

DRAFT
WELL INSTALLATION REPORT
FOR SAN GABRIEL VALLEY NPL AREA 3
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SAN GABRIEL BASIN
LOS ANGELES COUNTY, CALIFORNIA

EPA CONTRACT NO. 68-W-98-225
EPA WORK ASSIGNMENT NO. 041-RICO-09ES
CH2M HILL PROJECT NO. 175859.FI.03

Prepared for
U.S. Environmental Protection Agency
Region IX
75 Hawthorne Street
San Francisco, California 94105

Prepared by
CH2M HILL
Southern California Regional office
3 Hutton Centre Drive
Suite 200
Santa Ana, California 92707
October 2003

DRAFT
WELL INSTALLATION REPORT
FOR SAN GABRIEL VALLEY NPL AREA 3
REMEDIAL INVESTIGATION/FEASIBILITY STUDY

SAN GABRIEL BASIN
LOS ANGELES COUNTY, CALIFORNIA

EPA CONTRACT NO. 68-W-98-225
EPA WORK ASSIGNMENT NO. 041-RICO-09ES
CH2M HILL PROJECT NO. 175859.FI.03

October 2003

NONDISCLOSURE STATEMENT

This document has been prepared for the U.S. Environmental Protection Agency under Contract No. 68-W-98-225. The material contained herein is not to be disclosed to, discussed with, or made available to any persons for any reason without the prior expressed approval of a responsible official of the U.S. Environmental Protection Agency.

Contents

	Page
1.0 Introduction	1-1
1.1 Report Organization	1-3
2.0 Field Methods and Procedures	2-1
2.1 Access and Well Drilling Permits	2-1
2.2 Drilling Procedures.....	2-1
2.3 Formation Sampling	2-3
2.3.1 Lithologic Logging.....	2-3
2.3.2 Geophysical Logging.....	2-3
2.4 Well Construction	2-4
2.4.1 Typical Multiport Monitoring Well Construction.....	2-5
2.4.2 Typical Cluster Monitoring Well Construction.....	2-10
2.5 Well Development	2-10
2.6 Well Location Survey	2-10
2.7 Disposal of Drilling and Development Waste	2-12
2.8 Well Sampling	2-13
2.8.1 Cluster Monitoring Wells	2-13
2.8.2 Multiport Monitoring Wells	2-13
3.0 Sampling Results	3-1
3.1 Investigation-Derived Waste.....	3-1
3.2 Groundwater Quality and Level Data	3-1
4.0 References	4-1

Appendixes

- A Lithologic Boring Logs
- B Geophysical Logs
- C Video Survey Reports
- D Multiport Monitoring Well Completion Report
- E U.S. EPA Field Audit/CH2M HILL Comments to Field Audit

Tables

2-1	Multiport Monitoring Well Construction Details	2-6
2-2	Cluster Monitoring Well Construction Details	2-8
3-1a	Analytical Results – Soil and Mud Samples	3-2
3-1b	Analytical Results – Wastewater Samples	3-4
3-2	Preliminary Groundwater Sampling Results	3-5

Figures

1-1	Location Map	1-2
2-1	Monitoring Well Locations	2-2
2-2	Typical Design Detail for Multiport Monitoring Well	2-9
2-3	Typical Design Detail for Cluster Monitoring Well	2-11

Acronyms

bgs	below ground surface
Caltrans	California Department of Transportation
cc	cubic centimeters
EC	electrical conductivity
EPA	U.S. Environmental Protection Agency
FSP	Field Sampling Plan
IDW	investigation-derived waste
lbs.	pounds
LDR	land disposal restriction
MCL	maximum contaminant level
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
mL	milliliter
MP	multiport
NDMA	n-nitrosodimethylamine
NPL	National Priorities List
NTU	nephelometric turbidity units
PID	photoionization detector
QA	quality assurance
RI	Remedial Investigation
TCLP	Toxicity Characteristic Leaching Procedure
TPH	total petroleum hydrocarbons
TTLC	Total Threshold Limit Concentration
USCS	Unified Soil Classification System
VOC	volatile organic compound
WET`	Waste Extraction Test

1.0 Introduction

This report has been prepared to document field and laboratory activities associated with Remedial Investigation (RI) activities for San Gabriel Valley National Priorities List (NPL) Area 3 (Area 3). The location of Area 3 is shown in Figure 1-1.

Field activities included installation and sampling of three cluster monitoring wells and three multiport (MP) monitoring wells. These activities were performed in accordance with the *Field Sampling Plan for San Gabriel Valley NPL Area 3 Remedial Investigation Field Activities*, which was conditionally approved by the U.S. Environmental Protection Agency (EPA) on February 24, 2003 (EPA, 2002).

This report presents information, data, analyses, and procedures for well installation and sampling activities. General field and laboratory activities described in this report are:

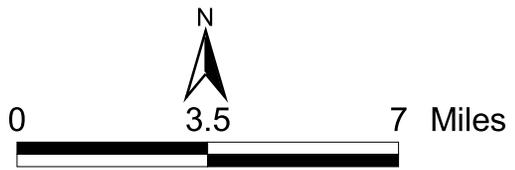
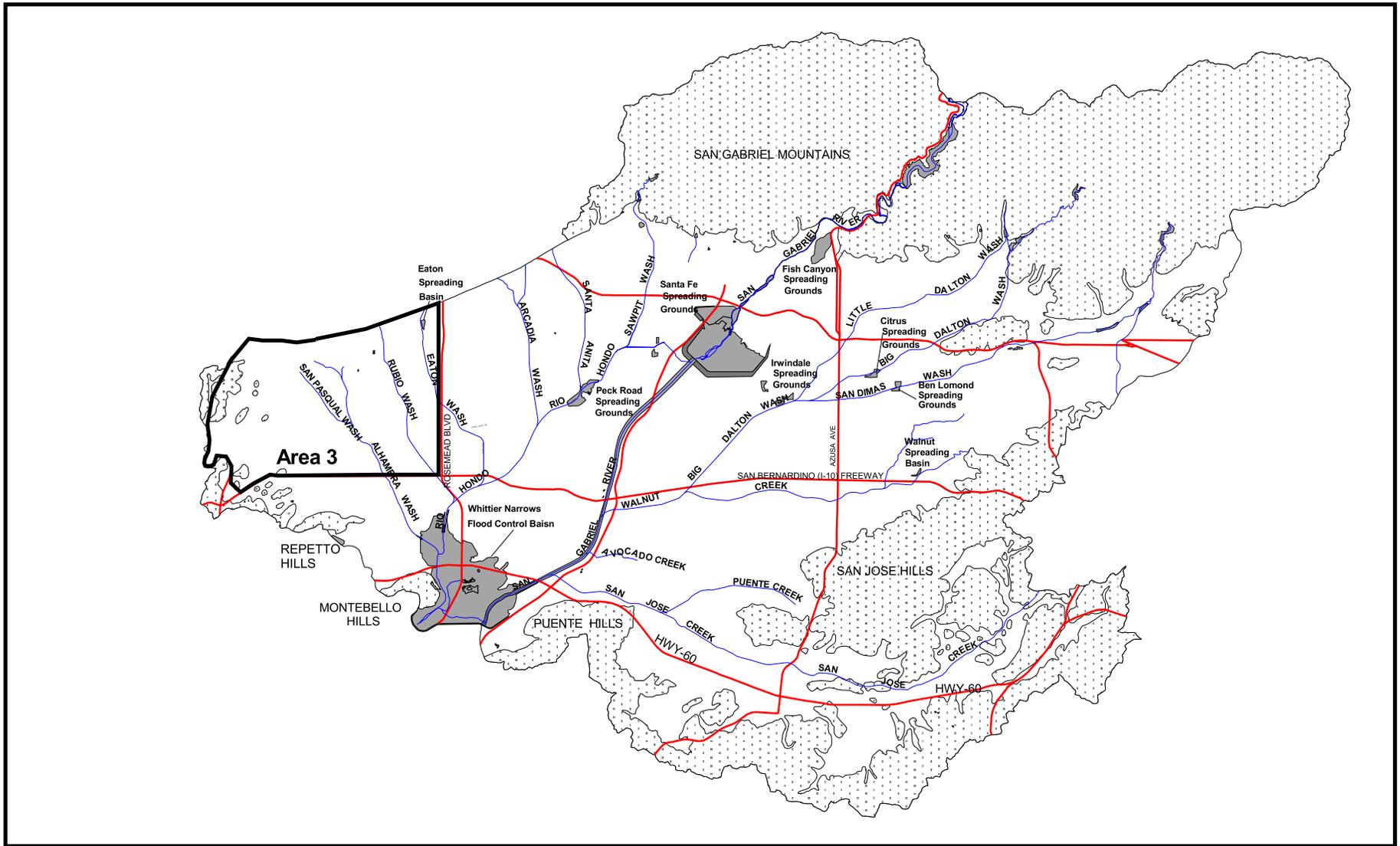
- Installation of three cluster monitoring wells – EPAMW11, EPAMW12A, and EPAMW12B – screened at 252 to 272, 384 to 394, and 308 to 318 feet below ground surface (bgs), respectively.
- Installation of three MP Wells – EPAMW13, EPAMW14, and EPAMW15 – screened in five, four, and six 10-foot intervals and completed to depths of 800, 635, and 800 feet bgs, respectively.
- Sampling of the wells for low-detection-limit volatile organic compounds (VOCs) and dissolved metals following development activities.

The objectives of the well installation and groundwater sampling activities are as follows:

- Characterize the three-dimensional nature and extent of VOC contamination in Area 3.
- Evaluate whether contaminants such as 1,4-dioxane, perchlorate, and n-nitrosodimethylamine (NDMA), discovered in other parts of the San Gabriel Basin, are present in Area 3.
- Collect groundwater data that would assist in identifying contaminant source areas within Area 3.

In addition, water level data collected from the cluster and MP wells will be used to monitor groundwater flow directions and gradients in the groundwater aquifers within Area 3.

Site background is explained in detail in Section 2 of the Field Sampling Plan (FSP) (EPA, 2002).



-  BEDROCK
-  MAJOR TRANSPORTATION
-  STREAMS
-  STUDY AREA BOUNDARY

**FIGURE 1-1
LOCATION MAP**

San Gabriel Valley NPL Area 3
Well Installation Report

1.1 Report Organization

This report is organized into four sections and five appendices, as listed below.

Section 1 Introduction

Section 2 Field Methods and Procedures

Section 3 Sampling Results

Section 4 References

Appendix A Lithologic Boring Logs

Appendix B Geophysical Logs

Appendix C Video Survey Reports

Appendix D Multiport Monitoring Well Completion Report

Appendix E U.S. EPA Field Audit/CH2M HILL Comments to Field Audit

2.0 Field Methods and Procedures

This section describes the drilling, installation, and development of the newly installed cluster monitoring wells and MP monitoring wells in Area 3. Solid and liquid waste sampling associated with investigation-derived waste (IDW) disposal is also discussed in this section. Locations of the newly installed wells are shown in Figure 2-1.

The procedures used during the field activities followed those provided in the FSP (EPA, 2002).

2.1 Access and Well Drilling Permits

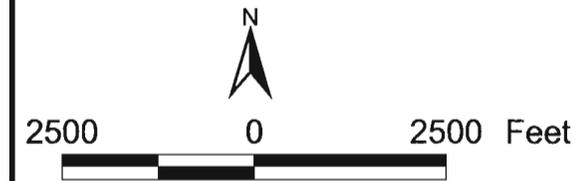
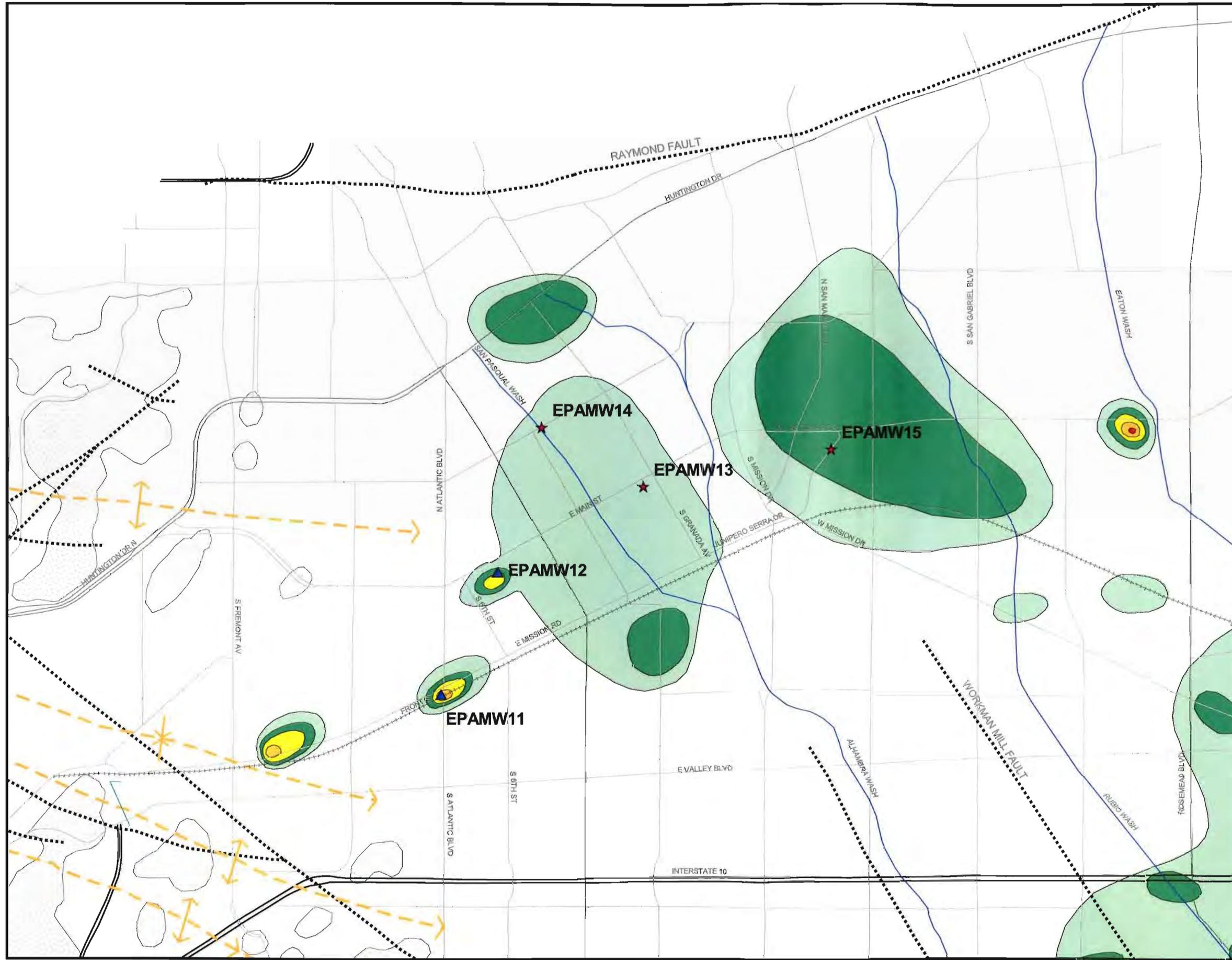
CH2M HILL, as a contractor to EPA, assisted EPA with coordination of the efforts required to obtain site access and the well drilling permits required by local agencies for installation of groundwater monitoring wells. The wells are located in the Cities of Alhambra and San Gabriel, California. CH2M HILL coordinated with the Cities of Alhambra and San Gabriel to (1) gain public acceptance of the well installation activities, (2) notify nearby residents of the upcoming activities, and (3) create adequate traffic and noise control systems at each well location. Permits were not obtained from the Los Angeles County Department of Health Services due to EPA's exemption from paying permit fees per Superfund regulations. However, the necessary completed permit applications were provided to the County prior to drilling.

In accordance with City and State guidelines, the appropriate traffic control equipment was placed around each of the well construction areas. Noise levels from drilling rigs and generators were a special concern with residents near the well locations. Therefore, noise levels were minimized using sound curtains around the perimeter of the drilling area at each well. CH2M HILL periodically monitored noise levels with a decibel meter to ensure compliance with local regulations.

2.2 Drilling Procedures

WDC Exploration and Wells (WDC), of Montclair, California, drilled boreholes for installation of the monitoring wells. Fieldwork started on December 9, 2002, at the first well (MW1-2A). The cluster and MP wells were drilled using the direct (mud) rotary technique and nominal 12-inch-diameter bits.

Drilling mud was used to prevent borehole collapse and to remove cuttings from the boreholes. Drilling mud reduces the possibility of cross-contamination of groundwater zones because the mud invades the formation along the borehole walls, forming a low-permeability mud cake. The mud is removed later from the borehole during well development. To prevent collapse of the borehole, the drilling mud properties were monitored and maintained, and the mud was generally kept circulating throughout the



-  BEDROCK
-  VOC CONTAMINATION POTENTIALLY EXCEEDING 1000X MCLS
-  VOC CONTAMINATION POTENTIALLY RANGING FROM 100X TO < 1000X MCLS
-  VOC CONTAMINATION POTENTIALLY RANGING FROM 20X TO < 100X MCLS
-  VOC CONTAMINATION POTENTIALLY RANGING FROM 10X TO < 20X MCLS
-  VOC CONTAMINATION POTENTIALLY RANGING FROM MCLS TO < 10X MCLS
-  VOC CONTAMINATION POTENTIALLY RANGING FROM LABORATORY DETECTION LIMITS TO < MCLS
-  BASIN BOUNDARY
-  MAJOR TRANSPORTATION
-  STREAMS
-  RAILROAD
-  FAULTS
-  ANTICLINE / SYNCLINE
-  EPAMW14
-  MULTIPOINT WELL
-  EPAMW11
-  CLUSTER MONITORING WELL

FIGURE 2-1
MONITORING WELL LOCATIONS
AND 2002 COMPOSITE VOC
CONTAMINATION
SAN GABRIEL VALLEY NPL AREA 3
WELL INSTALLATION REPORT

borehole. Drilling mud properties were maintained as follows, until well casing was ready to be installed:

- Weight: 9 to 10 pounds (lbs.)/gallon
- Viscosity: 30 to 40 seconds per quart
- Sand Content Did not exceed 1 percent
- 30-minute water loss 15 to 25 cubic centimeters (cc)

Drilling mud consisted of bentonite and water. No drilling additives were used at any of the wells. Water used for drilling mud was obtained from fire hydrants owned by the Cities of Alhambra and San Gabriel. WDC obtained permits to access the water from the hydrants.

2.3 Formation Sampling

An onsite CH2M HILL hydrogeologist collected and logged drill cuttings from the boreholes at 10-foot intervals, or at significant changes in borehole lithology. Formation sampling is described briefly below.

2.3.1 Lithologic Logging

In the direct-mud rotary method, approximately 2 gallons of drill cuttings were collected from the mud discharge pipe in each of two or three empty, 5-gallon buckets. More than one bucket was used to guarantee enough sample volume. After collecting the sample, the remaining portions of the 5-gallon buckets were filled with fresh water. The contents of each bucket were allowed to settle for approximately 3 minutes, then the top few gallons were poured off and fresh water was added again. This procedure was continued until the viscosity of the mud was reduced, thus allowing the cuttings to settle to the bottom of the buckets. The cuttings were then visually observed and described. The lithological boring logs, presented in Appendix A, show the locations, dates each boring was started and completed, and names of the field hydrogeologists. Each log describes the geologic material encountered, along with the Unified Soil Classification System (USCS) classification.

Cuttings were collected and placed in labeled, plastic, self-closing bags and clear, plastic, fishing tackle boxes. Air quality monitoring for VOCs was performed using a photoionization detector (PID) to assess the presence of organic contaminants in the air and in the soil cuttings during drilling. No organic contaminants were detected during drilling at any of the newly installed wells.

2.3.2 Geophysical Logging

Pacific Surveys of Claremont, California, performed geophysical logging of each nominal 12-inch-diameter borehole immediately after completing borehole drilling. The results from the geophysical logging of the boreholes were used in conjunction with lithological logs to

aid in selection of the well screen intervals. The following geophysical logs were run in each borehole:

- Electric (16- and 64-inch normal resistivity; spontaneous potential)
- Guard resistivity
- Gamma ray
- Sonic (excluding MW1-2)
- Caliper

The lithologic logs (Appendix A), actual drill cuttings, and geophysical logs (Appendix B) of the boreholes were reviewed to select the monitoring zone(s) for each well.

2.4 Well Construction

Immediately after completion of geophysical logging, the well screen depth, or depths in the case of the multiport wells, was selected based on the interpretation of the subsurface lithology and geophysical logs of the boreholes. Between four and six screen depth zones were chosen for the three multiport wells, MW1-3, MW1-4, and MW1-5. One screened interval was chosen for each of the two wells at cluster well MW1-2. Because, for the most part, relatively impermeable bedrock was encountered at cluster well MW1-1, only one well was installed at this location. The primary considerations in determining the screen locations were:

- High permeability and porosity – i.e., sand or gravel intervals were selected, as they are expected to provide the primary pathways for contaminant migration.
- Thickness of the permeable units – thickness of the interval was greater than 10 feet.
- Thickness of potential confining units – confining unit was thick enough to provide a potential confining boundary to the permeable unit, at least on a local scale.

In some cases, geophysical logs, screen intervals, and/or water quality data from nearby wells, were reviewed to assist in selection of monitoring zone(s) for each well. In addition, future groundwater levels were considered, as current groundwater levels are at historic lows for the San Gabriel Basin. Thus, in anticipation of a decrease in future groundwater depths, the shallowest screen intervals at some wells were selected to be close to the current groundwater table. In the case of well MW1-2B (the shallower well at the two-well cluster MW1-2), the interval that was screened is a probable pathway for the migration of contaminants when saturated groundwater conditions are present.

Following drilling and geophysical logging, flush-threaded (with O-rings) well screen and blank casing were placed into each borehole. The annular space of the borehole surrounding each screen was backfilled with selected gravel packs. Gravel pack selection was based on the lithologic logs and visual observation of drilling cuttings. Gravel pack was placed around each screen zone, generally extending about 10 feet above and below each screen.

Transition sand and a 1:1 mixture of granular bentonite and sand were placed above and below the gravel pack, surrounding blank casing. In the case of the cluster wells, transition sand and 1:1 mixture of granular bentonite and sand were just placed above the gravel pack, surrounding the blank casing. The remaining annular space of the borehole above the uppermost screen was backfilled with cement grout to the ground surface. The purpose of the transition sand was to prevent bentonite or grout from invading the gravel pack material.

Annular seals, consisting of a 1:1 mixture (by dry volume) of bentonite chips and No. 3 Monterey sand, were placed between each screen zone in the MP wells and above the one screen interval in the cluster wells. The two constituents of the seal were mixed dry in a hopper, then mixed with clean water and injected at specific depths using a tremmie pipe. This procedure was repeated until all screened intervals were gravel packed and sealed. The uppermost annular seal in the MP wells consisted of cement grout, with a small amount of bentonite powder to reduce shrinking and cracking. After the seals were installed, each screen interval was developed as described in Section 2.5.

General well construction details and screen intervals for the newly installed MP and cluster wells are shown in Tables 2-1 and 2-2, respectively. Construction information includes casing and annular materials, gradation of gravel pack, and transition sand selected. Additional information for MP and cluster wells is presented in the following subsections. Video surveys were run at each of the three MP wells to assess the integrity of the casing joints and to confirm the depths of the well screens after well construction and development. The results of the video surveys are presented in Appendix C.

2.4.1 Typical Multiport Monitoring Well Construction

Typical MP well construction is presented in Figure 2-2. Construction of MP wells includes installation of 4-inch-inner-diameter blank casing and screen in the borehole and placement of the Westbay System with packers inside the 4-inch well casing after well development.

Westbay Instruments, Ltd. (Westbay) of Vancouver, Canada, performed installation of the Westbay System. MP wells are equivalent in function to a series of nested monitoring wells, but require only one casing (with sampling tool access) in a single borehole. The system incorporates couplings, casings, and permanently inflated packers into a single instrumentation string that is installed inside a cased borehole with multiple screened intervals. This allows sampling of discrete depth intervals and measurement of water levels in those zones from a well constructed of a single casing with separate monitoring ports.

The (outer) well casing at MP wells MW1-3, MW1-4, and MW1-5 consists of 4-inch-inner-diameter mild and stainless (Type 304) steel and four to six 10-foot screened intervals (0.15, 0.02, or 0.04-inch slot, Type 304 stainless steel) installed in a 12-inch-diameter borehole.

Westbay technicians installed the MP system into the 4-inch-diameter steel casing. Packers were set against the inside of blank stainless steel casing below and above each screen interval. Three packers were actually installed between each screen interval to provide additional protection against downward or upward groundwater flow between screen intervals. Two of the packers were installed in a 20-foot-long section of stainless steel casing immediately above each screen interval, while one packer was installed immediately below

**Table 2-1
Multiport Monitoring Well Construction Details
San Gabriel Valley NPL Area 3
Well Installation Report**

Well	Casing			Annular Material		Multiport Casing	
	Depth (ft bgs)	Type (Slot Size and Zone)	Material	Depth (ft bgs)	Type	Depth (ft bgs)	Type
MW1-3	0-25	Blank	Conductor Casing	0 - 327	Cement Grout/Seal	--	Blank Casing
	0-330	Blank	Mild Steel	327 - 333.5	Bentonite/Sand (#3)	--	Blank Casing
	330-350	Blank	Stainless Steel	333.5 - 340.5	Transition Sand (#30)	337.9	QA Port
	350-360	0.040 Screen (Zone 5)	Stainless Steel	340.5 - 366	Gravel Pack (#3)	352.9	Measurement Port (Sampling)
	360-370	Blank	Stainless Steel	366 - 373	Transition Sand (#30)	367.9	QA Port
	370-460	Blank	Mild Steel	373 - 460.5	Bentonite/Sand (#3)	--	Blank Casing
	460-480	Blank	Stainless Steel	460.5 - 471	Transition Sand (#30)	467.9	QA Port
	480-490	0.040 Screen (Zone 4)	Stainless Steel	471 - 488	Gravel Pack (#3)	482.9	Measurement Port (Sampling)
	490-500	Blank	Stainless Steel			497.9	QA Port
	500-560	Blank	Mild Steel	488 - 564	Bentonite/Sand (#3)	--	Blank Casing
	560-580	Blank	Stainless Steel	564 - 569	Transition Sand (#60)	567.9	QA Port
	580-590	0.040 Screen (Zone 3)	Stainless Steel	569 - 600.5	Gravel Pack (#3)	582.9	Measurement Port (Sampling)
	590-600	Blank	Stainless Steel	600.5 - 604	Transition Sand (#60)	597.9	QA Port
	600-640	Blank	Mild Steel	604 - 637.5	Bentonite/Sand (#3)	--	Blank Casing
	640-660	Blank	Stainless Steel	637.5 - 640	Transition Sand (#30)	647.9	QA Port
	660-670	0.020 Screen (Zone 2)	Stainless Steel	640 - 676.5	Gravel Pack (#3)	662.9	Measurement Port (Sampling)
	670-680	Blank	Stainless Steel	676.5 - 684.5	Transition Sand (#60)	677.9	QA Port
	680-750	Blank	Mild Steel	684.5 - 755.5	Bentonite/Sand (#3)	--	Blank Casing
750-770	Blank	Stainless Steel	755.5 - 760.5	Transition Sand (#60)	757.9	QA Port	
770-780	0.020 Screen (Zone 1)	Stainless Steel	760.5 - 805.5	Gravel Pack (#3)	772.9	Measurement Port (Sampling)	
780-805	Blank (with end cap)	Stainless Steel			787.9	QA Port	
MW1-4	0-25	Blank	Conductor Casing	0 - 354	Cement Grout/Seal	--	Blank Casing
	0-360	Blank	Mild Steel	354-359	Bentonite/Sand (#3)	--	Blank Casing
	360-380	Blank	Stainless Steel	359-364	Transition Sand (#30)	367.9	QA Port
	380-390	0.015 Screen (Zone 4)	Stainless Steel	364-396.5	Gravel Pack (#2/16)	382.9	Measurement Port (Sampling)
	390-400	Blank	Stainless Steel	396.5-405	Transition Sand (#30)	397.9	QA Port
	400-440	Blank	Mild Steel	405-446	Bentonite/Sand (#3)	--	Blank Casing
	440-460	Blank	Stainless Steel	446-448	Transition Sand (#30)	447.9	QA Port
	460-470	0.015 Screen (Zone 3)	Stainless Steel	448-477	Gravel Pack (#2/16)	462.9	Measurement Port (Sampling)
	470-480	Blank	Stainless Steel	477-486.5	Transition Sand (#30)	477.9	QA Port
	480-525	Blank	Mild Steel	486.5-526.5	Bentonite/Sand (#3)	--	Blank Casing
	525-545	Blank	Stainless Steel	526.5-530	Transition Sand (#30)	532.9	QA Port
	545-555	0.015 Screen (Zone 2)	Stainless Steel	530-565	Gravel Pack (#2/16)	547.9	Measurement Port (Sampling)
	555-565	Blank	Stainless Steel	565-570	Transition Sand (#30)	562.9	QA Port
	565-585	Blank	Mild Steel	570-575	Bentonite/Sand (#3)	--	Blank Casing
	585-605	Blank	Stainless Steel	575-595	Transition Sand (#30)	592.9	QA Port
605-615	0.015 Screen (Zone 1)	Stainless Steel	595-635	Gravel Pack (#2/16)	607.9	Measurement Port (Sampling)	
615-635	Blank (with end cap)	Stainless Steel			622.9	QA Port	

**Table 2-1
Multiport Monitoring Well Construction Details
San Gabriel Valley NPL Area 3
Well Installation Report**

Well	Casing			Annular Material		Multiport Casing	
	Depth (ft bgs)	Type (Slot Size and Zone)	Material	Depth (ft bgs)	Type	Depth (ft bgs)	Type
MW1-5	0-25	Blank	Conductor Casing	0-305	Cement Grout/Seal	--	Blank Casing
	0-305	Blank	Mild Steel	305-315	Bentonite/Sand (#3)	--	Blank Casing
	305-325	Blank	Stainless Steel	315-317	Transition Sand (#30)	313	QA Port
	325-335	0.040 Screen (Zone 6)	Stainless Steel	317-350	Gravel Pack (#3)	328	Measurement Port (Sampling)
	335-345	Blank	Stainless Steel	350-354	Transition Sand (#30)	343	QA Port
	345-380	Blank	Mild Steel	354-483	Bentonite/Sand (#3)	--	Blank Casing
	380-400	Blank	Stainless Steel	483-390	Transition Sand (#30)	388	QA Port
	400-410	0.040 Screen (Zone 5)	Stainless Steel	390-422	Gravel Pack (#3)	403	Measurement Port (Sampling)
	410-420	Blank	Stainless Steel	422-432	Transition Sand (#30)	418	QA Port
	420-460	Blank	Mild Steel	432-468	Bentonite/Sand (#3)	--	Blank Casing
	460-480	Blank	Stainless Steel	468-472	Transition Sand (#30)	468	QA Port
	480-490	0.040 Screen (Zone 4)	Stainless Steel	472-502	Gravel Pack (#3)	483	Measurement Port (Sampling)
	490-500	Blank	Stainless Steel	502-508	Transition Sand (#30)	498	QA Port
	500-570	Blank	Mild Steel	508-575	Bentonite/Sand (#3)	--	Blank Casing
	570-590	Blank	Stainless Steel	575-578	Transition Sand (#30)	578	QA Port
	590-600	0.040 Screen (Zone 3)	Stainless Steel	578-614	Gravel Pack (#3)	593	Measurement Port (Sampling)
	600-610	Blank	Stainless Steel	614-626	Transition Sand (#30)	608	QA Port
	610-650	Blank	Mild Steel	626-658	Bentonite/Sand (#3)	--	Blank Casing
	650-670	Blank	Stainless Steel	658-665	Transition Sand (#30)	658	QA Port
	670-680	0.040 Screen (Zone 2)	Stainless Steel	665-691	Gravel Pack (#3)	673	Measurement Port (Sampling)
680-690	Blank	Stainless Steel	691-703.5	Transition Sand (#30)	688	QA Port	
690-750	Blank	Mild Steel	703.5-755	Bentonite/Sand (#3)	--	Blank Casing	
750-770	Blank	Stainless Steel	755-760	Transition Sand (#30)	758	QA Port	
770-780	0.040 Screen (Zone 1)	Stainless Steel	760-800	Gravel Pack (#3)	778	Measurement Port (Sampling)	
780-800	Blank (with end cap)	Stainless Steel			788	QA Port	

NOTES: QA = quality assurance
-- = blank multiport casing is in between each zone

Table 2-2
Cluster Monitoring Well Construction Details
San Gabriel Valley NPL Area 3
Well Installation Report

Well	Casing			Annular Material		Pump Depth (ft bgs)
	Depth (ft bgs)	Type	Material	Depth (ft bgs)	Type	
MW1-1	0 - 25	Conductor	Mild Steel	0 - 230	Cement Grout/Seal	262
	0 - 242	Blank	Mild Steel	230 - 241	Bentonite/Sand (#3)	
	242 - 252	Blank	Stainless Steel			
	252 - 272	Screen	0.020 Stainless Steel	241 - 289	Gravel Pack (#3)	
	272 - 282	Blank (with end cap)	Stainless Steel	289 - 458	Bentonite/Sand (#3)	
MW1-2A	0 - 25	Conductor	Mild Steel	0 - 368	Cement Grout/Seal	389
	0 - 374	Blank	Mild Steel	368 - 372	Bentonite/Sand (#3)	
	374 - 384	Blank	Stainless Steel			
	384 - 394	Screen	0.015 Stainless Steel	372 - 400	Gravel Pack (#2/16)	
	394 - 399	Blank (with end cap)	Stainless Steel	400 - 433	Bentonite/Sand (#3)	
MW1-2B	0 - 25	Conductor	Mild Steel	0 - 269	Cement Grout/Seal	NA
	0 - 278	Blank	Mild Steel	269 - 280	Bentonite/Sand (#3)	
	278 - 288	Blank	Stainless Steel			
	288 - 308	Screen	0.020 Stainless Steel	288-308	Gravel Pack (#3)	
	308 - 318	Blank (with end cap)	Stainless Steel			

NOTES:

Pump depth is the depth of the intake screen of the pump.

NA = Not Applicable

the screen interval. The packers were inflated with water to isolate the screen intervals within the cased well. The three packers also provide a means of quantitatively documenting that no hydraulic communication exists within the 4-inch casing between screen intervals. A detailed completion report on the installation of the Westbay system in the newly installed wells is presented in Appendix D.

2.4.2 Typical Cluster Monitoring Well Construction

Typical cluster monitoring well construction is shown in Figure 2-3. Construction of cluster monitoring wells includes installation of a 4-inch-diameter mild and stainless (Type 304) steel blank casing and stainless (Type 304) screen in a 12-inch-diameter borehole. Following well development, a dedicated bladder pump is set in the screen interval.

2.5 Well Development

Initial well development consisted of bailing residual drilling mud from each well. A process similar to pumping was then used in each well zone. Instead of pumping, however, water from each zone was removed by airlifting using a dual-swab assembly to isolate the airlift intake within each screen interval. At times during airlifting, the dual swab assembly was raised and lowered in the well to create a simultaneous surging action of water adjacent to the well screen. Following airlifting, a submersible pump was lowered to the screen interval, and the interval was pumped until clean. At this point, the pump was turned off and the water within the pump and tubing was allowed to surge back into the formation. This process was repeated until the water came out clean (see below) immediately following the surging. For the MP wells, straddle packers were placed immediately above and below the screen interval being pumped, which ensured isolation of well development benefits to one screen interval.

Field parameters (i.e., turbidity, pH, electrical conductivity [EC], and temperature) were measured during well development to determine the state of development. Well screen development was generally considered complete when turbidity fell to between 5 and 20 nephelometric turbidity units (NTU), and all other field parameters indicated a stable trend. If well video surveys indicated the presence of fines or drilling mud in the screen(s) of MP wells, additional well development was performed until subsequent video surveys showed the well screen(s) to be free of fines and/or drilling mud.

Upon completion of the MP and cluster monitoring wells, a flush-mounted, traffic-rated steel vault was installed to protect the well.

2.6 Well Location Survey

An engineering survey of new well locations and elevations was conducted on September 11, 2003, by Dulin and Boynton Licensed Surveyors. Well coordinates (UTM meters, NAD 83, zone 11) and wellhead reference point elevations (NVD88 to the nearest 0.01 foot) from this survey were entered into EPA's San Gabriel Basin database.

2.7 Disposal of Drilling and Development Waste

The installation and development of monitoring wells produced both solid and liquid wastes. The solids consisted of drill cuttings removed from the drilling mud by means of a sand shaker. The liquid waste consisted of drilling mud (bentonite and water) and well development water. All solid waste was containerized in California Department of Transportation (Caltrans) certified bins. In general, at each well location, the drill cuttings were stored in four or more 20-cubic yard roll-off bins, and the drilling mud and development water was segregated into two or more 21,000-gallon steel bilevel Rain-for-Rent tanks. The cuttings and drilling mud samples were analyzed for the parameters shown in Table 3-1 in Section 3, as specified in the FSP (EPA, 2002). A summary of laboratory results for the solid and liquid wastes is presented in Tables 3-1a and 3-1b in Section 3, respectively.

Samples of drill cuttings from roll-off bins for VOC analyses were collected using Encore sampling devices. The Encore sampling device was provided by the laboratory, as was a hermetically sealed 25-gram sample container. The sample container was pushed into the cuttings approximately 6 inches below the previously exposed surface of the material in the roll-off bin. The exterior of the container was then wiped with a clean towel to remove any solids and permit closure of the container. The container was closed according to the manufacturer's instructions. Sample identification information was filled out on the back of the recloseable (originally hermetically sealed) sample pouch, as well as on a removable sample tag. The maximum analytical holding time for VOCs is 14 days.

Samples of drill cuttings for additional analyses were collected in 6-inch brass sleeves in a manner similar to the collection of samples in the Encore sample containers. Samples for analysis of Total Threshold Limit Concentration (TTL) metals, total petroleum hydrocarbons (TPH)-gasoline, TPH-diesel, flashpoint, and pH were placed in brass sleeves, capped with teflon tape and plastic caps, placed in a sealed bag, and cooled to 4 degrees Celsius (°C).

One drilling fluid sample at each well site was collected and submitted for laboratory analysis. Each sample was collected using a new, disposable polyethylene bailer suspended on inert rope to fill the appropriate sample containers. After collecting drilling mud from near the bottom of the temporary storage container, the liquid was slowly poured from the bailer into the sample container to minimize agitation and to prevent overfilling of the container. Samples were collected in two 1-liter amber glass bottles and cooled to 4° C.

Monitoring well development water from each well was stored onsite in 21,000-gallon steel bilevel Rain-for-Rent tanks. Each well development water sample was collected using a new, disposable polyethylene bailer and inert rope to fill the appropriate sample containers (e.g., acidified, 40-milliliter [mL] glass vials for VOC analysis). After collecting water from mid-depth in the temporary storage container, the water was slowly poured from the bailer into the sample containers to minimize agitation and to prevent overfilling of the containers.

Sample packing and shipment followed procedures described in the FSP (EPA, 2002). Solid drilling mud waste samples were shipped to the EPA Region IX laboratory in Richmond, California (VOCs, metals, pH, and TPH) and Truesdail Laboratories in Tustin, California

(flashpoint). Well development water samples were shipped to the EPA Region IX laboratory (VOCs, nitrate, perchlorate, 1,4-dioxane, and dissolved metals), EMAX laboratories in Torrance, California (hexavalent chromium), Maxxam Laboratories in Ontario, Canada (NDMA), and Truesdail Laboratories (1,2,3-trichloropropane).

2.8 Well Sampling

Cluster monitoring wells EPAMW11 and EPAMW12A, and MP well EPAMW13 were sampled for the first time on March 5 and 6, 2003. MP wells EPAMW14 and EPAMW15 were sampled for the first time between July 15 and July 18, 2003, at which point cluster monitoring wells EPAMW11 and EPAMW12A, and MP well EPAMW13 were sampled a second time. Sample collection procedures are discussed in detail in the FSP (EPA, 2002). The results of the sampling are discussed below in Section 3.2.

On July 15, 2003, EPA performed an audit of groundwater sampling events taking place in San Gabriel Valley NPL Area 3. CH2M HILL responses to EPA findings and recommendations are included in Appendix E.

2.8.1 Cluster Monitoring Wells

A dedicated QED Model #ST1102M 1.66-inch-diameter, variable-speed bladder pump (bladder pump) was placed midway between the top and bottom of the well screen during well construction. This pump was used for the initial sampling event and will be used during future purging and sampling of the cluster monitoring wells. Purging and sampling will follow low-flow sampling technique procedures described in detail in the FSP (EPA, 2002).

2.8.2 Multiport Monitoring Wells

The procedures for sampling MP wells differ from those for cluster monitoring wells and involve collecting water from isolated screen intervals at depth in the MP wells. Water retrieved at the surface using specialized equipment is then collected in appropriate sample containers. Sampling procedures used for the MP wells are described in the FSP (EPA, 2002).

3.0 Sampling Results

This section summarizes drilling waste (solid and liquid) and groundwater sampling analytical results.

3.1 Investigation-Derived Waste

The installation and development of the six monitoring wells produced both solid and liquid IDW. A summary of the IDW analytical results, as well as the IDW disposal facility locations, is presented in Tables 3-1a and 3-1b. All well installation wastes (i.e., from borehole drilling, well construction, and well development) were disposed of offsite at approved disposal facilities, and the small volume of water generated at cluster monitoring wells EPAMW11 and EPAMW12A was disposed of at the Whittier Narrows Treatment Plant. Only a limited portion of the solid wastes were disposed of at a local Class III landfill, as the majority of wastes possessed detectable levels of petroleum hydrocarbons or elevated pH (Table 3-1a). In addition, the presence of VOCs required most well development water to be disposed of at an approved offsite facility (Table 3-1b).

3.2 Groundwater Quality and Level Data

Monitoring wells EPAMW11, EPAMW12A, and EPAMW13 were sampled for the first time on March 5 and 6, 2003. Wells EPAMW14 and EPAMW15 were sampled for the first time between July 15 and July 18, 2003, at which point EPAMW11, EPAMW12A, and EPAMW13 were sampled a second time. The results from sampling of these wells, including the depth to water at each location, are shown in Table 3-2 and are summarized below.

- Well EPAMW11 (Front Street, just west of Atlantic Boulevard): Groundwater depth is approximately 185 feet bgs. VOCs are present in the groundwater at concentrations more than 20 times the maximum contaminant levels (MCLs) for drinking water.
- Well EPAMW12A (Fourth Street, south of Main Street): Groundwater depth is approximately 325 feet bgs. VOCs are present in the groundwater at concentrations more than 10 times the MCLs for drinking water.
- Well EPAMW13 (Cordova Street, south of Main Street): Groundwater depth is approximately 310 feet bgs. VOCs are present in the groundwater at concentrations below the MCLs for drinking water.
- Well EPAMW14 (Alhambra Road, west of Novelda Road): Groundwater depth is approximately 355 feet bgs. VOCs are present in the groundwater at concentrations more than 10 times the MCLs for drinking water.
- Well EPAMW15 (Junipero Serra Drive, southwest of San Marino Avenue): Groundwater depth is approximately 295 feet bgs. VOCs are present in the groundwater at concentrations slightly exceeding MCLs for drinking water.

Table 3-1a
Analytical Results - Soil and Mud Samples
San Gabriel Valley NPL Area 3
Well Installation Report

COMPOUND/ANALYTE and METHOD	Hazardous Waste TCLP	Hazardous Waste TTLC	Federal Land Disposal	CA Land Disposal	SAMPLE ID																			
	Regulatory Level	Regulatory Level	Restriction	Restriction	MW1-1-002	MW1-1-003	MW1-1-011	MW1-1-012	MW1-1-013	MW1-1-014	MW1-2-006	MW1-2-007	MW1-3-008 (AHSDW008)	MW1-3-009 (AHSDW009)	MW1-3-010 (AHSDW010)	MW1-3-010	MW1-3-010	MW1-4-022	MW1-4-023	MW1-4-024	MW1-4-025	MW1-5-026	MW1-5-027	MW1-5-028
	µg/l TCLP	µg/kg WET	µg/kg (total)	µg/kg (total)	AHSDW002	AHSDW003	AHSDW011	AHSDW012	AHSDW013	AHSDW014	AHSDW006	AHSDW007	AHSDW017	AHSDW018	AHSDW020	AHSDW019	AHSDW021	AHSDW022	AHSDW023	AHSDW024	AHMDW025	AHSDW026	AHSDW027	AHMDW028
VOCs (EPA 8260)					µg/kg WET						µg/kg WET		µg/kg WET						µg/kg WET					
1,1,1-Trichloroethane	--	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
1,1,2,2-Tetrachloroethane	--	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
1,1,2-Trichloroethane	--	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
1,1,2-Trichloro-1,2,2-trifluoroethane	--	--	30,000	30,000	NA	NA	NA	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5								
1,1-Dichloroethane	--	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
1,1-Dichloroethene	700	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
1,2,3-Trichloropropane	--	--	30,000	30,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
1,2-Dibromo-3-chloropropane	--	--	--	--	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
1,2-Dibromoethane (EDB)	--	--	15,000	15,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<14	<14	<14	<140	<12	<12	<12
1,2-Dichlorobenzene [o-Dichlorobenzene]	--	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
1,2-Dichloroethane	500	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
1,2-Dichloropropane	--	--	18,000	18,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
1,3-Dichlorobenzene [m-Dichlorobenzene]	--	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
1,3-Dichloropropane	--	--	--	--	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
1,4-Dichlorobenzene [p-Dichlorobenzene]	--	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
2-Butanone [Methyl ethyl ketone]	--	--	36,000	36,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
2-Hexanone [Methyl butyl ketone]	--	--	--	--	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<14	<14	<14	<140	<12	<12	<12
4-Methyl-2-pentanone [Methyl isobutyl ketone]	--	--	33,000	33,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<14	<14	<14	<140	<12	<12	<12
Acetone	--	--	160,000	160,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<14	<14	<14	<140	<12	<12	<12
Benzene	500	--	10,000	10,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<14	<14	<14	<140	16	<12	<12
Bromodichloromethane	--	--	15,000	15,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Bromoform [Tribromomethane]	--	--	15,000	15,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Bromomethane	--	--	15,000	15,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Carbon disulfide	--	--	4.8 mg/L TCLP	4.8 mg/L TCLP	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Carbon tetrachloride	500	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Chlorobenzene	100,000	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Chloroethane	--	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Chloroform	6,000	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Chloromethane	--	--	30,000	30,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
cis-1,2-Dichloroethene	--	--	--	--	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
cis-1,3-Dichloropropene	--	--	18,000	18,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Dibromochloromethane [Chlorodibromomethane]	--	--	15,000	15,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Dichlorodifluoromethane	--	--	7,200	7,200	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Dichloromethane	--	--	--	--	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	1.7J	1.5J	<2.5
Ethylbenzene	--	--	10,000	10,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Ethyl-t-butyl ether	--	--	--	--	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
m,p-Xylene	--	--	--	--	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	1.3J	<2.5	<2.5
Methyl t-butyl ether (MTBE)	--	--	--	--	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
o-Xylene	--	--	--	--	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Styrene	--	--	--	--	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Tert-amyl-methyl ether	--	--	--	--	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Tetrachloroethene	700	--	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Toluene	--	--	10,000	10,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
trans-1,2-Dichloroethene	--	--	30,000	30,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
trans-1,3-Dichloropropene	--	--	18,000	18,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Trichloroethene	500	2,040,000	6,000	6,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<2.8	<2.5	<2.5	<2.5
Trichlorofluoromethane [Trichloromonofluoromethane]	--	--	30,000	30,000	<60	<30	NA	NA	NA	NA	<100	<20	<20	<20	<30	NA	NA	<2.9	<2.8	<2.8	<			

**Table 3-1a
Analytical Results - Soil and Mud Samples
San Gabriel Valley NPL Area 3
Well Installation Report**

COMPOUND/ANALYTE and METHOD	Hazardous Waste TCLP Regulatory Level	Hazardous Waste TTLIC Regulatory Level	Federal Land Disposal Restriction	CA Land Disposal Restriction	SAMPLE ID																			
					MW1-1-002	MW1-1-003	MW1-1-011	MW1-1-012	MW1-1-013	MW1-1-014	MW1-2-006	MW1-2-007	MW1-3-008 (AHSDW008)	MW1-3-009 (AHSDW009)	MW1-3-010 (AHSDW010)	MW1-3-010	MW1-3-010	MW1-4-022	MW1-4-023	MW1-4-024	MW1-4-025	MW1-5-026	MW1-5-027	MW1-5-028
					AHSDW002	AHSDW003	AHSDW011	AHSDW012	AHSDW013	AHSDW014	AHSDW006	AHSDW007	AHSDW017	AHSDW018	AHSDW020	AHSDW019	AHSDW021	AHSDW022	AHSDW023	AHSDW024	AHMDW025	AHSDW026	AHSDW027	AHMDW028
CA TITLE 22 METALS (EPA 6010/7471/7010)	µg/l TCLP	mg/kg WET	mg/kg TCLP	mg/kg TCLP	mg/kg WET																			
Aluminum	--	--	--	--	27,000	27,000	NA	NA	NA	NA	28,000	9,500	7,400	7,800	9,400	NA	NA	3,100	5,400	5,800	25,000	4,700	6,100	29,000
Antimony	--	500	1.15	1.50	<70	<70	NA	NA	NA	NA	<80	<30	<40	<30	<40	NA	NA	<23	<22	<22	<220	<24	<24	<110
Arsenic	5,000	500	5.00	5.00	9	7	NA	NA	NA	NA	9	4	2J	2J	3J	NA	NA	<2.3	1.2J	1.3J	<22	1.8J	<2.4	<11
Barium	100,000	10,000	21.00	21.00	170	180	NA	NA	NA	NA	200	80	60	50	90	NA	NA	27	50	61	230	68	41	160
Beryllium	--	75	1.22	1.22	0.9	0.9	NA	NA	NA	NA	1.1	0.4	0.4	0.3	0.4	NA	NA	0.1J	0.2	0.2	1.2J	0.2	0.3	1.4
Cadmium	1,000	100	0.11	0.11	<4	<3	NA	NA	NA	NA	<4	<2	<2	<2	<2	NA	NA	<1.1	<1.1	<1.1	<11	<1.2	<1.2	<5.6
Calcium	--	--	--	--	13,000	13,000	NA	NA	NA	NA	40,000	15,000	9,500	15,000	18,000	NA	NA	2,200	3,400	4,200	14,000	12,000	3,500	9,800
Chromium	5,000	2,500	0.60	0.60	40	40	NA	NA	NA	NA	27	10	7	7	15	NA	NA	2.5	6.4	7	39	8.7	8.6	23
Cobalt	--	8,000		80 mg/kg WET	10	10	NA	NA	NA	NA	10J	5J	4J	3J	4J	NA	NA	<4.6	3.1J	3.3J	<44	<4.8	3.5J	11J
Copper	--	2,500		25 mg/kg WET	40	40	NA	NA	NA	NA	40	72	14	37	22	NA	NA	4.8	6.9	50	29J	9.1	11	44
Iron	--	--	--	--	37,000	37,000	NA	NA	NA	NA	34,000	14,000	11,000	8,600	13,000	NA	NA	5,200	9,200	9,700	32,000	8,700J	12,000	32,000
Lead	5,000	1,000	0.75	0.75	10	10	NA	NA	NA	NA	13	5	9	6	10	NA	NA	1.8	2.3	2.2	18	3.5	2.5	12
Magnesium	--	--	--	--	12,000	12,000	NA	NA	NA	NA	9,800	3,800	2,600	2,600	3,300	NA	NA	1,000	1,900	2,100	8,300	5,600J	2,200	8,600
Manganese	--	--	--	--	540	550	NA	NA	NA	NA	680	270	190	170	240	NA	NA	100	180	190	620	210J	190	680
Mercury	200	20	0.025	0.025	0.1	0.3	NA	NA	NA	NA	0.3	0.31	0.08	0.06	0.09J	NA	NA	0.12	0.11	0.083	0.28J	0.043	0.13J	0.18
Molybdenum	--	3,500			<40	<30	NA	NA	NA	NA	<40	<20	<20	<20	<20	NA	NA	<11	<11	<11	<110	<12	<12	<56
Nickel	--	2,000	11.00	11.00	30	30	NA	NA	NA	NA	20J	<20	<20	<20	<20	NA	NA	<11	<11	<11	<110	6J	<12	<56
Potassium	--	--	--	--	6,000	6,000	NA	NA	NA	NA	6,000	2,000	2,000	2,000	2,000	NA	NA	800J	1,400	1,600	5,800J	1,100J	1,400	5,000J
Selenium	1,000	100	5.70	5.70	<7	<7	NA	NA	NA	NA	<8	<4	<4	<3	<4	NA	NA	<2.3	<2.2	<2.2	<22	<2.4	<2.4	<11
Silver	5,000	500	0.14	0.14	<7	<7	NA	NA	NA	NA	<8	<3	<4	<3	<4	NA	NA	<2.3	<2.2	<2.2	<22	<2.4	<2.4	<11
Sodium	--	--	--	--	800	800	NA	NA	NA	NA	1,700	500	2,700	900	1,100	NA	NA	250	190	190	7,300	300	270	2800
Thallium	--	700	0.20	0.078	<400	<300	NA	NA	NA	NA	<400	<200	<200	<200	<200	NA	NA	<80	<79	<78	<780	<84	<84	<390
Vanadium	--	2,400	1.60	1.60	70	70	NA	NA	NA	NA	60	27	20	16	25	NA	NA	8.9	19	20	74	16	23	57
Zinc	--	5,000	4.30	4.30	110	110	NA	NA	NA	NA	100	77	33	46	60	NA	NA	16	23	52	110	22	31	110
OTHER ANALYSES																								
pH (EPA 9040B)	--	--	--	--	12	8.3	NA	NA	NA	NA	12.2	12.2	11.2 (12.7)	12.1 (12.5)	12.1 (12.7)	8.4	8.3	9.6	8.8	10	8.9	10.5	9.2	8.8
% Solids	--	--	--	--	23	30	NA	NA	NA	NA	24	55	48	58	42	NA	NA	87	89	90	9	83	83	18
Flashpoint (EPA 1010)	--	--	--	--	>210°F	>210°F	NA	NA	NA	NA	>210°F	>210°F	>210°F	>210°F	>210°F	NA	NA	>210°F	>210°F	>210°F	>210°F	>210°F	>210°F	>210°F
8015B TPH gas (mg/kg)	Disposal facility-specific	Disposal facility-specific	--	--	<20	<20	<5	<20	<20	<10	<20	<7	<10	<8	7J	NA	NA	<5.7	<5.6	<4.8	<56	<6.8	<6.0	<28
8015B TPH diesel (mg/kg)	Disposal facility-specific	Disposal facility-specific	--	--	<300	100J	<30	<90	<100	<80	<100	<20	<100	<50	<100	NA	NA	<5.7	2.8J	<5.6	<170	<73	<6.0	<28
8015B TPH oil (mg/kg)	Disposal facility-specific	Disposal facility-specific	--	--	500J	<600	<100	<400	<400	<300	<400	<90	700	200	300	NA	NA	<23	16J	15J	<670	260	30	<110
Roll-Off Bin or Tank Where Sample Collected					composite	composite	IES157	171	166	0035	161	186	150	150	0023	145	189	161	NV1-121	NV1-121	239144	185	31	239526
Waste Disposal Facility							US Ecology	US Ecology	US Ecology	US Ecology	McKittrick	US Ecology	McKittrick	McKittrick	McKittrick	McKittrick	McKittrick	Puente Hills	Puente Hills	Puente Hills	McKittrick	McKittrick	McKittrick	McKittrick
Well Name							MW1-1				MW1-2				MW1-3					MW1-4				MW1-5
NOTES:	<p>Land Disposal Restrictions are based on 22 CCR 268.48 and 40 CFR 268.48 Universal Treatment Standards. Metals concentrations are 22 CCR 268.48 and 22 CCR 66268.107 (WET concentrations). California rules state that the lower of the California or the Federal Standard shall be used if the waste is a RCRA waste. Note that the soil LDR standards are not included in the table (since the drilling mud will probably preclude their use).</p> <p>TCLP = EPA Toxicity Characteristics Leaching Procedure TTLIC = California Total Threshold Limit Concentration -- = No applicable regulatory level < = Compound or analyte not detected above value shown J = Value is estimated NA = Not analyzed composite = composite sample from more than one roll-off bin () = samples collected in first round of roll-off bin sampling Puente Hills Landfill, Los Angeles County, California; McKittrick, Kern County, California; US Ecology, Nevada</p>																							

**Table 3-1b
Analytical Results - Wastewater Samples
San Gabriel Valley NPL Area 3
Well Installation Report**

Well Name	MW1-1	MW1-2A and B	MW1-3	MW1-4	MW1-5	MW1-5	MCL or AL (ug/L)
Location	Front and Atlantic	4th and Main	Cordova and Main	Alhambra and Novelda	Junipero Serra and Live Oak	Junipero Serra and San Marino	
Sample ID	AHWDW001	AHWDW004	AHWDW015	AHWDW029	AHWDW032 / AHWDW033	AHWDW034	
Date Sampled	01/16/03	01/16/03	03/06/03	06/24/03	07/14/03	07/14/03	
Compound or Constituent	Concentration (ug/L)						MCL or AL (ug/L)
ACT	4	<4	3J	<4	<4/<4	2.5J	
TCE	80	4	<1	11	<1/<1	<1	5 ¹
PCE	1	<1	<1	<1	0.6J/0.6J	<1	5 ¹
1,1-DCE	0.6J	<1	<1	<1	<1/<1	<1	6 ¹
cis-1,2-DCE	0.8J	<1	<1	1.3	<1/<1	<1	6 ¹
1,2-DCA	1	<0.5	<0.5	<0.5	<0.5/<0.5	<0.5	0.5 ¹
12P	2	<1	<1	<1	<1/<1	<1	5 ¹
1,2,3-TCP	<0.002	<0.002	<0.002	<0.002	0.127/0.122	0.06	0.005 ¹
TOL	1	<1	<1	<1	<1/<1	<1	150 ¹
14A	<1	<1	<1	<1	<1/<1	0.6J	3 ¹
NDMA	0.066J	0.0034	0.001	<0.002	<0.002/0.00556	0.0023	0.01 ¹
Calcium	89000	49000	36000	73000	45000/45000	58000	None
Magnesium	40000	18000	12000	22000	16000/16000	18000	None
Potassium	17000	6000	<5000	3500J	<5000/<5000	<5000	None
Sodium	110000	110000	47000	73000	39000/40000	37000	None
Cr ⁺⁶	2.2	4.9	0.57	0.9	<0.2/<0.2	<0.2	11*
NO ₃ -N	8600	2100	4100	9800	18000/18000	21000	10,000 ²
PCR	4	2	<2	3.2	2.3/3.2	2.8	4 ¹
Aluminum	52000	21000	<20	<40	<40/<40	<40	1,000 ¹
Antimony	<4	<4	<4	<4	<4/<4	<4	6
Arsenic	16	9	1J	1.4J	<2/<2	<2	10 ²
Barium	420	170	20	75	20/20	46	1,000 ¹
Beryllium	2	0.9J	<0.5	<1	<1/<1	<1	4 ¹
Boron	200	200	80J	120	81J/82J	87J	1,000 ³
Chromium	75	25	<1	<4	<4/<4	<4	50 ¹
Cobalt	21	7	<0.5	<2	<2/<2	<2	None
Copper	52	20	<2	<8	<8/<8	<8	1,300 ¹
Iron	69000	22000	<100	<100	<100/<100	<100	300 ³
Lead	21	8	<1	<4	<4/<4	<4	15 ¹
Manganese	1100	460	80	88	240/250	92	50 ³
Mercury	0.39	0.28	<0.03	0.03	0.076/<0.030	<0.030	2 ¹
Molybdenum	50	50	12	10	6/6.3	9.2	None
Nickel	45	12	1	3.9J	4.9/4.9	2.5J	100 ¹
Selenium	3J	<4	0.8J	<4	<4/<4	<4	50 ¹
Vanadium	130	70	<20	<20	<20/<20	<20	None
Zinc	290	140	72	160	22/24	340	5,000 ³

NOTES:

VOC values in ug/l (all other VOCs and all SVOCs were ND), TCE=Trichloroethene, PCE=Tetrachloroethene, 1,1,-DCE=1,1-Dichloroethene, cis-1,2-DCE=cis-1,2-Dichloroethene, 1,2-DCA=1,2-Dichloroethane, ACT=Acetone, 12P=1,2-Dichloropropane, TOL=Toluene, Ca=Calcium, Mg=Magnesium, K=Potassium, Na=Sodium, CR+6=Hex Chromium, NO3-N=Nitrate as N, PCR=Perchlorate, 1,2,3-TCP=1,2,3-Trichloropropane, 14A=1,4-Dioxane, NDMA=N-Nitrosodimethylamine

MCL=EPA or California Maximum Contaminant Level (whichever is lower)

AL=California Action Level; *California Toxics rule value for surface water discharge shown for hexavalent chromium.

