National Nuclear Security Administration
Sandia Site Office
P.O. Box 5400
Albuquerque, New Mexico 87185-5400

JUN 27 2008

CERTIFIED MAIL – RETURN RECEIPT REQUESTED

Mr. James Bearzi,
Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Road East, Bldg. 1
Santa Fe, NM 87505

Dear Mr. Bearzi:

On behalf of Sandia Corporation (Sandia) and the Department of Energy (DOE), DOE is submitting a Summary Report for Technical Area V Monitoring Well Plug and Abandonment and Installation: Decommissioning of Groundwater Monitoring Well TAV-MW1 and Installation of Groundwater Monitoring Well TAV-MW10.

If you have any questions regarding this submittal, please contact me at (505) 845-6036, or Dan Pellegrino of my staff at (505) 845-5398.

Sincerely,

Kimberly A Davis for

Patty Wagner
Manager

cc w/enclosure:
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Records Center, SNL/NM, Org.6765, MS 1089
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AOP 95-45, 06

CERTIFICATION STATEMENT FOR APPROVAL AND FINAL RELEASE OF DOCUMENTS

Document title: Summary Report for Technical Area V Monitoring Well Plug and Abandonment and Installation: Decommissioning of Groundwater Monitoring Well TAV-MW1 and Installation of Groundwater Monitoring Well TAV-MW10

Document author: Mike Sanders, Department 06765

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision according to a system designed to ensure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine or imprisonment for knowing violations.

Signature: Francis B. Nimick 6/18/08
Francis B. Nimick Date
Deputy to the
Nuclear Energy and Global Security Technologies
Center 6700
Sandia National Laboratories/New Mexico
Albuquerque, New Mexico 87185
Operator

and

Signature: Kimberly A. Davis for 6/27/08
Patty Wagner Date
Manager
U.S. Department of Energy
National Nuclear Security Administration
Sandia Site Office
Owner and Co-Operator

Sandia National Laboratories/New Mexico

SUMMARY REPORT FOR TECHNICAL AREA V MONITORING WELL PLUG AND ABANDONMENT AND INSTALLATION

Decommissioning of
Groundwater Monitoring Well TAV-MW1
Installation of
Groundwater Monitoring Well TAV-MW10

June 2008

Environmental
Restoration
Project

United States Department of Energy
Sandia Site Office

Sandia National Laboratories is a multiprogram laboratory managed and operated by Sandia Corporation, a wholly-owned subsidiary of Lockheed Martin Corporation, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL8500

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ACRONYMS AND ABBREVIATIONS

AOP	administrative operating procedure
ARCH	air rotary casing hammer
bgs	below ground surface
BV	bore volume
°C	degrees Celsius
DO	dissolved oxygen
DOE	U.S. Department of Energy
ER	Environmental Restoration
ft	foot, feet
FOP	field operating procedure
ID	inside diameter
KAFB	Kirtland Air Force Base
mg/L	milligrams per liter
mS/cm^3	millisiemens per cubic centimeter
MV	millivolts
NNSA	National Nuclear Safety Administration
NTU	nephelometric turbidity unit
NMED	New Mexico Environment Department
NMOSE	New Mexico Office of State Engineer
NOD	Notice of Deficiency
OD	outside diameter
pH	potential of hydrogen
P&A	plug and abandon
PVC	polyvinyl chloride
Sandia	Sandia Corporation
SNL/NM	Sandia National Laboratories/New Mexico
TA-V	Technical Area V
TD	total depth
WDC	WDC Exploration and Wells

1.0 INTRODUCTION

This report documents the activities for the plugging and abandoning (P&A), and the installation of groundwater monitoring wells at Technical Area V (TA-V) at Sandia National Laboratories/New Mexico (SNL/NM). The activities were performed in January through March 2008 by the SNL/NM Environmental Restoration (ER) Project personnel and the drilling contractor WDC Exploration and Wells (WDC).

1.1 Regulatory Action

On April 20, 2007, the U. S. Department of Energy (DOE) National Nuclear Security Administration (NNSA) and Sandia Corporation (Sandia), hereinafter referred to as NNSA/Sandia, submitted to the New Mexico Environment Department (NMED) a Well Plug and Abandonment and Replacement Plan for groundwater monitoring well TAV-MW1 (SNL/NM April 2007).

However, in June 2007, the NMED issued a Notice of Disapproval (NOD) regarding this plan (Bearzi June 2007). The NOD listed 13 items that needed to be addressed in a revised plan.

In August 2007, NNSA/Sandia submitted the revised *Monitoring Well Plug and Abandonment Plan and Replacement Well Construction Plan: Decommissioning of Groundwater Monitoring Well TAV-MW1 and Installation of Replacement Groundwater Monitoring Well TAV-MW10* (the Plan) to the NMED (SNL/NM August 2007). The revised plan addressed the issues listed in the NOD. The NMED issued a Notice of Approval on October 26, 2007 (Bearzi October 2007).

1.2 Site Description and History

TA-V is located on federally owned land controlled by Kirtland Air Force Base (KAFB) and permitted to the U.S. Department of Energy (DOE). TA-V is located in the central part of KAFB, south of the City of Albuquerque (Figure 1-1). TA-V facilities are designed to test radiation effects on components. These facilities include two research reactors, an intense gamma irradiation facility, and a hot-cell facility. Historically, wastewater containing contaminants derived from these facilities was disposed to drainfields, seepage pits, and unlined ponds.

Numerous subsurface investigations have been conducted in conjunction with surface remediation activities at TA-V. These investigations have resulted in a substantial body of information available in a series of publications and other data sources concerning elements of conceptual models of contaminant release and transport through the vadose zone and Santa Fe Group aquifer (SNL/NM April 2004).

After the replacement of TAV-MW1 with TAV MW10, the current TA-V groundwater monitoring well network consists of thirteen wells completed within interfingering alluvial fan and fluvial deposits of the Upper Santa Fe Group (Figure 1-2) (SNL/NM April 2004) . The current TA-V monitoring well network includes three background wells (TAV-MW3, AVN-1, and AVN-2), eight performance wells (TAV-MW2, TAV-MW4, TAV-MW6, TAV-MW7, TAV-MW8, TAV-MW9, the new TAV-MW10, and LWDS-MW1), and two sentry wells (TAV-MW5 and LWDS-MW2). With the exception of AVN-1 (constructed of 5-inch stainless steel), the TAV monitoring wells are constructed of nominal 5-inch, Schedule 80 polyvinyl chloride (PVC) casing, and have 20-foot (ft) long slotted Schedule 80 PVC screens.

