing with locking cap, four protective steel posts, and a brass marker stamped with the well number were set into the concrete. The permanent casing extends 2.1 ft and the protective casing extends 3.1 ft above the concrete pad. The Well Summary Sheet (as-built) and Well Construction Summary Report are included in Appendix A.

The vertical and horizontal coordinates of the well were surveyed in March 2001. The horizontal position of the well was determined by Global Positioning System observations referenced to horizontal control stations established by Rogers Surveying, Inc., Richland, Washington, and the U.S. Army Corps of Engineers. The coordinates are Washington Coordinate System, South Zone, NAD83(91) datum. Vertical datum is NAVD 1988 and is based on existing benchmarks established by the U.S. Army Corps of Engineers. Survey data are included in Table 3.

7.3 Well Development and Pump Installation

Well 299-W23-21 was developed in November 2000. A temporary, submersible pump was used to remove approximately 1,500 gal of formation water from the well. Initially, 25 ft of drawdown occurred using a pump rate of 6 gal/min. The flow rate was adjusted to 4.5 gpm resulting in 15 ft of drawdown and later to 5.0 gal/min resulting in 17 ft of drawdown. The final turbidity was 4.89 NTU.

A dedicated, Redi Flo-2 submersible sampling pump was installed in well 299-W23-21 in December 2000. The sampling pump intake is at 223 ft bgs (or about 10 ft below the water table). Static water level in the well was 212.7 ft bgs on December 27, 2000.

8.0 References

Caggiano, J. A. 1996. Assessment Groundwater Monitoring Plan for Single-Shell Tank Waste Management Area S-SX. WHC-SD-EN-AP-191, Westinghouse Hanford Company, Richland, Washington.

Ecology - Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy. 1998. *Hanford Federal Facility Agreement and Consent Order*. Document No. 89-10, Rev. 5 (The Tri-Party Agreement), Olympia, Washington.

Johnson, V. G., and C. J. Chou. 1999. *RCRA Assessment Plan for Single-Shell Waste Management Area S-SX at the Hanford Site*. PNNL-12114, Pacific Northwest National Laboratory, Richland, Washington.

RCRA - Resource Conservation and Recovery Act. 1976. Public Law 94-580, as amended, 90 Stat. 2795, 42 USC 6901 et seq.

WAC 173-160, Washington Administrative Code. *Minimum Standards for Construction and Maintenance of Wells*. Olympia, Washington.

WAC 173-303, Washington Administrative Code. *Dangerous Waste Regulations*. Olympia, Washington.

Appendix A

Well Construction and Completion Documentation

					Start Date	e: 9-	1-00	
WELL CONS	STRUCTIO	N SUI	MMAI	RY REPORT	Finish Da	te: 9-	11-00	
						Page 1	of _1	
Specification No.:	Rev. No.:	• • • •		Well Name: 299-W22-80	Temp. W	ell No.:	C 311 5	-
ECNs:				Approximate Location: S. of	241- тү	Tenk		OOW/
Project: CY 2000	RCRA Dri	Ilina		Other Companies: CHT		(444)	41417	
Drilling Company: Reso	naut Souir	Int		Geologist(s): T. Lee				
Driller: Kelly Cowde	en			L. Walker				
TEMPORARY CAS	ING AND DRILL DE	PTH		DRILLING METH	IOD/HOLE	DIAMETE	R	
*Size/Grade/Lbs. Per Ft.	Interval	Shoe C	D.D./I.D.	Auger:	Diameter	From	to	
(FJ) Gerban steel	0' - 250.3	9"	17-518"	Cable Tool:	Diameter	From	to	
	-		<u> </u>	Air Rotary: V 85/8"	Diameter	From	—— ⊃'to	251'
	-			A.R. w/Sonic:	Diameter	From	to	
	-				Diameter	From	to	
	-				Diameter	From	to	<u> </u>
*Indicate Welded (W) - Flush Joi	nt (FJ) Coupled (C)	& Thread	Design		Diameter	From	to	
	· · · · · · · · · · · · · · · · · · ·				4			
				· · · · · · · · · · · · · · · · · · ·				
	······			Drilling Fluid:				
Total Drilled Depth: 251	Hole Dia @ TD:	0"		Total Amt. Of Water Added Durin	a Drillina:			
Well Straightness Test Results:		/		Static Water Level: 205.29	Date:	9-11-00	7	
		GEO	OPHYSIC			1-11-00		
Sondes (type)	Interval	D	ate	Sondes (type)	Inte	erval	Da	te
	-					-		
				<u> </u>			<u> </u>	·····
	<u></u>							
		Narra (I ED WELL	360.5% rg - 1		t. Star Filmer	
<u>an de la construcción de la constru La construcción de la construcción d</u>			Slot		Int		[Mesh
Size/Wt./Material	Depth	Thread	Size	Туре	Annual Se	al/Filter Pack	Volume	Size
55304L /4"/45" Casing	<u>+2.2</u> - <u>205.03</u>		NA	Portland Cement Grout	<u> </u>	- 10.2'	7 bags	NA
4"/4.5" SS304L Screen	205.03'- 240.05'		0.020	Bentonite, granular	10.2'	- <u>187.1</u> '	76 bags	
4"/4.5" 55304L Sumo	240.05 - 242.05		NA	Bentonite, pellets	187.1	- 194.8	5 bud	3/8"
				Colorado Silico Sand	199.8'	- <u>248.4</u> ′	96 bar	10-20
			[,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	
		Antoria	OTHER A	CTIVITIES				.
Aquifer Test: 10-11 Develop	ment	Date: 9	-11-00	Well Abandoned:	Yes:	No:	Date:	
Description: Marifield	maudaum a	uel ro		Description:		<i></i>	<u> </u>	
							<u></u>	
			VELL SUF					
Date:				Protective Casing Elevation:	<u></u>			
Washington State Plane Coordina	ites:			Brass Cap Elevation:				
		C	OMMENT	S/REMARKS				
Val Colors, 10-200 city	Sanda DEH EL	EQ.IL I	+ 0/	- 51 84 513 · b. 1	1. 0-11-	4- 11	2 523/1	
5 h + to Le - 21 51110 .	/ / / /	1 1	A 76	El3/sall y 71 /	- 55 115	<u></u>	a TE/DO	CACT_
- WILNETS - J.I TE	ISTANGIAL DEN	ron i He	- 0.(3	12/ JUTI back A 16 bags	- 23.98	<u> 11</u>		
Reported By: 4. D. Wal	ner	1		Reviewed By: VINUTEN				to to
Title: Geologist	00	Date: 9	-11-00	Title: Andrey En	zr		Date: 7	41/00
Signature: To Wa	lin .	-		Signature: Hulten	צ			
				O'				

\a/[]					Page <u>1</u> of <u>2</u>
	L SUMMARY SI				Date: 9-6-00
Well ID: <u>C 3/15</u>		Well Name	: 299	<u>- W22-80</u>	
Location: South of 241-TX Ta	nk Farm / 200W	Project:	cy :	2000 RCRA	Drilling
Prepared By: L.D. Walker	Date: 9/11/00	Reviewed	By: ACC	Weekes	Date: 9/11/00
Signature: All Walks		Signature:	<u>NC4</u>	yse fee	
CONSTRUCTION DATA	A	Depth in		GEOLOGIC/HYDROL	OGIC DATA
Description	Diagram	Feet	Graphic Log	Lithologic	Description
0'→ 10.2': Portland Cement 6" Profective Casing 0'→ +3.2' +2.2'→ 205:03': SS type 304 well casing. 4"ID/ 4.5" OD 10.2'→ 187.1': Granular Bentonite		0 - 25 - 50 -		$\begin{array}{c} 0' \rightarrow 12' : 5 i\\ SAi \\ 12' \rightarrow 55' : 5\\ 55' \rightarrow 72' : \end{array}$	gktly Silty VD Silty SAND SAND
Тстрогану Casing 8518" ор / 7518" ID		- 75 — - - - 100 —		72'→ 133': 5	5;/ły SAND
All deptos in feet below ground surface All temp. Casing removed.		- - - - - - - - - - - - - - - - - - -		133'→138':	Silty Sandy GRAVEL

WELL SUMMARY SHEET Date: $9-6-00$ Well Name: $299-W32-80$ Location: Superior Source A Drilling Prepared By: L. D. Walker Date: $9/1/00$ Signature: Melime: $299-W32-80$ CONSTRUCTION DATA Date: $9/1/00$ Signature: Melime: $299-W32-80$ CONSTRUCTION DATA Depth in freet Description Diagram Depth in freet Total : $39/2$ Signature: Melime: $313' \rightarrow 158'$: $SAND$ ISSTER Source (FRAVEL) ISSTER Source (FRAVEL) <						,	Page 2 of 2
Well ID:C 3/15Well Name: $299 - W22 - 80$ Location:Samphi of 241-TX Tank Form / 2000 Project:CY 2000 RCRA DrillingPrepared By:L. D. WalkerDate: $9/11/00$ Signature:McdleladeSignature:McdleladeCONSTRUCTION DATADepth in FeetGelologic/MYDROLOGIC DATADescriptionDiagram150 -187.1' -> 194.8':150 - $3''$ SentonicsPc(lefs)194.8':150 - $3''$ SentonicsPc(lefs)194.8':150 - $3''$ SentonicsPc(lefs)194.8':150 - $3''$ SentonicsPc(lefs)194.8':155 - $3''$ SentonicsPc(lefs)194.8':155 - $3''$ SentonicsPc(lefs)194.8':20503'-> 240.05':Well Screen, type 304.55, 0.020-in slot cont. wire-wrap., 4"TD/4.5" OD240.05':Sumpton194.9'- 231.0':Slupff240.05':Sumpton194.9'- 231.0':Slupff240.05':Sumpton194.9'- 251.0':Slupff105.2''- 231.0':Slupff106.2''- 231.0':Slupff107.1''- 185''Sandy GRAVEL240.05''Sumpton107.1''- 185''Sumpton240.05'':Slupf107.1''- 185''Sumpton240.05''- 242.05'':Sumpton107.1''- 185''Sandy GRAVEL241.0''- 251.0'':Slupfon107.1''- 185''Sandy GRAVEL2	WEL	L SUMMARY SI	IEET				Date: 9-6-00
Location: $S = x_{4} f_{1} f_{2} = T T T Tank Farm / 2000 Project: CY 2000 RCRA Drilling Prepared By: L. D. U.S. / Ker Date: 9/11/00 Reviewed By: D. (Here, Kes Date: 9/11/00 Signature: T = 2000 RCRA Drilling CONSTRUCTION DATA Description Diagram Feet T = 194, 8':78'' Bentonite Pellets153' \rightarrow 177': Sandy GRAVEL175' = 185': Gravelly SAND175' = 185': Gravelly SAND185' \rightarrow 212': Sandy GRAVEL175' = 242.05': Sump194, 8' - 248.05': Sump175' = 242.05': Sump190, 05' - 242.05' + 242.05' + 242.05'190, 05' - 242.05' + 242.0$	Well ID: C3//5	· · · · · · · · · · · · · · · · · · ·	Well Name	: 29	9- W22	2-80	
Prepared By:L. D. WalkerDate: $9/11/00$ Reviewed By:DifficationDate: $9/11/00$ Signature:MC AllellicaSignature:MC AllellicaGeoLOGIC/MYDROLOGIC DATADescriptionDiagramDiagramGeoLOGIC/MYDROLOGIC DATA187.1'-+ 194.8':150 -138'-> 158':SAND78" Bentonite Pellets150 -138'-> 158':SAND194.8'-248.4':175 -158'-> 177':Sandy GRAVEL205.03'-240.05':171'>185':Gravelly SANDWellschen, type 304 SS,200 -185'-> 212':Sandy GRAVEL248.4'-251.0':Sluff205237'-> 251':Sandy GRAVEL248.4'-251.0':Sluff205237'-> 251':Sandy GRAVEL248.4'-251.0':Sluff200 -125'-125'-4uer 20.05':Well Schen, type 304 SS,0.020'-in slot cont. where-212'-> 237'-> 251':Sandy GRAVEL248.4'-251.0':Sluff215'-237'-> 251':Sandy GRAVEL248.4'-251.0':Sluff100 -125'-125'-All depths In Fret bolow275(1-11.00)All depths In Fret bolow275(1-11.00)	Location: South of 241-TX Ta	nk Farm/200W	Project:	Cγ	2000	RCRA	Drilling
Signature:M. U. L.CONSTRUCTION DATADepth in FeetGraphic Graphic Libologic DescriptionDescriptionDiagramDepth in Feet187.1'-> 194.8':150138'-> 158': SAND187.1'-> 194.8':150138'-> 158': SAND187.1'-> 194.8':150138'-> 158': SAND187.1'-> 194.8':175175'-Silica Sand, 10-20 mesh175'-177'-> 185': Grave Ily SAND205.03'-> 240.05':185'-> 212': Sandy GRAVELwell screech, type 304 SS, Urap, 4"TD/4.5" OD212'-> 237': Silty Sandy GRAVEL240.05'-> 242.05':225'-240.05'-> 242.05':225'-240.05'-> 242.05':225'-240.05'-> 242.05':225'-240.05'-> 242.05':240'-240.05'-> 242.05':240'-240.05'-> 242.05':240'-240.05'-> 242.05':240'-240.05'-> 242.05':240'-240.05'-> 242.05':240'-240.05'-> 242.05':240'-240.05'-> 242.05':240'-240.05'-> 242.05':240'-240.05'-> 242.05':240'-240.05'-> 242.05':240'-240.05'-> 242.05':240'-250-TD=251-15'-250-TD=251-15'-250275275275275275275275-275-275-275-	Prepared By: L.D. Walker	Date: 9/11/00	Reviewed	ву: ДС	Weck	es	Date: 9/11/00
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	Signature: AD Maller		Signature:	De	Aleep	ka	
$\begin{array}{c c c c c c c c c c c c c c c c c c c $	CONSTRUCTION DAT.	A	Denth in		GEOLOGIC	HYDROL	OGIC DATA
150 - 138' + 158': SAND $187.1' -> 194.8': 34 ND$ $187.1' -> 194.8': 34 ND$ $187.1' -> 194.8': 34 ND$ $177' -> 185' -> 177' -> 177' -> 185' -> 177' -> 185' -> 177' -> 177' -> 185' -> 177' -> 185' -> 177' -> 185' -> 177' -> 185' -> 177' -> 185' -> 177' -> 185' -> 177' -> 177' -> 185' -> 177' -> 185' -> 177' -> 185' -> 177' -> 177' -> 185' -> 177' -> 177' -> 185' -> 177' -> 177' -> 185' -> 177' -> 185' -> 175'$	Description	Diagram	Feet	Graphic Log		Lithologic	Description
All temp. Casing removed	$187.1' \rightarrow 194.8':$ $38'' Bentonite Pellets$ $194.8' \rightarrow 248.4':$ $Silica Sand, 10-20 mesh$ $205.03' \rightarrow 240.05':$ $Well screen, type 304 SS,$ $0.020 - in slot cont. wire -$ $wrap, 4'' ID / 4.5'' OD$ $240.05' \rightarrow 242.05': Sump$ $type 304.5s, 4''/4.5''$ $248.4' \rightarrow 251.0': Sluff$ $Total SS 4''/4/2'' material$ $is 244.25' (+2.2-242.05)$ $All depths in feet below$ $ground surface$ $All depths in feet below$		150 — - - - - - - - - - - - - - - - - - - -		$138' \rightarrow$ $158' \rightarrow$ $177' \rightarrow 12$ $185' \rightarrow$ $212' \rightarrow 22$ $237' \rightarrow$ $TD =$ $\omega. L. =$	$ \begin{array}{c} 158': \\ 177': \\ 85': G_{1} \\ 212': S \\ 37': S_{1} \\ 37': S_{1} \\ 37': S_{1} \\ 37': S_{2} \\ 37': S_{1} \\ 37': S_{2} \\ 37': $	SAND Sancly GRAVEL ave Ily SAND andy GRAVEL Ily Sandy PAVEL Sanchy GRAVEL Sanchy GRAVEL

			B	OREHOLE LOG		Page <u>i</u> of <u>9</u> Date: 9 - (- 0.0
Well ID:	C3115		Weli N	lame: 299-W22-80	Location: 200W / Conf	h of 241 SX Tack F
Project:	CY	2000	RCRA	Drilling	Reference Measuring Poin	t: ground Surface
	Sa	mple		Sample De	escription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distrib Moisture Content, Sorting, Angu Size, Reac	ution, Soil Classification, Color larity, Mineralogy, Max Particle ion to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
o						AIR ROTARY 850
-				0' -> 12' slight	ly Silty SAND(m)S	CSG 74" tricone b
_			—	80-85% sand 1	5-20% silt:	
_				Sand in 25% V.C.S	E - CSE / 40% wed /	
_				35% fa- v.fn '	2.57 6/1 (and).	
ሻ	Serb T.			dry i mole sorted	Sand = SA - A.	5': Gab sample
_	Archine .			60 % basalt 40% F	Elde . No Prot + Hel	for archine " weste
_	Character .	entir			the REAL POLICE	character setion
				······································		Ort- anthing and Blill
					-	HELE BADA BAN IN
	anh -					HEIS NAD - BOY WO-
0 —	as cherk			· ¥.		10: Grab schupte
-				12' 55' ME	(1, 2, 1, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2, 2,	to: archui
-				12 - Silty	SAND (MS)	13. PCI Sees not
-			<u> </u>	15.80% Sand	20-25% Silf	above background
-	é mila -			20% med, 20% tn.	-v.tr; dry;	
15 —	archie			'0YR, 5/2 (g	ayest proner poorly	15: Grabs Semple
-	and upter	alicz		Sorted; Sand A - St	; 50 % Dasaltic,	for archive and
-	(market in the second		·	50% granitic, mos	RXA to HCL	waste churacterizate
_						HEIS RAD= Boywos
-			· · · · ·			
20 —	grab -			· · · · · · · · · · · · · · · · · · ·		
_	<u> </u>		·		•	20': Grab Sample
-						In archive
_				23 55- SAN	o(s) the	0
_				+ 5%-511t-	95-100% Same	23'= RCT seer nothing
.5 —	gab-				Kee	above backgrowt
_	•					25': grat sample
_						for arching
_						t
_				e	· · · ·	
leported	By: T	A 140	GRAPH	KSRY: AX M. 10 RAY Review	red By: DC11/00For	L
itle:	prola	int.	<u></u>	Geologist 9/13/10 Title:	Geologist	· · · · · · · · · · · · · · · · · · ·
	. A	A	N	Mul Date: (1-1-00 Signatu	ITE: Malana	Date: Quillen

/ell ID:			_			Date: 9-1-00
	C311	5	Well N	lame: 299-w22-80	Location: SALTE -	241 Sx Takfu
roject:	RCR	A W.	- REY T	Dry RO -	Reference Measuring Point	: ground tur la
<u> </u>	Sa	mple		Sample Descri	iption	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distributior Moisture Content, Sorting, Angularity Size, Reaction	n, Soil Classification, Color, y, Mineralogy, Max Particle to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
<u>, </u>	ach			Silty SAND (ms	5) - 5 milar to	30': grab Sauplo
_				anove - Elightly	finer grained	for archine
-						
ز ــــــــــــــــــــــــــــــــــــ	quab					35: greb sampa
-						
- 	grab					40': grab Sample
-						- fre dicente
- 5 7	jab		· · · · · ·	· · · · · · · · · · · · · · · · · · ·		45': grab sample
- ` -						for er chure
- 	zub					50': grade sample
_ _	<u> </u>					for archive
- - ;K	dar			55'> 72' SAND tr- <5% 5;1t 95	(s) -100 % sand;	55': grab sample
		•		40% # cse/ 60% med 7/1 (light grey); 5l	- v.fn.; 2.5 y . moist; mod	fos archive
_	_			Gorted; Gaud - A-SA; 60% Feld; mod-strong	40% basalt/ RXN to HCL	50-65 drilled like gravel
ported	Ву:	I.A.	<u>lee/G</u>	raphics by UII M. ABeyjewed E	<u>sy: DCWeekes</u>	
nature:	γ_{s}	mal	+ (e	Date: 9-1, by Signature:	NCTI loo hes	Date: 9/14/00

			B	OREHOLE LOG		Page <u>S_</u> of <u></u> Date: 9 - 1 - ∞∞
Well ID:	CSI	15	Well N	lame: 299 - 622 - 80	Location: Storth	& SX Tank Farm
Project:	RC	2A (is ell	dilly	Reference Measuring Point	grow Surface
	Sa	mple) Sample Des	cription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distributi Moisture Content, Sorting, Angula Size, Reactio	on, Soil Classification, Color, rity, Mineralogy, Max Particle n to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
60 _	gras			SAND (s) - sin	nilar to above	60': grab sayle
_	U	-				for acchine
_						0
_						
_						
-					· · · · · · · · · · · · · · · · · · ·	17: 1 0
65 —	grab					63 grate sample
_						for a chune
-						
_						
	<u> </u>					2". 1 Ce 2.
7° —	grab					p. grab supra
-						for a chure
_				72' 133' Silty	SAND (m)	
-			-	75-80% sand 2	5-20% silt:	
-				20% fn 80% v.	fa: 104R 7/2	
~	56			(0; 1 + 2); c	in the hard	75': and Serve
/s —	gras		••••••	(tigh: gray), st.	moisi, moa -	13 - grad say .
-				STRONG KXN TO HO		for acone
_			_			
_						
_						
(?~						
χο —	gres		—			Pation Aca a
-						ou grad single
-						Au archier
-						
_						
26 —	mail					
(7	10					85: Gran Sc. Wh
-						1 c l in
-						for arcuive
-			[::::::			·
		<u> </u>		<u> </u>		
Reported	1 By:	T.A.	Lee/Gr	aphics by JIII MURRAY Reviewe	d By: DCWeekes	5
Fitle:	Gal	sat/ (Polesis	F 9/13/00 Title:	Geologist	·
	- rymer	<u> </u>	mague		ARVII	

			B	OREHOLI	E LOG		Page <u>4</u> of <u>9</u> Date: 9-5-00
Well ID:	C31	15	Well N	lame: 299-6	522.80	Location: South 5	> Sy Tark form
Project:	la	LA	Vel	Dilli)	Reference Measuring Point	: and andar
	Sa	mple			Sample Desc	ription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, G Moisture Conter	rain Size Distributio at, Sorting, Angular Size, Reactior	on, Soil Classification, Color, ity, Mineralogy, Max Particle n to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
90 _	grab	ł		Silty	SAND (M	(5) - sinilar	go! gruly sample
-	- U			+0	above	·	La cuchure
-	Air						93': begin 9/5/00
_	Rotary		· · <u>·</u> · · · · · ·				Air rotany
_			-				8 5/8" OD CS casing
95 -	Archite						95': Grab Sample
- ¹			-				For archive.
_							
-							
-		ļ	1	72' -> /33'	:	······	100': Grab-archin
100 -	Grab- Atching		-	Silty_	SAND (mS) 75-80%	
-				Sand, 20	0-25% Silt.	Sand is 30% Fn,	Drill rate ~
			-	7090 Y.	Fh. IOYR 5	/3 (brown) sl moist,	5 Ft. / minute
-			, , , , , , , , , , , , , , , , , , ,	well so	orted; SA;	85-90% gtz, Felds	
-				10-15%	basalt / othe	r, strong rxn	105': Grab- archiv
105-	Archive			+ 0 HCI			
-							a, \$, 8 at backgroun
-					·		levels
-							(()
-	Gal		(~				110' : Grab · archive
110 -	Archin						
-			····-·		·····		
-							
-							<u> </u>
-	Grab-			6.11		1	115 : Oneb- archive
115-	Archiv		· · · ·	<u>>;1ty</u>	SAND - a	s above	
-					micq		
			1	<u> </u>	·····		
-							
Reporter	L I Bv:	└──── ≺ ┼ ── Ѧ	[<u>.</u> .]	L.D. What	ke - Reviewe	By: DC Wlooke	۰ <u>۶</u>
Title:	<u></u>	<u>,</u>	100 1		Title:	Geologist .	
Signature		nof A	(A)	Date: 9-	-00 Signature	. ACTIER Mest	Date: 9/14/00
L	0	<u>, , , , , , , , , , , , , , , , , , , </u>					<u> </u>

			B	ORE	EHOL	E LO	G			Page _	5 of <u>9</u>
Well ID:	(3)	15	Well N	lame:	290-	14/22-	80	Location:	2010/11/5	1/ 1	<u>9-5-00</u>
Project:	<u> </u>	2000	RCRA	ת	217	VY 22 -	00	Reference	Measuring Poir	t Com	1 S. F.
	Sa	mple			<u></u>	Sam	ple Desci	ription		<u> </u>	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Moist	o Name, G ure Conter	rain Size nt, Sorting Size	Distributio , Angularit , Reaction	n, Soil Clas ty, Minerald to HCl	ssification, Color ogy, Max Particle	Depth Method Sampl Size	of Casing, Drilling Method of Driving ng Tool, Sampler e, Water Level
120-	Grab- Arthiw			72	·→ 13	3':				Air A	otary; 85%"
-					Silty	SAND	(m s)			OD	s casing
-			• +		-a.	s desc	ribed	on pre	vious		
-			-		٩	ege.		_		120 ':	Grub sample
-										For	archive
125 -	Grab- Archive										
_			*							125': 6	ival-archive
-										Drill r	ate: 5' Aib.
-									·		
_			4	12	<u>8'-13</u>	<u>s': s</u> ,	ilt inc	rease_	to ~ 30%	130':	Grab-archive
130 -	Grai- Archine		~~		s/ i	ncrea.	se in	moist	Lure		
-			·· - ~		Very	stru	ng ru	in HC	/		
-											
_			6.0	133	<u>′→ /3</u>	8': 5	5 <i>i/ty</i> :	Sandy	GRAVEL	135': 0	Grab-archive
_			$\dot{\circ}$	((m s G)	; 40	?º Gra	<u>vel, '4</u>	5% Sand		
135 —	Grab- Archin		$\widetilde{a} \circ$	15	90 Sili	<u>t. Gr</u>	×vel p	redan	med-cse	L	
-			202	pe	b. San	Q Y.	cse - m	ed.	10YR6/3	L	
_				(pq	le brow	<u>n), s/</u>	moist	; poo	rly sorted		
-			0,0	Gra	vel SA	A, sai	od SA	<u>-А'; з</u>	0% basalt.	140' : 6	Frab - archive
-				709	ogtzite	e, gral	nitiz, a	other.	Max size		
140—	Grub Archire	-	0	4-	-5 cm	<u>Stro</u>	ng rx	n HCI.			
_			0								
_				138	′ → 1	<u> 58 :</u>	SANI	p(s)	, 5% Granel		
				9	5 <i>70 Sa</i>	ncl,	tr sili	t San	d fn-med	145': G	rab-archive
-				peb	<u>j Sen</u>	d 10	% V.C	se, 60°	<u>% cse, 20%</u>		
145 —	Grab- Archive			me	e, 104	o Fa-	v. Fn.	10 YR 5	12 (gry brn)		
-				<u>s i</u>	<u>moist;</u>	mod	<u>sorted</u>	; SA-2	+; 30-40%		
-				ba sa	<u>it, 60</u>	-70% 0	;tz/fel a	l/other	; weak		
-			· · · · ·	rx1	n HCI.						
					<u></u>		Devie 1	~ ~	Auto		
Reported	ву: [. D. Wa	IKer				Reviewed	<u>ву: /)</u> n_ /	<u>'UNerke'</u>	>	
Signature	<u>(0eol</u>	ogist	. 11		Date: #	T as le		20109 MA	<u>IST</u>		
Signature	. <u> </u>		with -		Jaie. /-	5-00	oignature:	10	upened	Da	10: 414/00

			B	OR	EHOLELO	G		Page <u>6</u> of <u>9</u>
				Jome:	200 14/00	<u> </u>	Location: C . L Duu	Date: 9-5-00
Project		3/15			279- W22	-80	Reference Measuring Rei	SX lank farm/200W
Project	(7	2000	<u>k</u>	<u>RA</u>	Prilling	mula Daaa	relefence weasuring Pol	m. Ground Surface
	Sa	mple		—	Sa	mple Desc	ription	Comments:
Depth (<u>Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Grou Mois	ip Name, Grain Size ture Content, Sortin Siz	e Distributio ig, Angulari e, Reaction	on, Soil Classification, Colo ity, Mineralogy, Max Particl to HCl	r, e Sampling Tool, Sampler Size, Water Level
150-	Grab- Archive			13	8'→ 158':			Air rotary; 8% "o
_		ſ			SAND - as	e desci	ribed on previou	s CS casing.
-					ρα	<u>9e.</u>	100% Sand, tr sil	4
-								150': Grab Sample
_								For archive.
155-	Grab- Anhive							
								155' Grab-archive
_							······································	\
-			,	1.	58 - 177'	; Sai	ndy GRAVEL (sG)
-) °°0	50	-60% Gravel	<u>, 40- s</u>	50% Sand, tr silt	160': Grab-archive
160 —	Grab- Archire		000	Gr	avel 30% v.	Cse · C	se peb, 20% med,	
-			аО. (۷.	10% Fn, 109	o v. Fn	peb; Sand 20%	
_			0.0	V	. cse, 50% a	<u>cse, 20</u>	0% mcd, 10% Fn-	
_			و في الم	V	FN. 10YR5	<u>/2 (gr</u>	y brown) s/ moist	165: Grab- archive
_	<u></u>		200	+0	dry; poorly	sorted	; SA; Gravel	
165—	Archin		O_{b}	30	370 basalt,	707. gt.	zite/granific/other	Drill rate:
_			000	Se	and 80-859	0 9+z/	Feld, 15-20%	5'/2 min.
-			000		basa It /other	r lithic	Frags; Max size	-Adding water for
-		;	200.0	N	5-6 cm; n	o rxn	Hcl.	dust control
_			68.0					
170	Gral- Archive							170': Grub- archive
_			0.0				·	
—.			$O_{\mathcal{O}}^{\mathcal{O}}$					
_								
_			20.00				· · · · · · · · · · · · · · · · · · ·	
175-	Grab- Archive		D co					175' Grab- archive
-			$\sim 0\%$					
_			\tilde{D}	. 17	1 <u>7'→ 185'</u>	: Grav	velly SAND(35))
_		ŀ			descripti	ion on	next rage.	
Reported	By: 4	L.D. Wa	Iker			Reviewed	By: DCUkekes	
Title:	Geo	logist			· · · · · · · · · · · · · · · · · · ·	Title:	eologist	
Signature	: Ju	9 la	lkz		Date: 9-5-00	Signature	Malket	Date: 9/14/00