¹ = California

² = EPA

³ = secondary MCL

J-indicates results that are considered estimates because they fall between the instrument detection limit and the contract required quantitation limit.

all liquid was disposed of at Remedy Environmental, Orange County, California

= equal to or exceeding MCL, AL, or other regulatory level.

**Table 3-2
Preliminary Groundwater Sampling Results
San Gabriel Valley NPL Area 3
Well Installation Report**

Well Name	Well/Station ID	Well Depth (ft bgs)	Screened Interval(s) (ft bgs)	Casing Diam. (in.)	Date Sampled	Depth to Water (feet bgs)	Volatile Organic Compounds														Dissolved Metals														
							µg/L														(mg/L)														
							TCE	PCE	1,1-DCE	cis-1,2-DCE	CCL	1,2-DCA	Acetone	Chloroform	Dichlorodifluoromethane	Benzene	Toluene	Boron	Selenium	Nickel	Molybdenum	Chromium	Copper	Iron	Calcium	Magnesium	Potassium	Sodium	Manganese	Lead	Barium	Arsenic	Zinc		
MW1-1	EPAMW11	282	252-272	4	03/05/03	185.43	240/260	4/4	2/2	3/3	0.9/0.8	0.7/0.7	<4/<4	0.6J/0.6J	<1/<1	<1/<1	23/23	0.1/0.1	0.002J/0.002J	0.004/0.004	0.009/0.01	0.009/0.009	<0.008	<0.1/<0.1	90/92	32/33	<5/3J	71/73	0.02/0.02	<0.004/<0.004	0.098/0.097	0.002/0.002	0.01J/0.01J		
					07/18/03	185.72	200	5.4	2.3	3.6	0.9	0.7	<4	0.6J	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
MW1-2A	EPAMW12A	399	384-394	4	03/06/03	323.70	83	2	1	11	<0.5	<0.5	<4	<1	<1	<1	21	0.2	<0.004	0.004	0.021	<0.004	<0.008	0.07J	60	30	4J	90	0.098	<0.004	0.065	0.002	<0.02		
					07/17/03	326.04	71	1.9	1.1	9.5	<0.5	<0.5	<4	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
MW1-2B	EPAMW12B	318	288-308	4	--	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
					--	NA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
MW1-3	EPAMW13_05	800	350-360	4	03/06/03	311.79	1	<1	<1	0.5J	<0.5	<0.5	4	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
	EPAMW13_04		480-490		07/15/03	313.85	1.7	<1	<1	0.6J	<0.5	<0.5	3.3J	<1	<1	<1	<1	<1	0.078J	<0.004	<0.004	0.0072	<0.004	<0.008	<0.1	30	16	2.7J	36	<0.004	<0.004	0.026	0.001J	0.018J	
	EPAMW13_03		580-590		03/06/03	315.63	1	<1	<1	0.5J	<0.5	<0.5	3J	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	EPAMW13_02		660-670		07/15/03	324.47	<1/3.8	<1/<1	<1/<1	<1/1.3	<0.5/<0.5	<0.5/<0.5	<4/<4	<1/<1	<1/<1	<1/<1	<1/<1	<1/<1	0.07J/0.071J	<0.004/<0.004	<0.004/<0.004	0.0054/0.0052	0.0056/0.0056	<0.008/<0.008	<0.1/<0.1	70/70	22/22	3.1J/3.1J	29/29	<0.004/<0.004	<0.004/<0.004	0.055/0.055	<0.002/<0.002	0.061/0.061	
	EPAMW13_01		770-780		03/06/03	316.69	2	<1	<1	<1	<0.5	<0.5	8	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
					07/15/03	326.38	4.7	<1	<1	<1	<0.5	<0.5	2.2J	<1	<1	<1	<1	<1	0.056J	<0.004	<0.004	0.011	<0.004	<0.008	<0.1	23	12	2.7J	40	0.0033	<0.004	0.019	<0.002	0.036	
					03/06/03	318.33	2	<1	<1	1	<0.5	<0.5	4	<1	<1	0.5J	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
					07/15/03	329.71	<1	<1	<1	<1	<0.5	<0.5	2.5J	<1	<1	<1	<1	<1	0.071J	<0.004	<0.004	0.014	<0.004	<0.008	<0.1	21	9.7	<5	39	0.013	<0.004	0.02	<0.002	0.034	
			03/06/03	319.17	2	<1	<1	0.8J	<0.5	<0.5	<4	<1	<1	<1	<1	<1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		
			07/15/03	332.28	<1	<1	<1	<1	<0.5	<0.5	<4	<1	<1	<1	<1	<1	0.13	<0.004	<0.004	0.039	<0.004	<0.008	<0.1	32	11	4J	120	0.065	<0.004	0.026	0.002	0.01J			
MW1-4	EPAMW14_04	635	380-390	4	07/16/03	356.90	1.9	<1	<1	<1	<0.5	<0.5	2J	<1	<1	<1	<1	0.12	0.0028J	<0.004	0.078	<0.004	0.0045J	<0.1	7.7	5.4	<5	170	0.0024J	<0.004	0.01	0.012	0.014J		
	EPAMW14_03		460-470		07/16/03	359.19	44/54	0.6J/1	<1/0.6J	4.5/6.6	<0.5/<0.5	<0.5/<0.5	2.6J/<4	<1/<1	<1/1	<1/<1	<1/<1	0.11/0.11	<0.004/<0.004	0.0047/0.0044	0.0072/0.0065	0.003J/0.0036J	<0.008/<0.008	<0.1/<0.1	78/77	23/22	3.5J/3J	75/71	0.065/0.065	<0.004/<0.004	0.088/0.087	<0.002/<0.002	0.043/0.043		
	EPAMW14_02		545-555		07/16/03	372.79	12	<1	<1	1.4	<0.5	<0.5	<4	<1	<1	<1	<1	0.13	0.0054	<0.004	0.11	<0.004	0.0043J	<0.1	4.6	2.1	<5	230	0.002J	<0.004	0.0063	0.02	<0.02		
	EPAMW14_01		605-615		07/16/03	373.67	18	<1	<1	2	<0.5	<0.5	2.6J	<1	<1	<1	<1	0.13	<0.004	<0.004	0.06	<0.004	0.004J	<0.1	3.9	2.1	2.8J	150	<0.004	<0.004	0.0083	0.0049	<0.02		
MW1-5	EPAMW15_06	800	325-335	4	07/17/03	294.07	2.6	2.5	<1	<1	<0.5	<0.5	<4	<1	<1	<1	<1	0.074J	<0.004	<0.004	0.0042	0.005	<0.008	<0.1	53	18	2.5J	39	0.01	<0.004	0.039	0.001J	0.014J		
	EPAMW15_05		400-410		07/17/03	296.24	1.7	7.6	<1	<1	<0.5	<0.5	<4	<1	<1	<1	<1	0.082J	<0.004	<0.004	0.0047	<0.004	<0.008	<0.1	52	16	<5	34	0.036	<0.004	0.036	<0.002	0.02		
	EPAMW15_04		480-490		07/17/03	301.99	2	2.2	<1	<1	<0.5	<0.5	2.8J	<1	<1	<1	<1	0.095J	<0.004	<0.004	0.012	<0.004	<0.008	<0.1	43	16	2.8J	55	0.039	<0.004	0.032	<0.002	0.012J		
	EPAMW15_03		590-600		07/17/03	323.70	2.2	3.5	<1	<1	<0.5	<0.5	2.6J	<1	<1	<1	<1	0.097J	<0.004	<0.004	0.0073	<0.004	<0.008	<0.1	53	17	<5	37	0.061	<0.004	0.044	<0.002	0.15		
	EPAMW15_02		670-680		07/17/03	323.91	1.2	1.3	<1	<1	<0.5	<0.5	4	<1	<1	<1	<1	0.11	<0.004	<0.004	0.0084	<0.004	<0.008	<0.1	37	12	<5	34	0.058	<0.004	0.021	<0.002	0.021		
	EPAMW15_01		770-780		07/16/03	318.23	2.3	2.5	<1	<1	<0.5	<0.5	<4	<1	<1	<1	<1	0.089J	<0.004	<0.004	0.0068	<0.004	<0.008	<0.1	29	13	<5	36	0.07	<0.004	0.016	<0.002	<0.02		
						MCL(ug/l)	5 ¹	5 ¹	6 ¹	6 ¹	0.5 ¹	0.5 ¹	None	None	None	1 ¹	150 ¹	1 ³	0.05 ¹	0.1 ¹	None	0.05 ¹	1.3 ¹	0.3 ³	None	None	None	None	0.05 ³	0.015 ¹	1 ¹	0.01 ²	5 ³		

NOTES: TCE=Trichloroethene, PCE=Tetrachloroethene, CCL=Carbon Tetrachloride, 1,1-DCE=1,1-Dichloroethene, cis-1,2-DCE=cis-1,2-Dichloroethene, 1,2-DCA=1,2-Dichloroethane.
-- = not sampled
MCL=EPA or California Maximum Contaminant Level (whichever is lower).
¹ = California
² = EPA
³ = secondary MCL
J-indicates results that are considered estimates because they fall between the instrument detection limit and the contract required quantitation limit.
All other reported VOCs were not detected above laboratory detection limits (generally 1 ug/L)

Concentrations of VOCs will change with time and may increase or decrease depending on a variety of factors. In addition, groundwater levels will fluctuate depending on a variety of factors, and are anticipated to rise unless current below average rainfall patterns persist.

Monitoring well EPAMW12B was not sampled because the water table is presently below the screened interval of the well (288 to 308 feet bgs). As mentioned in Section 2.4, current groundwater levels are at historic lows for the San Gabriel Basin. However, groundwater levels will most likely rise in time, unless current below average rainfall patterns persist.

4.0 References

U.S. Environmental Protection Agency (EPA). 2002. *Field Sampling Plan For San Gabriel Valley NPL Area 3 Remedial Investigation Field Activities, San Gabriel Basin, Los Angeles County, California*. Prepared by CH2M HILL. September.

Appendix A
Lithologic Boring Logs



Boring Number: MW1-1

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Front Street and Atlantic Street
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: NA
 Logged by: Tom Perina
 Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
0		Ground Surface		
0 - 5		ASPHALT AND FILL MATERIAL		first 11-feet were air-knifed
5 - 10		POORLY GRADED SAND (SP) , some granitic cobbles, medium sand, yellowish brown (10YR 5/4)		bucket auger from 10-26 feet below ground surface
10 - 15		POORLY GRADED SAND (SP) , 10% gravel, weathered granitic clasts, light olive brown (2.5Y 5/6)		
15 - 26		SILTY SAND (SM) , deeply weathered granitic clasts, light olive brown (2.5Y 5/6)		
26 - 40		POORLY GRADED SAND (SP) , with trace gravel, fine to medium sand		
40 - 50		POORLY GRADED SAND (SP) , brownish yellow (10YR 6/6), fine to medium sand, trace gravel		



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
55		POORLY GRADED SAND WITH GRAVEL (SP) , coarse sand, yellow (10YR 7/6)		
60		POORLY GRADED SAND WITH GRAVEL (SP) , coarse sand; trace gray clay "balls"		
65		SANDY CLAY (CL) , yellowish brown (10YR 5/6)		
70				
75				
80		WELL GRADED SAND WITH GRAVEL (SW-GW) , very pale brown (10YR 7/4), medium to very coarse ssand, >15% gravel		
85				
90		CLAYEY GRAVEL (GC) , clay in the form of "balls"		
95		SANDY CLAY (CL)		
100				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
105		CLAYEY GRAVEL (GC) , very pale brown (10YR 7/4) gravels with pale brown (10YR 6/3) sandy clay		
110		GRAVEL (GW) , very pale brown (10YR 7/4)		
115		SANDY CLAY (CL)		
120		GRAVEL (GW) , fine gravel, very pale brown (10YR 7/4)		
125				
130				
135				
140		GRAVEL WITH CLAY (GC) , very pale brown (10YR7/4)		bedrock contact @ 140' based on geophysical logs
145				
150				



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Front Street and Atlantic Street
Project Number: 175859.FI.03

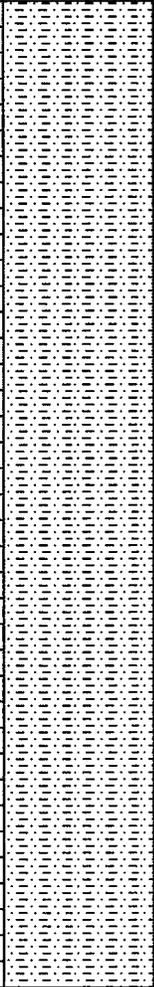
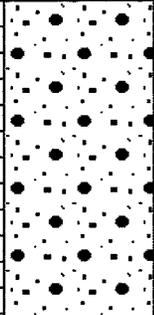
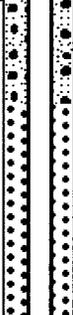
Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Tom Perina
Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
155				
160		<u>CLAYEY SAND (SC)</u> , trace gravel, brownish yellow (10YR 6/6)		
165				
170				
175				
180				
185				
190				drilled to 193 feet below ground surface on 12/30/02
195				
200				



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Front Street and Atlantic Street
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Tom Perina
Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
205		<u>SANDY CLAY (CL)</u> , brownish yellow (10YR 6/6)		
210				
215		<u>GRAVEL (GW)</u> very pale brown (10YR 7/4), trace clay in the form of "balls" (in top 2-feet of gravel layer; most likely traces of the above clay layer)		
220				
225				
230				
235				
240				
245				
250				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
255					
260					
265					
270					some clay "balls"
275			<u>SANDY CLAY (CL)</u> , yellowish brown (10YR 5/4)		approximate gravel-clay interface
280					
285					
290					
295					
300					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
305				
310				
315				
320				
320		<u>CLAY (CL)</u> , plastic, no visible sand		
322		<u>GRAVEL (GW)</u> , trace cobbles		hard drilling from 322 to 323 feet below ground surface
325		<u>CLAY (CL)</u> , light yellowish brown (10YR6/4), no sand, plastic		
330				still only clay coming out at 330 feet below ground surface
335				
340				
345				hard drilling - cobbles present
350				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
355	[Patterned]		[Patterned]	
360				
365	[Patterned]	<u>CLAY (CL)</u> , gray (10YR 5/1), plastic, no visible sand	[Patterned]	
370				
375	[Patterned]	<u>CLAY (CL)</u> , dark gray (10YR 4/1), plastic, trace sand	[Patterned]	
380				
385	[Patterned]		[Patterned]	
390				
395	[Patterned]		[Patterned]	
400				



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Front Street and Atlantic Street
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Tom Perina
Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
405				cobbles present
410				cobbles present
415				
420				
425				cobbles present
430		<u>CLAY (CL)</u> , pale brown (10YR 6/3), plastic, trace sand		
435				
440		<u>CLAY (CL)</u> , gray (10YR 5/1), plastic, trace sand		
445				
450				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Front Street and Atlantic Street

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Tom Perina

Start/Finish Date: 12.21.2002 / 12.23.2002

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
455				cobbles present
460		End of Log		TD = 460' bgs
465				
470				
475				
480				
485				
490				
495				
500				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
0		Ground Surface		
0 - 5		ASPHALT AND FILL MATERIAL		Core asphalt w/auger rig on 12/10/02, hand auger to 5' bgs
5 - 10		WELL-GRADED SAND (SW) Dark yellowish brown (10YR 3/4), dry, very fine to very coarse sand, 5% silt		5' to 25' bgs bore w/bucket rig and install conductor casing 12/10/02
10 - 15		WELL-GRADED SAND (SW) Fine to very coarse sand, 7% gravel, trace 3" cobbles, light olive brown (2.5Y 5/6), dry		
15 - 20		WELL-GRADED SAND (SW) Dark yellowish brown (10YR 4/6), dry, fine to very coarse sand, 7% fine to medium gravel (sub-rounded to sub-angular)		
20 - 25		WELL-GRADED SAND W/GRAVEL (GW) 15% gravel, trace cobbles		
25 - 30		WELL-GRADED SAND (SW) Fine to coarse sand		
30 - 35		WELL-GRADED SAND (SW) Fine to coarse sand		Begin mud rotary drilling @ 10:45 on 12/12/02
35 - 40		POORLY GRADED SAND (SP) Coarse to very coarse sand		
40 - 45		POORLY GRADED SAND (SP) Fine to medium sand		
45 - 50		WELL GRADED SAND w/SILT AND CLAY (SW-SM) Very fine to very coarse sand, 15%-20% silt and clay (in the form of "balls"), trace fine gravel		



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
55		POORLY GRADED SAND (SP) Fine to medium sand		Rig chatter between 54' and 73' bgs (coarse material)
60		WELL GRADED SAND (SW) Fine to very coarse		
65		POORLY GRADED SAND (SP) Fine to medium sand		
70		WELL GRADED SAND (SW) Medium to very coarse sand, trace clay, gravel and cobbles		
75		WELL GRADED SAND (SW) Fine to coarse		
80		WELL GRADED SAND w/SILT (SW-SM) Fine to very coarse sand, 15%-20% silty clay "balls"		
85				
90		GRAVELS AND COBBLES (GW)		
95		POORLY GRADED SAND (SP) Coarse to very coarse		
100		POORLY GRADED SAND (SP) Sub-angular, dark yellowish brown (10YR 4/4), multi-colored granite; coarse to very coarse		



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
105		WELL GRADED SAND (SW) Dark yellowish brown (10YR 4/4), fine to very coarse sand		Stop for day @ 16:30 12/13/02 start drilling @ 08:30 Rig chatter 139' - 151' (gravels & cobbles)
110		WELL GRADED SAND (SW) Yellowish brown (10YR 5/4), fine to very coarse sand		
115		WELL GRADED SAND (SW) Very fine to medium sand, trace coarse sand, brown (10YR 4/3), trace clay		
120		WELL GRADED SAND (SW) Very fine to medium sand, trace coarse sand, brown (10YR 4/3), trace clay		
125		WELL GRADED SAND (SW) Very fine to medium sand, trace coarse sand, brown (10YR 4/3), trace clay		
130		WELL GRADED SAND (SW) Very fine to medium sand, trace coarse sand, brown (10YR 4/3), trace clay		
135		WELL GRADED SAND (SW) Very fine to very coarse sand, dark yellowish brown (10YR 4/4)		
140		WELL GRADED SAND (SW) Very fine to very coarse sand, dark yellowish brown (10YR 4/4)		
145		WELL GRADED SAND (SW) coarse sand, trace gravel		
150				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
		WELL GRADED GRAVEL (GW) Trace silty clay "balls" (reddish brown)		
155		SILTY CLAY (CL) Trace sand and gravel		
160		WELL GRADED SAND (SW) Fine to coarse sand, yellowish brown (10YR 5/4)		
165		SILTY CLAY (CL) Trace sand		
170		WELL GRADED SAND w/SILT (SW-SM) Fine to very coarse sand, 15%-20% silt/clay, trace gravel (sub-angular)		
175		WELL GRADED SAND (SW) Fine to coarse sand, yellowish brown (10YR 5/4)		
180		WELL GRADED SAND w/SILT & CLAY (SW-SM) Brown (10YR 4/3), very fine to medium sand, 10%-15% silty clay "balls"		
185		WELL GRADED SAND w/SILT & CLAY (SW-SM) Brown (10YR 4/3), very		
190				
195				
200		POORLY GRADED SAND (SP) Medium to fine sand, yellowish brown (10YR 5/4)		



Boring Number: MW1-2

Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
205			WELL GRADED SAND (SW) Very fine to very coarse sand, trace gravel		213' to 228' Possible very fine confining layer (CL/ML)
210			POORLY GRADED SAND (SP) Medium to fine sand, yellowish brown (10YR 5/4)		
215			WELL GRADED SAND (SW) Very fine to very coarse sand, trace gravel		
220			SILTY CLAY w/SAND (CL) 10%-15% fine sand		
225					
230			WELL GRADED SAND (SW) Very fine to very coarse sand, trace gravel		
235			POORLY GRADED SAND w/SILTY CLAY (SP-SC) Coarse to very coarse sand, 10%-15% silty clay "balls"		
240			WELL GRADED SAND (SW) Fine to coarse sand		
245			WELL GRADED SAND w/GRAVEL (SW) Medium to very coarse sand, 15% gravel		
250			WELL GRADED SAND (SW) Yellowish brown (10YR 5/4), fine to coarse		
					Out of clays @ 230 Rig chatter (driller says "we're in tighter/stiffer material"; compacted coarse sands; (slow drilling))



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main & 4th (MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
305			POORLY GRADED SAND (SP) Medium to coarse sand, sub-angular to angular		
310			WELL GRADED SAND (SW) Fine to medium sand, trace silty clay		
315					
320					
325					
330			WELL GRADED SAND (SW) Fine to very coarse sand, trace gravel, yellowish brown (10YR 5/4)		
335					
340			SANDY CLAY (SC/CL) Fine to medium sand		
345					
350					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
355		WELL GRADED SAND w/SILT (SW-SM) Very fine to medium sand, 15%-20% silt, yellowish brown		
360		SILTY CLAY (CL)		
365				
370				
375				
380		SILTY CLAY (CL) Trace fine sands		
385		WELL GRADED SAND (SW) Very fine to medium sand		
390				
395				
400				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main&4th(MW1-2A is 20' west of MW1-2B)

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Maura Kennelly

Start/Finish Date: 12.10.2002 / 1.2.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
405		WELL GRADED SAND (SW) Very fine to medium sand; increase in silty clay "balls"		Slightly coarser grained
410				
415		WELL GRADED SAND (SW) Fine to very coarse sand, some silty clay "balls"		
420		WELL GRADED SAND (SW) Very fine to medium sand, trace silty clay		
425				
430				
435				
440				
445				
450		SANDY CLAY (SC/CL)		
		End of Log		
		End of Log		12/16/02 15:15; TD = 450' bgs



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
0		Ground Surface		
0 - 5		ASPHALT AND FILL		Air knife was used for first 10'; bucket rig was used to 26'
5 - 15		WELL GRADED SAND (SW) 60% medium grained sand, 30% fine grained sand, 10% coarse grained sand, yellowish brown (10YR, 5/4), <5% gravel, most likely fill, moist to dry		
15 - 20		WELL GRADED SAND (SW) Light olive brown (2.5Y, 5/6), 70% medium sand, 25% fine sand, 5% coarse sand, <5% gravel, granitic clast, moist		
20 - 35		WELL GRADED SAND (SW) 60% medium sand, 30% fine sand, 10% gravel, (5-20 mm), weathered sub-angular granitic clasts, dry to moist		
35 - 40		WELL GRADED SAND (SW) 70% coarse sand, 35% medium sand, 5% fine sand, brown, gray, white, pink, sub-angular to sub-rounded, quartz, k-spar, metamorphics		Background PID = 0.0 PPM. Rotary mud drilling notes: gravels were possibly logged as coarse to very coarse sand as gravels could have been broken up by tri-cone bit
40 - 45		WELL GRADED SAND (SW) Gravels <5%, 5-10 mm, metamorphics, weathered granites		Drill chatter @ 39' 8:22 PID = 0.0 PPM
45 - 50		WELL GRADED SAND (SW) Brown, gray, white, pink, 50% coarse sand, 30% fine sand, 20% medium sand, sub-angular to sub-rounded, metamorphics, micas, quartz, k-spars, <5% gravel		Drill chatter @ 46'
50 - 55		WELL GRADED SAND (SW) 50% coarse to very coarse sand, 30% fine sand, 20% medium sand, diorite, granodiorite, weathered granite, plagioclase, anorthosite, pyrite, micas, metamorphics, angular to sub-rounded		9:26 PID = 0.0 PPM



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Main Street and Cordova Avenue
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Bill Hannah and Ping Tian
Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
55					Drill chatter @ 58'
60					9:35 PID = 0.0 PPM
65					9:52 PID = 0.0 PPM
70			WELL GRADED SAND (SW) 50% coarse sand, 30% fine sand, 20% medium sand, <5% gravel		Drill chatter @ 71'
75					Drill chatter @ 77'
80					Drill chatter @ 80'; 10:08 PID = 0.0 PPM
85			WELL GRADED SAND (SW) 50% coarse to very coarse sand, 30% fine sand, 20% medium sand, <5% gravel (5-10mm), same mineralogy as above		Mud Test: Visc = 35 s/qt; Sand = 0.25%; Weight = 8.9 lb/gal; Water loss = 13cc/30 mins
90					10:20 PID = 0.0 PPM
95					Drill chatter @ 95'
100					Drill chatter @ 100'; 10:33 PID = 0.0 PPM



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments	
	Soil Type					
105					Drill chatter @ 103'	
						Drill chatter @ 106'
110						10:48 PID = 0.0 PPM
						Drill chatter @ 113'
115						
120				WELL GRADED SAND (SW) 50% coarse to very coarse sand, 30% fine sand, 20% medium sand, <5% gravel (5-10mm), granite, quartz, anorthosite, k-spar, diorite, granodiorite, gneiss, minor micas, metamorphics		
125						
130						11:27 PID = 0.0 PPM
135						
140						11:41 PID = 0.0 PPM
145						
150						11:54 PID = 0.0 PPM Drill chatter @ 150'



Boring Number: MW1-3

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Main Street and Cordova Avenue
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Bill Hannah and Ping Tian
Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
155			WELL GRADED SAND (SW) Grayish brown (10YR, 5/2), 40% coarse sand, 40% fine sand, 20% medium sand, mineralogy as above, gravel <5% (5-10mm)		Drill chatter @ 155'
160					Drill chatter @ 159' 12:15 PID = 0.0 PPM
165					12:27 PID = 0.0 PPM
170			WELL GRADED SAND (SW) 40% coarse sand, 30% fine sand, 20% medium sand, 10% gravel		12:27 PID = 0.0 PPM
175					12:45 PID = 0.0 PPM
180					Drill chatter @ 184'
185			WELL GRADED SAND (SW) 60% coarse to very coarse grained sand, 20% fine sand, 20% medium sand, <5% gravel (5-10mm)		13:02 PID = 0.0 PPM Drill chatter @ 191'
190					1/13/03 08:35 PID = 0.0 PPM
195					
200					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments	
	Soil Type					
205			WELL GRADED SAND (SW) 50% coarse to very coarse sand, 30% fine sand, 20% medium sand, <5% gravel		Drill chatter @ 203'	
						Drill chatter @ 207'
210						08:45 PID = 0.0 PPM
215						
220						9:29 PID = 0.0 PPM Drill chatter @ 221'
225						
230						09:48 PID = 0.0 PPM
235						
240						
245						
250				10:48 PID = 0.0 PPM		



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
255				
260				11:03 PID = 0.0 PPM
265				
270				
275				Drill chatter @ 275'
280				Drill chatter @ 280'
285				
290				12:04 PID = 0.0 PPM
295				
300				Drill chatter @ 298'



Boring Number: MW1-3

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Main Street and Cordova Avenue
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Bill Hannah and Ping Tian
Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments	
	Soil Type				
305		WELL GRADED SAND (SW) 50% coarse sand, 30% fine sand, 20% medium sand		Drill chatter @ 303'	
310				12:48 PID = 0.0 PPM; Drill chatter @ 310'	
315					
320				Drill chatter @ 318' 13:13 PID - 0.0 PPM	
325				Drill chatter @ 325'	
330				13:43 PID = 0.0 PPM Drill chatter @ 331'	
335					
340				WELL GRADED SAND (SW) 40% fine sand, 40% coarse sand, 20% medium sand	Soft drilling @ 336'
345				WELL GRADED SAND (SW) 50% coarse sand, 30% fine sand, 20% medium sand	Drill chatter @ 341'
350					14:48 PID = 0.0 PPM



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
355				
360				
365				
370				
375				
380				
385				
390				
395				
400				
				PID = 0.0 PPM
				16:39 PID = 0.0 PPM; weakly cemented



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
405				
410		WELL GRADED SAND (SW) 40% fine sand, 40% coarse and, 20% medium sand		1/14/03 09:07 PID = 0.0 PPM; weakly cemented
415				
420				9:38 PID = 0.0 PPM
425				
430				9:59 PID = 0.0 PPM
435				
440				
445				
450				10:55 PID = 0.0 PPM



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
455			WELL GRADED SAND (SW) 50% coarse sand, 30% fine sand, 20% medium sand		Drill chatter @ 460'; 11:07 PID = 0.0 PPM
460			WELL GRADED SAND (SW) 50% coarse sand, 30% fine sand, 20% medium sand, weakly cemented		
465			WELL GRADED SAND (SW) 40% coarse sand, 40% fine sand, weakly cemented		
470			WELL GRADED SAND (SW) 50% coarse sand, 30% fine sand, 20% medium sand, <5% gravel, weakly cemented		
475					
480			WELL GRADED SAND (SW) 40% fine sand, 30% coarse sand, 30% medium sand, weakly cemented, gravel <5%, minor clay		11:30 PID = 0.0 PPM
485					11:59 PID = 0.0 PPM
490					12:15 PID = 0.0 PPM
495					
500					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
505		WELL GRADED SAND (SW) 40% fine sand, 30% coarse sand, 20% medium sand, 10% clay, weakly cemented		
510		WELL GRADED SAND (SW) Brown (10YR, 4/1), 50% fine sand, 30% coarse sand, 10% medium sand, 10% clay, weakly cemented		
515				
520		WELL GRADED SAND (SW) 40% coarse sand, 40% fine sand, 20% medium sand, weakly cemented		13:58 PID = 0.0 PPM
525				Drill chatter @ 524'
530				14:30 PID = 0.0 PPM
535				Drill chatter @ 532'
540				Drill chatter @ 535'
545				14:50 PID = 0.0 PPM
550				



Boring Number: MW1-3

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Main Street and Cordova Avenue
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: NA
 Logged by: Bill Hannah and Ping Tian
 Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
555				15:31 PID = 0.0 PPM
560				
565				
570				
575				
580		WELL GRADED SAND (SW) 50% fine sand, 30% coarse sand, 10% clay, 10% medium sand		
585				16:35 PID = 0.0 PPM Resume drilling on 1/15/03 @ 08:30 @ 593'
590				
595				
600				
				08:40



Boring Number: MW1-3

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Main Street and Cordova Avenue
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: NA
 Logged by: Bill Hannah and Ping Tian
 Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments	
	Soil Type				
605		WELL GRADED SAND w/CLAY (SW-SC) Yellowish brown, fine to coarse grained sand, medium plastic clay, approximately 40% coarse sand, 25% medium sand, 25% fine sand, 10% clay			
610		CLAYEY SAND (SC) Yellowish brown, fine to coarse sand, medium plastic clay, 25% coarse sand, 25% medium sand, 20% fine sand, 30% clay			09:00
620		WELL GRADED SAND w/CLAY (SW-SC) Yellowish brown with white staining, fine to coarse sand, medium plastic clay, 40% coarse sand, 25% medium sand, 25% fine sand, 10% clay			09:28
630		WELL GRADED SAND w/CLAY (SW-SC) Yellowish brown with white staining, fine to coarse grained sand, medium plastic clay, 40% coarse sand, 25% medium sand, 25% fine sand, 10% clay			10:10
640			10:25		
650			10:45		



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Main Street and Cordova Avenue
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Bill Hannah and Ping Tian
Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
655					
660			WELL GRADED SAND w/CLAY (SW) Yellowish brown, fine to coarse grained sand, low plastic clay, 30% coarse sand, 30% medium sand, 30% fine sand, 10% clay		11:15
665					
670			WELL GRADED SAND (SW) Yellowish brown, fine to coarse grained sand, 10% fine gravel, 30% coarse sand, 30% medium sand, 20% fine sand, 10% clay		11:50
675					
680			WELL GRADED SAND w/CLAY (SW) Yellowish brown, fine to coarse sand, 30% coarse sand, 30% medium sand, 30% fine sand, 10% low plastic clay		12:30
685					
690			CLAYEY SAND (SC) Yellowish brown, fine to coarse sand, 30% coarse sand, 20% medium sand, 30% fine sand, 20% low plastic clay		12:55
695					
700					13:25



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

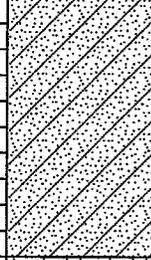
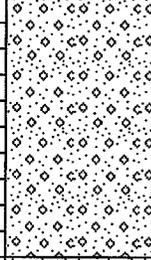
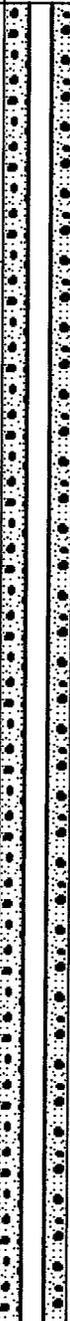
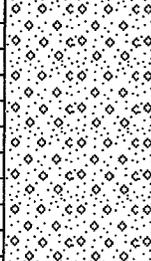
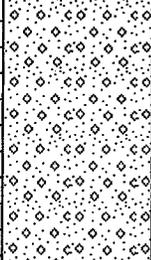
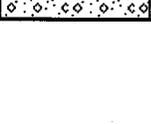
Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
705				
710		<p>WELL GRADED SAND (SW) Yellowish brown, fine to coarse sand, 30% coarse sand, 30% medium sand, 20% fine sand, 10% clay, 10% gravel</p>		13:45
715				
720		<p>WELL GRADED SAND (SW) Yellowish brown, fine to coarse grained sand, 30% coarse sand, 30% medium sand, 30% fine sand, 10% low plastic clay</p>		14:30
725				
730				14:50
735				
740				15:10
745				
750				15:20



Boring Number: MW1-3

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Main Street and Cordova Avenue
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: NA
Logged by: Bill Hannah and Ping Tian
Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
755		WELL GRADED SAND (SW) Yellowish brown, fine to coarse grained sand, 30% coarse sand, 30% medium sand, 35% fine sand, 5% clay		15:45
760				16:00
765				09:00
770				09:45
775		CLAYEY SAND (SC) Yellowish brown, fine to coarse grained sand, 40% coarse sand, 20% medium sand, 20% fine sand, 10% medium plastic clay		10:45
780				
785				
790				
795				
800				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Main Street and Cordova Avenue

Project Number: 175859.FI.03

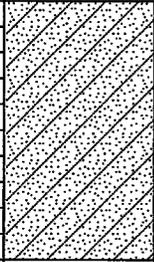
Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: NA

Logged by: Bill Hannah and Ping Tian

Start/Finish Date: 1.9.2003 / 1.24.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
805				
810		End of Log		10:50 TD = 810'
815				
820				
825				
830				
835				
840				
845				
850				



Boring Number: MW1-4

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Alhambra and Novelda Rd
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: N/A
 Logged by: Maura Kennelly
 Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
0		Ground Surface		
0 - 5		ASPHALT AND FILL MATERIAL		Install conductor casing to 25 ft bgs, drill to 25 ft bgs by hollow stem auger (15" bit and 14" conductor casing) at 0830 hrs on 5/6/03
5 - 20		WELL GRADED SAND WITH GRAVEL (SW) , dark brown, 80% fine to very coarse sand, 18% fine to very coarse gravel, 2% angular to sub-angular cobbles		
20 - 25		WELL GRADED SAND WITH GRAVEL (SW) , dark brown, fine to very fine coarse sand, fine to very coarse gravel, 15% sub-rounded to sub-angular 3" or greater cobbles		
25 - 30		WELL GRADED SAND WITH GRAVEL (SW) , yellowish brown, 90% fine to very coarse sand, 10% fine to very coarse, angular to sub-angular gravel, trace cobbles		
30 - 40		WELL GRADED SAND (SW) , dark grayish brown (25Y4/2), 85% very fine to medium; 15% coarse to very coarse sand		
40 - 50		CLAYEY SILT WITH SAND (ML) , dark yellowish brown (10YR 4/6), 90% silt with clay, 10% medium to coarse sand		5/7/03 1200 hrs, mud rotary (12.25" Mill Tooth bit)



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Alhambra and Novelda Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Maura Kennelly

Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
55		SANDY SILT WITH CLAY (ML) , dark yellowish brown (10YR4/6), 90% silt with clay, 10% medium to coarse sand		
60		POORLY GRADED SAND WITH GRAVEL (SP) , coarse to very coarse sand, 5% angular to sub-angular gravel		Rig chatter
65		GRAVELS AND COBBLES , angularity of pieces suggest broken up cobbles, 50% coarse to very coarse sand		
70		POORLY GRADED SAND WITH GRAVEL (SP) , coarse to very coarse, 5 to 7% gravel		
75		WELL GRADED SAND (SW) , yellowish brown (10YR5/4) very fine to very coarse sand, trace medium gravel		Rig chatter (possible cobbles or gravels)
80				
85				
90				
95				
100				



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
105			WELL GRADED SAND (SW) , dark yellowish brown (10YR4/6), very fine to coarse sand, 5% silt, trace clay, trace gravel		Rig chatter (cobbles and gravel)
110			POORLY GRADED SAND WITH SILT AND GRAVEL (SP) , coarse to very coarse sand, trace gravel, trace clay/silt		Rig chatter
115			WELL GRADED SAND (SW) , yellowish brown (10YR5/4), 95% very fine to very coarse sand, 1% gravel, 4% silt/clay		
120					
125					
130					
135					
140			SILTY SAND (SM) , very fine to fine sand, 25% silt, trace clay, trace coarser sand		
145					
150			WELL GRADED SAND WITH SILT (SW-SM) , 85% very fine to very coarse sand, 15% clay/silt		



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Alhambra and Novelda Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Maura Kennelly

Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
155				
160		POORLY GRADED SAND (SP) , brown (10YR4/3), 90% very fine to fine sand, 8% coarse sand, 2% silt/clay		
165				
170				Stop for day 5/8/03, start drilling at 0930 hrs, switch to a button carbide bit
175				
180		WELL GRADED SAND (SW) , 90% medium to very coarse sand, 5% very fine to fine sand, 5% silty clay	1000 hrs	
185		SILTY SAND (SM) , 60% medium to very coarse sand, 25% silt/silty clay, 15% very fine to fine sand		
190				
195				
200				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Alhambra and Novelda Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Maura Kennelly

Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
205			WELL GRADED SAND (SW) , 80% medium to very coarse sand, 15% very fine to fine sand, 5% clayey silt/silt		
210			POORLY GRADED SAND (SP) , 90% coarse to very coarse sand, 5% very fine to medium sand, 5% silty clay	1050 hrs	
215					
220			WELL GRADED SAND WITH SILT AND CLAY (SW-SM) , very fine to coarse sand, 15% silt/clay	1105 hrs	
225					
230			WELL GRADED SAND WITH SILT AND CLAY (SW-SM) , 75% very fine to coarse sand, 25% silt/clay		
235			WELL GRADED SAND WITH SILT AND CLAY (SW-SM) , very fine to coarse sand, 15% silt/clay	1120 hrs	
240				1135 hrs	
245					
250					250 ft bgs - Hard to get a large sample of silt because it doesn't ball up like clay, it appears platy, can see it on shaker as well



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Alhambra and Novelda Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Maura Kennelly

Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
255			SANDY SILT (SM-ML) , 60% silt, 30% sand (fine to coarse), 10% clay		1225 hrs
260			SILTY SAND (SM) , 70% very fine to coarse sand, 30% silt/clay		
265					
270			SILTY SAND/SANDY SILT (SW-SM/ML) , 60% very fine to coarse sand, 40% silt/clay		
275					
280					
285					
290			SILTY SAND (SW-SM) , 75% very fine to medium sand, 10% coarse sand, 15% silt/clay		
295					
300					



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
305				
310		WELL GRADED SAND (SW) , 90% very fine to medium sand, 7% coarse sand, 3% clayey silt, trace very coarse sand		1405 hrs
315				
320		WELL GRADED SAND (SW) , 93% very fine to medium sand, 7% silt/clay, trace coarse to very coarse sand		1430 hrs
325				
330		WELL GRADED SAND (SW) , 90% very fine to medium sand, 10% silt, trace coarse sand		1445 hrs
335				
340				
345				
350				



Boring Number: MW1-4

Sheet: 8 of 17

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Alhambra and Novelda Rd
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: N/A
 Logged by: Maura Kennelly
 Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
355		WELL GRADED SAND WITH CLAY (SW-SC) , 85% very fine to coarse sand, 7% coarse sand, 8% silty clay/clayey silt, medium to low plasticity		
360		SILTY SAND (SM) , 75% very fine to fine sand, 25% silt clay		
365				
370				
375				
380				
385				
390		SILTY SAND (SM) , 75% very fine to fine sand, 25% silt/clay, trace coarse sand		
395				Stop for day 5/9/03 0930 hrs
400				0950 hrs



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
405		WELL GRADED SAND WITH SILT AND CLAY (SW-SC) , 80% very fine to coarse sand (70% very fine to medium sand and 10% coarse sand), 20% silt and clay		Easy to drill through, quite soft 1000 hrs 1025 hrs Formation became less soft, possible coarser material, however, still lots of silty clay Some rig chatter A lot more coarse sand
410		CLAY WITH SAND (CL) , lots of fines, approximately 5 to 10% very fine to fine sand		
415		SILTY CLAY (CL) , trace medium to coarse sand, soft, low plasticity		
420		SILTY CLAY (CL) , trace medium to coarse sand, soft, low plasticity		
425		SILTY CLAY (CL) , trace medium to coarse sand, soft, low plasticity		
430		SANDY CLAY/CLAYEY SAND (SC/CL) , lots of fines, approximately 20% medium to coarse sand, clay is very silty and has a low plasticity		
435		SANDY CLAY/CLAYEY SAND (SC/CL) , lots of fines, approximately 20% medium to coarse sand, clay is very silty and has a medium to low plasticity		
440		SILTY WELL GRADED SAND (SM-SW) , 75% very fine to very coarse sand, 20% silt, 5% clay		
445		WELL GRADED SAND WITH SILT (SM-SW) , 45% very fine to fine sand, 30% medium to very coarse sand, 25% silt and clay		
450		WELL GRADED SAND WITH SILT (SM-SW) , 45% very fine to fine sand, 30% medium to very coarse sand, 25% silt and clay		



Boring Number: MW1-4

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Alhambra and Novelda Rd
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: N/A
 Logged by: Maura Kennelly
 Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
455				1130 hrs
460		WELL GRADED SAND WITH SILT (SW) , 35% very fine to medium sand, 50% coarse to very coarse sand, 15% silt/clay		1215 hrs
465		SILTY SAND (SM) , 45% silt, 45% very fine to fine sand, 10% medium to coarse sand		
470		SILTY SAND (SM) , 45% silt, 35% very fine to fine sand, 20% medium to very coarse sand		Harder drilling
475		SILTY SAND (SM) , 45% silt, 35% very fine to fine sand, 20% medium to very coarse sand		1300 hrs
480		CLAYEY SILT (ML) , trace medium to coarse sand		Button bit moving slow in finer material Silt suspends in water (drilling fluid), hard to capture good sample, platy appearance when brought to surface
485				1640 hrs
490		SILTY SAND/SANDY SILT (SM/ML) , 50% silt and clay, 50% very fine to coarse sand		
495		SILT (ML) , trace sand		1700 hrs, stop for day 5/10/03, 0900 hrs, switch to a mill tooth bit
500				



Boring Number: MW1-4

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Alhambra and Novelda Rd
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: N/A
 Logged by: Maura Kennelly
 Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
505		CLAYEY SILT (ML) , medium to low plasticity, 5 to 7% medium to coarse sand		500 ft bgs - Rig chatter, however the cuttings are extremely fine
510		SILT (ML) , 5% clay, 10% fine to coarse sand		Rig chatter, greater than that at 500 ft bgs
515		SANDY SILT WITH CLAY (ML) , 60% silt, 35% very fine to coarse sand, 5% clay (medium to low plasticity)		0940 hrs Drilling fluid is very thick (without adding more bentonite) indicating that there is clay (lots of fines)
520		SANDY SILT WITH CLAY (ML) , 60% silt, 30% sand, 10% clay		
525		WELL GRADED SAND WITH SILT AND CLAY (SW) , 75% very fine to very coarse sand, 15% silt, 10% clay		Easier drilling (softer material)
530		WELL GRADED SAND WITH SILT AND CLAY (SW) , 75% very fine to very coarse sand, 15% silt, 10% clay, contains more coarse sand than above		1010 hrs
535				
540		SILTY SAND (SM) , 45% very fine to coarse sand, 55% silt/clay	1040 hrs	Bucket did not pick up a good sample because of all the fines
545				
550				1055 hrs



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Alhambra and Novelda Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Maura Kennelly

Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
555		WELL GRADED SAND WITH CLAY (SW-SC) , 65% very fine to coarse sand, 35% silty clay (brown 7.5YR4/2)		Thinning back mud by pumping into Baker tank (clay is thickening it up)
560		WELL GRADED SAND WITH CLAY AND SILT (SW) , 5% clay (brown 7.5YR4/2), 20% silt, 50% medium to very coarse sand, 25% very fine to fine sand		1155 hrs Rig chatter, slow moving, stiff/hard native material
565				
570				1215 hrs
575				1220 hrs
580		WELL GRADED SAND WITH SILT (SW) , 40% medium to coarse sand, 40% very fine to fine sand, 20% silt		
585				1230 hrs
590		WELL GRADED SAND WITH SILT (SW) , 40% medium to coarse sand, 45% very fine to fine sand, 10% silt/clay		1235 hrs
595				
600				1300 hrs



Boring Number: MW1-4

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Alhambra and Novelda Rd
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: N/A
 Logged by: Maura Kennelly
 Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
605			SILTY SAND (SM) , 60% very fine to coarse sand, 40% silt/clay		1305 hrs, rig chatter (stiffer material), drilling very slowly
610			WELL GRADED SAND (SW) , 90% very fine to coarse sand, 10% silt/clay		
615			WELL GRADED SAND (SW) , 50% medium to coarse sand, 30% very fine to fine sand, 20% silt/clay		
620			WELL GRADED SAND (SW) , 85% very fine to medium sand, 15% clay and silt		1410 hrs, driller indicates softer material
625					
630			SANDY SILT WITH CLAY (ML) , 70% silt, 10% clay, 20% very fine to coarse sand		Stop for day at 1330 hrs 5/12/03 1300 hrs
635					
640			SANDY SILT WITH CLAY (ML) , 60% silt, 10% clay, 30% very fine to coarse sand		
645					
650					1345 hrs



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
655					
660			SILTY SAND (SM) , 75% very fine to coarse sand, 25% silt, trace clay, yellowish brown (10YR5/6)		1415 hrs
665					
670					1430 hrs
675					
680			WELL GRADED SAND (SW) , 10% silt, 90% very fine to coarse sand		
685					
690					
695			POORLY GRADED SAND WITH SILT (SP-SM) , 80% very fine to fine sand, 10% silt, dense		Drilling got alot easier, driller says we might have hit a clay layer Harder drilling 1500
700					



Boring Number: MW1-4

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
705				
710		POORLY GRADED SAND WITH SILT (SP-SM) , very fine to fine sand, 20% silt, 5 to 7% coarse sand, dense		1615, Very stiff, very slow drilling rate
715		SILTY SAND (SM) , 55% very fine to fine sand, 25% medium to coarse sand, 20% silt		Stop for day at 1715 5/13/03 0930
720		POORLY GRADED SAND WITH SILT (SP-SM) , 80% very fine to fine sand, 20% silt, trace medium grained sand		1005, very stiff, very slow drilling rate (bedrock?)
725				1040, sandstone?
730				1110
735				Driller said he thinks the type of material changed, drilling got alot easier, rig chatter
740		WELL GRADED SAND (SW) , 60% very fine to medium sand, 20% coarse sand (slightly cemented with silty clay), 20% silt		1145, easier drilling
745				1150
750				



Boring Number: MW1-4

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
755					1210
760					1235
765					1245
770		WELL GRADED SAND WITH SILT AND CLAY (SW) , 50% very fine to fine sand, 25% medium to coarse sand, 25% silt/clay (fines)			1255
775					Rig chatter
780			WELL GRADED SAND WITH SILT (SW) , brown (10YR4/3), 85% very fine to medium sand, 15% silt, trace black clay		
785					1335
790		WELL GRADED SAND WITH SILT (SW) , 85% very fine to coarse sand, 15% silt, trace clay, very dark grayish brown (10YR3/2)			1340
795					1350
800					



Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Alhambra and Novelda Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Maura Kennelly
Start/Finish Date: 5.6.2003 / 5.13.2003

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
805			WELL GRADED SAND WITH SILT AND CLAY (SW) , 80% very fine to coarse sand, 20% silt and black clay		
810			End of Log		1435 on 5/13/03, total depth = 810 ft bgs
815					
820					
825					
830					
835					
840					
845					
850					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
0			Ground Surface		
0 - 5			ASPHALT AND ROAD BASE MATERIAL		Air knife used for first 10 feet, 18 inch bit (direct mud rotary) used to 25 feet bgs, install 14 inch conductor casing
5 - 30			WELL GRADED SAND WITH GRAVEL (SW) , yellowish brown, 90% fine to very coarse sand, 10% fine gravel (0.25" average), subangular		Logger B. Lechler 5/28/03
30 - 35			WELL GRADED SAND (SW) , with some pebbles, sand is mostly quartz and feldspars		
35 - 40			POORLY GRADED SAND AND GRAVEL (SP) , approximately 15% gravel (quartz and feldspar) with some clay balls, sand is medium to very coarse, approximately 70% coarse sand		Rig chatter
40 - 50					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
55			SANDY SILT WITH CLAY (ML) , yellowish brown (10YR5/4), 90% silt with clay, 10% fine sand, trace coarse sand		
60			SANDY SILT WITH CLAY (ML) , yellowish brown (10YR5/4), 90% silt with clay, 10% fine sand, trace coarse sand, interbedded gravel, gravel likely coming from larger clasts, possible transition zone		Rig chatter
65			WELL GRADED SAND WITH GRAVEL (SW) , 60% well graded sand, 35% medium gravel (mostly granitic, some lithics)		Rig chatter
75			WELL GRADED SAND WITH GRAVEL (SW) , trace clay, 60% well graded sand, 35% medium gravel (mostly granitic, some lithics)		Stop drilling for 15 minutes
85					
90					
95			WELL GRADED SAND WITH GRAVEL (SW) , contains less gravel than above		
100					Rig chatter



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
105			WELL GRADED SAND (SW) , brown (10YR4/3) to dark yellowish brown (10YR4/4)		
110			WELL GRADED SAND (SW) , more coarse than above, possible transition to gravel or interbedded with gravel		Rig chatter
115					Rig chatter
120			POORLY GRADED SAND (SP) , with trace silt/clay balls, approximately 15% sand is more coarse than above		
125					
130			WELL GRADED SAND AND GRAVEL (SW) , gravel is angular, probably from larger clasts, mostly quartz and feldspar with some darker lithics		
135					
140			WELL GRADED SAND (SW) , dark yellowish brown (10YR4/6), mostly fine to medium sand (75%), 20% coarse to very coarse sand, and approximately 5% silt/clay		
145					Rig chatter
150					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
155		POORLY GRADED SAND (SP) , with gravel, 60% very coarse sand, 20% fine to medium gravel, and 20% fine to medium sand		
160		POORLY GRADED SAND (SP) , with silt/clay, 85% fine to medium sand, 10% silt/clay, and 5% coarse sand		
165				
170		WELL GRADED SAND (SW) , with silt and gravel, gravel is fine and not from larger clasts		
175		POORLY GRADED SAND (SP) , with gravel, 75% coarse sand to fine gravel, 25% fine to medium sand		
180				
185			1315 hrs	
190		POORLY GRADED SAND (SP) , 75% coarse to very coarse sand with fine gravel, 25% fine to medium sand		
195		WELL GRADED SAND (SW) , very fine to very coarse sand, approximately 30% coarse to very coarse sand		
200				



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
205					
210			WELL GRADED SAND (SW) , very fine to very coarse sand, approximately 30% coarse to very coarse sand, with few gravel clasts		
215					
220			WELL GRADED SAND (SW) , very coarse to very fine sand with trace fines (silt/clay)		Rig chatter
225					
230			POORLY GRADED SAND (SP) , 80% coarse to very coarse sand, 20% fine to medium sand		Rig chatter
235					
240			WELL GRADED SAND (SW) , approximately 60% fine to medium sand and 40% coarse sand.		Cuttings coming off shaker are finer than those collected from mud tank, therefore, above 230 to 235 is probably SW.
245					
250					1535 hrs



Boring Number: MW1-5

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Live Oak and Junipero Serra Rd
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: N/A
 Logged by: Paul Pongetti and B.J. Lechler
 Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
255		WELL GRADED SAND (SW) , more coarse than above, 50% coarse to very coarse sand, 50% fine to medium sand		Driller says drilling is harder.
260		WELL GRADED SAND (SW) , coarser than above, approximately 60% coarse to very coarse sand, 40% fine to medium sand		
265				
270		POORLY GRADED SAND (SP) , 80% coarse to very coarse sand, 20% fine to medium sand		
275		WELL GRADED SAND (SW) , 50% fine to medium sand, 50% coarse sand		
280		WELL GRADED SAND (SW) , with gravel, 40% fine to medium sand, 30% coarse sand, 20% fine gravel		Soft drilling (possible clay) Stop for day at 1655 hrs 5/29/03 0800 hrs
285				
290				
295				
300				



Boring Number: MW1-5

Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Live Oak and Junipero Serra Rd
Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Paul Pongetti and B.J. Lechler
Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
305			POORLY GRADED SAND WITH SILT (SP-SM) , mostly fine to medium sand (80%), with 10% fines (silt/clay), and 5% coarse sand		
310			WELL GRADED SAND WITH SILT/CLAY (SW-SM/SC) , 85% very fine to very coarse sand, with approximately 15% silt/clay		
315					
320			WELL GRADED SAND (SW) , 60% fine to medium sand, 40% coarse to very coarse sand		PID reading = 0.0 ppm at drill rig
325					
330			WELL GRADED SAND (SW) , 50% fine to medium sand, 40% coarse sand, 10% silt/clay		
335					0915 hrs
340			WELL GRADED SAND (SW) , approximately 70% fine to medium sand, 30% coarse to very coarse sand, trace fines (silt/clay)		
345					
350					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
355			WELL GRADED SAND (SW) , less coarse than above		0950 hrs
360			WELL GRADED SAND (SW) , with fines (silt/clay), approximately 60% fine to medium sand, 30% coarse to very coarse sand, 10% silt/clay		
365					
370			WELL GRADED SAND (SW) , 50% fine to very fine sand, 35% medium sand, 15% coarse to very coarse sand		
375					
380			WELL GRADED SAND (SW) , with silt/clay, 50% fine to medium sand, 40% coarse sand, 10% silt/clay		1030 hrs
385					
390					
395			WELL GRADED SAND (SW) , coarser than above, 40% fine to medium sand, 30% coarse to very coarse sand, 15% silt/clay, 15% fine gravel		1105 hrs
400					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
405					
410			WELL GRADED SAND (SW) , 40% fine to medium sand, 30% coarse to very coarse sand, 15% silt/clay, 15% fine gravel, coarse grains are quartz and feldspars, finer grains are quartz, micas		1200 hrs Driller said approximately last 5 feet were hard drilling, speculates a boulder.
415			POORLY GRADED SAND (SP) , with clay and gravel, 60% medium to coarse sand, 20% fine gravel, 20% clay/silt		
420			POORLY GRADED SAND (SP) , with clay and gravel, 60% medium to coarse sand, 20% fine gravel, 20% clay/silt, clays appear to be weathered lithic fragments, gravel composed of quartz and feldspars		
425			WELL GRADED SAND (SW) , with clay and gravel, 30% fine to medium sand, 30% coarse sand, 20% fine gravel, 20% clay (weathered lithics)		
430					
435					1245 hrs
440			WELL GRADED SAND (SW) , with clay and gravel, 40% fine to medium sand, 40% coarse to very coarse sand, 15% clay, 5% fine gravel		1330 hrs
445					
450					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
455			SILTY CLAY (CL) , with sand, clay/silt is yellowish brown (10YR5/4), to dark yellow brown (10YR4/4), medium plasticity, with 10% coarse to fine sand		1410 hrs
460					
465					
470			SANDY CLAY/SILT (CL-ML) , yellowish brown (10YR5/4), approximately 60% silt/clay, 20% fine sand, 20% medium to coarse sand		
475					
480					
485			POORLY GRADED SAND (SP) , with silt/clay, 30% fine sand, 30% medium sand, 30% silt/clay, 10% coarse sand		
490					1650 hrs
495			WELL GRADED SAND (SW) , with silt/clay, 40% fine to medium sand, 40% coarse to very coarse sand, 20% silt/clay		
500					Soft drilling (hard drilling from 487 to 498).