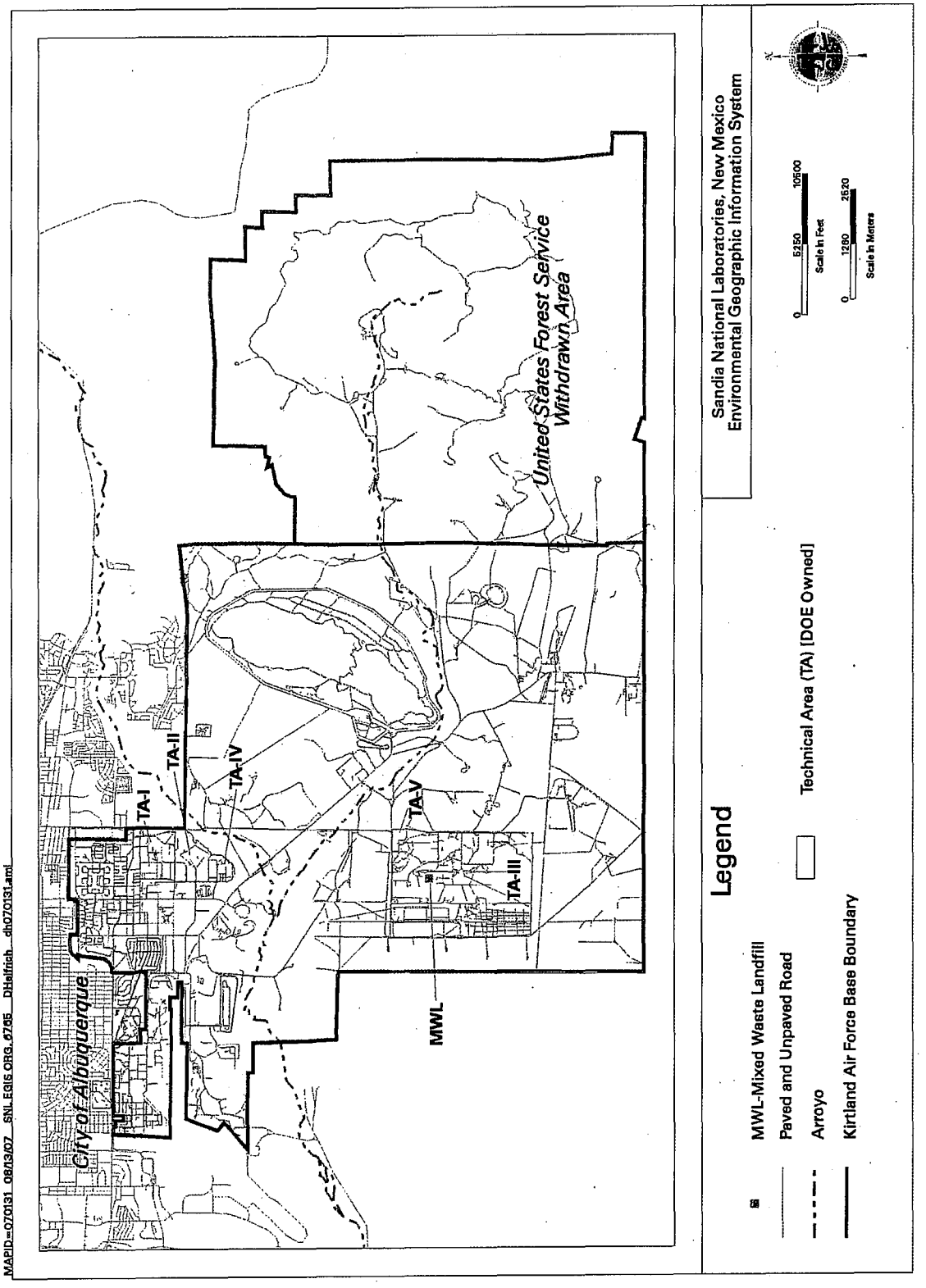

Figure 1-1. Location Map of Sandia National Laboratories and Kirtland Air Force Base

Groundwater levels have been declining in the regional aquifer throughout the SNL/NM and KAFB area, and monitoring well TAV-MW1, installed in 1995, contained less than 1 ft of water when it was last measured in December 2007. For this reason, TAV-MW1 was decommissioned and new replacement monitoring well TAV-MW10 was installed at a location approximately 10 feet (ft) west of TAV-MW1. (Figure 1-2).

1.3 Objective

The objective of this project was to successfully P&A TAV-MW1 by grouting the well in situ and to install replacement well TAV-MW10. This report is organized in chronologic order of activities: the P&A of TAV-MW1, the drilling and installation of TAV-MW10, and the development of TAV-MW10.

The report meets the reporting requirements of the NMED and the New Mexico Office of the State Engineer (NMOSE). The NMED Compliance Order on Consent (the Order) specifies the required elements for reporting on installation of monitoring wells (NMED April 2004) (Attachment A). The NMOSE requirements and guidance can be found in *Rules and Regulations Governing Well Driller Licensing; Construction, Repair and Plugging of Wells* (NMOSE August 2005).