			B	OREHOLE LOG		······································	Page <u>7</u> of Date: 9-5	9
Well ID:	C 31	1.5	Well N	lame: 299- W22-8	ŝo	Location: S. of 241~	SY Touk	Form
Project:	<u> </u>	2000	RCR	A Drilling		Reference Measuring Point	: Ground	Suchie
	Sa	mple		Sample	Descr	iption	Comm	ients:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Dist Moisture Content, Sorting, An Size, Re	tribution ngularit eaction	n, Soil Classification, Color, y, Mineralogy, Max Particle to HCl	Depth of Cas Method, Meth Sampling To Size, Wat	sing, Drilling od of Driving ol, Sampler ter Level
180-	Grab- Archite		a .	177'- 185': C	Grav	elly Sand (95)	Air Rotar	y; 8 5/8" 00
-				10-1590 Gravel, 8	<u>85-9</u>	070 Sand. Gravel	CS sasing	, , ,
-				predom fn-med	peb	; Sand 10% v-cse		,
-			0	to cse, 60% med, 3	30 %	Fn - y. Fn. 104R5/3	180': Gra	6 sample
-			0	(brn) sl moist; moc	& son	ted, Sand SA - SR,	- for ar	chive
185-	Grab - Archive		о О	90% qtz/feld, 10	0%	basult lother,		
-			00	no rxn HCI.			185': Gra	6- archive
_			(- gradual con	mtac	t		
-			ن <u>ہ</u>	185'→212': S	and	, GRAVEL (SG)		
-			000	60% Gravel,	40	% sand, tr silt.	190': Gra	b-archive
190-	Archive		10 °	Gravel 20% Cse	<u>e peb</u>	<u>, 40% med, 30%</u>		
-			Ö, e Ö	Fn, 10% V. Fn pet	6; 5	and 10% v. cse-		
–			\dot{D}	<u>cse</u> , 50% med, 3	3070	Fn, 10% v. Fn.		
-			,	10YR 5/2 (grayish	bro	wn) sl moist;	195': Grab.	- archive
-	Graha		0.7	pourly sorted; g	irave/	SR-SA, Sand SA,		
195-	Auchiy	t	Ö	Gravel 30 40% bo	asalf	, 75% gtzite, gravitic,	·	
			Ö	other; Sand 1	1070	asult, 90% gtz/		
-			$\mathcal{D} = \mathcal{O}$	Felds; tr mica	• <u>; </u>	io rxh HCI.		
-							200': Grab	-archivr
_			O_{0}	195 - 197 : Sanc	<u>l</u> ca	mtent up to		
200-	Grab- Archize		808	60%, then	back	to ~ 60-70%		
-			80	gravel			Drill rate	:
-			OOO				5 FI/	<u>4 min.</u>
-		-	D B		····-			
-							205': Grab	- archire
205-	Grab- Archire		ŠÕ					
-			RO					
-			50					
-								
			0.52.0		=.			
Reported	l By:	L.D. W	klker	Rev	viewed	By: DCWeekes		
Title:	<u>6eol</u>	og <i>ist</i>		Title	e: 🤇	cologist	· · · · · · · · · · · · · · · · · · ·	
Signature	e: 🕂) Hh	an	Date: 9-5-00 Sigr	nature:	(AC Apohle	Date:	7114/00

			D		G		Page <u>8</u> of	9
			D '		<u> </u>		Date: 9-5	-00
Well ID:	<u> </u>	115	Well N	Name: 299-W22-	80	Location: S. of 241-SX	Tank Farm	/200W
Project:	<u> </u>	2000	RCR	A Drilling		Reference Measuring Point	Ground	Surface
	Sa	mple	-	San	nple Descr	iption	Comm	ents:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Moisture Content, Sorting Size	Distribution g, Angularit e, Reaction	n, Soil Classification, Color, y, Mineralogy, Max Particle to HCl	Depth of Cas Method, Meth Sampling To Size, Wat	ing, Drilling od of Driving ol, Sampler ter Level
210-	Grab- Archive				·		Air Rotar	·y j 8 5/8"
-			000	Silt content 1	herea s	ing	OD CS C	asing
-			000				210': GR	ab sample
-			050	212 -> 237'	: Silty	Sandy GRAVEL	fora	rchive.
-	ST #1	100 %	$\mathbb{S}^{\mathbb{Z}}$	(msG);60	20 Gray	1e1, 25-30% Sand,	213.3 - 215.	<u>8' Split</u>
215-	analysis	rec.		10-15% silt.	. Grave	1 tr sm. cob,	tube samp	le for
-	GrabArchi	e	000	20% v. cse pe	eb <u>, 30</u>	To cse, 40% med,	sieve and	ilysis
-			n:07	10% Fn-y. Fn	; Sano	1 30% v. cse - cse,	215 1: Grab	-archive
-				<u>30% med, 40</u>	<u>290 Fr-</u>	V. Fn; 10YR4/2		
-	Steh-	-		(dk grayish bro	oun) w	et; pourly sorted,		
220—	Archive	:	9880	gravel R-SA,	Sand	SR-SA; Grave/	220': Gral	- archive
-			000	<u>20% basalt, 3</u>	10% gra	nitic, 50% gtzite/othe	- av I	
-			$\mathcal{O}\mathcal{Q}$	Sand predum qtz	/felds	; max size ~ 10 cm,	n,P, 8 at	background
-			200	no txn HCl.				101010
	Grab-		0.00				225: Grab	- archive
225—	Archive		000			A 0	<u>End</u> 9-5	-00
			9.00	more water	<u>predu</u>	<u>ced</u> during	Begin 9-1	5-00
-			Ö	drilling - wa	shing	times out of	/ C /	
_			0.00	Forary Chi	p catt	ings - difficult	230 : Grab-	archive_
-	Grab-		<u>SO</u>	in solid	51/E	content except	> !! !	
230-	Archive		<u> 2007</u>	<u>in spilt 7</u>	use sa	mples.	Depth to u 2015 7	iater:
			8				272	4 5 1.1
_	ST #2	90%	Sol	msG- simila		- have	4.60 Source	·
_	Sieve	rec.			<u>F 10 (</u>	2 110 11	Sieve analy	
235	analysis						* RIO 51/1 1	
בכג –							BLOSIN2	BOYVES
_			200	production of	med-	Fu sand incorrect	Waste Cho	met
_				in the rotan	v cut	inos	Samples -	from First
			ğĝ	· · · · · · · · · · · · · · · · · · ·				
Reported	By:	L.D.	Wa/Ke	r	Reviewed (av: DCUkekes		
Title:	G	cologi	st		Title: 6	eologist		
Signature	: Al	o un	the	Date: 9-6-00	Signature:	Mr. Weekler	Date: 9/	1400

			B	OREHOLE LOG		Page $\underline{9}$ of $\underline{9}$
Well ID:	07	3115	Well N	Name: 299-W22-80	Location: S of 241-5	Y Tank Farm / 2019/41
Project:	<u> </u>	2000	RIK	A Drilling	Reference Measuring Point:	Ground Surface
	Sa	mple		Sample Desc	cription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distributi Moisture Content, Sorting, Angular Size, Reaction	on, Soil Classification, Color, ity, Mineralogy, Max Particle n to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
240 —	Grab- Archin	2	620	237 -> 251: Sandy	GRAVEL (SG)	Air rotary ; 8 % OD
-	ST #2	100.94	0.0	similar to msG	described on	CS casing
-	Sieve	rec.	0	previous page	, with silt content	240': Grab Sample
-	analysis		20	down to 5-10%		For archive
-	_		\dot{c}	theaving sand in	split tube sample #3	241 + 243.5': split
245—	Grab- Archive		0000	with casing shoe	at 242'	tube sample for
-	Air			Sand is med-fn	(see sieve analysis)	sieve analysis.
-	NOTUPY		O_{2}°	Sandy GRAVEL -	40% Gravel.	245': Grab-Archive
_	V		0.0	55% Sand. 5%	silt. Gravel 10%	
250-	Greb- Archive		0.0. 0.0	V. Cse peb, 30% c	se, 40% med, 20%	250': Grab-archive
-			0800	Fn-Y. Fn. Sand	10% v.c.se - cse,	
-				60% med, 30% Fn	Sand 10YR4/3	
_				(brown) wet: mod -	well sorted : Gravel	
_				R-SR, Sauch SR-SA	; Sand 85% ytz/	
255-				Felds, 15% basalt	lother, trmica.	TD = 251'
_						
_						
_				· · · · · · · · · · · · · · · · · · ·		
_						
260-						
-				· · · · · · · · · · · · · · · · · · ·		
-						
-						
-						
265-				· • •		
-						
-				· · · · · · · · · · · · · · · · · · ·	***	
-						
				T		
Reported	By:	L.D. W	alker	Reviewed	By: DCUkekes	
Title:	Geo	ologist		Title:	Seologist	
Signature		9 Ub	the	, Date: 9-6-00 Signature	. Incupener	Date: 1/14/00

					Start Dat	e: _ 0	7-01	-		
WELL CONS	STRUCTIO	N SUI	RY REPORT	Finish Da	ate: oil	3110)				
						Page 📘	of _1_			
Specification No.: 5000-50	Rev. No.: O			Well Name: 299-W22-81 Jern Well No.: C3123						
ECNs: NA			_	Approximate Location: E. of 241 Sx Tont Form 1200 112						
Project: RCRA Dra	lling CY2	.001	-	Other Companies: BHT, (CHI	<u></u>		<u></u>		
Drilling Company: Resund	nt Sonic	Intern	<i>citiona</i>	Geologist(s): LD. Walk	ion 1	P. Vellin	145, 5,M	Faura		
Driller. Gary How	ell		<u></u>	S. Kiesler, J.K. Murr	av 1	Wee	kes			
TEMPORARY CAS	ING AND DRILL DE	PTH		DRILLING METH	OD/HOLE	DIAMETE	R			
*Size/Grade/Lbs. Per Ft.	Interval	Shoe C).D./I.D.	Auger:	Diameter	r From	to			
Carbon Steel	0 - 269'	11"	95/8"	Cable Tool: 105/8* /95/8"	Diameter	r From	—— > to	269'		
10 5/8 " / 9 5/8"				Air Rotary:	Diameter	r From	to			
······				A.R. w/Sonic;	Diamete	From	to			
	-				Diamete	From	to			
				· · · · · · · · · · · · · · · · · · ·	Diamete	r From	to			
*Indicate Welded (W) - Flush Jol	Int (FJ) Coupled (C)	& Thread	Desian		Diameter	From	to			
				*						
			•	Drilling Fluid:						
Total Drilled Depth: 270	Hole Dia @ TD	a"		Total Amt. Of Water Added During	Drilling					
Well Straightness Test Results				Static Water Level: 475 9 Da C	Data:	un los				
rion on algination restrictures.	passed	GEC		ALLOGGING	Date: 2	0 0 0				
Sondes (type)	Interval			Sender (huno)	- Int					
Sperman Constant	A 268 75		1	Solides (type)	inu	ervai	Da	te		
STELIKAL GAMMA	0 73577	1/22	101							
NEVIKON		1/221	01							
	land to the second second	2017 - 1919 - 19				•	r Kalendari	sta in Teac		
	i i per gale por tan an ing i pertensi. I	Vi da state			<u>082885</u>			<u> </u>		
Size/Wt./Material	Depth	Thread	Sice	Туре	inte Annual Se	erval al/Filter Pack	Volume	Mesh		
4"10 55 End cadema	261.72 263.72	FUR	NA			-				
4"ID SS WW Screen	226.75' 261.72'	FYRO	20	Portland rement	0	- 11'	9	ain		
4"ID Jours Againg	+2'-226.75	EVAD	AIA	Google hants its	11	- 209.9	10995			
(schedule 5)	-	1.100	101	Renter its sollet (36)	209.9	- 167	101.5 000	364		
				Silier Sand	7167	170'	V DOUD	1060		
					<u></u>		1 0 22 000			
Aquifer Test:	ing the second of the state of the second	Date:		Well Abandoned	Yes	No	Date:	ः सिद्धां ह		
Description:		Dute.		Description:	1103.	110.				
	en e		, El l'en		is pirst	ې د ور مې کې				
<u>ner en russen for Andel en feren</u> Date:	endra značni se Belje L	n	iere au	Protective Ceels- El				<u></u>		
Washington State Diano Coordina	toc:			Protective Lasing Elevation:	···					
TYASHINGUN SLALE Plane Coordina		an status		Drass Cap Elevation:	a an	ಕ್ಷ ಕನ್ನಡ ಸಂಪುದ	Andres St.	s sign		
A H 1 1	and -	<u> </u>	MMENT	SIREMARKS	<u> sector</u>		() 동안() () () -			
tor Tland cement in 9	Ht Logs, 90	anular # (<u>berto</u> c	nite in 50# bags, be	ntonite	pellet	2			
10 JOH 601 JUIC	T JA TIO IN SO	T 097			,			<u></u>		
Reported By: CTKIOE		7 F		Reviewed By: DCUkek	<u>છ</u>					
Title: Geologist		Date:4	10/01	Title: Geologist			Date: 🖌	11/01		
Signature: 41 Marc				Signature: Stelleeks	4		,	·		

				 	Page of
Well ID: 299= (3123			299-1	1122-81	Date: 2/3/01
Location: FAST. SIDE 241-5 TANK TA	0 40	Project: R	CRA (1 V 1 001	
Prepared By: M. 190AN DCILLee kes	Date: 2/5/01	Reviewed	By: 1m	nu aste	Date: 02/05/01
Signature: Munur / MC7/00 bas	951-1	Signature:	Ims	and the	10.401
CONSTRUCTION DATA			110	GEOLOGIC/HYDR	OLOGIC DATA
Description	Diagram	Depth in Feet	Graphic Log	Litholo	gic Description
6-in dia protective ss		0-	2002-2	0-9.5' SIL	ry SANDY GRAVE
Casing set 1 'above the 4-in casing 4-in TD sch 5 == 3041		-		9.5'-19'.SL	IGHTLY SILTY SAN]
well casing: +2 → 226.75'		25		34'-4D' 5	546HTLY SHITY SA
Portland cement grout: $O' \rightarrow II$ Granular bentonite: $II' \rightarrow 209.9'$		50-	0.000000000000000000000000000000000000	40'- 45'5 GRAVEUY : 45'-48'51 48'- 70'SL	LIGHTLY SILT SAND LTY SANDY GRAV IGHTLY SILTY SAN
Temporary Casing: 1096*/496 * set 9750(269')		- 75 _ -		70'- 140' :	SAND
· · · · · · · · · · · · · · · · · · ·		- - 100			
All depths in feet bebu ground surface All temporary casing removed		25 -			

					Page <u>2</u> of <u>2</u>	
WEL	L SUMMARY SH	IEET			Date: 2/5/01	
Well ID: C 3/23		Well Name: 299-W22-81				
Location: East Side 241-S Tank	Farm/200W	Project:	RCR	A CY 2001		
Prepared By: L. D. Wa/Ker	Date: 2/5/01	Reviewed	ву: <u>DC</u>	Weekes_	Date:2/5/0/	
Signature: AMalk		Signature:	JXC44	eekes		
CONSTRUCTION DATA	A	Denth in	· (SEOLOGIC/HYDRO	LOGIC DATA	
Description	Diagram	Feet	Graphic Log	Lithologi	c Description	
Bentonite pellets, ¾" 209.9 → 216.7'		150 — - -		40'→163'; 63'→174':	Silly SAND Silly Sondy	
Silica sand, 10-20 mesh 216.7'→ 270'		- 175 -	000 000 000 000 000 000	174'→178': :	GRAVEL Silly SAND	
4-in ID, 0.020-in slot Cont. wire wrap, ss -type 304: 226,75 →261.72'		- - 200	00000000000000000000000000000000000000	(GRAVEL	
Sump: 4-in ID 55 304 261.72'→ 263.72' Total 4-in ID 55 material is262.72'(+2'→ 263.72')	××4.00000000000000000000000000000000000	- 225 - -		WL=225.5'	1/29/01	
	111-11-1-1-1 	250- -		259'-> 270' TD= 270	: Sandy GRAVEL	
All depths infect below ground surface All temp, casing removed from the ground.		- - 275 - - -				

			B	OREHOLE LOG		Page <u>1</u> of <u>9</u> Date: 1-9-01	
Well ID:	С 3	123	Well N	lame: 299- W22-81	Location: E. side 241-	S Tank Farm / 200W	
Project:	RCR	A Dri	lling.	CY 2001	Reference Measuring Point:	Ground Surface	
1	Sa	mple	, , , , , , , , , , , , , , , , , , ,	Sample Desc	ription	Comments:	
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distributio Moisture Content, Sorting, Angulari Size, Reaction	on, Soil Classification, Color, ity, Mineralogy, Max Particle n to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level	
0						Cable tool drive	
_	Drive	NA NA		0'-> 9.5': Silty	Sandy GRAVEL	barrel: 10 5/8" 00	
-	Barrel		900	(msG); 40% Gravel	1. 45% Sand, 15%	CS casing	
_			Dee	Silt. Gravel 5% (cobble, 30% y. cse	,	
-			O O	peb, 40% csc-med,	25% Fn-v. Fn peb,	5': Collect grab	
5 -	Grab-		0.0	Sand 30% v.c.se - c	se, 50% mcd, 20%	sample For archive	
_	ACCNIVE			Fn-y. Fn. 10YR4/21	(dk grayish brn)	a, X, B at background	
_			000	moist; poorly sort	ted; Gravel R-SR	levels	
-			00	Sond SA-A. 60%	basalt. 40% atzite	,	
-				other; max size	2 lo cm; rxn to	10': Collect grab	
10 -	Grab-		0.7	HCI weak to stron	ng - tr caliche coatin	as for orchive	
			0 - O	on some gravel.	·····	a, &, & background	
_			•			0-12 DRVM Samples:	
-				9.5'-> 19' : Sligh	HIY Silly SAND	B11202, B112C3, B10F13	
-			-	((m)S); 5% Gray	iel, 80% Sand,	15': Grab-Archive	
15 -	Grab- Archiv	4		15% Silt. Gravel	tr cse-med Reb,	1, 8, 8 at background	
-			0	predum v. Fn peb,	Sand 30% v.cse,		
-				4090 csc-med, 309	5 Fn - v. Fn; 10YR 5/2	2	
-	-			(gr brn), sl moist ;	; mod - poor sorted,		
-] [Sand SA-A, 40%	basalt, 60% gtz/	20': Grab-Archive	
20 -	Grab ~		0	feld/ other; tr i	iron oxide ; weak	d, B, & at background	
-	·		0	to no rxn HCl.	· · · · · · · · · · · · · · · · · · ·	End 1-9-01	
	-			19'-34': SANI	D (S); 5% Grave	13'-20' DRUM Samples:	
-	-		-	90% Sand, 5% Silt	. Similar to above	B112D3, B112C4	
-				with decrease in	silt content.	25'- Grab Sumple	
25 -	GRAB-	1		25'- HCI rxn mod. Su	ind still course-v.com	re RAD @ backgroun	
-	-			70-75% silt frag. are	LdK. grave HCl rearch	ve	
-	-			Pebbes & to trace			
-	-						
	-		a -		XALL.		
Reporte	d By:	L.D. W	alker	JILL MURRAY Review	ed By: DUMeeke	۶	
Title:	Ge	ologist	/ Geo	Title:	20logist		
Signatu	re: X	2 W	elh 4	ATTIM Date: 1/10/01 Signatu	ITO: / Meekea	Date: 1/24/01	
			V	J			
		В	DREHOLE LOO	3	······································	Page Date:	<u>2</u> of <u>9</u>
--------------------------	-------------------------------------	-------------------------	--	--------------------------------------	---	-------------------	--
Well ID:	3123	Well N	ame: 299 - 6/22 -	81	Location: FAST SIDE	241.	S TANK FARM
Project: PC	RADRIL	ING C	Y2001	<u>9</u>]	Reference Measuring Po	int: G	NIND SURFACE
	Sample		Sam	ple Desc	ription		Comments:
Depth (Ft.) Ty DRU	vpe Blows lo. Recovery REL NA	Graphic Log	Group Name, Grain Size I Moisture Content, Sorting Size,	Distributio , Angular Reactior	on, Soil Classification, Cok ity, Mineralogy, Max Partic i to HCl	or, Dep le San	th of Casing, Drilling od, Method of Driving opling Tool, Sampler Size, Water Level
30-GRF	₩	1.0	30'- sitts T sli	shtly,	gruls less frequen	+ 30'	Grab/ARCHIVE
<u></u>	CHIVS			<u> </u>	S D -	No	RAD ABOVE BACKGRUN
_			·				
			211-40' 5		IS TI SAATA		· · · · · ·
26-600			SAID 85% SIL 1	<u>LIGHTL</u> 5% Tr	ADILIA SAND	25'	GAAD APCHINE
as AR	HIVE	00.0	Anthe Contral Subram	1 7501	and JIIS. SAUDS	CL N	PAR ADOUT RANGENUL
		00-	Sel y Cana Helvand	<u>1, 1570</u> Line Re	1. 14 75% · AL. 1. 1.	27	- Self share
			25V 4/2 24 Aroun	ch Cu u	· Sile all and with		HCl ventive <1
		-	chine 540 5/1 Pa	ILL E	. SIBOFARY W/ 10	h	
ND TON		0	3/2 - thing apple		<u>айн: Стүгсэмр. ресу</u>		CONDLADUSTIK
	TANANG		40'-45' Such		UTGOAVELIN SA		TACK CANIAD BAD
		N=	Guild 159- 514154		SILL EXERCECT ON		EPONOKOMI KAU
		0.0	1. Anter an anter 1076	<u> </u>	Las' Sende and	<u>ra</u>	
		0.000	19. pero mark, subang,	<u>2011 pers</u>	addring Junies Cours	veous	že
115		0.0.00	Sille 14 med 10 to the	<u>n di</u>	Within poorly sort sul	9 11C	GRAA MOULNIC
ARI	CHINE	6000	Must a for INVA	<u>: warn</u> \$/~	g mutkn pusate bo	10 43	DOCULANNORAN
		0.00	1451 - UR'S WALLAND	in M	Garale Latt		DICKORSTON
		80 CE: 10 5 0 CE: 10	75 - 70 JULY SANUT	CHAR / C	chailing and	on the	ITXN SAMECOLOR
			48'- 70' Such	<u>m. coy</u> v S	s max TOTO GNIS,	15% 511	-, Toto Sand
	0.1		10- 10 SLIGHI		TY JAND		To! CARA LADANAL
30-14	CHIVE		UCHI USTO, SITE IST	D I TYNE	grus. Jands Mod 3	57464 C	DO GUARS/HORGAVE
		-	houle in the 2 Start	- 1060	Her , NO HELT XM, SUD	an <u>g subn</u>	Vid KHU- BKEYROUN
			2 SY 41 my Bankhar	UNN CHE	The reactive w/ outure	<u>conrings</u>	In Chunks of Clays
		- P.O.	THE OWNER	<u>ተዱነ ፡ ስር</u> ተ	151-2005417-10/6	5	C DAR ARALINE
55 60		0.00	SHI CALLE	<u>1 14 5</u>	I CE E JO TO		@ ALLYC Nor W/D
	ANE	Q ~ ~	JIN. 0005.			- KAU	e dacheriounal
						-	
			EV' SUE MI	. 1 1			
		····	20 5111 (Onto	nt J	SUINC		
Reported By:	hu Murant	1		Reviewe	ABV: DALIBOL	01	
Title	JUL/NVKJCAY			Title	Caplas of		
Signature			Date: Under	Signatur	e: Mala. Ann		Date: 1/79/01
	A TITU HAM				property		1-1-1-1

			B	OREHOLE LOG		Page <u>3</u> of <u>9</u>
Well ID:	C312	23	Well N	ame: 299 - W12.7 - 81	Location: EAST SIDE	41-S TANK FARM
Project: *	RCR	A-DA	LILING	CY2001	Reference Measuring Point	GROUND SURFACE
	Sai	mple		Sample Des	cription	Comments:
Depth <u>(Ft.)</u>	Type No. Drive Barrel	Blows Recovery	Graphic Log	Group Name, Grain Size Distribut Moisture Content, Sorting, Angula Size, Reactic	ion, Soil Classification, Color, rity, Mineralogy, Max Particle on to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
60-	GRAS+	61A	-	SAME AS ABOVE ~ EXCE	of sand size V	60'- Grab/Archive
-	ARCHIVE			cse-mad = 80% of sand	fraction, subrand	RAD @ BACKGROWD
-			1 0			15'- 6 4 4 4 9 10 10
65-	ARCHIVE	-	:0			B GKABAKCHINE
-						KAD @ BACKGROUND
			۲. بر ا			Th' - Coult the laive
70_	GUAAL	$\left \right $		70'-140': SAND		LAD @ PACKGPWIN
<i>1</i> 0	ARCHIVE			90% sand 10% silt >	sunds up ll saited ion	Wad
_	. 1			to subround V. fine sand 90	% fire sand 10%; No H	Urxn Begin 1-11-01
-				Silts dKgray's besalt 60	%; MOIST color 2.54	6/2
-	. V			light brownish gray		
75-	Grab-					75': Grab - Archive
-	- 1		÷ +			Rad at background
-	-			77: Sand becomi	ing coarser	
-	-			~ 5% silt, Sana	predom fn-med.	
-	V					80': Grab - Archive
180-	Grab- Archive			80': Sand Finer:	as above, but	Rad - background
-	-			now predom.	Fn - V.fn.	
	-					
-	-					
95-	Grab-	$\{ \ \ $		•		85: Grab-Archive
02-	- <u>Archir</u> I	*		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·	Red - Deckground
-						
]		\			· · · · · · · · · · · · · · · · · · ·	
Reporte	d By: JIL	MURIZAY	/	L.D. Walker Review	wed By: Delikekes	· · · · · · · · · · · · · · · · · · ·
Title	augist			Title:	Geologist	
Signatu	allm	unen 1	ASWA	Date: /-//-0/ Signat	ure: ACUlerkea	Date: 1/29/01
	Varge	0				

			B	DREHOLE LOG	······································	Page <u>4</u> of <u>9</u> Date: 1-11-01
Well ID:	C 31	23	Well N	ame: 299- W22-81	Location: E. side 241	- S Tank Farm / 200W
Project:	RCR	A Dr	illina	CY 2001	Reference Measuring Point	Ground Surface
1	Sa	mple		Sample De	escription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distrib Moisture Content, Sorting, Angu Size, Reac	ution, Soil Classification, Color, Ilarity, Mineralogy, Max Particle tion to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
90 -	Grab-	NA				Cable tool-drive
-	Drive Bancel					barrel. Casing is 105/8"00 cs
-				SAND (S)		90': Grab sample
95 -	Grab- Archive			95-100% Sa	nd, tr-5% Silt.	For Archive
				10% cse, 40% m 10YR5/2 (grayist Mod-well sorted	ed, 30% Fr, 20% r.Fr. brown), s/ moist; 	A, B, S at backgrouel levels.
				70% atz felds of	her: max size~ 1.0	95': Grab- Archive
100-	Grab- Archive			. mm; weak rxn	<u>нс1.</u>	d, 8, 8 - background
				102'→103': Slightly beck to	, Silly Sand; then Sand	1001: Grab-Archive A, B, Y - background
05 — -	Grab- Archive			105': Sand is w Fine to ver	ell sorted, predom. y fine.	105': Grub - Archive 1, P, K - buckground
-	Grab-	4		2 		110': Grating Grab-
-	- <u>Arch/x</u>					Red - background
-	- Grab-					115': Grab-Archive
115 — - - -	- <u>Archiv</u>			Fn-v.Fn, S	R, no rxn HCI	
Reporte	- ♥ od Bv:	<u>ر م ر</u>	1. /k-		iewed By: DAlibelas	
Title	<u></u>	L, D, l	Naine	r Title	appoint	
Signatu	re: 7	a ha	ll.	Date: /-//-O/ Sigr	nature: Date Ka	Date: 1/29/61
					V	