Boring Number: MW1-5

Client: US EPA
 Project: San Gabriel Valley NPL Area 3
 Location: Live Oak and Junipero Serra Rd
 Project Number: 175859.FI.03

Driller: WDC Exploration & Wells
 Drilling Method: Mud Rotary
 Sampling Method: N/A
 Logged by: Paul Pongetti and B.J. Lechler
 Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
505			POORLY GRADED SAND (SP) , with silt, 75% coarse to very coarse sand, 15% fine to medium sand, 10% silt/clay		Hard drilling
510			WELL GRADED SAND (SW) , with silt, 40% coarse sand, 20% medium sand, 20% fine sand, 20% silt/clay		
515			SANDY SILT/CLAY (ML-CL) , 70% silt/clay, 15% fine to medium sand, 10% coarse sand		Soft drilling 1600 hrs
520			WELL GRADED SAND (SW) , 40% very fine to fine sand, 30% medium sand, 30% coarse to very coarse sand		
525					
530			WELL GRADED SAND (SW) , with silt/clay, 40% very fine to fine sand, 30% medium sand, 30% coarse to very coarse sand, with a few silt/clay balls		
535			WELL GRADED SAND (SW) , with silt/clay, 40% fine sand, 20% medium sand, 20% coarse sand, 20% silt/clay		
540					
545			WELL GRADED SAND (SW) , 40% fine sand, 30% coarse sand, 20% medium sand, 10% silt/clay		
550					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
555					1635 hrs
560					
565			WELL GRADED SAND (SW) , 60% fine to medium sand, 30% coarse sand, 10% silt/clay		
570			CLAY WITH SILT AND SAND (CL) , yellowish brown (10YR5/4), 95% clay/silt with fine to coarse sand		1725 hrs, done for day. 5/30/03, resume drilling at 0810 hrs.
575			WELL GRADED SAND (SW) , with silt/clay, 40% fine sand, 30% medium sand, 20% coarse sand to fine gravel, 10% silt/clay		
580					
585			WELL GRADED SAND (SW) , with silt and clay, a little coarser than above, 60% fine to medium sand, 10% coarse sand, 10% silt/clay		
590					0855 hrs
595			WELL GRADED SAND (SW) , 30% fine sand, 30% coarse sand to fine gravel, 20% medium sand, 20% silt/clay (weathered lithics)		
600					Rig chatter



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
605					0945 hrs
610					
615			<u>WELL GRADED SAND (SW)</u> , 70% fine to medium sand, 30% coarse sand with trace fine gravel		
620					
625					
630					1055 hrs
635		<u>WELL GRADED SAND (SW)</u> , 40% medium sand, 30% coarse sand, 30% fine sand			
640		<u>WELL GRADED SAND (SW)</u> , 40% medium sand, 30% coarse sand, 30% fine sand, coarse to medium grains composed of quartz and feldspars, finer grains of quartz and micas			
645		<u>WELL GRADED SAND (SW)</u> , with silt and clay, 40% fine sand, 20% medium sand, 20% coarse sand; 20% silt/clay			
650					



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
655	[Patterned Soil Type Column]		WELL GRADED SAND (SW) , 40% medium sand, 30% coarse sand, 30% fine sand	[MW Construction Column]	1150 hrs
660					
665					
670					
675			WELL GRADED SAND (SW) , 40% medium sand, 40% coarse sand, 20% fine sand, and nearly all quartz and feldspar		1230 hrs
680					
685			WELL GRADED SAND (SW) , 40% fine sand, 30% medium sand, 30% coarse sand		<p>Samples are biased toward coarse side. There are more fines coming off shaker that are not represented in samples.</p>
690					
695					
700					1325 hrs



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
705			WELL GRADED SAND WITH CLAY (SW) , 40% fine sand, 20% medium sand, 20% coarse to very coarse sand, 20% clay/silt, clay propably represents interbeds		Driller says we have probably been in and out of clay since approximately 695 ft bgs. 1400 hrs
710			WELL GRADED SAND (SW) , 40% fine sand, 30% medium sand, 25% coarse sand with <5% fine gravel and <5% clay		
715			WELL GRADED SAND (SW) , 40% fine sand, 30% medium sand, 25% coarse sand, <5% clay, no gravel		
720			WELL GRADED SAND (SW) , 40% fine sand, 30% coarse sand, 20% medium sand, 10% silt/clay		
725					
730			WELL GRADED SAND (SW) , 40% fine to very fine sand, 30% medium sand, 20% coarse sand, 10% silt		1445 hrs
735					
740			WELL GRADED SAND WITH CLAY (SW) , 40% fine to very fine sand, 30% medium sand, 20% coarse sand, 10% silt, with a few clay balls		
745					
750					Driller says we have been in and out of clay (soft drilling) since 700 ft bgs. He said a lot of it dissolves so it is difficult to get sample or see in shaker.



Client: US EPA

Project: San Gabriel Valley NPL Area 3

Location: Live Oak and Junipero Serra Rd

Project Number: 175859.FI.03

Driller: WDC Exploration & Wells

Drilling Method: Mud Rotary

Sampling Method: N/A

Logged by: Paul Pongetti and B.J. Lechler

Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information		Lithologic Description	MW Construction	Comments
	Soil Type				
755			WELL GRADED SAND (SW) , with clay, 70% fine to medium sand, 20% coarse sand, 10% clay/silt (interbeds), trace fine gravel		1515 hrs
760					
765			WELL GRADED SAND (SW) , 60% fine to medium sand, 40% coarse sand, with some silt (not represented in sample)		1540 hrs
770					
775					
780			WELL GRADED SAND (SW) , 40% coarse sand, 30% medium sand, 20% fine sand, 10% silt, fines (silt/fine sand) are mostly micas and quartz		Cuttings coming off shaker suggest much finer sand, but can not get representative sample.
785					
790			WELL GRADED SAND (SW) , 50% fine to very fine sand, 30% medium sand, 20% coarse sand		1625 hrs
795					
800					



Boring Number: MW1-5

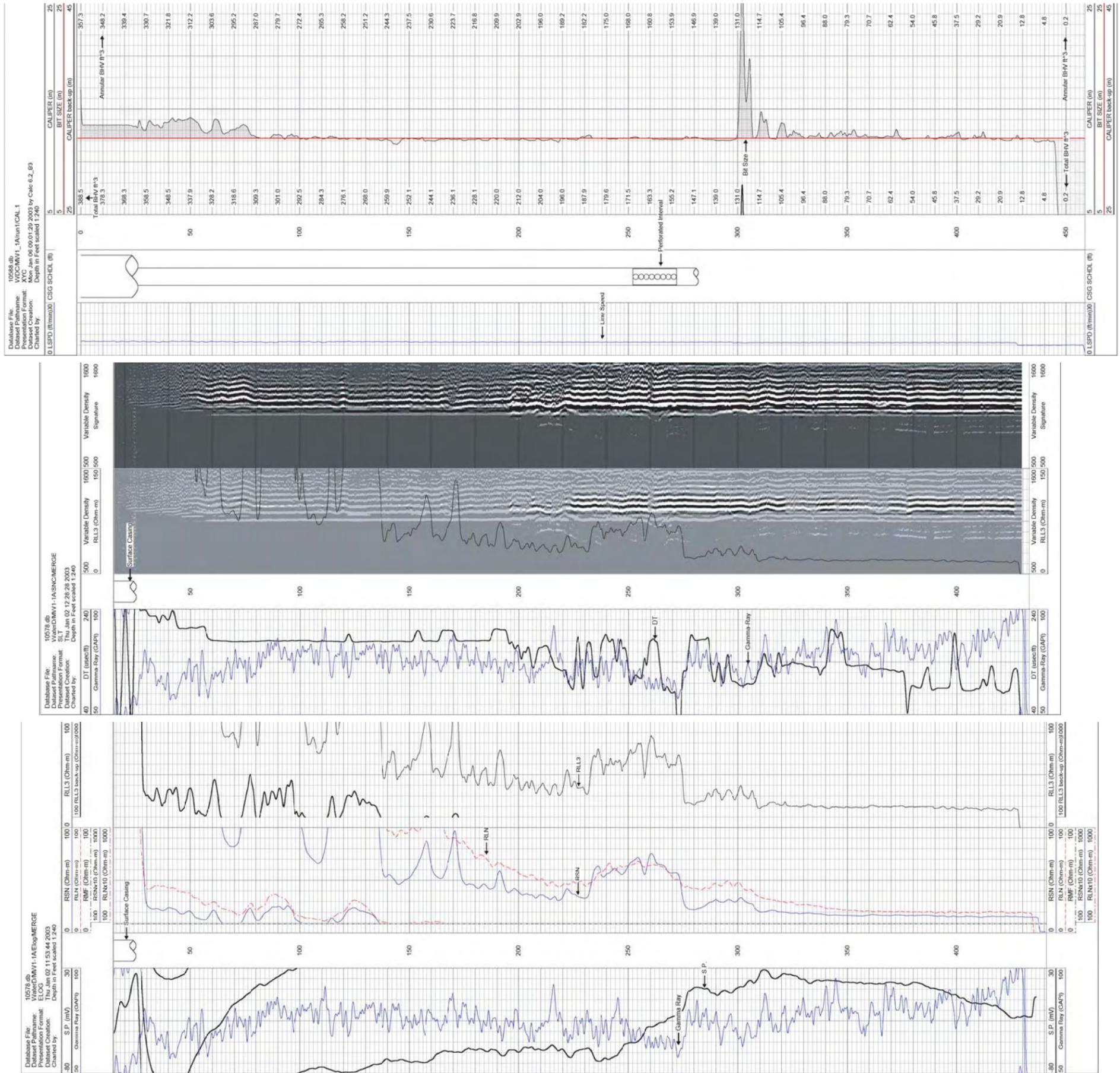
Client: US EPA
Project: San Gabriel Valley NPL Area 3
Location: Live Oak and Junipero Serra Rd
Project Number: 175859.FI.03

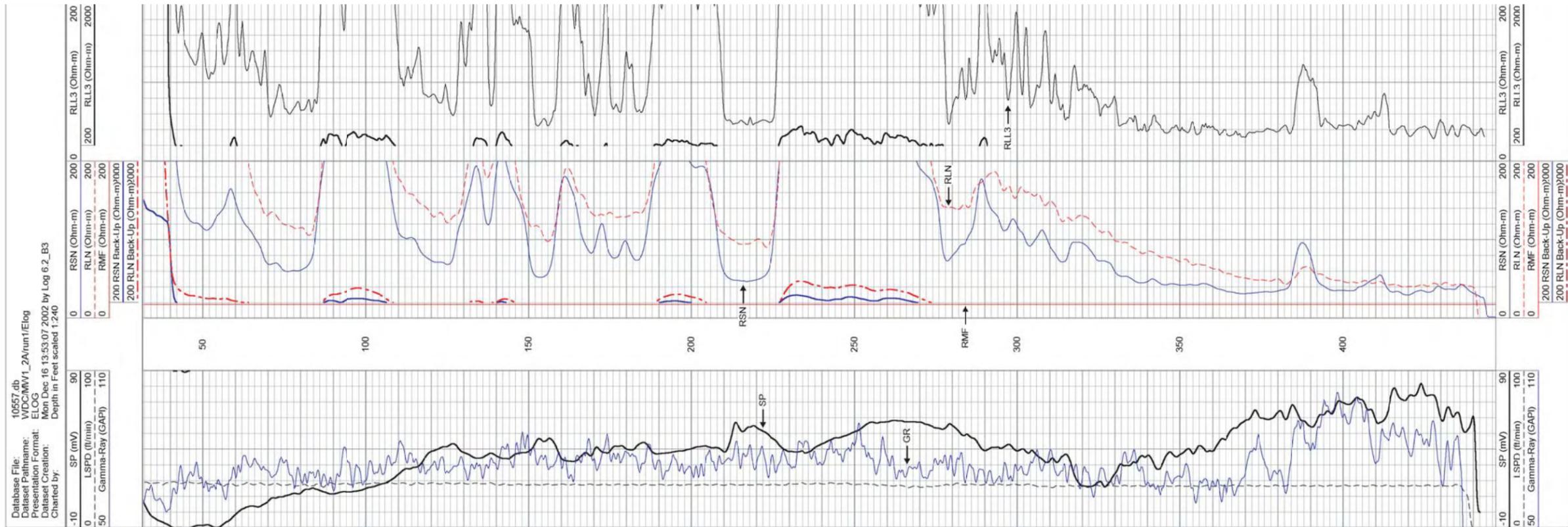
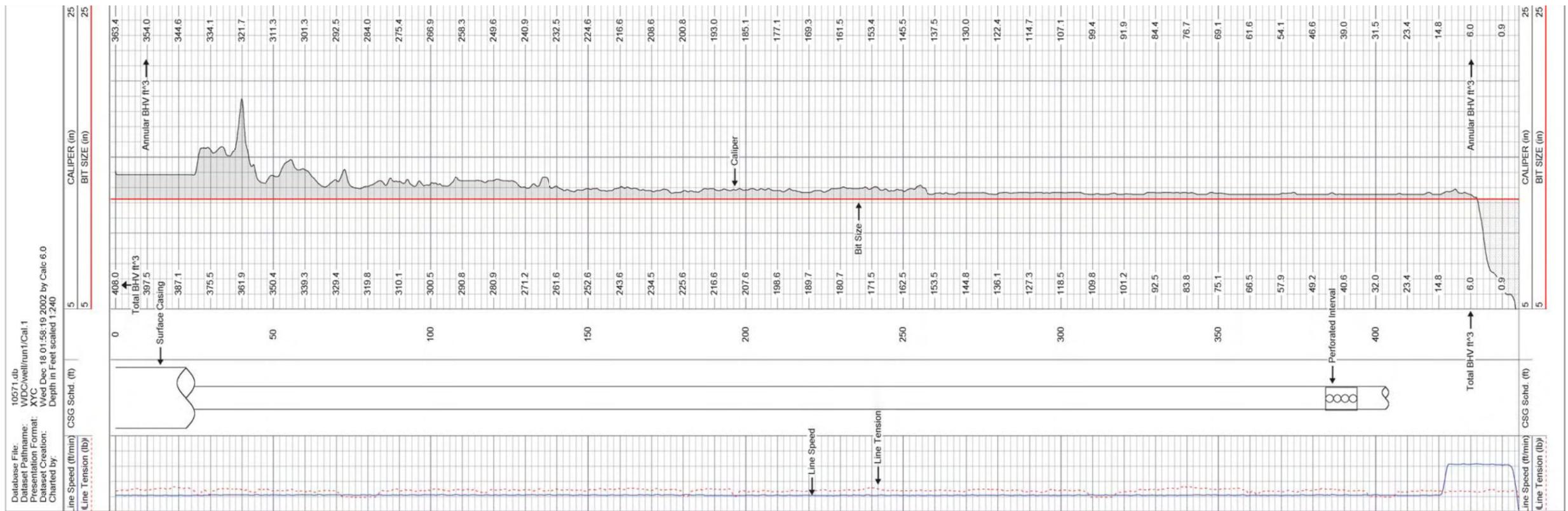
Driller: WDC Exploration & Wells
Drilling Method: Mud Rotary
Sampling Method: N/A
Logged by: Paul Pongetti and B.J. Lechler
Start/Finish Date: 5.27.03/5.30.03

Depth (ft)	Borehole Information	Lithologic Description	MW Construction	Comments
	Soil Type			
805				
810		End of Log		1645 hrs
815				
820				
825				
830				
835				
840				
845				
850				

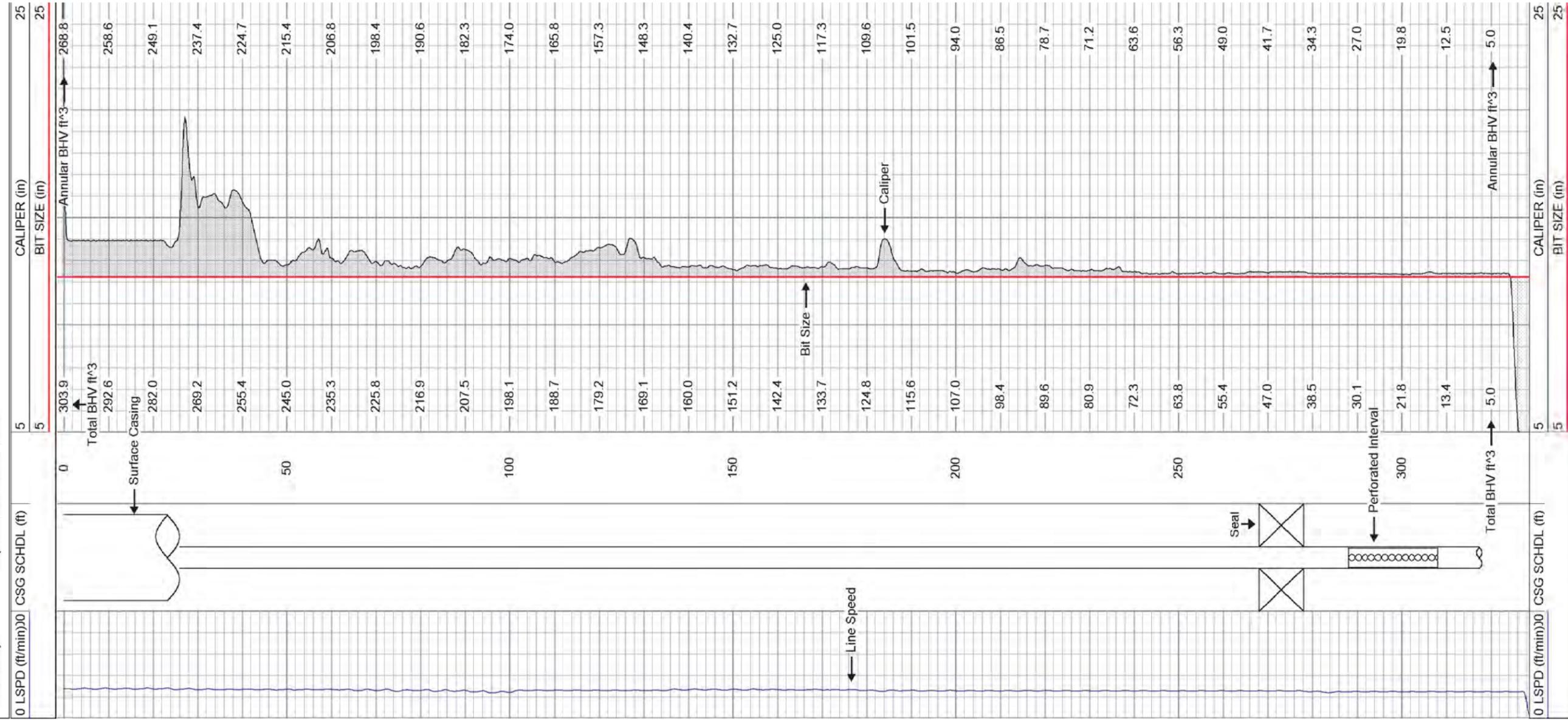
Appendix B

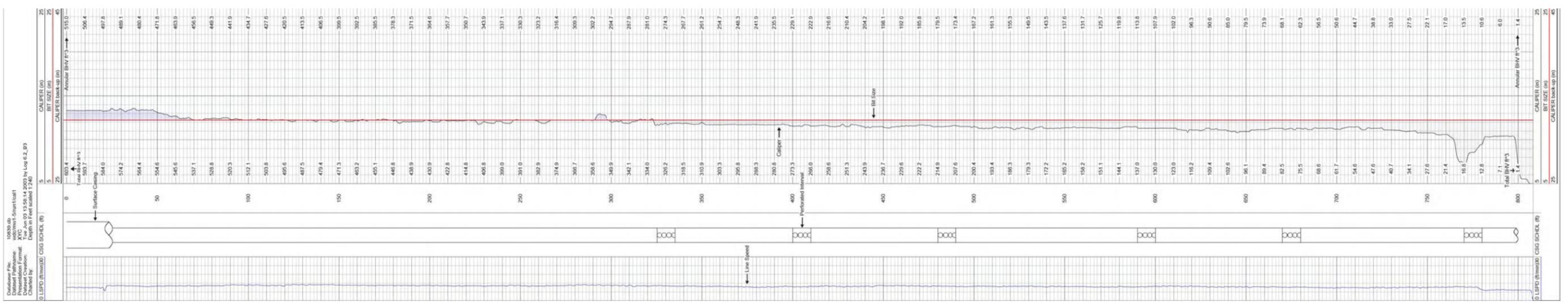
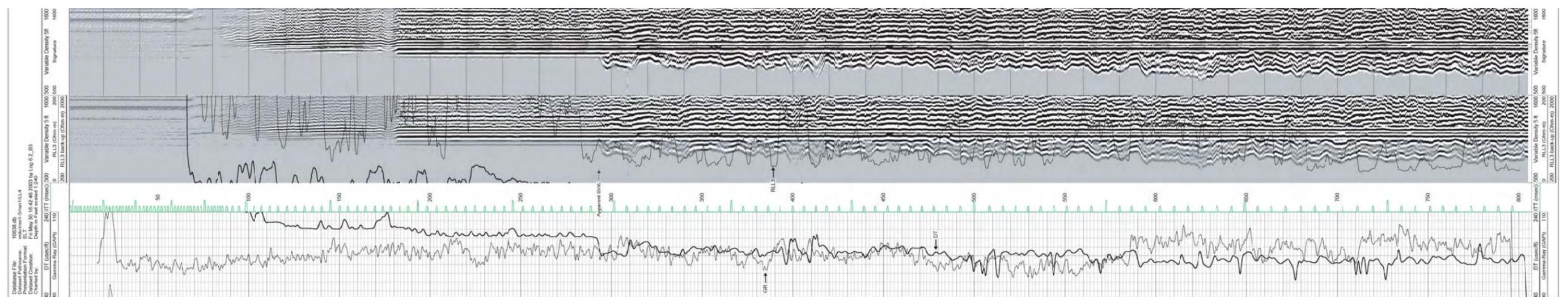
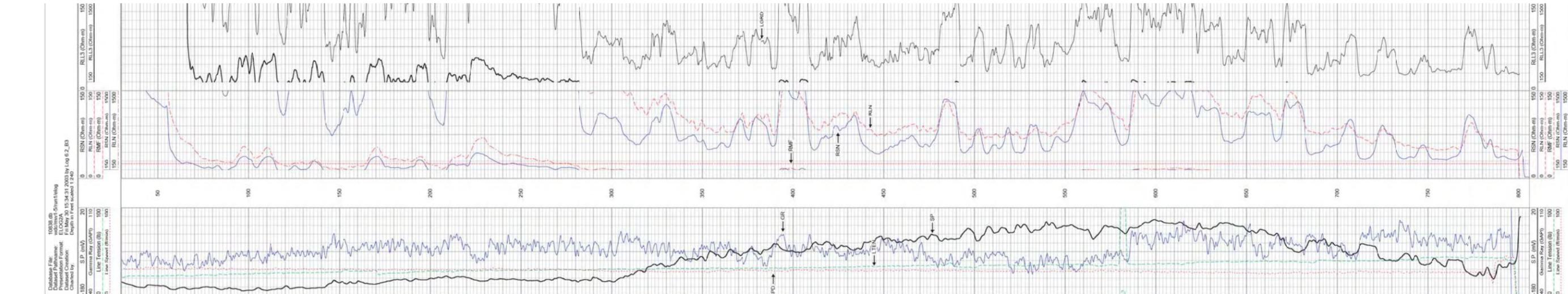
Geophysical Logs





Database File: 10573.db
 Dataset Pathname: WDC/MW1_2B/run1/CAL.2
 Presentation Format: XYC
 Dataset Creation: Mon Dec 23 06:39:21 2002 by Calc 6.2_B3
 Charted by: Depth in Feet scaled 1.240





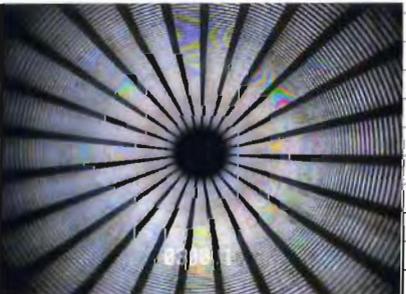
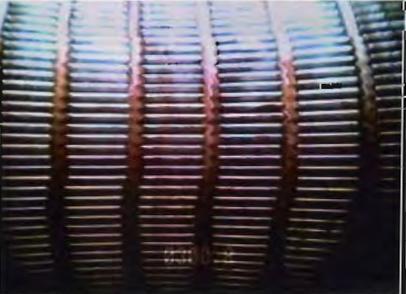
Geophysical Logs for MW1-5

Source: Pacific Surveys, 2003

Appendix C
Video Survey Reports

Video Survey Report

Company: Water Development Corp.	Date: 16-Jan-03
Well: MW1-2B	Run No.: One
Field: Alhambra	Job Ticket: 10956
State: California	Total Depth: 317 ft
	Water Level: 312.8 ft
Location: Fouth south of Main	
Zero Datum: Top of Casing Tool Zero: Side-Scan	
Reason for Survey: Inspection of Screened Interval	

Depth	Remarks		
0.0 ft	Begin Survey: Mild Steel	Perforation: Wire-Wrap	286.80 ft to 307.10ft
277.3 ft	Top of Stainless Blank		
286.8 ft	Stainless Screen: no evidence of water: perms open		
307.1 ft	Screen ends: all screen interval open		
312.8 ft	Water encountered in sump		
317.0 ft	Fill: end survey		
	288 ft		
			
		Casing Size 4" Mild Steel 4" S/Steel	0.00 ft to 277.30ft 277.30 ft to 318.00ft
	289 ft	300 ft	300 ft
			

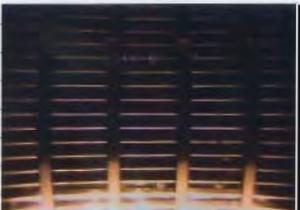
Notes: All depths are referenced to side-scan. Down-view lens is 5" below side-scan.
All perforated intervals appear open, yet no water/moisture visible.

Pacific Surveys

a full service geophysical well logging company

Video Survey Report

Company:	WATER DEVELOPMENT	Date:	10-Feb-03
Well:	MW 1-3	Run No.:	One
Field:	Alhambra	Job Ticket:	10630
State:	California	Total Depth:	800 ft
		Water Level:	313 ft
Location:	Main and Cordova		
Zero Datum:	Ground level	Tool Zero:	Side view lens
Reason for Survey:	New well		

Depth	Remarks	Perforation:	
0.0 ft	Begin recording		
313.0 ft	Static water level	Wire wrap	350.00 ft to 360.00ft
329.4 ft	Stainless steel casing		480.00 ft to 490.00ft
349.4 ft	Top of screen (clean)		580.00 ft to 590.00ft
359.0 ft	Bottom of screen		660.00 ft to 670.00ft
369.0 ft	Camera hangs up on casing joint		770.00 ft to 780.00ft
	Down view light went in attempt to get past joint		
365.5 ft	Pause recording in order to change light		
348.0 ft	Camera hangs up again with new light		
	Light broken (resume recording with side view only)		
479.7 ft	Top of screen (small amount of material in screen)		
489.0 ft	Bottom of screen		
579.7 ft	Top of screen (small amount of material in screen)		
589.0 ft	Bottom of screen		
659.5 ft	Top of screen (appears to be more material in screen)	Casing Size	
669.0 ft	Bottom of screen	4.00 in	0.00 ft to 800.00ft
769.6 ft	Barely able to see top of screen		
	Appears to be completely plugged		
778.0 ft	No visibility at all		
779.0 ft	Stop camera due to zero visibility		
	356'	359'	489'
			
		660'	769.7'
			

Notes:

- Bottom of light bar is 24" below side view lens.
- Depth is referenced at side view lens.
- 20 feet of stainless steel above each screen and 10 feet below each screen.
- Video with side view only after second bottom light went out due to camera hanging up at joints.
- Bottom screen appears completely plugged.

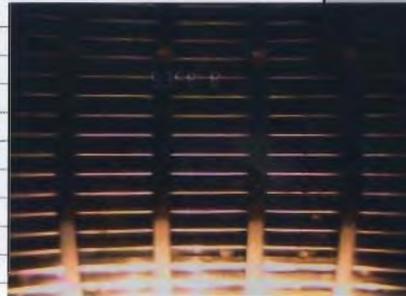
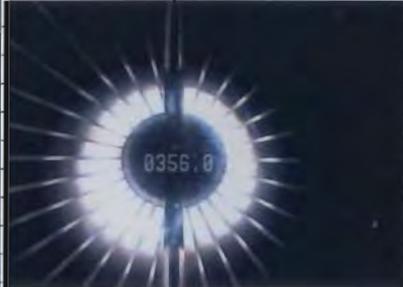
Pacific Surveys

a full service geophysical well logging company

Video Survey Report

Company:	WATER DEVELOPMENT	Date:	14-Feb-03
Well:	MW 1-3	Run No.:	Two
Field:	Alhambra	Job Ticket:	10659
State:	California	Total Depth:	800 ft
		Water Level:	313 ft
Location:	Main and Cordova		
Zero Datum:	Ground level	Tool Zero:	Side view lens
Reason for Survey:	Redeveloped bottom perfs after first video survey.		

Depth	Remarks	Perforation:	
0.0 ft	Begin recording	Wire wrap	
313.0 ft	Static water level		350.00 ft to 360.00ft
329.4 ft	Stainless steel casing		480.00 ft to 490.00ft
349.4 ft	Top of screen (clean)		580.00 ft to 590.00ft
359.0 ft	Bottom of screen		660.00 ft to 670.00ft
479.7 ft	Top of screen (small amount of material in screen)		770.00 ft to 780.00ft
489.0 ft	Bottom of screen		
579.7 ft	Top of screen: clean		
589.0 ft	Bottom of screen		
659.5 ft	Top of screen: Clean		
669.0 ft	Bottom of screen		
659.5 ft	Top of screen (appears to be more material in screen)		
669.0 ft	Bottom of screen		
767.8 ft	Top of screen: clean		
777.8 ft	Top of screen: clean	Casing Size	
778.2 ft	Fill: end survey	4.00 in	0.00 ft to 800.00ft
356'	359'		



660'



Notes: All depths are referenced to side-scan. Down-view lens is 5" below side-scan.

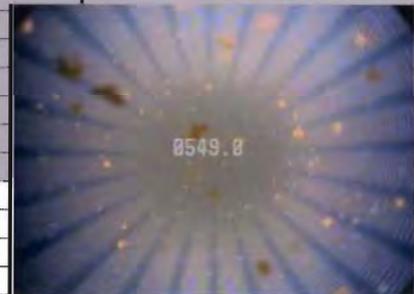
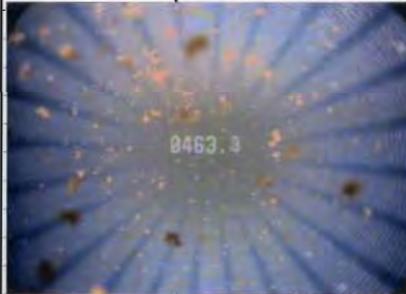
Pacific Surveys

a full service geophysical well logging company

Video Survey Report

Company:	Water Development Corp.	Date:	14-Jun-03
Well:	MW1-4	Run No.:	Two
Field:	Alhambra	Job Ticket:	10868
State:	California	Total Depth:	624 ft
		Water Level:	357.9 ft
Location:	Corner of Alhambra @ Novelda		
Zero Datum:	G.L.	Tool Zero:	Side-scan
Reason for Survey:	General Inspection		

Depth	Remarks	Perforation:	
357.9 ft	SWL: bio-fouling material present Visibility poor	Wire-wrap	380.00 ft to 390.00ft
379.9 ft	Screen: appears open	S/Steel	460.00 ft to 470.00ft
389.4 ft	Screen ends		545.00 ft to 555.00ft
420.0 ft	Water column becomes more cloudy w/bio-growth		605.00 ft to 615.00ft
459.8 ft	Screen: appears open		
469.4 ft	Screen ends		
513.0 ft	Bio-fouling	Casing Size	
544.8 ft	Screen: appears open	4"	0.00 ft to 635.00ft
554.3 ft	Screen ends	Mild & S/Steel	
568.0 ft	Turbidity increases		
604.7 ft	Screen: appears open		
614.2 ft	Screen ends		



Notes: All depths are referenced to side-scan. Downview is 5" below side-scan.

800.919.7555
909.625.6262

4456 via st ambrose
claremont ca 91711

fax: 909.399.3180

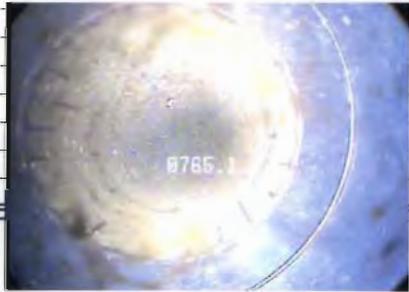
Pacific Surveys

a full service geophysical well logging company

Video Survey Report

Company:	Water Development	Date:	28-Jun-03
Well:	MW1-5	Run No.:	One
Field:	NPL Area 3	Job Ticket:	10893
State:	California	Total Depth:	776 ft
		Water Level:	293 ft
Location:	San Marino at Junipero Serra		
Zero Datum:	Top of Casing	Tool Zero:	Side-scan
Reason for Survey:	General Inspection		

Depth	Remarks	Perforation:	
0.0 ft	Start of survey	Wire wrap	
292.5 ft	Static Water level, cloudy with particulates		
322.0 ft	Top of screen; open, clear wire wrap		
332.0 ft	Bottom of screen		
397.0 ft	Top of screen; open, clear		
406.5 ft	Bottom of screen		
476.7 ft	Top of screen; clear; open		
486.2 ft	Bottom of screen	Casing Size	
586.2 ft	Top of screen; open and clear	4" S/steel	
596.0 ft	Bottom of screen		
666.0 ft	Top of screen; cloudy with bacterial suspended particulates; open		
675.6 ft	Bottom of screen; very cloudy		
765.5 ft	Top of screen; mostly plugged with apparent loose sediments, very cloudy		
775.3 ft	Bottom of screen		
776.0 ft	Bottom; fill		



Notes: All depths are referenced to side-scan. Downview is 5" below side-scan.

800.919.7555
909.625.6262

4456 via st ambrose
claremont ca 91711

fax: 909.399.3180

Pacific Surveys

a full service geophysical well logging company

Video Survey Report

Company:	WATER DEVELOPMENT CORP	Date:	07-Jul-03
Well:	MW 1-5	Run No.:	Two
Field:	Alhambra	Job Ticket:	10884
State:	California	Total Depth:	800.0 ft
		Water Level:	296.0 ft
Location:	Junipero Serra Dr. @ San Marino Ave.		
Zero Datum:	Ground level	Tool Zero:	Side view lens
Reason for Survey:	ReVideo		

Depth	Remarks	Perforation:	
3.0 ft	Begin recording		
296.0 ft	Static water level (very dark)	Wire wrap	
325.7 ft	Top of screen (visibility improves)		
335.3 ft	Bottom of screen		
400.5 ft	Top of screen		
410.0 ft	Bottom of screen		
481.0 ft	Top of screen		
491.0 ft	Bottom of screen	Casing Size	
500.0 ft	Water becomes very dirty	4.00 in	
580.0 ft	Down lens is completely dark		
630.0 ft	Side lens is dark		
671.5 ft	Top of screen (visibility improves slightly)		
681.0 ft	Bottom of screen		
685.0 ft	No visibility again		
772.0 ft	Able to see top of screen with side lens		
772-776 ft	Some material evident in screen		
777.0 ft	Screen appears clean		
	Unable to see bottom of screen		
800.0 ft	Camera stops		



Notes: Depth is referenced at side view lens.
 Bottom of light bar is 24" below side view lens.
 20 feet of stainless steel above and 10 feet below every screen section
 except bottom screen has 20 feet stainless above and below.

800.919.7555
 909.625.6262

4456 via st ambrose
 claremont ca 91711

fax: 909.399.3180

Appendix D
Multiport Monitoring Well Completion Report

#115 - 949 West Third Street
North Vancouver, BC V7P 3P7
Canada
Tel. (604) 984-4215
Fax (604) 984-3538



August 18, 2003
WB824

Mr. Ray Quintero
Water Development Corporation
5566 Arrow Highway,
Montclair, CA 91763
U.S.A.

Subject: Completion Report for Westbay MP System Monitoring Wells: MW1-3,
MW1-4, MW1-5. Alhambra, California.

Dear Mr. Quintero:

This report summarizes the work carried out by Westbay Instruments Inc. related to the installation of three MP38 monitoring wells in Alhambra, California. This work was completed under Water Development Corporation (WDC) P.O. No. CH222B, as authorized in your fax to Westbay (February 7, 2003). Westbay representative Mr. Gwyn Graham was on-site from February 17 to 20 to carry out the installation of well MW1-3. Westbay representative Mr. Mark Lessard was on-site from June 17 to 19 to carry out the installation of well MW1-4 and from July 8 to July 10 to carry out the installation of well MW1-5. The MP System monitoring wells were successfully installed to depths of 797 ft, 632ft. and 797 ft. respectively. The MP installations passed all of Westbay's standard quality assurance tests.

Training of WDC field personnel (Neil Davis) on operation and basic maintenance of the Westbay Model 6012 Open/Close tool with magnetic sensor and monitor was conducted by Mr. Graham during the installation of well MW1-3.

We look forward to working with you in the future. Please call if you have any questions or comments.

Yours truly,



Mark Lessard

Encl.: Bound Completion Report for Westbay MP38 wells: MW1-3, MW1-4 and MW1-5.

COMPLETION REPORT

MP38 Monitoring Wells: MW1-3, MW1-4 and MW1-5.

Alhambra, CA

Prepared for:

Water Development Corporation

5566 Arrow Highway,

Montclair, CA 91763

U.S.A.

Prepared by:

Westbay Instruments Inc.

WB824

August 18, 2003

CONTENTS

1.	Introduction	1
2.	Personnel	1
3.	Installation	1
3.1	Previous Activities	1
3.2	Preparation of Monitoring Well Design	2
3.3	Layout of MP Casing Components	2
3.4	Lowering of MP Components	2
3.5	Hydraulic Integrity Testing	3
3.6	Positioning of MP Components	3
3.7	Inflation of MP System Packers	11
4.	Fluid Pressure Measurements	11
5.	Operator Training	11

APPENDICES

Appendix 1: MW1-3

Appendix 2: MW1-4

Appendix 3: MW1-5

1. Introduction

This report and the attached Appendices document the technical services carried out by Westbay Instruments Inc. under WDC P.O. No. CH222B. A Westbay MP System groundwater monitoring system was installed in each of boreholes No. MW1-3, MW1-4 and MW1-5 in Alhambra, California.

Installation of the Westbay MP-38 wells was conducted over the period February 17 to July 10. This report documents the installation tasks and related QA checks.

2. Personnel

Westbay technical services representative Mr. Gwyn Graham was on site to carry out the installation of MW1-3 from February 17 to 20, 2003. Westbay representative Mr. Mark Lessard was on site from June 17 to 19 to carry out the installation of well MW1-4 and from July 8 to July 10 to carry out the installation of well MW1-5. Assistance during the installation was also provided by personnel from WDC and the work was supervised by representatives from CH2M Hill.

3. Installation

The monitoring wells were installed as indicated below on Table 1.

(Note: Monitoring well reference elevations were not available at the time of writing).

Table 1, Summary of MP Well Installations

Monitoring Well No.	Installation Date	Borehole Depth (ft)	MP38 Casing Length (ft)	No. Monitoring Zones
MW1-3	02/18/03	800 (bgs)	798	5
MW1-4	06/19/03	635 (bgs)	633	4
MW1-5	07/10/03	800 (bgs)	798	6

The wells were installed according to the procedure described below.

3.1 Previous Activities

A nominal 16-inch diameter borehole was drilled, using a mud-rotary drilling method by WDC. A multi-screened steel-cased 4-inch diameter (ID) well was installed in the borehole. The screen zone, along with the pipe 20 ft. above and 10 ft. below the screen zone was stainless steel, which used a 20-slot screen size and backfilled with No.2 sand adjacent to the screen intervals, and a bentonite/sand seal between sand packs. All backfill material was installed through a tremmie pipe.

Each screen interval was developed to remove drilling fluids before installation of the MP casing. Video logs of the completed multi-screen cased wells were conducted by a separate

contractor, supervised by WDC and CH2M Hill, prior to installation of the MP Casing. The video logs showed conditions favorable for installation of the Westbay MP System well.

3.2 Preparation of Monitoring Well Design

Ray Quintero of WDC sent preliminary monitoring zone locations, based on the screen locations, to Westbay. Westbay prepared MP Casing logs, which specifies the location of components in the boreholes, prior to arrival at the sites. The log for MW1-3 was reviewed by Ray Quintero of WDC and Maura Kennelly of CH2M Hill and approved in the field. The logs for MW1-4 and MW1-5 were reviewed by Maura Kennelly of CH2M Hill and approved in the field, prior to installation of the wells. The MP Casing Logs as approved were used as an installation guide in the field. Field copies of the logs are in the Appendices.

The three Westbay MP System monitoring wells were designed with 5, 4 and 6 sampling zones respectively to coincide with the screened zones in the 4-inch cased wells. An MP measurement port and MP pumping port coupling were included in each of the sampling zones to provide the capability to measure fluid pressures, collect fluid samples, conduct hydraulic tests and permit injection of fluids into monitoring zones, if required.

3.3 Layout of MP Casing Components

Prior to MP System installations, the MP System casing components were set out near the boreholes according to the sequence indicated on the MP Casing Logs. Each casing length was numbered beginning with the lowermost as an aid to confirming the proper sequence of components. The appropriate MP System couplings were attached to the casing sections. In MW1-3 the magnetic location collars were attached 2.5 feet below the MP measurement port in each sampling zone. The location of each magnetic collar is also 2.5 feet above the respective pumping port. In wells MP1-4 and MW1-5 the magnetic location collars were attached 2 feet below the MP measurement port in each sampling zone.

Each casing component was visually inspected. Serial numbers for each MP packer, MP pumping port and MP measurement port coupling were recorded on the MP Casing Log. The well component layout was confirmed with the log before the components were lowered into the well.

3.4 Lowering of MP Components

The MP casing components were placed in the well using a SMEAL rig operated by WDC. Each casing joint was tested with a minimum internal hydraulic pressure of 150 psi for one minute to confirm hydraulic seals. A record of each successful joint test and the placement of each casing component are noted on the MP Casing Logs by check marks.

Clean water supplied by WDC was added to the MP casing when necessary to counter buoyancy effects while components were lowered into the borehole and was used for the joint tests.

3.5 Hydraulic Integrity Testing

After the MP casing was lowered into the borehole, the water level inside the MP casing was monitored at a depth different from the open borehole water level for a minimum period of fifteen minutes to confirm hydraulic integrity of the MP casing. The data from the hydraulic integrity test is shown on the first page of the MP Casing Log in the Appendix. The borehole water levels for MW1-3, MW1-4 and MW1-5 were respectively 313, 359 and 296 feet below ground surface (bgs) and the MP casing water levels were 667.05, 392.95 and 446.75 feet (bgs). The tests indicated that the MP casings were water tight prior to packer inflation.

3.6 Positioning of MP Components

After the components were lowered into the borehole, the MP casing string was positioned as indicated on the cover page of the Summary Casing Log. Ground surface was used as the borehole datum for MW1-3 and the top of the 4" casing was used for wells MW1-4 and MW1-5. The MP casing string was supported in these positions while packer inflation was carried out. Summary Casing Logs, which show the final "as-built" locations of the components in each well, are included in the Appendices. Tables 2 a,b,c show the depth locations of key components:

Table 2a, Depths of Key Items for MP monitoring well MW1-3.

Zone No.	Screen Interval* (ft ,bgs)	MP Casing No. (from MP Log)	Packer No.	Packer Serial No.	Nominal Packer Position** (ft)	Magnetic Collar Depth (ft)	Measurement Port Depth** (ft)	Pumping Port Depth** (ft)	Port Name	
SQA-1		1					787.9		SQA-1	
		2	1	13190	782.9					
	1		3					777.9	PP1	
			4				775.4			MC
			5					772.9		MP1
SQA-2		6	2	13180	762.9					
		7			757.9		757.9		SQA-2	
		8	3	13185						
LQA-1		9-16					677.9		LQA-2	
		17	4	13188	672.9					
	2		18					667.9	PP2	
			19				665.4			MC
SQA-3		20					662.9		MP2	
		21	5	13184	652.9					
		22					647.9		SQA-3	
LQA-2		23	6	13189	642.9					
		24-28					597.9		LQA-3	
		29	7	13187	592.9					
3	580-590	30						587.9	PP3	
		31				585.4			MC	
		32					582.9		MP3	

Table 2a, Depths of Key Items for MP monitoring well MW1-3.

			33	8	13179	572.9				
SQA-4			34					567.9		SQA-4
			35	9	13183	562.9				
LQA-3			36-42					497.9		LQA-4
			43	10	13181	492.9				
4	480-490		44						487.9	PP4
			45				485.4			MC
			46						482.9	
			47	11	13186	472.9				
SQA-5			48					467.9		SQA-5
			49	12	13178	462.9				
LQA-4			50-59					367.9		LQA-5
			60	13	13182	362.9				
5	350-360		61						357.9	PP5
			62				355.4			MC
			63						352.9	
			64	14	13176	342.9				
SQA-6			65					337.9		SQA-6
			66	15	13177	332.9	337.9			

* Note: Depths are with respect to ground level

** Components positions are referenced to the top of the subject MP System coupling

Table 2b, Depths of Key Items for MP monitoring well MW1-4.

Zone No.	Screen Interval* (ft, bgs)	MP Casing No. (from MP Log)	Packer No.	Packer Serial No.	Nominal Packer Position** (ft)	Magnetic Collar Depth (ft)	Measurement Port Depth** (ft)	Pumping Port Depth** (ft)	Port Name	
SQA-1		1					622.9		SQA-1	
		2	1	13227	617.9					
1	605-615	3						612	PP1	
		4				609.9			MC	
		5						607.9		MPI
		6		2	13226	597.9				
SQA-2		7				592.9		SAQ-1		
		8	3	13225	587.9					
LQA-1		9-11					562.9		LQA-1	
		12	4	13232	557.9					
2	545-555	13						552.9	PP2	
		14							MC	
		15					549.9			MP2
SQA-3		16	5	13229	537.9					
		17					532.9		SQA-3	
		18	6	13228	527.9					
LQA-2		19-23					477.9		LQA-2	
		24	7	13230	472.9					

Table 2b, Depths of Key Items for MP monitoring well MW1-4.

3	460-470	25					467.9	PP3
		26			464.9			MC
		27				462.9		MP3
		28	8	13231	452.9			
SQA-4		29				447.9		SQA-4
		30	9	13235	442.9			
LQA-3		31-35					397.9	LQA-3
		36	10	13233	392.9			
		37					387.9	PP4
4	380-390	38				384.9		MC
		39					382.9	MP4
		40	11	13234	372.9			
SQA-5		41					367.9	SQA-5
		42	12	13236	362.9			

* Note: Depths are with respect to ground level

** Components positions are referenced to the top of the subject MP System coupling

Table 2c, Depths of Key Items for MP monitoring well MW1-5.

Zone No.	Screen Interval* (ft, bgs)	MP Casing No. (from MP Log)	Packer No.	Packer Serial No.	Nominal Packer Position** (ft)	Magnetic Collar Depth (ft)	Measurement Port Depth** (ft)	Pumping Port Depth** (ft)	Port Name
SQA-1		1					788		SQA-1
		2	1	13314	783				
		3						783	PP1
		4				780			MC
		5					778		MPI
		6	2	13256		763			
		7					758		SAQ-2
		8	3	13313		753			
LQA-1		9-15					688		LQA-1
		16	4	13257	683				
2		17						678	PP2
		18							MC
		19					673		MP2
		20	5	13261		663			
SQA-3		21					658		SQA-3
		22	6	13312	653				
LQA-2		23-27					608		LQA-2
		28	7	13260	603				

Table 2c, Depths of Key Items for MP monitoring well MW1-5.

6	325-335						333	PP6
						330		MC
							328	MP6
		70	17	13410	318			
SQA-7		71						SQA-7
		72	18	13409	308		313	

* Note: Depths are with respect to ground level

** Components positions are referenced to the top of the subject MP System coupling

3.7 Inflation of MP System Packers

The MP packers were inflated sequentially beginning at the bottom of the wells using clean water supplied by WDC. Westbay's model No. 6055 vented inflation tool was used for packer inflation. All of the packers appear to have inflated normally. The data for inflation of each packer are provided on the MP Packer Inflation Records included in the Appendices.

4. Fluid Pressure Measurements

After packer inflation was completed, fluid pressures were measured at each measurement port. At that time, the in-situ formation pressures may not have recovered from the pre-installation activities and potential groundwater pressure increases in monitoring zones that may result from packer inflation. This latter effect may be more likely to occur in monitoring zones located in low-permeability geological formations. Longer term monitoring may be required to establish representative fluid pressures.

The initial pressure profile at MW1-3 on February 20, 2003 included incorrect pressure readings at several Measurement Ports. A second pressure profile was measured by Westbay on June 19, 2003 and these data are included in the Completion Report.

The initial pressure profile at MW1-4 on June 19, 2003 included an incorrect pressure reading at the Measurement Port MP2 in zone 2. Maura Kennelly of CH2M Hill measured a second pressure profile on July 16, 2003 and these data are included in the Completion Report. Figure 2

A plot of the Piezometric levels in all zones is shown in Figure 1 in the Appendices. The data were examined to confirm proper operation of the measurement ports and as a check on the presence of annulus seals between monitoring zones. The calculation sheets for the pressure profiles of the MP monitoring wells are also enclosed in the Appendices.

5. Operator Training

Training was provided to WDC representative Neil Davis in the following area:

- Operation and maintenance of the Model 6012 open/close tool (for operation of pumping ports) and operation of the Model 3033 manual cable reel.

APPENDIX 1

Monitoring Well MW1-3

Summary Casing Log	- 5 pages
Figure 1, Piezometric Pressure Profile, All Zones	- 1 page
Figure 2, Piezometric Pressure Profile, Screened Zones	- 1 page
Piezometric Pressure/Levels Field Data and Calculation Sheets	- 1 page
MP Casing Log (field copies)	- 9 pages
MP Packer Inflation Records	- 16 pages

Summary Casing Log

Company: WDC / CH2M Hill
Well: MW1-3
Site: Alhambra
Project:

Job No: WB824
Author: GG

Well Information

Reference Datum:
Elevation of Datum: 0.00 ft.
MP Casing Top: 0.00 ft.
MP Casing Length: 798.08 ft.

Borehole Depth: 800.00 ft.
Borehole Inclination:
Borehole Diameter: 4.00 in.

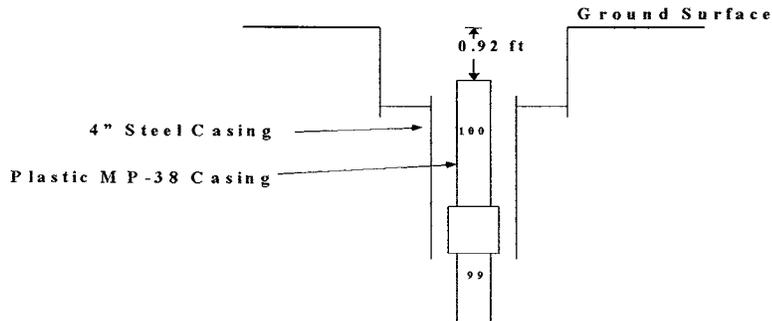
Well Description:
MP38
Other References:

File Information

File Name: MP-1.WWD
Report Date: Fri Jul 18 14:47:01 2003

File Date: Jun 10 13:42:29 2003

Sketch of Wellhead Completion



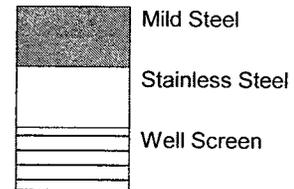
Legend

(Qty) MP Components (Library - WD Library 7/27/00)

- 
(2) 0225F02 - MP38 Casing,
PVC, 2 ft.
- 
(60) 0225F10 - MP38 Casing,
PVC, 10 ft.
- 
(15) 0239F05 - MP38 Packer, Stiffened
- 
(24) 0225F05 - MP38 Casing,
PVC, 5 ft.
- 
(1) 0223 - MP38 End Cap
- 
(81) 0202 - MP38 Regular Coupling
- 
(15) 0205 - MP38 Measurement Port
- 
(5) 0224 - MP38 Pumping Port
- 
(5) 0216 - MP38 Magnetic
Location Collar