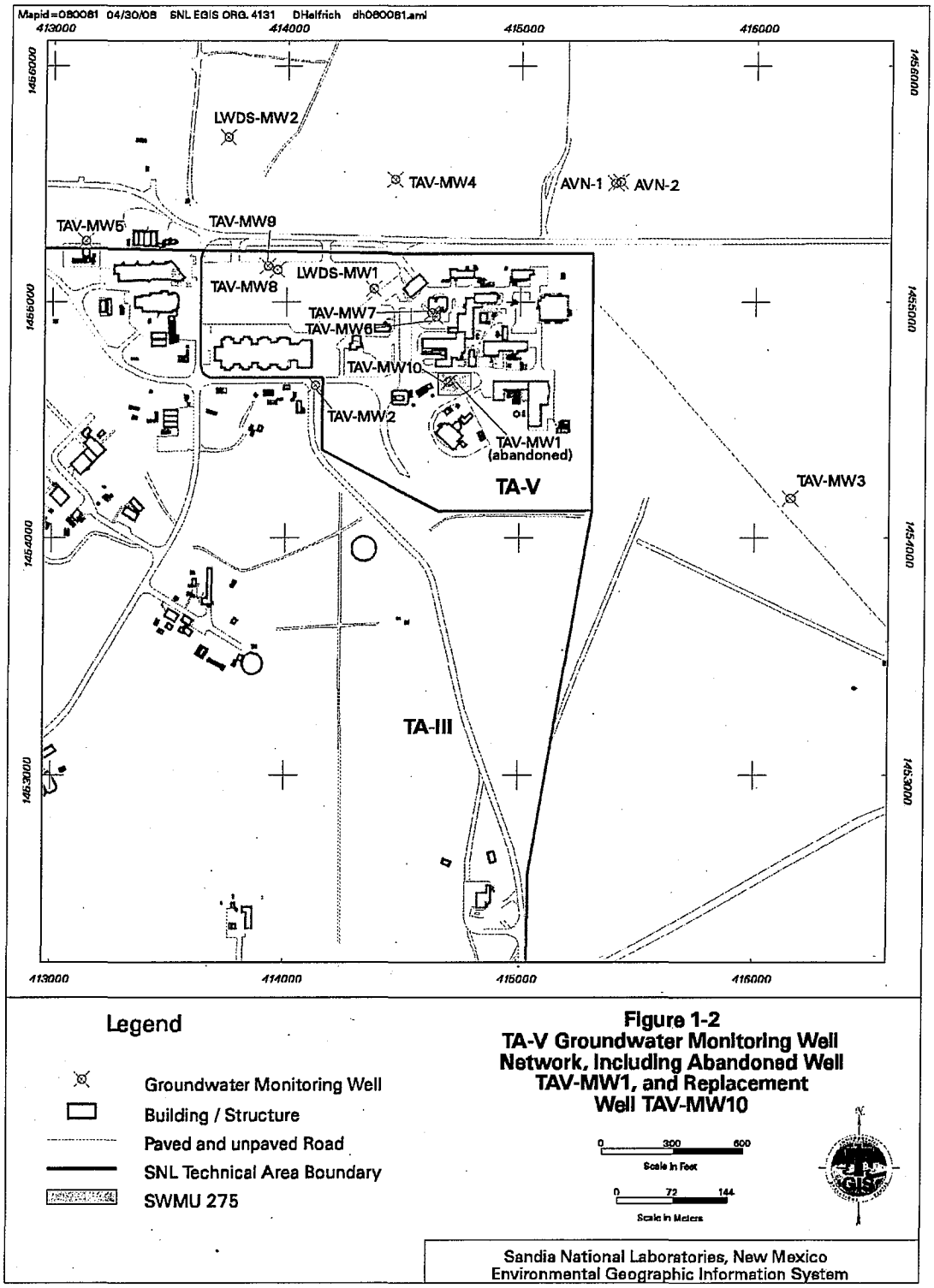

Figure 1-2. TA-V Groundwater Monitoring Well Network, Including Abandoned Well TAV-MW1, and Replacement Well TAV-MW10

2.0 PLUG AND ABANDONMENT

The monitoring well TAV-MW1 was plugged in situ on January 30 and February 5, 2008. A Groundwater Well Abandonment Diagram is included as B. On January 30 bentonite slurry grout mix was pumped into the well casing and screen with a portable grout plant. Grout was pumped through tubing placed at the bottom of the well and was pulled up as well was filled. The well was grouted from the bottom of the well at 509.5 ft below ground surface (bgs) to within approximately 20 ft of the surface and allowed to set overnight. A total of approximately 670 gallons of bentonite grout (consisting of twenty-eight 50-pound bags of bentonite and water) were pumped into the well on January 30. On February 5, the well and open portion of the annulus was filled to close to the surface by mixing bentonite grout in a tub, and pumping it into the well. The existing 5-ft length of protective conductor casing, concrete well pad, and steel guard posts were then removed from the surface of the well head at that time. On February 6, 2008, the well and annulus were filled to within 2 ft of the surface with coarse bentonite chips. The final 2 ft of the well and annulus were then filled with concrete, and a 3-ft by 3-ft concrete well monument was constructed over the location of the former well, and a brass marker was set in the monument. The marker was stamped with the abandoned well name, date of P&A, and well depth. Field notes for the TAV-MW1 P&A are provided as Attachment C.

3.0 DRILLING AND WELL INSTALLATION

All drilling, well installation, and well development operations were performed by WDC and were supervised by SNL/NM ER Project personnel. No geophysical logging was completed in this borehole. The borehole for TAV-MW10 was drilled using the air rotary casing hammer (ARCH) method.

The following sections describe the borehole drilling, lithologic logging, and well construction. Complete field documentation, field forms, daily driller reports, and lithologic logs, are on file at the SNL/NM Customer-Funded Records Center. Field notes for the installation and construction of TAV-MW10 are also included as Attachment C.

3.1 Drilling Operations

Prior to the start of drilling operations in TA-V, the drilling equipment (a Speedstar 30K drilling rig and associated equipment) was decontaminated at the ER Project decontamination pad in TA-III prior to the start of drilling operations. Drilling of the borehole for well TAV-MW10 commenced on January 31, 2008. The first 200 ft of borehole was advanced with a tricone bit and with 11 3/4-inch outside diameter (OD) drive casing to accommodate drilling through caliche and gravel zones. At 200 ft bgs, the bit and drive casing was switched to 9 5/8-inch OD and the smaller drive casing was telescoped into the larger diameter drive casing. This telescoping procedure was used to reduce the buildup of borehole wall friction, and mitigate difficulties in removing the drive pipe if only one diameter had been used for the entire length of the borehole. The depth to water in the adjacent well TAV-MW1 (located approximately 10 ft east of the drilling location) was approximately 510 ft bgs in December 2007 before it was decommissioned, and the total depth (TD) of the replacement well TAV-MW10 borehole TD was determined and planned for based upon this known water level at the site. The TD of the cased borehole (539 ft bgs) was achieved on February 2, 2008.

3.2 Lithologic Logging

A lithologic log based on the cuttings returned from the borehole was generated by the ER Project geologist. A combination diagram showing the lithologic log, and well construction details is included as Attachment D.

The surface geology in the TA-V area is characterized by a veneer of post-Santa Fe Group aeolian sediments underlain by late Pliocene to Pleistocene upper Santa Fe Group alluvial fan deposits. These alluvial fan deposits extend to, and below the water table in the TA-V area, and originated in the Manzanita Mountains east of TA-V. They typically consist of a mixture of silts, sands, and gravels that are poorly sorted, and exhibit moderately connected lenticular bedding. Individual beds range from 1 to 5 ft in thickness with a preferred east-west orientation and have moderate to low hydraulic conductivities (SNL/NM March 1996).

From the surface to 80 ft bgs, the TAV-MW10 borehole penetrated a mixture of gravel, sand, and silt, with gravel fragments up to 1.5 inches in diameter. Sediments from 80 to 512 ft bgs consisted predominantly of fine-grained silty sand and clayey sandy silt. This interval also contained relatively thin layers of mixed gravel, sand, and silt from 343 to 348, 435 to 448, and 499 to 503 ft bgs. A relatively coarse interval consisting of a mixture of gravel (with fragments up to 3 inches in diameter), sand, and silt was then penetrated at approximately two ft below the water table (at 510 ft. bgs) and was present from

512 to 531 ft bgs. The bottom 8 ft of the borehole from 531 to 539 ft bgs penetrated relatively fine silts and sands.

3.3 Initial Groundwater Level and Well Construction

As borehole drilling penetrated the saturated zone starting at approximately 510 ft bgs, cuttings returns to the surface became increasingly sparse because the damp fine-grained sediments were sticking to the interior of the drive pipe. The cuttings indicated that the lithology changed from relatively fine, low hydraulic conductivity material (clayey sandy silt) to significantly coarser sediments at a depth of 512 ft bgs. Water injection was started at 517 ft bgs to facilitate return of the cuttings to the surface. The coarser material persisted to 531 ft bgs, and then appeared to change back into relatively fine grained sediments to the bottom of the borehole at 539 ft bgs.