			Page <u>5</u> of <u>9</u>			
Well ID:	٢3	123	Well N	lame: 299- 1/27 - 81	Location: E et (200	T- KE /2001/
Project:	RCR			CV 2001	Reference Measuring Point	Grann Parmy 200W
	Sa	mple	mag-	Sample Des	cription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distribut Moisture Content, Sorting, Angula Size, Reactio	tion, Soil Classification, Color, arity, Mineralogy, Max Particle on to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
120 -	Grab- Arshive	NA				Cable tool - drive
-	Drive	1		SAND (S)	as above.	barrel. 10 5/8"
-	barrel			95-100% Sand, tr	-5% Silt.	OD CS casing
-				10YR5/3 (brown), s	I moist; well sorted,	
-	*			SA predom; 30% +	n, 70% v. Fn ;	120': Grab sample
125 —	Archive			occ. thin $(<0.1')$ la	yer of med-cse sand,	for archive
-				20% basalt, 80% .	atz/feld/other ;	a, B, & at background
-				max size ~1 mm	; no rxn HC1.	
-						125: Grab-Archive
-	*				-	Rad - background
130	Archive			130': V. fn sand w/	trace of orange	
	<u>*</u>			staining	····	130': Grab - Archive
-	Tu					Rad - background
-				·····		End 1-11-01
-	W Grah					1-12-01 Begih
135	Archive					Hard tool drilling
-	нτ					135': Grab-Archive
-					<u> </u>	Rad - background
-			· · · · · · · ·			
	Grab-					
140	Archive			140 -> 163: Silty	SAND (mS)	140': Grab-Archive
-	HT			80% Sand, 20%	Silt. Similar	Rad- background
-				to above with	higher silt content	
-			_	Sand 20% Fn, 80	20 V. Fn. Well sorted,	
-	¥ 6(SA-SR, 104R4/3 (1)	rown) wet color	
145 —	Archine			weak rxh HCI		145 : Grab - Archive
-						Rad-background
-				·····		
-						
-	*		<u> </u>			
Title	<u>ыу: /</u>	.D.Wa//	ier	Review	ed By: DCULERKES	•
Signature	60000	ist	17-		Seciegist	
Signature	- 70	Nal	n	Date: [- 15-0] Signatu	re: / NC Alenea	Date: 1/2-10/

		Page 6 of 9				
Well ID:	(3)	23	Well N	lame:)99. W/22 - 8/	Location: F stale 211	S Tark En (200)
Project:	RCI	RA Dei	·llina	CY 2001	Reference Measuring Point	STANK Parm/200W
	Sa	mple		Sample De	escription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distrib Moisture Content, Sorting, Angu Size, Reac	ution, Soil Classification, Color, ularity, Mineralogy, Max Particle tion to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
150 -	Grab- Auchim	ţ .				Cable tool - hard
-	Hard		-	Silly SAND (m 5)	tool. 10% 00
-	tool		1.1	80% Sand, 20%	to Silt. Sand 20%	(S casing
-				med, 40% Fn, 40%	v. Fn. 104R4/3 (bru)	,
-	Gtaba			wet in hard tool	1 sluppy Mod-well	150': Grab sample
155	Archive			Sorted, SR-SA;	20-25% basell, 75-	For Archive
-				80% gtz, Feld / other	, tr mica; weak	a, B, & at background
-				+xn HCI + (on dry s	ample)	
-				155's tr lithic Fran	<u>gs 2-4 mm</u>	155 : Grab - Archive
-	Grab-		- 0			Rad - background
160-	Archive			A at the t		
-			. –	arilling indicates s	sharp transition to	160 : Grab - Archive
-				gravel at 16:	3	Rad - background
-				163 -> 174': Sil	ty Sandy GRAVEL	165': Grab - Archive
165-	Grab- Archie	c		(MSG) 35% GM	avel. 50% Sand. 15%	Rad-backyround
- 1			920	Silt. Brown color o	of silt similar to	<u> </u>
-			08	above. Poorly sorte	d, sand SA; graved	
-			0-:-0 0-:0	Fragments show t	trace of SR,	
-	1		000	Gravel 40% basalt.	60% granitic lother	170' Grab - Archive
- 071	Archie	ĺ		Sand 25% basalt,	7590 gtz/feld	Rad - background
-			$O_{\overline{C}}$			•
-			$\mathcal{O}^{\circ}\mathcal{O}$	drilling indicate	s grailual decrease	End 1-15-01
-				in gravel con	tent	Begin 1-16-01
-			ġ'nġ	1 1 1		
175 —	Grab Archiv	•		174→178 : Sil	ty SAND (ms)	175 : Grab - Archive
-		c	+	5% gravel, 70%	Sand, 25% Silt,	Borchole designated
-				tr clay on drill	bit.	radiological low
-			\dot{s}			risk
Reported	Bv:	(D 1	<u></u>	Bouic	awad Bur Dalahal-	<u> </u>
Title:	Gaz	<u>, D. Wa</u>	//ser		We by DC Weekes	
Signature	: ~	109157 D 41	a	Date: 1-11-01 Signa	ture NY 260 Ang	Date: 1/2 alar
L		12	ver		property -	

			B	OREHOLE LOG		Page 7 of 9
Well ID:	C31	23	Well N	lame: 199- W122-81	Location: F cul > U	5 Talk Entry / 2001
Project:	RCF		illing	CV 2001	Reference Measuring Point:	Gray A Sy Fran
	Sa	mple		Sample Descri	iption	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distributior Moisture Content, Sorting, Angularity Size, Reaction	n, Soil Classification, Color, y, Mineralogy, Max Particle to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
180-	Grab - Archive					Cable tool - hard tool
-	HΤ			$\frac{178' \rightarrow 259': Siller}{(h \in G)} 40.76 \text{ Gravel}$	y Sandy GRAVEL	10 5/8" OD CS Casing
-				15% Silt. Gravel pre	dom med-cse peb	180': Grab sample
-				judging by Fragments	and drilling	For Archive
185—	Grab- Archive		0070	characteristics. R-SR	; Sand preclam	
-				med-fn; 20% basalt	, 80% qtz/felds,	185: Grab - Archive
-			840	SA; max size sm. (cobble	
			80			in la Gardan La
	Grab -		$O_{\overline{z}}Q$	1901: Emvel a lad	•••••	190: Oren Archive
190 -	Archive I		$\mathcal{O}\mathcal{O}$	170 · Graver content	Increase	Encl 1-16-01
_				5:14 ~ 10%	······································	
_						· · · · · · · · · · · · · · · · · · ·
_						195 ': Grab - Archive
195-	Archive		ð Ö			
-						
-				· · · · · · · · · · · · · · · · · · ·		
-			0		·····	200' : Grab-Archive
- 200	Grab- Archive			Silty Sandy GRAN	VEL - as above	
-				, 		
-			∂O	: 	·····	
-			800			
-	Grab-					205 : Grab - Archive
205—	Archiv		80			
-			SQ			· · · · · · · · · · · · · · · · · · ·
-			Öğ	Sand traction predo	m fn-v.fn	· · · · ·
-	\downarrow	Y		· · · · · · · · · · · · · · · · · · ·		
Reported	By:	(<u> </u>	n 1 Ko -	Reviewed	BV: DALILOOLOS	L
Title:	Geo	-100. cl	AINCE	Title:	Seoling ist.	
Signature	i A	O Na	lh.	Date: 1-17-01 Signature	NC Weekes	Date: 4/11/01

			В	OREHOLE LOG		Page 8 of 9 Date: 1-17-01
Well ID:	C 3	123	Well N	ame: 299- W22-81	Location: E. Side 241-	s Tank Farm/200W
Project:	RC	RA D	rill inc	CY 2001	Reference Measuring Point	Ground Surface
1	Sa	mple		Sample Des	cription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distributi Moisture Content, Sorting, Angula Size, Reactio	on, Soil Classification, Color, rity, Mineralogy, Max Particle n to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
210-	Grab-		88			Cable tool - hard tool
-	ЦТ	N A		Silty Sandy GRA	IVEL (msG)	10 38" OD CS casing
-			<u>o</u> 8	50% Gravel, 35-40%	Sand, 10-15% Silt.	
-				104R4/3 (brown from s.	ilt); poorly sorted,	210': Grab-archive
-			000	gravel Frags broken	by drilling - show	
215-	Archive			sides round to sul	I-round. Sand	215 : Grab - archive
-			930	SA. Gravel 20% ba	salt, 80% granific/	
-			200	<u>qtzite / other ; Sand</u>	predan Fn-V.Fn.	
-			000	30% basalt, 70% gt	z/feld/other.	220': Grab-archive
-	Grab-					
220	Archive		0.00			
-			0.00		· · · · · · · · · · · · · · · · · · ·	
·			050			
-			0000			End 1-17-01
-	Grab-		200			5+2-+ 1-18-01
225	Archive		0010	225 Silty Sandy (GRAVEL (MSG)	225" Grab/ Archive
-				as above.	<u></u>	
-			00			
-			0.00			
-			0.00	·		
230-	Archie		0.00	230' Silty Sandy G	AMEL(nSG)	230: Grab - Archive
-			0.11	as above.		
-			20:01	·		
-			0.0.0			
-			0-0			2.4.64
235-	Aranje		0.0-	235 Silly Sandy C	rovel (nsb)	235 " Grab - Archive
			10,0	as above.		
-			00,4		·	238-2405 split
-	split +1	75%0	050		·····	Spoon #1 sieve
Bonorte		recovery	0.4.0	De de la	A Du Daulasta	-
Title	л су: 1 Г	<u>L.D.</u> W	alker		Garbacit	•
Signatur	680	<u>109ist</u> 8 ///	10		Seciogist	Data: IChin In
Signatur	•. <i>/</i>	" Wal	m		ne. por Macha	L Date. 4/1/0

			B	OREHOLE LOG		Page <u>9</u> of <u>9</u> Date: 1/18/01
Well ID:	6.312	3	Well N	lame: 299-w22- 81	Location: E c. i. 241-5	Tente 6 m / 200W
Project:	Rr	LA DR		. CY 2001	Reference Measuring Point:	Ground Surface
	Sa	mple		Sample Desc	ription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distributio Moisture Content, Sorting, Angular Size, Reactior	on, Soil Classification, Color, ity, Mineralogy, Max Particle n to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
2%—	Splitspoon #1	mere	0.00	238-259 5114 5mby	GRAVEL (mSG)	Cable Tool-hard hool
-	6-al/Archin	NA	0.0.0	45 20 g mel, 35 20 sand, 3	20°6 silt, gwel	105/2 '00 cs casing
-	Hand tool		0.000	Doorly sorted, SA-JR, max p Jaselt, 85 lo g+2,10 /other, JA, preson. csc+ fine 2020	2545 = 66mm, 15 2 Sand poorly sorted, basalt, 8020 g+2/	240': 6rab/archive End 1/18/01 242' Begin 1/19/01
245—	Gral/AR		0.0	feldsportomer, no RXN H	ta.	245: Grab/archive say
-	HT 55#2- 2463'-, 2493	100% recovery		as above except max size plasticity on sitts, dark bow	≈90 mm, medium In send w/a bundant mica	Split spoon sample Collected for sieve analysis (2463-2478)
- 250	HT Grab/AR HT	NA	0.000			250': Grab/archinesayle
- - 255	Grab/AR		0.0.0.0			255: Gab/Archie single
-			000000	259'-> 270': Sand	y GRAVEL (S G)	End 1/19/01 begin 1/22/01
20-	Grab- Archive			60% Gravel, 30-3 Silt. Gravel 30% v	5% Sand, 5-10% .cse-cse peb, 30%	260': Grab - Archive
-	SS# 3	10090 rec.	500 000 000	med, 40% Fn-v. Fn; S -cse, 50% med. 30%	Sand is 20% v. c.e. Fn-v. Fn: 104R4/4	260.5' + 262.5': split spoon #3 for sieve
-		NA		(dark yel. brown), w Sand SA, Grovel R-	sr; 15% basalt,	analysis rad-background.
z65	Grab- Archive		00000	85% gtz/granitiz/othen size ~ 10 cm; no	et, tr mice, max rxn HCl.	W.L. = 226.35' 265': Grab - Archive
-						269-270: Grab-Archiv
Bancat	Grab-Ar	Aive Y	<u>p:0:0</u>	Allha Free Daview	ad But DAllaghe	$\frac{110}{210}$
Title	и ву: ф Ста	at Vel	lines /	Diveries Review	Good a cit	>
Signation		> 5. 5 +	· A		$\frac{OeOlogis}{V}$	A Date: 11 1 1 1
Signatur	•. Pat	- Vell	mes of	Mare 1/18/01 Signatu	". Al Mere	2 Daie. 4////0/

WELL CONS	STRUCTIO	N SUI	MMA	RY REPOR	RT	Finish D	ate: 314	<u>- 4 01</u> +101		
A		-	Page 1 of 1							
Specification No.: COCOT	Rev. No.: O			Well Name: 299-W22-83 Temp. Well No .: (3126						
ECNS: NA				Approximate Locat	tion: EAST SU	vr of	SX Ta	nk Fai	-	
Project: 0100 RCRA Dri	lling			Other Companies:	CHI	<u> </u>		<u></u>		
Drilling Company: RSI				Geologist(s): D	cweekes	, Cr	artinez	C Tri	æ	
Driller: Gary Howell				-		,)		
TEMPORARY CAS	SING AND DRILL DE	РТН	م المراجعة المقابلة المشرور والتي المحسومة	D	RILLING METH	OD/HOLI		R	2	
*Size/Grade/Lbs. Per FL	Interval	Shoe C).D./I.D.	Auger:	-	Diamete	r From	to		
Carbon STEEL	0-275'	117	10"07	Cable Tool:	(9")	Diamete	r From		25	
103/4"/ +0# 9 1/2"	·	10%	· 6%"	Air Rotary:		Diamete	r From	to		
,			- * {	A.R. w/Sonic;		Diamete	r From	to		
						Diamete	From	to		
						Diamete	From	to		
*Indicate Welded (W) - Flush Joi	nt (FJ) Coupled (C)	& Thread	Desian			Diamete	r From	to		
· · · · · · · · · · · · · · · · · · ·						Diamete		10		
				Drilling Eluide H	D					
Total Drilled Depth: クフベノ	Hole Dia @ TD.	du		Total Arri Of Mint		D-:#	477			
Well Straightness Test Results: DAccorres				I total Amt. Of Water Added During Drilling: 223 gallons						
		5/5/01		Locomo	<u>. 241.05</u>	Date: 3	<u>>114/01</u>	lotas elen una	ş	
Sondes (type)	Internal		orn (SIC)		<u> (1886-1986) (18</u>			<u>. 1966 (1967)</u> -		
SDONTAL GALLAN		1/ 2/2		Sondes	(type)		erval	Date		
Speding Clumma		a 311	101			<u> </u>				
- New Yorkey		<u> </u>	· · · · ·		· · · · · · · · · · · · · · · · · · ·		-	<u> </u>		
<u>veuton</u>	<u></u>	<u> 3/7</u>	01		antania danata matana	Solomouriadas :	e anti-	Garden Amilia and		
		<u>955 (</u> 1		ED WELL		<u>े के देखें</u> 	1699 - Ne		egig T	
Size/Wt./Material	Depth	Thread	Slot Size	Тур)e	Int Annual Se	terval al/Filter Pack	Volume	M S	
4" 10 endcap, 55304	261.3 - 263.3	F450	NA	Colorado Silica	a Sand	2163	. 263-3	58 ber	6	
4" ID screen, SS3	224.3.261.3	F480	0.020"	Pertonite Rei	lets 1/4"	211.3	-216.3	5 buc.	9	
4" 113 CASING,	+2.0 - 226.3	F420	NA	Bentonite	Aumples	10'	-211.3	149 60	1%	
	<u> </u>			Portland	Concretel	0'	- 10	B bo	1	
and the second	I				(Ciment)		· · · · · · · · · · · · · · · · · · ·		Γ	
	建设 制度。		OTHER A	CTIVITIES 😹 😳						
Aquifer Test:		Date:		Well Abandoned:		Yes:	No:	Date:		
Description:				Description:		•	•	•		
	· _ · · · · · · · · · · · · · · · · · ·									
	1707 States	V	VELLORI			0.138.0246		4412-X		
Date:		8. 27 E. A. G. 202		Protective Casing	Elevation:		3789982/df	147 (29 (16)		
Washington State Plane Coordina	ites:			Brass Cap Elevat	ion:					
A PRINTER BOARD AND A PRINTER OF THE PARTY OF	A SOUTH STATE	C C	OMMENT	S/REMARKS	É. S. S. C. S. S. S.	8 K	.	No.	<i>4</i> 5	
	A CONTRACTOR OF A CARDING AND A CARDING A		<u>58</u> .	(= 31.02 M3	A FAITAL		1000 A	67 13	16.	
Val cales: 10-20 Survey Sa	-10: 0.535 L13	I MAGY P		s onor	DENION	15. 40	JEIS ()	OLTT	μæ	
Volcales: 10-20 Silica SA X 5 bxkits= 2161	No: 0.535 Af3	<u>Ing X'</u>	<u>1.6 ^</u>	יו גוצוו	× 1110 hr	> 10m		3		
Valcales: 10-20 Survey Sa × 5 bxkyts= 3.144	285 43/m	crumb	<u>sies (</u>	1.71 Ft3/bag	× 149 kugs	= 105	5.79 ++	<u> </u>		
Val cales: 10-20 Silva Sa × 5 bickets= 3.14 Portiand Cement: 1. Reported By: ATAUE	285 43/bag >	crumb ^c B boo	s = 10 s = 10	1.71 ft3/bag .28 ft3	× 149 kugs	* 105	5.79 ft	3;		
Val cales: 10-20 Silva SA X 5 bickets= 3.144 Portional Connent: 1. Reported By: (TRILE Title: Gardson	285 43/bag >	B bo	$\frac{1}{ s ^2} = \frac{10}{ s ^2}$.71 f43 bag .28 f43 Reported By: (× 149 kugs TMF au	= 105	5.79 ++	3 	7	
Val cales: 10-20 Silva Sa X 5 bickuts = 3.144 Portiand Coment: 1. Reported By: (TRILE Title: Geologist Signature: (1):	285 H3/bay >	Date: 2	$\frac{1}{ s ^2} = \frac{10}{ s ^2}$	28 ft ³ Reported By:	× 149 kugs IMF aus plogist	e 105	5.79 ++	3; Date:4/	110	

WEL	L SUMMARY S	HEET			Page of <u></u>
Well ID: C 3L2L		Well Name	: 200		Date. 02 28 101
ocation: East of SX Taak	East	Project:	<u> </u>	- 622-8	<u> </u>
Prepared By: Chartene Theretine ?	Date: Date:	Reviewed	By: DC	Lileetos	Date: 4/2/0/
Signature:		Signature:	Ma	Vile a la a	<u> </u>
CONSTRUCTION DAT	A			GEOLOGIC/HYDRO	
Description	Diagram	Depth in Feet	Graphic Log	Litholog	ic Description
2-DA. PROTECTIVE CASING 1.0' above the 4" casing 1.5'00/4"1D WELL CASING, SSTYRE30 +2.0→2.26.3' Patrons Cener Geour 0'-> 10.0' 		ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا		0-0.5 6 rave A-R s and t 0.5-12 Sand gravel. 0-5°6 12-19 Sands(12-19 Sands(19-30.5 San trace grav 20.5-32 Grav 20.5-3	A, basalt rich, gravel (5), 95% ~100% 5), 2r gravel (0-10° d (5) 100% sand el elly sand ger nd (5) bn-gr, ted is gr stringer of ses of sitz harge cobbles avelly sand is and (s) y silty sand (m): a lens detected

WEL	L SUMMARY SI	IEET			Page <u>2</u> of <u>3</u>
Well ID: C3132		Well Name	299-	W22-83	
Location: EASE of SX Tonk	Farm	Project: 🙀	C.R.A F		
Prepared By: Charlene Montinez	Dateoslarla	Reviewed	By: \\//	lector	Date: 4/3/nr
Signature: Coc allow the the		Signature:	str>	Machad_	100
CONSTRUCTION DAT	A		1000	GEOLOGIC/HYDRO	
Description	Diagram	Depth in Feet	Graphic Log	Lithologi	ic Description
all dupth in jest below yraind surface. All timp. casing remared from		120		72.0'+ 128.0's	lightly sitty south
ground.				139 - 134 San 134 - 134 Sandy 137 - 141 - Caler 141 - 21 - 24 141	db)(micaseous) silt (sm) tr gravel ere [Sandy Silt](sm) tr Call are sitt(sm)tr grave gravedly silt (sgr
Genzulae Bentonite 10.0'-> 211.3'			10110101010101010101010101010101010101		
				175-7185 Strag	nd (B) y Sand (ms)
		 	00000000000000000000000000000000000000	si hey 195→2361 450	undy gravel
Bentonite Peuers 1/4" 211.3' →216.3'			01000000000000000000000000000000000000	Watter Depty	227.05 be 314
Silica Sandi 10-70 mesh		1	0.00.000		8.178
211, 3' ~ 775'		- _∿	20200	1925-234 Spli	LS poonsand
			0.0.0	gravel we col	bbles

WEL	L SUMMARY SI	IEET			Page <u>3</u> of <u>3</u>
		Well Name			Date. 03/06/01
Location: Earth B SWTCH	P	Project:	RCDA	6701	Dailling
Prepared By:	Date:	Reviewed	By: DC	lileekp	Date: 43/01
Signature:		Signature:	NAZ	Joehos	<u> </u>
CONSTRUCTION DATA	A			GEOLOGIC/HY	
Description	Diagram	Depth in Feet	Graphic Log	Lith	nologic Description
Were Screen, 4'1D, D. D2D- -in slot annivers encewap SStre 304, 226.3' → 261.3' Sump. 4'1D SS Type 304 261.3' → 263.3' TOTAL SS 4"ID moterial is 265.30' (+2.0' → 263.3') All depths infect below grand Surface. All temp casing removed from		240	100.00.00.00.00.00.00.00.00.00.00.00.00.	$\frac{275}{232} \rightarrow 5(11)$	ty sandy gravel
ground.		-	-		

			B	BOREHOLE LOG								
Well ID:	121	126	Well N	lame:	299-11177-03	2	Location: Fact Sil-	-2KL-SYT LE M				
Project	<u>C</u> Yee	DODO		12.00	211-022-03	<u>}</u>	Reference Measuring Point:	CTI-SA Igaktanili				
	Sa			<u> </u>	Sample De		intion	Commente				
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl				Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level				
0-	Drive.	NA	207720	0-0	.5 'GRAVEL (Back	(.	1) Basa Hrich, A-R,	Cable tool drilling				
_	Banel	1	<u> </u>	390	dardgravel			W drive barrel				
_	(08)			0.5-	+12' 5AND(s):	9	5-100 % Sand, 0-52	Background readings				
_				grau	el, 10YR5/4 yello	wi	sh brown (dry), dry,	on spoils even: 290 com				
-				maa	lerately sorted, A-	-51	A, 202 645, 80%	3.5 cpm (X				
5-	Grab			9tz	and other, primari	ily	vf-m sand	Gabsanekes				
-				Ļ		<u> </u>		<d btx<="" td=""></d>				
-												
-					·		·					
-												
10-	Grab	╊ ┨					·····	Grab sample@10				
-				 				<0,082				
_				12-	>19' SAND(S): 9	6-	1002 Find, 0-1020					
, –				9r91	vel, mostly f-c sa	ind	, 10YR4/2 derk					
-				919	yish brown (moist)	<u>) m</u>	10ist, 50% 645,50%					
15-	Grab			o th	er, moderately sort	ted.	, A-SA, "salt +	Grab sample 15				
-			0	pepf	er"look			<d 00x<="" td=""></d>				
-												
-				 			A () ()	·····				
-	Garb		ابب جب	<u>n-</u>	→ 30.5 5AND(S):	10	10% sand, tr gravely					
20-	0190	†		104	R5/2 gray ish brow	in (moist), moist, moderal	640 smoke ZO'				
-				Sor	ting, A-SA, vt-m	5	970	< d BBR				
-				 	-							
-			· · · ·					· · · · · · · · · · · · · · · · · · ·				
-		4										
25-		1		 				Grapsanple 25				
-				<u> </u>	·			La gra				
-					· · ·							
-					······································							
<u> </u>			<u> </u>	·I			TIMC I	,I				
Reported	тву: <u>Д</u>	· Weeks	<u>ଞ୍</u>		Revi	iewe	a by: Willfaulot	E				
	00/99/	st Shalla	,	····		: <u>(</u>	AND -	- Data 41. 1.				
Signatur	e: /////	UN HEL	-		Date: 72/01 Sign	atu	re: YIIIJamoto	Date: //0/01				
	2 /42/07				•		1					

			В	OREHOLE LOG			Page 2 of 10
Vell ID:	C31	26	Well N	lame: 299-4122-83	3	Location: East of	Stank Farm
Project:	RCK	AFY	DID	illing		Reference Measuring Point	Ground Surface
	Sar	nple	<u> </u>	Sample	Comments:		
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Dist Moisture Content, Sorting, Ar Size, Re	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level		
30-	6000	147544	5	SI Gravelly Sand	10	har in the second	Grap Samala 22
-	6840	0.0.000		at 225' Landi	a +11 EDZ	ingrand organity	VIX OX
_	0B	0000		at sois. Junais	<u> </u>	2 1 1	-4 0, 10, 0
	1			W gravel as collet	, 40	om. Inere is a	
-				trace of silt, Basa	<u> 16 in</u>	both factions is	
				65% with telsics +	beim	335%. The color	
5-	Grab	Grab		is black to med a	<u>dkq</u>	to bogy, 10 YRS	Grab Jample 35'
-				The unit is moist		- ·	Ld YP,~
-		3.45		32' St. Sdy SILT 3	strin	ger, then back in	6
-				bn-gy sand med	0 - £1	ne grad, mod.	V.Sm. (1/2") nade
				Sorted. As previou	us/v	described	of wh-gy comenter
40-	Grab						Sand - 5/. RXN to HO
-							Grab Samah @40'
_							ed yper
_						<u> </u>	
				1	,		CIE Later
5-	GRAB			Learse grained st	ringe	ers of sand, BK	Grab Sample @ 45
-				todk-gy, < 8" th	ick,	then thin,	20 8 por
-				discontinuous? S	it her	nses/stringerst	Drive barrel is
-				Overall silt Co	onte	nt is 15-20% now	getting difficult
_				is silty sand.			remore.
0_	Grab	<u> - 7</u>		•			Grab Samole 50'
_		777	· /	-V.S. gravel stringer	- 51	5-57.5 it is	<d td="" xb.x<=""></d>
_		27 - 2 - S		gray whitsh-grad	, w/	35% a 15% S and	IH: < Defect.
_		૾ૢૼૺ૾ૺૢૼ૾ૢ		Gravel is 60 2 Break	SA-	SR parch sacted	
_				Sand is VE-Crand	1 55	There is dry	Grade Sumala 8.55
5_	Gmb	\mathcal{Q}		lance could it	, <u> </u>	conductory	Ed 2 Br
<u> </u>		Q P		Large CODOR, Th	enco	- sand wirding	
-				Then poorlysofted.	san	w vf gravel.	Note caving
-		0		· · · · · · · · · · · · · · · · · · ·			
-		0.0					
	∟₩		L				
eported	1 By: 1/	<u>nt au r</u>	otc	Re	eviewe	By: Klun	
tle: Z	5 <i>eo j</i> og	1st .		Tit	itie: 🤇	Seologist	·
gnature	: UNA	auroto		Date: 23/01 Si	ignatur	: Noneillos	Date: 4/3/01

BHI-EE-183 (12/97)

			B	OREł		OG	·····	·	Page <u>3</u> of <u>10</u>
Well ID:	(31	26	Well N	ame:	299-112	2-83	Location:	tof	Y Tant Gara
Project:	RCK	A EVI	N Drill	inc	011 000	2.9.2	Reference Measu	ring Point:	Frank Farme
	Sa	mple			Sample Description				Comments:
Depth <u>(Ft.)</u>	Type Blows Log No. Recovery			Group N Moisture	Name, Grain S e Content, Soi S	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level			
60—	Grab	ΛA	0.00	57.5	-65.5	Graven Sandy Of	Ever Lens in	the	Grab Sample @ 60'
_	DB	141	6.00	San	nd. max	SIZE is	2", average	S/2e	ed & Bas
_			0	is .	"/2". G=	25%	5 = 65% . +A	e unit	,,
-			0.0.0	is 1	t-qy to	wh-gy	overall due	40	
			000	appar	cent Calc	areous (2) ament.		
65-	Grab		0.0.0	G	radation	nal cha	nge to a	It to	Grab Sameleelos
-				med SANE	<u>Yellowisi</u> 5 ⁷² (95%)	<u>h-bn to</u> s, 590 r	It tan F.g.	rnd	20 8 pc
-									
n^{-1}									6.6
10-	Grad			Grad	tes into i	nedium	and coarse	sand,	Grab ample @ 10
-				Ment	hack into	Vf-f&m	sand.		Ld Spa
-			- <u>-</u>					<u> </u>	
-				$\frac{n'}{2}$	125	1	Slight	/y	
				5,17	content	t to 15.	% SILY S.	and (n)	
75-	Grab			VT-	C, IOYR	<u>6/3 pak</u>	brown (dry),	moist	Grab ample 75
-				todr	y, moder	<u>ately sor</u>	ted, A-SR,	10-20%	cd P, Y, ~
-				bas,	<u>90-80%</u>	other (n	estly gtz), st	ong	
-				(XM	rxn to H	Cl			
-							·····		
80-	Grad								Grab Sample Bo
-									< d Bta
-				···	·				End of shift they ed
-				min	or silt	lenses	noted ~ 8	3'	~ •
_				sik c	ontent	to 15%	, slighty si	lty_	
85-	Grab			sand	(m)s, v	f-m 1	OYRU13 par	re brown	Grab Sample Q85
_				(dru)	slightly	moist	to dry mod	erately	4037-4
_				Sort	ed A-S	n R 10-21	1/2 basalt.	80-901	
_				+ 550	other	、 <u> </u>			
	V	<u> </u>		1					
Reported	ву: <i>ЛМ</i>	aurot ,	/ DCUke	fes		Review	ed By: (.t	.Wall	ler.
Title: Gy	edealist					Title:	Geolas	;st	
Signature	: MBA	unte D	Caler &	la D	ate: 2/27/0	, Signatu	re:	tell.	Date: 4/10/01
	00				1 1				