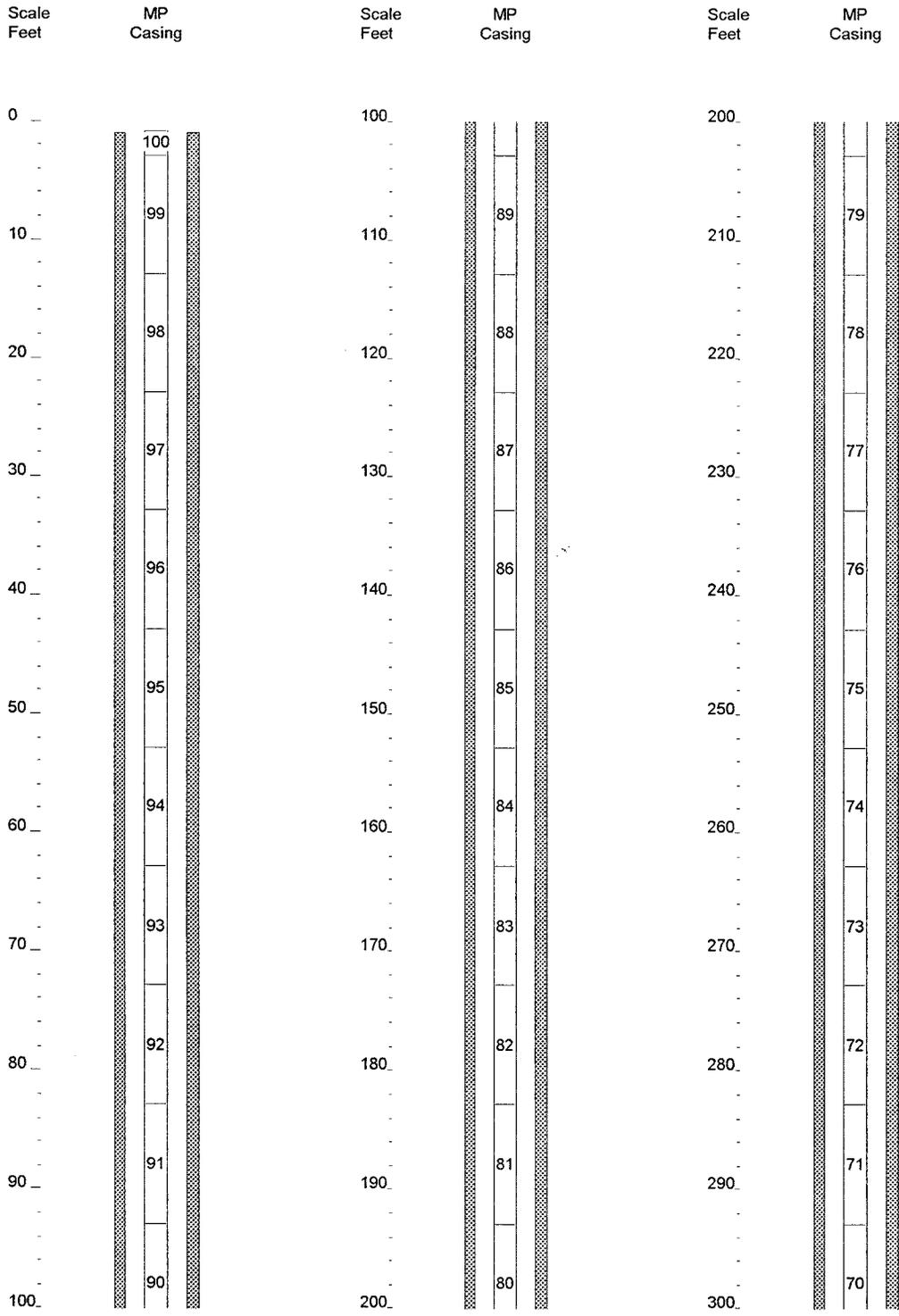
Geology

Backfill/Casing



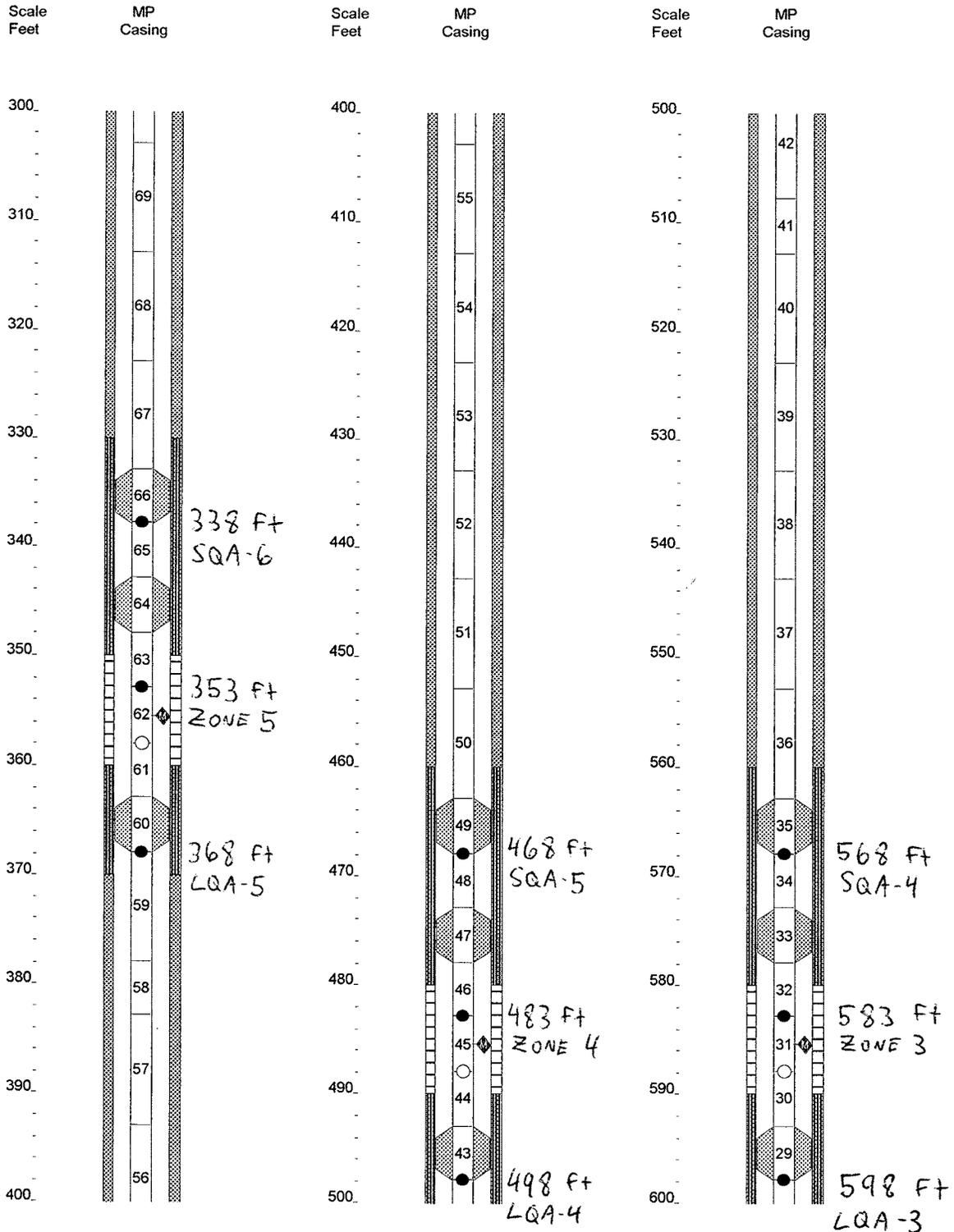
Summary Casing Log
WDC / CH2M Hill

Job No: WB824
Well: MW1-3



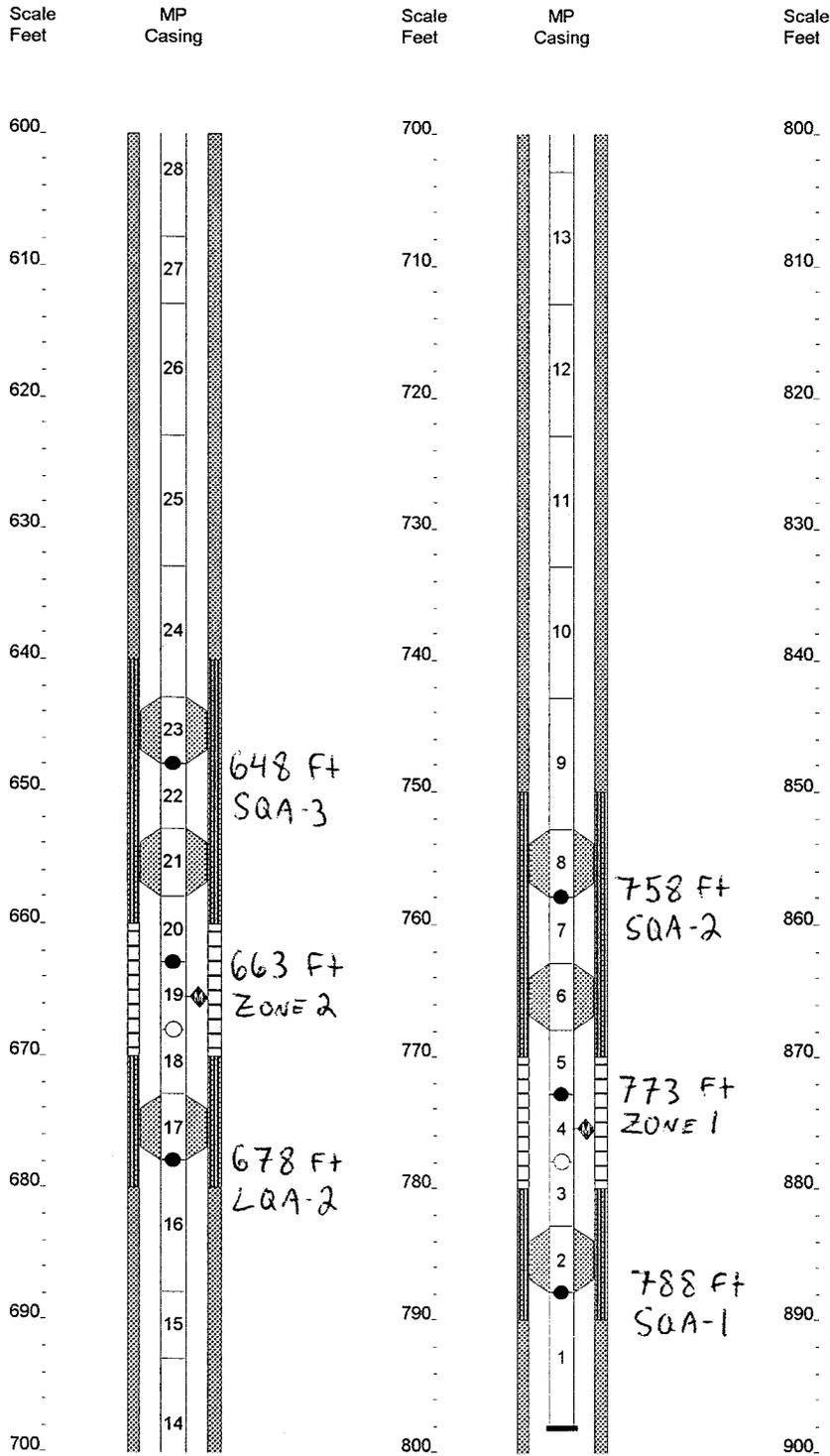
Summary Casing Log
WDC / CH2M Hill

Job No: WB824
Well: MW1-3



Summary Casing Log
WDC / CH2M Hill

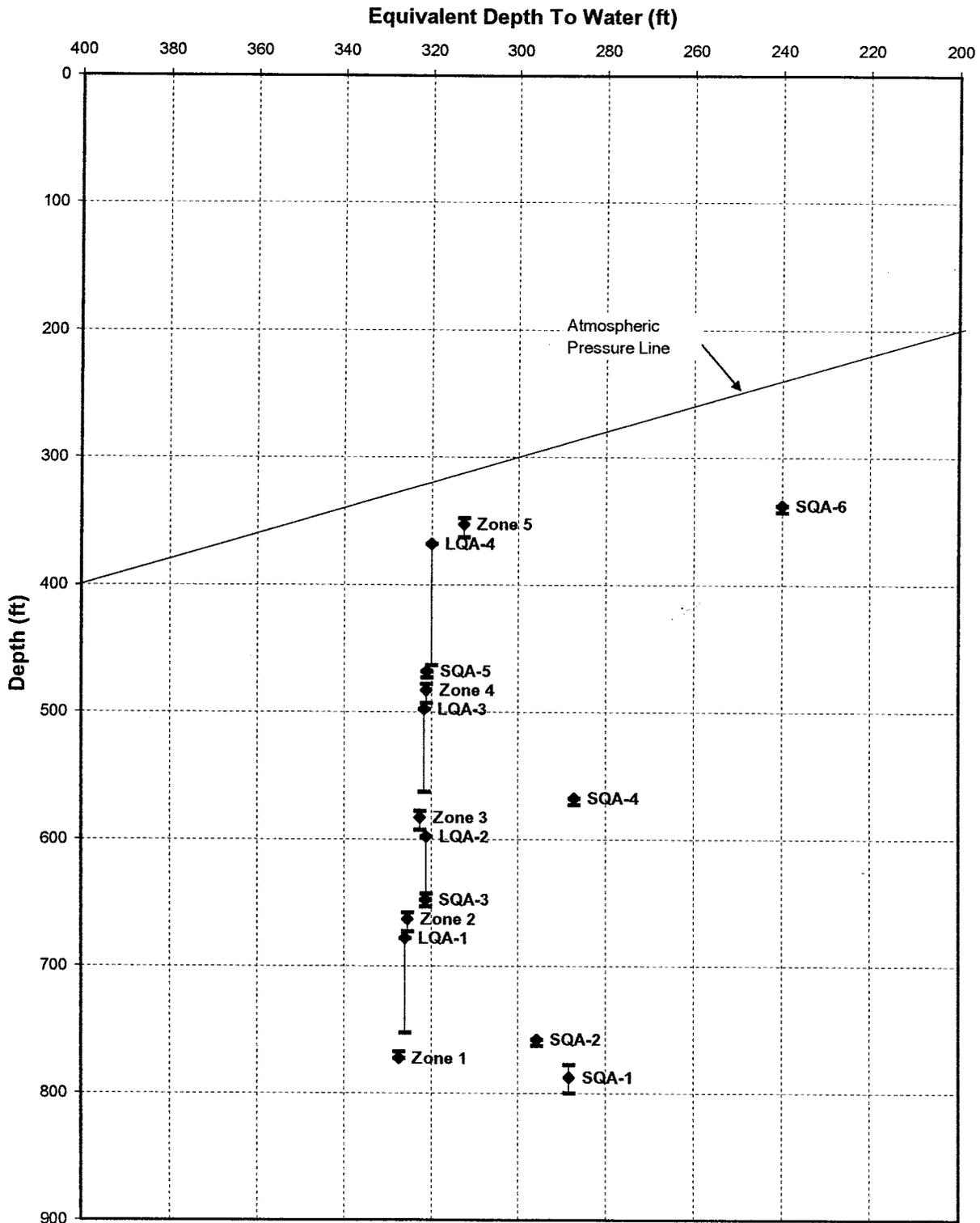
Job No: WB824
Well: MW1-3



Piezometric Profile

Monitoring Well: MW1-3

Profile Date: 06/19/03
 Comments: All Zones



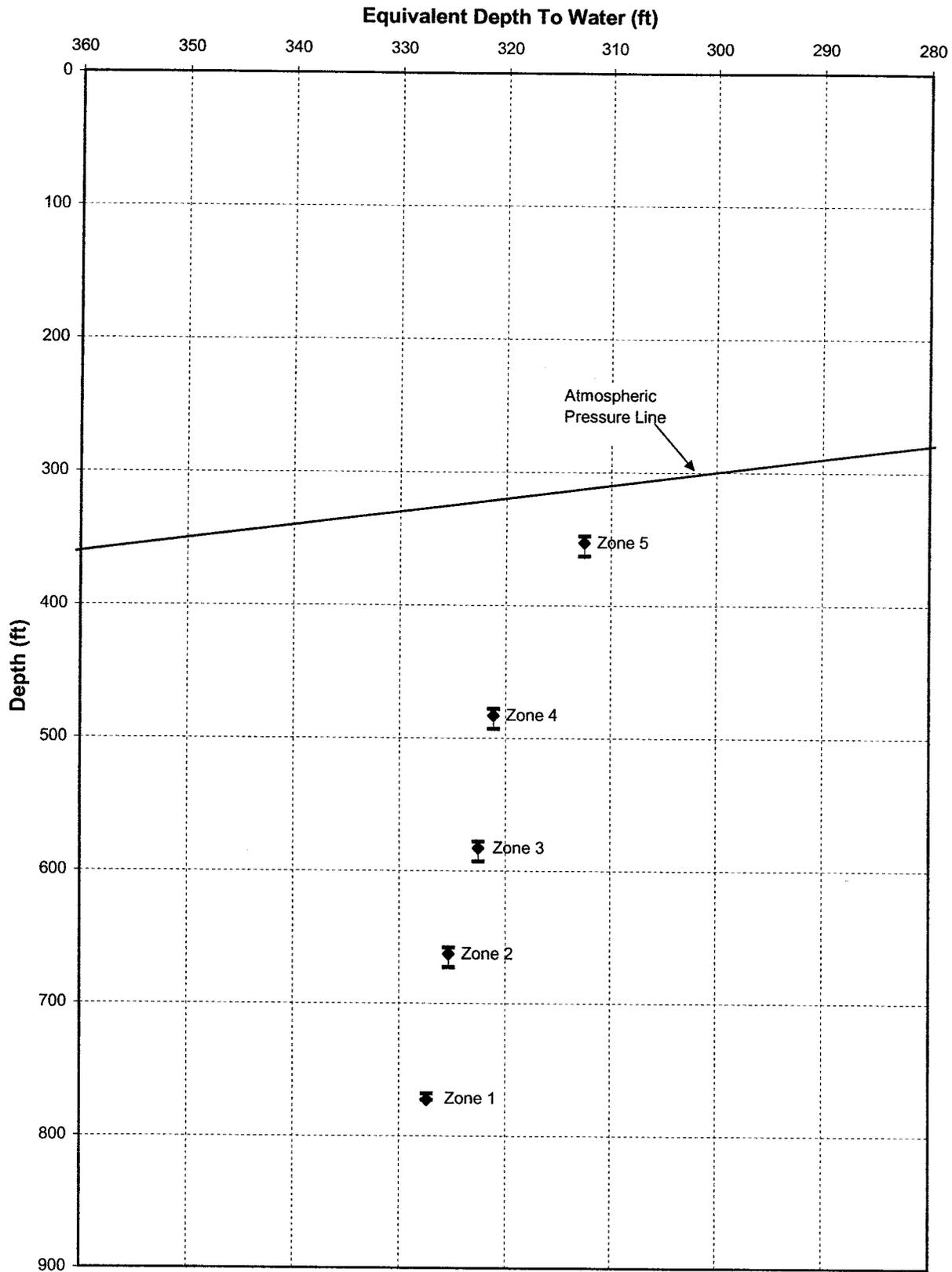
Client: WDC
 Site: Alhambra, CA
 Datum: ground surface

Figure 1

Plot By: _____ Date: _____
 Checked By: _____ Date: _____
 Westbay Project : WB824

Piezometric Profile Monitoring Well: MW1-3

Profile Data: 06/19/03
Comments: Screen Zones



Client: WDC
Site: Alhambra, CA
Datum: Ground Surface

Figure 2

Plot By: _____ Date: _____
Checked By: _____ Date: _____
WestBay Project : WB824



Westbay
Instruments Inc.

A Schlumberger Company

Piezometric Pressures/Levels Field Data and Calculation Sheet

Datum: Top of Steel Casing (11) Probe Type: EMS Client: WDC/CH2M H:11 Date: June 19/03
 Elev. G.S.: _____ Serial No.: 1764 Job No.: WB824 Well No.: MW1-3
 Height of MP above G.S.: -8" Probe Range: 0 to 1000psi Location: Mach + Cordova (Cavillan)
 Elev. top of MP Casing: _____ Weather: Wet/overcast MP Casing Type: MP38
 Reference Elevation: _____ Atm. Pressure: 14.58 Operator: ML
 Ambient Reading (Patm) (Pressure, Temperature, time) Start: 14.57/21.87/14.7 Finish: 14.59, 21.3, 2:24 pm

Port No.	Port Depth From Log (ft)	Port Depth From Cable (ft)	Port Elev. (ft)	Fluid Pressure Readings			Temp. (°C)	Time H:M:S	Pressure Head Outside Port () H = (P2-Patm)/w	Piez. Level Outside Port () Dz = Dp - H	Comments
				Inside Casing (P1)	Outside Casing (P2)	Inside Casing (P1)					
QA1	788	787	/	221.58	231.20	221.57	23.0	1:55	499.70	288.30	SQA-1
Z1	773	772	/	215.05	207.78	215.05	23.3	1:57	445.67	327.32	ZONE1
QA2	758	757	/	208.54	215.01	208.53	23.4	1:59	462.35	295.65	SQA-2
QA3	678	677.5	/	173.74	167.19	173.74	23.2	2:02	352.04	325.96	LQA-1
Z2	663	662.5	/	167.81	160.98	167.23	23.1	2:03	337.72	325.28	ZONE-2
QA4	648	647.5	/	160.74	156.25	160.74	22.3	2:05	326.80	321.19	SQA-3
QA5	598	597.5	/	138.97	134.60	138.97	22.7	2:07	276.86	321.14	LQA-2
Z3	583	583	/	132.41	127.50	132.41	22.6	2:09	260.48	322.52	ZONE3
QA6	568	568	/	125.92	136.36	125.92	22.5	2:11	280.92	287.08	SQA-4
QA7	498	498	/	95.48	91.08	95.48	22.3	2:13	176.47	321.53	LQA-3
QA8	368	—	—	—	—	—	—	—	—	—	—
Z4	353	—	—	—	—	—	—	—	—	—	—
Z4	483	483	/	89.00	84.77	89.00	22.1	2:14	161.91	321.08	ZONE4
QA8	468	468	/	82.43	78.29	82.46	22.0	2:16	146.97	321.03	SQA-5
QA9	368	368.5	/	38.95	35.41	38.96	21.7	2:18	48.05	319.95	LQA-4
Z5	353	353.5	/	32.38	32.13	32.37	21.5	2:20	40.48	312.52	ZONE5
QA10	338	338.5	/	25.88	57.11	25.87	21.4	2:21	98.11	239.89	SQA-6

Casing Installation Log

Company: WDC / CH2M Hill
Well: MW1-3
Site: Alhambra
Project:

Job No: WB824
Author: GG

Well Information

Reference Datum:
Elevation of Datum: 0.00 ft.
MP Casing Top: 0.00 ft.
MP Casing Length: 798.16 ft.

Borehole Depth: 800.00 ft.
Borehole Inclination:
Borehole Diameter: 4.00 in.

Well Description:
MP38
Other References:

File Information

File Name: MP-1.WWD
Report Date: Fri Feb 07 17:52:01 2003

File Date: Feb 05 14:03:05 2003

Comments

[Empty comment box]

Log Information

Borehole condition confirmed.
MP well design & preparation.
MP well design checked.
MP well and borehole approved to install.

(method) Man Date: 2/14/03
By: Gwyn Graham Date: 17 Feb/03
By: Man Date: 2/18/03
By: Man Date: 2/18/03

**Well Designer Report
WDC / CH2M Hill**

Depth to water = 313 ft (to Top)
Feb. 18/03 10:00

**Job No: WB824
Well: MW1-3**

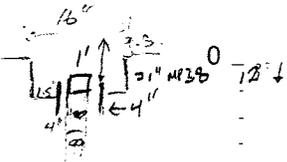
Hydraulic Integrity

w.l. in MP38 well = 667.15 ft (Toc) at 7.50
w.l. in MP38 well = 667.05 ft (Toc) at 8.05
Scale Feet Well MP Casing

Test OK (1/2)
QA Tested OK

Joint Test Tool Two 1085
Value = 250psi

MP Casing Inflation Tool Two 1085
Description Hold back valves = 210 psi



0	101 100	<input type="checkbox"/>	0225F02 - MP38 Casing, PVC, 0225F02 - MP38 Casing, PVC,
10	99	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
20	98	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
30	97	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
40	96	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
50	95	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
60	94	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
70	93	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
80	92	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
90	91	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
100	90	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-3

Scale Feet	Well Casing	MP Casing	QA Tested OK	MP Casing Description
100			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
110		89	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
120		88	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
130		87	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
140		86	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 16:30	0225F10 - MP38 Casing, PVC,
150		85	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
160		84	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
170		83	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
180		82	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
190		81	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
200		80	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-3

Scale Feet	Well Casing	MP Casing	QA Tested OK	MP Casing Description
200			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
210		79	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
220		78	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 16:50	0225F10 - MP38 Casing, PVC,
230		77	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
240		76	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
250		75	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
260		74	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
270		73	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
280		72	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
290		71	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
300		70	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-3

Scale Feet	Well MP Casing	QA Tested OK	MP Casing Description
300		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 15:35	
310	69	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
320	68	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
330	67	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
340	66	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 13177, 140 psi	0239F05 - MP38 Packer, Stiffer
	65	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> (1275)	0205 - MP38 Measurement Por
		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC,
	64	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 13176, 130 psi	0239F05 - MP38 Packer, Stiffer
350	63	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC,
	62	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> (1272)	0205 - MP38 Measurement Por
		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC,
360	61	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> (16159)	0224 - MP38 Pumping Port
		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC,
	60	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 13182, 135 psi	0239F05 - MP38 Packer, Stiffer
370		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> (1273) 15:00	0205 - MP38 Measurement Por
	59	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
380	58	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC,
		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
390	57	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
		<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
400	56	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-3

Scale Feet	Well MP Casing	MP Casing	QA Tested OK	MP Casing Description
400			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
410		55	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
420		54	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
430		53	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
440		52	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
450		51	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
460		50	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
470		49	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 14:30	0239F05 - MP38 Packer, Stiffer
		48	<input checked="" type="checkbox"/> 13178, 135psi <input checked="" type="checkbox"/> (1286)	0205 - MP38 Measurement Por 0225F05 - MP38 Casing, PVC,
480		47	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffer
		46	<input checked="" type="checkbox"/> 13186, 140psi	
490		45	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> (1279)	0225F05 - MP38 Casing, PVC, 0205 - MP38 Measurement Por 0225F05 - MP38 Casing, PVC,
		44	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 16:53	0224 - MP38 Pumping Port 0225F05 - MP38 Casing, PVC,
500		43	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 13181, 130psi <input checked="" type="checkbox"/> (1283)	0239F05 - MP38 Packer, Stiffer 0205 - MP38 Measurement Por

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-3

Scale Feet	Well MP Casing	MP Casing	QA Tested OK	MP Casing Description
500		42	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
510		41	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC,
520		40	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
530		39	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 13:50	0225F10 - MP38 Casing, PVC,
540		38	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
550		37	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
560		36	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
570		35	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 13185, 130 psi	0239F05 - MP38 Packer, Stiffer
		34	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> (1234)	0205 - MP38 Measurement Por 0225F05 - MP38 Casing, PVC,
580		33	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 13179, 135 psi	0239F05 - MP38 Packer, Stiffer
		32	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> (1281)	0225F05 - MP38 Casing, PVC, 0205 - MP38 Measurement Por
590		31	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> (1016)	0225F05 - MP38 Casing, PVC, 0224 - MP38 Pumping Port
		30	<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC,
600		29	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> 13187, 140 psi <input checked="" type="checkbox"/> (1280)	0239F05 - MP38 Packer, Stiffer 0205 - MP38 Measurement Por

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-3

Scale Feet	Well MP Casing	MP Casing	QA Tested OK	MP Casing Description
600		28	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
610		27	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC,
620		26	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
630		25	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
640		24	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
650		23	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffer
		22	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0205 - MP38 Measurement Por 0225F05 - MP38 Casing, PVC,
660		21	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffer
670		20	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 0205 - MP38 Measurement Por
		19	<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC,
		18	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0224 - MP38 Pumping Port 0225F05 - MP38 Casing, PVC,
680		17	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffer 0205 - MP38 Measurement Por
690		16	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
		15	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC,
700		14	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-3

Scale Feet	Well MP Casing	MP Casing	QA Tested OK	MP Casing Description
700			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	
710		13	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
720		12	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
730		11	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
740		10	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
750		9	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
760		8	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffer
760		7	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <i>13185, 140psi (1224)</i>	0205 - MP38 Measurement Por 0225F05 - MP38 Casing, PVC,
770		6	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffer
770		5	<input checked="" type="checkbox"/> <i>13180, 135psi</i>	0225F05 - MP38 Casing, PVC,
780		4	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <i>(1222)</i>	0205 - MP38 Measurement Por 0225F05 - MP38 Casing, PVC,
780		3	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <i>(5410)</i>	0224 - MP38 Pumping Port 0225F05 - MP38 Casing, PVC,
790		2	<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <i>13190, 130psi (1278)</i>	0239F05 - MP38 Packer, Stiffer 0205 - MP38 Measurement Por
790		1	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC,
800			<input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <i>10:30</i>	0223 - MP38 End Cap

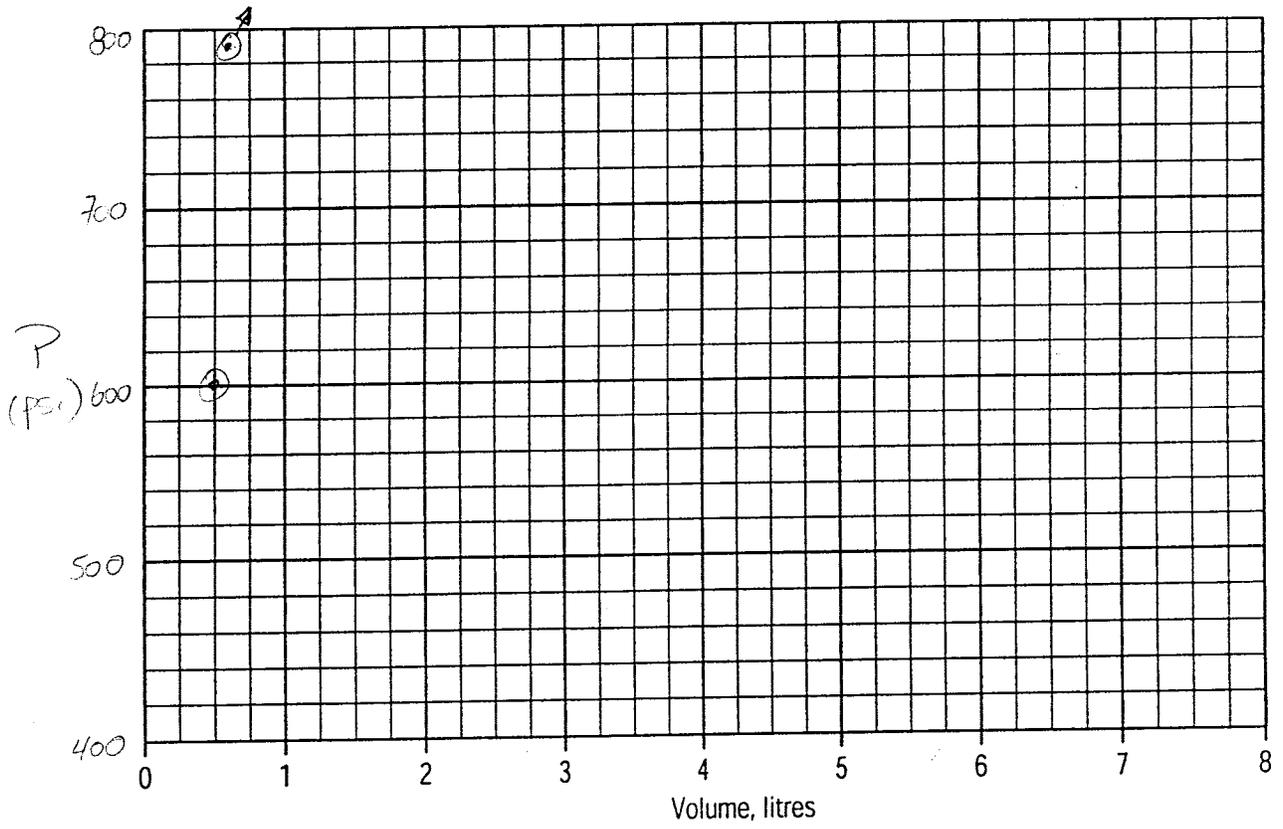


MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW1-3
 Location: Alhambra MW1-3 Completed by: GG Date Inflated: Feb. 19/03
 Packer No.: N/A Serial No.: N/A Depth (ft / m): 800 Inflation Tool No.: TIW1085
 Packer Valve Pressure, P_V : N/A psi Final Line Pressure, P_L : 1150 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 313 (ft / m) = 136 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ N/A psi

Volume, litres	0	0.5	0.65	0.75	0.80	0.25					
Pressure, psi	0	600	790	950	1150	0					
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments BLANK WALL TEST



Westbay
Instruments Inc.

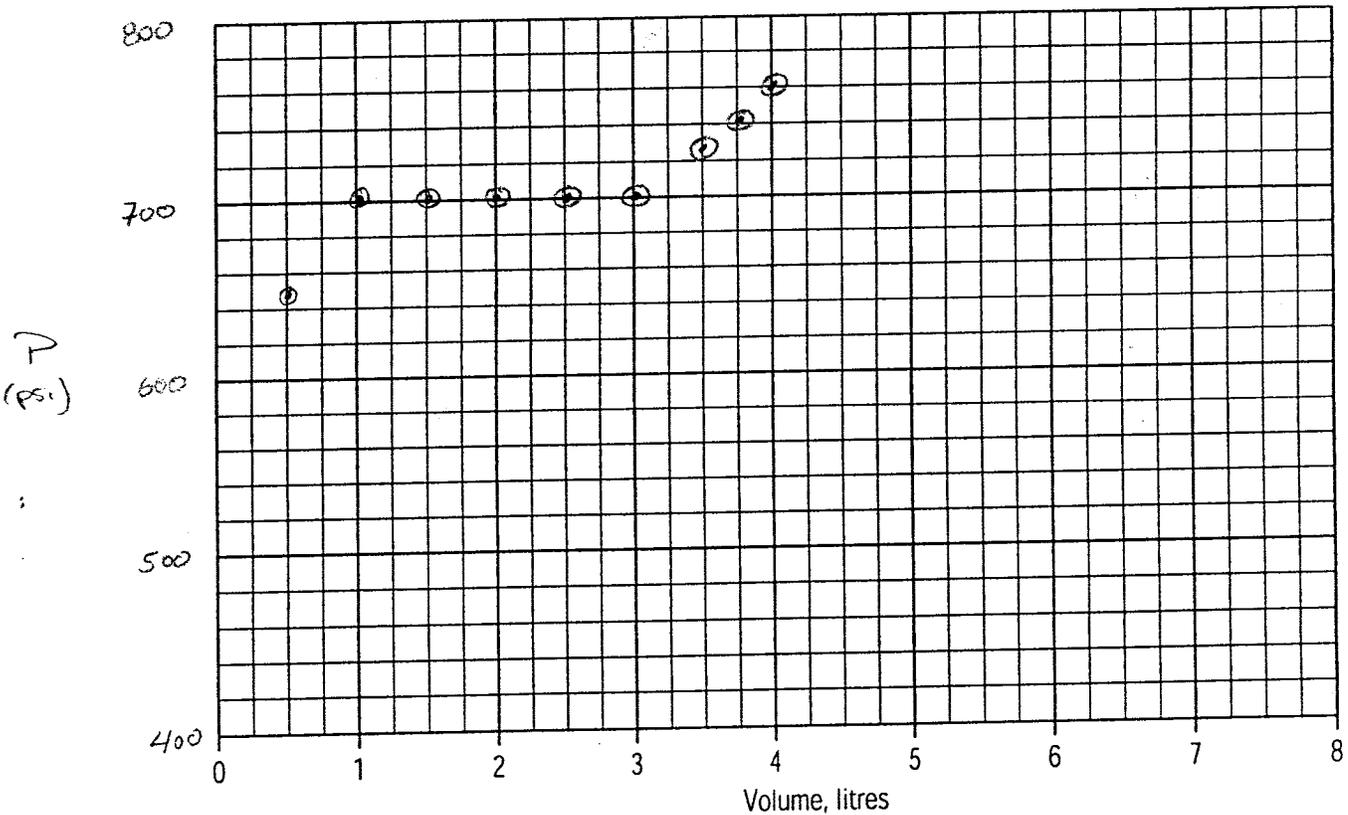
A Schlumberger Company

MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB824 Well No.: MW1-3
 Location: Alhambra - MW1-3 Completed by: GG Date Inflated: Feb. 19/03
 Packer No.: 1. Comp. #2 Serial No.: 13190 Depth (ft/m): 788 Inflation Tool No.: TIW 1085
 Packer Valve Pressure, P_v : 130 psi Final Line Pressure, P_L : 760 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 313 (ft/m) = 136 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 156 psi

Volume, litres	0	0.5	1.0	1.5	2.0	2.5	3.0	3.5	3.75	4.0	3.75
Pressure, psi	0	650	700	700	700	700	700	725	740	760	0
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer #1



Westbay
Instruments Inc.

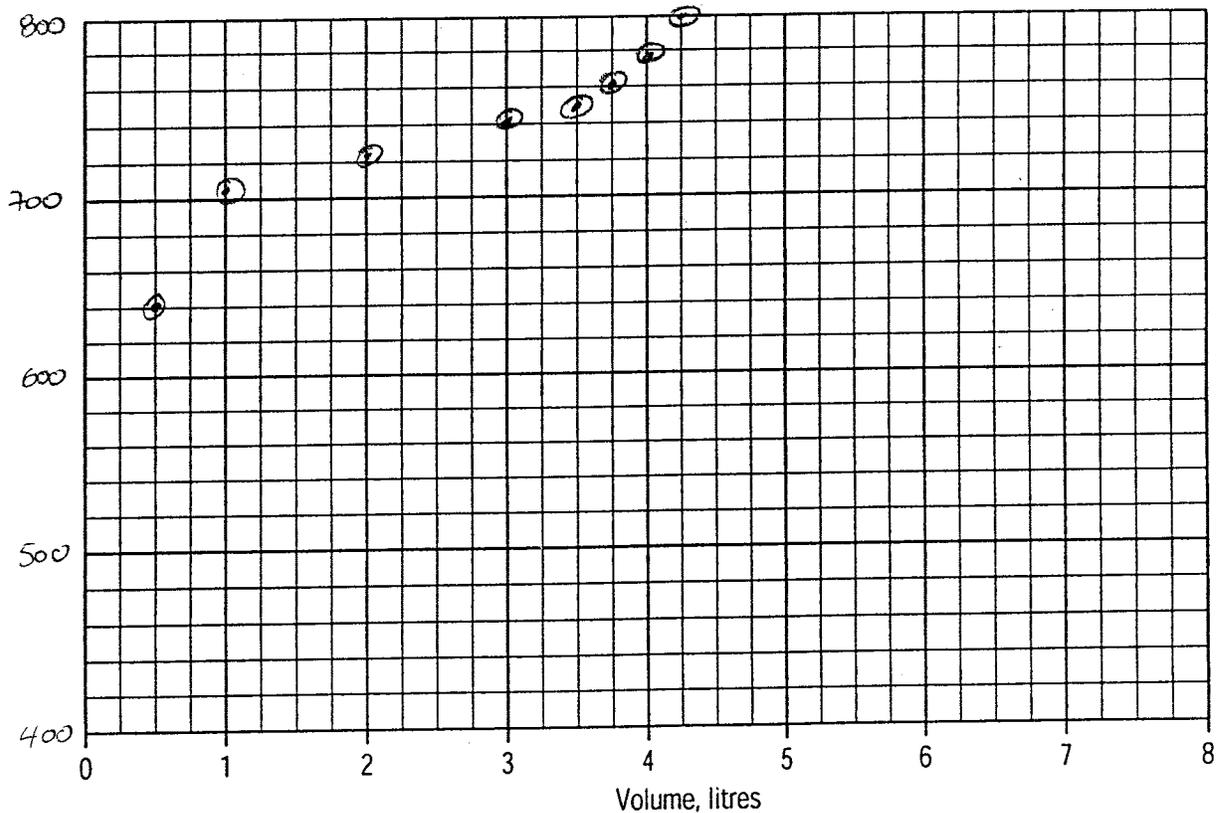
A Schlumberger Company

MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW1-3
 Location: Alhambra - MW1-3 Completed by: GG Date Inflated: Feb. 19/03
 Packer No.: 2, Comp #6 Serial No.: 13180 Depth (ft/m): 763' Inflation Tool No.: TW 1035
 Packer Valve Pressure, P_V : 135 psi Final Line Pressure, P_L : 775 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 33 (ft/m) = 136 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 166 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.5	3.75	4.0	4.25	4.0	
Pressure, psi	0	640	710	725	740	750	760	775	800	0	
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer #2



Westbay
Instruments Inc.

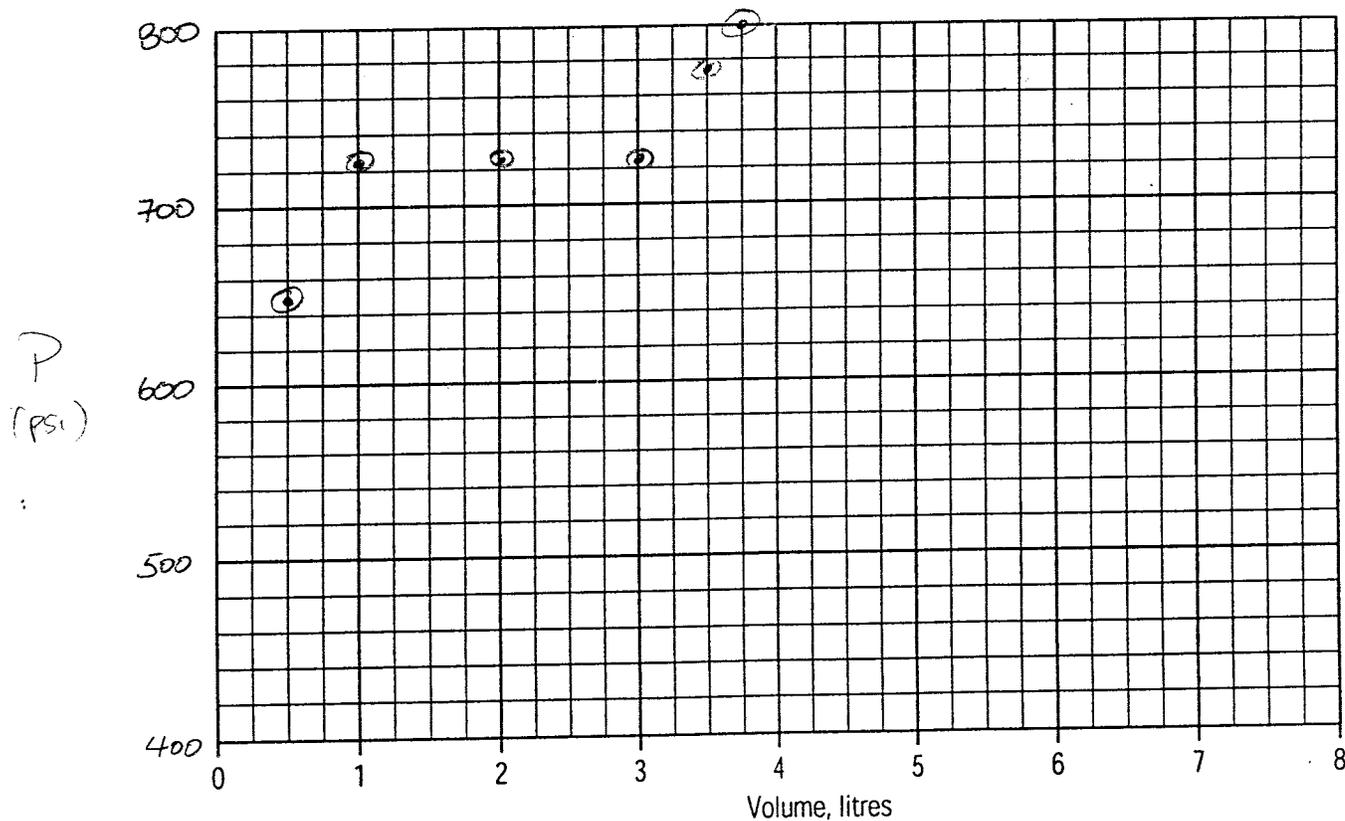
A Schlumberger Company

MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW1-3
 Location: Alhambra - MW1-3 Completed by: GG Date Inflated: Feb 19/03
 Packer No.: 3, Comp #8 Serial No.: 13185 Depth (ft/m): 648' Inflation Tool No.: TW1035
 Packer Valve Pressure, P_V : 140 psi Final Line Pressure, P_L : 775 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 313 (ft/m) = 136 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 161 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.5	3.75	3.5			
Pressure, psi	0	650	725	725	725	775	800	0			
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer #3

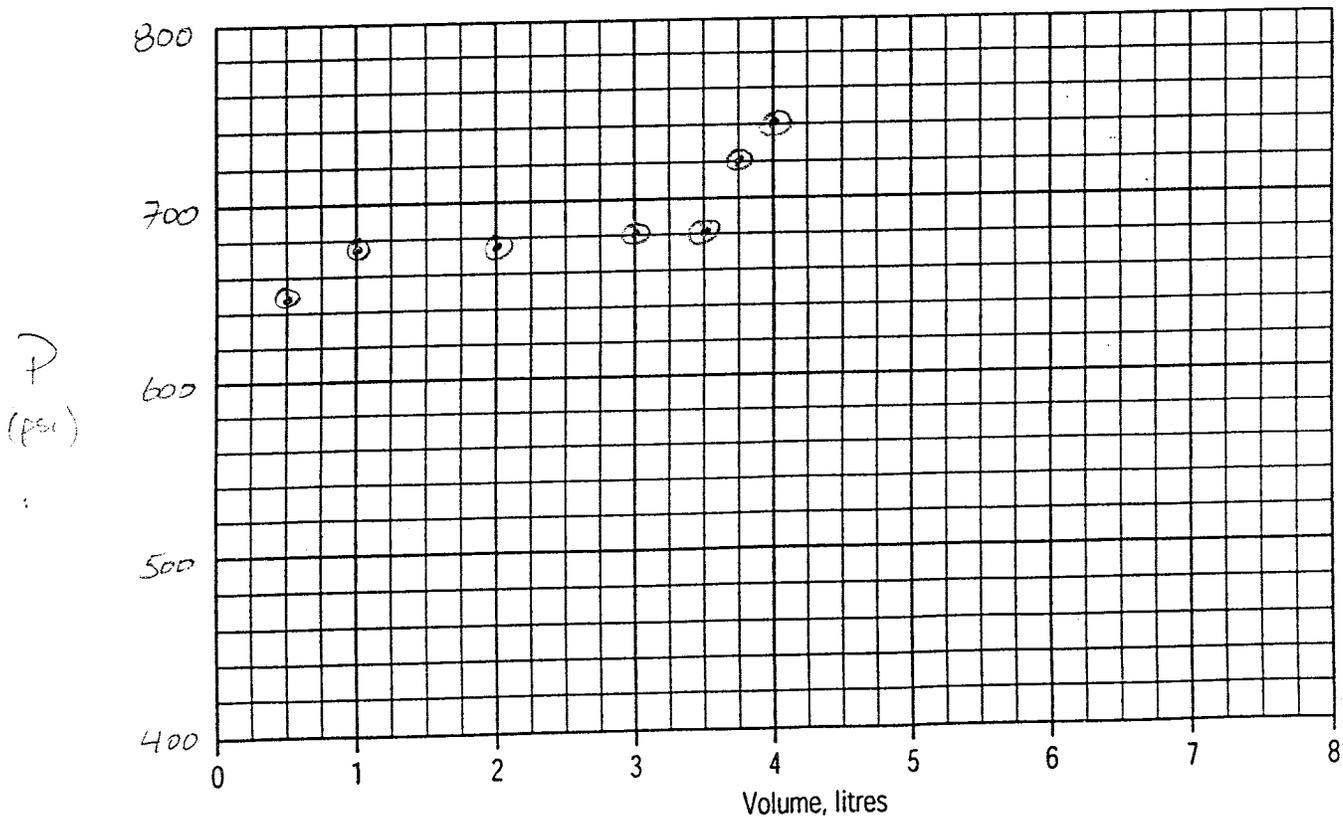


MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW 1-3
 Location: Alhambra MW 1-3 Completed by: GG Date Inflated: Feb. 19/03
 Packer No.: 4, Comp #17 Serial No.: 13188 Depth (ft/m): 678 Inflation Tool No.: TW1085
 Packer Valve Pressure, P_V : 140 psi Final Line Pressure, P_L : 740 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 313 (ft/m) = 156 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 126 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.5	3.75	4.0	3.80		
Pressure, psi	0	650	675	675	680	680	720	740	0		
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer #4



Westbay
Instruments Inc.

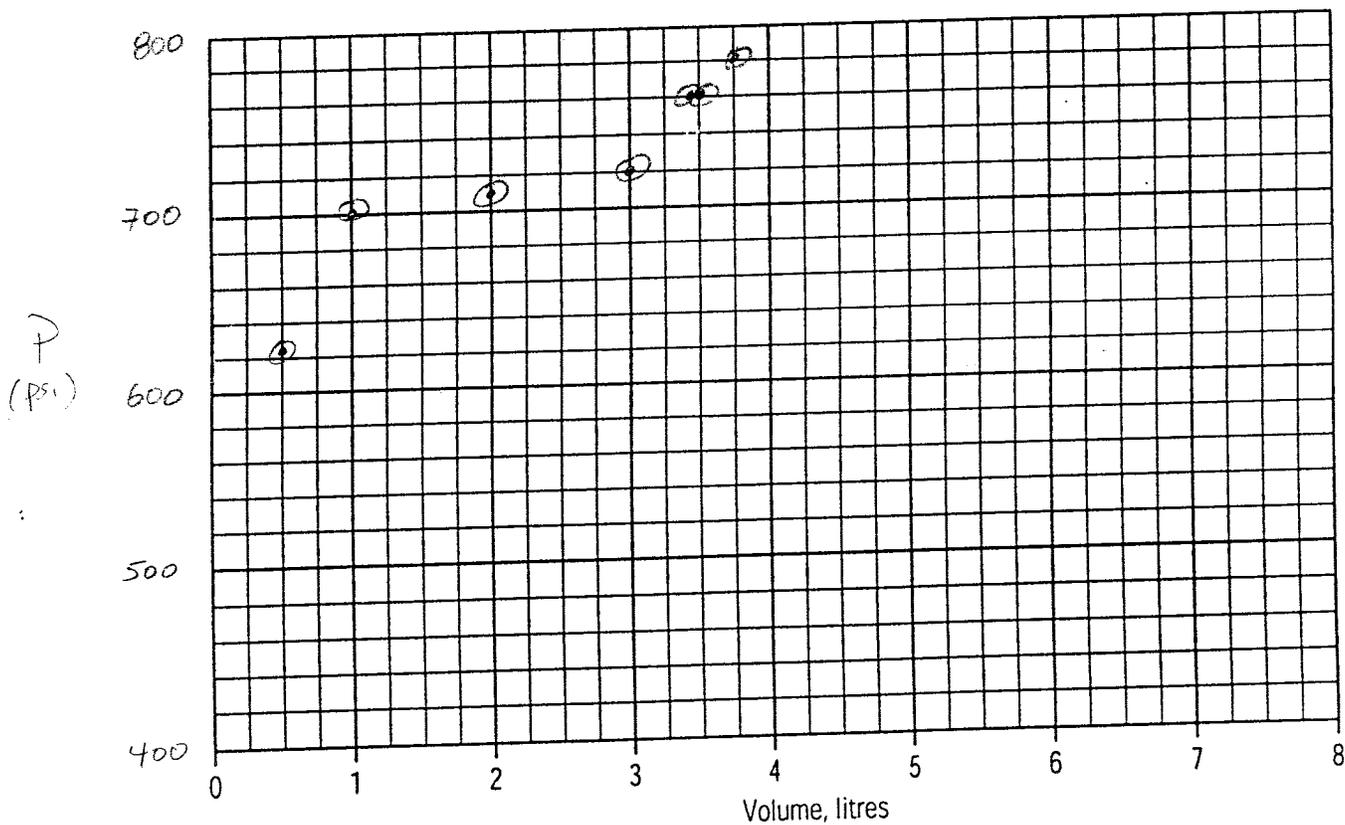
A Schlumberger Company

MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW1-3
 Location: Alhambra MW1-3 Completed by: GG Date Inflated: Feb. 20/03
 Packer No.: S, Comp. 21 Serial No.: 13184 Depth (ft/m): 653 Inflation Tool No.: TW1085
 Packer Valve Pressure, P_v : 130 psi Final Line Pressure, P_L : 760 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level 313 (ft/m) = 135 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w \cdot P_v \cdot P_T =$ 156 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.4	3.5	3.75	3.5		
Pressure, psi	0	625	700	710	720	760	760	780	D		
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer # 5



Westbay
Instruments Inc.

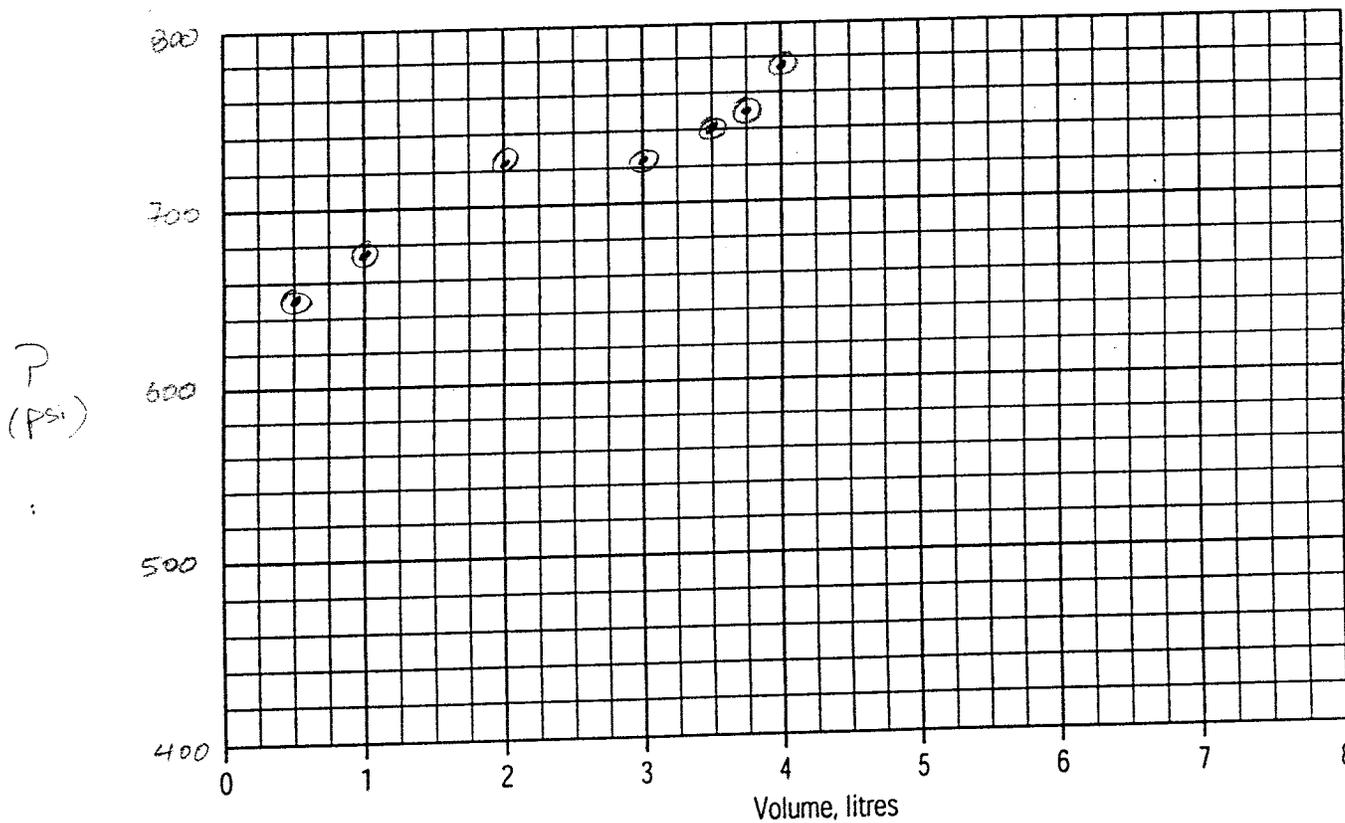
A Schlumberger Company

MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW1-3
 Location: Alhambra MW1-3 Completed by: GG Date Inflated: Feb. 20/03
 Packer No.: 6, Comp. 23 Serial No.: 13189 Depth (ft/m): 648 Inflation Tool No.: JTW1085
 Packer Valve Pressure, P_V : 130 psi Final Line Pressure, P_L : 750 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 313 (ft/m) = 136 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 146 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.5	3.75	4.0	3.65		
Pressure, psi	0	650	675	725	725	740	750	775	0		
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer #6



Westbay
Instruments Inc.

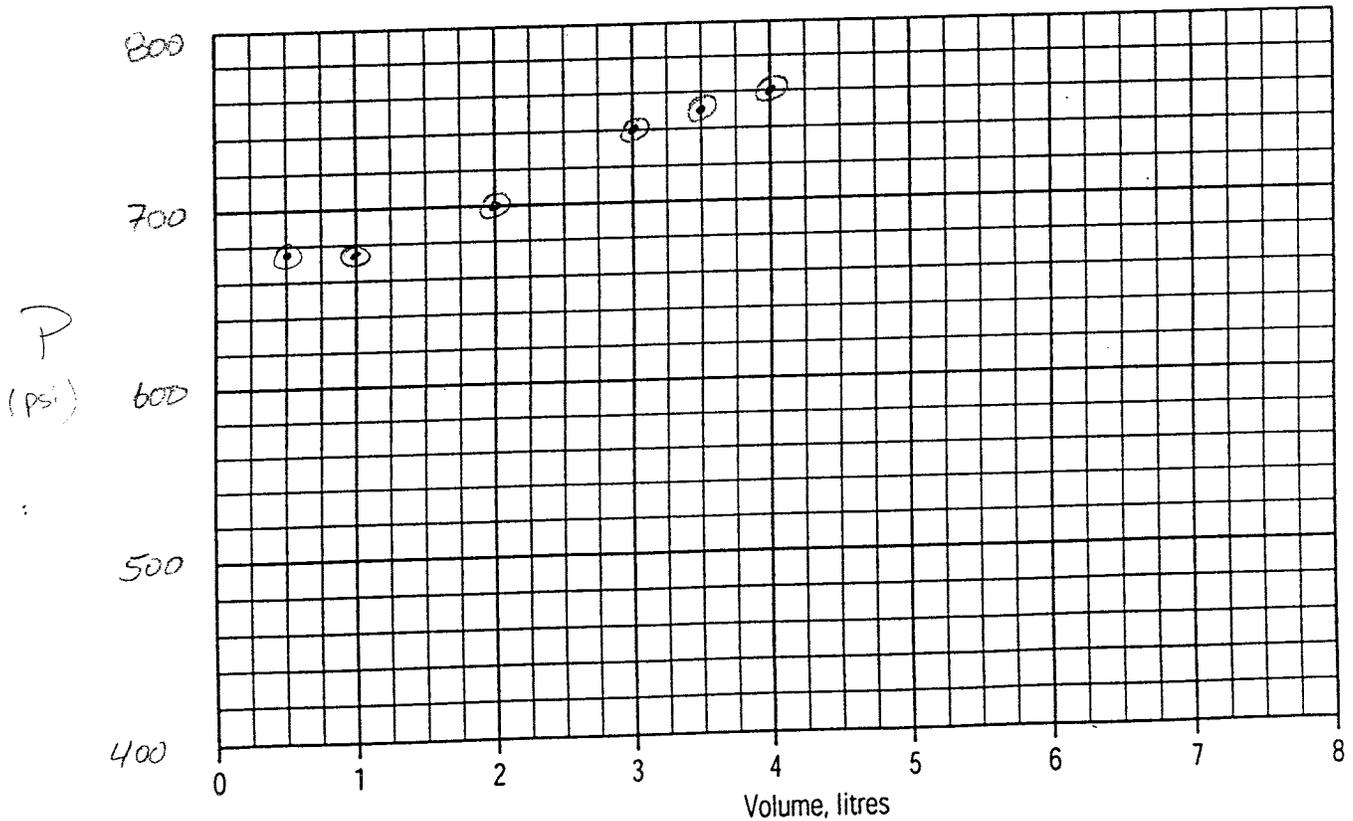
A Schlumberger Company

MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW1-3
 Location: Alhambra MW1-3 Completed by: EG Date Inflated: Feb. 19/03
 Packer No.: 7/mmp. 29 Serial No.: 13187 Depth (ft/m): 593 Inflation Tool No.: TW1095
 Packer Valve Pressure, P_v : 140 psi Final Line Pressure, P_L : 760 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 313 (ft/m) = 136 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 146 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.5	4.0	3.75			
Pressure, psi	0	675	675	700	740	750	760	0			
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer = 7



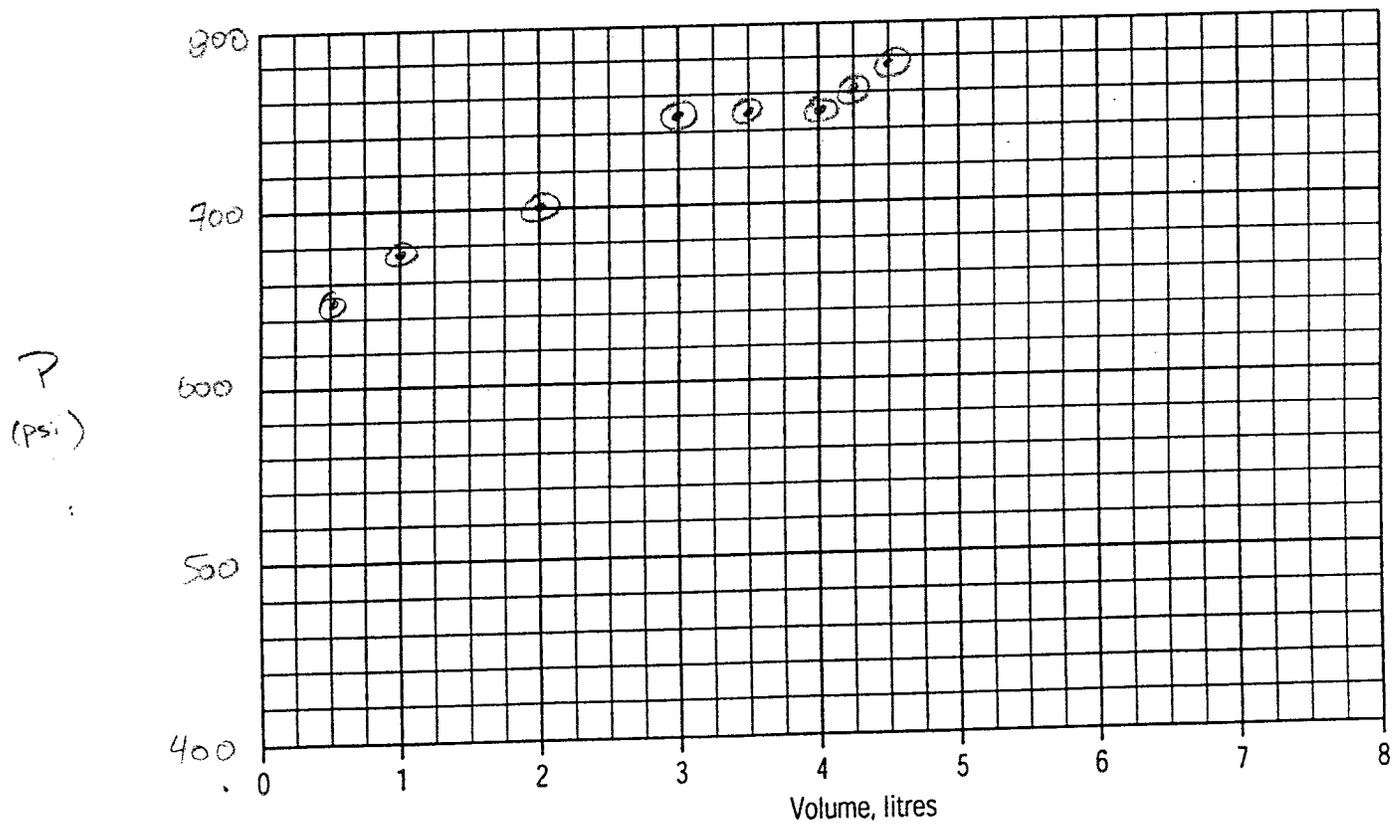
Westbay
Instruments Inc.
A Schlumberger Company

MP Packer Inflation Record

Project: WDC- Alhambra Project No.: WB 824 Well No.: MW1-3
 Location: Alhambra, MW1-3 Completed by: GG Date Inflated: Feb. 19/03
 Packer No.: 8, Comp. 33 Serial No.: 13179 Depth (ft / m): 573 Inflation Tool No.: TW1085
 Packer Valve Pressure, P_v : 135 psi Final Line Pressure, P_L : 760 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 313 (ft / m) = 136 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 151 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.5	4.0	4.25	4.5	4.15	
Pressure, psi	0	650	675	700	750	750	750	760	775	0	
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Factor # 8



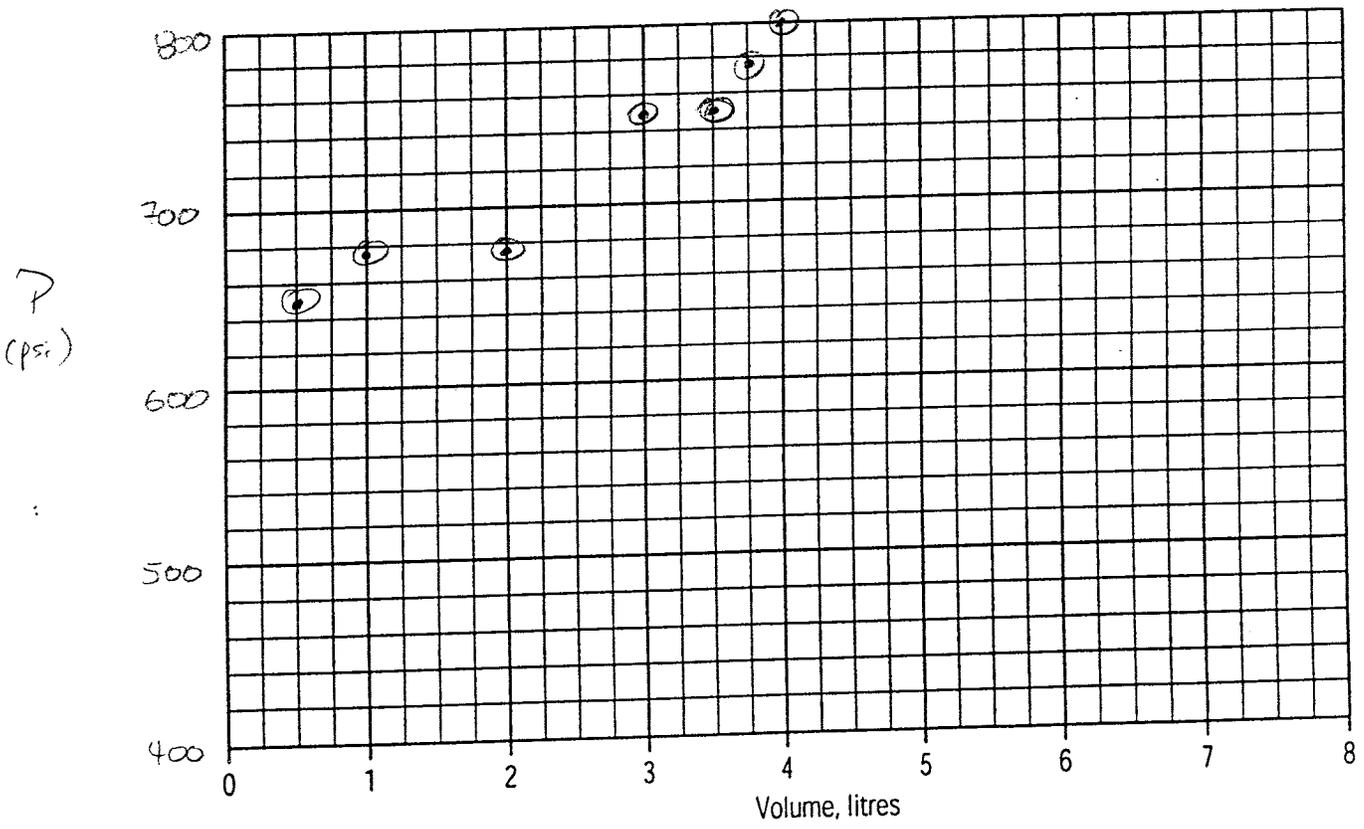
Westbay
Instruments Inc.
A Schlumberger Company

MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW1-3
 Location: Alhambra, MW1-3 Completed by: GG Date Inflated: Feb. 19/03
 Packer No.: 9 Comp. 35 Serial No.: 13133 Depth (ft/m): 568 Inflation Tool No.: TW1085
 Packer Valve Pressure, P_V : 130 psi Final Line Pressure, P_L : 775 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 313 (ft/m) = 136 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 171 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.5	3.75	4.0	3.75		
Pressure, psi	0	650	675	675	750	750	775	800	0		
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer # 9

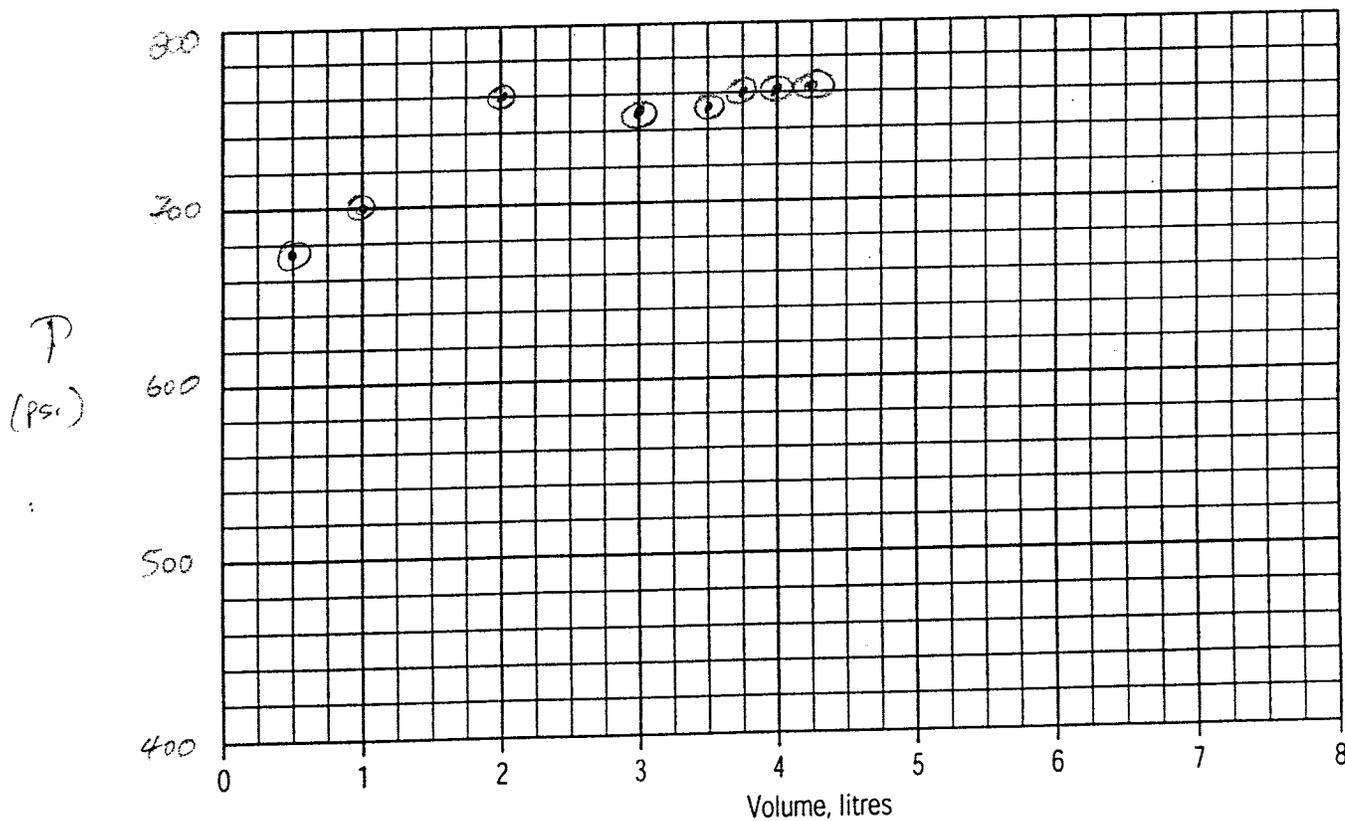


MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW1-3
 Location: Alhambra, MW1-3 Completed by: GG Date Inflated: Feb. 19/03
 Packer No.: 10, Comp. 43 Serial No.: 13181 Depth (ft/m): 498 Inflation Tool No.: JTW1095
 Packer Valve Pressure, P_V : 130 psi Final Line Pressure, P_L : 760 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 313 (ft/m) = 136 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 156 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.5	3.75	4.0	4.25	4.0	
Pressure, psi	0	675	700	760	750	750	760	760	760	0	
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer = 10



Westbay
Instruments Inc.