Since this new borehole was located only about 10 ft away from the TAV-MW1 well, and it was known that the last water level in that well (measured in December 2007) was approximately 510 ft bgs, it was concluded that the new well could be designed and constructed without waiting overnight for the static water level to recover in the borehole. Well installation therefore began on the same day that the borehole TD was achieved (February 2, 2008), and commenced as soon as the drill bit and pipe were tripped out of the hole. The well was constructed of nominal 5-inch diameter (inside diameter [ID] of 4.767 inches and OD of 5.563 inches) Schedule 80 PVC flush-threaded blank casing and a 20-ft length of 0.020-inch slot schedule-80 PVC screen. This screen slot size was specified in the Plan to accommodate the relatively coarse sands and gravels present in most of the screened interval. The sump consisted of a 5-ft length of nominal 5-inch diameter Schedule 80 PVC flush-threaded blank casing with a threaded end cap placed at the bottom.

The bottom of the 5-ft-long sump in well TAV-MW10 was placed at 533 ft bgs and the 20-ft screen section was placed from 508 to 528 ft bgs. Most of the 20-ft well screen was installed in the relatively coarse, transmissive unit encountered from 512 to 531 ft bgs in the borehole. Approximately 6 ft of #10-20 sand (Colorado Silica Sand) was used to backfill the borehole below the sump from 539 to 533 ft bgs. The #10-20 sand was also used as the primary sand pack in the annulus around the screen, and also 9 ft above the top of the screen to 499 ft bgs. A 5-ft secondary sand pack layer using #40-60 Colorado Silica sand was then placed from 499 to 494 ft bgs. A 39-ft volclay coarse chip plug was then placed above the secondary sand pack, from 494 to 455 ft bgs. The chip plug was then hydrated with approximately 150 gallons of water, and was allowed to set for more than one hour. A bentonite grout mixture (consisting of a ratio of three 50-pound bags of sand-sized bentonite product mixed with 100 gallons of water) was used to fill the annulus from 455 to 7 ft bgs. The first lift of approximately 120 ft of grout was placed and allowed to set for 24 hours. The subsequent lifts of grout were placed in approximately 100-ft lifts and allowed to set for a minimum of approximately one hour. Figure 3-1 shows well construction activities taking place on February 4, 2008. The final grout lift was installed on February 5, 2008, and was brought to 7 ft bgs. The drive pipe was tripped out of the borehole as well construction materials were added, with care being taken to keep the bottom of the drive pipe below the top of the construction materials at all times during well construction, to prevent collapse of the borehole. The Well Construction Diagram for TAV-MW10 is provided in Attachment E.

3.4 Wellhead Construction

A 10-ft length of nominal 12-inch diameter steel casing was used as the protective casing at the surface. On February 6, 2008 the casing was placed approximately 7-ft below ground and 3-ft above and was equipped with a hinged locking cap. A fitted locking well cap was also placed on the PVC casing. Concrete was placed in the annulus from the top of the grout at 7 ft bgs to the surface. A 3-ft by 3-ft pad was built around the casing and a brass marker cap was placed in the pad denoting the well name. Three steel guard posts were placed around the pad, and the posts and the protective casing were painted yellow.

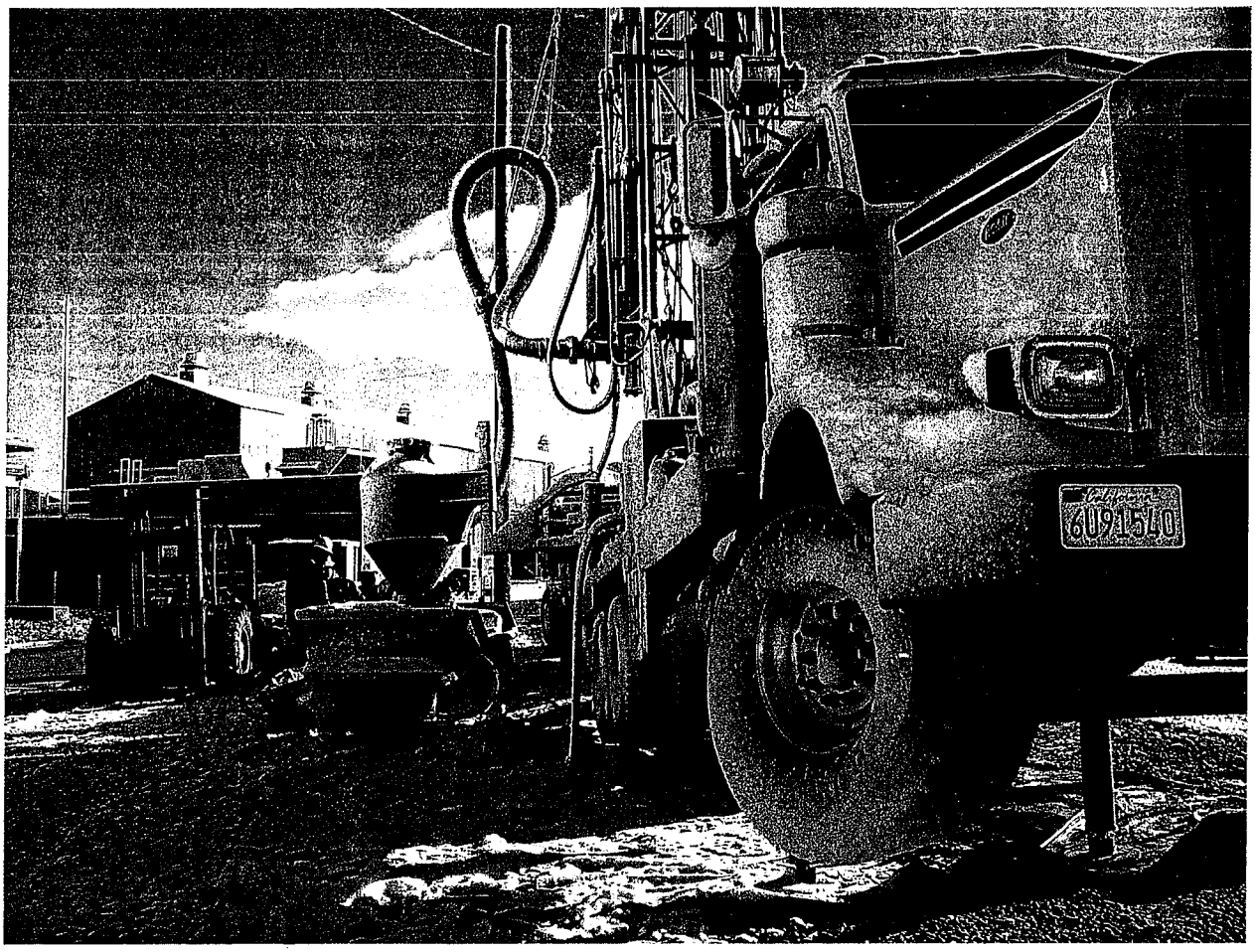

Figure 3-1. TAV-MW10 Well Construction Activities on February 4, 2008. View Looking Northeast.