			B	OREHOLE LOG			Date: Data: Date: Data: Data: Date: Data:
Well ID:	53126	•	Well N	ame: 299- W22-83	L	ocation: East of	X Tank Form
Project:	RCRA	E40	i Dri	lling	F	Reference Measuring Point	Ground Surface
	Sa	mple		Sample I	Descri	ption	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distr Moisture Content, Sorting, An Size, Rea	ribution gularity action t	, Soil Classification, Color, , Mineralogy, Max Particle o HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
۹٥ —	Grap	NA		90 miner stit podules.	5;12	content to	Grab sample @95
-	Ψ₽			15% slightly silts	بي ج م	nd (m)s vf-c	40BYor
-	1			10 YR 613 pale bron	<u>wn (</u>	(cy) slightly	
-				moist to dry mod	de cat	ely control ASR	
_				10-20% basalt . 80-	- 90 %	o other (at 2)	
15 <u>—</u>	Grab			strong rxn to H	c۱.		Grab same te Q 95
-				01			50 Bra
_				95 same as abov	re		
-							
_							
i@	Grab			han this series and	4.4.5	511+ to 15%	Grab somethe bio
_			- 1-	shahth silt. sand (m	15.1	F-C VONBLAS	KY & K.C
_				and brown (dr.) Sliel	h+1.	maist to day.	
-				moderates costes Ar	4	LOTION LANG AD-POIL	
_				ats (other) stands	<u> </u>	<u>10-20 (8863 80-30 (8</u>	
105_				ALCOME STRONG FO			Goob Samuel Q 105
_				105 minor eith and h		بديدة والاسترافي والمسرو	CIUD Sample W 105
_				NOT MINDE ALL NOSLA	ند.د. امز	19 1 1 sole burger	201000
_				(do) alightly and only		rnals del control	
				WILD SIGNING MAIST TO	<u>, ary</u> .	moderately sorted	
NO-				- 3R - 10 - 20 /0 Dasa	5, 80	- 20 10 962 (other)	·
	Ĩ	†					C. L. C. C.
-				Dame description	<u>a.</u> 5	105	Orab Sample La LLC
-			5 5 5 5			····	~0 Ard
_							
-	Grad			site			
		1 1		115 minor settion no	shule.	s. si le content to	Greb Sample DU
				15 10 slightly silt	8 50	<u>-1 (m).s vf-c</u>	~d &rac
-				sorrul3 pate br	معنَّم	(dry) slightly	End of shift
_				molst to dry. Mode	ratel	y sorted A-SR	10126101
		L V	·-·-	10-20% bas, 80-90%	<u>, ot</u>	her (qtz).	
Keported	^{By:} e ;m	and ane	100	Weekees Re	viewe	BY: Unitaun	The
Title: C	cologi	157	10.1	Titl	ie: <i>C</i>	TEOlogis	
Signature	"C, mar	tin /	xye	UL Date: 2/27/01 Sig	gnature	* MT fauron	Date: 7/10/0/

			В	OREHOLE LOG		<u></u>	Page 5 of 10 Date: 2, $67/61$
Well ID:	131	26	Well N	ame: 299-447-8	3	Location: Fart of SX	Took From
Project:	RCR	4 FY	Dr	Iling	-	Reference Measuring Point	Grand Surfice
	Sa	mple	1 211	Sampl	e Desc	ription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Di Moisture Content, Sorting, A Size, R	stributio Angular leaction	on, Soil Classification, Color, ity, Mineralogy, Max Particle n to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
120-	Grab	NA		Slightly S	iHy	SAND (m)S	Grib@rzo
-	ЪB		—	Continues 95 descr	ibed	on p.4. mostly	
-				vf-f sand			
125	Grab		-				Grab@125
-							<d a<="" b="" td=""></d>
-							
			o_	very thin clayey sil	tobs	iened@~129'	1 cobble founde ~129'
130-	Grab	†					Grab@130'
	.			•			<d byx<="" td=""></d>
. _	-			•			
, –	-			Micqueous @~ 133	/		
-				134'->137' Sandy	SIC	T(5M):25% vf-f	Harder drilling@ 134'
135-	Grab]		sand, 752 silt, 10	(R6/	4 light yellowish brown	Grabe 135
- 1	-			(dry), moist (pabebly	from	water added to boring	< d BRA
-	Grab	<u>+</u>	277	e~133-134"), well sort	ed,m	expart Imm	Distinct contact@137
-	- -]	10-1	137 -> 141" CALCE	ÊrE	[Sandy SILT](SM);	Greb@137'
-	- '		田田	mostly sand tsilt with	h cale	careous cement, some	<d bra<="" td=""></d>
140-	Grah	1	E G	areas of solid cement, t	r-5%	small gravel, 10YR 8/2	Grab@140'
· -	-		101	very pale brown (dry),	by to	moist, pyrolusite	Endofshift 2/2/01
-	-		$=\dot{Q}_{1}\dot{Q}_{1}$	dentrites present,	9190	rel content increase	1
-	- \		12:00	down hole			
-	-		0.5	141 -> 145 Sandy	sit ((Sm): Some salceres	is cobbles = 3"
145	Grab	-		coment, up to 15	ic gr	avel up to 2 Size	~143
-	-		0 e O	IDYR 73 Pale brow	in a	ry), dry, sand 20%	Grap @ 145
-	- \		0.0.2	vf-Q, silt 45%	5+	rong ran to Her.	40 Broc
-	- }		200	cobbles to 3"	S 8	SR	
	- V	LV_	001-10	0145 Same as a	bove	- no cement	End of shift
Reporte	ad By: D	Curek	5		Review	wed By: JMFauro	te
Title: ૯	redogi	st, ,			Title:	Geologist	
Signatu	ire: M	Upe kes	٤	Date:	Signat	ture: MJaurot	5 Date: 7/10/01
							-

			B	OREHOLE LOG			
Nell ID:	C 317	مالا	Well N	ame: 299-122-9	2	Location: Same of	SX Tonk Book
Project:	RCON	AEV		0:11:00	<u> </u>	Reference Measuring Point	Can la farm
	Sar	mple		Samp	e Desc	ription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Di Moisture Content, Sorting, / Size, F	stributio Angulari Reaction	n, Soil Classification, Color, ty, Mineralogy, Max Particle to HCI	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
so	C neb	NA	0.0	150' > 155 Sandy	velly slit	Sm). up to 15% grovel	Grab sample @ 150'
	26		$D \sim 0$	WR TIZ IS gray pake br		dry) dry, sand 20%	20 B, r, x
-	₩ ⊤		0,70 10 0,00 0,00	vf-c, silt 65%, Strong rxn to HC1.	<u>58-</u>	SR grains lamuel	
_ کې	Grata_			155 -> 100 'sandy	gravel	4 silt. up TV 156	Ercub sample @155
-				gravel dk gribrow	<u>n (</u> w	t), sand 20% f-c.,	slurry only theo added
_			0[0] 10 10	= 30 10, NO man	to	dell. gravel & 10mm	-0 13 8, d
_			0.70-	Gra della		v	
ao	Grab		000	160 Sandy silt	(sm)	, LISTO gravel,	Grab Sample @ 150
_				dK grlbr (wet) s	and .	Rosalt Solu	Sturry only 420
-				QT2 (other) 50 10.	non	en to Hel.	
- -			10-1-0 1-0 1-0	gravel A-SR 2	10		
~	stab	•	0.0	as above Gravel	i <u>m) S</u> Size	<u>ame description</u> is increasing	Shurry the Daddal
-			1014 1-1-1	silt is decreasing		4	
-			0-0 10		•		
_ 	6795	.		170-> 175 Sand	(5)	410 logravel.	Grab sample @ 170'
-				dark gray. (wet)	sand	vf-c, A-SR	Simmy the Dadded
_				grains 60-70%	baso	IZ, gtz (other)	-
-							
ษ_	Grab_			125-3 185 511t	sand	Drownist buis darknaray	Grab sample Q V26
_			1	(wet) silt 30%	Sanc	at + (other) un-20 Th	Sturry H20 adda
-							
-		Y		I.	Dautaur	ADa DArital -	
tle	by Ch	artene	Mart	inez !	Title:	a by: Milleckes	
	<u>eolog</u>	115E		Date	Signation	Decilogist	1 Data: 11/2/2

BOREHOLE LOG		Page <u>7</u> of <u>10</u>
		Data
Well ID: o 7 . o.	Lanotion: -	Dale: 03 (02/0)
	Location: East of SX	Tank Farm
TOJUCE RCRAFYOL Drilling	Reference Measuring Point:	Ground Surtace
Sample Sample De	scription	Comments:
Depth (Ft.) Type No. Blows Recovery Graphic Log Group Name, Grain Size Distribut Moisture Content, Sorting, Angu Size, React	ution, Soil Classification, Color, larity, Mineralogy, Max Particle ion to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
180 NA 180-185 silty sand (m)	s) dark brigr (wet)	grab sample @ 180
-	olo, uf-c, A-SR	Ho added (slurg)
grains 00-70% basa	12, 30-40% other	- v
- 185-195 sandy grave	lly site (sam) dk brige	grab sample QUSS
185 - 15-2010 (wet) gravel 15-2010	, sand vf-c, A-SR_	How added (slarry)
	50 to other Possibly	LABER
- Ctrip cemented.		
- 190-191 Sandy gravelly	silt (som). Same	grab sample @ 190
190 generation as above		H20 added (slurry)
		· · ·
- Harder drilling. Drille	er feels gravel may	be. comented.
	· · · · ·	
- 195-275 silty sandy	gravel (msg) dark	grab sample@195
195 erab Q. O. o. brige (wet) gravel 3	5-45 % passibly	H20 added (sturry)
- 1 00.00 cemented send vf-c_F	- SR grainslaravel	
- 0,00 silt, besalt 50%, 4	elsics 50 10	·····
- Poor sitty sandy g	ravel (msg) same	grab sample @ 200'
a description as about	e	Ho added (sturry)
- #T		
-	·	
-		
205 - 205 silty sandy one	wellmsg)dk brigt	grab sample @ 205
- (wet) gravel 35-45 %	possibly cemented	Hoo added (slurry)
- 0.00 sand vf-c. A-SR grain	slaravel. Some sile	LOBRA
- Dosalt 50 % felsics	50°h.	End of shift
V V 0:25:5		03102101
Reported By: Charlene, Martinez Revie	ewed By: DCMeekes	
Title: Geologist Title:	Geologiet,	
Signature: Charles the Times Date: Olaslas Signa	ature: "NC Tikefull	Date: 4/3/01

			B	DREHOLE LOG		Page <u>a</u> of <u>10</u> Date: 03105101				
Well ID:	63121-		Well N	ame: 299 - w 22- 83	Location: Each of Sy	Tonk Form				
Project:	RCOA	EVai	Doilli		Reference Measuring Point:	Fortund Suctor				
	Sa	mple		Sample Des	Sample Description					
Depth <u>(Ft.)</u>	pth <u>t.)</u> Type Blows No. Recovery		Graphic Log	Group Name, Grain Size Distribu Moisture Content, Sorting, Angula Size, Reacti	tion, Soil Classification, Color, arity, Mineralogy, Max Particle on to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level				
210-	NA ;		0-0-07	210 silty sandy grave	1 (msq) ak brigr (wet)	grab sample@ 210				
-			0.000	gravel 35-45 to , possibl	ly comented, sond if-c	Hao added (slurry)				
-			00.0	A-SR grains/gravel so	me sitt, bas 50-60%	LABRA				
_			0.0	felstes 40-50 b						
_			0.0.0							
אב —	ere b		0.00	25 same description as	above	grab sample.@215				
-	-BT		0.0.0			H= O added (slurry)				
-			0.000			LOBRE				
_			0.00							
_			0.0.0	220" silty sendy aray	el (mso) dk br/on (wec)	anab sample @ 220				
200			0.0.0	acres 35-45% sand us	-c. A-SR analosl	LABRA				
	#7	1	0.000	Normal same silt base	15 50 % falses 50 %					
			0.0	Uravel. Some Still 10050						
			200							
_			0.0	225 same description	as above.	grab sample @225				
an	arab		0.0			63 B 8 06				
_	¥T		0.00							
_			0.0.0			Guy to prod @ 207.9				
			1.0.0			(03196/01)				
			0.0 -			1001001012				
			0.00	230' same description	as above.	anab sample @ 230				
- I	\$17		0.0.0							
_		<u> </u>	0-0-0	122-124 51 the court on	small (solit comp) colling	50117 50000 332-324				
_	Split	90-20		d d d	(the count of a sitt	Source of recovery				
	spoon	rend	0.0	AL Brige (Wee) give ei 33-4	S VIAQUO VICC, DILG					
-	1	NA	0.0.0	A-SR, peorly sorted		End britt (3-5-01/				
235	Gran	1 1	0.0.9							
-	-1 "		0.00	235 siley sandy gravel	(msq) dk brigr (wet)	grab sample @ 235				
-	•		0.	gravel 35-45 6, sand uf	-c. A-SR grainslyravel	Ho added (sturry)				
-	·],	/	0.0	Some silt basalt 50	-40%, felsics 40-50%	40 Bra				
	<u> </u>	<u> </u>	0.00		2011					
Reporte	d By: On	arlene T	Martin	Revie	ewed By: Delletes					
Title: G	cologist	.		Title:	Geologist					
Signatu	re: cha	some m	artine		ature: <u>XC Miches</u>	2 Date: 4/3/01				

			B	ORE	EHOLE LOO	3			Page <u>9</u> of <u>10</u> Date: 3/(/ 0)
Well ID:	C 313	26	Well N	lame:	299-1022-8	<u> </u>	Location: EDAT of	52	Tenk Form
Project:	RCRA	EYO	I Deil	1100	<u> </u>		Reference Measuring P	oint:	Ground Surface
	Sa	mple		1	Sam	Comments:			
Depth <u>(Ft.)</u>	n Type Blows Log No. Recovery				p Name, Grain Size ture Content, Sorting Size	Distributio , Angular , Reactior	on, Soil Classification, Co ity, Mineralogy, Max Part n to HCl	lo r, icle	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
240	Grab	NA	10.00 10.00 10.00 10.00	240	silty	1 (32)	dank brigt (wet)		Grab @ 240 slurry
-		1	0.0.0	gras	vel 35-45 6, 50	nd vf-	c, A-SR grains		H2O added
-				สู่รอง	rel, some silt	, basal	12 50-60%, felsie 40	-50	
-	6.00		0.000	745	·				
-	HT		0.00	A 7.0	Jume des				Ho added
-	V Salit	V		<u>יישר</u> י	- split spoon !	navel Li nas sm	~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~	-	501it 50000 247-249
-	Spaan		0.9.9	dK !	brlgr (wet) qu	avel a	ss-usio, sand v	f-c,	
-		NA		A-5	<u>R grainslara</u>	vel so	me silt baselts	0-	
290-	HT		000000	601	0, TRISIC 40-5		CONTLY SENTER		grabe 250 slurry
			0.0.0.0	250	silty some carel	21.34	helan (wet) acous) 3	-	DT D BOREA
-			00000	San	vf-s. A-SR Gra	nsl6ra	vel some silt base	رات	
_			20000	50.	60% , felsic 4	0-50%	•		
2 5 5 —	Grab HT			255	Same desc	<u>ripti</u>	on as above		grab@255' slurry
			0.000						
-			0.000						
260-	6 rep		0.0.0	260	silty sandy	gravel	(mag) dk brige (w	3	Grab@ 260 Sturry
				gra	vel 35-45%	sand	vt-c. noticable	<u> </u>	` .
-	Split	V .		لنك	t nodules, grai	ns A-	SR. Besalt 50%,	_	End of shift
-	spoon	ļ	50°0'	for	sics 50%.				10100101
-		NA	2000	262	2 Jud split	<u>spoon</u>	silty sandy gravel	(msg	Split spoon 262- Shi
کمد	HT		0.75	دەل	<u>bles(sm) 42". c</u>	K brlg	r (wet) gravel 35-	. 92 . F	poorly sorted
			0.00	a rai	inal gravel A-S	R. Bes	s. 50%, felsics Si		
-			0.00	QTAU	HI 35-45 %	Litt.s	and uf-c, grainsl		I an a and a starty
	. V_	LV_	800	laray	el A-SR, Bas	a\t 50	b, felsice 50 h	<u> </u>	
Reporte	d By:	arlene. 1	narti			Review	ved By: DCULEEK	es	-
Title: G	010	gist	·			Title:	Geologist		
Signatur	18: Char	ene m	enting		Date: 3/6/01	Signatu	re: <u>ACAleeks</u>	Ø.	Date: 4/3/01

BOREHOLE LOG										
	• -		Wall	lamo:			Location	Date: 03107101		
Project:	<u>C 312</u>	b	I vven N	ane:	299- 622-83	5	Location: East of Si	K Tank Farm		
I Toject	RCRA	male PY0	I Driv	ling	Ing Reference Measuring Point:			Ground surface		
1							ription	Comments:		
Depth (<u>Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Moistu	Name, Grain Size ire Content, Sorting Size,	Distributio , Angular Reactior	on, Soil Classification, Color, ity, Mineralogy, Max Particle n to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level		
072	6766. HT	NA	0.0.0	סרב '	silty sandy a	gravel	(msq) dK or lar (wet)	grab@270 slumy		
			0.0.	grave	135-450,5	ile, s	and vf-c, grains/			
-			; o ; ; ;	dear	el A-SR, ba	salt 5	in telsics Solo,			
-				Q on r l	ly sorted.					
-			0.00							
275	6 rale	Υ.	<u></u>	275	Same as a	bove	description	grab@ 275 slurry		
<u> </u>					TD					
_				213	D	<u> </u>				
_										
280										
۱ 										
_										
					········					
							·····			
				-						
				 		- <u></u>				
				<u> </u>						
								1		
								-		
				 				· · · · · · · · · · · · · · · · · · ·		
						<u>.</u>	· · · · · · · · · · · · · · · · · · ·			
				<u> </u>		<u></u>	·····			
Reported	BV: n h-		1000	L		Review	ed By: Milbol-	.l		
Title: (uriene	1120	inez	·	Title	Generat	•		
Signature	9: 0 0	anse m	т. ¹	_	Date: mission	Signatu	re: MDIlashan	Date: 4/2/01		
	- Char	the e In	anne			1 Signald	NCOMERCE			

			<u> </u>	Start Date: 7- 27. 0							
WELL CONS	STRUCTIO	N SU	MMAI	RY REPORT	Finish Date: \$/2	1100					
					Page /	of					
Specification No.:	Rev. No.:			Well Name: 299-14/77-70	Temp Well No	<u> </u>					
ECNs:				Approximate Location: 14/ Fema 241-6 Ter 15							
Project: CV2000	PCPA D	0		Other Companies: Base (1) EUT and							
Drilling Company: Post allow	<u>ACKA PFI</u>	<u>ung</u>	1. 1	Contention (Dented BHL, CHI							
Driller: Kelly Col	uden, Mow	RASPIR	Ti 0491_	Geologistis). L. D. WE/Ker, J.KMURRAY							
TEMPORARY CAS	ING AND DRILL DE	PTH .	-	DRILLING METH	OD/HOLE DIAMETE	R					
*Size/Grade/Lbs. Per Ft.	Interval	Shoe C).D./i.D.	Auger:	Diameter From	to					
FJ 8 1/8 CS	0-260	878	7 78"	Cable Tool:	Diameter From	to					
				Air Rotary: 8 5/8"	Diameter From	0' to	260'				
				A.R. w/Sonic:	Diameter From	to					
					Diameter From	to					
				Diameter From							
*Indicate Welded (W) - Flush Joi	nt (FJ) Coupled (C)	& Thread	Design		Diameter From	to					
					4						
				Drilling Fluid:							
Total Drilled Depth: 260'	Hole Dia @ TD:	¥5/0"		Total Amt. Of Water Added During	Drilling						
Well Straightness Test Results:	A)AICU-	0 10		Static Water Level: 211 H E Date: 211 align							
	<u>1841611</u>	GEC	PHYSIC	AL LOGGING							
Sondes (type)	Interval		21 111 0107	Sandas (type)	Internal						
Sondes (type)	intervar			Sondes (type)	Interval	Dat	Le				
<u> </u>					·						
				·	•						
	r	C	OMPLET	ED WELL	r						
Size/Wt./Material	Depth	Thread	Slot Size	Туре	Interval Annual Seal/Filter Pack	Volume	Mesh Size				
55.304L CASING 4"10	+2 - 215.5		NA	Colorado Silica SAND	205'-260.5'	96 bags	10-20				
SS304L SCREEN	215.5 - 250.5		0.020	BENTONITE PELLETS	200.1' - 205'	3 buck	3/8"				
SS316L SUMP	250.5 - 252.5		NA	BENTONITE CRUMBLES	10' - 200.1'	900m					
				FORSTAND CEMENT GROUT	0/0'	10 hors	NA				
				RPREMIUMGEL	0 - 10'	1/5 bag	NA				
		C	THER AC	CTIVITIES							
Aquifer Test: WELL DEVE	LOPMENT	Date: 8/	21/00	Well Abandoned:	Yes: No:	Date:					
Description: MONITOR PRA	WPAWN AND	record	2V	Description:		.					
	· · · · · · · · · · · · · · · · · · ·	. W	ELL SUR								
Date:	· · · · ·			Protective Casing Elevation:							
Washington State Plane Coordinat	es:			Brass Cap Elevation							
			MMENTS	REMARKS							
Val C las in the state	1			LI - FIOILAS - I			· · · ·				
VUL LAICS: 10-20 Silica Sa	M-0.5444	- <u>d-d/oc</u>	<u>ag × 9</u>	0 bay - 01.37+1; Kentoni	ite pellets - 0.62	+1/bck	etx				
SDUCKETS = 1.86+1"; Gran	vier <u>pentonite</u>	- 0.734	<u> 17 beg ×</u>	70 bag = 65. 10 ++-	1	-					
Reported By: JILL MURPA	н	<u> </u>		Reviewed By: Luten	S AUTEN						
Title: GROLOGIST		Date: 9	12/00	Title: Ss. Dreven	22.	Date: %	21/00				
Signature July 7	Thereas			Signature: Auten	2						
	(($\overline{\mathcal{O}}$							

NA/E1		JEET			Page 1 of 2
WEL	L SUNIVIARY SP			0 1/22 20	Date: 0 (15/00
	KE - langet	Project	<u>. 29</u>	<u>y- W23-20</u>	Derthaue
Proposed By: () + 1/4 West and	n K rann / 200 W	Pavioued	<u>רץ גו</u> איי אא	Ubalica	Date: elactor
Signature: 10 AL CHI AL	Dale. 8/15/00	Signatura	an <u>ucc</u>	Weekes	Date: 8/25/00
Signature: AD Halle CALL	Munaz	Signature.	ac a		
CONSTRUCTION DATA		Depth in	Crashia		USIC DATA
Description	Diagram	Feet	Log	Lithologic	Description
0'-10' POETLAND CEMENT TYPE I+ I GWANT STAINLESS STEEL CASING 304L +2' -> 215.5' 4" 1D, 4.5" OD 10'- 200.1' BENTONITE CRUMBLES PERMANENT OUTER CASING EMPLACED WITH A 3' STICKUP TEMP. CASING 85/8" OD, 75/8" ID		0		0'→ 6': Silly 6'→ 19': Sand 19'→ 34': Gray 34'→ 36': Sa 36'→ 55': S 55'→ 83': S 83'→ 87': G 83'→ 87': G 87'→ 94': Si 102'→ 117': 117'→ 139': S	Sandy GRAVEL ly GRAVEL relly SAND ndy GRAVEL SAND SAND Fravelly SAND AND SAND Fravelly SAND SAND Fravelly SAND SAND
All depths below ground surface				129 / 149 · A	Vo Returns
THE LADING TEMOVEL				1151 4110 . 11	

wi	LL SUMMARY S	HEET			Page <u><</u> of <u><</u> Date: 8/15/00
Well ID: C 3/12		Well Name	e: 2	99 - W23 -	20
Location: W. Fence of 241-5	Tank Farm / 200 W	Project:	CY 2	000 RCR	A Drilling
Prepared By: L.D. Wolker JKMU	MAY Date: 8/15/00	Reviewed	By: DC	Ukekes	Date: 8/25/00
Signature: TO Cuelles	lfx Munay	Signature:	NOU	kekes	1 1
CONSTRUCTION		Depth in	- (GEOLOGIC/HYDRO	
Description	Diagram	Feet	Graphic Log	Litholog	ic Description
		150 -		148'→153':	Silly SAND
		-	280	<u> 153'→ 157':</u>	Silly Sandy
				(w/caliche)	GRÁVEL '
		- 1		157 -> 169':	No Returns
		-	පැත	,	
		175 —	200	169'-> 184':	Silly Sandy
		-	8 <u>9</u> 90	G	RAVEL
		–			
~~		-		184'-> 220'	: Sandy GRAVE
195= 200.1-205		-			
BENTONITE FELLETS		200-	998		<u> </u>
		-	808		·····
		-	<u> </u>		
		- v -		214.29 DTW	8/15/00
SCREEN 215.5'-250.5'		-			
304L 55 0.020 in slot		225—			
Cont. Wire wrap, 4" 1D, 4.5"0,		-	303	220 -> 260.	5: Sandy GRAVE
		_			•
SANDPACK: 205'-260.5			O°	<u>.</u>	
SILICA, 10-20 Mesti		-	250	· ···	
		250-			
250.5-252.5 SUMP		-	\overline{OOO}		
316L SS 4" 1D, 4.5" OD		_	088	TD = 260	.5′
·		_			
		_	[
		275-			
			Γ		
		_	ſ		
All depths below ground sur		_			
All build and	ן ו ו ו ו ו ו ו ו ו ו ו ו ו ו ו ו ו ו ו	_	-		

			B	OREHOLE LOG		Page <u>1</u> of <u>9</u> Date: 7-27-00
Well ID:	٢ ٦	3112	Well N	lame: 299- W/23-20	Location: West side	241-SX Tank Farm
Project:	CY:	2000	RCRA	Drilling	Reference Measuring Point:	Ground Surface
	Sa	mple		Sample Desc	ription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	on, Soil Classification, Color, ity, Mineralogy, Max Particle 1 to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level	
0 —	Air _		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		/···	Air Rotary, 85/8"
-	Rotary		Ō0°	o'→6': Silty Sa	andy GRAVEL (msG)	OD. CS casing
-				40% Gravel, 45-5	714" tricone bit	
-				Silt. Gravel med .	ese peb, Sand	
-	<u> </u>	-	D 0	predom. med-cse; 7.5	YR 5/2 (brn), dry,	
5 —	Archive	Waste Charact	0.0	pourly sorted; prob	able backfill.	5 : grab sample
-		rad: BOY	0.00			for archive
-		chem:	\sim	6 -> 19' : Sandy 6	GRAVEL (SG)	(one pint)
-		BOYVXI		60% Gravel, 35	90 Sand 5% silt	and waste charact.
-			$\mathcal{O}_{\mathcal{O}}$	(chilling indicates tr.	Cobble) 25% v.cse-	10' 1-pint grab
10-	Grab- Archive	-	\mathcal{S}	cse peb, 50% med	peb, 25% fn-v. Fn.	Sample ton archive
-			$\mathcal{O}\mathcal{O}$	Sand 40% V. cse, 30%	Po cse, 30% med-v. Hi,	*
			\overline{Q}	10YR 5/2 (grayish brn)	, dry, puorly sorted	600-100 dpm
-			\bigcirc	Gravel is SR-SA,	Soud SA-A.	a jo arrect readings
-	Grab.	42540		Sand predum basul	+, grave / mixed	15 archive grad
15 —	arch/y	Changt.	\dot{O}	- probable w backril	11. Mod rxn to HCI.	and waste
-		VNZ	° O	gravel co	mtent decreasing-	Characterization
-		chem: Boxivxi	\dot{o}	· · · · · · · · · · · · · · · · · · ·		mali BOY VALL and
		2010/1	\bigcirc	10-341: (IL SAND(05)	BOYVAID
_	Grah -		ی ہ ? 0 د	French la 159	85-90% Saud	201's and someth
20 -	Archin			tr silt Gravel +	55 1018 Jenes,	Fat archive
			0	45% fr pal 50% v	For net . Sand 30%	
			0	K. CSP 40% CSP 30	290 med - fr.: 10YR5/1	
_			o	(arox) day, mod sast	d: SA, 60-70%	
25	Grab-			baselt. 30-40% atz.	felds, offer; max	25': grab sample
	<u></u>		0	$Size \approx 10 \text{ mm}$; no r	xn HC1.	for archive
_				25-26': predom u	ned- cse sand, the	4
_				back to gravelly	Sand.	
Reported	By:	L.D. h	<u>)a l Ke</u>	r Reviewe	d By: DCWeckes	·
Title:	Geo	logis	<u>+</u>	Title: C	Scologist	
Signature	: AC	Was	Re	Date: 7-27-00 Signatur	e: NC Weeker	Date: 6/25/00