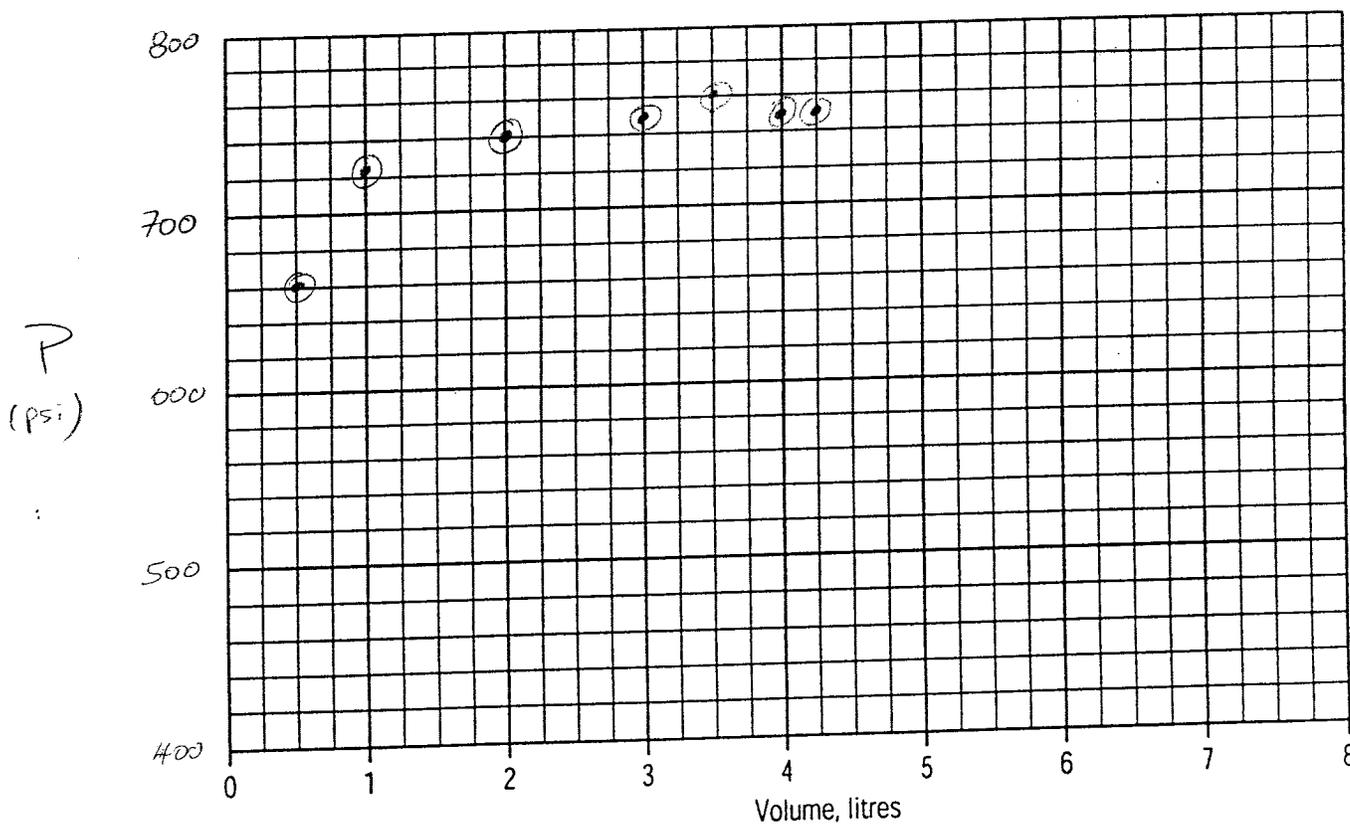
A Schlumberger Company

MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW1-3
 Location: Alhambra, MW1-3 Completed by: GG Date Inflated: Feb. 19/03
 Packer No.: 11, Comp 47 Serial No.: 13186 Depth (ft / m): 478 Inflation Tool No.: TW1035
 Packer Valve Pressure, P_v : 140 psi Final Line Pressure, P_L : 750 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 313 (ft / m) = 136 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 136 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.5	4.0	4.25	4.0		
Pressure, psi	0	660	725	740	750	760	750	750	0		
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer # 11



Westbay
Instruments Inc.

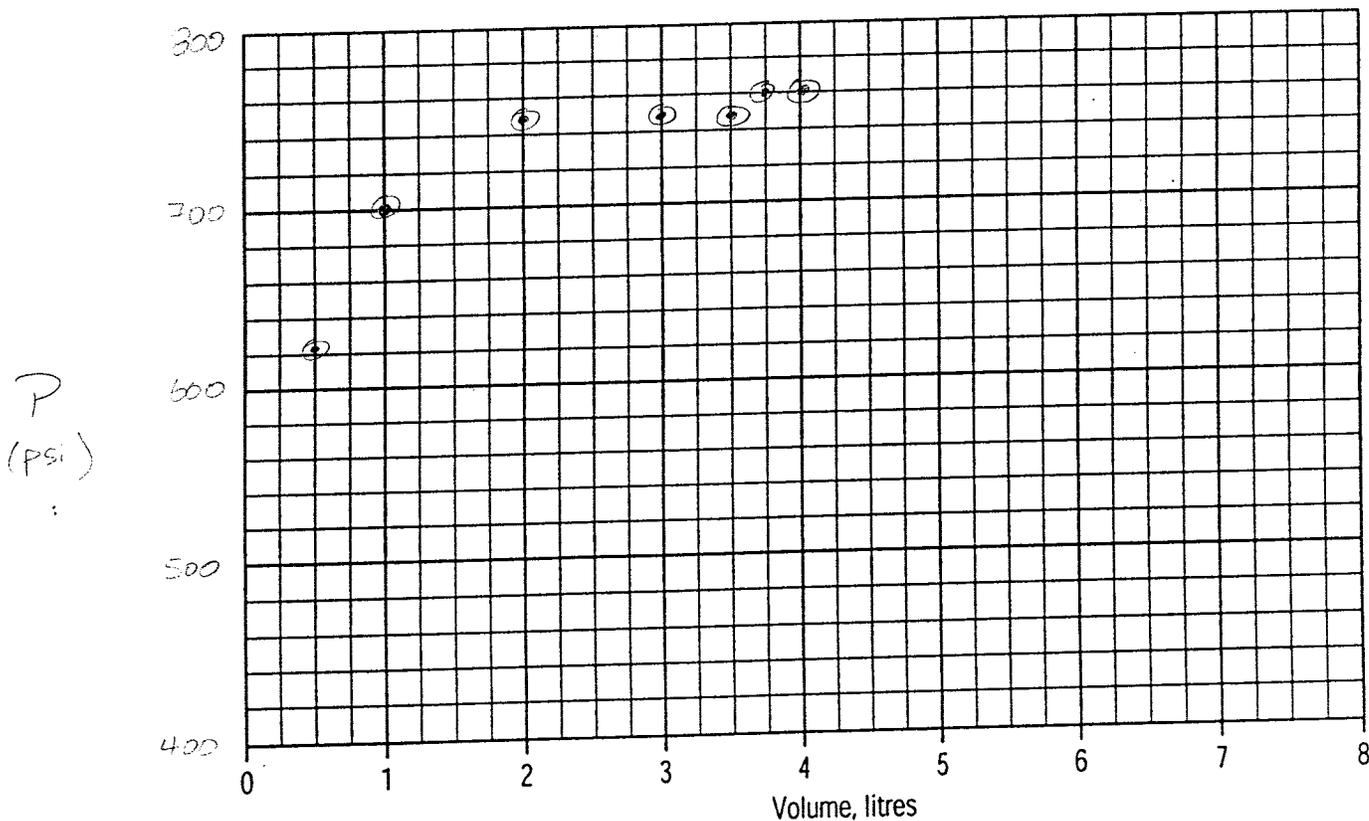
A Schlumberger Company

MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW1-3
 Location: Alhambra, MW1-3 Completed by: GG Date Inflated: Feb. 19 63
 Packer No.: 12, Comp Serial No.: 13175 Depth (ft/m): 468 Inflation Tool No.: Tim 585
 Packer Valve Pressure, P_v : 135 psi Final Line Pressure, P_L : 760 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 313 (ft/m) = 136 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 151 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.5	3.75	4.0	4.25	4.0	
Pressure, psi	0	625	700	750	750	750	760	760	760	0	
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer #12



Westbay
Instruments Inc.

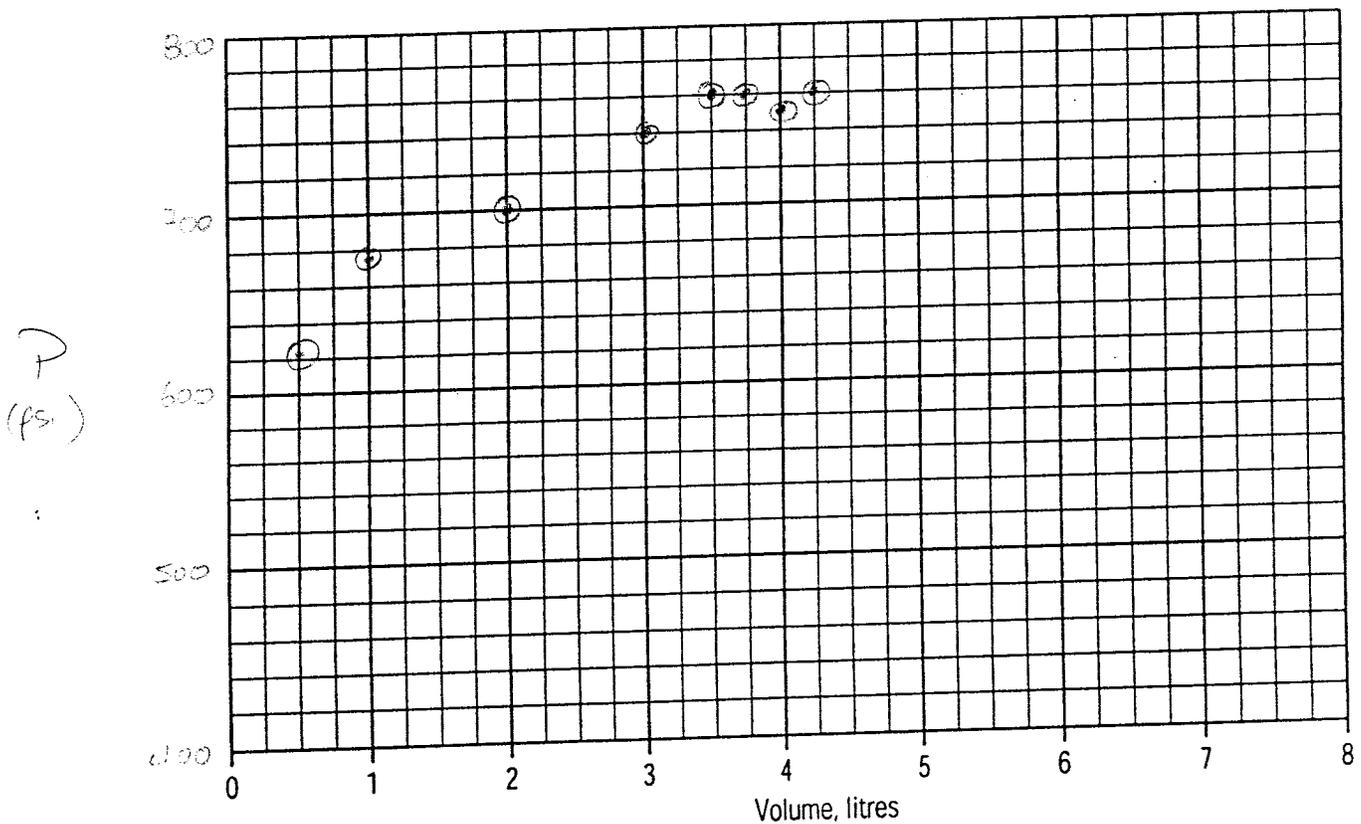
A Schlumberger Company

MP Packer Inflation Record

Project: WDC- Alhambra Project No.: WB824 Well No.: MW1-3
 Location: Alhambra, MW1-3 Completed by: GG Date Inflated: Feb. 13 1983
 Packer No.: 13, Comp. 60 Serial No.: 13182 Depth (ft/m): 368 Inflation Tool No.: TW1285
 Packer Valve Pressure, P_v : 135 psi Final Line Pressure, P_L : 760 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 313 (ft/m) = 136 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 151 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.5	3.75	4.0	4.25	4.50	
Pressure, psi	0	625	675	700	740	760	760	750	760	0	
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer # 13



Westbay
Instruments Inc.

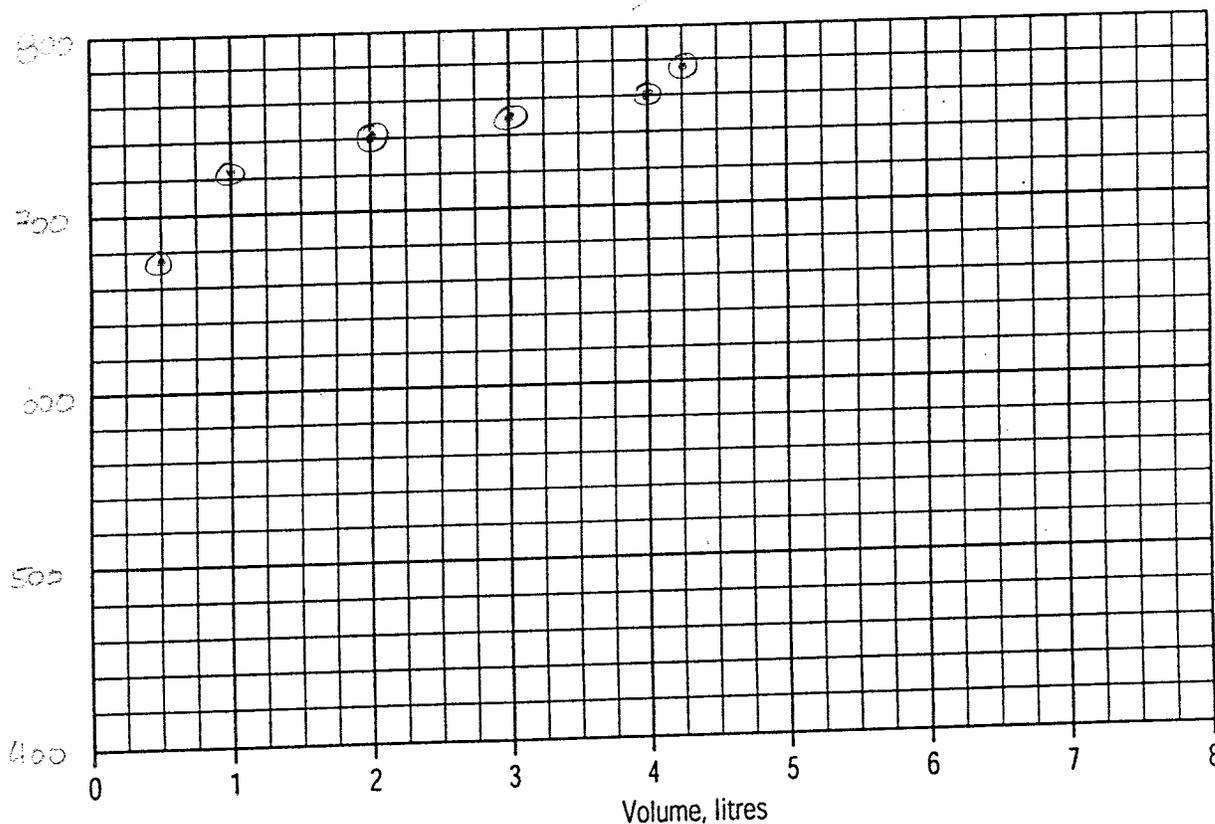
A Schlumberger Company

MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB824 Well No.: MW1-3
 Location: Alhambra MW1-3 Completed by: GG Date Inflated: Feb. 19/03
 Packer No.: 14, Comp. 64 Serial No.: 13186 Depth (ft/m): 348 Inflation Tool No.: TW1095
 Packer Valve Pressure, P_V : 130 psi Final Line Pressure, P_L : 775 psi Tool Pressure, P_T : 610 psi
 Borehole Water Level: 33 (ft/m) = 136 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 171 psi

Volume, litres	0	0.5	1.0	2.0	3.0	4.0	4.25	4.5			
Pressure, psi	0	675	725	740	750	760	775	0			
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



P
(psi)

Comments Packer #14



Westbay
Instruments Inc.

A Schlumberger Company

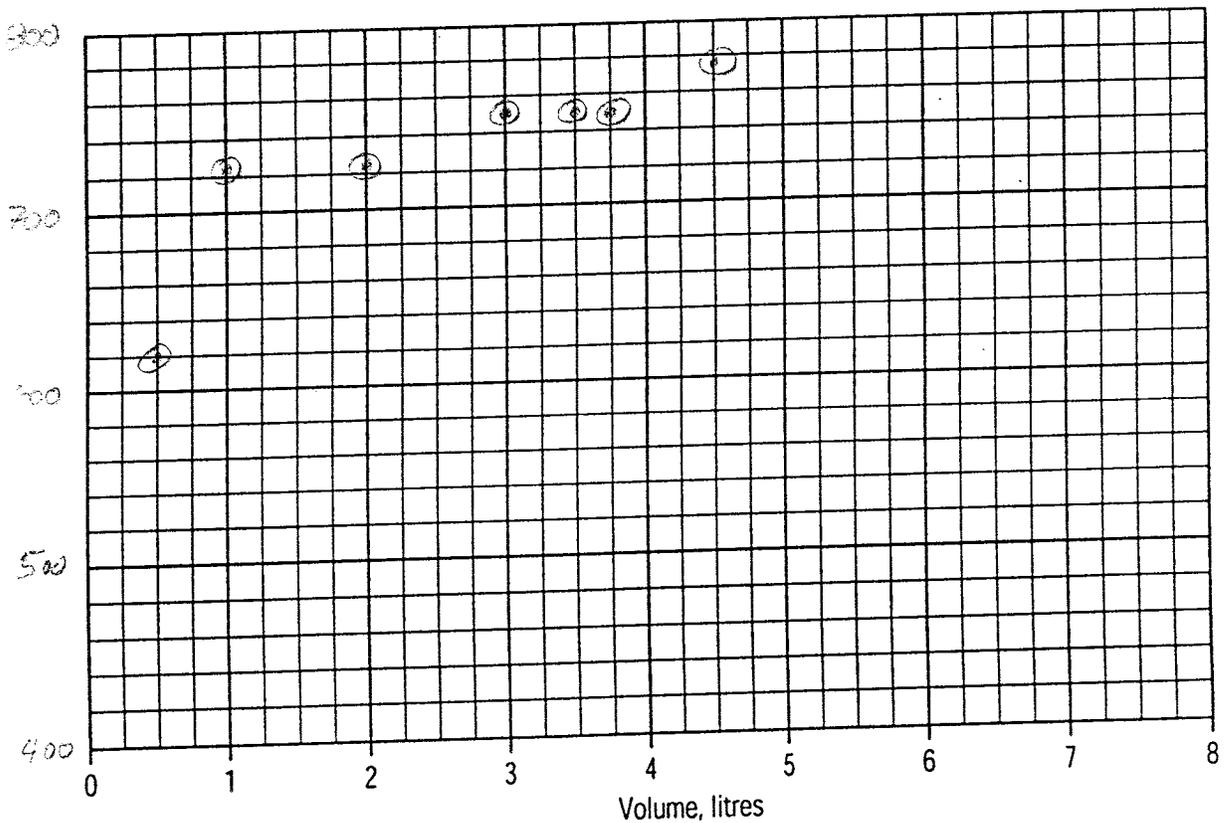
MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW1-3
 Location: Alhambra - MW1-3 Completed by: GG Date Inflated: Feb 19 1988
 Packer No.: 15, Comp. 66 Serial No.: 13177 Depth (ft / m): 338' Inflation Tool No.: TW 1085
 Packer Valve Pressure, P_V: 140 psi Final Line Pressure, P_L: 775 psi Tool Pressure, P_T: 610 psi
 Borehole Water Level: 312 (ft / m) = 136 psi (P_W) Calculated Packer Element Pressure, P_E = P_L + P_W - P_V - P_T = 161 psi

Volume, litres	0	0.5	1.0	2.0	3.0	3.5	3.75	4.5	4.35		
Pressure, psi	0	620	725	725	750	750	750	775	0		
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)

P
(psi)



Comments Packer #15

APPENDIX 2

Monitoring Well MW1-4

Summary Casing Log	- 5 pages
Figure 1, Piezometric Pressure Profile, All Zones	- 1 page
Figure 2, Piezometric Pressure Profile, Screened Zones	- 1 page
Piezometric Pressure/Levels	
Field Data and Calculation Sheets (06/19/03)	- 1 page
Field Data and Calculation Sheets (07/16/03)	- 1 page
MP Casing Log (field copies)	- 8 pages
MP Packer Inflation Records	- 14 pages

Summary Casing Log

Company: WDC / CH2M Hill
Well: MW1-4
Site: Alhambra
Project: WDC# CH222B

Job No: WB824
Author: GG

Well Information

Reference Datum:
Elevation of Datum: 0.00 ft.
MP Casing Top: 0.00 ft.
MP Casing Length: 632.96 ft.

Borehole Depth: 635.00 ft.
Borehole Inclination:
Borehole Diameter: 4.00 in.

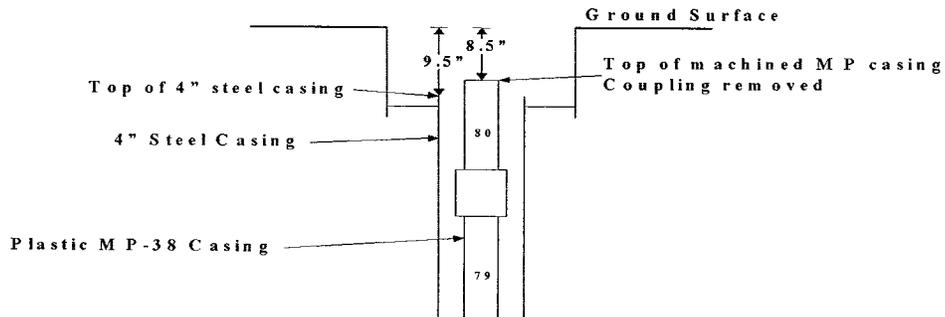
Well Description:
MP38
Other References:

File Information

File Name: 824MP-2.WWD
Report Date: Fri Jul 18 14:33:33 2003

File Date: Jul 18 14:21:01 2003

Sketch of Wellhead Completion



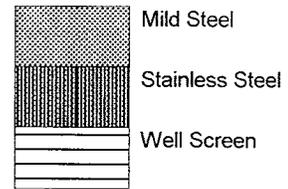
Legend

(Qty) MP Components
(Library - WD Library 7/27/00)

Geology

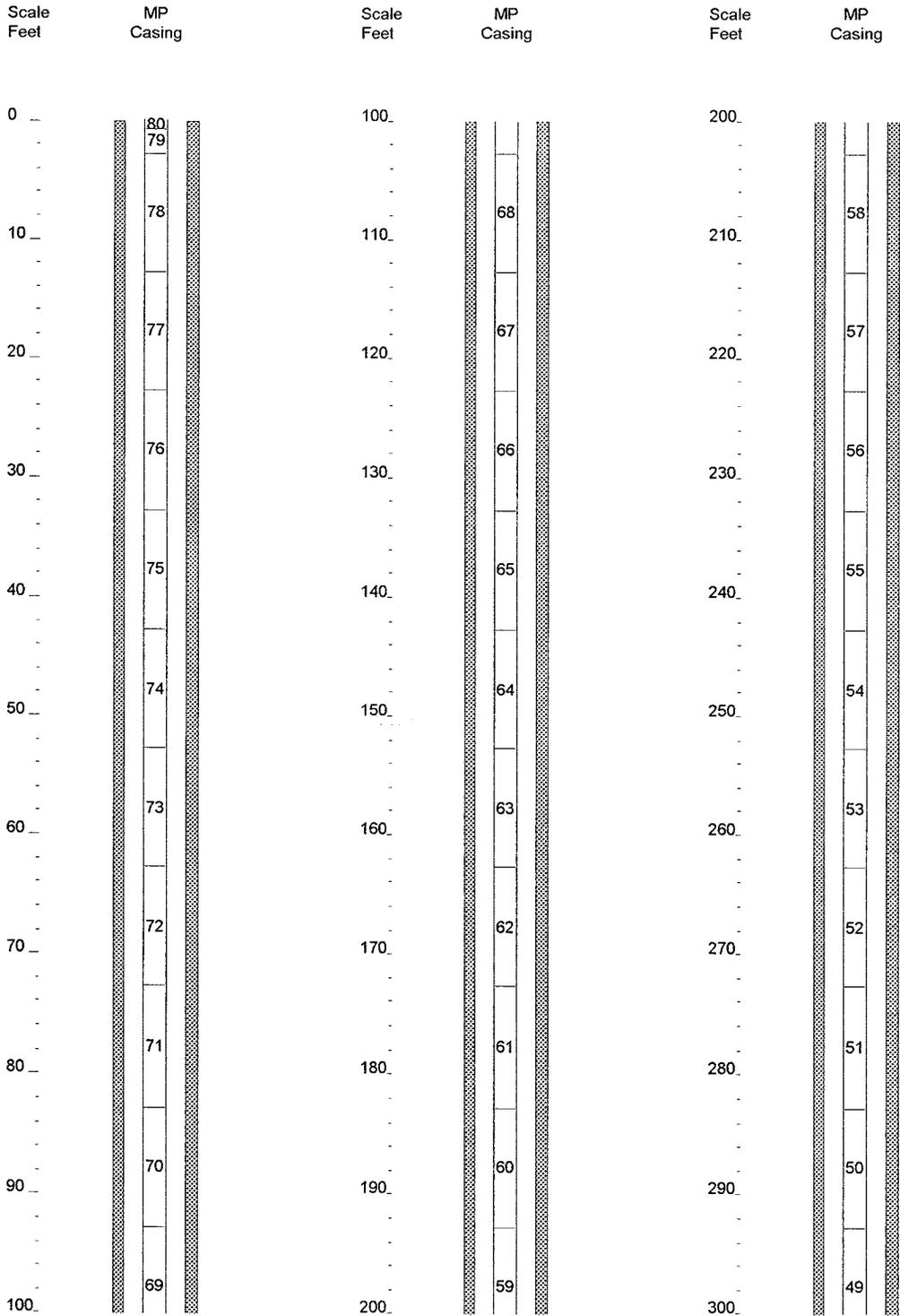
Backfill/Casing

-  (1) 0225F01 - MP38 Casing, PVC, 1ft.
-  (1) 0225F02 - MP38 Casing, PVC, 2 ft.
-  (48) 0225F10 - MP38 Casing, PVC, 10 ft.
-  (12) 0239F05 - MP38 Packer, Stiffened
-  (18) 0225F05 - MP38 Casing, PVC, 5 ft.
-  (1) 0223 - MP38 End Cap
-  (64) 0202 - MP38 Regular Coupling
-  (12) 0205 - MP38 Measurement Port
-  (4) 0224 - MP38 Pumping Port
-  (4) 0216 - MP38 Magnetic Location Collar



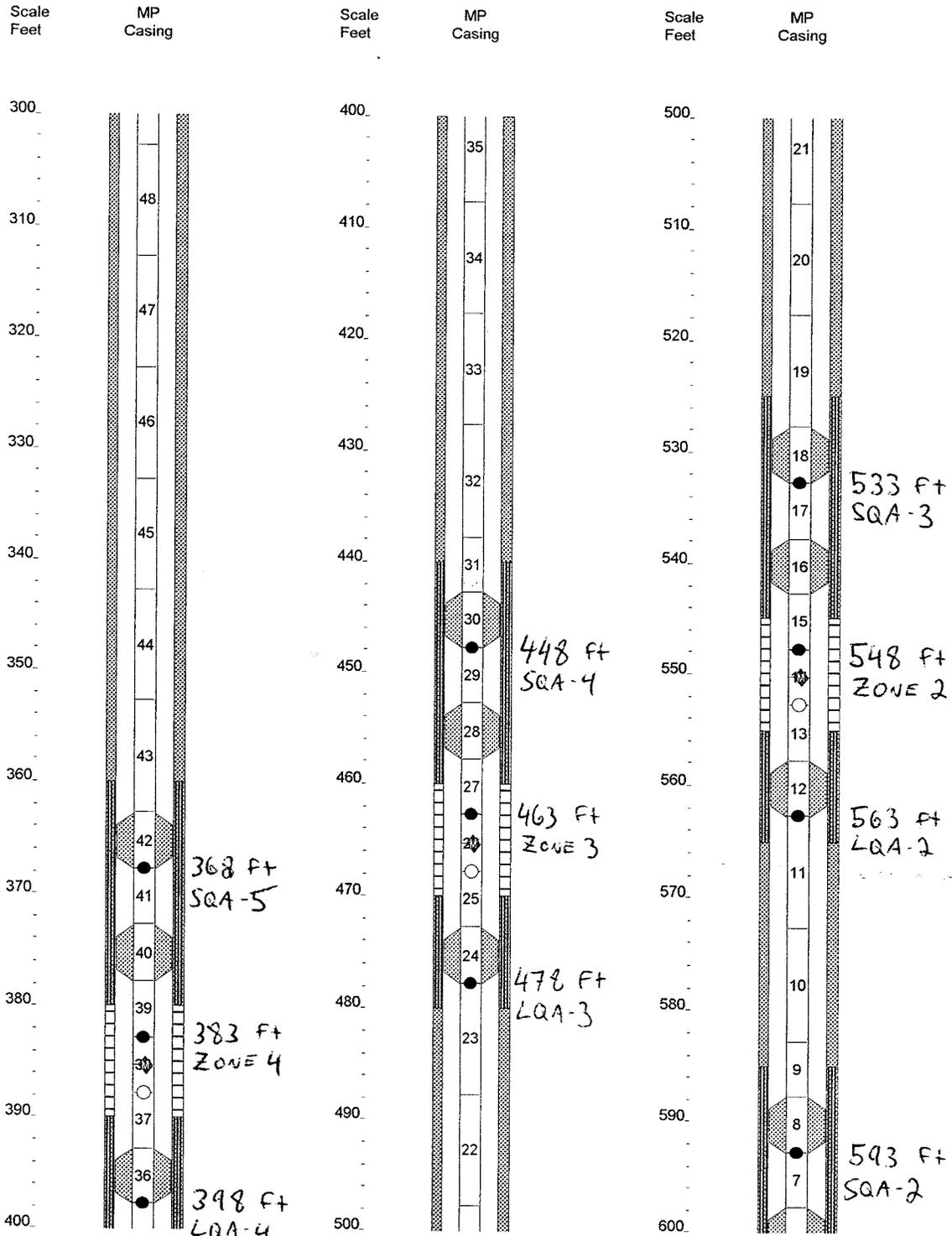
Summary Casing Log
WDC / CH2M Hill

Job No: WB824
Well: MW1-4



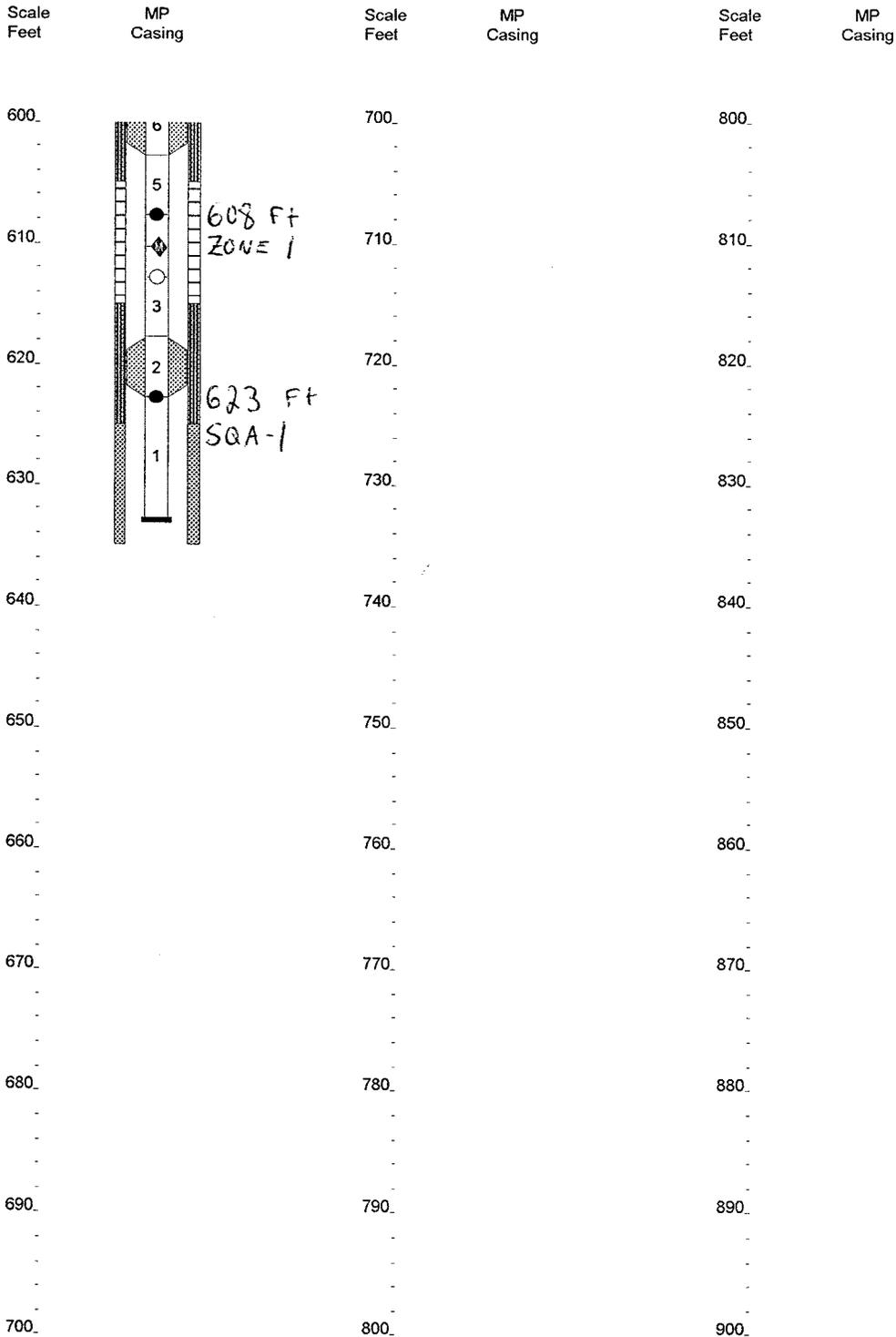
Summary Casing Log
WDC / CH2M Hill

Job No: WB824
Well: MW1-4



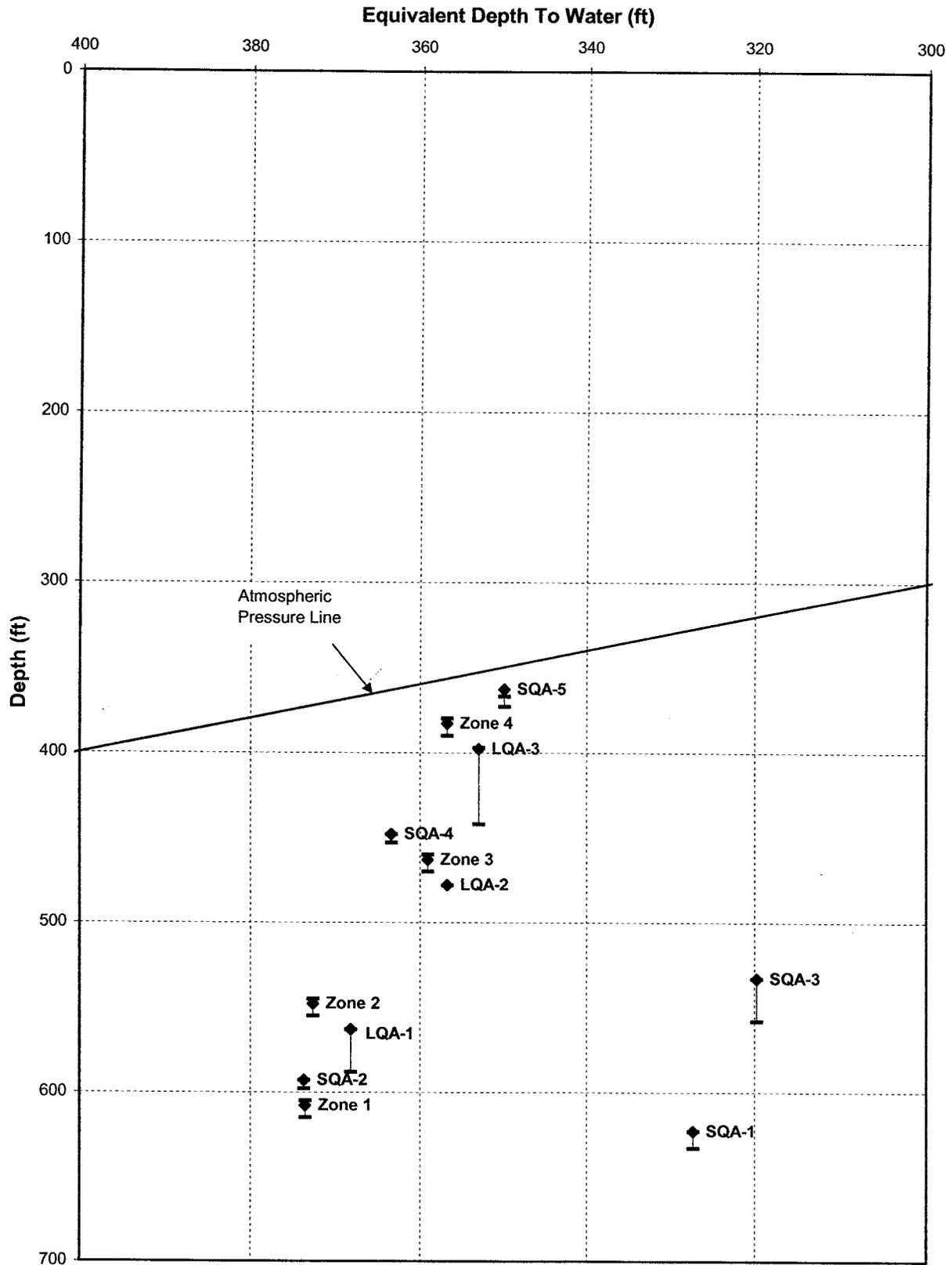
Summary Casing Log
WDC / CH2M Hill

Job No: WB824
Well: MW1-4



Piezometric Profile
Monitoring Well: MW1-4

Profile Date: 06/19/03
 Comments: All Zones



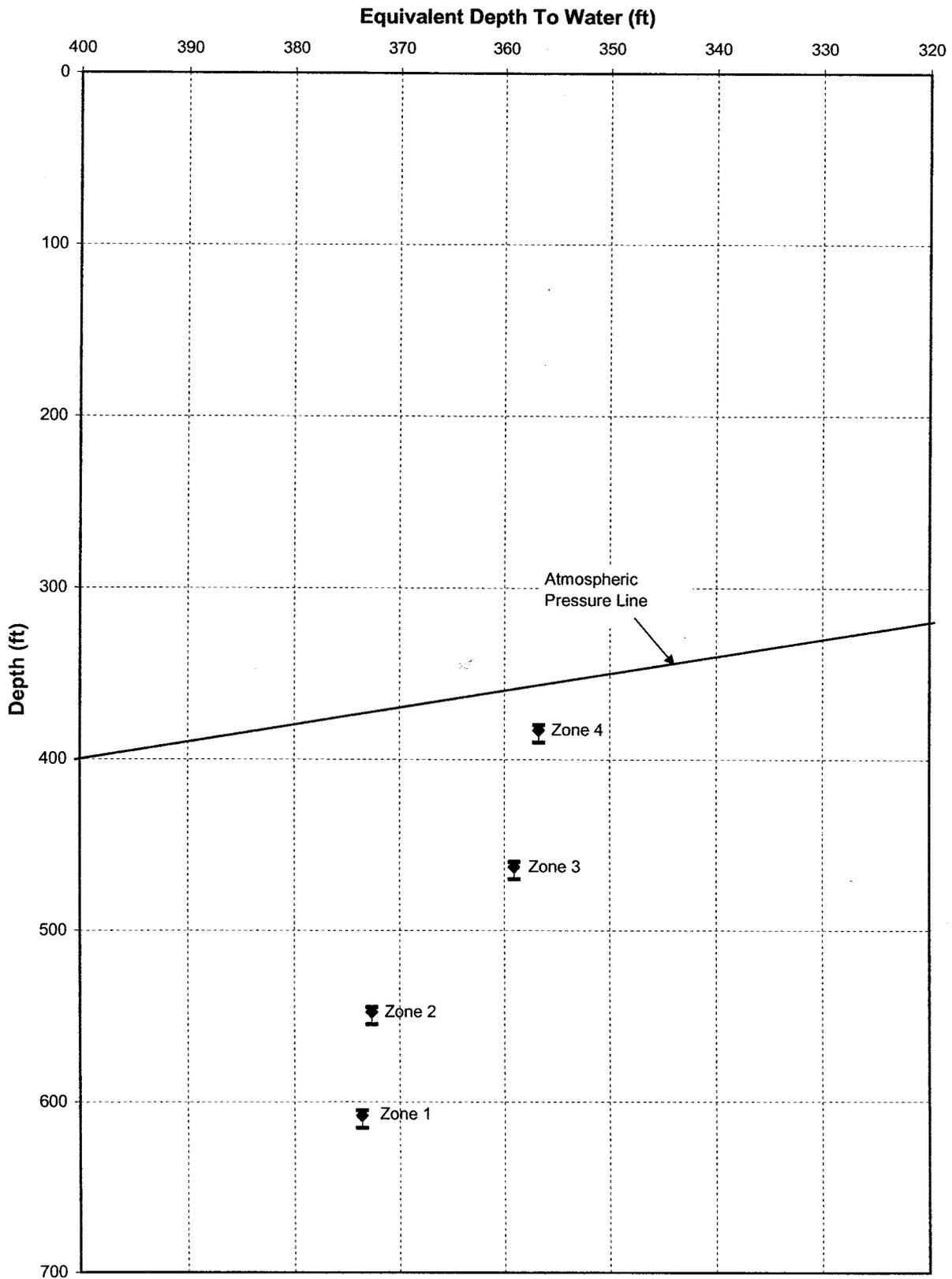
Client: WDC
 Site: Alhambra, CA
 Datum: Ground Surface

Figure 1

Plot By: _____ Date: _____
 Checked By: _____ Date: _____
 Westbay Project: WB824

Piezometric Profile Monitoring Well: MW1-4

Profile Data: 07/16/03
Comments: Screen Zones



Client: WDC
Site: Alhambra, CA
Datum: Ground Surface

Figure 2

Plot By: _____ Date: _____
Checked By: _____ Date: _____
WestBay Project : WB824



Westbay
Instruments Inc.

A Schlumberger Company

Piezometric Pressures/Levels Field Data and Calculation Sheet

Datum: GROUND SURFACE Probe Type: EMS Client: CH2MHILL Date: 07/16/03
 Elev. G.S.: _____ Serial No.: 1764 Job No.: W13824 Well No.: MW 1-4
 Height of MP above G.S.: _____ Probe Range: 0 to _____ Location: ALAMBRA ROAD
 Elev. top of MP Casing: _____ Weather: _____ MP Casing Type: MP 38
 Reference Elevation: _____ Atm. Pressure: _____ Operator: MAURA KENNEDY
 Ambient Reading (Patm) (Pressure, Temperature, time) Start: _____ Finish: _____

Port No.	Port Depth From Log ()	Port Depth From Cable ()	Port Elev. ()	Fluid Pressure Readings			Temp. ()	Time H:M:S	Pressure Head Outside Port () H = (P2-Patm)/w	Piez. Level Outside Port () Dz = Dp - H	Comments
				Inside Casing (P1)	Outside Casing (P2)	Inside Casing (P1)					
Z1	608			124.77	116.23	124.40			234.44	373.55	ZONE 1
SQA2	593			117.82	109.67	117.84			219.308	373.69	SQA-2
Z2	548			98.24	90.62	95.21			175.36	372.63	ZONE 2
SQA3	593			91.72	107.16	91.72			213.51	319.48	SQA-3
Z3	463			61.17	59.66	61.16			103.94	359.055	ZONE 3
SQA4	448			54.67	51.27	54.65			85.51	362.48	SQA-4
Z4	383			26.29	25.99	26.27			26.27	356.72	ZONE 4
SQA5	368			19.76	20.29	19.77			13.125	354.87	SQA-5

*NOTE: DATA TRANSCRIBED FROM CH2MHILL FIELD RECORDS.

MP Casing Log

Company: WDC / CH2M Hill
Well: MW1-4
Site: Alhambra
Project: WDC# CH222B

Job No: WB824
Author: GG

Well Information

Reference Datum:
Elevation of Datum: 0.00 ft.
MP Casing Top: 0.00 ft.
MP Casing Length: 632.16 ft.

Borehole Depth: 635.00 ft.
Borehole Inclination:
Borehole Diameter: 4.00 in.

Well Description:
MP38
Other References:

File Information

File Name: MP-2.WWD
Report Date: Wed Jul 16 12:44:42 2003

File Date: Jun 26 11:09:23 2003

Comments

Log Information

Borehole condition confirmed.
MP well design & preparation.
MP well design checked.
MP well and borehole approved to install.

(method) Video Date: —
By: GG Date: June 26/03
By: Mark Leonard Date: July 9/03
By: Client not available Date: —

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-4

corehole
TW = 358.85

Hydraulic Integrity Test

Scale
Feet

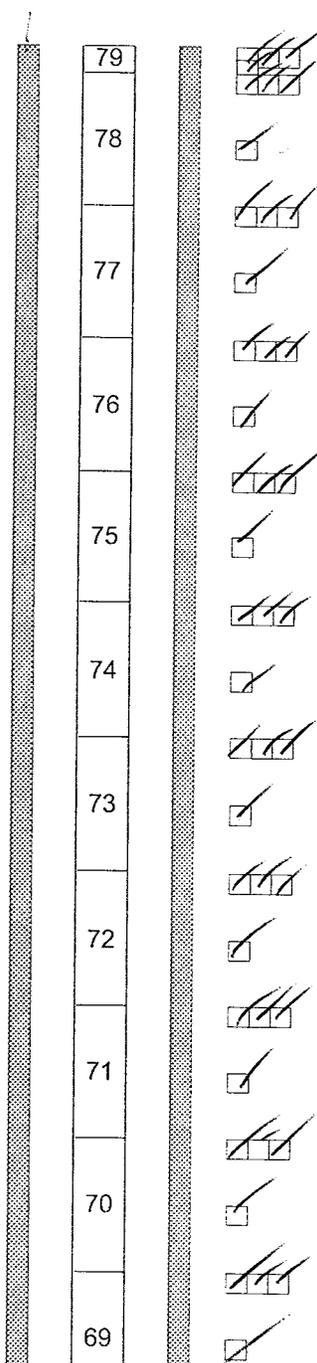
Well MP
Casing

QA Tested
OK

MP Casing
Description

Start at 9:55 am @ 393.70'
10:00 am @ 393.15'
10:15 am @ 392.48'
10:30 am @ 392.45'

0
10
20
30
40
50
60
70
80
90
100



0225F02 - MP38 Casing, PVC, 2 ft.
0225F10 - MP38 Casing, PVC, 10 ft.

Test O.K.
Mud Loss

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-4

Scale Feet	Well MP Casing	MP Casing	QA Tested OK	MP Casing Description
100			<input checked="" type="checkbox"/>	
110		68	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
120		67	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
130		66	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
140		65	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
150		64	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
160		63	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
170		62	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
180		61	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
190		60	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
200		59	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-4

Scale Feet	Well MP Casing	MP Casing	QA Tested OK	MP Casing Description
200			<input checked="" type="checkbox"/>	
210		58	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
220		57	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
230		56	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
240		55	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
250		54	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
260		53	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
270		52	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
280		51	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
290		50	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
300		49	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-4

Scale Feet	Well MP Casing	MP Casing	QA Tested OK	MP Casing Description
300			<input checked="" type="checkbox"/>	
310	48		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
320	47		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
330	46		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
340	45		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
350	44		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
360	43		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
370	42		<input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffened
	41		<input checked="" type="checkbox"/>	0205 - MP38 Measurement Port
			<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
380	40		<input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffened
	39		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
	38		<input checked="" type="checkbox"/>	0205 - MP38 Measurement Port
			<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
390	37		<input checked="" type="checkbox"/>	0224 - MP38 Pumping Port
			<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
400	36		<input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffened
			<input checked="" type="checkbox"/>	0205 - MP38 Measurement Port

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-4

Scale Feet	Well MP Casing	MP Casing	QA Tested OK	MP Casing Description
400		35	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
410		34	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
420		33	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
430		32	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
440		31	<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
450		30	<input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffened
		29	<input checked="" type="checkbox"/>	0205 - MP38 Measurement Port
		28	<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
460		27	<input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffened
		26	<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
470		25	<input checked="" type="checkbox"/>	0224 - MP38 Pumping Port
		24	<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
480		23	<input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffened
		22	<input checked="" type="checkbox"/>	0205 - MP38 Measurement Port
490			<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
500			<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-4

Scale Feet	Well MP Casing	MP Casing	QA Tested OK	Description
500	21		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
510	20		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
520	19		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
530	18		<input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffened
	17		<input checked="" type="checkbox"/>	0205 - MP38 Measurement Port
	16		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
540	15		<input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffened
	14		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
550	13		<input checked="" type="checkbox"/>	0224 - MP38 Pumping Port
	12		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
560	11		<input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffened
	10		<input checked="" type="checkbox"/>	0205 - MP38 Measurement Port
570	9		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
580	8		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
590	7		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
600			<input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffened
			<input checked="" type="checkbox"/>	0205 - MP38 Measurement Port
			<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.

Well Designer Report
WDC / CH2M Hill

Job No: WB824
Well: MW1-4

Joint Test Tool Pressure

Scale
Feet

Well MP
Casing

QA Tested
OK

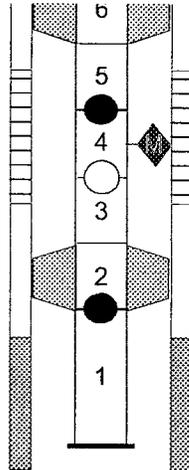
MP Casing
Description

200 ps: -TFW1085

Start 10:45 am
End 9:10 pm

600

2:03 pm



13226

150 psi
140

0239F05 - MP38 Packer, Stiffened

June 17/03

0225F05 - MP38 Casing, PVC, 5 ft.

610

141901

0205 - MP38 Measurement Port

Start 7:50

0225F05 - MP38 Casing, PVC, 5 ft.

End 9:30

5207

0224 - MP38 Pumping Port

June 18/03

0225F05 - MP38 Casing, PVC, 5 ft.

620

1:30 pm

13227

155 psi

0239F05 - MP38 Packer, Stiffened

1405

145

0205 - MP38 Measurement Port

1389

0225F10 - MP38 Casing, PVC, 10 ft.

630

0223 - MP38 End Cap

640

650

660

670

680

690

700

Client not available to sign off well design.



Westbay
Instruments Inc.

A Schlumberger Company

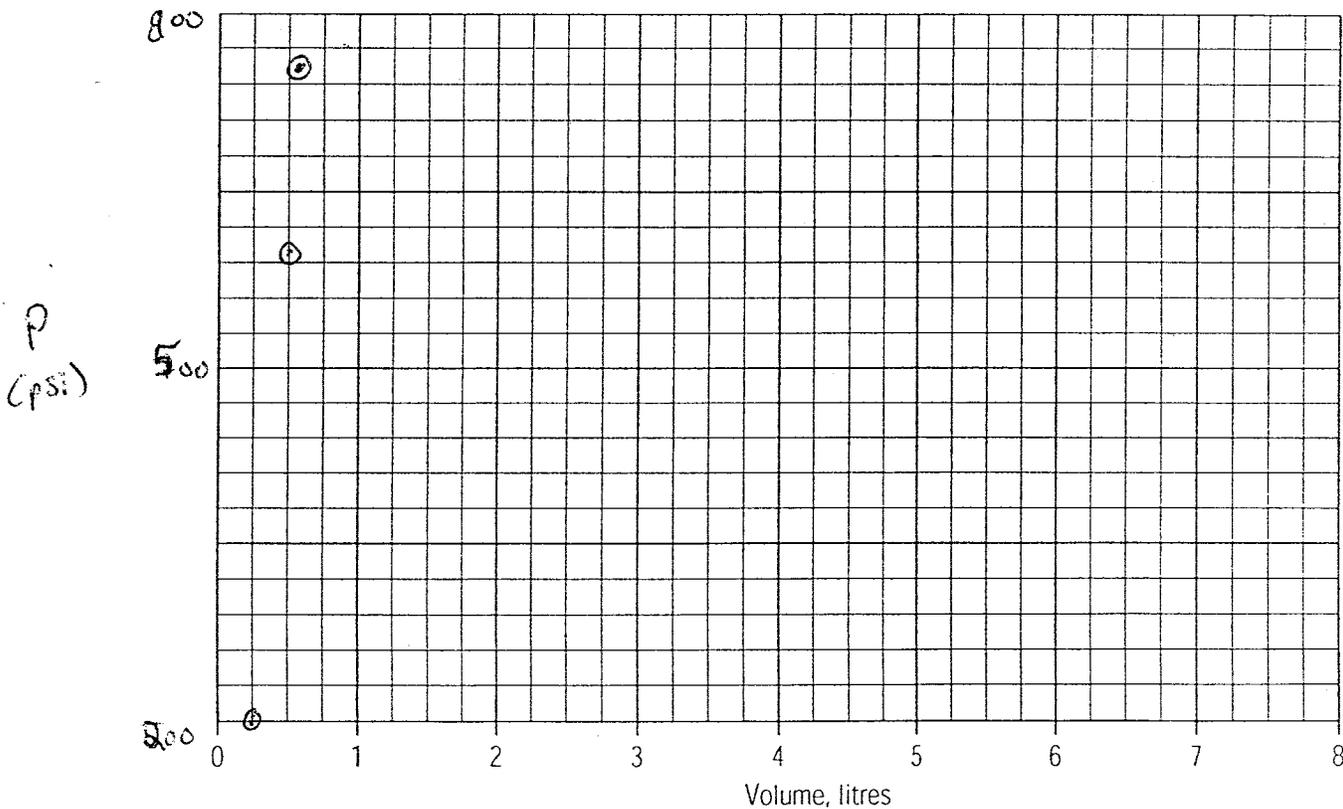
Sheet 1 of 14

MP Packer Inflation Record

Project: WDC/CH2M Hill Project No.: WB 824 Well No.: MW1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 18/03
 Packer No.: BWT Serial No.: N/A Depth (ft/m): ≈ 630 Inflation Tool No.: TIW1085
 Packer Valve Pressure, P_V: N/A psi Final Line Pressure, P_L: 750 psi Tool Pressure, P_T: 525 psi
 Borehole Water Level: 360 (ft/m) = 155 psi (P_w) Calculated Packer Element Pressure, P_E = P_L + P_w - P_V - P_T = N/A psi

Volume, litres	<u>.25</u>	<u>.50</u>	<u>.75</u>	<u>1.65</u>	<u>1.50</u>						
Pressure, psi	<u>200</u>	<u>500</u>	<u>Ø</u>	<u>750</u>	<u>0</u>						
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Blank wall Test



Westbay
Instruments Inc.