4.0 WELL DEVELOPMENT

Well development of TAV-MW10 was conducted March 12 and 13, 2008, in accordance with the Well Development Field Operating Procedure (FOP) 94-41 (SNL/NM November 1994). The well was developed with a WDC development rig. The pre-development water level reading taken on March 12, 2008, was approximately 509.5 ft bgs. The calculated saturated well bore volume (BV) includes the saturated portion of the screen, and the pore space [estimated to be 30 percent] in the portion of the annular gravel pack surrounding the saturated portion of the screen) was approximately 33 gallons.

Water quality parameters required by FOP 94-41 were measured and recorded with a flow-through meter during the well development, including:

- Temperature (degrees Celsius [°C])
- Specific Conductivity (millisiemens/cubic centimeter [mS/cm^3])
- pH (potential of hydrogen), and
- Turbidity (measured in nephelometric turbidity units [NTUs]).

Additional water measurements not required by FOP 94-41 that were recorded during purging included:

- Oxygen-reduction potential (millivolts [MV])
- Dissolved oxygen (DO), percent
- Dissolved oxygen (milligrams per liter [mg/L])

The development began by initially removing accumulated fine sediment in the well sump with a stainless steel bailer (very little sediment was recovered from the sump). The well screen was then swabbed for approximately 30 minutes, and the bailer was then used to evacuate 150 gallons of very turbid (much greater then 1000 NTUs) water from the well. The well screen was then swabbed a second time for approximately 30 minutes, and another 150 gallons of turbid water was bailed. The well was swabbed for a third and final time, followed by bailing another 150 gallons of water. A total of 450 gallons (13.6 BVs) of water was bailed from the well, and it continued to be fairly turbid (approximately 1000 NTUs) when bailing was discontinued on March 12, 2008.

On the following day (March 13, 2008) an electric submersible pump was installed into the well, with the bottom of the pump placed at 525 ft bgs (3 ft above the bottom of the screen). An additional 200 gallons of water were pumped from the well with the pump. Water quality parameters were stable (less than 10% variability over at least 3 consecutive well bore volumes) at conclusion of pumping, and the water was visually clear of suspended solids. The final turbidity measurement was 1.66 NTUs, compared to the goal of less then 5 NTUs. A total of 650 gallons (approximately 20 BVs) were bailed and pumped from the well over the two days of development.

At the conclusion of development the static water level was measured at approximately 509.6 ft bgs, very similar to the initial pre-development measurement of 509.5 ft bgs. A summary of the water quality parameters measured during pumping are presented in Table 4-1. The Well Development Forms are provided as Attachment F.

Table 4-1. Summary of Water Quality Parameters During TAV-MW10 Well Development

Date, Time	Well Evacuation Method	Cumulative Gallons Removed	Temperature (°C)	Specific Conductivity (mS/cm^3)	pH	Turbidity (NTUs)
3/12/08:						
1021	bailing	50	19.56	0.583	8.02	>1000
1040	bailing	100	20.27	0.584	7.82	>1000
1100	bailing	150	20.50	0.582	7.79	>1000
1146	bailing	200	20.55	0.582	7.75	>1000
1206	bailing	250	20.66	0.585	7.73	>1000
1322	bailing	300	20.80	0.583	7.65	>1000
1432	bailing	350	21.01	0.586	7.62	>1000
1501	bailing	400	20.81	0.584	7.59	>1000
1528	bailing	450	20.63	0.582	7.58	1000
3/13/08:						
814	subm. pump	500	20.45	0.584	7.83	5.98
826	subm. pump	550	21.45	0.579	7.67	2.4
837	subm. pump	600	20.86	0.579	7.56	1.56
847	subm. pump	650	21.54	0.580	7.47	1.66

ft = feet
°C = degrees Celsius
mS/cm^3 = millisiemens/cubic centimeter
NTUs = Nephlemetric turbidity units
pH = potential of hydrogen
subm. = submersible

5.0 VARIANCES

All FOPs and Administrative Operating Procedures (AOPs) cited in the Plan (SNL/NM August 2007) were followed. Two variances from the Plan occurred during installation of TAV-MW10, including:

- Section 5.1 of the Plan states that TAV-MW10 will be installed at a location approximately 50 ft away from TAV-MW1. However, because of the severe space limitations due to existing infrastructure, fences, and buried and overhead utilities at the site, TAV-MW10 was drilled approximately 10 ft west of TAV-MW1.

- Section 5.2.1 of the Plan specified that the cased borehole will be logged using natural gamma and neutron wire-line geophysical methods. However, no geophysical logging was conducted in the borehole because geophysical was performed in adjacent TAV-MW1 borehole in 1995. Also, the depth to water in well TAV-MW1 was known, and logging was not required to help determine the initial depth to water at the TAV-MW10 borehole location.

6.0 REFERENCES

Bearzi, J. (New Mexico Environment Department Hazardous Waste Bureau), June 2007. Letter to P. Wagner (U.S. Department of Energy) and F. Nimick (Sandia National Laboratories), RE: Notice of Disapproval: Monitoring Well Plug and Abandonment Plan and Replacement Well Construction Plan, Decommissioning of Groundwater Monitoring Well MWL-BW1, Installation of Replacement Groundwater Monitoring Well MWL-BW2, April 9, 2007, Sandia National Laboratories, NM5890110518, HWB-SNL-07-014. June 19, 2007.