			B	OREHOLE LOG			Page <u>2</u> of <u>9</u> Date: 7-27-00
	12		Well N	Jame: 790 4/22-		Location: W/act ch-	2111-SY TOLK Form
Vveil ID.	(2)	2000	PCE	$\frac{1}{2} \frac{1}{2} \frac{1}$	20	Reference Measuring Point:	Ground Surface
Filipect.		<u>2000</u> mple		<u>A Drilling</u> Sample	e Desc	ription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Dis Moisture Content, Sorting, A Size, Re	stributic ingulari eaction	n, Soil Classification, Color, ty, Mineralogy, Max Particle to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
30-	Grab-	-	···· ;;	Gravelly	SA,	ND (g.S) as	Air Rotary , 8 5/8"
-	Archive			described a	tove	L	OD CS casing
_							7 1/4" tricone
_				34'-> 36': 5	Sana	ly GRAVEL (SG	
-			Ö.	50% Gravel,	50	90 Sand, tr silt.	301: Grab samples
35 -	Grab- Archiv	1	$\dot{\circ}$	Gravel 30% cse-	-med	peb, 50% Fn peb,	35': For archive
- 1	<u></u>	Ī	° S O	20% y. fn peb	،کړ	and 25% v. cse,	
_		-	6	3090 cse, 40%	MC	l, 5% Fn; 108R5/1	
_			0	(gray), clry, po	vorly	sorted; gravel	
			0	SR, sand SA	; 6	0% baselt, 40%	40': Grab sample
40-	Grab- Archive			gtz + other,	max	size ~ 3-4 cm,	for archive
_				no txh HCI.		······	
-				36'→ 55'	: 5	AND (S)	
-				+r - 5 % - Gra	vel.	95-100% Sand,	
		1		tr silt. Sand	£ "2	290 V. (se- cse, 40%	45 Grah sample
45-	Grab- Archiv	2		med., 20% Fn-y.+	Fn.	10YR 4/1 (dk. gry)	archive
-				dry; mod. sortes	l; 6	0-70% basalt,	drill rate-
-				<u>30-4090 qtz, fe</u>	elds	other- tr mico	514 minutes
-				no rxn Hcl			
-							50 grab sample
50 -	Gtal- Archive						for archive
- 1			0	<u>51'→52':~</u>	5%	grave/	
-							
-							
-				Sand become	ing	Finer	
55-	Grab-	e l					55 grab Sample
-				55'-> 83':	<u>SA/</u>	VD (S)	tor archive.
-				100% Sand,	<u> </u>	r sitt. Sand	
				20% cse, 50%	o me	d, 30% Fn-Y.Fn.	
		L		104R6/3(pale	brow	m), 40 To basult, 60%	912/other
Reported	d By:	L.D. U	Ja /Ke	<u> </u>	eviewe	BOBY: UCWEERE	
Title:	Geo	logist			nue: (20109151	Data: QhClon
Signatur	e: AC	2 Ul	the	Date: 7-27-00 S	ignatu	e: NC Afferred	Date. 0/23/00

			B	OREHOLE LOG				Page <u>3</u> of	9
Well ID:	- c	3112	Well N	lame: 299 - W/23 - 20	<u>, </u>	ocation: W	side 24	I- SX Tonk	Farm
Project:	C.Y	2000	RC	RA Dailling	/	Reference Me	easuring Point	Ground	Surface
<u> </u>	Sa	mple		Sample	e Descri	ption		Comme	ents:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Dist Moisture Content, Sorting, Ar Size, Re	tribution ngularity eaction t	, Soil Classifi , Mineralogy o HCl	ication, Color, , Max Particle	Depth of Casi Method, Metho Sampling Too Size, Wate	ng, Drilling d of Driving I, Sampler er Level
60-	Grab-							Ait Rotary	, 8 5/8 "
-				SAND(S)	B	coming	Finer.	OD CS'	casing
_				95-100% Sauc	d. †	r- 5%	silt.	7 1/4" to	icone
_				20% cse 30%	o med	40%	Fu, 1070		
-				V. Fh; IOYR6	/3 (pale bru), s/ moist,	60': Grab	sample.
65-	Grad			mod - well so	rted	<u>; SA-SF</u>	R, 60-708	for at	chive.
-				9tz, 30-40%	basal	It othe	r; weak	65': grab	sample
-				to mod rxn H	4C1			fur a	irchive
_									
_									
70	Grab- Ambive							70': graf 5	ample
_								For arcl	hive
·									
_									
_							· · · · · ·	75': grab s	ample
75-	Grab- Auchive							for ar	chive
_								77': drille	r reports
_								harder de	rilling
_									
-			-	80'+81': Silt	cont	ent 5-10	0%		
80-	Grab-					•		80': grab	sample
-	ALAN							for are	hive
_							_		
_				83'-> 87': G	Frave	lly SA	ND (95)		
_			0	15% Gravel, 8	35%	Sand.	tr silt.		_
85-	Greb-		-0.0	Gravel med-fn	peb.	SR ; Sou	d similar	85': grab	Sample
	ATCAILE			to above, tr m	ica .	Max Siz	e ~2cm.	for arc	hève
_									
_									
-			ö						
Reported	By:	L.D.	Walk	er Re	eviewed	ву: Д	1 Week	25	
Title:	Ge	ologic	4	Titl	ile: 6	beolagi	st,		
Signature	i A	to in	ally	Date: 7-27-00 Sig	gnature:	ACA	Jeckes	Date: 💈	3/25/00
			{			~ .			

			B	ORE	EHO	LE LC	G		Page <u>4</u> of <u>9</u> Date: 7-17-00
Well ID.		2112	Well N	lame:	799-	10/23-	- 20	Location: W side 24	1-SK Tonk Form 200
Project	<u> </u>	2000	RC	PA	-11 Del	· Ilina		Reference Measuring Point	" Ground Surface
	Sa	mple				Sa	mple Desc	ription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Grou Moist	p Name, ture Con	, Grain Siz tent, Sortii Siz	e Distributio ng, Angular e, Reactior	on, Soil Classification, Color, ity, Mineralogy, Max Particle n to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
40 —	Grab-		0.0	8	7′→	94'	: SAN	D (S), 52 Gravel,	Air Rotary, 8 5/8"
–					95%	Sand,	tr s	ilt. Gravel 10%	OD CS casing
-			0.0		Fn pe	<u>k, 90%</u>	Y. FA	peb. Sand 50% v.cse	
-				to	cse,	30% w	el, 20	20 Fu-y.Fn	90': grab sample
-		-	5 . C		<u>94'</u> ->	102'	Grave	lly sand (3)	for archive
95 —	Archive		000		/5	<u>lo grav</u>	<u>re1,8</u>	070 Sand, 590 Silt	
			0.0	97	7': c	ravel	conte	nt increasing	95' grab sample
			O		259	o Gras	<u>(e , 7.</u>	5% Sand, frsilt	Fur archive
-			0						
100-	Grab: Archive		0.0						100 grab sample
-			0						for archive
-				10	<u>2′→</u>	<u>//7 '</u>	: SAN	(D (S); tr-5%	
-					Grav	<u>el, 95</u>	5-100%	Sand, tr silt.	
-	Gomb:		9.0	Gr	avel	is med)- Fn pe	6; Sand 20% v.cse	105 : grab sample
105 —	_Auchin	0		<u></u>	e, 509	to med,	<u>30 % fr</u>	-v.th. 104R5/2	for archive.
-				(gryisi	<u>h brh)</u>	<u>il mois</u>	t; mod sorted;	
-			, a' , ,	<u></u>	<u>nd `</u>	<u>A-SR</u>	; 75%	2 9tz, telds, 25%	
-			o	Da	isa/t	/other	, we	<u>ak rxh Hcl.</u>	110' anch sample
-	Grab		о 			<u>.</u>	<u> </u>		for archive
110	Archiv	۴		a	tavel	deche	- cin a :	Sand Size dechess	• <u>• • • • • • • • • • • • • • • • • • </u>
							<u> </u>		
_									
_									115' grab sample
JU5-	Grab: Archive								for archive
-									
_									
-			J						
			· · · · · · ·					2011	
Reported	By: 2	D. W	alker				Reviewe	d'By: IX Wecker	5
Title:	Geol	ogist	<u></u>				Title:	Deologist Maria	Data: BhCha
Signature	: Th	Wall	kn		Date:	7-27-0	0 Signatur	e: /NC Aperica	Dale. 0/200

1			D	000			· · · · · · · · · · · · · · · · · · ·	Page <u>5</u> of <u>9</u>
			В	JRE		3	·····	Date: 7 - 27-00
Well ID:	C 31	12	Well N	lame:	299-W23-	20 _	Location: W. siche 241-	-SX Tauk Farm /200W
Project:	CY	2000	RCI	<u>A</u>	Drilling		Reference Measuring Point	Ground Surface
	Sa	mple			Sam	ple Desc	ription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Moist	o Name, Grain Size ure Content, Sorting Size,	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level		
120 -	Ъ Б		-		7'→139': 5	Slightly_	Silly SAND ((m)S)	Air rotary, 85/8" OD
_	Grage- Archive				80-90% Sai	nd, 10	0-20% silt.	CS Casing
_				ک	and tr cse,	20%	med, 40% Fn, 40%	120': grab sample
-					1. Fn. IOYR	6/3 (pale brown), sl moist	for archive
_				ω	ell to mod so	rted;	SA-SR, 80% 9+2-	
— 5 يا	Grab Archive			ot	Feld, 20% 60	salt/	other; trmica	125' grab sample
_				m	od-strong ry	Kn HC	1	For archive
_			-					Drill rate: 20'/20min
_								
_				130	': YETY Stron	4 rXV	to HCI - possible	130' grab sample
130-	Grab- Archive				caliche pou	vdc red	by air rotary	for archive
- 20	71108112		<u> </u>		I			
_			- -					end shift 7/27/00
_			·				-	Resume : 7/28/00
_			~~					135' arab sample
125	Grab		ст. ў. т.					For archive
(35	- SPENICE				man meturn			
				F	vor return	<u></u>		
-							Dulle Around	
-				Δ	o returns	<u>- a</u>	Filling does not	the fact has called
140 —					Indicate "	z cha	nge ih sediment	No samples colecter
-					139 198			This 140 and
-						,	<u> </u>	/45
-								
-							<u></u>	
145					·····			
-								
-								
-			<u>ا</u> جند بن	12	<u> 18 → 153'</u>	: <u>Sil</u>	ty SAND(mS)	
-			: ۲ ب		see nex	t pag	ne Dark-1	L
Reported	By:	L.D. W	a/ker_			Keviewed	аву: <u>UCURERES</u>	
Title:	Geola	gist		••••••		Title:	eologist	
Signature	AV	Walk	2		Date: 7-28-00	Signature	:/ x C affected	Date: 0/25/00

			B	ORE	HOI	ELO	G		Page <u>6</u> of <u>9</u>
	<u> </u>			lamer	260			Looptions later 1	Date: 7-28-00
Project:		112			<u>- 299 -</u>	- W23	- 20	Reference Measuring Deir	41-SX Tauk Farm
			<u></u> KC	<u>RA</u>	Pril	ling	ania Dece		". Ground Surta
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Moistu	Name, G ire Conte	irain Size nt, Sorting Size	Distributio g, Angulari e, Reaction	n, Soil Classification, Colo ty, Mineralogy, Max Particle to HCl	Depth of Casing, Drilling Method, Method of Drivir Sampling Tool, Sample Size, Water Level
150-	Grab-			14	8'>	153 :	Silt	, SAND (mS)	Air Rotary; 85/8
_			÷		709	o San	d, 30	20 Silt. Sand is	OD (S casing
-				2	0% Fr	<u>, 801</u>	6 v. Fn	10YR6/3	7 1/4" tricone bi
_			$\overline{\bigcirc}$	<u>(pa</u>	le bru	<u>); we</u>	t From	water added	
-				to	<u>clea</u>	r bi	f y lin	es; well sorted,	150': grab sampl
155-	Archiv	e		SA	<u>- SR</u> ;	prec	lom qt	z/Felds,trmica	For archive
-				str	mg l	401	txh - c	alcarcous.	
-			PerO.				,		155 : Grab samp
-			\ F	15	$3 \rightarrow$	<u>157</u>	: Si	ty Sandy GRAVE	4 for archive
-				(<u>m s G</u>). (609° G	ravel, 30% sand,	
160-				20	<u>%</u> 5	:1 <u>t.</u>	Sravel	30% csepeb,7	
-)		<u></u>		160': no returns
-				-/ U	57'- >	169' :) no	reduce teturns	· · · · · · · · · · · · · · · · · · ·
-				(Су	clone	_ <u>p/чд</u> де	d with fines	
-		ĺ		<u>5</u>	0% w	ied per	6, 20%	Fu- v. Fn; Sand	165': no returns
165-				Pr	<u>e clum</u>	Fn -	v. fn;	10YR6/3 (pl pm)	
-			\	ho	ist,	poorl	<u>y sorti</u>	ed; gravel SA-	Drill rate ~
-			\	5 R	<u>⇒ w</u>	ith co	aliche	coatings ; Grave	/ 1 ft./1min.
-			\ -	60	20 base	<u>a/t, 40</u>	<u>5% gra</u>	with other , max	
-		20 7	8	52	ze ~	4 cm	; HCI	txh strong	
-070	Archive						<u> </u>	<u> </u>	170 : grab sample
-				169	\rightarrow	<u>84</u> :	Silty	Sandy GRAVEL	for archive
-		- V			<u>(m5(</u>	<u>z) 6(</u> 20	<u>) - 70%</u>	<u>Gravel, 15-20%</u>	LEL, OVM & detect
-		1 Mer	<u>3 20</u> -	<u></u>	and,	10-+4	<u>5% Si</u>	It. Similar	$\alpha, \beta, \delta < detect.$
-	Stab-			to	gra	vels	above	with out the	
די דידי	Archive	 		<u></u>	aliche	Coq	tings.	Still mod-strong	175 grab Somple
-		P		H	CI rx	<u>n iu</u>	<u>si(t.</u>		top archive
-		•. V4			176	dril	ler no	tes large cobble	
-		ŭ.				or s	mall	poulder	
			20					By Dalilanta	<u> </u>
Title [.]	<u>, L</u>	$\frac{1}{1}$ $\frac{1}{1}$	iner				Title:	Seclarist	·
Signature:	<u> </u>	10915t	- 11		ate 7/	10/2-	Signature	NO TALANKAS	Date: QACIA
signature.	AC	v nal	2		//	28/001	oignature.	1 aperico	0010.0/25/00

1			B	OREHOLE LOG	······	Page <u>7</u> of <u>9</u>
	(7)		Well N		Location: L L as A	Date: -7-38-00
Project:	 	2000	- PC P	A D-:11:	Reference Measuring Point:	- SX Jank Farm / 200W
	Sa	<u>2000</u> mple		ASample Des	scription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distribu Moisture Content, Sorting, Angula Size, Reaction	tion, Soil Classification, Color, arity, Mineralogy, Max Particle on to HCI	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
180'-	Grab- Archive		000	169'-> 184': Silt	y Sandy GRAVEL	Air Rotury; 85/8"
-				(m s G)	/ /	OD CS Casing
-			000	silt content de	creasing	
_						180': grab sample
-				184 -> 220 : Sanc	<u>by GRAVEL (SG)</u>	For archive
185 —	Grab- archive		000	70% Gravel, 25	5% Sund, 5% silt.	
-			\mathcal{O}	Gravel is tr ey.c.	se peb, 30% cse, 40%	185': grab Sample
_			0.00	med, 30% Fh-Y. Fh	peb. Sauch predom	for archive
-			0:0:0	med-Fn; 10YR 5/2/	gravish brn), moist,	
-	Ciala		\mathcal{O}	poorly sorted; Grave	1 R-SA, Sand SR-SA,	
190 —	Archive		0,2,2,0 0,2,2,0	Gravel 50% bosalt,	50% gravitic, qtzite;	190': grab sample
-			0.00	Sand 70% 9tz, 30%	o basalt lother, mica,	For archive
-			$O = O_{i}$	max size ~ 5 cm;	Weak rxn HCl.	
-			°D i Q			
_	Contr		900			
195-	Archive		2.01	Water added to	circulating air	145 : grab Somple
-				to clear plugge	ed lines	tor archive
-			O p			
-		•				
	Srab-	é				and in franch
200	Archive		000			200 gres sample
			00.00			TOP ATCRIVE
		l.	0008			
_				205'; decrease in	sound and silt	205': Grah Somele
200-	Grab-	k i	2000	content - but Fin	es could be	for archive
205 _	AVE DIVE	20 20 20	220	woshed out by	water added at	
_			200	bit		
_		2	<u> </u>			
_			325	Gravel size increas	se - predom. csepeb.	
Reported	Ву:	. D. We	alker	Review	ed By: DC Weekes	
Title:	Geo	logist		Title:	Geologist	
Signature	ak	4 Wall	h	Date: 7-28-00 Signatu	re: MCWeeker	Date: 8/25/00

			B	OREHOLE LOG		Page <u>8</u> of <u>9</u> Date: 7-28-00				
Well ID:	C 3	3/12	Well N	Name: 299-W23-20	Location: W. sicle 241-	SX Touk For /2000W				
Project:	C١	1 2000	5 T	RCRA Drilling	Reference Measuring Point:	Ground Sunface				
·	Sa	mple		Sample Desc	ription	Comments:				
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distributic Moisture Content, Sorting, Angular Size, Reaction	oup Name, Grain Size Distribution, Soil Classification, Color, isture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl					
210-	Grab- Archire			Sandy GRAV	EL (sG)	Air Rotary : 8 5/8"				
-				-as described a	above-	OD CS casing				
-						210': Grab sumple				
	Gmb-					for archire Full 7/28/00				
- בו <i>צ</i>	Archive		802			Beain 7/31/00				
_						215': Grab -archive				
_			208	- sl. increase in silt-		2201: grab sample				
-	Grab - achive un			220'-> 2605: Sandy	GRAVEL (SG)	For archive and				
220—	Waste c. Solit#1	100%	0.0	70% Gravel, 20%	Sand, 10% silt.	Waste Charact.				
-	Spoon Sieve	rec. inalysis-	293	Gravel tr sm cob, 1	0% V.C.se pek, 40%	HEIS # BOY YXZ, BOY YN B				
				cse peb, 40% med. peb; Sand 20% v.c 30% v. Fn: 1088 5/3	<u>peb, 1070 fn-v.tn</u> se-med, 50% fn, (hm): wet: tr	219.5 - 222.0': split tube sample #1 for				
225-	Grab- Archive	Ę		pale olive silt; poo	rly sorted, gravel	sieve analysis				
-		1		R-SA; Sund SR-SA	; Gravel 40% basal	End 7/31/Begin 8/1				
-			5 <u>6</u> 6	60% granitic, atzite,	other; Sand 15-20%	225': Archive				
_				2 8 cm; no rxn H	(1. Max Size	230' : Archive				
230-0	Stab-		S. S.	228'-7 230': water	prochection					
-[decrea	ses	LEL, OVM & detect.				
-			\bigcirc	230 → 235': Sand c	ontent increase;					
-				water pi	roduction increase	W.L. = 215 w 214.5				
	Archive					235: Archive, 293				
235-	waste G		3.00	SALA GRAVEL BAT	V-sit it is La	Bay VALL				
	Sieve	100%		above LO-L5%	arovel 30% cond	236.0'- 237.5' ST				
_ -	ancelysit			5-10 % silt. Gravel	<u>R-SR</u> , Sand SR	#2 for sieve analysis				
_			880	10YR4/3 (brn), wet, .	Sand predom. med size	,				
Reported I	By: 🛛	D. Wa	lker	Reviewed	By: DCUEEKES	_				
litle:	Geol	ogist		Title: (Geologist					
Signature:	AL	alla	h	Date: 8-1-00 Signature	NC Upekes	Date: 8/25/00				

			В	OREHOLE LO	G		Page <u>9</u> of <u>9</u>			
Well ID:	- C 3	1112	Well N	lame: 299-11/23	-20	Location: 11 5:00 241.	SK Tack En /2001			
Project:		(200	0	PCRA Drilling	<u></u>	Reference Measuring Point:	GEORGIA Susface			
	Sa	mole	ř –	Sar) nnie Desc	rintion	Comments:			
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Moisture Content, Sortin Size	Froup Name, Grain Size Distribution, Soil Classification, Color, loisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl					
240 —	Grab- Archive						Air Rotary; 85/8"00			
_			\mathcal{O}				CS casing			
-				drilling indica sand lenses	tes al-a	possible thin 2.2' thick.	240': Grab sample For archive			
_			DOG				End 8/1 / BEQU 8/2			
2 <i>45</i> —	Grab- Archive						245': Grab-archive			
_							250': Grab-archive			
-	Grab- Archiv			220'-> 260.5':	Sandi	, GRAVEL (SG)	250.1'-> 252.6':			
250-	Solit	•		63-1076 Grav	<u>er, sc</u>	2/0 Send, TF- 3/0	Jplit Tube Sample			
_	tube #3 Sieve	90% rec.		Silt. Gravel	tt sm	<u>cob, 20%, v. cse peb,</u>	T3 for sieve analysis			
	analysis			<u>чила сле рев,</u>	5076 m	ed, 1010 Th - V. Ph;				
			O_{0}^{O}	Jang 2075 V.C	<u>cse - cse</u> ve 4/2 /	(1 0010 med, 2010				
255	Grab-		O	mod - poorly s	orted :	Grave R-SR. Sand	255 : Grab for archive			
_			\bigcirc	SR-SA; Grave	(mixed	l basalt, granifir,				
_			0,00	gtziti, = other	; Sand	80% ytz, feld, 20%				
-	1		$\mathcal{O}_{\mathcal{O}}$	basalt + other	lith F	rayments; wax size				
-	Srah-			8-10 cm; no	rxa H		260' : Grab For			
260 —	Archive			255: Sand con	ntent in	icrease to 50%.	archive			
-[ŀ	tt silt - or	therwis	e as above.				
-			ļ	260': Sand de	crease	to ~ 30 %	TD = 260.5			
-			ļ				8-3-00 water			
-			ļ				level = 214.1'			
265				·			w/ casing at			
-			ļ				260.0' - 0.5'			
_	:						open hole			
_			ļ	<u>:</u>						
_										
Reported	By:	L.D.	Walke	: F	Reviewed	By: DCWeekes				
Fitle:	Ge	ologist	4	<u>_</u>	Title:	Seologist				
Signature:	A	8 Ub	lk	Date: 8/3/00	Signature	: (XC Ukeket	Date: 8/25/00			

			FIELD TUBU		TIVITY RE GOODS T		RT Y				Page <u>1</u> of Date: 8/15	1/00	
Well	Name: Z	.99-	W23-20			Wel	I I.D.:	С 3	112		,]
[TEMP	ORAR	·۲			PERM	PERMANENT*			SCREEN/CAP*			1
Jt.#	Length (ft.)	Jt.#	Length (ft.)	Jt.#	Length (ft.)	С	Jt.#	Length (ft.)	C	Jt.#	Length (ft.)	Jt.#	1
1	10.6	21	10.0	1	20.03	C	21			1	2.00' SUMP	C	
2	5.0	22	10.0	2	20.03		22			2	5.00		$\Pi 15'$
3	10.0	23	5.0	3	20.03	C	23			3	9.99		J screen
4	10.0	24	5.0	4	20.02		24			4	10.00		720'
5	10.0	25	5.0	5	20.03	C	25			5	10.00		scree
6	10.0	26	5.0	6	20.03		26			6]
7	10.0	27	5.0	7	20.04	C	27			7]
8	10.0	28	5.0	8	20.04		28			8			
9	10.0	29	5.0	9	20.03	C	29			9			
10	10.0	30	5.0	10	20.02	C	30			10			
11	10.0	31	5.0	11	20.03	C	31			11			
12	(0.0	32	5.0	12			32			12			
13	(0.0	33	-5.0_	13			33			13]
14	10.0	34	260.6	14			34			14]
15	10.0	35		15			35			15			
16	10.0	36		16			36			16			
17	10.0	37		17			37			17]
18	10.0	38		18			38			18			
19	10.0	39		19			39			19			
20	10.0	40		20			40			20]
Tot		Tot		Tot	220.3		Tot			Tot	36,99']

*Indicate those joints with centralizers with a C in the available box. ALL casing length shall be measured to the nearest 0.01 ft.

Comments/Remarks: Added 5' of temp casing to begin completion.
* All temporary casing removed *

Arm-ok-

Temporary: O.D./I.D. 8-5/8"/7-5/8" Permanent: O.D./I.D. 4.5"/4" 4.5"/4" Screen: O.D./I.D. 4.5"/4"
FERMANENT CASING & SCREEN ARE SS 304L SCREEN 15.020.5LOT.
TAILPIPE IS SS3162 W/ 4" ID+ 4.5" OD. There is the extra joint
WATH A CENTRALIZER BECAUSE THAT WAS WHAT WAS AVAILABLE AT TIME
OF INSTALLATION .
STAINLESS STICKUP of 4.8' cut to 2.0'
PERMANENT OUTER CASING 6.0' PIECE Emplaced with a 3.0' Stickup.