A Schlumberger Company

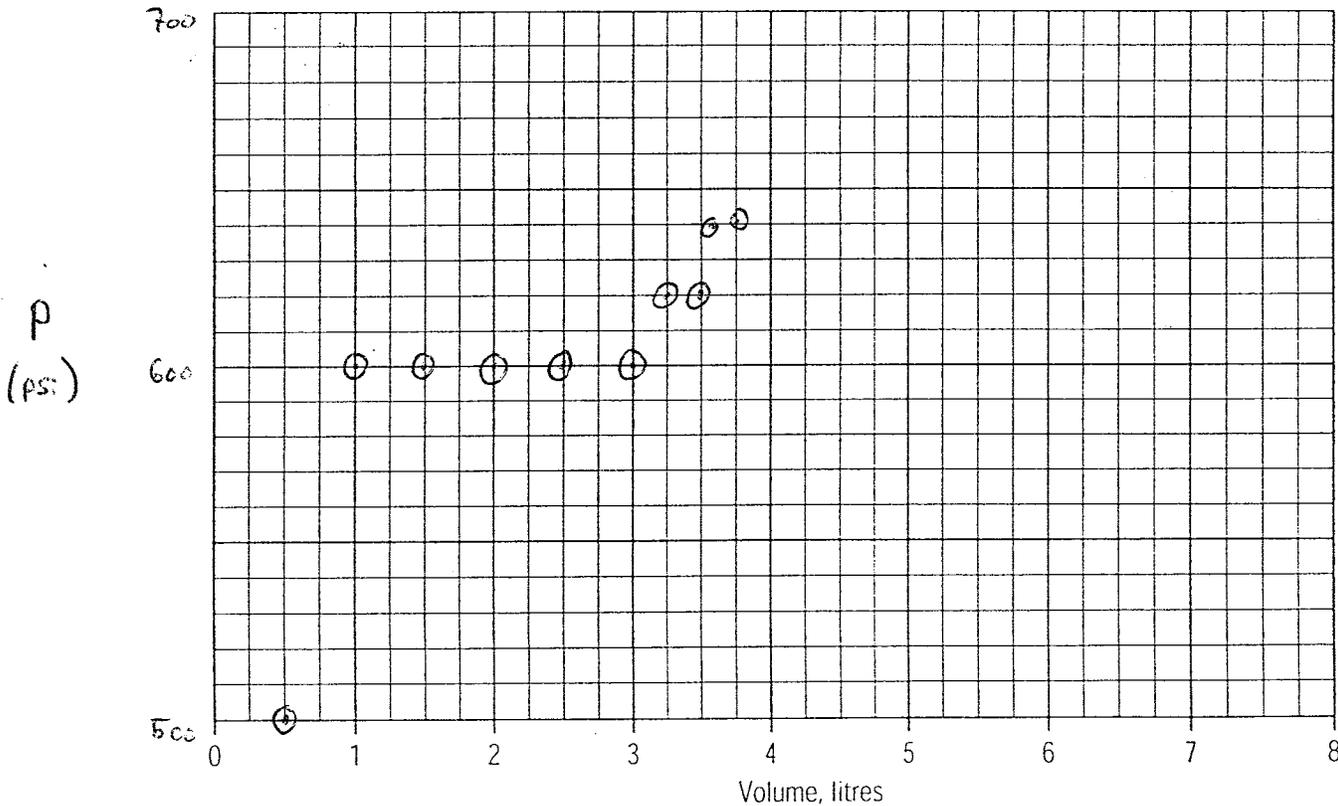
Sheet 2 of 14

MP Packer Inflation Record

Project: WDC / CH2M Hill Project No.: WB824 Well No.: MW1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 18 / 03
 Packer No.: 1, comp 2 Serial No.: 13227 Depth (ft) (m): 623 Inflation Tool No.: TIW1085
 Packer Valve Pressure, P_V : 145 psi Final Line Pressure, P_L : 660 psi Tool Pressure, P_T : 525 psi
 Borehole Water Level: 360 (ft) (m) = 155 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 145 psi

Volume, litres	0	0.5	1.0	1.5	2.0	2.5	3.0	3.25	3.5	3.6	3.75
Pressure, psi	0	500	600	600	600	600	600	620	620	640	640
Volume, litres	3.85	4.0	4.25	3.95							
Pressure, psi	640	650	660	6							

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer #1



Westbay
Instruments Inc.

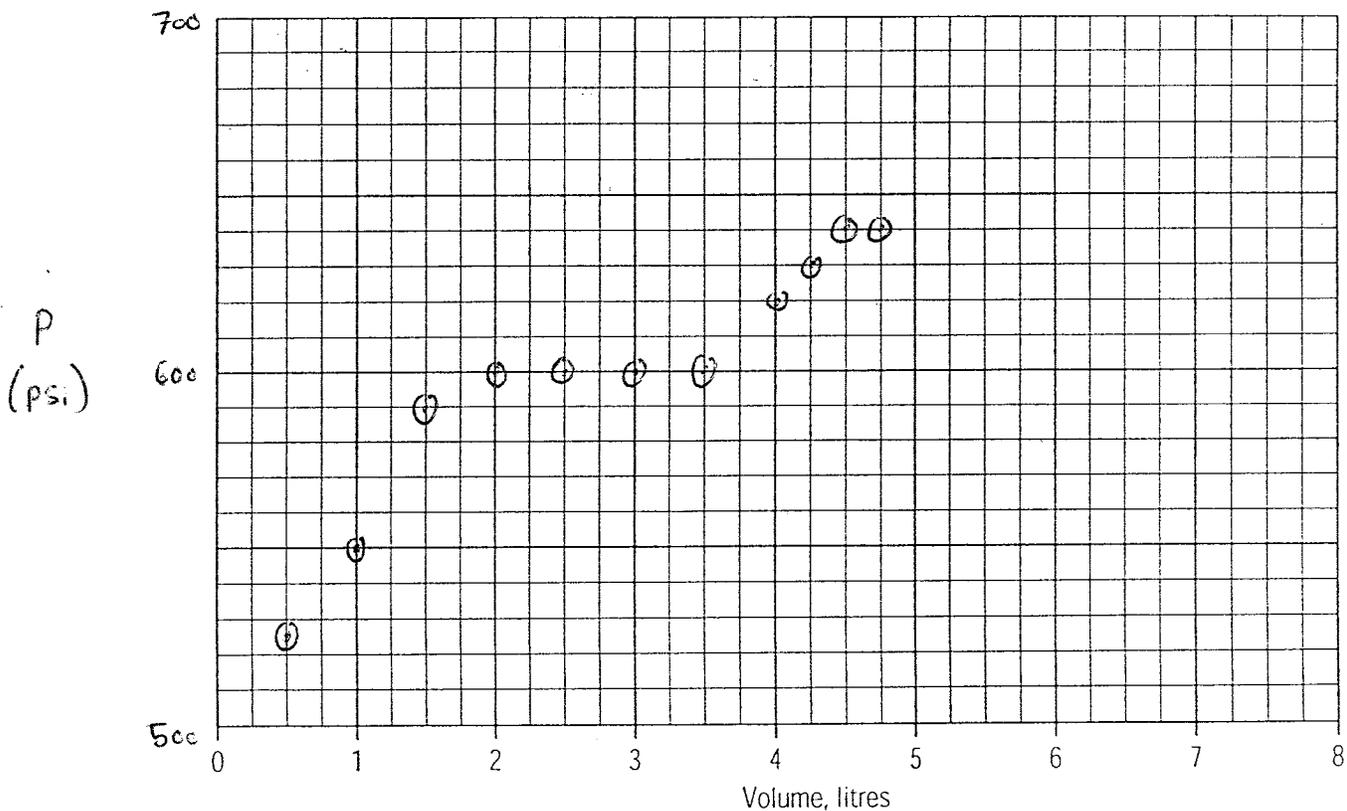
A Schlumberger Company

MP Packer Inflation Record

Project: WDC / CH2M Hill Project No.: WB824 Well No.: MW1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 18, 2003
 Packer No.: 2, Comp 6 Serial No.: 13226 Depth (ft) (m): 608 Inflation Tool No.: T1W1085
 Packer Valve Pressure, P_V : 140 psi Final Line Pressure, P_L : 640 psi Tool Pressure, P_T : 525 psi
 Borehole Water Level: 360 (ft) (m) = 155 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 130 psi

Volume, litres	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.25	4.5	4.75
Pressure, psi	525	550	590	600	600	600	600	620	630	640	640
Volume, litres	4.45										
Pressure, psi	0										

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer #2



Westbay
Instruments Inc.

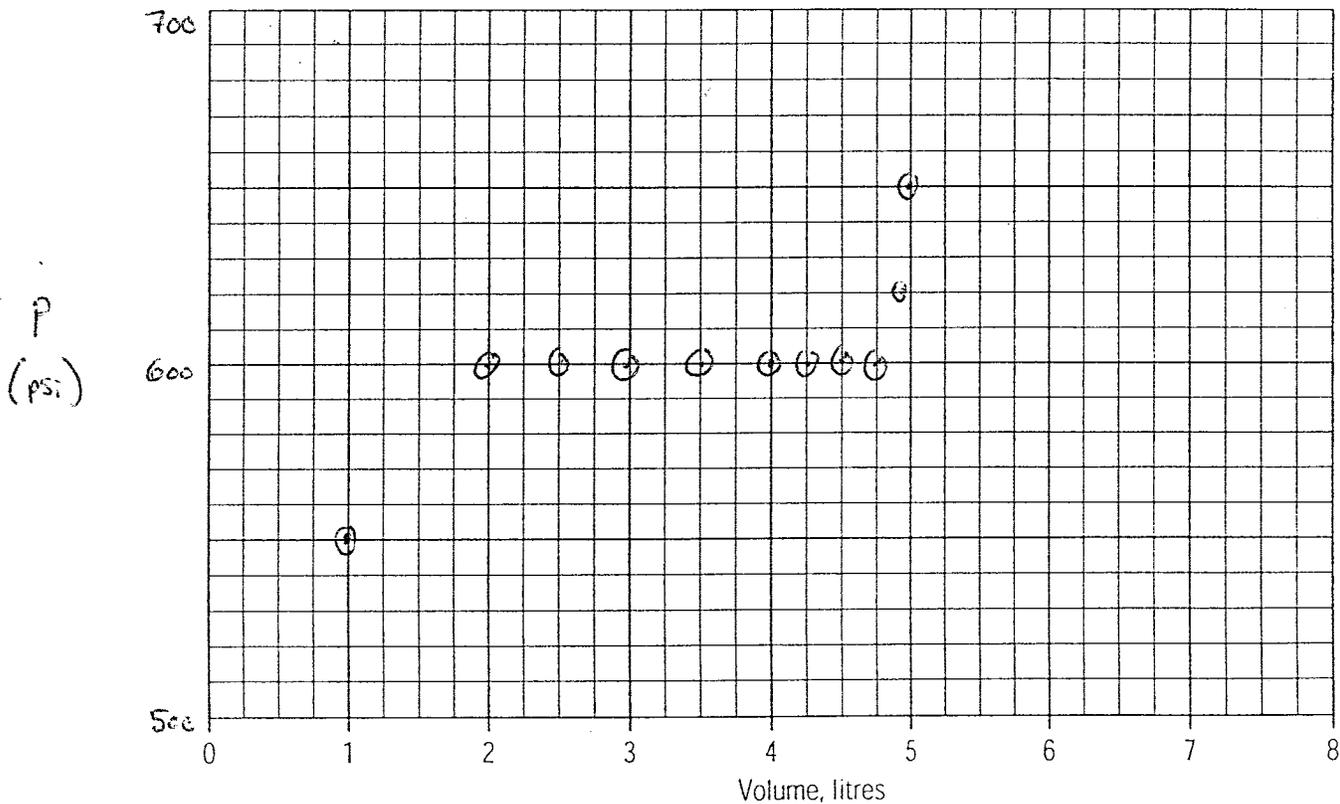
A Schlumberger Company

MP Packer Inflation Record

Project: WDC / CH2M Hill Project No.: WB824 Well No.: MW 1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 18/03
 Packer No.: 3, comp @ Serial No.: 13225 Depth (ft/m): 593 Inflation Tool No.: TIW1085
 Packer Valve Pressure, P_v: 130 psi Final Line Pressure, P_L: 650 psi Tool Pressure, P_T: 525 psi
 Borehole Water Level: 360 (ft/m) = 155 psi (P_w) Calculated Packer Element Pressure, P_E = P_L + P_w - P_v - P_T = 150 psi

Volume, litres	1.0	2.0	2.5	3.0	3.5	4.0	4.25	4.5	4.75	4.85 ^{4.90}	5.0
Pressure, psi	550	600	600	600	600	600	600	600	600	620	650
Volume, litres	4.75										
Pressure, psi	0										

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer # 3



Westbay
Instruments Inc.

A Schlumberger Company

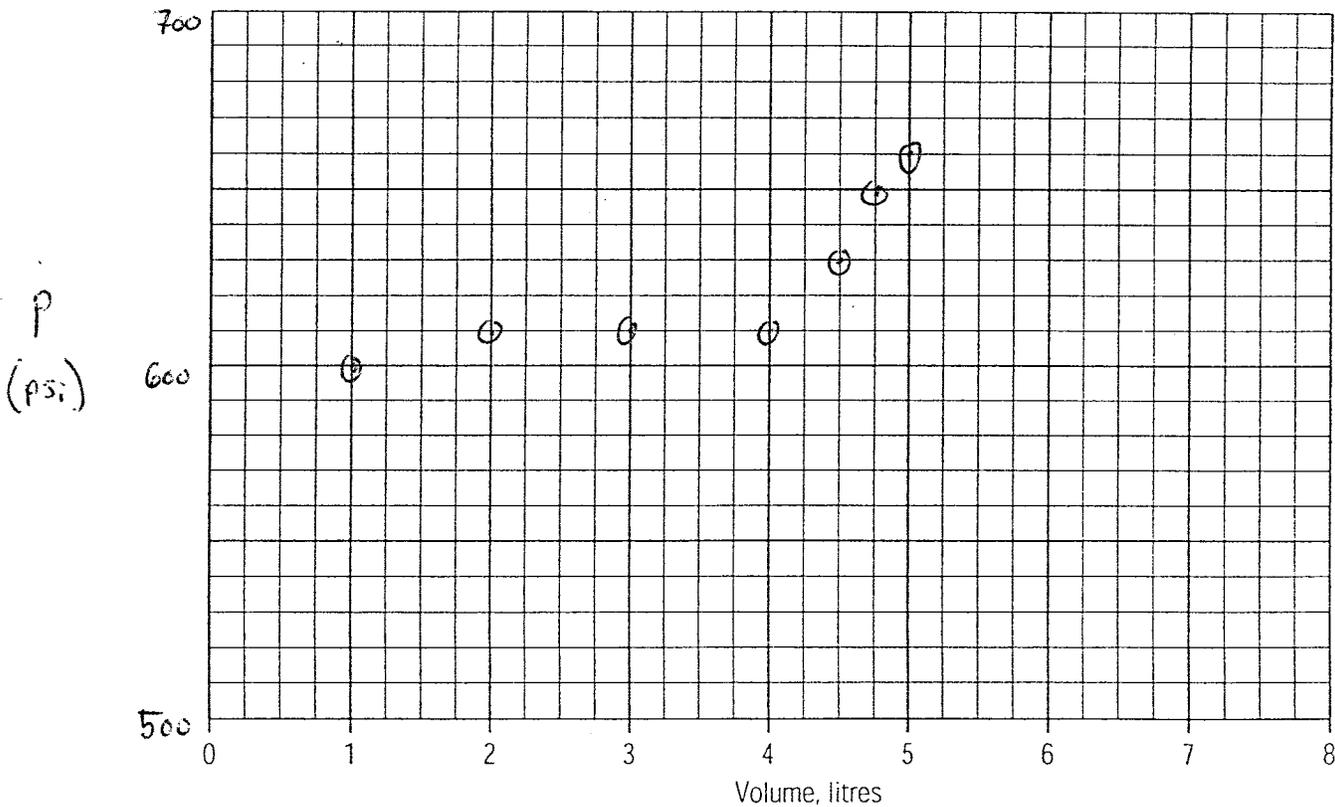
Sheet 5 of 14

MP Packer Inflation Record

Project: WDC / CH2M Hill Project No.: WB824 Well No.: MW1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 18/03
 Packer No.: 4 comp 12 Serial No.: 13232 Depth (ft) (m): 563 Inflation Tool No.: TRW1085
 Packer Valve Pressure, P_V : 135 psi Final Line Pressure, P_L : 660 psi Tool Pressure, P_T : 525 psi
 Borehole Water Level: 360 (ft) (m) = 155 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 155 psi

Volume, litres	1.0	2.0	3.0	4.0	4.5	4.75	5.0	4.55			
Pressure, psi	600	610	610	610	630	650	660	0			
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer # 4



Westbay
Instruments Inc.

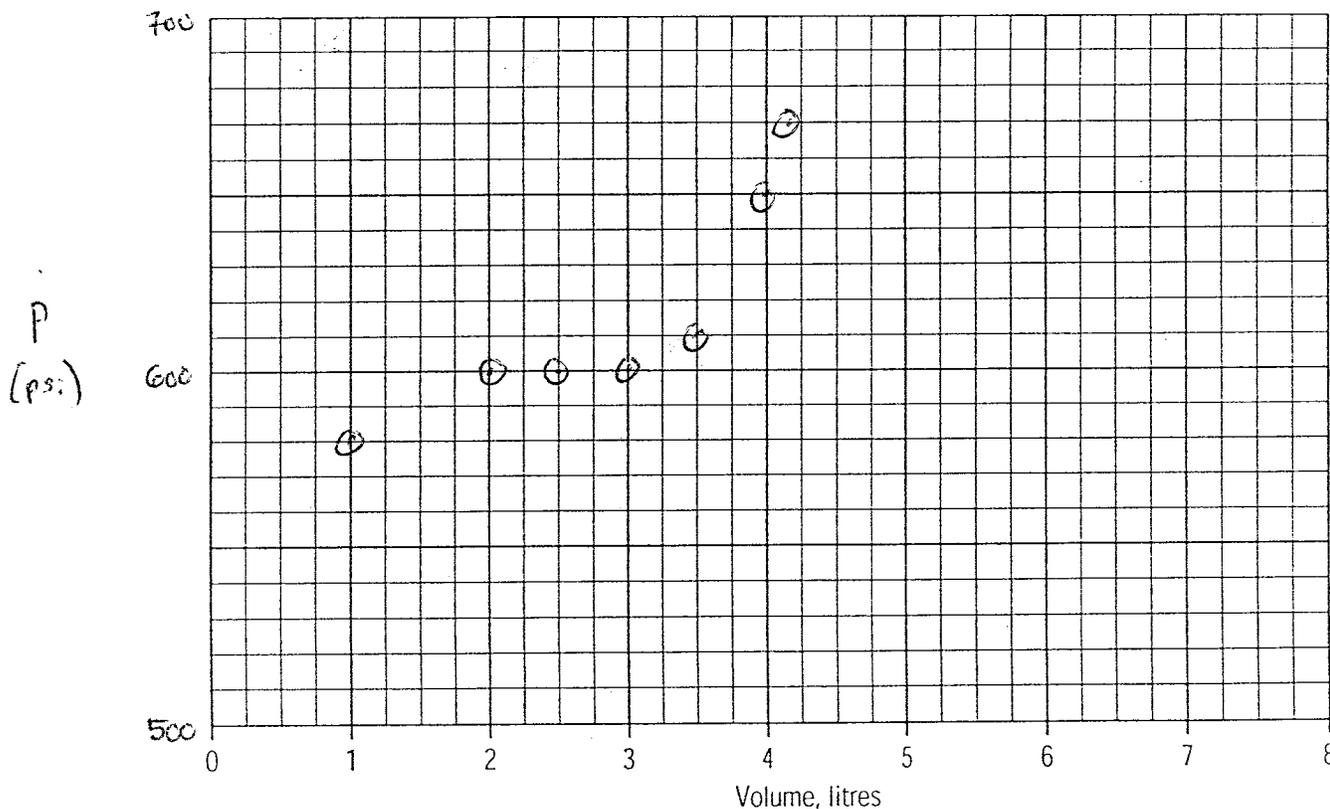
A Schlumberger Company

MP Packer Inflation Record

Project: WDC/CH2M Hill Project No.: WB824 Well No.: MW1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 19/03
 Packer No.: S Comp 16 Serial No.: 13229 Depth (ft) m): 548 543 Inflation Tool No.: TIW1085
 Packer Valve Pressure, P_V : 135 psi Final Line Pressure, P_L : 670 psi Tool Pressure, P_T : 525 psi
 Borehole Water Level: 360 (ft) m) = 155 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 165 psi

Volume, litres	1.0	2.0	2.5	3.0	3.5	4.0	4.2	3.85			
Pressure, psi	580	600	600	600	610	650	670	⊕			
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer #5



Westbay
Instruments Inc.

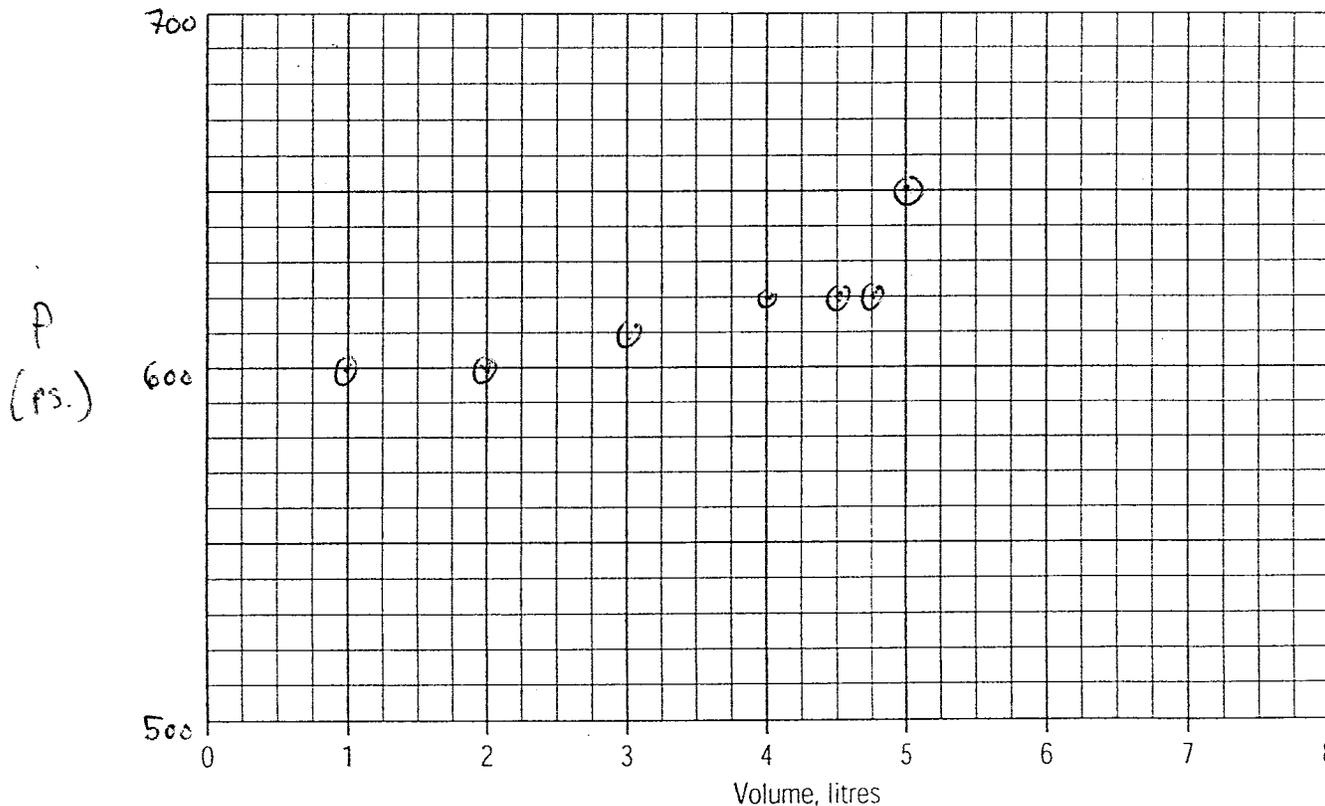
A Schlumberger Company

MP Packer Inflation Record

Project: WDC / CH2M Hill Project No.: WB824 Well No.: MW1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 18/03
 Packer No.: 6, Comp 18 Serial No.: 13228 Depth (ft/m): 533 Inflation Tool No.: TIW1085
 Packer Valve Pressure, P_V : 140 psi Final Line Pressure, P_L : 650 psi Tool Pressure, P_T : 525 psi
 Borehole Water Level: 360 (ft/m) = 155 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 140 psi

Volume, litres	1.0	2.0	3.0	4.0	4.5	4.75	5.0	4.6			
Pressure, psi	600	600	610	620	620	620	650	650			
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer #6



Westbay
Instruments Inc.

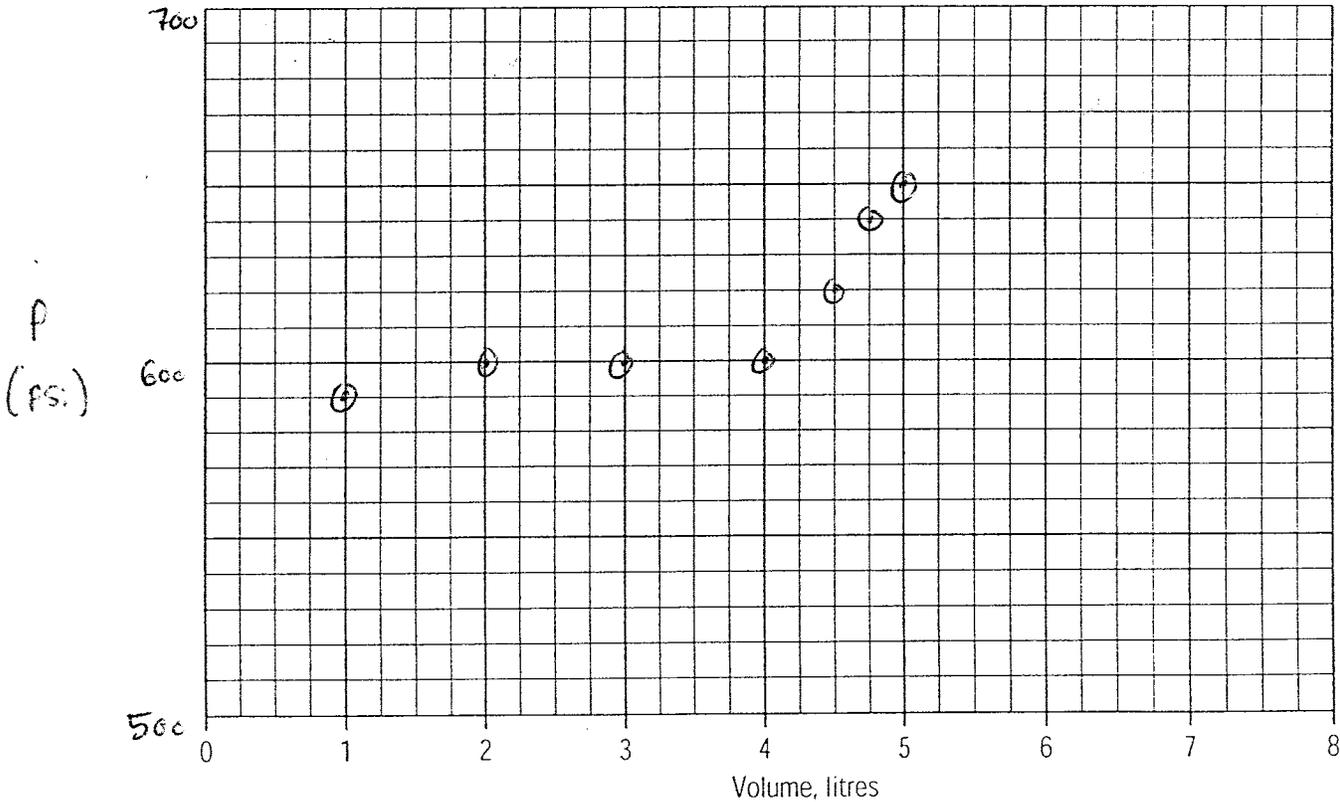
A Schlumberger Company

MP Packer Inflation Record

Project: WDC / CH2M Hill Project No.: WB824 Well No.: MW1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 18/03
 Packer No.: F, comp 24 Serial No.: 13230 Depth (ft) m): 478 Inflation Tool No.: T1W1085
 Packer Valve Pressure, P_v: 140 psi Final Line Pressure, P_L: 650 psi Tool Pressure, P_T: 525 psi
 Borehole Water Level: 360 (ft) m) = 155 psi (P_w) Calculated Packer Element Pressure, P_E = P_L + P_w - P_v - P_T = 190 psi

Volume, litres	1.0	2.0	3.0	4.0	4.5	4.75	5.0	4.55		
Pressure, psi	590	600	600	600	620	640	650	Ø		
Volume, litres										
Pressure, psi										

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer # 7



Westbay
Instruments Inc.

A Schlumberger Company

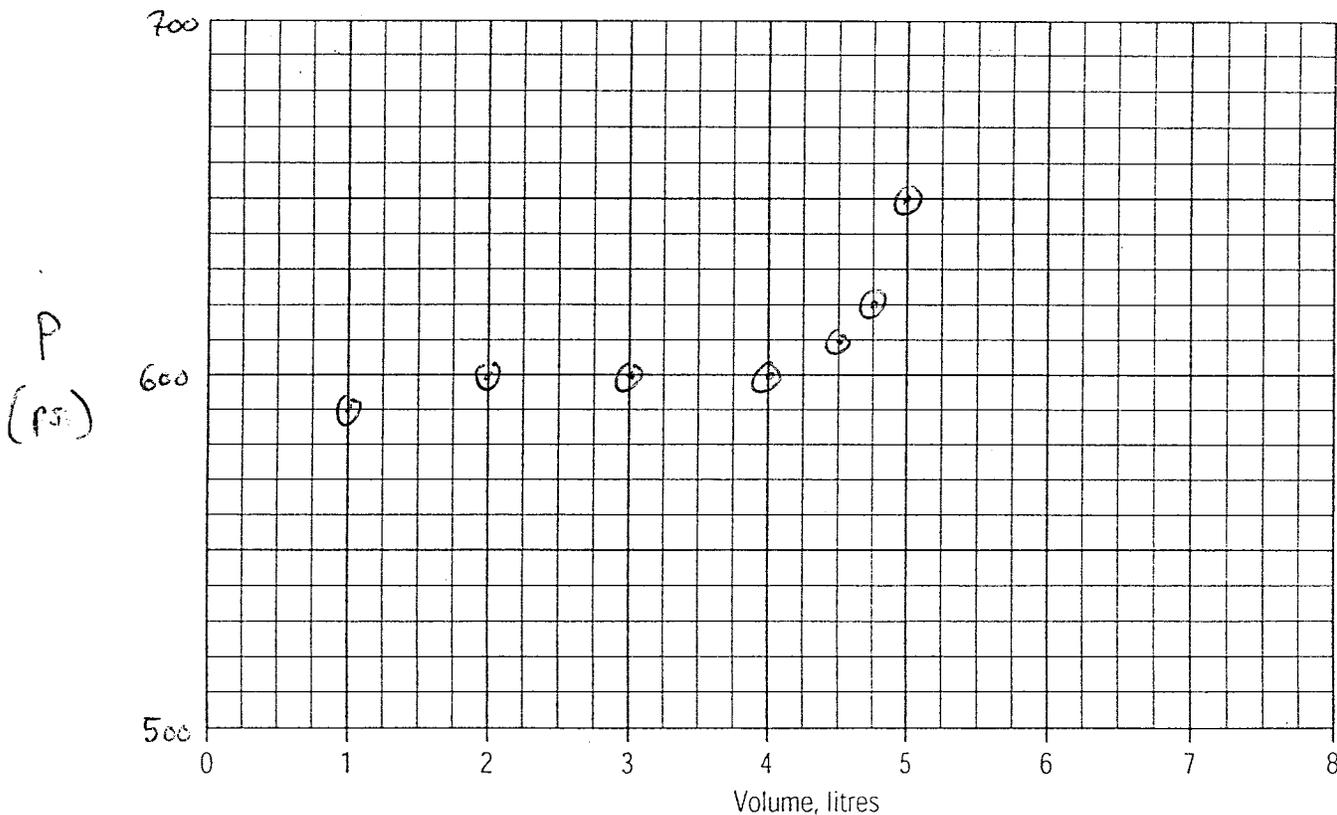
Sheet 9 of 14

MP Packer Inflation Record

Project: WDC / CH2M Hill Project No.: WB824 Well No.: MW1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 18/03
 Packer No.: 8, Comp 28 Serial No.: 13231 Depth (ft/m): 463 Inflation Tool No.: TIW1085
 Packer Valve Pressure, P_v : 130 psi Final Line Pressure, P_L : 650 psi Tool Pressure, P_T : 525 psi
 Borehole Water Level: 360 (ft/m) = 155 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 150 psi

Volume, litres	1.0	2.0	3.0	4.0	4.5	4.75	5.0	4.6		
Pressure, psi	590	600	600	600	610	620	650	650		
Volume, litres										
Pressure, psi										

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer # 8

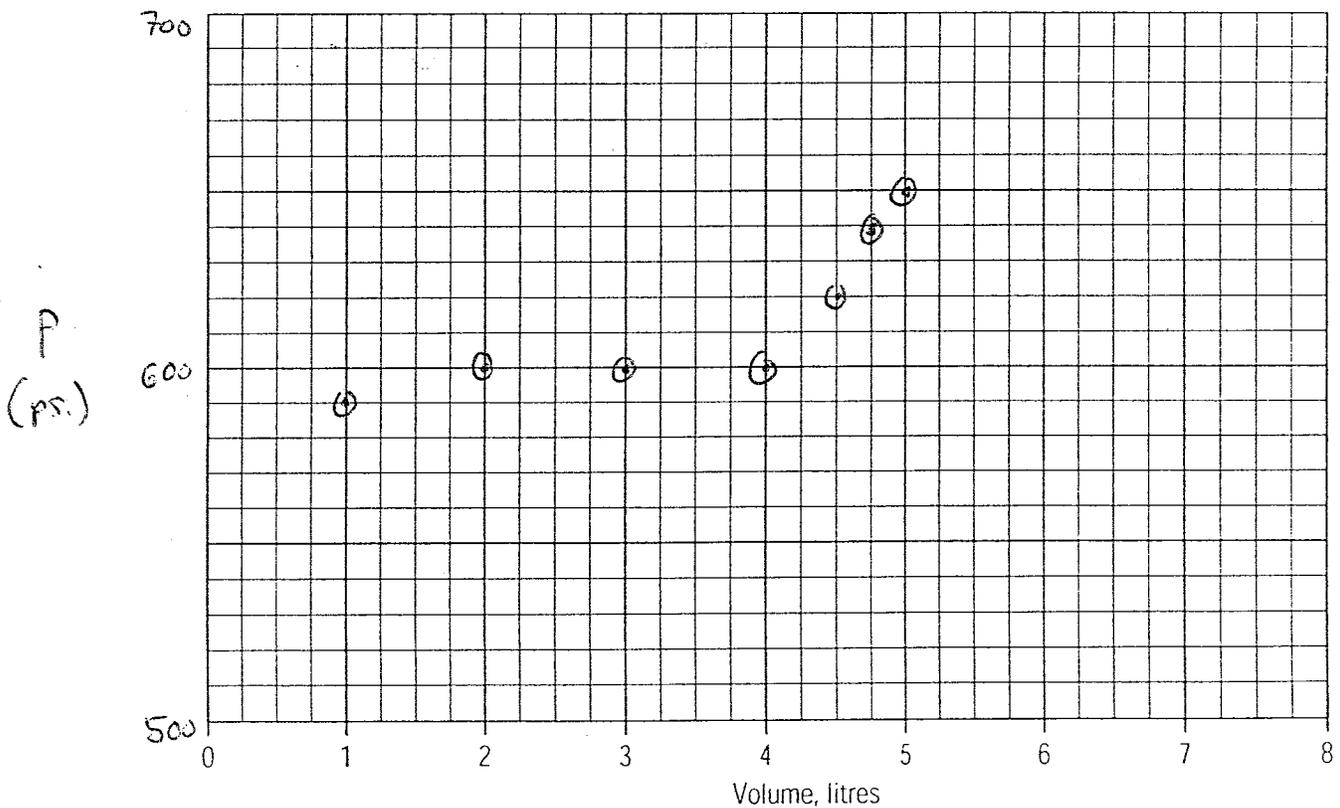


MP Packer Inflation Record

Project: WDC/CH2M Hill Project No.: W8824 Well No.: MMI-4
 Location: Alhambra Road Completed by: ML Date Inflated: Jan 18/03
 Packer No.: 9, comp 30 Serial No.: 13235 Depth (ft/m): 448 Inflation Tool No.: TIW1085
 Packer Valve Pressure, P_V : 135 psi Final Line Pressure, P_L : 650 psi Tool Pressure, P_T : 525 psi
 Borehole Water Level: 360 (ft/m) = 155 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 145 psi

Volume, litres	1.0	2.0	3.0	4.0	4.5	4.75	5.0	4.6			
Pressure, psi	590	600	600	600	620	640	650	Ø			
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer # 9



Westbay
Instruments Inc.

A Schlumberger Company

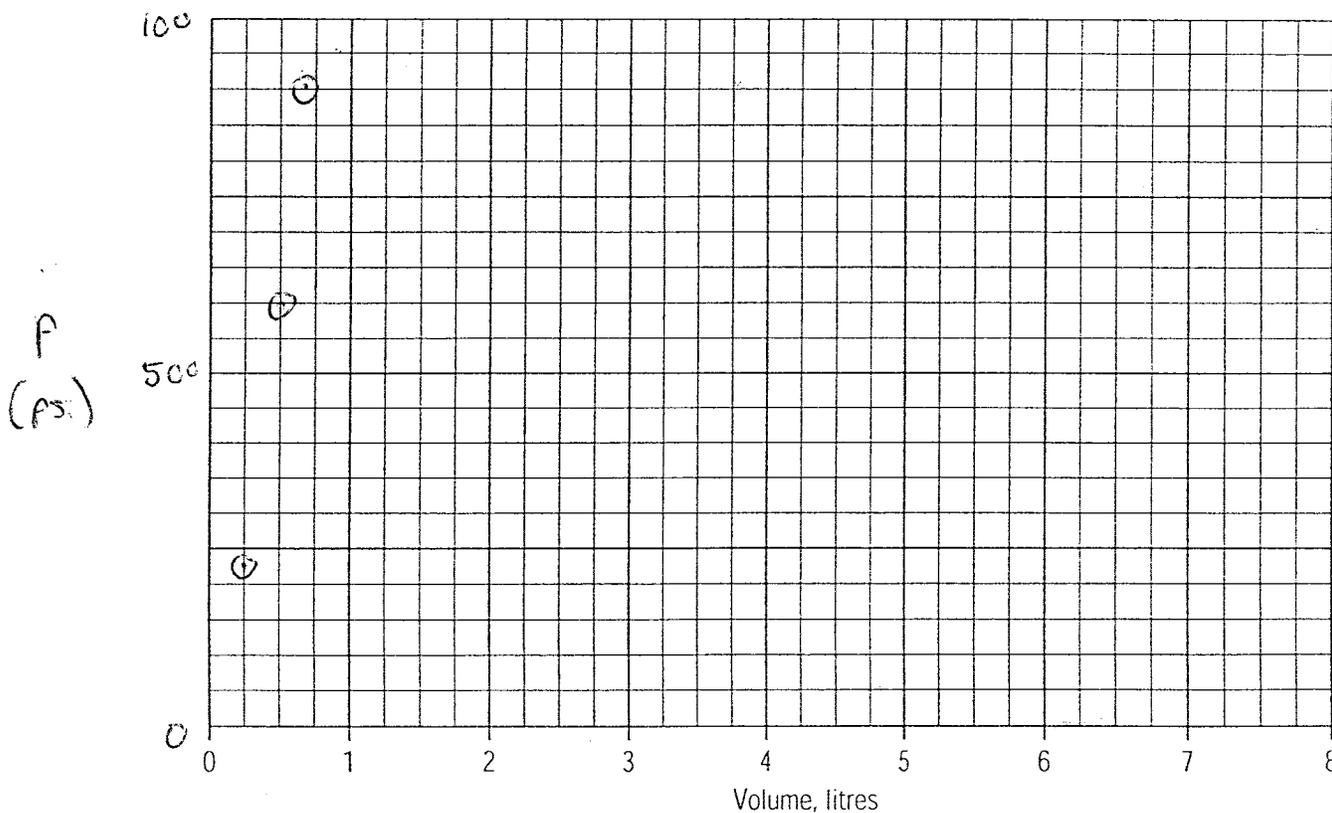
Sheet 11 of 14

MP Packer Inflation Record

Project: WDC/CH2m Hill Project No.: WB 824 Well No.: mw 1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 19/03
 Packer No.: BVT Serial No.: N/A Depth (ft/m): 586 Inflation Tool No.: TEW 1085
 Packer Valve Pressure, P_V : nil psi Final Line Pressure, P_L : 900 psi Tool Pressure, P_T : 525 psi
 Borehole Water Level: 300 (ft/m) = 155 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ nil psi

Volume, litres	0.25	0.5	0.7	0.75							
Pressure, psi	225	600	900	Ø							
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Blank wall Test



Westbay
Instruments Inc.

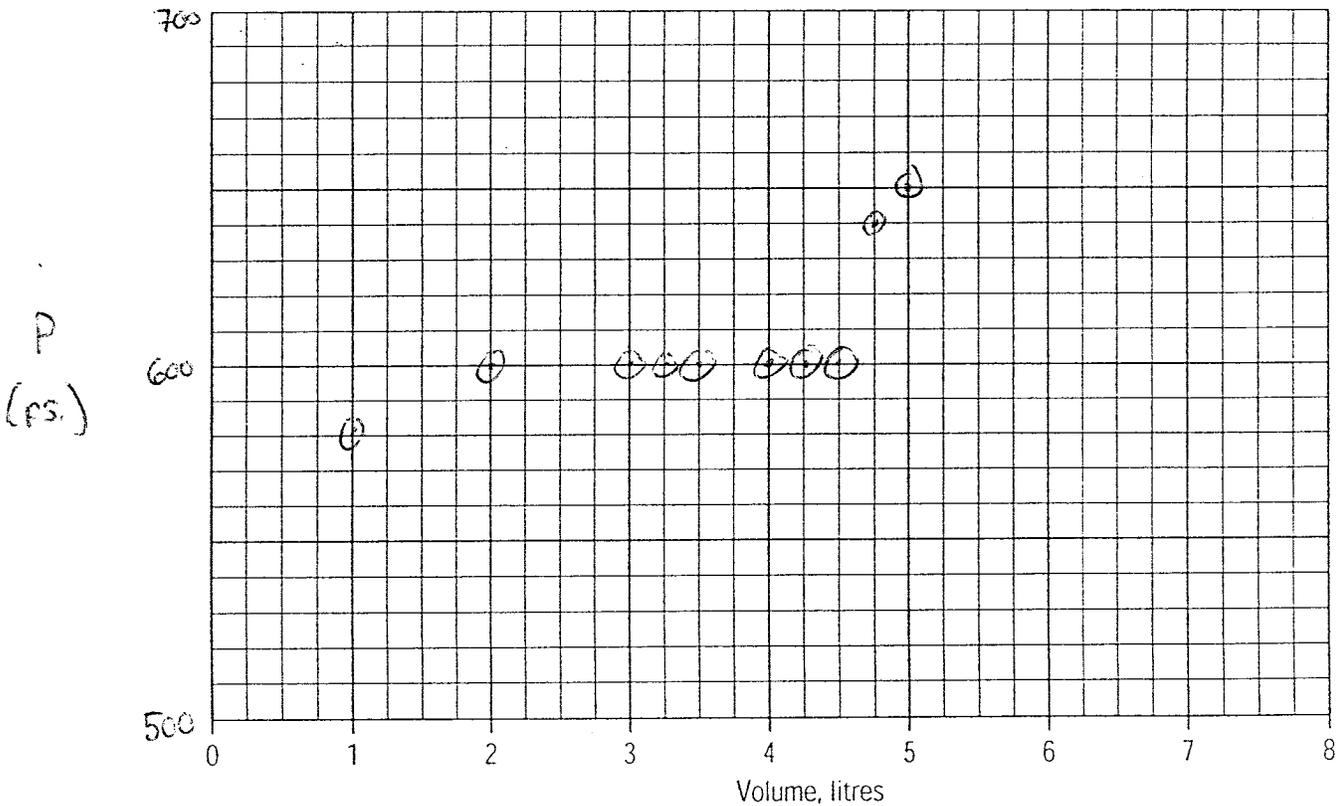
A Schlumberger Company

MP Packer Inflation Record

Project: WDC / CH2M Hill Project No.: WBS24 Well No.: MW1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 19/03
 Packer No.: 10, comp 36 Serial No.: 13233 Depth (ft/m): 398 Inflation Tool No.: TIW1085
 Packer Valve Pressure, P_v : 130 psi Final Line Pressure, P_L : 650 psi Tool Pressure, P_T : 525 psi
 Borehole Water Level: 360 (ft/m) = 155 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 150 psi

Volume, litres	1.0	2.0	3.0	3.25	3.5	4.0	4.25	4.5	4.75	5.0	4.6
Pressure, psi	580	600	600	600	600	600	600	600	640	650	⊕
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer #10



Westbay
Instruments Inc.

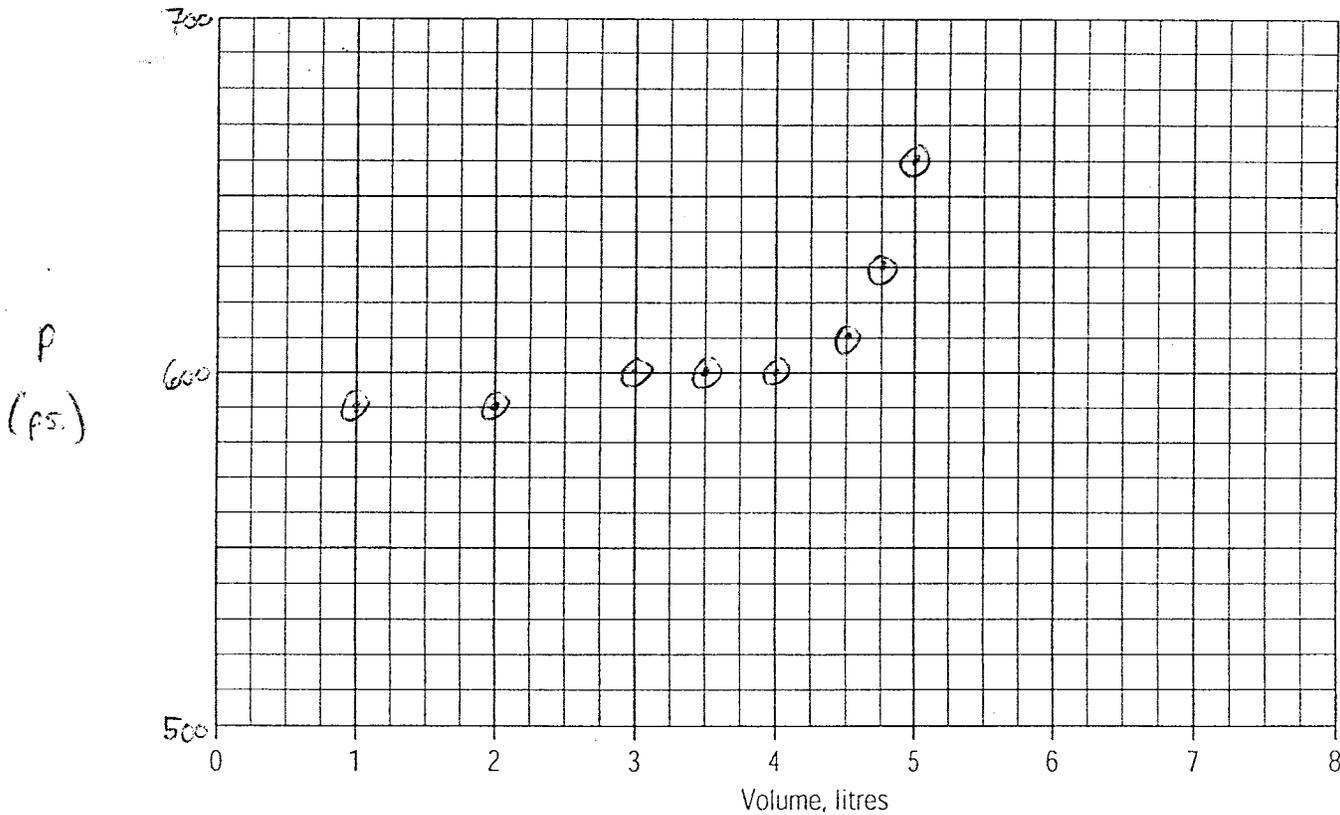
A Schlumberger Company

MP Packer Inflation Record

Project: WDC/CH2M Hill Project No.: WB824 Well No.: MW1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 19/03
 Packer No.: 11, Comp 40 Serial No.: 13234 Depth (ft/m): 383 Inflation Tool No.: 71W1085
 Packer Valve Pressure, P_V : 140 psi Final Line Pressure, P_L : 660 psi Tool Pressure, P_T : 525 psi
 Borehole Water Level: 360 (ft/m) = 155 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 150 psi

Volume, litres	1.0	2.0	3.0	3.5	4.0	4.5	4.75	5.0	4.65		
Pressure, psi	590	590	600	600	600	610	630	660	⊕		
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer # 11



Westbay
Instruments Inc.

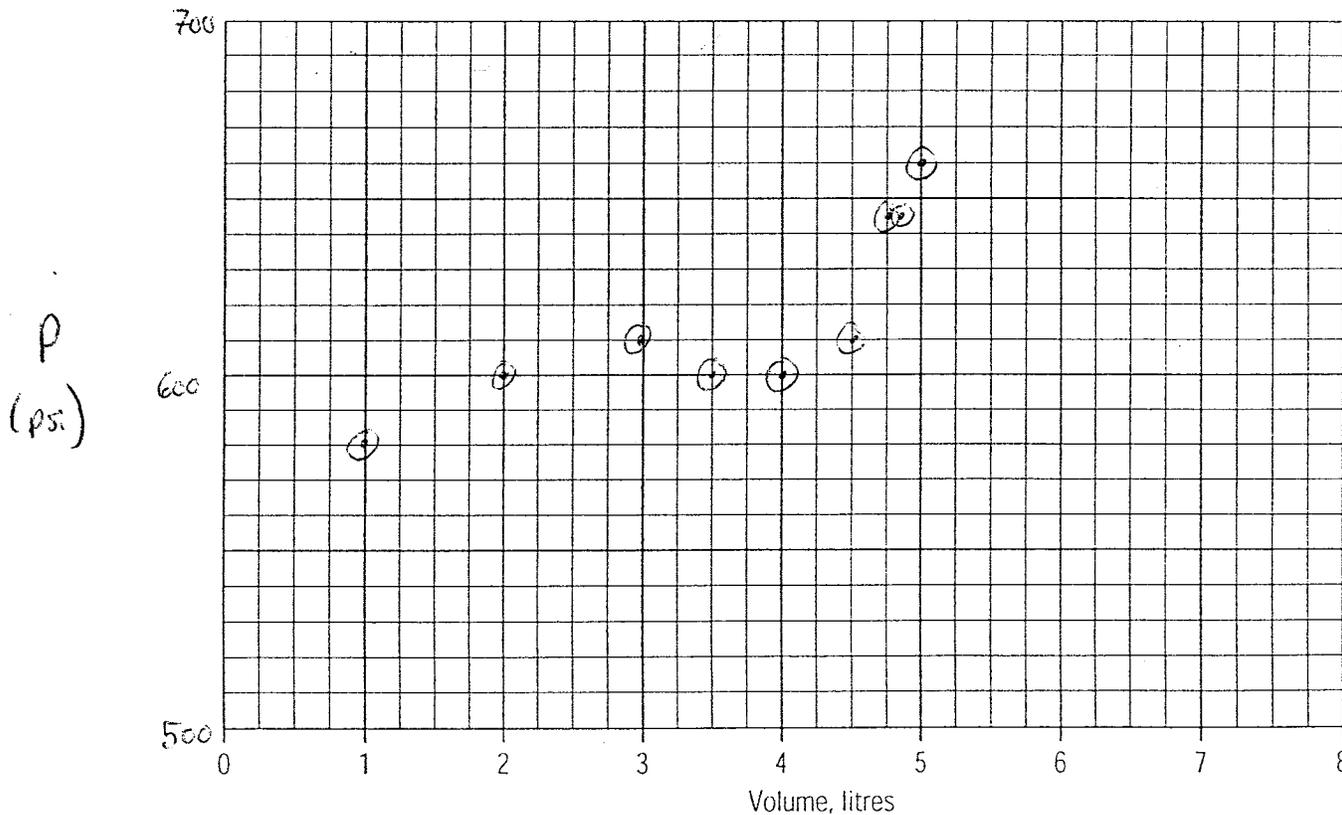
A Schlumberger Company

MP Packer Inflation Record

Project: WDC/CH2M Hill Project No.: WBB24 Well No.: MW1-4
 Location: Alhambra Road Completed by: ML Date Inflated: June 19/03
 Packer No.: 12, comp 42 Serial No.: 13236 Depth (ft/m): 368 Inflation Tool No.: T1W1085
 Packer Valve Pressure, P_v : 135 psi Final Line Pressure, P_L : 660 psi Tool Pressure, P_T : 525 psi
 Borehole Water Level: 360 (ft/m) = 155 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 155 psi

Volume, litres	1.0	2.0	3.0	3.5	4.0	4.5	4.75	4.8	5.0	4.65	
Pressure, psi	580	600	610	600	600	610	645	645	660	⊕	
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer # 12

APPENDIX 3

Monitoring Well MW1-5

Summary Casing Log	- 5 pages
Figure 1, Piezometric Pressure Profile, All Zones	- 1 page
Figure 2, Piezometric Pressure Profile, Screened Zones	- 1 page
Piezometric Pressure/Levels	
Field Data and Calculation Sheets	- 1 page
MP Casing Log (field copies)	- 9 pages
MP Packer Inflation Records	- 20 pages

Summary Casing Log

Company: WDC / CH2M Hill
Well: MW1-5
Site: Alhambra
Project: WDC# CH222B

Job No: WB824
Author: GG

Well Information

Reference Datum:
Elevation of Datum: 0.00 ft.
MP Casing Top: 0.00 ft.
MP Casing Length: 798.16 ft.

Borehole Depth: 800.00 ft.
Borehole Inclination:
Borehole Diameter: 4.00 in.