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ATTACHMENT A

Well Data Required by the NMED Compliance Order on Consent for TAV-MW10

Items Required by the Order[a] Section VIII.D	Comments
1. Well name/number	TAV-MW10
2. Date of well construction	February 6, 2008 (completion)
3. Drilling method	Air rotary casing hammer
4. Drilling contractor and name of driller	WDC Exploration and Wells, Mark Green
5. Borehole diameter and well casing diameter	Borehole: 11 3/4 inches 0 to 200 ft bgs, 9 5/8 inches 200 to 539 ft bgs
	Well casing: 5.563 inches OD, 4.767 inches ID
6. Well depth	533 ft bgs (borehole depth 539 ft bgs)
7. Casing length	535.35 ft total (533 ft bgs, 2.35 ft above ground)
8. Casing materials	Schedule 80 PVC
9. Casing and screen joint type	Flush thread
10. Screened interval(s)	508 to 528 ft bgs
11. Screen materials	Schedule 80 PVC
12. Screen slot size and design	0.020-inch slotted screen
13. Filter pack material and gradation	Primary: #10-20 silica sand
	Secondary: #40-60 silica sand
14. Filter pack volume (calculated and actual)	Calculated: 14 ft^3, (28) 50-lb bags
	Actual: 18 ft^3, (36) 50-lb bags
15. Filter pack placement method	Gravity feed through drive casing
16. Filter pack interval(s)	Primary: 539 to 499 ft bgs
	Secondary: 499 to 494 ft bgs
17. Annular sealant composition	Volclay chip plug, bentonite grout
18. Annular sealant placement method	Gravity feed through drive casing
19. Annular sealant volume (calculated and actual)	Calculated: Plug 13.3 ft^3, (17.7 50-lb bags Grout 1st 100-ft lift, 35.0 ft^3, 300 gallons Grout 2nd through 4th approx. 100-ft lifts, approx. 1280 gallons total (brought to 7 ft bgs)
	Actual: Plug: 15.8 ft^3, (21 50-lb bags of chips) Grout 1st 100-ft lift (not tagged), 35.0 ft^3, 300 gallons Grout 2nd through 4th approx. 100-ft lifts, approx. 1280 gallons total (brought to 7 ft bgs)
20. Annular sealant interval(s)	Plug: 494 to 455 ft bgs
	Grout: 455 to 7 ft bgs
21. Surface sealant composition	Concrete
22. Surface seal placement method	Gravity feed into annulus
23. Surface sealant volume (calculated and actual)	Calculated: 2.45 ft^3
	Actual: not recorded, placed concrete 7 to 0 ft bgs
24. Surface sealant interval	7 to 0 ft bgs
25. Surface seal and well apron design and construction	3-ft by 3-ft by approximately 4-inch deep concrete pad
26. Well development procedure and turbidity measurements	Stainless steel bailer and submersible pump (see Table 4-1 for turbidity measurements)
27. Well development purge volume(s) and stabilization parameter measurements	Total of 650 gallons (see Table 4.1 for parameter measurements)
28. Type and design and construction of protective casing	10-ft length of 12-inch diameter steel casing with hinged cap (7 ft bgs and 3 ft above ground)
29. Well cap and lock	Hinged cap on protective casing with padlock and locking well cap with padlock on well casing
30. Ground surface elevation	5431.95 ft amsl
31. Survey reference point elevation on well casing	5434.3 ft amsl
32. Top of monitoring well casing elevation	5434.3 ft amsl
33. Top of protective steel casing elevation	5434.98 ft amsl (locking cover removed)

Items Required by the Order[a] Section VIII.D	Comments
34. Name of geologist	Mike Sanders
35. Initial water level	509.5 ft bgs (pre-development water level, March 12, 2008)
36. Final water level	509.6 ft bgs (post-development water level, March 13, 2008)
37. Date of well development	March 13, 2008 (completed)

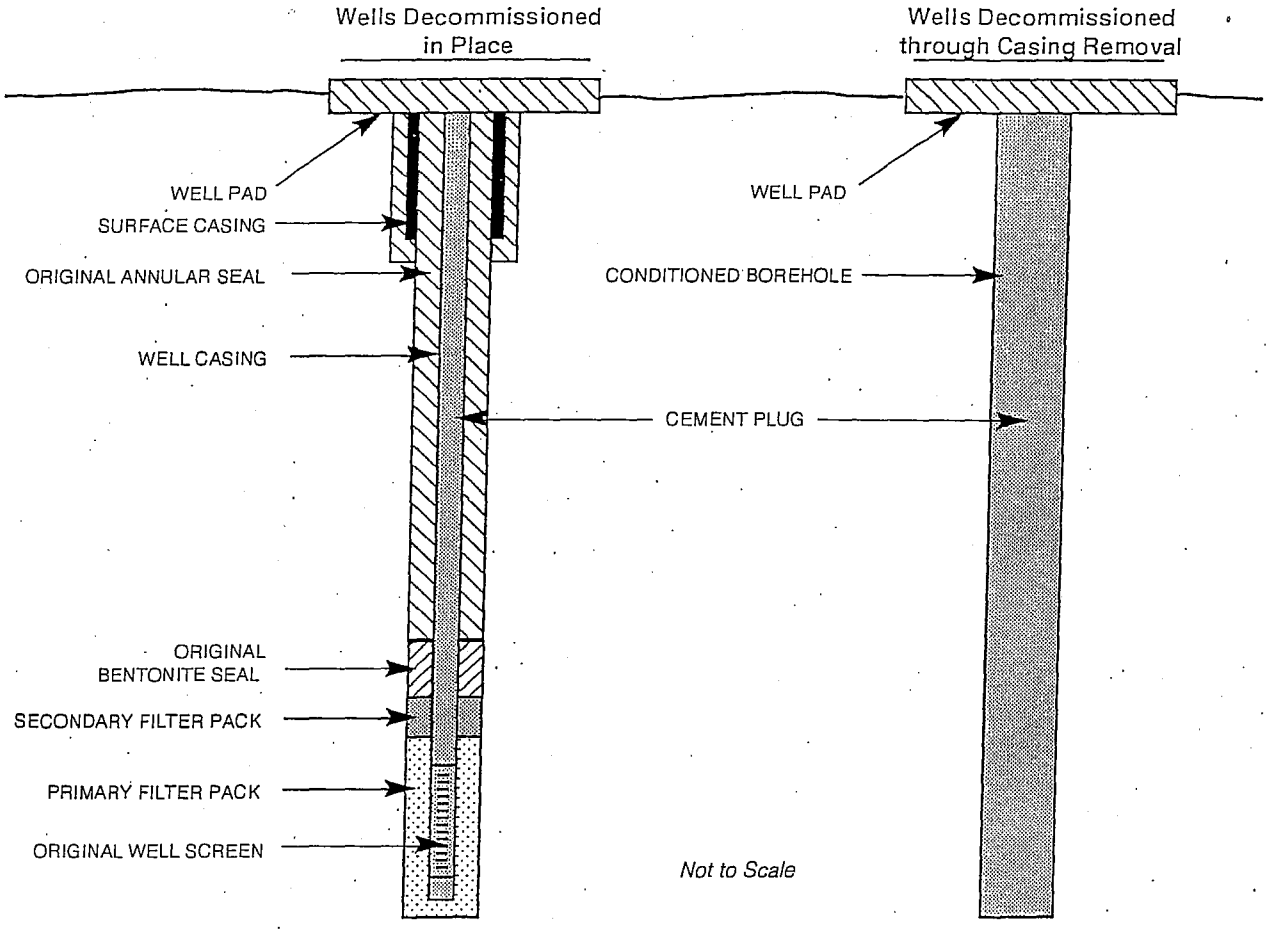
[a] New Mexico Environment Department, April 2004. "Compliance Order on Consent Pursuant to the New Mexico Hazardous Waste Act," § 74-4-10, New Mexico Environment Department.

amsl = above mean seal level
bgs = below ground surface
COOC = Compliance Order on Consent
ft = feet
ft^3 = cubic feet
ID = inside diameter
NMED = New Mexico Environment Department
OD = outside diameter
PVC = polyvinyl chloride