Reported By: JILL MURPAY		Reviewed By: M.L. Johnson				
Title: GEOGET	Date: 8/15/00	Title: BHI STR	Date: 9 - 8 - 00			
Signature: DI X. Muna	vy · · ·	Signature: Mart Ala				
BHI-EE-182 (12/97)	0	1.0				

						Start Date: C	alar to		
WELL CONSTRUCTION SUMMARY DEDORT					от Н	Siniah Dote:	126/00		
WELL CONSTRUCTION SUMMAR			I REFUR		rinish Uate:	1/7/00	·		
Statistics No. 0200W-SP-1000				Page 1					
Specification No.: COOOT Rev. No.: O			P	Well Name: 299-423-21 Temp-Well No.: C313					
EUNS: NA			<u> ť</u>	Approximate Locat	ion: West 51	<u>de of 241</u>	5x TANK	Film	
Project: RCRA EN 2000 Drilling			<u> </u>	Other Companies:	BHIG	CHI,			
Drilling Company: Resonan	t Sonic Ini	ternatio	mal	Geologist(s): 🕤	.M.Faur	ote & G.	5. The	mas	
Uniller: <u>Mic Wrasp</u>	7 F		and the part of the						
TEMPORARY CASI	NG AND DRILL DE	auter a		D D	RILLING METH	odificationame		2	
*Size/Grade/Lbs. Per Ft.	Interval	Shoe O	.D./I.D.	Auger:		Diameter From _	to		
11 3/4 " OD Carbon Steel	<u>_076,41</u>			Cable Tool:		Diameter From _	<u>GS</u> to	259'	
8 % OD Carbon Steel	0.253.5	9"[7 爹"	Air Rotary:	<u></u>	Diameter From _	to		
	`	,		A.R. w/Sonic:		Diameter From _	to		
	·					Diameter From _	to		
						Diameter From _	to		
*Indicate Welded (W) - Flush Joir	nt (FJ) Coupled (C)	& Thread	Design			Diameter From _	to		
Thread design C.	Asing.								
						-			
				Drilling Fluid:	H20				
Total Drilled Depth: 259	Hole Dia @ TD:	8. ⁵ ″.	1. 1.	Total Amt. Of Wat	er Added During	Drilling: 500	gallons	;	
Well Straightness Test Results: 🚄	D.Z'LX 6 12 "0	D Toxel	es bottom	Static Water Leve	212.88	Date: ///	3/00		
		GEC	PHYSICA	LLOGGING					
Sondes (type)	interval	Da	te	Sondes	(type)	Interval	Dat	te	
Spectral gamma	0'.257'	10/31	60 (y.s.)			·	_		
RLS Nevtron-Neutron	0'. 213'	10/31/	DO (Top	V		·			
						·	_		
			OMPLET	ED WELKS SS					
Size/Wt./Material	Denth	Thread	Slot	Tvi	na	Interval	Volume	Mesh	
			Size	• • • • •		Annual Seal/Filter P	ack Vordinie	Size	
55 304 L CASING 4"1D	72.10 . 212.58		NA	Colorado Sil	KA SAN	202.0 . 257.	5 36.54	10-20	
55 304 2 Screen 4"1)	217.58 - 247.69		0.020	Bettenite	Pollets	193.7 - 202.0	2 4 bucke	5	
55 316 L Sump 4"1D	249.69 - 257.87	 	NA	Bertonite .	Crumbles	10.1 - 193	7 132 br		
				Portland	Cement Cost	<u> </u>	10 bes		
an a	••				and a star with the star of the star of the star				
			OTHERA	SIDITIES					
Aquifer Test:		Date:		Well Abandoned:		Yes: No:	Date:		
Description:				Description:					
				ļ					
]					
	n an an an Anna an Ann An Anna an Anna	Y State	VELLISOF	RYEY DATA					
Date:			Protective Casing Elevation:						
Washington State Plane Coordinates:			Brass Cap Elevation:						
	Sec. P.C.	C Star C	OMMENT	S/REMARKS	s ann a stàit				
10/ Coles: 10-20 silien 3	And - 0.54 ft	3/5012-6	49 X 3L	,5 bars = 19]	1 ft), Bento	nite Pellets -:	0.12ft 1/2.	icket	
X 4buckets = 248 ft3.	Granular Bents	mite - a	0.73A"	1009 × 132 1009	5 = 96.36 f	+3			
Reported By:		. 1 (•			
······································	Ture Im	1 100 105		Renorted By: A	A ARC				
Title Scalad	homas /DC	Data	ulylas	Reported By:	h. h.		Data		
Title: Scientist	tomas /DC	Date:	1/7/00	Reported By: Title:	34 10. 34 10.		Date:	<u>A</u>	
Title: <u>Scienchet</u> Signature: <u>Junes</u>	Tomas /DC	Date:	1/7/00 1	Reported By: Title: Signature:	1, 10. 		Date:	4	
WEL	L SUMMARY	SHEET			Date: /////				
---------------------------------------	---------------	------------------	------------------------	--------------------------	--	--	--		
Well ID: <u>C</u> 3//3		Well Name	e: 2	"99- W23-	21				
Location: West of 241 Sx TAM	K Farm	Project:	RCRA	FY 2000 Dr	illina				
Prepared By: G. S. Thomas	Date: 11/7/00	Reviewed	By: DC	Weekes	Date: 12/20/0				
Signature: Drug Thomas		Signature:	NEZ	lectres	_1				
CONSTRUCTION DAT	A		GEOLOGIC/HYDROLOGIC DA						
Description	Diagram	Depth in Feet	Graphic Log	Litholog	ic Description				
6- in diameter protective 55		H 0 _		0-0.5': 6.	envel				
Casing set 1.0' above the 4-in	IKXXI KX	XI _		0.5'-8.5' :	Sand				
CAsing] _		8.5'- 20.0' : 5	Fond to Slightly 5				
•		<u> </u>		50-1	1 1				
4-in TD sched. 5. 55 3046		1 -			· · · · · · · · · · · · · · · · · · ·				
well Casina :		1 25 -		20.0'- 36.8' : :	Sandy Gravel				
+2.10'-> 212.58' bee		4 _							
		<u> </u>		36.8'-38.5';	S. M. Sand				
Portland Coment Graut:				395'-400':51	Latty Gaugelly S				
0' -> 10.1'		Я <u> </u>		1010 10	ing an in ar in the start of th				
		50		100-0001	Sand				
Granular Bentonite				40.0 - 20.0 1	SHTA				
10.1 -> 192.7'					· · · · · · · · · · · · · · · · · · ·				
		시 -			· · · · · · · · · · · · · · · · · · ·				
· · · · · · · · · · · · · · · · · · ·		HI -		- <u> </u>					
		1	4						
Transportante Cara									
13/1"/ 10 3/1" at at at 1	E E		0.6.6.1.10	80.0' · 83.0': Gy	evelly Srand				
956 " / 75/4" + 252 5'				83.0 - 88.0 : Sil	ty SANd				
018/18 70 203.0									
	1.	-	0.00	08.0 - 77.0': G	iravelly Sand				
		100			- •				
· · · · · · · · · · · · · · · · · · ·	FI FI			<u>91.0' - 120.5': 5</u>	and				
	1 1	-							
		-		· ····					
	1	-							
		125		120.5'-130.5'	: Silty SAnd				
All depths in feet below		-		130.5'-131.5':	Sandy Silt				
ground Surface		-		131.5'-139.0':	Silty SANd				
Ill temp. CASing removed		-		139.0'- 141.5':51	lightly Silty Sand				
from The around.				1415'-1425':	Silty Sand				

				Page 2_ of 2				
Well ID:	L SUMMARY SI			Date: 11/7/00				
		Vveli Name: 249 - W23 - 21						
Prenared By:	MARK FARM	Project:	KCRA FY 200	o Drilling				
Signature:	Date: 11/7/00	Reviewed	By: DeWeckes	Date: /2/ 20/00				
CONSTRUCTION DAT		Signature: ACalleelter						
	A.	Depth in	GEOLOGIC/HYI	DROLOGIC DATA				
Description	Diagram	Feet	Graphic Log	blogic Description				
Bentonite Pellets:	E L	150 -	147-153': j	Sandy Silt				
193.7'-202.0'	[4	_	<u>153'-158': Sl</u>	olthy Silty Gravelly Sand				
Silica Sand: 10-20 mesh			158'- 168': 51	and				
202.6 - 257.5		- 175 —	0.68'-189';	Sandy Gravel				
Well Screen								
4-in TD, 0.020-in, slot		-						
Cont. Wire-Wrap, SS type	1 2	-	189'-193': 5	Lightly Silty Gravelly Spand				
304:		-	193'-197.5': 0	Gravelly Silty Sand				
212.58' -> 249.69'		200 _	197.5'- 204':	Gravelly Sandy Silt				
		_	N.L. = 212	.88 675 (11/3/00)				
Sump: but			204 - 214:5	Hy Sandy Gravel				
4 in 10 55 304 L +0		- 1		. / /				
249.69' -> (251.87')		-	2111'-211':G	Francelly Standy Sitt				
Tetal II with second at		275	2/1 - 140' -	the Level				
15 253.97' (+2.10'+251.87')		_		ilty SANdy Grave				
		_						
		-	246'-255':	Sandy Gravel				
		250 -						
		-	255' 255'					
		-	293 - 257 :	Gravelly Silty Sand				
			TD 259					
		-		·				
		-	1					
All depths in teet below		-		<u> </u>				
ground Surface		-	•					
All temp. CASING removed from		-	· · · · · · · · · · · · · · · · · · ·	······································				
The ground			۱ <u>ــــــ</u>					

			B	OREHOLE LOG	3		Date: 9/26/m
Well ID:	63	113	Well N	ame: 299-W23-2	2/ 1	ocation: Westof Sh	Tank Farm
Project:	RCR	A FY200	Drill	ina		Reference Measuring Point	Ground Surface
	Sa	mple		Samp	ple Descri	ption	Comments:
Depth <u>(Ft.)</u>	Type No.	Biows Recovery	Graphic Log	Group Name, Grain Size D Moisture Content, Sorting, Size,	Distribution Angularity Reaction 1	n, Soil Classification, Color, /, Mineralogy, Max Particle io HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
0			م مرجع مرد مرد مرد م	0-0.5 Gravel surface	2		Cable tool drilling
_			0	0.5-8.5 Sand	(s) bi	own(7.5YR5/3)	with drive barre
_				20% or 65% m	1570 +	arnd sub and to	
_				sub-round. < 5%	o sm g	ravel \$10% st and	
_				> 85% sand.		· · · · · · · · · · · · · · · · · · ·	Silt content to ~12-1
5 -	Ant			45% Sand 3	% arave	1. 2% silt. 50% f	
_	granive			40% m 5% cr 5	5% vcs.	, <u> </u>	
_	BIOSV	7 RAR	e e	sporadic arave	1 to 1.	5" 1248	RAD SAMPLE - 7
-			0	8.5-10° and to sl.	sty. Sar	nd.	from waste drum
_				8.5' sut/clay/ru	lier wi	clay balls and	· · · · · · · · · · · · · · · · · · ·
10-		CHEM		apparent root	debris	. Possible small a	betie CHEMSAME
-	Archive	SAMP.	0-5-1	dka tuna structu	ne Ahro	uch the silt. The	from waste
_	Rudicio	BOTVP8		~IPTa filt und 85.	-87% 5	and spanding.	9. Arouel
_			0	The sound is 55% f	z c%	and is 20 an that	
				culture to cut un	1. STOM	and to see that	2 Laudad
		RAD	e	Sub-ung to guo-round	and rol	and, ary, moderate	PAD CAMPACE
/5	trchire	00000		grains of since mic	<u>a ç me</u> l	A MOIPHIC FOCKS, 20	from waste drum
			Q	E's a bus		t at the	
_			0	Tine gr. String	jets rea	CL MOG. TO HCI	
-				V.Sancy SITE T	<u>8-18.5</u> 0'	<u>,</u>	
			0.0000	200 Parse sand e 1	7	59 (11AT 5 E9.	1 20.0-36.81
20-	Archive			Here Sandy Ora	A COL	<u> 109</u> - 4010 0, 0103	
-			0.000	Megraver 15 6010 C	Dasa/E	40/0 0/mor cor 15/	tg ds rong in
_			00 <i>6</i> .a	Sub Tound to round	grains.	IN Sand 15 TUT	cr, du n cr, 30 m
-			076 070775	and solot in Su	b-ang H	Sub-round grav	ns that are poorly
- ~-				Sortegand ary.	Grains	Inciense in size	
25	Irchive			TO 1.5 6422.			
-			0.00000		t si/ty S	ands sandygravels	
-			000	and gravelly sand	<u>as · 61</u>	To Dasalt, 4070 silica	V metamorphics
-			0.00.00				
	By: Th	1 Venuent	5.16		Paviowor	(By DOLL-L	ـــــــــــــــــــــــــــــــــــــ
Title	alach L	raunote			Title:	about	2
Signature	The	ñ.	*-	Data Alas I		Martan And	Data 11/2/2
oignature	<u>. </u>	zjaun	LO	Date: 1/29/00	Signature	NO apaport	

A.55

			B	OREHOLE LOG			——	Page <u>2 of 9</u>
Well ID:	C 3	113	Well N	lame: 299-4/27-21	, 1	ocation: 11/2++	. (Date: 9/29/00
Project:	RCR	A EVA	non D	alling		Reference Measuring	Point	and Calo
	Sa	<u>mple</u>		Sample	Descr	iption		Comments
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Dist Moisture Content, Sorting, An Size, Re	tributior ngularit eaction	n, Soil Classification, C y, Mineralogy, Max Pa to HCl	olor, rticle	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
30-	Archive			Gy-bn to It bn maist.	sandy	site w/cky.		Cable tool (drive barre
-	11211102			Back into sandy 9	ra re	, largest is 14	"x2"	Archive@ 1527 hrs.
-				no visible silt, 60	0% ba	alt, Repper and s	alt,	n appearance.
35-	1		$O_{\mathcal{O}}$	still dominantly sand	<u>aiam:</u> lu a ca	up - for mad an		
-	<u>irchive</u>			tight sandy silt @ 3 365-38.5 Silty Sand, 1	ight	36.5, then into		@37'endshift 9/29/20
-				Sand w/ brown silt a	and m	uscowite the un To silt 100% Bas	it.	
- 40	Andrew			38.5-40.0 Sl. Gravely S	Sánd, can	that changes in	n-to_	40' Arch samp @0702,12
-	alonive		-	40.0-80.° Sand .	site i	ontent is 3.5%.		
_				Sand is brown (7.	5YR	1/3), grains are	-	
-		4		60% med, 35% f, 5%	Pocr .	in mad well sort	ed u	nit.
_				of sub-round to round	nd gra	ins. It has a	verg	
45—	Archive	7,me 6745		weak reaction to HCL	. The	unit is 55-60	<u>%</u>	
_				Basat with the rea	main	ung grains be	ing_	
-				<u>silica and/or metamor</u>	<u>phic</u>	graniskes. The u	nit	
-				is slightly moist.		· · · · · · · · · · · · · · · · · · ·		
50	Archive	time 0803		Slight Increase	in sıl	t content		
_								
-				······································				
-			7774					
55—	Archive C	0843 hrs						
-				·····				RCT gets < detect
				this a life of				04 too/s and sorts
				TILI SHITY STRINGER	- 30-	56,5		
Reported	ву: √./	M.Fau	rote	Rev	viewed	By: DCCikerk	205	1
Title: G	eolog	ıst		Title	le: E	eo/agist		
Signature	m	Tann	ta .	Date: 10/2 /07 Sig	nature	SC Zilee ke	A	Date: ///3/00
	11					y contract		

BHI-EE-183 (12/97)

			B	OREHOLE LOG		Date: 10/2/00
Well ID:	C 31.	13	Well N	lame: 299-W23-21	Location: West of 241-	SX Tank Farm
Project:	RCRA	FY 2000	Drill	ing	Reference Measuring Point:	Ground Surface
	Sa	mple		Sample Desc	ription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distributic Moisture Content, Sorting, Angulari Size, Reaction	on, Soil Classification, Color, ity, Mineralogy, Max Particle n to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
60-	1006			V. thin silt stringers (Y2-	- (" thick) that are	Cable tool
-	<u>all'hive</u>	=0404		moist. The self is brown.		Drilling
_						
-				Continues as th	le same med and	
_				fine arnined Sand	AS ACCHIPHEL. dos	cribad
65_	And			and granned sounds	as pienousig des	
	HICAIVE C	0147	38 <i>82</i>		· · · · · · · · · · · · · · · · · · ·	· · · · · · · · · · · · · · · · · · ·
-						
-						
-						
-				Sporadic discontinuous	s silt stringers th	at
70-	ARCHIVE	022		react stronaly or mode	rately strong to Hr	and REGIAL
· _	SPLIT			the intervening out to	elitta an in an	Split
_	DAMPLER			in maryening sand has	SINNE OF NO MAN.	SPLIT SPOON
. –	77777	e overdri	KA I			SAMPLING FROM
-	SPOON					70' to 140',
-		/ 1154hrs.		- 14 to a		CONTINUOUS
75-	11111	ARCHIVE		medių ergrna sana 76-	-77	
-	5583			H2.0 looked mit and of	shoe - came from	
_				H. Connetion @ NH7 6		ala 1 intel
_	222	Anchingh		The rotination, e + 11.5	- Water seepage (Cicanout 17-19, '418/0
-	55#4				·······	
				Gravelly San	ð.	
80-	107160	ARCHIVE	27 - C	80.0 - 81. Sanderte mue	+ w/ CoCO3 coment.	Contact sty 5/5.6
-	55#5	STACT AGAN	00000	V. strong Rin to HCI. T	The unit is 60% bas	o/t
	10/18/00	on 10%8/00		and 40% Felsie The Unit	consists of 40% -	81-82'- 1t. hn
_	, uni	-AKCHINIME		55905 and Ella Ha	sand is and and	1 site w/ <10%sand
-	55#6			Silanderil ad 20%	r uran poor 14 sorte	shallow ripple man
-	lioshes			uno-ang. rosuo-ra, sulo ci	+ 43 10 m, 23 105. INC	d.
85—	CC NT	ARCHIVE, Clastic		The unit is variegated in a	color, but generally	
-	10/18/00	dite/10		white to light gray-brown .	the unit is dry.	
	1200 hrs.	186	0	83-88 V. Silty sand, m: 19 Poorly softed mai	st. or-bntobn w M-1	tored # 84-Poss
_	SS#A	4	0.0.0.0	hematite staining	and coment. STORADI	Plant ren
	10/18/00		8.002	Bo 1" clastic dike of cr. sand and	a huy hernatite staining	
	1 Du . 7	MC	<u> 1927 - 1975</u> 1	L	Du Dalla	L
керопео	л ву: (/./	II Fau	ote	Reviewe	a by: PCUREEES	
Title:	edog	vist		Title: (Geologist	
Signature	e: //m7	aura	T	Date: 10/18 /00 Signatur	re: NCUbelles	Date: ///3/00

			B	OREHOLE LOG	}		Page <u>4</u> of <u>9</u> Date: 10/10/00
Well ID:	C31	13	Well N	lame: 299-W33-21	L	ocation: Ubst of 241.	X Tank Carm
Project:	RCRA	A FY20	OD Dri	lling	R	eference Measuring Point:	Comment Surface
	Sa	mple		Samp	ble Descrip	otion	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Di Moisture Content, Sorting, / Size, F	Distribution, Angularity, Reaction to	Soil Classification, Color, Mineralogy, Max Particle) HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
90-	25#9	ARCAIVE	0 - 02	58-99 Grave	elly San	d (95) 55% Bosa	ve Cable tool
–	10/18/00		0-0	and 25% gravel	G-m.ga	nd) in It-medgy.	angy drilling
-	1540		00.00	and black sand of 90%	% F, 30%	m and soloer grains	that
-	55#10		00.00	are poorty sorted, sub	sounds	bsub-angulor IS Ca	103 comented
-	1418		200	the unit is dry, and loc	cally from	exide stoined. The un	vet
95-	<u>////</u> 55# II	Archire	000	contains ~ 87. silt	<u>+</u>		
-	10/18/00		0.01				
-	1445		. 10. 0				
-	35#12		0				
-	19/10/00			99-120.5 Spind (5) 50	- CD % Quarte, 92%	
100-	35-413	Archive		V. fine - fine , 10 % mod	dium, to	ACE COARSE, 10YR Sty	-5/4
-	10/18/00			(information), moist	+ , pourly	Sorted sub round to	202
–	1605			Jub Angalar.	den		
-	55#14			Silt content increas	sim 10-1	5% , Trace of mich	
-	0756		44 - 14 44			•	
106-	55#15	Archive					
-	10/19/00		÷.,	Silt context decre	Maing <	5% . lithic incremse	
_	0826			+0~15% mostly Q	Quartz wi	the some staining	
-	55=16		-				
_	0910						
110-	1111	Archive		silt ~ 10%			
-	10/19/00						
-	0956						
-	55 \$ 18						
_	10/15/00						
115-	1111	Archive					
_	JS# 19 10/19/00						
_	1052		5 C				
_	55#20	-					
_	10/19/00			· · · · · · · · · · · · · · · · · · ·		<u> </u>	
Reported	i By: (<i>T</i>)	MEAN	nte_	125 Thomas IF	Reviewed	By: DClaboka	· · · · · · · · · · · · · · · · · · ·
Title: (5001	ogist	- / 5.	entert 1	Title: G	eologist	
Signature	Am Za	untit	No SH	Date: 10/A/MS	Signature:	Merilan hon	Date: 11/3/m
-7			~ / ~	////		V - year - or	

Defect: LogsDefect: C 3113Well Name: $299 - \omega 23 - 21$ Location: $\omega st f ef 241 5x$ Tark FormSampleSample DescriptionComments:DepthGraphicGraphicGraphicContent Sorting, Angularity, Mineralogy, Max ParticleDepth of Casing, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle1777Archive120 - 7777Archive120, 5 - 123 Sylly Sand (m3), 25-35% 3;1t, 100 Colspan="2">Cable tool drilling Sampling Tool, Sampler Size, Water Level120, 5 - 123 Sylly Sand (m3), 25-35% 3;1t, 100 Colspan="2">Cable tool drilling Sampling Tool, Sampler 20, 5717120, 5 - 123 Sylly Sand (m3), 25-35% 3;1t, 100 Colspan="2">Cable tool drilling Sampling Tool, Sampler 20, 5717120, 5 - 123 Sylly Sand (m3), 25-35% 3;1t, 100 Colspan="2">Cable tool drilling 20, 5717121, 738 # 21122, 7124 decreasing sylle (clear & submanded, pirma 20, 5 - 1124 decreasing sylle, clear & submanded, pirma 2124 - 1320, 5 - 511 ty Sand as above130 - 131, 5 Sandy Syll T (s M) ss?a syll, 45%1315 - 131, 5 Sandy Syll T (s M) ss?a syll, 45%124 decreasing Sylle (s mode, maist, 10, 100 20, 20, 20, 20, 20, 20, 20, 20, 20, 20,			<u> </u>	B				Page <u>5</u> of <u>9</u>
Vient No.C 3115(Well Name: 299 - ω 23 - 21Location: ω 1 of 241 sx Tank FormProject:RCRAFY 2000 $pr(i)_{ing}$ Reference Measuring Point:Ground surfaceDepthTypeSampleGraphicGroup Name, Grain Size Distribution, Soil Classification, Color.Method, Method of Driving120TITLArchiveItes Content, Sortig, Angularity, Mineralogy, Max ParticleMethod, Method,		4 3						Date:
IndexReference Measuring PointGround surfaceDepthTypeBlowsGraphicGroup Name, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max ParticleDepth of Casing, Drilling Method, Method, Start, Start	Project:	<u> </u>	3		vame:	299- W23-21	Location: West of 241	5x Tank Farm
$\begin{array}{ c c c c c c c c c c c c c c c c c c c$	-Tojeci:	KCKA	<u> </u>	000 70	Thing	· · · · · · · · · · · · · · · · · · ·	Reference Measuring Poin	t: Ground surface
Depth (F1) Type No. Blows Recovery Graphic Log Graphic Group Name, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Minerelogy, Max Particle Depth of Casing, Drilling Method, Method of Driving Sampler Size, Water Level 120 IIII 25 + 121 Archine 120.5 - 123 Site, Reaction to HCI Size, Sand, must, 10 YR 5/4 (known) 132 113/00 123.5 - 123 Site, Sand, must, 10 YR 5/4 (known) 123.5 - 124 125 - 17/1 35 # 22 124 decreasing Site is subrounded, strong 125 - 10/10/00 123.5 - 111y Sand as above 124-130.5 - 511 by Sand as above 126 - 10/10/00 134 - 131.5 - Sandy Sill (smile, meist, 136 - 131.5 - Sandy Sill (smile, meist, 136 - 131.5 - Sandy Sill (smile, meist, 137 - 10/100 134 - 131.5 - Sandy Sill (smile, meist, 134 - 140 135 - 10/19/00 1345 - 140 Silty SAND (mist, payerid) 134 - 131.5	1	Sa	mple		Ļ́	Sample De	scription	Comments:
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Grou Mois	p Name, Grain Size Distribu ture Content, Sorting, Angu Size, React	ution, Soil Classification, Color larity, Mineralogy, Max Particle ion to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
$ \begin{array}{c} 10 11/00 \\ 1152 \\ \hline 11$	120	<u>////</u> \$5 * 21	Archive		12	0.5-123 Silty Sand	(m5), 25-35% 31H,	Cable tool drilling
1152 1152 1152 1151 1152 1151 1152 1151 1155 1151 1155 1123-124 1123-124 decreasing Sith to Sliphtly Silty SAND 1123-124 decreasing Sith to Sliphtly Silty SAND 1123-124 decreasing Sith to Sliphtly Silty SAND 1124-130.5 Silty Sand as above 1135 1141 1136-131.5 Sandy Silt (s M) 55% silt, 45% 1130-131.5 Sandy Silt (s M) 55% silt, 45% 1131-131.5 Sandy Silt (s M) 55% silt, 45% 1135 It (s S Silt) 1135 Sandy Silt (s M) 55% silt, 45% 1135 Sandy Silt (s M) 50% silt) 1136 Silty	-	10/19/00			70.	75% v.f.f. sand, n	1015t. 10 YR 5/4 (brown),	
$ \begin{array}{c} -\frac{35 \text{ dd} 22}{10/11/00} \\ -\frac{1256}{125} \\ -\frac{127}{11} \\ -\frac{1256}{33 \text{ dd} 23} \\ -\frac{127}{11} \\ -\frac{123}{33 \text{ dd} 23} \\ -\frac{127}{11} \\ -\frac{127}{11} \\ -\frac{127}{11} \\ -\frac{55 \text{ dd} 23}{10} \\ -\frac{127}{11} \\ -\frac{55 \text{ dd} 24}{100} \\ -\frac{1127}{11} \\ -\frac{55 \text{ dd} 24}{100} \\ -\frac{1127}{11} \\ -\frac{55 \text{ dd} 25}{100} \\ -\frac{1127}{11} \\ -\frac{55 \text{ dd} 25}{100} \\ -\frac{1127}{11} \\ -$	-	1152			SAN	d grains or Ange, vellow.	clear & submunded strong	
$ \begin{array}{c} i/1/1/00 \\ 1256 \\ 125 \\ 123 - 124 \\ 123 -$	-	55 ± 22			Pvn	to Hel Lavered , your 5	tainene	
$ \begin{array}{rcl} $	-	10/19/00			123	- 124 degradation 5 ht	to Chilthe Cilty Sans	
$ \begin{array}{c} $	125-	7777	Archive		10/	- 130 C S H. C. J	1 JILAT LY STITY SAWL	2
$ \begin{array}{c} $		39#23			129	- 150,5 Dilty SAnd	as above	
$\frac{777}{10} = \frac{777}{100}$ $\frac{777}{100} = \frac{7777}{100}$ $\frac{7777}{100} = \frac{7777}{100}$ $\frac{7777}{$		1329		4				
- 55#24 190 - 1415 130 - 121.5 Sandy SILT (S M) 55% SiH, 45% 5 and . Sand v.f f 25% matric, meist, - 1450 - 140 - 140	-	1111		7.4				· · · · · · · · · · · · · · · · · · ·
$ \begin{array}{c} - & 1415 \\ 130 - & 1277 \\ - & 158 \\ - & 10119100 \\ - & 14150 \\ - & 1450 \\ - & 1450 \\ - & 1450 \\ - & 1450 \\ - & 1450 \\ - & 1450 \\ - & 158 \\ 21 \\ - & 558 \\ 21 \\ - & 558 \\ 22 \\ - & 158 \\ 21 \\ - & 158 \\ 21 \\ - & 158 \\ 21 \\ - & 158 \\ 21 \\ - & 158 \\ 21 \\ - & 158 \\ 21 \\ - & 158 \\ 21 \\ - & 158 \\ 21 \\ - & 158 \\ 21 \\ - & 158 \\ 21 \\ - & 118 \\ - & 148 \\ - & 118 \\ - & 148 \\ - & 118 \\ - & 148 \\ - & 118 \\ - & 148 \\ - & 118 \\ - & 148 \\ - & 118 \\ - & 148 \\ - & 118 \\ - & $	-	10/19/00						
130 - 11/1 Archive - 10/19/00 - 10/19/00 - 10/19/00 - 10/19/00 - 10/19/00 - 10/19/00 - 10/19/00 - 10/19/00 - 10/19/00 - 10/20/00 - 10/20/00	-	1415			L			
- 10/19/20 - 1450 - 1450 - 1450 - 1450 - 1450 - 1450 - 1450 - 1450 - 1450 - 1325 - 140 -	130 —	<u>////</u> 35#25	Archive.		130	-131.5 Sandy SILT ((SM) 55% SIH, 45%	
- 1450 - 1450 - 1277 - 55#22 - 1325 - 1235 - 1277 - 1280/00 - 1235 - 1277 - 1280/00 - 12	-	10/19/00			SAND	. Sand v.f f. 25%	& matic moist	
- 55#26 - 1335 - 1335 - 17/7 - 10/20/00 - 10/20 - 1	<mark>ا _</mark>	1450			1= 78	5/4 (prown), low pla	sticity layered	
- 18 troloo 1335 175 - 1777 - 18 troloo 1365 - 140 51 Lty SAND (m.5) 46% 5.1t, 60% - 18 troloo - 18 tro		55 # 24						· · · · · · · · · · · · · · · · · · ·
135 Archive 1365-146 5124y SAND (m5) 4625.14, 60% = 1365-146 5124y SAND (m5) 4625.14, 60% 1416 Sand v.f. ~f., 20 Motic, moist, 10 y85/4 1416 (Growin), medium Rx n HCL, sand lenses from = 35#28 10/20/00 140 Archive 148 - 141.5 Slightly Silty SAND CWS. 15% 514 Changed to	_	10/00						
- 10/20/00 10/20/00 10/1/ - 10/20/00 10/1/ - 10/20/00 10/1/ - 10/20/00 - 10/20 - 10/20	135	1/1/	Archive		1315	-139 01 S. 1+4 SAND	(5) 18-11 · A	
- 1416 - 1586 - 1586 - 1586 - 147 - 1416 - 1586 - 1586 - 1586 - 1476 - 1416 - 1416	<u> </u>	35#27 18/20/00					(mj/ 40/5117,60%	
- 1456 140 - 11/1 Archive Hills Slightly Silty SAND Cards. 15% 51H Changed to		1416		$\rightarrow \epsilon$	Dino	, 2 and V.t f., 20	Matic, Moist, 10 485/4	
- 10/20/00 - 1456 140 - 2/2/2 Archive 1133 - 141.5 5/19471y 51/4y SAND Crub S. 15% 51 H Changed to		<u>////</u> 55#29			Coros	sn), medium Rxn HC	L, Sand leases from	
- 1456 140 - 1/17 Archive 110 - 141.5 Slightly Silty SAND Card S. 15% Silt Changed to	-	10/20/00						
140 - 2727 Archive 141.5 Slightly Silty SAND GUS. 15% Silt Changed to		1456			1 74			
	140 —		Archive		198	-141.5 Slightly Silty	5AND CHUS. 15% 51H	Changed to
- 85% SAND, SAND, SANd V. Fine - Fine, Marst, 10 42 5/4 drive barrel of	-				85%	SAND, SAND V. Fine - f	ine, moist, 10 YR 5/4	drive barrel at
- (Irowin), nuclium Zxn to HCL. 140'	-				Chron	wn), medium Ran to 1	<u>tcl</u> .	1401
- 141.5 - 143.5 Silty Stand	-				141.	5 - 143.5 Silty Sand	1	
	-			-		,		
145 _ 1/17 Archive143.5 - 147 Sheltly Silty Spain (w) 5 152 SH Changed to	145	7777	Archive		143.	5-147 Slightly Sil	+r SAND (w) 5 Kg si	Changed to
- BS9 Send Sand if of word in the State and herd tool hit	_			<u> </u>	859	Sead Sand of - f	y - 10 10 5/4 (may 2)	hend tool hit
					35%	Mafre Mafre	MOIST, LO IN 47 (PYOWN)	at 145' Caffer
	_			,				ampline constr
- Tronive sample								TICHIVE SAMPLE
Reported By: 65 There a contend by Datasate	Reported	Bv: 7	15 11		L	Davia	wed By DAlland	[Collected]
Title: Sain tigt	Title	<u></u>	tich	oma s		Revie	TO DY. DC WEEKE	
Signature: $M_{\rm e} \leq M_{\rm e} \leq M_{\rm e}$	Signature	Jeres M	n TIST	·			Geologist	
Date: 10/23/00 Signature: / Ulaberhea Date: 11/3/00	Signature	· Xru	5 / ho	mar		Date: 10/13/00 Signa	ture: (y Capernea	Date: /1/3/00