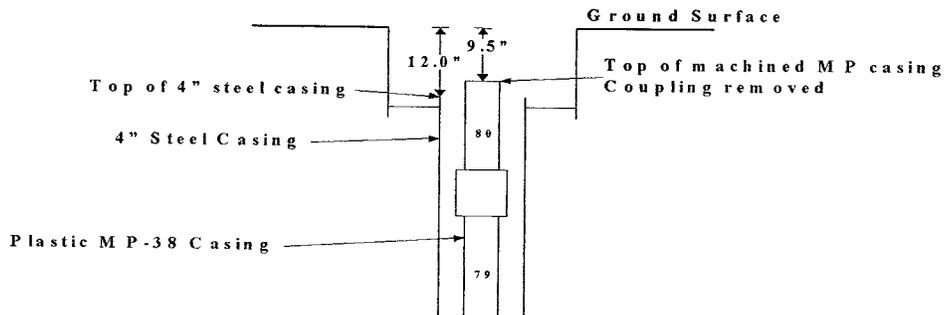
Well Description:
MP38
Other References:

File Information

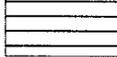
File Name: 824MP-3.WWD
Report Date: Fri Jul 18 14:38:51 2003

File Date: Jul 15 10:40:22 2003

Sketch of Wellhead Completion

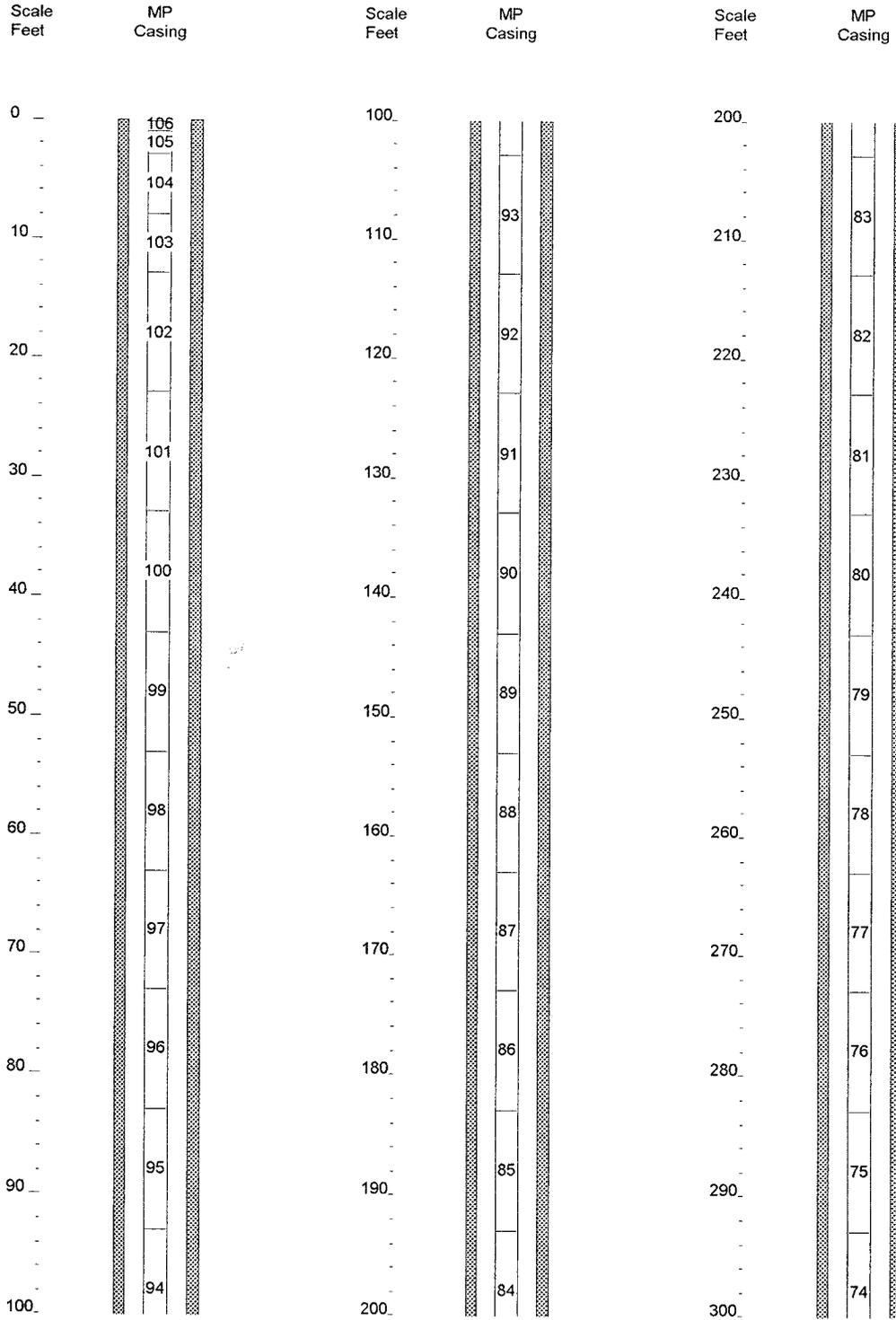


Legend

(Qty) MP Components (Library - WD Library 7/27/00)	Geology	Backfill/Casing
 (1) 0225F01 - MP38 Casing, PVC, 1 ft.		 Mild Steel
 (1) 0225F02 - MP38 Casing, PVC, 2 ft.		 Stainless Steel
 (31) 0225F05 - MP38 Casing, PVC, 5 ft.		 Well Screen
 (55) 0225F10 - MP38 Casing, PVC, 10 ft.		
 (18) 0239F05 - MP38 Packer, Stiffened		
 (1) 0223 - MP38 End Cap		
 (82) 0202 - MP38 Regular Coupling		
 (18) 0205 - MP38 Measurement Port		
 (6) 0224 - MP38 Pumping Port		
 (6) 0216 - MP38 Magnetic Location Collar		

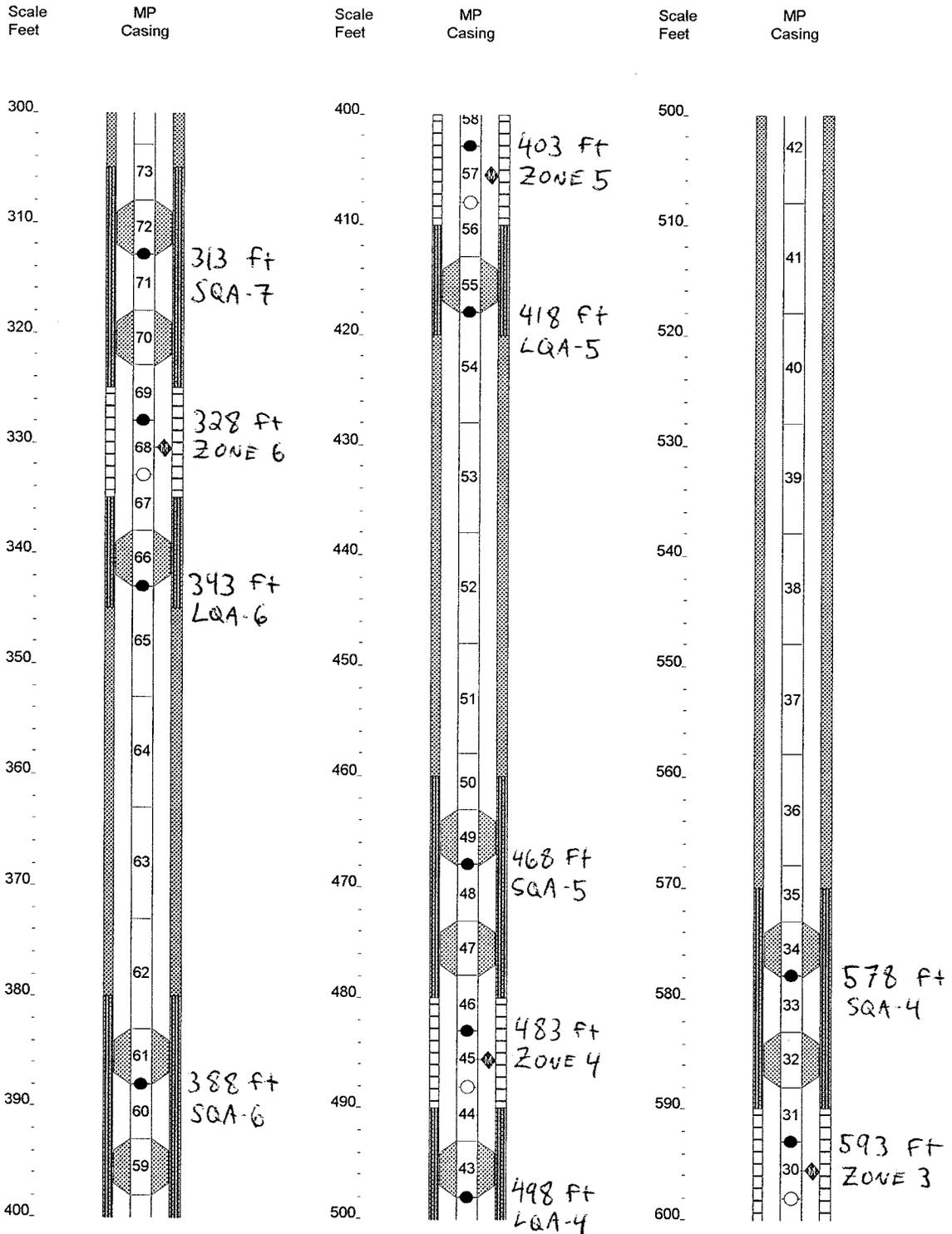
Summary Casing Log
WDC / CH2M Hill

Job No: WB824
Well: MW1-5



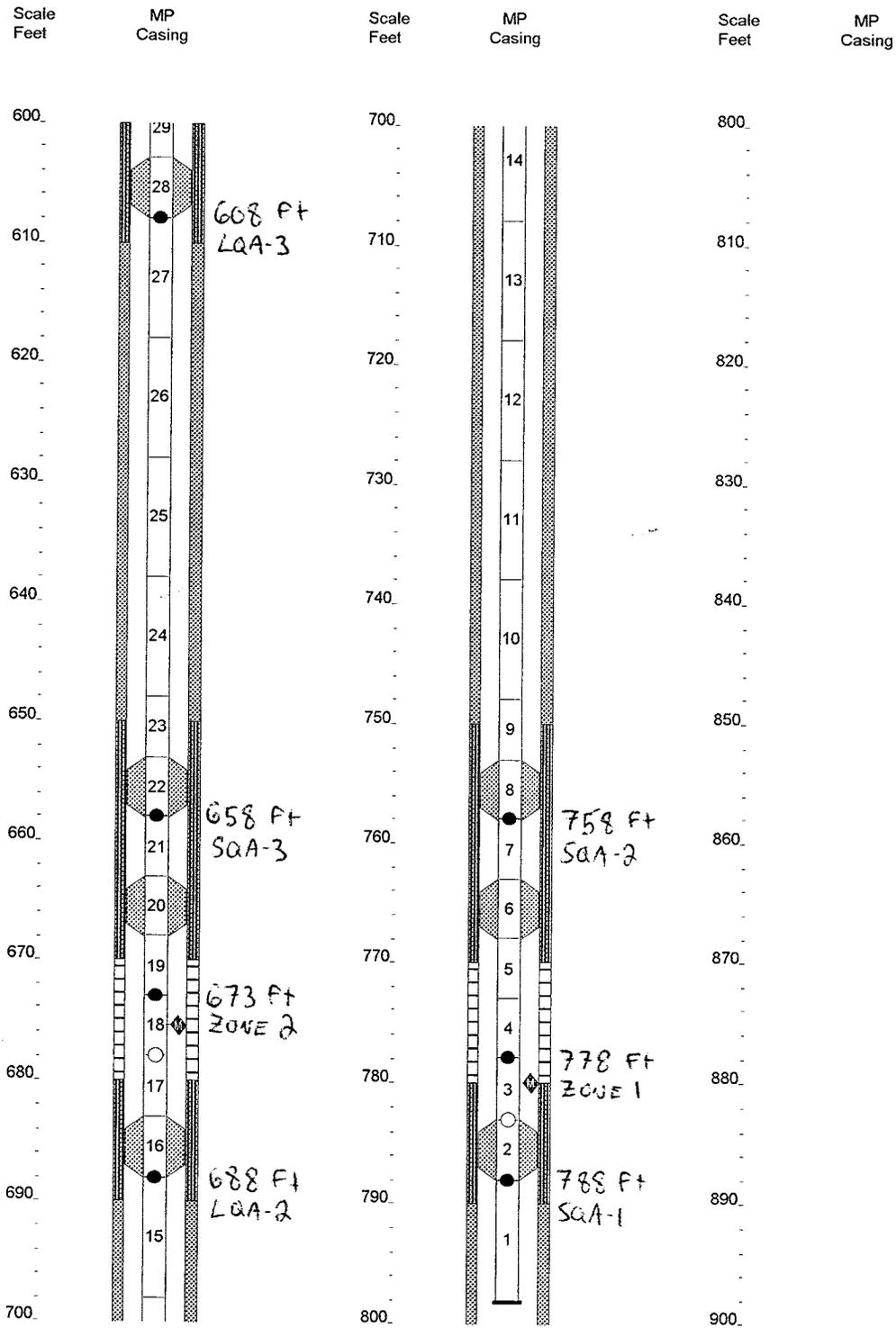
Summary Casing Log
WDC / CH2M Hill

Job No: WB824
Well: MW1-5



Summary Casing Log
WDC / CH2M Hill

Job No: WB824
Well: MW1-5





Westbay
Instruments Inc.

A Schlumberger Company

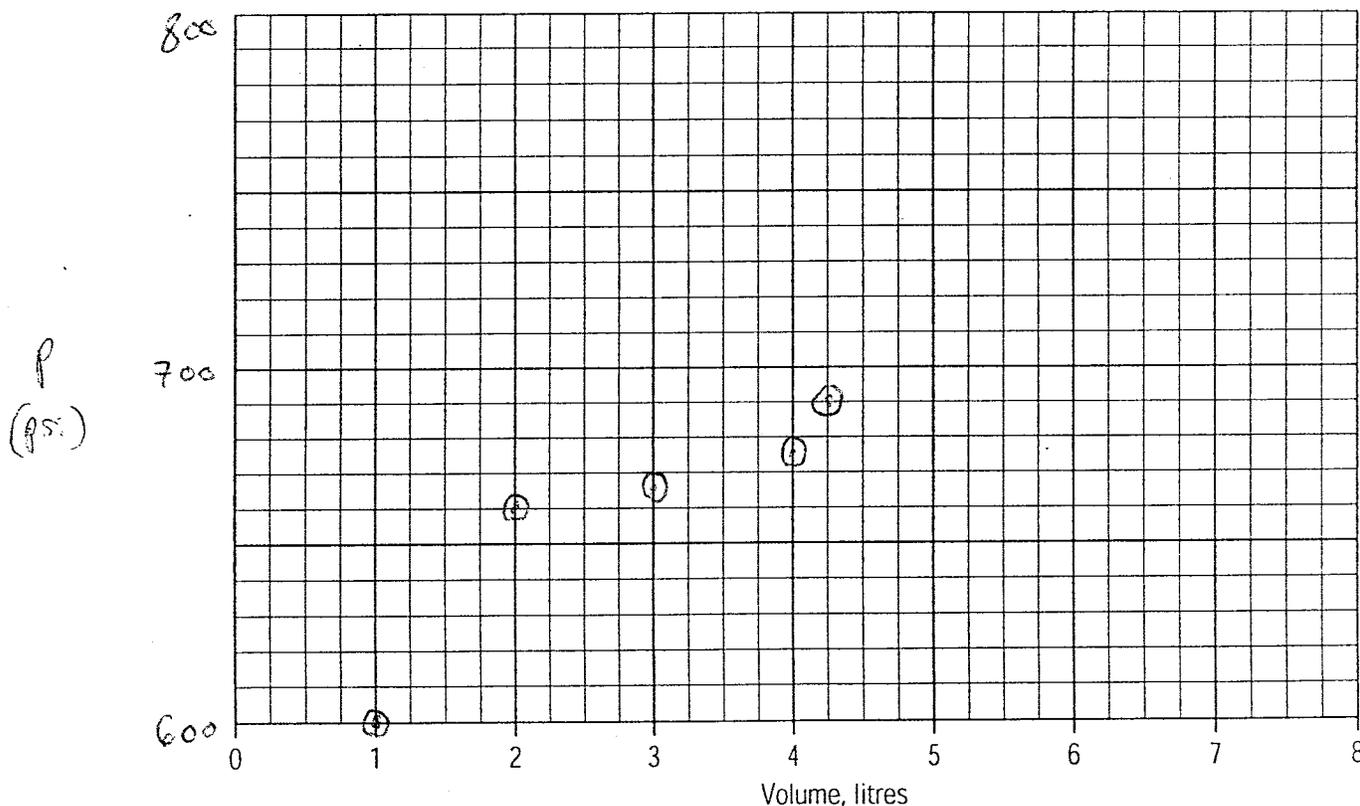
Sheet 20 of 20

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-S
 Location: W MAIN ST Completed by: ML/AB Date Inflated: July 10/03
 Packer No.: 18, comp 72 Serial No.: 13409 Depth (ft/m): 312 Inflation Tool No.: TIW 1085
 Packer Valve Pressure, P_V : 145 psi Final Line Pressure, P_L : 690 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 296 (ft/m) = 138 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 175 psi

Volume, litres	1.0	2.0	3.0	4.0	4.25	4.0					
Pressure, psi	600	660	665	675	690	0					
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



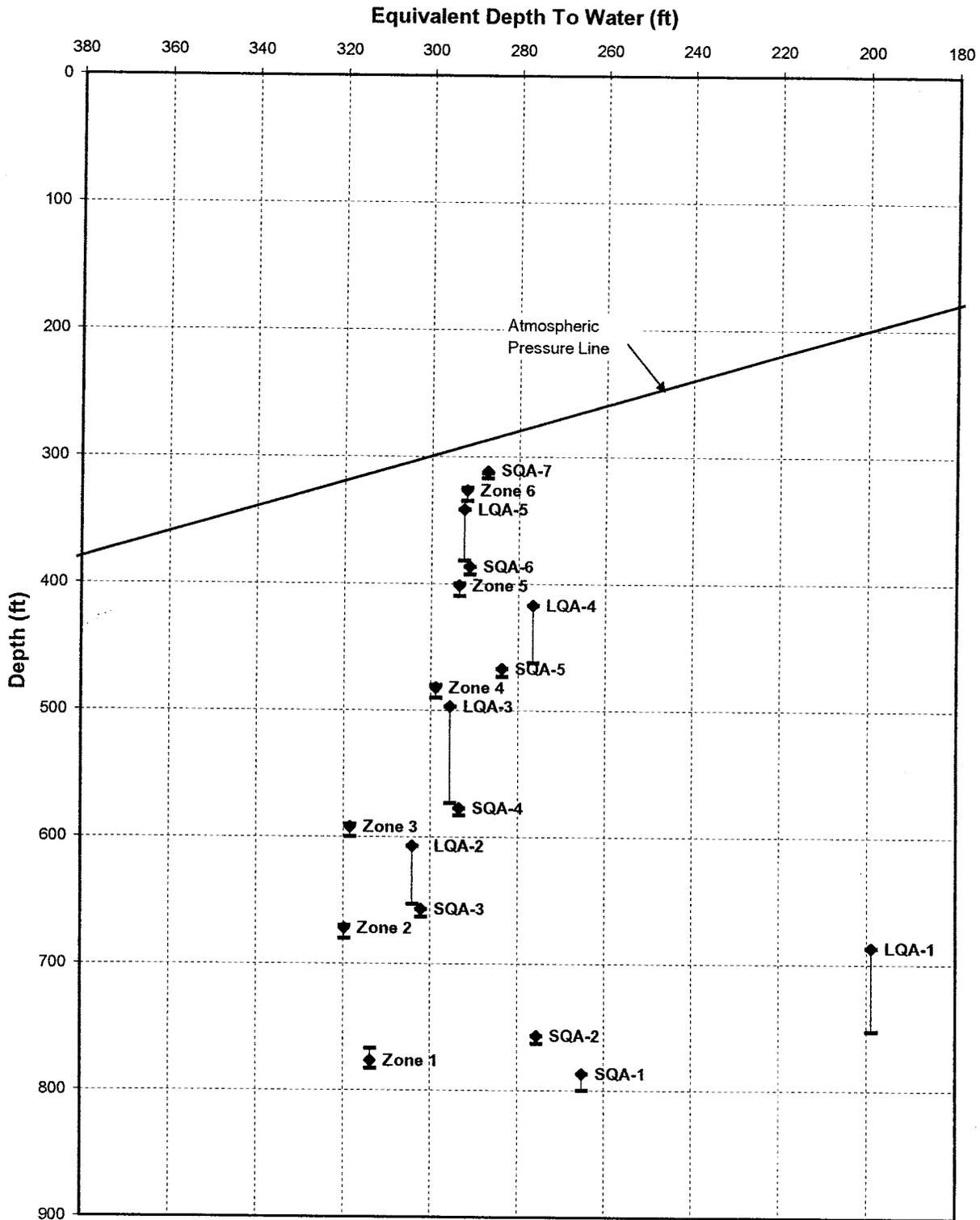
Comments

packer 18

Piezometric Profile

Monitoring Well: MW1-5

Profile Date: 07/10/03
 Comments: All Zones



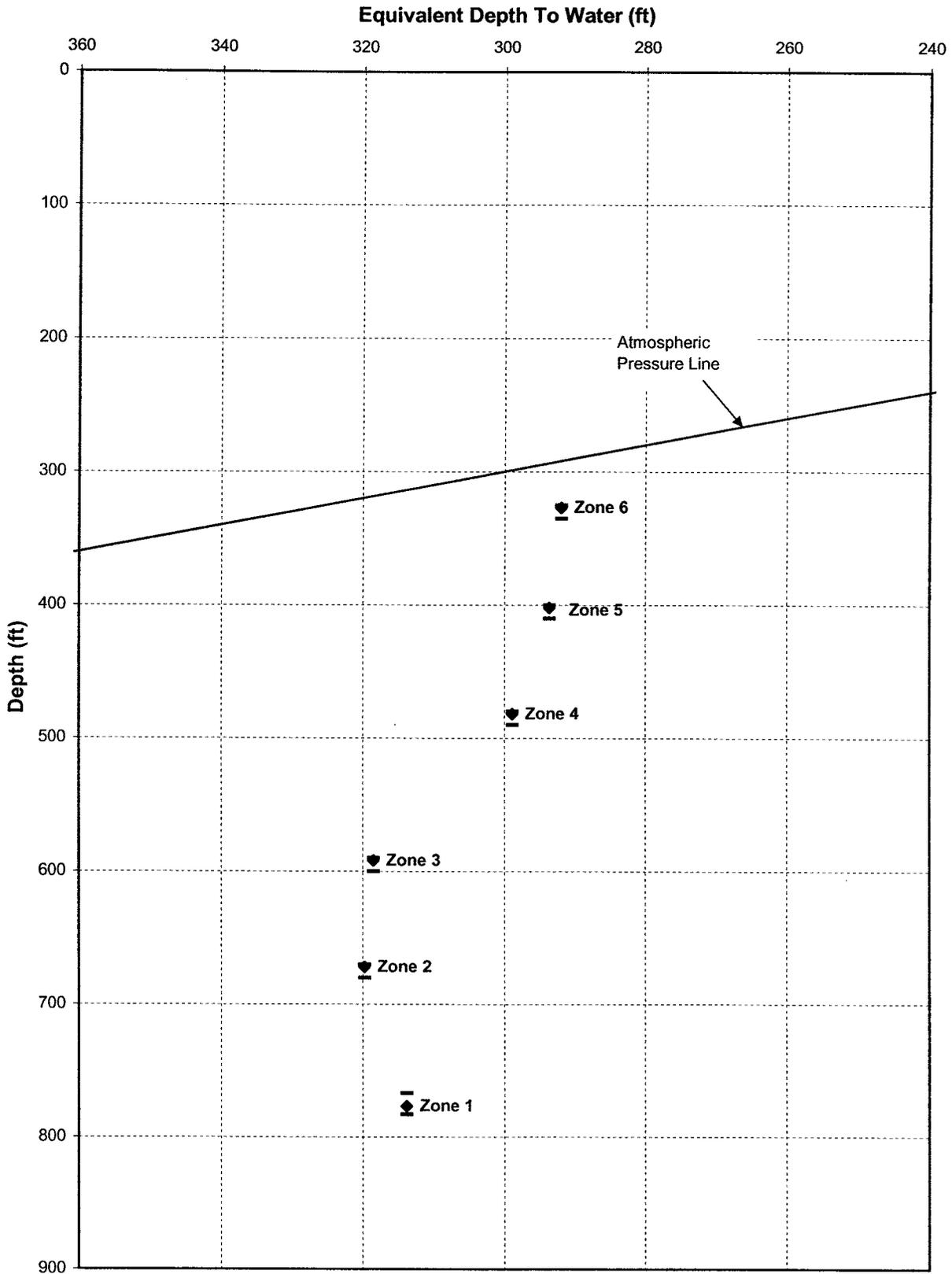
Client: WDC
 Site: Alhambra, CA
 Datum: Ground Surface

Figure 1

Plot By: _____ Date: _____
 Checked By: _____ Date: _____
 Westbay Project : WB824

Piezometric Profile
Monitoring Well: MW1-5

Profile Date: 07/10/03
Comments: Screen Zones



Client: WDC
Site: Alhambra, CA
Datum: Ground Surface

Figure 2

Plot Date: _____ Date: _____
Checked By: _____ Date: _____
Westbay Project: WB824



Westbay
Instruments Inc.

A Schlumberger Company

Piezometric Pressures/Levels Field Data and Calculation Sheet

Datum: Top of 4" Steel casing Probe Type: Sampler Client: Cham Hill/WDC Date: July 10/03
 Elev. G.S.: Serial No.: EM 1764 Job No.: WB824 Well No.: MW1-5
 Height of MP above G.S.: -9.5' Probe Range: 0 to 100psi Location: Alhambra
 Elev. top of MP Casing: Weather: clear-hot MP Casing Type: MP38
 Reference Elevation: Atm. Pressure: 14.60 Operator: ML/AB
 Ambient Reading (Patm) (Pressure, Temperature, time) Start: 14.60/13:50 Finish: 14.59/20.72/15:03

Port No.	Port Depth From Log (ft)	Port Depth From Cable (ft)	Port Elev. ()	Fluid Pressure Readings			Temp. (°C)	Time H:M:S	Pressure Head Outside Port () H = (P2-Patm)/w	Piez. Level Outside Port () Dz = Dp - H	Comments
				Inside Casing (P1)	Outside Casing (P2)	Inside Casing (P1)					
1	787	785	/	230.3	240.9	230.3	26.26	14.09	522.029	264.97	SQA-1
2	777	775	/	225.9	215.4	225.9	25.67	14.13	463.206	313.8	Zone 1
3	757	755	/	217.4	223.3	217.2	25.09	14.25	481.403	275.56	SQA-2
4	687	684	/	186.8	226.15	186.78	24.55	14.28	488.00	198.99	LQA-1
5	672	670	/	180.3	167.3	180.3	23.76	14.31	352.24	319.75	Zone 2
6	657	654	/	173.7	168.4	173.7	23.42	14.33	354.78	302.21	SQA-3
7	607	604	/	151.9	145.9	151.9	22.97	14.35	302.8838	304.116	LQA-2
8	592	590	/	145.4	133.17	145.4	22.45	14.37	273.51	318.48	Zone 3
9	577	574	/	138.9	137.48	138.9	22.98	14.39	283.46	293.53	SQA-4
10	497	495	/	104.1	101.9	104.9	21.51	14.42	201.38	295.61	LQA-3
11	482	480	/	97.5	94.0	97.45	21.02	14.44	183.16	298.83	Zone 4
12	467	465	/	91.0	94.25	91.0	20.82	14.46	183.27	283.72	SQA-5
13	417	415	/	69.2	75.45	69.2	20.61	14.48	140.36	279.63	LQA-4
14	402	400	/	62.65	61.6	62.65	20.43	14.50	108.41	293.58	Zone 5
15	387	385	/	56.1	56.1	56.1	20.50	14.51	95.73	291.26	SQA-6
16	342	340	/	36.4	36.06	36.4	20.22	14.54	49.50	292.49	LQA-5
17	327	325	/	29.9	29.8	29.9	20.23	14.56	35.06	291.93	Zone 6
18	312	310	/	23.4	25.3	23.4	20.38	14.59	24.68	282.31	SQA-7

Casing Installation Log

Company: WDC / CH2M Hill
Well: MW1-5
Site: Alhambra
Project: WDC# CH222B

Job No: WB824
Author: GG

Well Information

Reference Datum:
Elevation of Datum: 0.00 ft.
MP Casing Top: 0.00 ft.
MP Casing Length: 798.16 ft.

Borehole Depth: 800.00 ft.
Borehole Inclination:
Borehole Diameter: 4.00 in.

Well Description:
MP38
Other References:

File Information

File Name: MP-3.WWD
Report Date: Thu Jun 19 11:27:02 2003

File Date: Jun 19 11:18:23 2003

Comments

Log Information

Borehole condition confirmed.
MP well design & preparation.
MP well design checked.
MP well and borehole approved to install.

(method) VIDEO Date: _____
By: [Signature] Date: 06/24/03
By: [Signature] Date: 06/24/03
By: [Signature] Date: 7/18/03
(inc)

MP Casing Log
WDC / CH2M Hill

Job No: WB824
Well: MW1-5

Hydraulic Integrity Test

447.30' at 12:55 pm
446.80' at 1:15 pm
446.75' at 1:20 pm
446.75' at 1:25 pm

Test O.K.
Mud Sealed

End of lowering
12:15 pm

Scale Feet	MP Casing	QA Tested OK	MP Casing Description
0	105 / 106 104 / 105	<input checked="" type="checkbox"/>	0225F01, PVC, 1'
10	103	<input checked="" type="checkbox"/>	0225F02 - MP38 Casing, PVC, 10 ft.
20	102	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
30	101	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
40	100	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
50	99	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
60	98	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
70	97	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
80	96	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
90	95	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
100	94	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.

Borehole Water Level - 296'

MP Casing Log
WDC / CH2M Hill

Job No: WB824
Well: MW1-5

Scale Feet	MP Casing	QA Tested OK	MP Casing Description
100		<input checked="" type="checkbox"/>	
110	93	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
120	92	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
130	91	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
140	90	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
150	89	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
160	88	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
170	87	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
180	86	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
190	85	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
200	84	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.

MP Casing Log
WDC / CH2M Hill

Job No: WB824
Well: MW1-5

Scale Feet	MP Casing	QA Tested OK	MP Casing Description
200		<input checked="" type="checkbox"/>	
210	83	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
220	82	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
230	81	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
240	80	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
250	79	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
260	78	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
270	77	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
280	76	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
290	75	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
300	74	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.

MP Casing Log WDC / CH2M Hill

Job No: WB824
Well: MW1-5

Scale Feet	MP Casing	QA Tested OK		MP Casing Description
300		<input checked="" type="checkbox"/>		0225F05 - MP38 Casing, PVC, 5 ft.
310	1:00 pm 73 72 71	<input checked="" type="checkbox"/>	13409 145	0239F05 - MP38 Packer, Stiffened 0205 - MP38 Measurement Port
320	12:44 pm 70 69	<input checked="" type="checkbox"/>	1414 130	0225F05 - MP38 Casing, PVC, 5 ft. 0239F05 - MP38 Packer, Stiffened
330	68 67	<input checked="" type="checkbox"/>	1417 130	0225F05 - MP38 Casing, PVC, 5 ft. 0205 - MP38 Measurement Port 0224 - MP38 Pumping Port 0225F05 - MP38 Casing, PVC, 5 ft.
340	12:16 pm 66 65	<input checked="" type="checkbox"/>	13321 130	0239F05 - MP38 Packer, Stiffened 0205 - MP38 Measurement Port
350		<input checked="" type="checkbox"/>		0225F10 - MP38 Casing, PVC, 10 ft.
360		<input checked="" type="checkbox"/>		0225F10 - MP38 Casing, PVC, 10 ft.
370	Start 8:30 am End of lowering on first day - 4:40 pm 63	<input checked="" type="checkbox"/>		0225F10 - MP38 Casing, PVC, 10 ft.
380	62	<input checked="" type="checkbox"/>		0225F10 - MP38 Casing, PVC, 10 ft.
390	12:00 pm 61 60	<input checked="" type="checkbox"/>	13320 130	0239F05 - MP38 Packer, Stiffened 0205 - MP38 Measurement Port
400	11:34 am 59 58	<input checked="" type="checkbox"/>	1418 130	0225F05 - MP38 Casing, PVC, 5 ft. 0239F05 - MP38 Packer, Stiffened 0225F05 - MP38 Casing, PVC, 5 ft.

MP Casing Log WDC / CH2M Hill

Job No: WB824
Well: MW1-5

Scale Feet	MP Casing	QA Tested OK	MP Casing Description
400		<input checked="" type="checkbox"/> 1416	0205 - MP38 Measurement Port
		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
410		<input checked="" type="checkbox"/> 16216	0224 - MP38 Pumping Port
		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
	11.14 am 10.18 am	<input checked="" type="checkbox"/>	
420		<input checked="" type="checkbox"/> 13318 140	0239F05 - MP38 Packer, Stiffened
		<input checked="" type="checkbox"/> 1419 1412	0205 - MP38 Measurement Port
		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
430		<input checked="" type="checkbox"/>	
		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
440		<input checked="" type="checkbox"/>	
		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
450		<input checked="" type="checkbox"/>	
		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
460		<input checked="" type="checkbox"/>	
		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
	10.56 am	<input checked="" type="checkbox"/> 13314 135	0239F05 - MP38 Packer, Stiffened
470		<input checked="" type="checkbox"/> 1424	0205 - MP38 Measurement Port
		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
	10.41 am	<input checked="" type="checkbox"/> 17317 130	0239F05 - MP38 Packer, Stiffened
480		<input checked="" type="checkbox"/>	
		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
		<input checked="" type="checkbox"/> 1429	0205 - MP38 Measurement Port
		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
490		<input checked="" type="checkbox"/> 16214	0224 - MP38 Pumping Port
		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
	10.25 am	<input checked="" type="checkbox"/> 13315 135	0239F05 - MP38 Packer, Stiffened
500		<input checked="" type="checkbox"/> 1422 0660	0205 - MP38 Measurement Port

MP Casing Log WDC / CH2M Hill

Job No: WB824
Well: MW1-5

Scale Feet	MP Casing	QA Tested OK	MP Casing Description
500	42	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
510	41	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
520	40	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
530	39	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
540	38	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
550	37	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
560	36	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
570	35	<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
580	34	<input checked="" type="checkbox"/> 13259	0239F05 - MP38 Packer, Stiffened
	33	<input checked="" type="checkbox"/> 1423	0205 - MP38 Measurement Port
	32	<input checked="" type="checkbox"/> 13258	0225F05 - MP38 Casing, PVC, 5 ft.
	31	<input checked="" type="checkbox"/>	0239F05 - MP38 Packer, Stiffened
	30	<input checked="" type="checkbox"/> 1428	0225F05 - MP38 Casing, PVC, 5 ft.
	29	<input checked="" type="checkbox"/> 6211	0224 - MP38 Pumping Port
		<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.

10:03 am

9:40 am

130

130

MP Casing Log WDC / CH2M Hill

Job No: WB824
Well: MW1-5

Scale Feet	MP Casing	QA Tested OK		MP Casing Description
600		<input checked="" type="checkbox"/>		
610	9:18 pm 28	<input checked="" type="checkbox"/>	13260 135	0239F05 - MP38 Packer, Stiffened
		<input checked="" type="checkbox"/>	1421	0205 - MP38 Measurement Port
620	27	<input checked="" type="checkbox"/>		0225F10 - MP38 Casing, PVC, 10 ft.
630	26	<input checked="" type="checkbox"/>		0225F10 - MP38 Casing, PVC, 10 ft.
640	25	<input checked="" type="checkbox"/>		0225F10 - MP38 Casing, PVC, 10 ft.
650	24	<input checked="" type="checkbox"/>		0225F10 - MP38 Casing, PVC, 10 ft.
660	4:23 pm 23	<input checked="" type="checkbox"/>		0225F05 - MP38 Casing, PVC, 5 ft.
	22	<input checked="" type="checkbox"/>	13312 130	0239F05 - MP38 Packer, Stiffened
	21	<input checked="" type="checkbox"/>	1423 0575	0205 - MP38 Measurement Port
	20	<input checked="" type="checkbox"/>		0225F05 - MP38 Casing, PVC, 5 ft.
670	4:07 pm 19	<input checked="" type="checkbox"/>	13261 135	0239F05 - MP38 Packer, Stiffened
	18	<input checked="" type="checkbox"/>	1420	0225F05 - MP38 Casing, PVC, 5 ft.
	17	<input checked="" type="checkbox"/>	1420	0205 - MP38 Measurement Port
	16	<input checked="" type="checkbox"/>	1420	0225F05 - MP38 Casing, PVC, 5 ft.
680	3:32 pm 15	<input checked="" type="checkbox"/>	13257 130	0239F05 - MP38 Packer, Stiffened
		<input checked="" type="checkbox"/>	1410	0205 - MP38 Measurement Port
690		<input checked="" type="checkbox"/>		0225F10 - MP38 Casing, PVC, 10 ft.
700		<input checked="" type="checkbox"/>		

MP Casing Log
WDC / CH2M Hill

Job No: WB824
Well: MW1-5

Joint test tool - TIW 1085
Tool Pressure 170 psi.
Second day of lowering
tool at 210 psi.
Inflation tool Pressure

Scale Feet	MP Casing	QA Tested OK	MP Casing Description
700	14	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
710	13	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
720	12	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
730	11	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
740	10	<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
750	9	<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
760	8	<input checked="" type="checkbox"/> 13313	0239F05 - MP38 Packer, Stiffened
	7	<input checked="" type="checkbox"/> 13314	0205 - MP38 Measurement Port
	6	<input checked="" type="checkbox"/> 13256	0239F05 - MP38 Packer, Stiffened
	5	<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
	4	<input checked="" type="checkbox"/>	0225F05 - MP38 Casing, PVC, 5 ft.
	3	<input checked="" type="checkbox"/> 1427	0205 - MP38 Measurement Port
	2	<input checked="" type="checkbox"/> 6125	0225F05 - MP38 Casing, PVC, 5 ft.
	1	<input checked="" type="checkbox"/> 13314	0224 - MP38 Pumping Port
		<input checked="" type="checkbox"/> 1426	0239F05 - MP38 Packer, Stiffened
		<input checked="" type="checkbox"/>	0205 - MP38 Measurement Port
		<input checked="" type="checkbox"/>	0225F10 - MP38 Casing, PVC, 10 ft.
		<input checked="" type="checkbox"/>	0223 - MP38 End Cap

8:39 pm
8:24 am
2:31 pm

135
135
130

start lowering
3:30 am
July 9/03

Borehole water
depth 296'

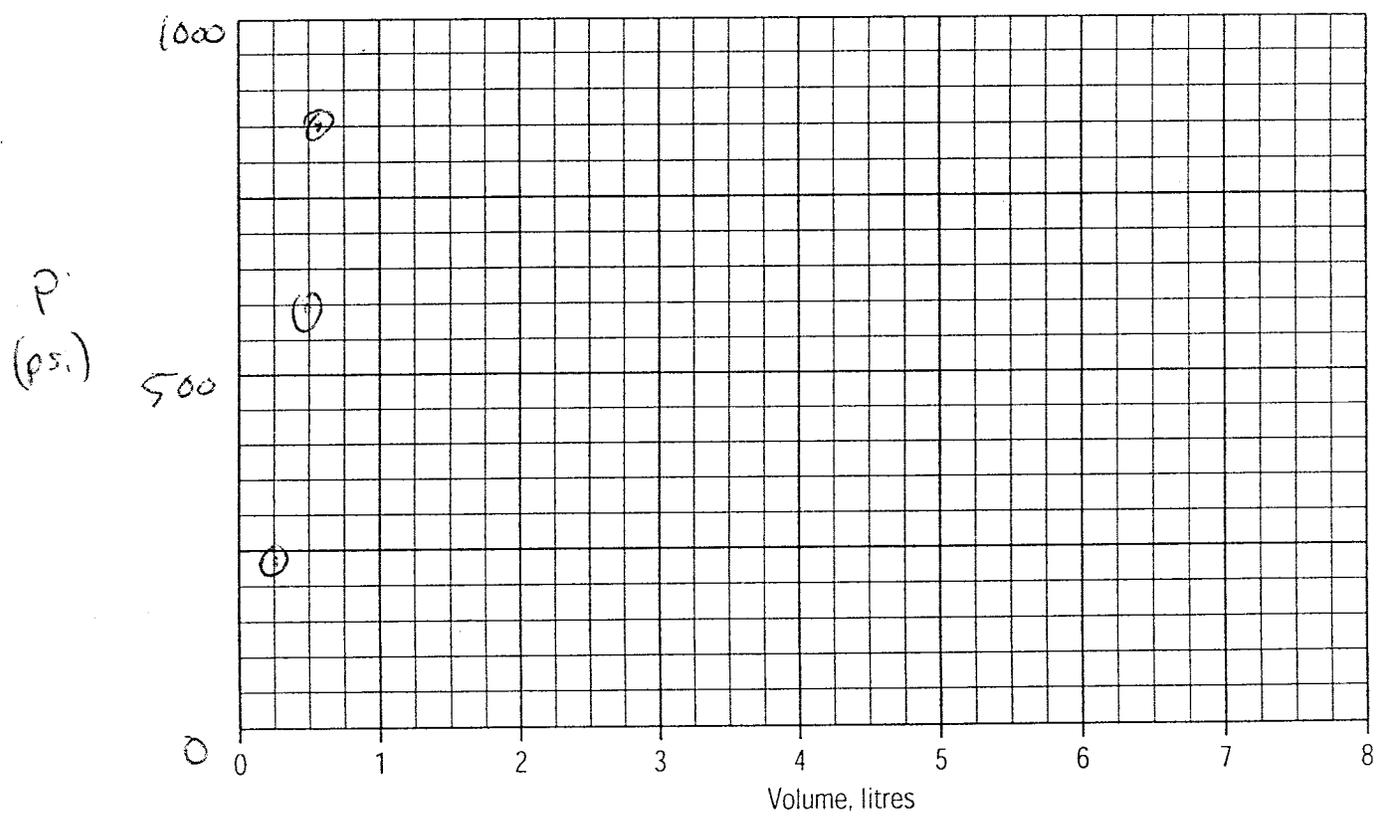


MP Packer Inflation Record

Project: WDC - Alhambra Project No.: WB 824 Well No.: MW1-5
 Location: W. Main St. Completed by: ML/AB Date Inflated: July 9/03
 Packer No.: BWT Serial No.: BWT Depth (ft/m): 800 Inflation Tool No.: IFW 1085
 Packer Valve Pressure, P_v : n/a psi Final Line Pressure, P_L : 850 psi Tool Pressure, P_T : 540 psi
 Borehole Water Level: 296 (ft/m) = 130 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ n/a psi

Volume, litres	.25	.50	.60	.35							
Pressure, psi	245	600	850	0							
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Blank Wall Test - July 9/03

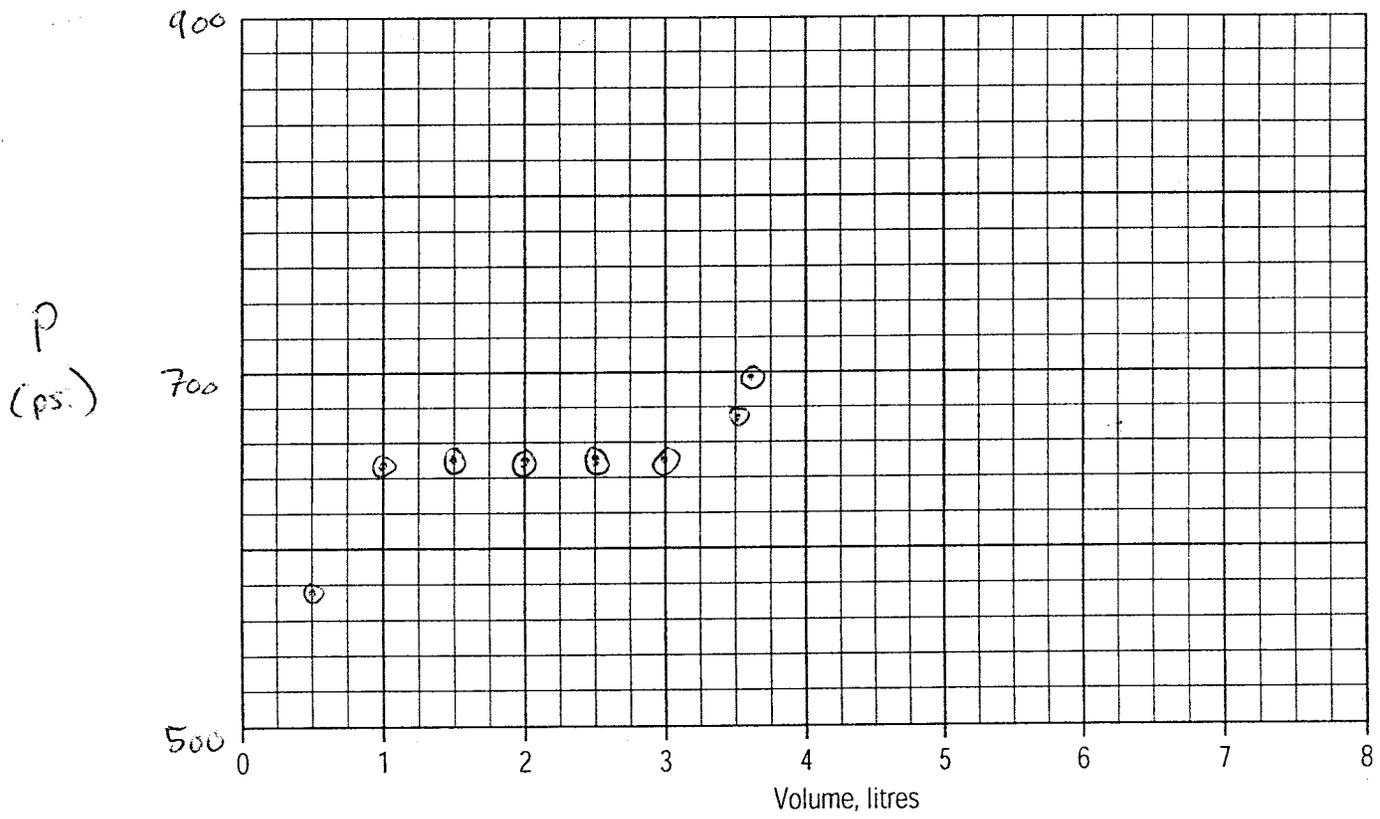


MP Packer Inflation Record

Project: WDC-Alhambra Project No.: WB 824 Well No.: MW 1-5
 Location: W. Main St. Completed by: ML/AB Date Inflated: July 9/03
 Packer No.: 1, comp 2 Serial No.: 13314 Depth (ft/m): 787 Inflation Tool No.: IFW-1085
 Packer Valve Pressure, P_v : 130 psi Final Line Pressure, P_L : 695 psi Tool Pressure, P_T : 540 psi
 Borehole Water Level: 296 (ft) m) = 130 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 155 psi

Volume, litres	.50	1.0	1.5	2.0	2.5	3.0	3.5	3.6	3.4		
Pressure, psi	575	645	650	650	650	650	675	645	0		
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer 1



Westbay
Instruments Inc.

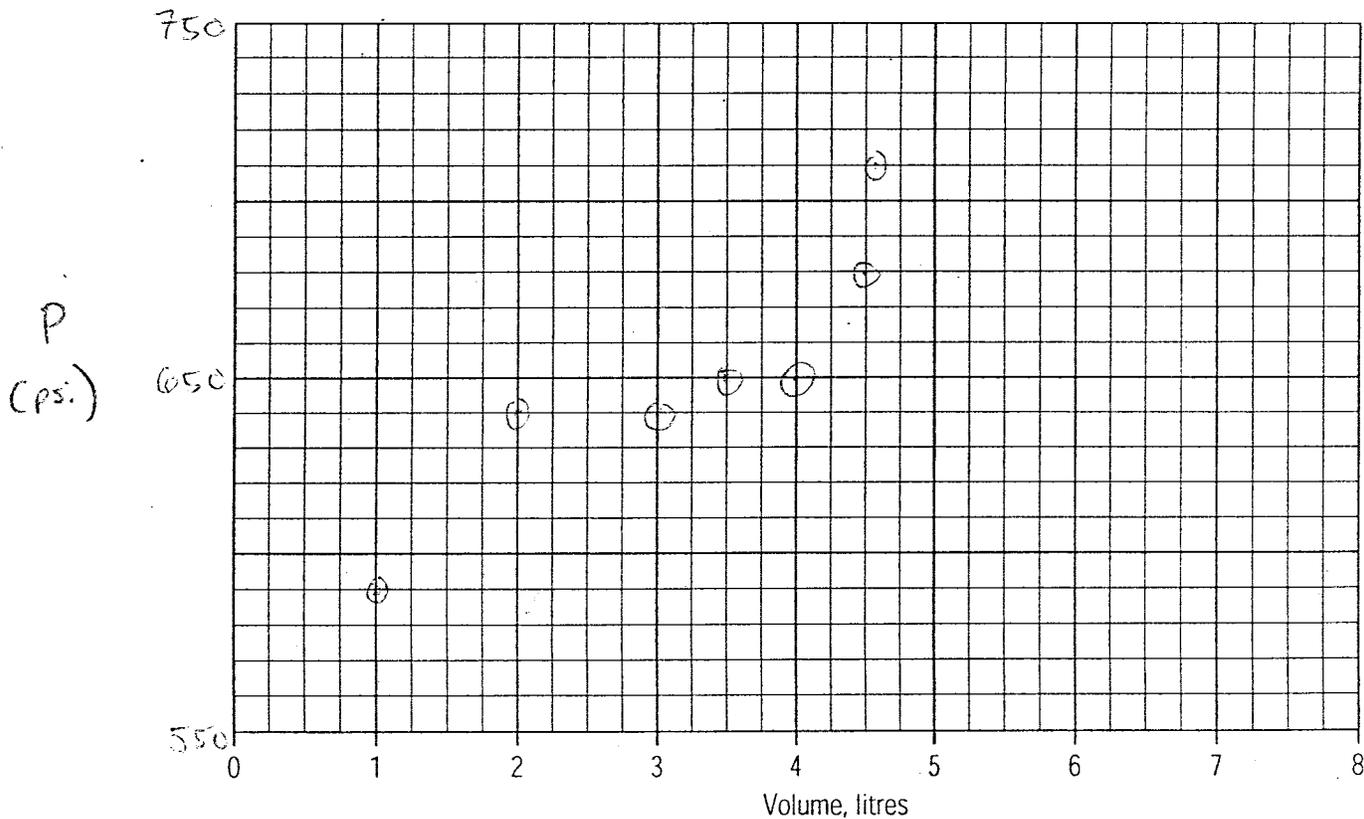
A Schlumberger Company

MP Packer Inflation Record

Project: WDC - ALHAMBRA Project No.: WB 824 Well No.: MW1-5
 Location: W MAIN ST Completed by: ML LAB Date Inflated: July 10/03
 Packer No.: 2, comp 6 Serial No.: 13250 Depth (ft/m): 767 Inflation Tool No.: TIW-1085
 Packer Valve Pressure, P_v : 135 psi Final Line Pressure, P_L : 710 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 796 (ft/m) = 130 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 175 psi

Volume, litres	1.0	2.0	3.0	3.5	4.0	4.5	4.6	4.35		
Pressure, psi	590	640	640	650	650	680	710	0		
Volume, litres										
Pressure, psi										

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer 2



Westbay
Instruments Inc.

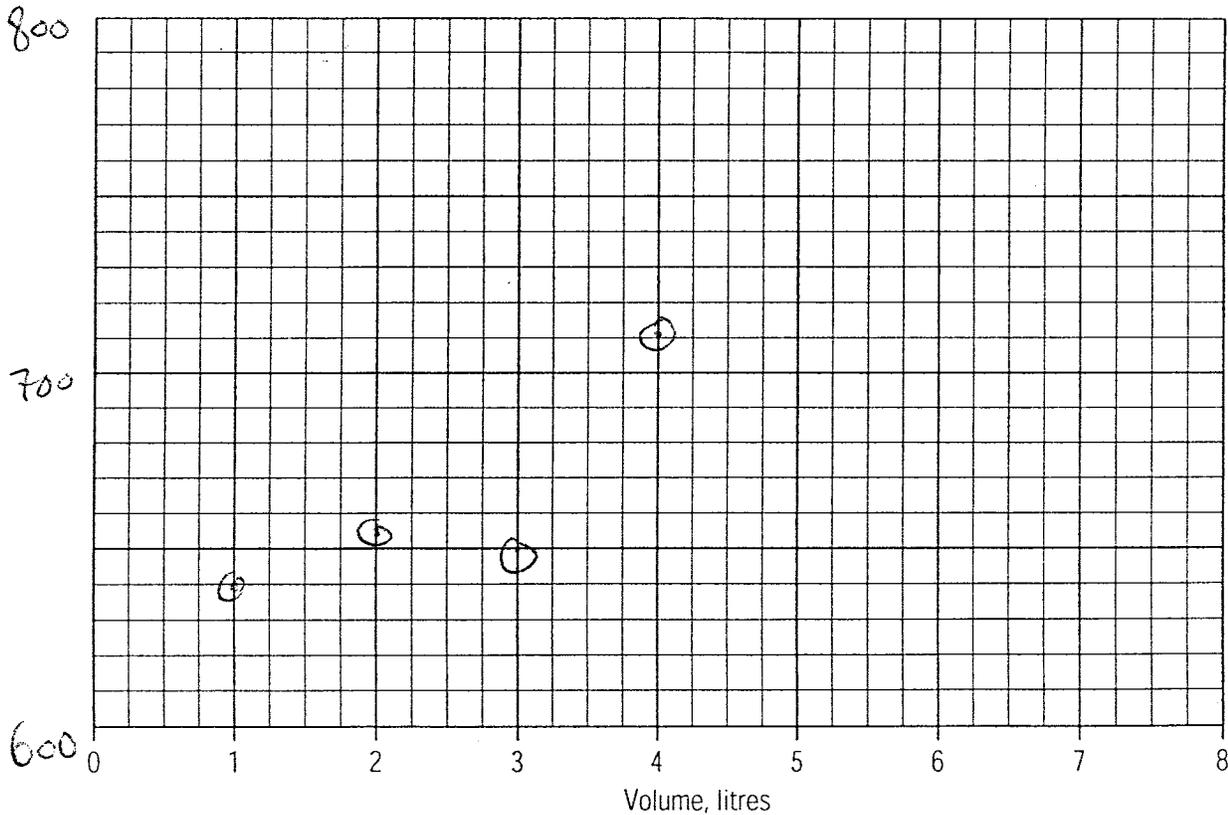
A Schlumberger Company

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-5
 Location: W MAIN ST Completed by: ML/AB Date Inflated: July 10/03
 Packer No.: 3, comp 8 Serial No.: 13313 Depth (ft/m): 757 Inflation Tool No.: TIW-1085
 Packer Valve Pressure, P_V : 135 psi Final Line Pressure, P_L : 710 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 296 (ft/m) = 130 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 175 psi

Volume, litres	<u>1.0</u>	<u>2.0</u>	<u>3.0</u>	<u>4.0</u>	<u>3.6</u>					
Pressure, psi	<u>640</u>	<u>655</u>	<u>650</u>	<u>710</u>	<u>0</u>					
Volume, litres										
Pressure, psi										

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer 3



Westbay
Instruments Inc.

A Schlumberger Company

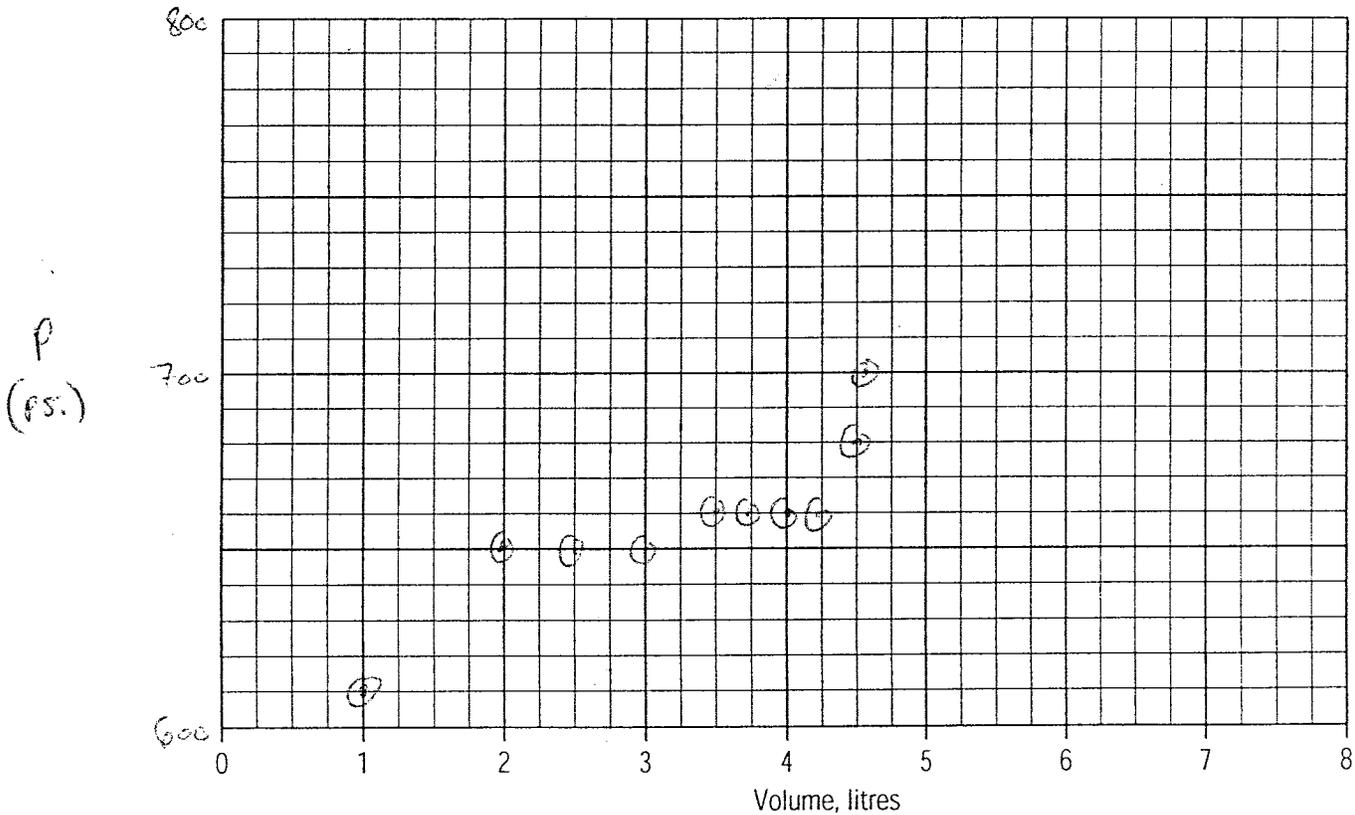
Sheet 5 of 20

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-5
 Location: W MAIN ST Completed by: ML/AB Date Inflated: July 9/03
 Packer No.: 4, comp 16 Serial No.: 13257 Depth (ft): 687 Inflation Tool No.: TIW-1085
 Packer Valve Pressure, P_v : 130 psi Final Line Pressure, P_L : 700 psi Tool Pressure, P_T : 540 psi
 Borehole Water Level: 276 (ft) = 130 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 160 psi

Volume, litres	1.0	2.0	2.5	3.0	3.5	3.75	4.0	4.25	4.5	4.55	4.25
Pressure, psi	640	650	650	650	660	660	660	660	680	700	0
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments

Packer 4



Westbay
Instruments Inc.

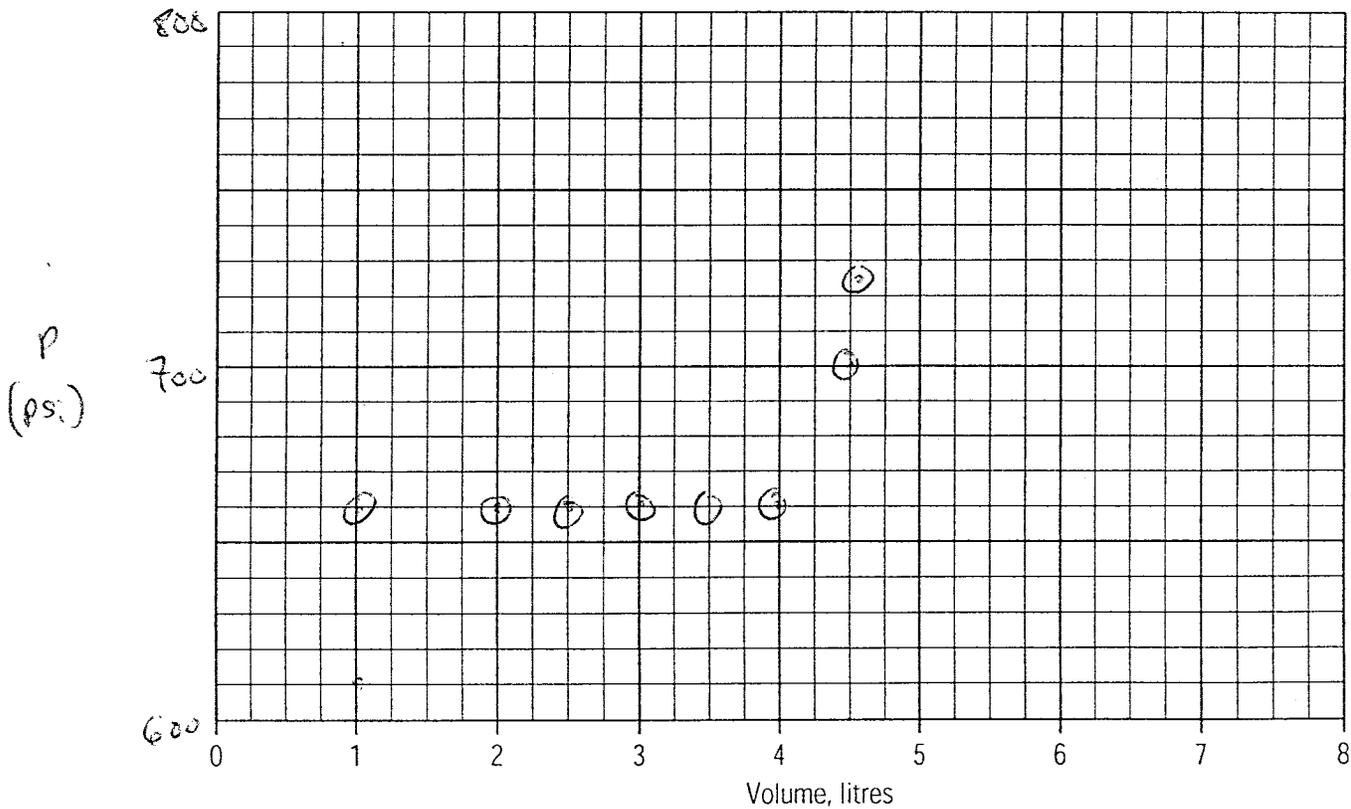
A Schlumberger Company

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-5
 Location: W MAIN ST Completed by: ML LAB Date Inflated: JULY 9/03
 Packer No.: 5 Comp 20 Serial No.: 13261 Depth (ft) (m): 667 Inflation Tool No.: TIW-1085
 Packer Valve Pressure, P_V : 135 psi Final Line Pressure, P_L : 725 psi Tool Pressure, P_T : 540 psi
 Borehole Water Level: 296 (ft) (m) = 130 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 180 psi

Volume, litres	1.0	2.0	2.5	3.0	3.5	4.0	4.5	4.6	4.35		
Pressure, psi	660	660	660	660	660	660	700	725	0		
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer 5



Westbay
Instruments Inc.