ATTACHMENT B

Groundwater Monitoring Well Abandonment Diagram for TAV-MW1

SNL/NM ER PROJECT
GROUNDWATER MONITORING WELL ABANDONMENT DIAGRAM



WELL NAME	TAV-MW1	WELL NAME	
LOCATION DESCRIPTIVE	SNL/NM TA-V	LOCATION DESCRIPTIVE	
STATE PLANE COORDINATE X:	414699.928	STATE PLANE COORDINATE X:	
Y:	1454667.5	Y:	
SURFACE CASING TYPE	12 IN. STEEL	CASING REMOVAL METHOD	
SURFACE CASING LENGTH	5 FT.	FINAL HOLE DIAMETER	
I.D. OF WELL CASING	4.75 IN.	FINAL HOLE TOTAL DEPTH	
WELL CASING DEPTH	509.5 FT BGS	PLUGGING GROUT TYPE	
SCREEN INTERVAL	489.5-509.5 FT BGS	GROUT VOLUME USED	
PLUGGING GROUT TYPE	BENTONITE CONCRETE	DEPTH LIFT 1	
GROUT VOLUME USED	~700 GALS	DEPTH LIFT 2	
DEPTH LIFT 1	509.5-20 FT BGS	DEPTH LIFT 3	
DEPTH LIFT 2	20-2 FT BGS	DATE OF DECOMMISSIONING	
DEPTH LIFT 3	2-0 FT BGS		
DATE OF DECOMMISSIONING	2/6/08		

ATTACHMENT C

Field Notes for Activities at TAV-MW1 and TAV-MW10

1/25/08: SANDERS INTO OFFICE TO WORK LAST MINUTE SECURITY PROBLEM (BEN HUFF IS CONTACT). WORKCON HAD DRILLERS ON STANDBY

VISIT TO TA-V, ADVANCE PLANNING 1/28/08 MON

~0930 MET PAUL SILVA, CRAIG HAUSER (SNL SAFETY ENG) + JOHN CHAVEZ (WDC DRILLER). CHAVEZ COMPLETED TA-V SAFETY VIDEO @ B. 6585, FOLLOWED BY SITE VISIT BY ALL FOUR FOLKS. CONCLUDED THAT ALL EQUIP. WILL BE >10' AWAY FROM OVERHEAD POWERLINE, AND NO DE-ENERGIZING WILL BE REQD. HAUSER WILL SEND EMAIL TO BEN HUFF (SNL SECURITY GUY) TO THIS EFFECT. DRILLERS ON SB ALL DAY (10.5 HRS)

~1020 DEPARTED SITE

1/29/08 TUES.

STILL WORKING (HARD) ON TRYING TO GAIN ACCESS TO TA-V FOR DRILLING WORK. NOT ABLE TO COMPLETE PROCESS BY END OF DAY. DRILLERS ON STANDBY SINCE LAST THURSDAY PM 1/24/08 DUE TO SNL/DOE DELAYS NOT THE FAULT OF WDC.

1/30/08 WED

PERSONNEL: MIKE SANDERS (SNL/GRAM)
TERRY MACDONALD, MARK GREEN, JOHN CHAVEZ, RICHARD BAKER (WDC) (ESCORT)

TASK: GAIN ACCESS (HOPEFULLY) TO TA-V, SET UP, START DRILLING.

WEATHER: OVERCAST, COLD (20°-40°).

0722 ARRIVE @ DECON PAD IN TA-III, WAIT FOR DRILLERS TO LOAD UP + MOVE OUT TO TA-V GATE AREA.

0820 WAITING W/ EQUIP. NEAR TA-III ENTRANCE. PAUL SILVA CAME OUT, SAID OK TO PROCEED. EVERYTHING IS ACCEPTABLE ON SNL SIDE BUT STILL LACKING A COUPLE OF DOE SIGNATURES (DOE TA-V REP + RANDY KUBASEK [B.800]). PAUL-

1/30/08

WED. 1/30/08

HAS CLEARED EVERYTHING THRU SNL SECURITY + TA-V MGRS. OK TO PROCEED CALLED DAVE SIDDOWAY (RCT) TO COME OUT & CHECK EQUIP.

0855 SIDDOWAY CHECKED EQUIP. FOR RAD (OK) CALLED TERRY MACDONALD & SILVIA. START MOVING IN EQUIP.

1150 STAGED MOST OF DRILL RIG EQUIP. INTO TA-V, AFTER BEING TOLD BY PAUL RAGLAND (TA-V MGR) OK TO PROCEED (IN LOBBY OF 6588 ~ 1030, W/ DAVID MILLER ON SPEAKER). DAVID ARRIVES @ TA-V ~1115, TOLD ME WE STILL HAD ISSUES W/ DOE & STOP AGAIN. DAVID TALKING TO TERRY LOVATO (DOE) ABOUT VARIOUS ASPECTS OF THIS WORK.

LIMS - LAB. INTEGRATED MGMT SYSTEM - FIND ON SNL WEB. DESCRIBES ALL PROJECT DOCUMENTS.

1205 DAVID M. SAID OK AS PER TERRY LOVATO (SNL SEC. REP. @ TA-V), PAUL RAGLAND.

★ IF DOE AUDITORS VISIT DRILL SITE THEY NEED TO NOTIFY DAVID MILLER THAT THEY ARE AT SITE.

1321 MOVING WATER TRUCK BACK INTO TAN w/ LOAD OF WATER FOR P&A. CALLED SIDDOWAY (RCT) FOR CHECK OF GROUT PLANT, BEFORE GOING INTO TAN.

1350 GROUT PLANT CHECKED, START SET-UP FOR WELL P&A.

1600 STILL PUMPING GROUT INTO TAN-MW2 CHECKED IN W/ PAUL SILVA - CONFIRMED THAT RIG NEEDED TO BE MOVED TO GRAVEL AREA @ NIGHT (OK). TOLD TO CONTINUE WORK

MR Samuels 1/30/08

~672 GALS GROUT TOTAL

TAV-MW1 P+A WED 1/30/08

1623 FILLED WELL TO WITHIN ~20' OF SURFACE (BY 4 PM). USED (28) 50 LB BAGS BENT. GROUT. 2.5 BAGS PER ~~80~~ 68 GALS WATER WELL TOP OFF IN AM. AGREE TO 5.5 HRS STANDBY TODAY 7-9, 11-1, 430-600. CANT DO ANY MORE WORK TODAY AFTER ~4 PM, GROUT NEEDS TO SET OVERNIGHT IN WELL.

1645 ALL HANDS DEPART TA-V. I LEFT MESSAGE W/ JOAQUIN GONZALES RE DELIVERY OF ROLLOFF 930-10 AM TOMORROW, & MESSAGE W/ PAUL SILVA RE ANTICIPATED MAST RAISING ~9 AM TOMORROW, AFTER TOPPING OFF BENT. GROUT IN TAV-MW1.