			B	ORE		3		Page 6 of 9
Well ID:	6 311	ζ.	Well N	lame:	299-1522-21			Date: /0/23/00
Project:	PAD	FY 7		-11	CT1- W123-21		Reference Measuring Poin	5x lunk Farm
	Sa	mple		0	Sam	nle Desci	rintion	Commente
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Grou Moist	p Name, Grain Size I ure Content, Sorting Size,	Distributio , Angulari Reaction	n, Soil Classification, Color ty, Mineralogy, Max Particle to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
150	777	Archive		147-1	53 Sandy SILT	(sm)	30-40% fine to very	Cable tool drilla
-				fine 3 Mois dry	Sand, 60-70% 3; t, strong Pin Hel , non plastic.	lt, 109 ., 2.5 Y	16 Mafic & 90% felsic, 18 7/3 (pole yellow) when	Using hard tool
155-	<u>ZZT</u>	Archive	· •	53-1	168 SINGLY S.H.	Cieve II.	SAND into S unit	
-			0.1	514, 514, 30% (10-15 2 growl, 20-1 10-15 2 growl, 20-1 Elsic as fine public M. 462 f- 4.5 w	so 2 san so 2 san sand com ith 309,	JAND (M) 9 J. 10-15 2 1D. Gravel 70% Baset & ped with Cally, Sand 30%	¢,
_			; <u> </u>	2 mm	HeL. 10 48 5/3/1	mwn) u	Jhen maist	7
160	117	Archive	. o 	158-1	62 5 mnd (s).	3-5%	y.ff publies. 7-10%	
_			o	S.H.	85-90% JAND.	Smand i	25-30% C-UK, 30-35%	r.
-			;ó .	35-49	1% f- u.f. 50%	basett,	50% febre, Strong Rx	n
-				Her,	DYR 5/3 (AMW	N when	moist	
-				ļ				
165 —	_///	Archive		162-1	48 Jand (3). 3	0% v.f	-find and rogo	
-				madi	um Sand, 25-30	36 basal	+ , 70-75% felsic,	
-				Stren	A RAN HEL, 10	12 5/3	(brown)	
-			0					
-			·•· 8					
170	///	Archite	.0.0	168-1	184 Sandy GRA	VEL (S	G), Gravel 35%,	-
-			0.0	SAN	d 60% , Silt 5%	L. Grm	vel broken into Pebble	\$
			0.0	of 5-	10% M, 15-209. +	, 70-8	0% VF. SAND 55-60%	, ¢ <i>s</i> ,
·			-0	35%	m, 10% v.f	f. SA	nd & Gravel 75-90%	
-			9.00	Mahe	- \$ 20-25% fels.	e, No	RXN HCL, Color of	
175-	///	Archive	<i>o</i>	fine	& v. fine sand 2	5 Y U/1	(dark Gray) when wet	•
-			<i>.</i>	-				
-			0-0					
-			0					
			<u>;</u>		-, _,,			
Reported	ву: С	7.5.74	omes			Reviewe	d By: DC Weeke	<u> </u>
		cut 151	<u> </u>			Title: C	seologist	
Signature		us Th	ennes		Date: /0/24/00	Signature	e: Alaller	Date:///3/00

			B	ORE	HOLE LOG			Pag	ge 7 of 9
Well ID:	C 3113	3	Well N	lame:	299-123-21	Loc	ation: test of 24	158 7	Ank Farm
Project:	RCRA	A FY Z	000 Dr	Illing		Ref	erence Measuring F	oint:	round Suffice
ı	Sa	mple		0	Sampl	e Descripti	on		Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Moist) Name, Grain Size Di ure Content, Sorting, A Size, R	stribution, S Angularity, N Reaction to I	oil Classification, Co /lineralogy, Max Par ICI	blor, D ticle S	Pepth of Casing, Drilling ethod, Method of Driving Sampling Tool, Sampler Size, Water Level
180	777	Archive	0.0					Ca	ble tool drilling
-			000		······			U:	sing hard tool
- - 185 -	1777	A+chive		184- 189 5:4 55%	Sandy Gravel 8%. Gravel book vf. 5and 30% c	(s 6) Grm Ken ; vito pe '-VC , 45	24 35%, 5 And 6 Hos of 5% 4, - 2 24, 25% f-vf.	0%, 16% F,	
	////	Archive		Gyn Rxn 189- 193 5,14 of 10	uel \$50nd 50-55 % HCL, Glor 2.5 Y Slightly Silt Gra 18%, Sand 60% 20m, 10-15% f, 75	Matic , 4 15/2 (Gvay velly Save 6. Grave -80% Uf.	15-50% Febre, No 10h borron) in sluor 1 (m)95. Gorave 1 booken into Tell Sand 5% 455, 5%	y. 1 22 2 , los	
	7777	Archive		609 193 54	6 m, 20% f, 5% v. - 197.5 Gravelly 5. Ime description as	f. Matic alty Sand (above for	66%, No Ern, Color (gm5). Groud 20% gravel & Sand Con	, 25 X(3 , 5mm 50 ntest.	i/2) (Graysh brown)
		Archive		1975 54-10 5% 10	-204 Gravelly 50 1 31%, 5:H 42% 1, 40% f, 55% v.f	ndy Silt (Growel) Sand 5	(gm M) Gravel 2 woken into petitos a % v.c. 20%C, 50	7%, f &M,	
- 205 -	- - - -	Archive	0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.	204- 5A-	209 Silty SA 209 Silty SA 2096 Silt 3 cription is the si	ndy Gra 27°10 . G ame As	vel (msG).Gr iravel & sand 200.	avel 4	5%
-	-		00	;			· · · · · · · · · · · · · · · · · · ·		
I	-l ed By:	6	<u> ?::::?</u> 77	 		Reviewed	av DAlilon	Loc	
Title:	<u></u>	antict	Lhow	25		Title:	a logist	<u> </u>	<u></u>
Signatu	re: M	AND A			Date: /a//	Signature	Malante	al.	Date: /// 2/00
u		my re	omog		10/26/00		In gues		

:

				B		 G		Page g of <u>9</u>
Well ID:			-					Date: 10/26/00
Project:	- CSI	2		weil N	ame: 297-0073-	21	Location: west of 241:	sx TANK Form
		- <u>71 r</u>	<u>-y</u>	2000	Vnilling		Reference Measuring Point	CTOKINO Surface
					Sar	nple Desc	ription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blow Recov	vs very	Graphic Log	Group Name, Grain Size Distribution, Soil Classification, Color, Moisture Content, Sorting, Angularity, Mineralogy, Max Particle Size, Reaction to HCl		Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level	
210-	Z77-	Arch	we e	-0-0- 0-0-	209-214 Silty 5m	ndy Gra	vel (msG). Gravel 34	Cable tool
-			t c		Sand 35% 5ilt 3	1% . G.	wels broken into Telfle	drilling using
-			10.		of 3% M, 50% F, 4	17% 41.	1 broken V.C. Pable.	hard tool bit
-				0	Jand 25% VC, 2	5% C	30% M, 15% f, 5%	us, except where
-	71.1			-0	Matric 40 % .			Split spoon driven
215 —	1111	Arch	ve :		214-219 Gravely	Sandy	Silt (gm M). Gravel :	5%
-		0.10	, i	o0	Sand 35%, 51/4 4	% . GrA	ud braken into Petbles	
-	55-# 29	KANP SI	rre e	0.0	of 3% m, 30% f, 5	7% v.f.	SANd 20% vc, 30% c,	Rad sample out of
-	10/26/88		Ø	о. - о-в	25% m, 25% f, 10	2 A. 4	10 % Matic.	Waste drum.
-	1215	Archi	ive b	 			·····	
220-			1.X.		219-224 Silty 54,	dy Gr	wel (msG). Grandy	%
-			4	00	Sand 33%, 5,1+ 21	% . Gr	vel large & small cobbles	
. –		Acres		0.10	present, 1% VC, 2%	C, 7 %	m, 40f, 50 vf, Sand	
1 -	7171	Samp	<u>ن</u> ب	5.00	15% VC , 15% C , 1	5% M,	404 59 vf. 40% M	& Chem sample out
-			2.	0.0.0	Gravels Sub . wellrow	ded or)	broken, Medurate weath	of waste drum.
225-	1111	Arch	ive	0.00	224-240 S; 14 5m	dy Gr	avel. Gravel 53%,	/
-			1.0	0.0	SAND 26%, Silt	21. 2/0. 1	Mafic 60% . Gravel	*
-	7777	Rad	4	000	5% M, 45% f, 50%	Uf. SAN	1 30% UC, 30% C, 70%	and shift 10/21/0
-		Samp	le K	20.00	M, 10% f, 10% vf.			Rad sample out of
-				9 9:- 0	Continues	as silty	Sundy Gravel al	Waste drum.
730-	ZIIZ	Archin	6	20-0	15% m, 40% 30	% san	155%G	
-			Č.	0000				
-	55.#		Ľ.	0800				split drove very hard .
-	30	l). A	at heart one > 4'	rock @	231'. The unit is high	variegated in color . it
-	121100	[1		is bn, bk, or, tan, gy,	gn-gy an	d various light shades.	the unit is moist,
235-	111	Archiv	e		and exhibits Feor	hematite	goethile?) matrix a	nd staining Gravel is
_			K	D_{n-1}	subround to round	and Y4 to	544 in 512e.	
_								Add appl Han
_								
				+0/14				
Reported	d By: C	4.5.1	Thom	<u>as /)</u>	Mfaurote.	Review	ed By: DCU/eo to	5
Title:	Scient	st /	Ge	doais	t.	Title:	Seologist.	·
Signatur	e: the	H.	al.	Mnzan	Date: 10/27/12	- Signatu	re: NC2/00/kes	Date: /1/3/00
	7	,	70	0	1		- V - V	

			B	OREHOLE LOG		Page <u>9</u> of <u>9</u>
Well ID:	C3	113	Well N	lame: 249-11123-21	Location: Ubot af 7(1)	extant form
Project:	ACR	A FY2	an D	OUTING OF	Reference Measuring Point	Grand Victore
	Sa	mple		Sample De	scription	Comments:
Depth <u>(Ft.)</u>	Type No.	Blows Recovery	Graphic Log	Group Name, Grain Size Distribu Moisture Content, Sorting, Angul Size, Reacti	tion, Soil Classification, Color, arity, Mineralogy, Max Particle on to HCl	Depth of Casing, Drilling Method, Method of Driving Sampling Tool, Sampler Size, Water Level
240-	111	Archive	2 2 2 2 7 7 6	~240 Silt decreases sa	nd increases - Sana	Hard tool bit
-				Gravel. Gravel 50%,	Sand 45% silt 5% . (ravel is F-med
-		Ē		grained, Sand is f- Cr q	arained 1/ 35% F, 45	20m & 1090cr
-				It-med gy bn wet. Ahu	adant silic based f	for ant
245—		,				26% LEL @ 209002
-			-0-			Co @ 860ppm in casing
-		27		246-247,248 heaving s	and - did not discern	420 ppm when running too
_	55#31	recovery	0.0	any increased penetrat	ion rate.	drum -0133 Seed. (242-22475
	10/27/00	end shift	000	V. sty gravel, strongly alter	ed clasts and matrix - who	¥
250-	1559	10/22/00	9.20	appears to have been Carloz	now seems to be Ca Dy	H20 - loose, friable.
-				The Unit is not saturated,	and contains 5-10%	lay (alteration by moducia)
. –			000	in 15-20% silt matrix y	hat shows minimal sa	nd. The gravels (50%)
-			0.10	are well rounded, f-med.	grad, max size is 1.52	2" most are 1" or
166	7000	Gular	0 1 0 1 0	1853. The unit is diffic	ult to drill; it append	ers to have been
200	<i></i>	HICNV-	0 1 1 0	subjected to heavy Nitric.	or Sulturic acid concent	ations - Pure Guess!
-			00	155-TS Gravelly Silty SA	nd (gm5). Gravel 2/2	
			-D-	Sitt 36%, 5And 43%	Gravel broken into	
-			0.50 0.50	peoples, <17 C, 20% med,	30f., 50% ut. SANd 35% 40	
-			బె.గె.సి.పి.	25% c, 20% M, 15% f, 5% VI	5. 30 % refie	
-	-			T.D. 259 695		
-				······		
-						
-						
-						
	L	244				
Reported	I By: J.	M.Fau	note,	65 Thomas Review	ved By: DC Weekes	
Title: G	<u>neð/oq</u> i	ist	/ Sug	ntist of Title:	Geologist	
Signature	MA	ustat a	May The	man Date. 30 00 Signat	ure: SC Theleer	Date: /1/3/00
	11	/	1' -		·	

Appendix B

Physical Properties Data

Appendix B

Physical Properties Data

This Appendix includes the results of testing for particle size distribution on split spoon samples from the wells 299-W22-80, 299-W22-81, 299-W22-82, 299-W22-83, 299-W23-20, and 299-W23-21. The analyses were done by CH2M Hill Hanford Inc using standard sieve techniques.

	SIEVE ANALYSIS												
WELL NAME	299-W22-80	DEPTH	213.3'-215.8'	SAMPLE#	W22-80-213.3	WELL ID#	C3115						
TESTED BY	JMW	CONTACT	Dave Weekes	PHONE	372-9524	DATE	09/08/2000						
SAMPLE	SIEVE	CUMULATIVE	% WEIGHT	%	Grain Size	COMMEN	rs						
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)								
982.30	2"	0.0	0.0	100.0	50.80								
	1.5"	0.0	0.0	100.0	38.10								
	3/4"	167.4	17.0	83.0	19.05								
	3/8"	297.6	30.3	69.7	9.42								
	#4	377.7	38.5	61.5	4.70								
	#10	469.1	47.8	52.2	1.98								
	#20	551.9	56.2	43.8	0.83								
	#40	627.6	63.9	36.1	0.42								
	#60	761.1	77.5	22.5	0.25								
	#100	825.8	84.1	15.9	0.150								
	#200	875.7	89.1	10.9	0.074								



Grain Size, mm

Comments:	Silty Sandy Gravel		
All data are acc	curately and completely recorded		
Checked By:	Maleekes	Date: 9/19/00	· · · · · · · · · · · · · · · · · · ·
	0····0		

SIEVE ANALYSIS

WELL NAME	299-W22-80	DEPTH	232.0'-234.5'	SAMPLE#	W22-80-232.0	WELL ID#	C3115
TESTED BY	JMW	CONTACT	Dave Weekes	PHONE	372-9524	DATE	09/08/2000
SAMPLE	SIEVE	CUMULATIVE	% WEIGHT	%	Grain Size	COMMEN	TS
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)		
925.30	2"	0.0	0.0	100.0	50.80		
	1.5"	0.0	0.0	100.0	38.10		
	3/4"	254.5	27.5	72.5	19.05		
	3/8"	440.3	47.6	52.4	9.42		
	#4	529.3	57.2	42.8	4.70		
	#10	598.0	64.6	35.4	1.98		
	#20	637.7	68.9	31.1	0.83		
	#40	678.2	73.3	26.7	0.42		
	#60	780.7	84.4	15.6	0.25		
	#100	823.1	89.0	11.0	0.150		
	#200	853.8	92.3	7.7	0.074		



Sieve Analysis Data for Sample W22-80-232.0





SIEVE ANALYSIS									
WELL NAME	299-W22-80	DEPTH	241.0'-243.5'	SAMPLE#	W22-80-241.0	WELL ID#	C311		
TESTED BY	JMW	CONTACT	Dave Weekes	PHONE	372-9524	DATE	09/08/200		
SAMPLE	SIEVE			~~~~~					
WT (g)	SIZE IN.	WEIGHT(q)	RETAINED	PASSING	(mm)		15		
663.90	2"	0.0	0.0	100.0	50.80				
	1.5"	0.0	0.0	100.0	38.10				
	3/4"	0.0	0.0	100.0	19.05				
	3/8"	0.0	0.0	100.0	9.42				
	#4	0.0	0.0	100.0	4.70				
	#10	0.0	0.0	100.0	1.98				
	#20	1.0	0.2	99.8	0.83				
	#40	141.6	21.3	78.7	0.42				
	#60	568.6	85.6	14.4	0.25				
	#100	631.2	95.1	4.9	0,150				

98.1

0.074

1.9

#200

651.4





CH2M Hill Hanford, Inc.	
 SIEVE ANALYSIS	

WELL NAME	299-W22-81	DEPTH	238.0'-239.5'	SAMPLE#	W22-81-238.0	WELL ID#	C3123
TESTED BY	John Wimett	CONTACT	Dave Weekes	PHONE	372-9130	DATE	01/26/2001
SAMPLE	SIEVE	CUMULATIVE	% WEIGHT	%	Grain Size	COMMEN	TS
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)		
980.10	2"	0.0	0.0	100.0	50.80		
	1.5"	0.0	0.0	100.0	38.10		
	3/4"	124.9	12.7	87.3	19.05	1	
	3/8"	236.9	24.2	75.8	9.42		
	#4	375.9	38.4	61.6	4.70		
	#10	525.2	53.6	46.4	1.98		
	#20	621.3	63.4	36.6	0.83		
	#40	671.2	68.5	31.5	0.42		
	#60	713.0	72.7	27.3	0.25		
	#100	775.4	79.1	20.9	0.150		
	#200	850.3	86.8	13.2	0.074	1	





Comments: Silty Sandy Gravel

All data are accurately and completely recorded.		· · · · · · · · · · · · · · · · · · ·
Checked By: Aleked	Date: 4/3/01	

SIEV	/E	A١	IAL	Y.	SIS
------	----	----	-----	----	-----

WELL NAME	299-W22-81	DEPTH	246.3'-247.8'	SAMPLE#	W22-81-246.3	WELL ID#	C3123
TESTED BY	John Wimett	CONTACT	Dave Weekes	PHONE	372-9130	DATE	01/26/2001
				•			
SAMPLE	SIEVE	CUMULATIVE	% WEIGHT	%	Grain Size	COMMEN	TS
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)		
982.80	2"	0.0	0.0	100.0	50.80		
	1.5"	0.0	0.0	100.0	38.10		
	3/4"	177.7	18.1	81.9	19.05		
	3/8"	352.1	35.8	64.2	9.42		
	#4	487.1	49.6	50.4	4.70		
	#10	595.6	60.6	39.4	1.98		
	#20	664.3	67.6	32.4	0.83		
	#40	715.5	72.8	27.2	0.42		<u>.</u>
	#60	795.2	80.9	19.1	0.25		<u> </u>
	#100	857.3	87.2	12.8	0.150		
	#200	897.0	91.3	8.7	0.074	[



Sieve Analysis Data for Sample W22-81-246.3



CH2M Hill Hanford, Inc.										
SIEVE ANALYSIS										
WELL NAME	299-W22-81	DEPTH	260.5'-262.5'	SAMPLE#	W22-81-260.5	WELL ID#	C3123			
TESTED BY	John Wimett	CONTACT	Dave Weekes	PHONE	372-9130	DATE	01/26/2001			
SAMPLE	SIEVE			0/	Grain Sizo		TC			
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)	COMMEN	15			
968.50	2"	0.0	0.0	100.0	50.80					
	1.5"	0.0	0.0	100.0	38.10					
	3/4"	184.1	19.0	81.0	19.05					
	3/8"	368.3	38.0	62.0	9.42					
	#4	507.8	52.4	47.6	4.70					
	#10	617.6	63.8	36.2	1.98					
	#20	668.9	69.1	30.9	0.83					
	#40	702.7	72.6	27.4	0.42					
	#60	811.9	83.8	16.2	0.25					
	#100	869.7	89.8	10.2	0.150					
	#200	900.6	93.0	7.0	0.074					





Sieve Analysis Data for Sample W22-81-260.5

CH2M Hill Hanford, Inc.								
SIEVE ANALYSIS								
WELL NAME	299-W22-83	DEPTH	233.0'-234.0'	SAMPLE#	W22-83-233.0	WELL ID#	C3126	
TESTED BY	John Wimett	CONTACT	Dave Weekes	PHONE	372-9130	DATE	03/23/2001	
·····								
SAMPLE	SIEVE	CUMULATIVE	% WEIGHT	%	Grain Size	COMMEN	TS	
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)			
983.00	2"	0.0	0.0	100.0	50.80	[

0.0

24.9

41.5

50.9

58.4

64.5

69.1

77.9

84.7

89.6

100.0

75.1

58.5

49.1

41.6

35.5

30.9

22.1

15.3

10.4

38.10

19.05

9.42

4.70

1.98

0.83

0.42

0.25

0.150

0.074

1.5"

3/4"

3/8"

#4

#10

#20

#40

#60

#100

#200

0.0

244.7

407.6

500.2

574.4

634.4

679.2

765.4

832.8

880.7

U.S. St	d. Sieve بالم	.4		4	9	2	Q	8	8	20			
100%		<u>.</u>	<u>~~</u> ::::	*	*	*	*		*	*			
90%													
80%		\sum		+ + + + + + + + + + + + + + + + + + + +									
70%							• • • • • • • • • • • • • • • • • • • •						
60%													
50%										-		·····	
40%													
30%							>						
20%										-			
10%				÷						\			
0%											·		

Comments:	Silty Sandy Gravel		
All data are acc	curately and completely recorded.		
Checked By:	Allered	Date: 4/3/0/	
	<i>V</i> . <i>V</i> .		

			CH2M Hill Hanford, Inc.		
WELL NAME	299-W22-83	DEPTH	248.0'-249.0' SAMPLE#	W22-83-248.0 WELL ID#	C3126

W22-83-248.0 WELL ID#

0.1

0.01

C3126

TESTED BY	John Wimett	CONTACT	Dave Weekes	PHONE	372-9130	DATE 03/23/2001
SAMPLE	SIEVE	CUMULATIVE	% WEIGHT	%	Grain Size	COMMENTS
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)	
963.70	2"	0.0	0.0	100.0	50.80	
	1.5"	108.8	11.3	88.7	38.10	
	3/4"	248.5	25.8	74.2	19.05	
	3/8"	354.0	36.7	63.3	9.42	
	#4	450.2	46.7	53.3	4.70	
	#10	548.6	56.9	43.1	1.98	
	#20	618.4	64.2	35.8	0.83	
	#40	667.4	69.3	30.7	0.42	
	#60	721.4	74.9	25.1	0.25	
	#100	780.8	81.0	19.0	0.150	
	#200	832.6	86.4	13.6	0.074	



1. Grain Size, mm



10.

100.

SIEVE	ANA	LYSIS
-------	-----	-------

WELL NAME	299-W22-83	DEPTH	262.0'-264.0'	SAMPLE#	W22-83-262.0	WELL ID#	C3126
TESTED BY	John Wimett	CONTACT	Dave Weekes	PHONE	372-9130	DATE	03/23/2001
SAMPLE	SIEVE	CUMULATIVE	% WEIGHT	%	Grain Size	COMMEN	TS
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)		
980.90	2"	0.0	0.0	100.0	50.80		
	1.5"	302.9	30.9	69.1	38.10		
	3/4"	378.3	38.6	61.4	19.05		
	3/8"	509.1	51.9	48.1	9.42		
	#4	597.7	60.9	39.1	4.70		
	#10	671.3	68.4	31.6	1.98		
	#20	715.6	73.0	27.0	0.83		
	#40	739.9	75.4	24.6	0.42		
	#60	775.0	79.0	21.0	0.25		
	#100	856.0	87.3	12.7	0.150		
	#200	905.7	92.3	7.7	0.074		





		C	H2M Hill Hant	ord, Inc.			
			SIEVE ANAL	YSIS			
WELL NAME	299-W23-20	DEPTH	219.5'-220.0'	SAMPLE#	W23-20-219 5		C3112
TESTED BY	JMW	CONTACT	Dave Weekes	PHONE	372-9524	DATE	08/02/2000
SAMPI F	SIEVE			0/		COMMEN	TO
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)		15
708.60	2"	0.0	0.0	100.0	50.80		
	1.5"	0.0	0.0	100.0	38.10		
	3/4"	111.9	15.8	84.2	19.05		
	3/8"	219.9	31.0	69.0	9.42		· · · ·
	#4	309.7	43.7	56.3	4.70		
	#10	387.0	54.6	45.4	1.98		
	#20	432.4	61.0	39.0	0.83		
	#40	472.5	66.7	33.3	0.42		
	#60	511.6	72.2	27.8	0.25		
	#100	553.3	78.1	21.9	0.150		
	#200	593.8	83.8	16.2	0.074		



Sieve Analysis Data for Sample W23-20-219.5

Comments:	Silty Sandy Gravel
-----------	--------------------

All data are accurately and completely recorded.	· · · · · · · · · · · · · · · · · · ·
Checked By:	Date:

		C C	HZM HIII Hant	ord, Inc.			
L			SIEVE ANAL	YSIS		÷	
WELL NAME	299-W23-20	DEPTH	236.0'-237.5'	SAMPLE#	W23-20-236	WELL ID#	C3112
TESTED BY	JMW	CONTACT	Dave Weekes	PHONE	372-9524	DATE	08/02/2000
·	_						
SAMPLE	SIEVE		% WEIGHT	%	Grain Size	COMMEN	TS
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)		
874.40	2"	0.0	0.0	100.0	50.80		
	1.5"	0.0	0.0	100.0	38.10		
	3/4"	0.0	0.0	100.0	19.05		
	3/8"	192.1	22.0	78.0	9,42		· · · ·
	#4	334.0	38.2	61.8	4.70		
	#10	448.6	51.3	48.7	1.98		

60.9

72.6

78.8

83.8

88.6



Sieve Analysis Data for Sample W23-20-236

39.1

27.4

21.2

16.2

11.4

0.83

0.42

0.25

0.150

0.074

Commonto	Cille Construction
Comments:	Sity Sandy Gravel

#20

#40

#60

#100

#200

532.4

634.5

689.2

732.8

774.3

Checked By: Date:	

		C	H2M Hill Hanf	ord, Inc.	· · · · · · · · · · · · · · · · · · ·		
L	<u></u>		SIEVE ANAL	YSIS			
WELL NAME	299-w23-20	DEPTH	250.1'-252.6'	SAMPLE#	W23-20-250.1	WELL ID#	C3112
TESTED BY	JMW	CONTACT	Dave Weekes	PHONE	372-9524	DATE	08/03/2000
SAMPLE	SIEVE	CUMULATIVE	% WEIGHT	%	Grain Size	COMMEN	TS
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)		
972.50	2'	0.0	0.0	100.0	50.80		

1.5"	0.0	0.0	100.0	38.10	
3/4"	185.3	19.1	80.9	19.05	
3/8"	500.5	51.5	48.5	9.42	
#4	562.2	57.8	42.2	4.70	
#10	600.3	61.7	38.3	1.98	
#20	626.9	64.5	35.5	0.83	
#40	732.0	75.3	24.7	0.42	
#60	851.8	87.6	12.4	0.25	
#100	888.1	91.3	8.7	0.150	
#200	913.6	93.9	6.1	0.074	

50.80



Comments:	Sandy Gravel
-----------	--------------

All data are accurately and completely recorded.		
Checked By:	Date:	

		CI	H2M Hill Hanf	ord, Inc.			
			SIEVE ANAL	YSIS			
	200 14/22 21	DEDTU	017 01 010 Ft		14/00 04 04 7 0		
TESTED BY	299-0023-21	DEPTH	217.0-219.5	SAMPLE#	W23-21-217.0	WELL ID#	C3113
LIESTED BT	JIVIVV	CONTACT	Dave Weekes	PHONE	372-9524	DATE	11/09/2000
	T						
SAMPLE	SIEVE	CUMULATIVE	% WEIGHT	%	Grain Size	COMMEN	TS
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)		
949.60	2"	0.0	0.0	100.0	50.80		
	1.5"	0.0	0.0	100.0	38.10		
	3/4"	64.1	6.8	93.2	19.05		
	3/8"	221.1	23.3	76.7	9.42		
	#4	344.4	36.3	63.7	4.70		
	#10	474.4	50.0	50.0	1.98		
	#20	585.9	61.7	38.3	0.83		
	#40	651.3	68.6	31.4	0.42		
	#60	718.3	75.6	24.4	0.25		
	#100	794.6	83.7	16.3	0.150		
	#200	856.9	90.2	9.8	0.074		



Sieve Analysis Data for Sample W23-21-217.0

CH2M	Hill	Hanf	ord,	Inc.