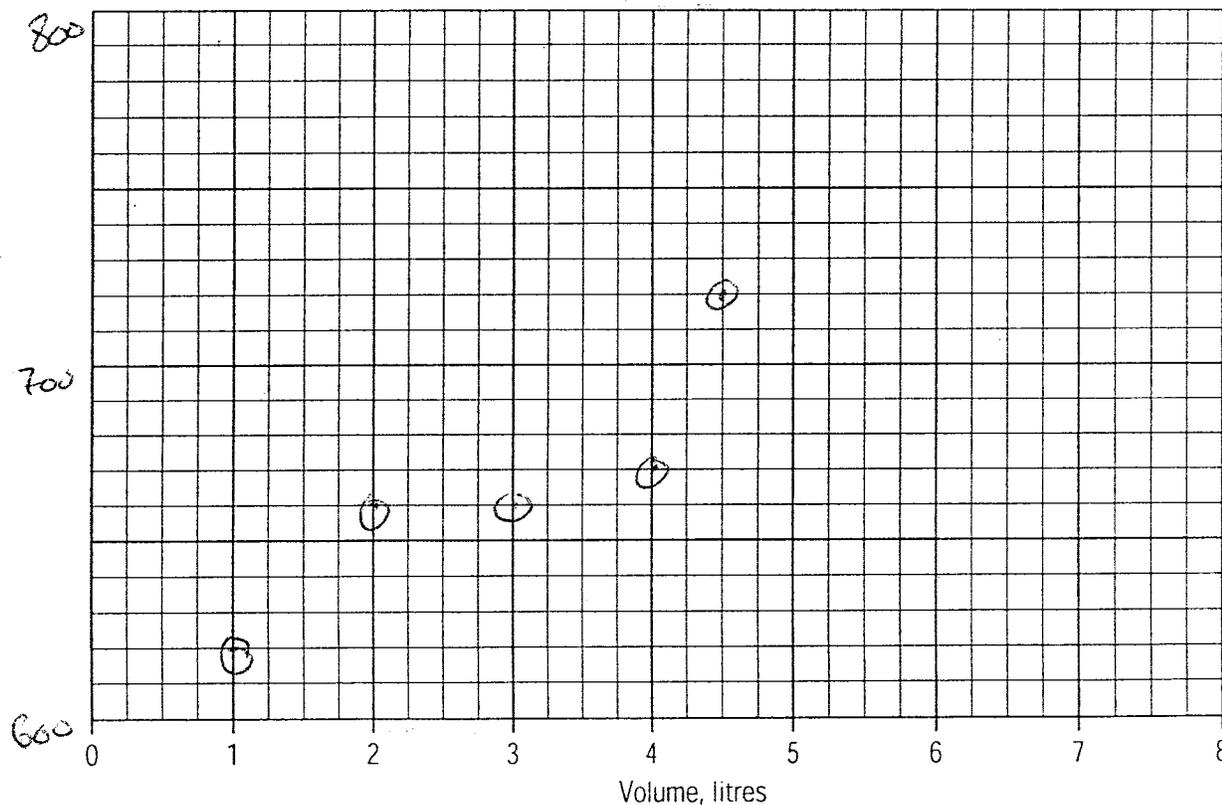
A Schlumberger Company

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-5
 Location: W MAIN ST Completed by: ML LAB Date Inflated: July 9/03
 Packer No.: Bcomp22 Serial No.: 13312 Depth (ft) m): 657 Inflation Tool No.: TIW-1085
 Packer Valve Pressure, P_v : 130 psi Final Line Pressure, P_L : 220 psi Tool Pressure, P_T : 540 psi
 Borehole Water Level: 296 (ft) m) = 130 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 180 psi

Volume, litres	1.0	2.0	3.0	4.0	4.5	4.2					
Pressure, psi	620	660	660	670	720	0					
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer G



Westbay
Instruments Inc.

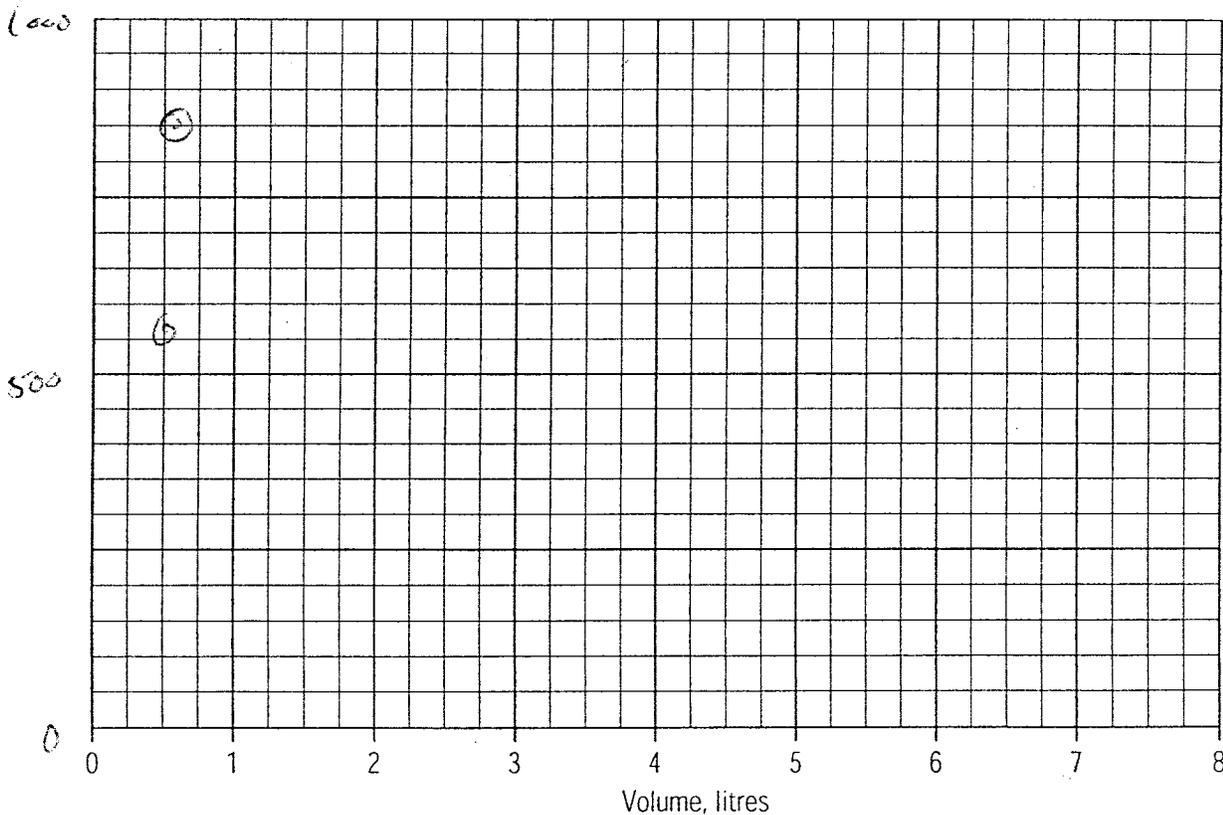
A Schlumberger Company

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-5
 Location: W Main ST Completed by: MLAB Date Inflated: July 10/03
 Packer No.: BWT Serial No.: BWT Depth (ft/m): 800 Inflation Tool No.: TW-1085
 Packer Valve Pressure, P_v : n/a psi Final Line Pressure, P_L : 850 psi Tool Pressure, P_T : 540 psi
 Borehole Water Level: 296 (ft/m) = 130 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ n/a psi

Volume, litres	0.5	0.65									
Pressure, psi	570	850									
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Blank Wall Test - July 10/03



Westbay
Instruments Inc.

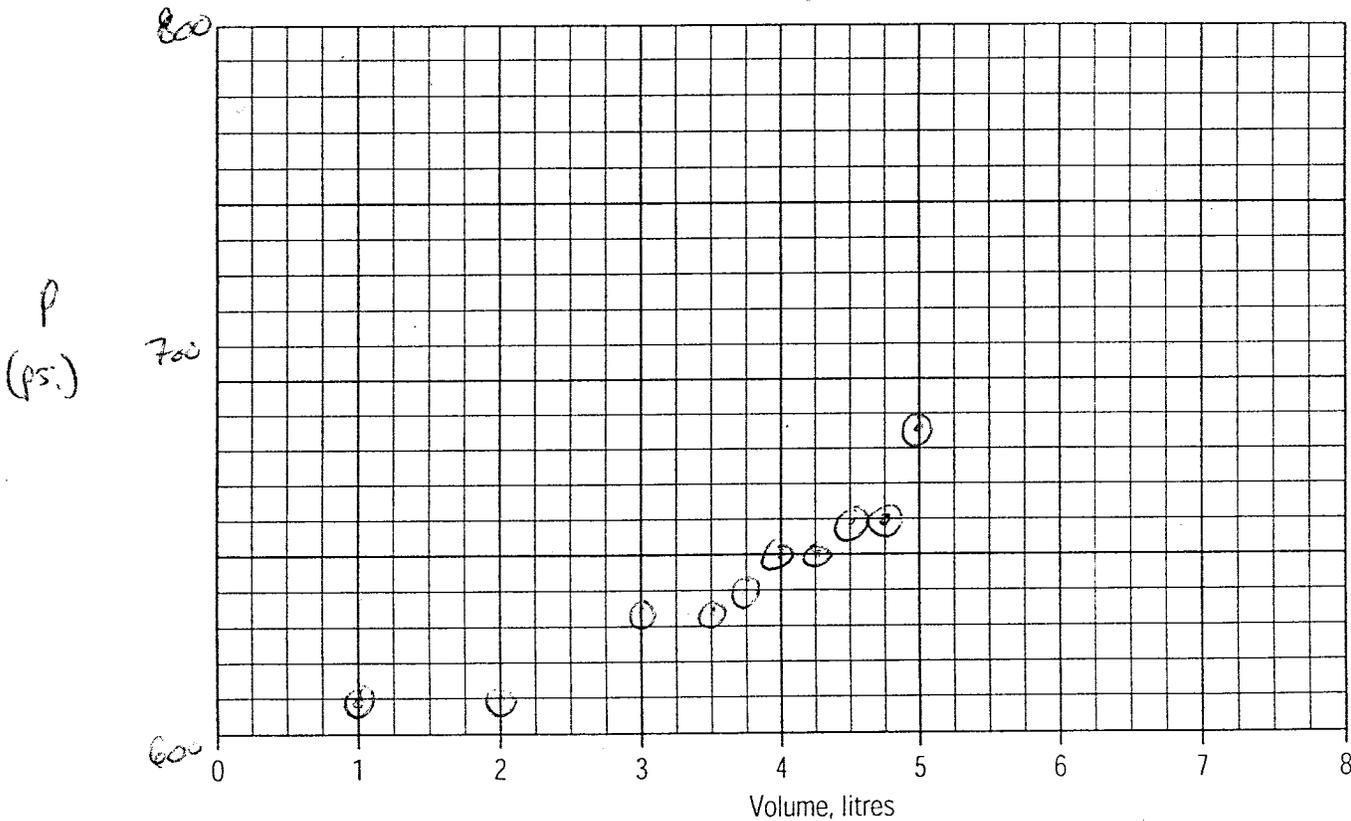
A Schlumberger Company

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-S
 Location: W MAIN ST Completed by: ML LAB Date Inflated: July 10/03
 Packer No.: F_{comp} 28 Serial No.: 13260 Depth (ft/m): 607 Inflation Tool No.: TIW 1085
 Packer Valve Pressure, P_V: 135 psi Final Line Pressure, P_L: 685 psi Tool Pressure, P_T: 530 psi
 Borehole Water Level: 296 (ft/m) = 130 psi (P_w) Calculated Packer Element Pressure, P_E = P_L + P_w - P_V - P_T = 160 psi

Volume, litres	1.0	2.0	3.0	3.5	3.75	4.0	4.25	4.5	4.8	4.8	5.0
Pressure, psi	610	610	635	635	640	650	650	660	685	660	685
Volume, litres	4.6										
Pressure, psi	0										

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer 7



Westbay
Instruments Inc.

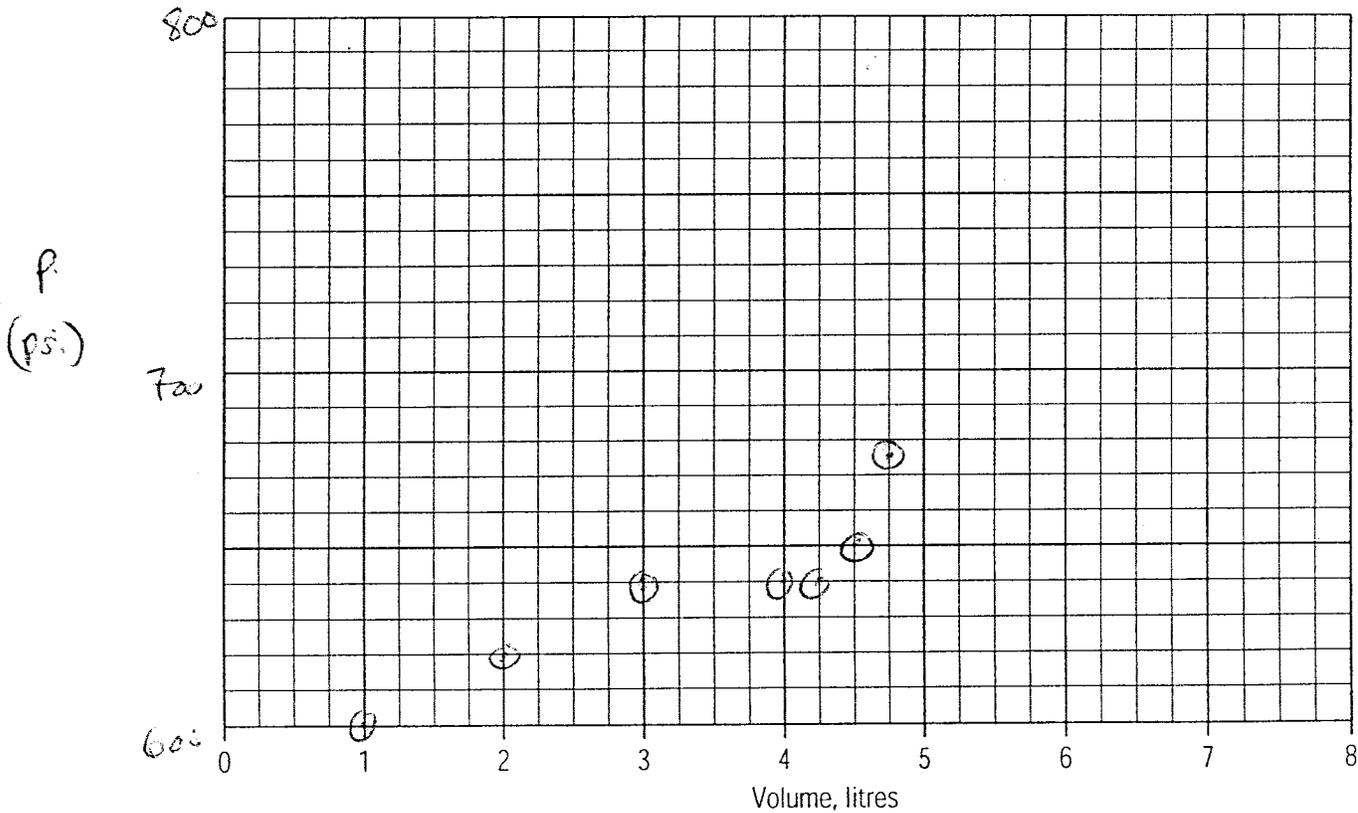
A Schlumberger Company

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-S
 Location: W MAIN ST Completed by: ML/AB Date Inflated: July 10/03
 Packer No.: 8 Comp 32 Serial No.: 13258 Depth (ft / m): 587 Inflation Tool No.: TIW 1085
 Packer Valve Pressure, P_v : 130 psi Final Line Pressure, P_L : 675 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 296 (ft / m) = 130 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 145 psi

Volume, litres	1.0	2.0	3.0	3.5	4.0	4.25	4.5	4.75	4.5		
Pressure, psi	600	620	640	640	640	640	650	675	0		
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer 8



Westbay
Instruments Inc.

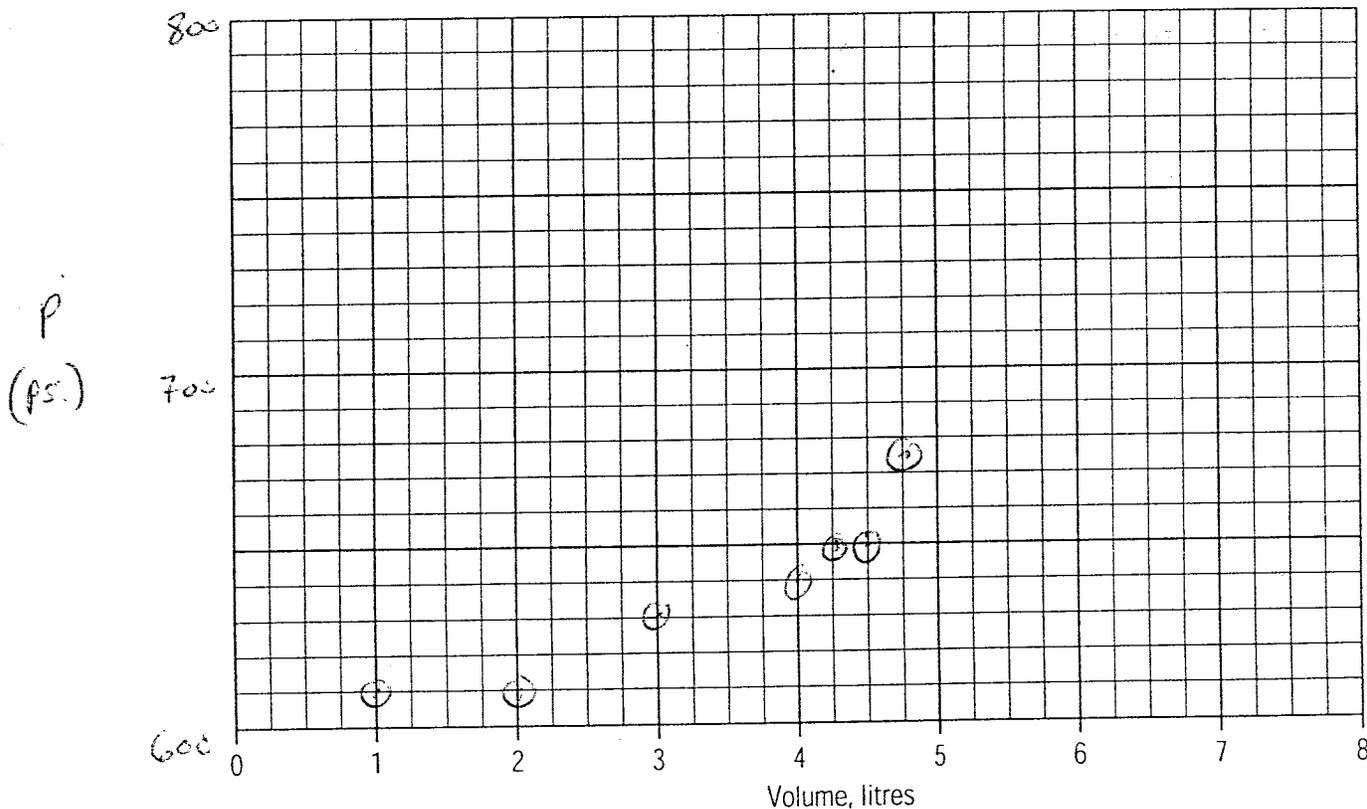
A Schlumberger Company

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-5
 Location: W MAIN ST Completed by: ML LAB Date Inflated: July 10/03
 Packer No.: 9 comp 34 Serial No.: 13259 Depth (ft) (m): 577 Inflation Tool No.: TW 1085
 Packer Valve Pressure, P_V : 130 psi Final Line Pressure, P_L : 675 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 296 (ft) (m) = 130 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 145 psi

Volume, litres	1.0	2.0	3.0	4.0	4.25	4.5	4.75	4.5			
Pressure, psi	610	610	630	640	650	650	675	0			
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer 9



Westbay
Instruments Inc.

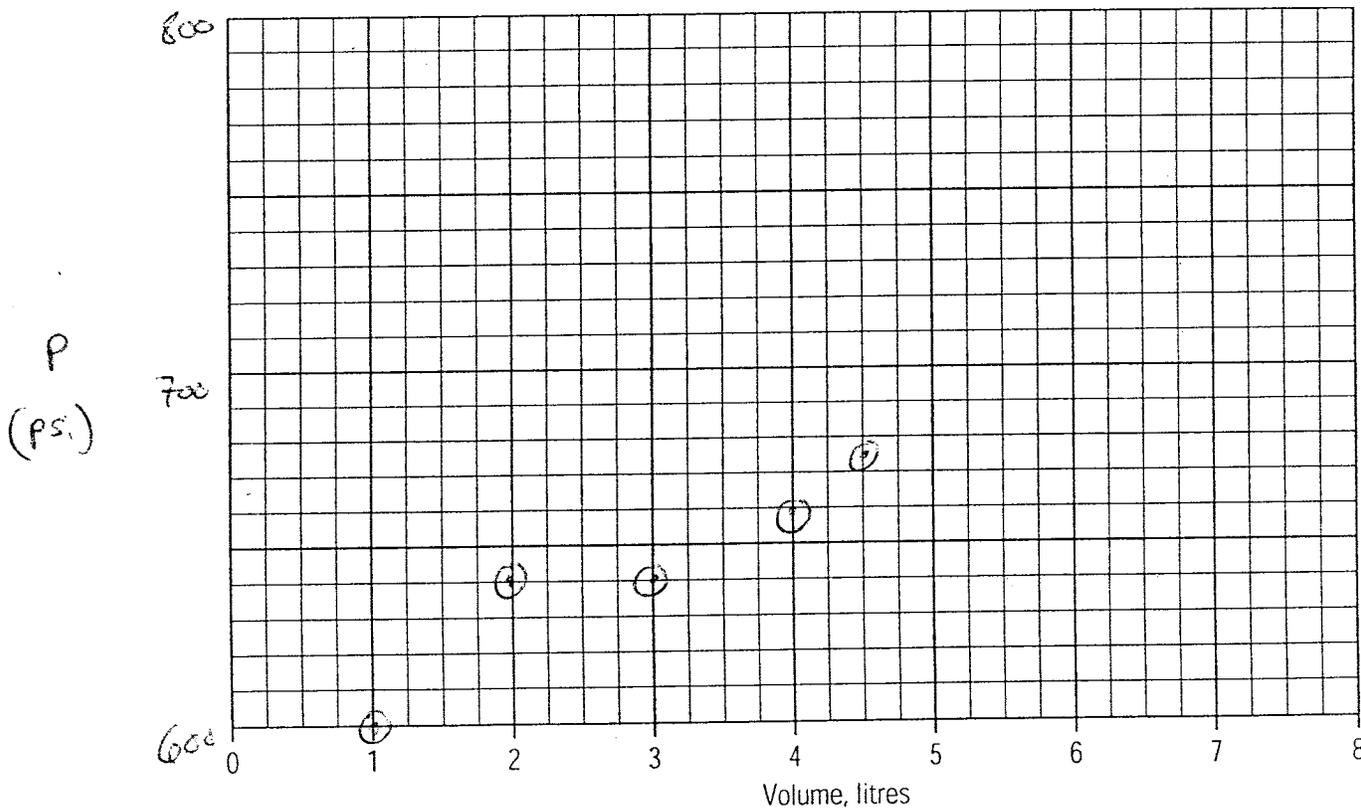
A Schlumberger Company

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-S
 Location: W MAIN ST Completed by: ML/AB Date Inflated: July 10/03
 Packer No.: 10, comp 43 Serial No.: 13315 Depth (ft/m): 497 Inflation Tool No.: TIW 1085
 Packer Valve Pressure, P_V : 135 psi Final Line Pressure, P_L : 675 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 296 (ft/m) = 130 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 150 psi

Volume, litres	1.0	2.0	3.0	4.0	4.5	4.25					
Pressure, psi	600	640	640	660	675	0					
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer 10



Westbay
Instruments Inc.

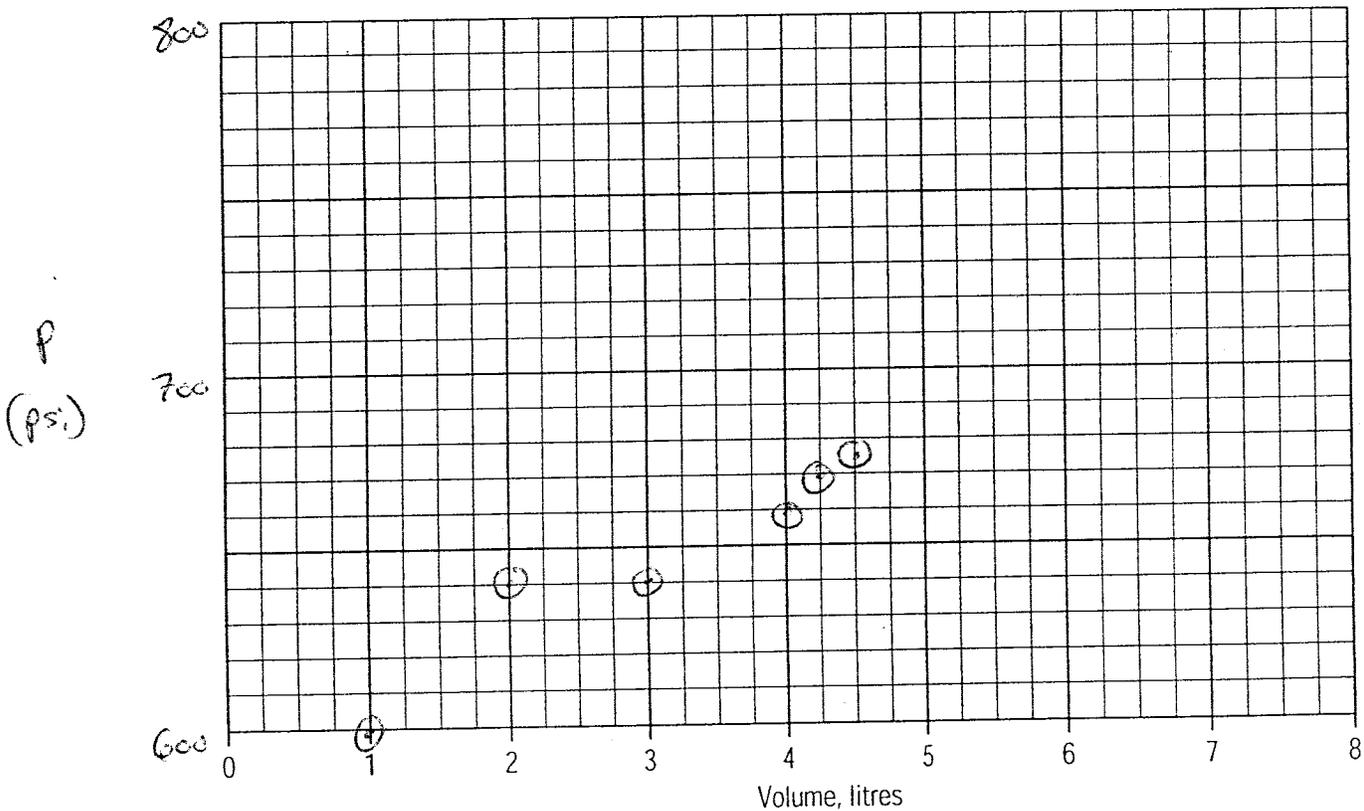
A Schlumberger Company

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-S
 Location: W MAIN ST Completed by: ML LAB Date Inflated: July 10/03
 Packer No.: 11, comp 47 Serial No.: 13317 Depth (ft) (m): 477 Inflation Tool No.: TW 1085
 Packer Valve Pressure, P_v : 130 psi Final Line Pressure, P_L : 675 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 296 (ft) (m) = 130 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 145 psi

Volume, litres	<u>1.0</u>	<u>2.0</u>	<u>3.0</u>	<u>4.0</u>	<u>4.25</u>	<u>4.5</u>	<u>4.20</u>				
Pressure, psi	<u>600</u>	<u>640</u>	<u>640</u>	<u>660</u>	<u>670</u>	<u>675</u>	<u>0</u>				
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments: Packer 11



Westbay
Instruments Inc.

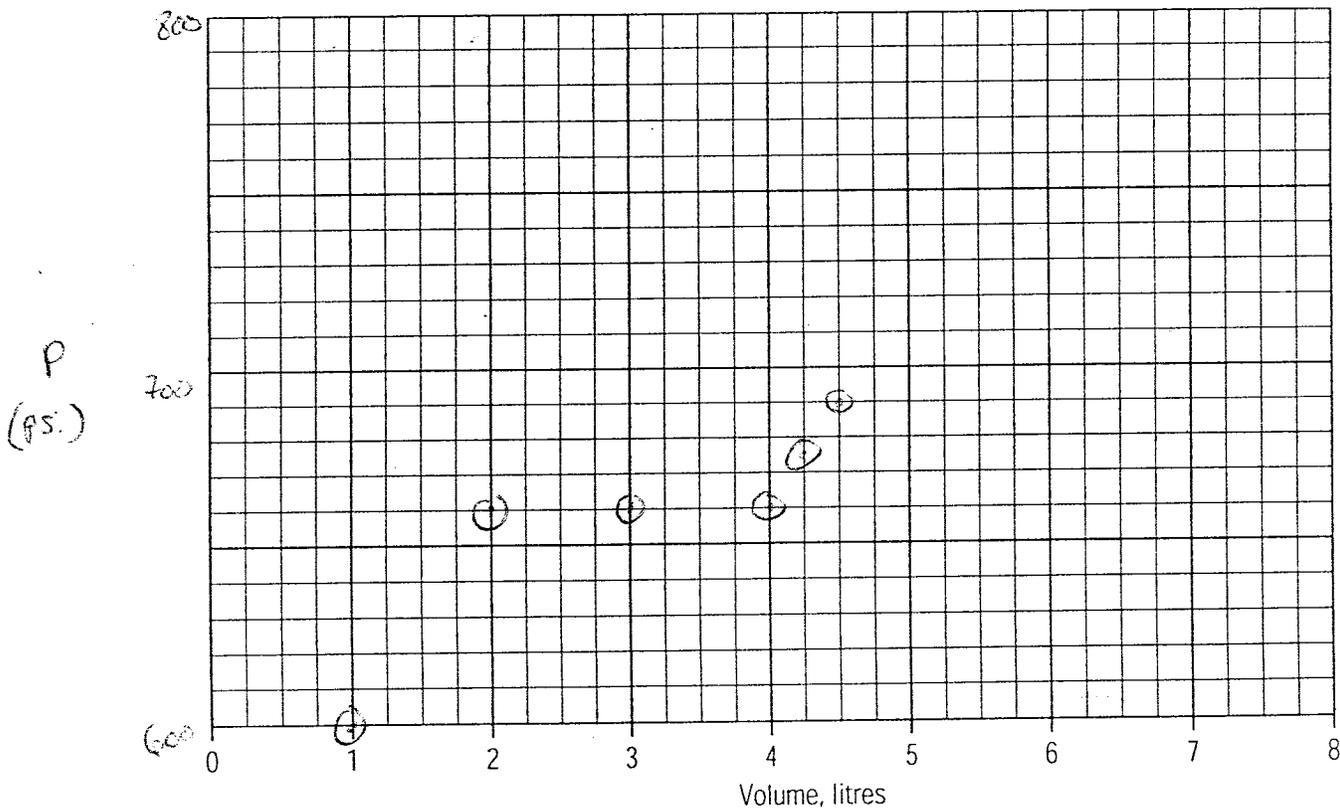
A Schlumberger Company

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-S
 Location: W MAIN ST Completed by: MLIAB Date Inflated: July 10/03
 Packer No.: Discop 49 Serial No.: 13316 Depth (ft) (m): 467 Inflation Tool No.: TW 1085
 Packer Valve Pressure, P_v : 135 psi Final Line Pressure, P_L : 690 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 276 (ft) (m) = 130 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 165 psi

Volume, litres	1.0	2.0	3.0	4.0	4.25	4.5	4.2				
Pressure, psi	600	660	660	660	675	690	0				
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer 12

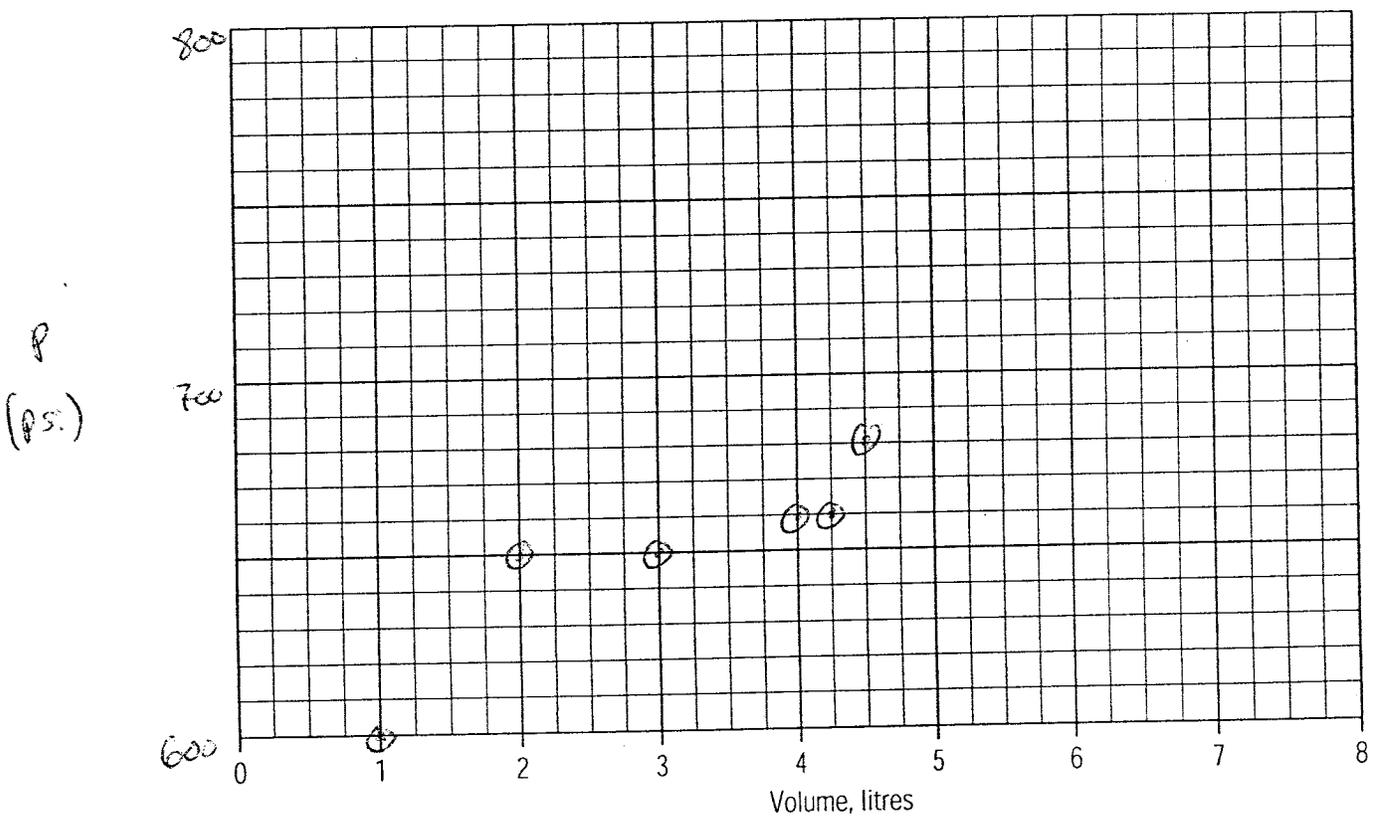


MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-S
 Location: W MAIN ST Completed by: ML LAB Date Inflated: July 10/03
 Packer No.: 13 comp 55 Serial No.: 13318 Depth (ft) m): 417 Inflation Tool No.: TW 1085
 Packer Valve Pressure, P_v : 140 psi Final Line Pressure, P_L : 680 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 296 (ft) m) = 130 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 160 psi

Volume, litres	1.0	2.0	3.0	4.0	4.25	4.5	4.7				
Pressure, psi	600	650	650	660	660	680	0				
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer 13

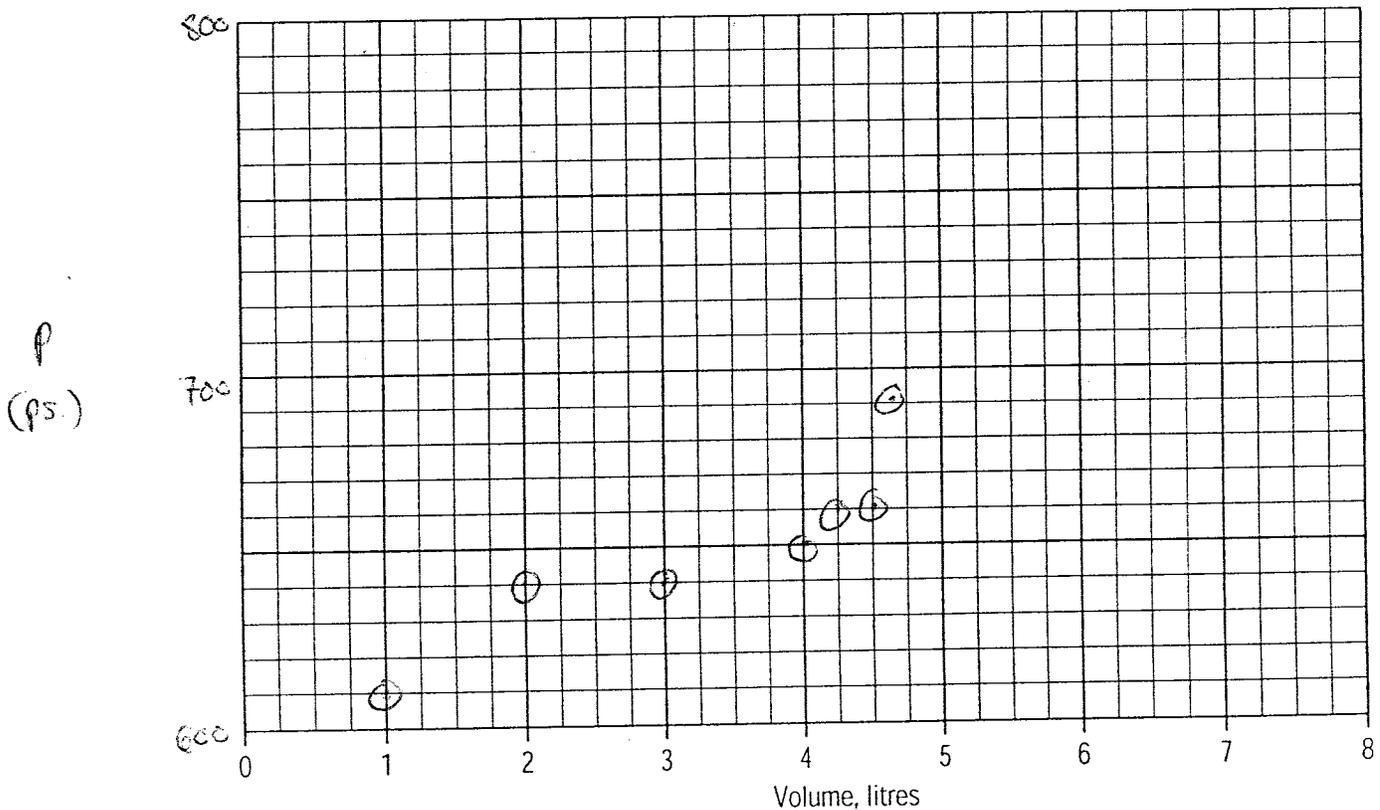


MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MWI-5
 Location: W MAIN ST Completed by: MLI AB Date Inflated: July 10/08
 Packer No.: 14 comp 59 Serial No.: 13319 Depth (ft) (m): 397 Inflation Tool No.: TW 1085
 Packer Valve Pressure, P_V : 130 psi Final Line Pressure, P_L : 690 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 276 (ft) (m) = 130 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 160 psi

Volume, litres	1.0	2.0	3.6	4.0	4.25	4.5	4.65	4.3			
Pressure, psi	610	640	640	650	660	660	690	0			
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments: Packer 14

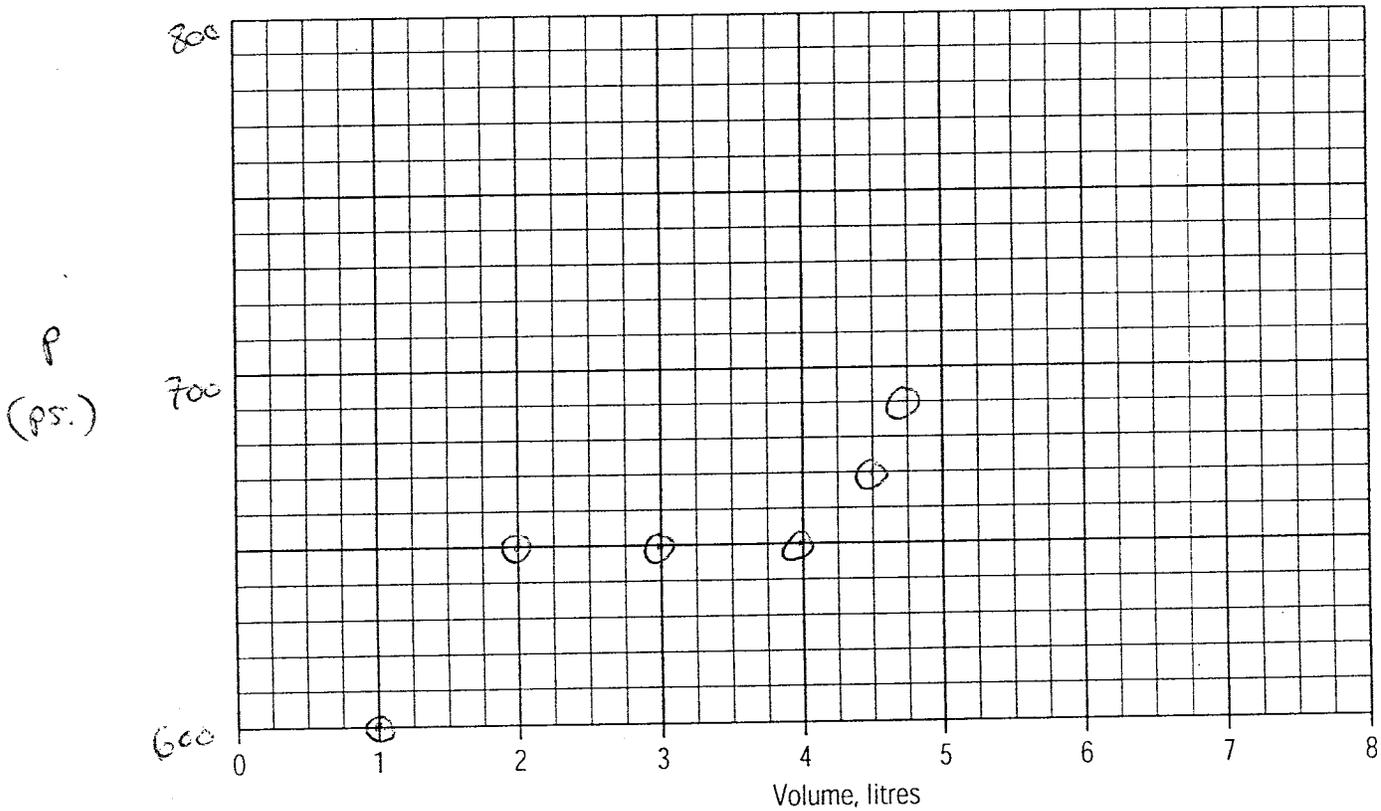


MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MWI-5
 Location: W MAIN ST Completed by: MLAB Date Inflated: July 10/03
 Packer No.: 15 Comp 61 Serial No.: 13320 Depth (ft/m): 387 Inflation Tool No.: TW 1085
 Packer Valve Pressure, P_v : 130 psi Final Line Pressure, P_L : 690 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 296 (ft/m) = 130 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_w - P_v - P_T =$ 160 psi

Volume, litres	1.0	2.0	3.0	4.0	4.5	4.75	4.95			
Pressure, psi	600	650	650	650	670	690	0			
Volume, litres										
Pressure, psi										

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments frack 15

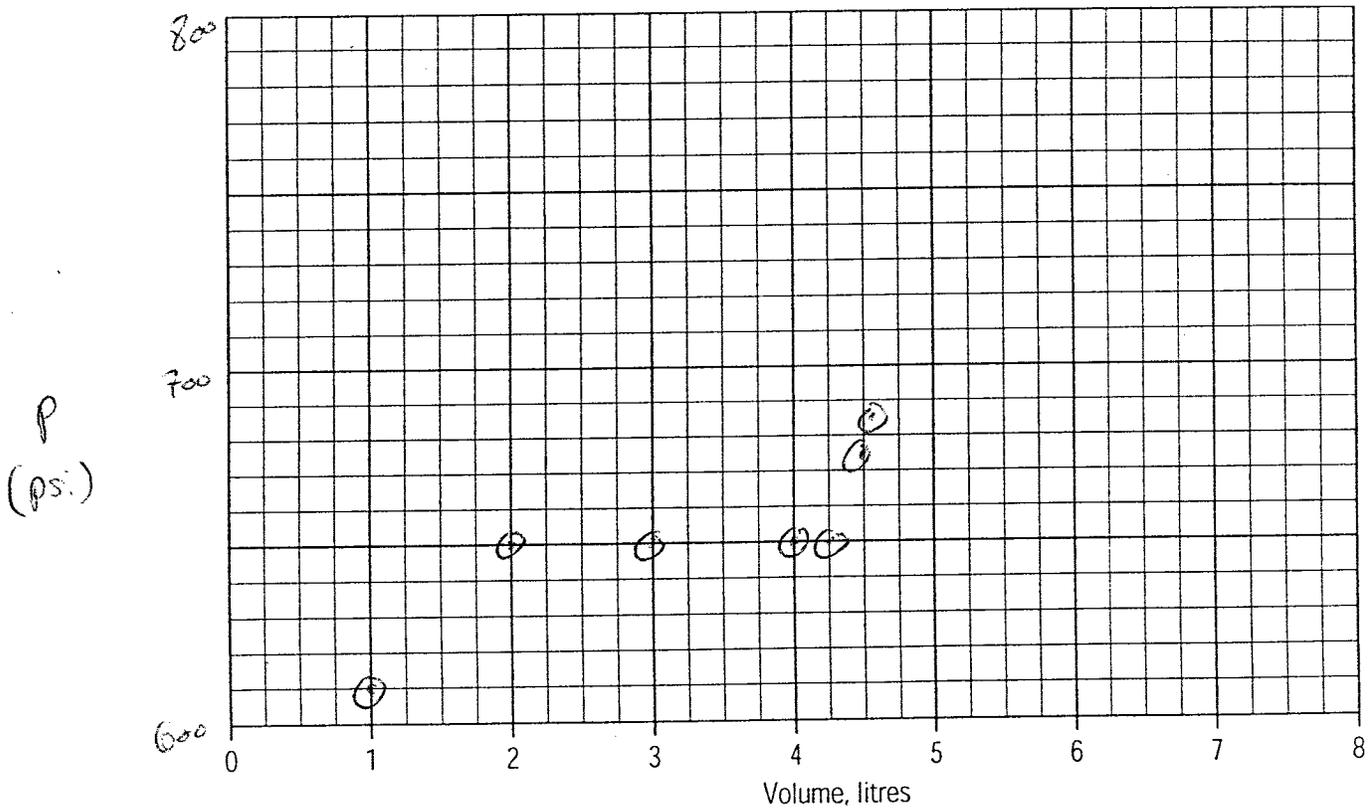


MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WB 824 Well No.: MW1-5
 Location: W MAIN ST Completed by: ML IAB Date Inflated: July 10/03
 Packer No.: 16 (comp 16) Serial No.: 13321 Depth (ft/m): 342 Inflation Tool No.: TLW 1085
 Packer Valve Pressure, P_V : 130 psi Final Line Pressure, P_L : 685 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 296 (ft/m) = 130 psi (P_W) Calculated Packer Element Pressure, $P_E = P_L + P_W - P_V - P_T =$ 155 psi

Volume, litres	1.0	2.0	3.0	4.0	4.25	4.5	4.6	4.3			
Pressure, psi	610	650	650	650	650	675	685	0			
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments: Packer 16



Westbay
Instruments Inc.

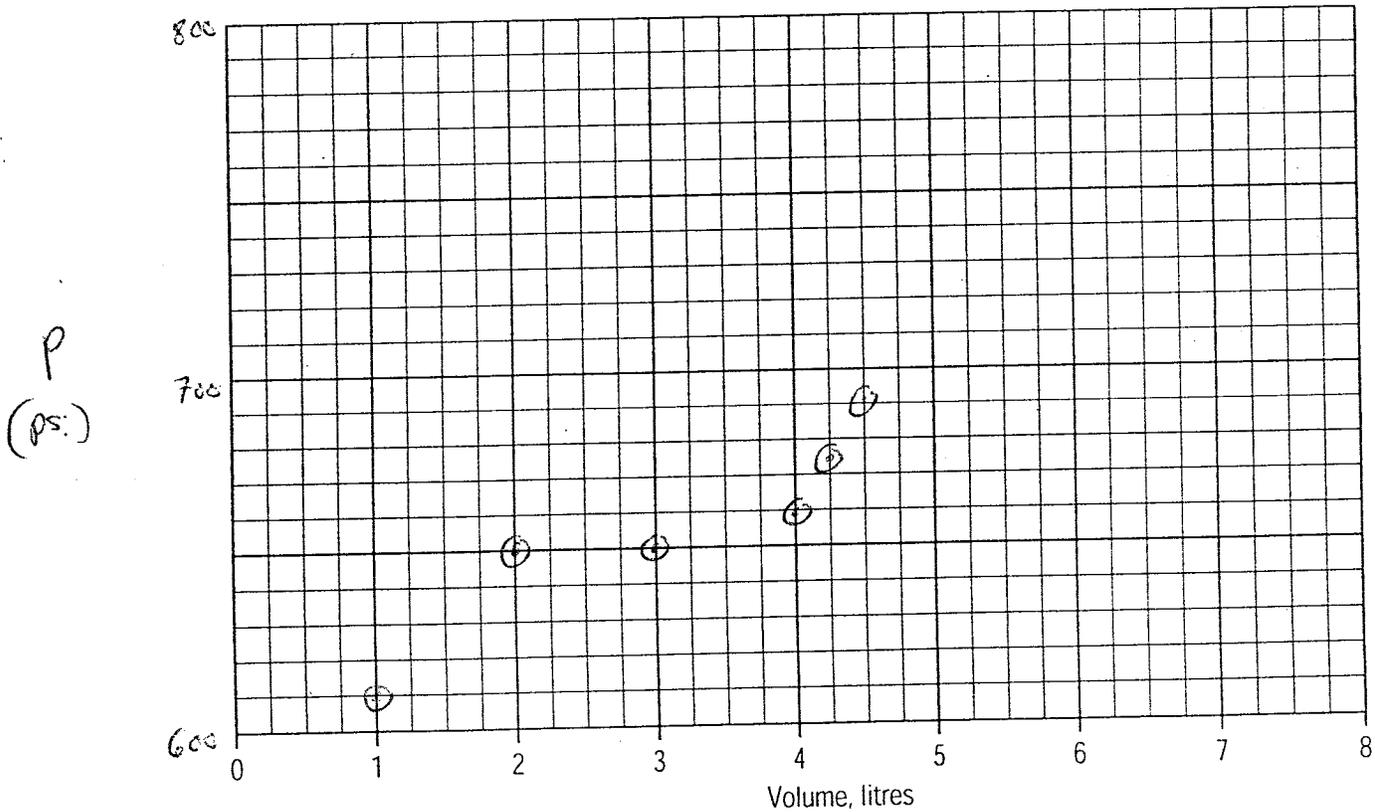
A Schlumberger Company

MP Packer Inflation Record

Project: WDC ALHAMBRA Project No.: WD 824 Well No.: MW 1-5
 Location: W MAIN ST Completed by: ML 1 AB Date Inflated: July 10/03
 Packer No.: 17, comp 70 Serial No.: 13410 Depth (ft. / m): 322 Inflation Tool No.: TIW 1085
 Packer Valve Pressure, P_v : 130 psi Final Line Pressure, P_L : 690 psi Tool Pressure, P_T : 530 psi
 Borehole Water Level: 296 (ft./m) = 130 psi (P_w) Calculated Packer Element Pressure, $P_E = P_L + P_{wv} - P_v - P_T =$ 160 psi

Volume, litres	1.0	2.0	3.0	4.0	4.25	4.5	4.25				
Pressure, psi	610	650	650	660	675	690	0				
Volume, litres											
Pressure, psi											

Plot of Gauge Pressure (psi) vs. Volume (litres)



Comments Packer 17

Appendix E
U.S. EPA Field Audit / CH2M HILL Responses to Field Audit

Field Audit Report

San Gabriel Valley NPL Area 3 Remedial Investigation

**Greg Nagle
USEPA Region 9
July 15th 2003**

Introduction:

On July, 15th, 2003 Greg Nagle conducted a field audit of groundwater sampling procedures for the San Gabriel Valley NPL Area 3 Remedial Investigation in Alhambra, California at monitoring well location MW1-3. The field audit was scheduled to coincide with sampling of a recently installed multiport well. The primary objective of the audit was to determine if sampling practices used at the site were appropriate for the determination of volatile organic compounds (VOCs), and metals in water, and consistent with the methods described by EPA's contractor CH2M-HILL. All samples were collected for analysis of VOCs and dissolved metals, by the EPA Region 9 Laboratory.

Audit Participants:

Greg Nagle of the EPA Region 9 Laboratory Field and Biology Team performed the audit. Maura Kennelly, Staff Geologist CH2M-HILL, Jeff D. Gamlin, CH2M-HILL, Staff Hydrogeologist. CH2M-HILL conducted the sampling for CH2M-HILL.

Procedures:

The audit was performed based on the procedures specified in the *Quality Assurance Project Plan (QAPP) for San Gabriel Valley NPL Area 3 Remedial Investigation, February 2003*, and the *Field Sampling Plan (FSP) for San Gabriel Valley NPL Area 3 Remedial Investigation, February 2003*. Groundwater sampling was conducted as specified in the FSP using technology provided by Westbay Instruments, Inc. CH2M-HILL personnel were well-trained, experienced and knowledgeable with respect to operation of sampling equipment, sample collection, handling, preservation, documentation and shipping procedures. Findings and recommendations are summarized below.

Findings/Recommendations:

There were no findings to indicate that the sample integrity was compromised during sample collection and handling activities. There were no findings that require immediate action. A recommendation was made immediately following each finding.

1. Finding

Section 6.2.2 of the SAP states that *'The first sample drawn at each depth will be used to measure field parameters (temperature, pH, turbidity and specific conductance) and to allow for some flushing of the instrumentation'*. The pH meter was malfunctioning at the time of the audit. This was considered of minor concern as the first sample was analyzed for (temperature, turbidity and specific conductance) and no purge or well stabilization is

required for the multiport monitoring well system.

Recommendation

Back-up equipment (such as multi-meters) should be carried into the field.

2. **Finding**

Section 6.6.3.2 of the FSP states that “In addition, carbon disulfide, tertiary butyl alcohol, methyl-isobutyl ketone and methyl ethyl ketone will be added to the list of VOCs to be analyzed by the laboratory. This will be noted on the COC that accompanies the samples to the laboratory.” This information was missing from the record for July 15th 2003. This COC was also missing the project name.

Recommendation

Add the project name, and additional compounds to COC record as specified in the FSP.

3. **Finding**

The field team collected supplemental data not specified by the work plans. This data was recorded on a form specific to the Westbay Equipment which includes formation pressure, fluid pressure, depth etc....

Recommendation

The form for the data specific to the Westbay Equipment should be included in the applicable work plan by addendum and/or, in the next revision.

4. **Finding**

Table 5-2a and Section 6.3.1 of the FSP states that “*Samples [for dissolved metals] will be placed in a 1-liter polyethylene bottles*”. In the event that only VOCs and metals are required, and samples are being sent to the Region 9 lab, the minimum volume of sample for metal analysis may be reduced from 1 liter (L) to ≥ 500 milliliters (mL). This will reduce the number of trips down the hole. The sampling probe collects volume of 1 L. After filling the 3 x 40 mL vials for VOCs, the balance (~800 mL) should be used for the metals analysis.

Recommendation

Revise FSP to indicate that when samples for metals analysis are being sent to the Region 9 laboratory, less than 1 liter of sample may be collected in a 1-liter container provided that at least 500 mL of sample is collected. This recommendation was communicated verbally to Maura Kennedy the following day.

5. **Finding**

It was unclear to field personnel how the water level at each interval is being determined. I was informed that water level was calculated using formation pressure.

Recommendation

Documentation should be provided detailing how water levels are being determined for multiport wells and included in the QAPP.

Field Audit - San Gabriel Valley NPL Area 3 Remedial Investigation

TO: Greg Nagle/U.S. EPA Region IX
FROM: Maura Kennelly/CH2M HILL
DATE: September 30, 2003

This memorandum has been prepared in response to the findings and recommendations of Mr. Greg Nagle of the U.S. Environmental Protection Agency (EPA) Region IX Laboratory Field and Biology Team. On July 15, 2003, EPA performed an audit of groundwater sampling events taking place in the San Gabriel Valley National Priorities List (NPL) Area 3. The following are CH2M HILL's responses to the U.S. EPA representative's findings and recommendations:

Response to Comment 1

Due to the malfunctioning of the onsite pH meter that particular day, it was recommended that a backup meter be brought into the field. As an alternative to the EPA representative's recommendation, the meters will be examined prior to going into the field to ensure that they are functioning properly.

Response to Comment 2

At times, it is requested in the work plan and quality assurance project plan (QAPP) that additional analytes be included in the analyses. These additions will be provided to the field team prior to each sampling event, along with the schedule of wells to be sampled and the EPA Region IX laboratory assignment and case number.

Response to Comment 3

During sample collection from the Westbay multiport wells, pressures inside and outside of the casing are collected and recorded on a Westbay form in order to calculate the depth to water when the sampling team is back in the office. Per EPA's recommendation, this form will be included in the next revision of the FSP.

Response to Comment 4

Table 5-2a and Section 6.3.1 of the FSP (EPA, 2002) state that samples being analyzed for dissolved metals will be placed in 1-liter polyethylene bottles. Maura Kennelly spoke to the Region IX laboratory staff, who indicated that only 500 milliliters of water are needed for dissolved metals analysis. This has been noted, and during future sampling events, only 500 milliliters of water will be collected.

Response to Comment 5

CH2M HILL field personnel sampling Westbay multiport wells have been trained and educated on all aspects of the Westbay system. The onsite staff at the time of the audit were able to give EPA's representative a full explanation of the calculations used to determine the water levels from pressure data collected from the Westbay wells. It is not necessary to bring documentation into the field stating how water levels are calculated, because these levels are calculated in the office using Microsoft Excel. However, a description of the pressure to water level conversion calculation will be included in the next revision of the QAPP.