				,						
SIEVE ANALYSIS										
WELL NAME	299-W23-21	DEPTH	232.0'-234.0'	SAMPLE#	W23-21-232.0	WELL ID#	C3113			
TESTED BY	JMW	CONTACT	Dave Weekes	PHONE	372-9524	DATE	11/09/2000			
SAMPLE	SIEVE	CUMULATIVE	% WEIGHT	%	Grain Size	COMMEN	TS			
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)					
982.80	2"	0.0	0.0	100.0	50.80					
	1.5"	0.0	0.0	100.0	38.10					
	3/4"	127.9	13.0	87.0	19.05					
	3/8"	237.9	24.2	75.8	9.42					

33.5

46.0

56.0

61.8

71.0

77.7

83.8

66.5

54.0

44.0

38.2

29.0

22.3

16.2

4.70

1.98

0.83

0.42

0.25

0.150

0.074

#4

#10

#20

#40

#60

#100

#200

329.4

452.5

549.9

607.6

698.0

763.9

823.1

U.S. St	d. Sieve	ŗ,	4.	0	**	0	° O	ç	<u></u>	8		
100%			3	<u> </u>	#	*	¥	#	<u>¥ ¥</u>	<u> </u>	 	
90%												
80%											 	
70%											 	
60%					\mathbf{h}							
50%											 	
40%											 	
30%												
20%												
10%											 	
0%												
10	00.			10 .			1.			0.1		4



		CI	H2M Hill Hanf	ord, Inc.							
SIEVE ANALYSIS											
	299-W23-21	DÉPTH	247 5'-248 5'	SAMPLE#	W/23-21-247 5		C3113				
TESTED BY	JMW	CONTACT	Dave Weekes	PHONE	372-9524	DATE	11/09/2000				
SAMPLE	SIEVE		% WEIGHT	%	Grain Size	COMMEN	TS				
WT (g)	SIZE IN.	WEIGHT(g)	RETAINED	PASSING	(mm)						
981.20	2"	0.0	0.0	100.0	50.80						
	1.5"	0.0	0.0	100.0	38.10						
	3/4"	100.3	10.2	89.8	19.05						
	3/8"	287.8	29.3	70.7	9.42						
	#4	388.9	39.6	60.4	4.70						
	#10	477.1	48.6	51.4	1.98						
	#20	554.7	56.5	43.5	0.83						
	#40	621.2	63.3	36.7	0.42						
	#60	712.3	72.6	27.4	0.25						
	#100	805.5	82.1	17.9	0.150						
	#200	875.5	89.2	10.8	0.074						





Sieve Analysis Data for Sample W23-21-247.5

Appendix C

Borehole Geophysical Logs

Appendix C

Borehole Geophysical Logs

This appendix contains the borehole geophysical logs obtained from boreholes 299-W22-81, 299-W22-83, 299-W22-83, and 299-W23-21. The logs were run and analyzed by Duratek, Waste Management Federal Services Northwest, Inc. and MacTec Inc. Log Header sheets and Log Analysis Summary Reports are included with the logs.

Log Data Report 299-W22-81

Borehole Information

Site:	East of	SX Tank Farm; RC	RA well	Sit	e Number:	299-W22-81		
N-Coord: N/A			E-Coord: N/A			TOC Elev	N/A	
GW Depth:	235.4 ft	Log Date:	1/22/01	Date Drilled:	01/22/01	TD, (ft):	268.4 ft	
Casing Record		(all casing dep	ths in feet	relative to grou	nd surface)		Page: 1	
Туре:				ID, in.	Thick, in.	Тор	Bottom	
Steel-thread				9.25	0.75	1.9' AGS	269.0	

Borehole Notes:

Borehole 299-W22-81 (C3123) was drilled in January 2001 to a total depth of 268.4 ft. A cable-tool drilling rig was used to install the borehole. Single casing was present from 1.9 ft above ground surface to a total depth of 269.0 ft and was comprised of 9.25-in.-diameter, 0.75-in.-thick threaded steel. At the time analysis was performed, the borehole coordinates and ground surface elevation were not available. The zero reference for all log depths is the ground surface. The depth to water reported by the well site geologist was 226.3 ft, but the measurements from the neutron logging suggest the depth to water was at approximately 235.4 ft at the time of logging.

Equipment Information

Log System:	2B		Туре:	HPGe	Efficiency:	35%
Cal Date:	Feb-00	Cal Ref:	GJO-HAN-30		Log Proc:	MAC-VZCP 1.7.10-1, Rev 3

Log Event	A	A		
Log Run No.	1	2		
Date	1/22/01	1/22/01		
Logging Engineer	A. Pearson	A. Pearson		
Start depth, (ft)	0.0	130.0		
Finish depth (ft)	160.0	264.0		
Count time (sec)	n/a	n/a		
Live Time / Real Time:	L	L		
Shield	None	None		
MSA Interval, (ft)	0.5	0.5		
Logging speed, (ft/min)	0.7 ft/min	0.7 ft/min		

Logging Information

Logging Operation Notes:

Logging operations were performed by MACTEC-ERS under contract with Duratek Federal Services, who also specified the logging parameters. This borehole was logged with the MACTEC-ERS Spectral Gamma Logging System (SGLS) in two log runs to a total depth of 264 ft. Details for the SGLS logging events and log runs are presented in the *Logging Information* section of this report. Neutron logging events are not recorded in this Log Data Report.

Log run two (130-264 ft) overlaps part of log run one (0-160 ft) and defines the repeat interval (130-160 ft) for the SGLS survey. The repeat log run was performed to check for depth and concentration repeatability

Log Data Report 299-W22-81

Analysis Information

Analyst:	R. Spatz, R. McCain
Analysis	Ref: MAC-VZCP 1.7.9, Rev. 2
A	NI_4

2/12/01 **Date:** Page:

2

Analysis Notes:

Log analysis was performed by MACTEC-ERS under contract with Duratek Federal Services. The pre- and post-survey field verification spectra met the acceptance criteria established for peak shape and detector efficiency. The energy calibration and peak-shape calibration from these spectra were used in processing the log spectra. Dead time was less than 10% throughout the borehole and no dead time corrections were applied. Repeat logging intervals were collected at the depths shown in the combination plot. Excellent repeatability is shown, confirming an acceptable performance of the logging systems.

A casing correction factor for 0.75-in.-thick steel casing was applied to the data between depths of 0 and 264 ft. A water correction factor was also applied to spectral data collected below the depth of 235.4 ft. At the time of logging, grout was not present around the borehole.

Gamma-ray photon peaks associated with specific energies were used to calculate concentrations in picocuries per gram (pCi/g) for naturally occurring radionuclides potassium-40 (K-40), uranium-238 (U-238), and thorium-232 (Th-232) (KUT), with gammaray energies of 1460.8, 609.3, and 2614.5 keV, respectively.

Shorter than optimal system counting time (0.7 ft/min) for relatively thick casing (0.75-in.-thick) is the cause of the intermittent detection of U-238 (609.3 keV).

Spectral data analysis at the 85.75- and 165.75-ft depths, using the routine processing software, calculated two very low concentrations of Cs-137. Review of the spectra shows high counting errors; therefore, the peaks are not considered statistically valid. In the absence of additional Cs-137 being detected from above or below these intervals, the existence of the Cs-137 could not be corroborated and was removed from the log plots

Higher than average KUT concentrations below the depth of 256 ft may be attributed to a lithology change, or the absence of casing, which caused the concentrations to be overestimated at this depth.

Neutron data acquired with the SGLS using Duratek Federal Services' neutron moisture sonde are presented in neutron count rate instead of percent volumetric moisture, because this tool is not calibrated on the SGLS.

Log Plot Notes:

Separate log plots are provided for total gamma, total neutron, and naturally occurring radionuclides (KUT). A plot of the total neutron count rate is provided on the combination plot as well as on several plots showing total gamma and total neutron count rates.

Results / Interpretations:

Borehole 299-W22-81 was logged with the SGLS on January 22, 2001. A neutron and spectral gamma survey were both conducted in this borehole and recorded as log Events A and B, respectively,

Man-made contaminants were not detected by the SGLS survey. Naturally occurring U-238 and Th-232 concentrations increase between 130 and 140 ft, and KUT concentrations increase between 142 and 160 ft, which may indicate lithology changes. The total gamma count rate correlates at those depths where KUT concentrations increase. Neutron logging detected ground water at the 235.4-ft depth.



C.4

Spectral Gamma Survey

Duratek Federal Services

Project: RCRA Well Well: 299-W22-81

Log Date: January 22, 2001 Depth Datum: Ground Level



Spectral Gamma Survey

Duratek Federal Services

Project: RCRA Well Well: 299-W22-81

Log Date: January 22, 2001 Depth Datum: Ground Level



Spectral Gamma Survey

Duratek Federal Services

Project: RCRA Well

Well: 299-W22-81

Log Date: January 22, 2001 Depth Datum: Ground Level



C.7


Spectral Gamma Survey



Spectral Gamma Survey



Spectral Gamma Survey

Neutron-Neutron Moisture Borehole Survey

Duratek Federal Services, Inc.

Log Header

Project: 2000 RCRA Drilling

Well: 299-W22-81

Log Type: Moisture Gauge

Borehole Information			
Well # <u>C3123</u>	Water Depth 235 ft	Total Depth 269 ft	
Elevation Reference <u>n/a</u>	Elevation <u>n/a</u> ft	·	
Depth Reference Ground Surface	Casing Stickup <u>1.9</u> ft		
Casing Diameter 9.25ID in	Depth Interval 0 to 269 ft	Thickness <u>0.75</u> in	

*235 ft water depth is from log response of 1-22-01, geologist's set water depth at 226 ft

Logging Information

Log Type:	Moisture Gauge
Company	Duratek Federal Services, Inc.
Date/Archive File Name	January 22, 2001 2W22081
Logging Engineers	A. Pearson
Instrument Series	RLSM00.0
Logging Unit	RLS-2
Depth Interval	0 to 100 ft Prefix FOBA1
	90 to 190 ft FOBA2
	180 to 236 ft FOBA3
Instrument Calibration Date	July 14, 2000 WHC SD EN TI 206 Boy 0
Canoration Report	WIIC-5D-EN-11-500, Nev. 0

Analysis Information

	Company	Three Rivers Scientific
	Analyst	Russ Randall
	Date	February 5, 2001
Notes	Moisture values range from 3% to 21 235 feet is due to the proximity of the the 9.25 inch casing diameter from s	% for the depths logged. The onset of high moisture readings at water level in the borehole. No valid calibration is available for urface to 269 feet. The calibration for the 10.75 inch borehole
	diameter was extrapolated from standa	ard diameter conditions, and casing correction applied to all depths
	logged.	

Moisture Log Analysis & Summary

Duratek Federal Services, Inc.

Project:	2000 RCRA Drilling	Well ID:	299-W22-81
Log Type:	Moisture Gauge	Log Date:	January 22, 2001

General Notes:

The largest borehole diameter for the calibration models is an 8.64 inch borehole diameter, with .32 inch casing thickness, and the borehole diameter in these log data is 10.75 inches. Therefore, an extrapolation was calculated for the applied calibration coefficients to match the conditions of the logged borehole. The method of extrapolation generated conservative estimates for the moisture values (possibly lower values than a valid calibration). The size differential of this borehole from the calibration standard is at the limits of rigorous extrapolation; however, the resultant moisture values appear to be near those commonly encountered for vadose zone results at the Hanford site.

Log data collected with a depth reference of ground surface.

System Performance Verify: The pre- and post-log verification passed performance standards, +1.3% change from start of log to end of log, in the shield verify.

Repeat Interval: Based on the repeat intervals from 91 to 100 feet and 181 to 190 feet, the logging system performed according to specifications.

Environmental Corrections: The moisture levels have been corrected for casing thickness (0.75 inch) for all well depths logged. No formation density correction has been applied because density values are not available.

Observations:

The moisture levels show values ranging from 3% to 21% for all depth intervals logged. The abnormally high readings that begin at 235 feet are a response to the water level at 235 feet. Note that geologist's information puts the water depth at 226 feet. The date of the geologist's information is unknown, but the moisture log response puts the water depth of 235 feet on January 22, 2001.

Duratek Federal Services, Inc.

Project: 2000 RCRA Drilling

Borehole:

Log Date : January 22, 2001

299-W22-81 Depth Datum : Ground Surface



Gross Gamma (c/s)

Calibration extrapolated to 10.75 inch borehole diameter Casing thickness correction for 0.75 inch Analysis by Three Rivers Scientific

Duratek Federal Services, Inc.

Project: 2000 RCRA Drilling

299-W22-81

Borehole:

Log Date : January 22, 2001 Depth Datum : Ground Surface



Spectral Gamma & Moisture Survey

Duratek Federal Services

Project: RCRA Well Well: 299-W22-81 Log Date: January 23 &24, 2001 Depth Datum: Ground Level



Spectral Gamma & Moisture Survey

Duratek Federal Services

Project: RCRA Well Well: 299-W22-81

Log Date: January 23&24, 2001 Depth Datum: Ground Level



C.16

Spectral Gamma & Moisture Survey

Duratek Federal Services

Project: RCRA Well Well: 299-W22-81

Log Date: January 23&24, 2001 Depth Datum: Ground Level



Duratek Federal Services

Log Header

Project: RCRA Drilling

Well: 299-W22-83

Log Type: HPGe Spectral Gamma Ray

Borehole Information				
Well # <u>C3126</u>	Water Depth	236*	ft	Total Depth 274.2 ft
Elevation Reference <u>n/a</u>	Elevation	n/a	ft	
Depth Reference Ground Surface	Casing Stickup	1.75	_ft	
Casing Diameter 9.25 ID in	Depth Interval	0 to 273	_ft	Thickness <u>0.75</u> in

*Water depth determined from Moisture Log

Logging Information

Log Type:	HPGe Spectral Gamma	Ray	
Company	Duratek Federal Service	s	
Date/Archive File Name	March 7, 2001 H2W22	2083	
Logging Engineers	R. Steffler		
Instrument Series	RLSG07000S01.0		
Logging Unit	RLS-1		
Depth Interval	0 to 50 ft	Prefix	A710
	48 to 160 ft		A711
	135 to 273 ft		A712
Instrument Calibration Date	Oct 6, 2000		
Calibration Report	WHC-SD-EN-TI-292, F	Rev 0.	

	•		
Analy	1010	Intorr	nation
A iai	1313		nauon

	Company	Three Rivers Scientific
	Analyst	Russ Randall
	Date	March 12, 2001
Notes	No man-made contamination was detected detection threshold. The water level from thresholds.	Many depth intervals have the natural uranium levels below 236 to 273 also reduces the gross gamma and raises detection

Spectral Gamma Ray Log Analysis & Summary

Waste Management Federal Services

Project:	RCRA Drilling	Well:	299-W22-83
Log Type:	HPGe Spectral Gamma Ray	Log Date:	March 7, 2001

General Notes:

Total gamma is a response to geologic concentrations of natural radionuclides. A change in sensitivity of gross gamma to geologic concentrations of natural radionuclides occurs at the water level (236 feet).

Log data collected with a depth reference of ground surface.

System Performance Verify: The pre- and post-log verification passed performance standards; a -0.03% change was observed in the gross, (based upon borehole survey data sheet). The FWHM of the 583 keV photo peak was also within specifications for pre- and post-log verification.

Repeat Interval: Based on the repeat interval, the logging system performed as per specifications.

Environmental Corrections: All radionuclide concentrations have been corrected for casing attenuation (entire well). Water correction was applied to depths deeper than 236 feet. The information on the borehole survey data sheet indicates the water depth of 225 feet, but the moisture log response and the HPGe log response puts the water depth at 236 feet. No casing correction was applied to the total gamma due to Compton downscatter interference.

Radionuclides:

No man-made radionuclide contamination was detected. This observation was confirmed using a summing technique for the spectral data.

The natural uranium concentration is below detection threshold over many intervals. The changes in gross gamma from 130 to 150 and from 190 to 230 feet are reflected by changes in potassium, uranium, and thorium; which are indicative of geologic effects. Note that the use of the uranium signal is difficult due to the high statistical deviations and the high detection threshold. The drop in gross gamma at 236 feet is due to the water attenuation within the well. The rise in gross at 264 feet is reflected in a rise in the potassium and uranium over this same interval indicative of geologic changes just below the water level.

Duratek Federal Services



Duratek Federal Services





Neutron-Neutron Moisture Borehole Survey

Duratek Federal Services, Inc.

Log Header

Project: RCRA Drilling

Well: 299-W22-83

Log Type: Moisture Gauge

Borehole Information			
Well # <u>C3126</u>	Water Depth 236* ft	Total Depth 274.2 ft	
Elevation Reference <u>n/a</u>	Elevation <u>n/a</u> ft	-	
Depth Reference Ground Surface	Casing Stickup <u>1.75</u> ft		
Casing Diameter 9.25 ID in	Depth Interval 0 to 274 ft	Thickness <u>0.75</u> in	

*Water level determined from Moisture Log

Logging Information

Log Type:	Moisture Gauge
Сотрапу	Duratek Federal Services, Inc.
Date/Archive File Name	March 8, 2001 M2W22083
Logging Engineers	J. Meisner
Instrument Series	RLSM00.0
Logging Unit	RLS-1
Depth Interval	0 to 100 ft Prefix MA91
	95 to 200 ft MA92
	175 to 234 ft MA93
Instrument Calibration Date	July 14, 2000
Calibration Report	WHC-SD-EN-TI-306, Rev. 0

Analysis Information

	Company	Three Rivers Scientific
	Analyst	Russ Randall
	Date	March 12, 2001
Notes	Moisture values range from 2% to 18% for the 234 feet is due to the proximity of the water the 9.25 inch casing diameter from surface the diameter was extrapolated from standard diameter logged.	the depths logged. The onset of high moisture readings at evel in the borehole. No valid calibration is available for o 273 feet. The calibration for the 10.75 inch borehole eter conditions, and casing correction applied to all depths

Duratek Federal Services, Inc.

Project: RCRA Drilling

Log Date : March 8, 2001 Depth Datum : Ground Surface

Borehole: 299-W22-83



Duratek Federal Services, Inc.

Project: RCRA Drilling

Log Date : March 8, 2001

299-W22-83 Borehole:

Depth Datum : Ground Surface



Moisture Log Analysis & Summary

Duratek Federal Services, Inc.

Project:	RCRA Drilling	Well ID:	299-W22-83
Log Type:	Moisture Gauge	Log Date:	March 8, 2001

General Notes:

The largest borehole diameter for the calibration models is an 8.64 inch borehole diameter, with 32 inch casing thickness, and the borehole diameter in these log data is 10.75 inches. Therefore, an extrapolation was calculated for the applied calibration coefficients to match the conditions of the logged borehole. The method of extrapolation generated conservative estimates for the moisture values (possibly lower values than a valid calibration). The size differential of this borehole from the calibration standard is at the limits of rigorous extrapolation.

Log data collected with a depth reference of ground surface.

System Performance Verify: The pre- and post-log verification passed performance standards, -7.4% change from start of log to end of log, in the shield verify.

Repeat Interval: Based on the repeat intervals from 95 to 100 feet and 175 to 200 feet, the logging system performed according to specifications.

Environmental Corrections: The moisture levels have been corrected for casing thickness (0.75 inch) for all well depths logged. No formation density correction has been applied because density values are not available.

Observations:

The moisture levels show values ranging from 2% to 18% for all depth intervals logged. The average readings are somewhat lower than usual for Hanford vadose zone moisture levels, indicating that the calibration extrapolation is under correcting for the borehole diameter of this borehole. The abnormally high readings that begin at 234 feet are a response to the water level at 236 feet. Note that geologist's information puts the water depth at 225 feet. The date of the geologist's information is unknown, but the moisture log response and the HPGe log response put the water depth of 236 feet on March 8, 2001.

Waste Management Federal Services

Log Header

Project: 2000 RCRA Drilling

Well: 299-W23-21

Log Type: HPGe Spectral Gamma Ray

Borehole Information				
Well # <u>C3113</u>	Water Depth	<u>212.5</u> ft	Total Depth <u>257.5</u> ft	
Elevation Reference <u>n/a</u>	Elevation	<u>n/a</u> ft		
Depth Reference Ground Surface	Casing Stickup	<u>3.86</u> ft		
Casing Diameter <u>10.125 ID</u> in	Depth Interval	<u>0 to 70</u> ft	Thickness <u>0.75</u> in	
Casing Diameter <u>7.625 ID</u> in	Depth Interval	<u>0 to 253.5 ft</u>	Thickness <u>0.5</u> in	

Logging Information

Log Type:	HPGe Spectral Gamm	na Ray
Company	waste Management P	ederal Services
Date/Archive File Name	October 30, 2000	H2W23021
Logging Engineers	J. Meisner	
Instrument Series	RLSG07000S01.0	. 이 가장 가장 같은 것이 가지 않는 것이 있는 것이 있는 것이 있다.
Logging Unit	RLS-1	
Depth Interval	0 to 160 ft	Prefix A702
	146 to 243.5 ft	Prefix A703
Instrument Calibration Date	Oct 6, 2000	
Calibration Report	WHC-SD-EN-TI-292	, Rev 0.
방송 경험에 가는 것이 같은 것이 집중 것을 받았다.		

Analysis Information

Company	Three Rivers Scientific
Analyst	Russ Randall
Date	November 25, 2000
Notes No man-made contamination was detected.	The depth interval 0 to 80 feet shows the natural uranium
levels are at or below detection threshold. I	ikewise, the thorium levels are at or below detection levels
from 210 to 243 feet. The dual casing from	1 0 to 70 feet reduces the gross gamma and raises detection
thresholds. The water level from 212 to	265 also reduces the gross gamma and raises detection
thresholds.	

Waste Management Federal Services



Waste Management Federal Services





Waste Management Federal Services

Spectral Gamma Ray Log Analysis & Summary

Waste Management Federal Services

Project:	2000 RCRA Drilling	Well:	299-W23-21
Log Type:	HPGe Spectral Gamma Ray	Log Date:October	30 & 31, 2000

General Notes:

Total gamma is a response to geologic concentrations of natural radionuclides. Two changes in sensitivity of gross gamma to geologic concentrations of natural radionuclides occur at the dual casing change (70 feet) and the water level (212 feet).

Log data were collected with a depth reference of ground surface.

System Performance Verify: The pre- and post-log verification passed performance standards; a -9.1% and +0.3% change was observed in the gross (day 1 and day 2, respectively). The FWHM of the 583 keV photo peak was also within specifications for pre- and post-log verification.

Repeat Interval: Based on the repeat interval, the logging system performed as per specifications.

Environmental Corrections: All radionuclide concentrations have been corrected for casing attenuation (entire well). Water correction was applied to depths deeper than 212 feet. No casing correction was applied to the total gamma due to Compton downscatter interference.

Radionuclides:

No man-made radionuclide contamination was detected.

The natural uranium concentration is below detection threshold from 0 to 80 feet, and the thorium is below detection threshold from 210 to 240 feet. Both of these intervals have additional gamma attenuation due to dual casing from 0 to 70 feet and the water annulus from 212 to 265 feet.

The changes in gross gamma from 75 to 110 feet are reflected by changes in potassium, uranium, and thorium; which is indicative of geologic effects.

Neutron-Neutron Moisture Borehole Survey

Waste Management Federal Services

Log Header

Project: 2000 RCRA Drilling

Well: 299-W23-21

Log Type: Moisture Gauge

Borehole Information				
Well # <u>C3113</u>	Water Depth <u>212.5</u> ft	Total Depth 257.5 ft		
Elevation Reference <u>n/a</u>	Elevation <u>n/a</u> ft	-		
Depth Reference Ground Surface	Casing Stickup <u>3.86</u> ft			
Casing Diameter <u>10.25 ID</u> in	Depth Interval <u>0 to 70</u> ft	Thickness <u>0.75</u> in		
Casing Diameter 7.625 ID_in	Depth Interval 0 to 253.5 ft	Thickness <u>0.5</u> in		

Logging Information

Log Type:	Moisture Gauge	
Company	Waste Management Federal Services	
Date/Archive File Name	October 31, 2000	M2W23021
Logging Engineers	J. Meisner	12월 22일 전 12일 전 12월 12일 전
Instrument Series	RLSM00.0	
Logging Unit	RLS-1	
Depth Interval	0 to 8; 65 to 164 ft	Prefix MA68
	140 to 202 ft	MA69
Instrument Calibration Date	July 14, 2000	
Calibration Report	WHC-SD-EN-TI-306,	Rev. 0
동안 전쟁이 모양이 가장을 알려왔다. 이 가지 않는	이는 것 이 가지 않는 것이라. 이 분분명 관람	방법이 한 방법에 가슴을 걸려 가지 않는 것이 같이 많이 많이 했다.

Analysis Information

	Company Three Rivers Scientific
	Analyst Russ Randall
	Date November 25, 2000
Notes	Moisture values range from 2% to 32% for the depths logged. The onset of high readings at 212 feet is
	due to the proximity of the water level in the borehole. No valid calibration is available for the 10 inch
	casing diameter from surface to 70 feet, thus the application of the 8 inch calibration is plotted as a blue
	line (with circle symbols) over 0 to 8.5 and 65 to 70 feet.

Waste Management Federal Services

Project: RCRA Drilling	Log Date: October 31, 2000
Borehole: 299-W23-21	Depth Datum: Top of Casing



Moisture Vol. %

Waste Management Federal Services



Waste Management Federal Services

Project: RCRA DrillingLog Date : October 31, 2000Borehole: 299-W23-21Depth Datum: Top of Casing



Moisture Log Analysis & Summary

Waste Management Federal Services

Project:	2000 RCRA Drilling	Well ID:	299-W23-21
Log Type:	Moisture Gauge	Log Date:	October 31, 2000

General Notes:

The 8 inch calibration coefficients were used for all logged depths. The 8 inch calibration standard has an 8.64 inch borehole diameter, with .32 inch casing thickness, and the borehole diameter in these log data is 8.625 inches. The depth interval from 0 to 8.5 feet and from 65 to 70 feet has both the 8 inch and 10 inch casing. Thus the inappropriate use of the 8 inch calibration over these depths is plotted with a blue line and circle symbols. Note: no calibration exists for the 10 inch casing.

Log data were collected with a depth reference of ground surface.

System Performance Verify: The pre- and post-log verification passed performance standards, -0.9% change from start of log to end of log, in the shield verify.

Repeat Interval: Based on the repeat interval from 140 to 164 feet and 202 to 213 feet, the logging system performed according to specifications.

Environmental Corrections: The moisture levels have been corrected for casing thickness (0.5 inch) for all well depths logged. No formation density correction has been applied because density values are not available.

Observations:

The moisture levels show values ranging from 2% to 32% for the depth interval from 70 feet to 212 feet. The abnormally high readings that begin at 212 feet are a response to the water level at 212 feet.

Variable moisture structure shows from 75 to 212 feet. Over this depth interval, there is some correlation with the gross gamma signature, and sections with little correlation. Therefore, moisture content is sensitive to the geologic structure over this interval, while the changes in natural radionuclides is not as sensitive to the geologic structure.

The very low readings from 65 to 70 feet may be due to voids behind the casing.

Distribution

No. of <u>Copies</u>	No <u>Co</u>	. of <u>pies</u>	
OFFSITE	3	CH2M HILL Group	
Confederated Tribes of the Umatilla Indian Reservation		A. J. Knepp (2) D. A. Myers	H0-22 H0-22
P.O. Box 638 Pendleton, OR 97801	2	CH2M HILL Hanford, Inc.	
ATTN: J. R. Wilkerson		J. V. Borghese D. C. Weekes	H9-03 H9-02
L. Seelatsee Wanapum Band Grant County P.U.D.	3	Washington State Department of Ec	cology
30 "C" Street S.W. P.O. Box 878		B. Goswami A. D. Huckaby	B5-18 B5-18
Ephrata, WA 98823		M. Brown	B5-18
P. Sobotta Nez Perce Tribe		U.S. Environmental Protection Agen	ncy
Environmental Restoration/Waste Management		C. A. Faulk	B5-01
P.O. Box 365 Lapwai, ID 83540-0365	13	Pacific Northwest National Laborate	ory
Confederated Tribes and Rands of the		V. G. Johnson (3)	K6-96
Yakama Nation		S. P. Luttrell	K6-96
Environmental Restoration/Waste		W. J. Martin B. A. Williams	K6-81 K6-81
2808 Main Street		Hanford Technical Library (2)	P8-55
Union Gap, WA 98903 ATTN: R. Jim		DOE Public Reading Room (2)	H2-53

ONSITE

3 DOE-RL

M. J. Furman (2)	A5-13
R. M. Yasek	H6-60