THURS 1/31/08

PERSONNEL: SANDERS, MACDONALD (ESCORTS), GREEN, CHAVES, BARE (WDC)

WEATHER: CLEAR COLD IN AM (20°S) & PM

TASK: TOP OFF TAV-MW1 W/ GROUT, PULL SURFACE COMPLETION, START TAV-MW10 BOREHOLE

0700 MEET DRILLERS @ TA-V GATE, START ENTRY PROCEDURE (W/ MACDONALD)

0855 MACDONALD @ SITE, SANDERS RETURNING PAGE. LT. NOTE @ DON BERRY OFFICE TO COME TO SITE ASAP TO DISCUSS ABAN. UTIL. BEFORE DRILLING STARTS. TAV-MW1 TOPPED OFF, & SURFACE COMPLETION REMOVED. CASING BROKE OFF ~1' BELOW GRADE.

0900 MAST IS UP. NO EQUIPMENT WILL BE CLOSER THEN ~15' FROM OVERHEAD POWER LINE. (OK IF ≥10')

0914 CALLED JOAQUIN GONZALES (ROLLOFFS), ASKED IF ROLLOFF DELIVERY COULD BE EXPEDITED TO AVOID MORE STANDBY. HE'LL TRY, & SAID

[illegible] 1/31/08

TAV-MUD DRILLING THURS 1/31/08
TO CALL HIS MANAGER (KEN TETRAULT).
TALKED TO KEN, EXPLAINED SITUATION.
HE SAID CAN'T DO BEFORE THIS AFTERNOON.
WE'LL HAVE TO WAIT TO SEE WHAT
HAPPENS.

0955 START DRILLING. DON BERRY, PAUL
SILVA KEVIN GRAY STOPPED TO CHECK
PROGRESS, MAKE SUGGESTIONS. PER BERRY NO
PROBLEM W/ ABA
UTILITIES @ BORING LOC

1020 TO 36' BGS, ADD JT. SILTY GRAVELS AND
RUNNING 11.5' DIAM DRIVE CASING (DC)
TO 300' @ THIS POINT.

1038 DC @ 56'. SOME GRAVEL & 3" OUT OF
CYCLONE. ADD 20' JT. GRAVEL IS #25
& PE BITZITE MAINLY.

1053 TO 65'. INCR. GRAVEL (FROM MANZANITAS).
EST 20%? MIXED W/ SILTY SAND, PROB.
GRAVEL LENS. <2.5". 2 HOPPERS
ARE FULL, WAITING FOR 20YD
ROLLOFFS. DRIVERS TO PERALTA YARD.
STANDBY AGAIN. HEADED BACK TO OFFICE
TO AWAIT PAGE FROM JOAQUIN GONZALES
(ROLLOFF MOVER).

1228 CALLED MARTINA (LT.) BACA (PRO-FORCE).
DISCUSSED TAV WEEKEND ACCESS ISSUE
TOLD HER IT WAS CLEARED THRU CHERYL
DESJARDIN, WHO WILL PUT IT ON THE "PLAN
OF THE DAY". BACA SAID IF CHERYL APPROVES
THEN WE'RE GOOD TO GO. I'LL VERIFY W/
CHERYL TODAY THAT WEEKEND PLANS ARE
IN PLACE. DON BERRY IS WEEKEND
CONTACT CAN BE REACHED @ 561-0940 (P) IF
NEED BE. ALSO CALLED DAVID MILLER
RE PROGRESS & LACK OF PROBLEMS (EXCEPT
ROLLOFF DELAY) TODAY LT. MESSAGE

1356 1ST ROLLOFF DELIVERED HEADING TO MWL TO
RETRIEVE 2ND ROLLOFF. DRILLERS
MK Sanchez 1/31/08

TAV-MW10 DRILLING. THURS 1/31/08

COMING THRU GATE W/ TRUCK + TRAILER, ESCORTED BY TERRY M.

1430 START DRILLING AGAIN. AFTER DEPLOYING HEAVY LINER FOR 1ST ROLLOFF. DUMPED 2 HOPPERS W/ CUTTINGS (+WATER + GROUT FROM P+A OF YESTERDAY) INTO 1ST LINED ROLLOFF.

1454 TO 76'. TRANSITIONED FROM SILT SAND + FINE GRAVEL TO SAND + FINE GRAVEL (DRY + DUSTY). ADD 20' JT.

1500 TO 80' - TRANS. TO DAMP SILTY SAND NO DUST. PAUL SILVA DROPPED BY TO V PROGRESS. HE'LL BE IN TOMORROW.

1510 TO 96'. ADD 20' JT. SILTY SAND W/ MINOR (<5%) RNDD GRAVEL ≈1.5". DAMP.

1515 110'. ROCKY (DRILL STRING BOUNCING. ONLY FOR A FEW FT.

1528 116'. ADD 20'. SILTY SAND W/ MINOR CRSE SAND. DAMP.

1538 136'. ADD 20'. SAME AS ABOVE

1548 156'. " " " " "

1606 175'. GRAVEL LENS, MTN. FRONT ROCK TYPES

1630 TO 196'. TRIP OUT DRILL PIPE + BIT, SWITCH TO 9 5/8" DC.

1705 TRIPPED OUT DRILLPIPE + BIT, FUEL RIG, PREPARE FOR SWAP TO 9 5/8 DC TOMORROW.

1750 ALL HANDS DEPART SITE. MARK GREEN & I AGREED ON 5.5 HRS SB YESTERDAY (WED) + 2.5 TODAY (FOR ROLLOFF DELAY). TTL TO DATE ~ 68 (86 TTL BUDGETED FOR JOB).

2/1/08 FRIDAY

PERSONNEL: SANDERS, MACDONALD (SWL), GREEN, CHANES, BARE (WDC)

WEATHER: CLEAR, CALM, COOL (40's)

TASK: CONTINUE BOREHOLE DRILLING, HOPEFULLY TO TODAY.

MR Sanders 2/1/08

TAV-MW10 DRILLING - 2/1/08 FRI

~1000 ARRIVE @ TAV GATE. DRILLERS PREPPED EQUIP. @ DECON PAD LOADED PIPE TRUCK w/ 9 5/8" DC WENT TO BADGE OFFICE FOR CHAVES LONG-TERM BADGE (NEW BADGE & CT 444

1104 SANDERS CALLS DAVE SIDDOWAY RE RAD CHECKS ON EQUIP. LEAVING TAV ON WEEKEND (NO ANSWER), CHECKS IN W/ PAUL SILVA RE VARIOUS ISSUES. DRILLERS & MACDONALD INSTALLING LINER IN 2ND ROLLOFF.

1138 PIPE TRUCK IS BACKED UP TO RIG, BUT WENT INTO SOFT GROUND, PROBABLY DUE TO EXCAVATION & CONSTRUCTION OF OLD SEPTIC SYSTEM IN 1960's. DISCUSSED SITUATI @ LENGTH W/ DRILLERS. CONCLUDED THAT SETUP IS NOT IN UNSAFE CONDITION AS IS AND TRUCK IS TOO HEAVY @ PRESENT TO TRY TO RE-POSITION (WITH HEAVY LOAD OF PIPE). ELECTED TO GO AHEAD AND CONTINUE DRILLING, GET WEIGHT OFF PIPE TRUCK & THEN TRY TO RE-POSITION. VERY LIMITED IN OPTIONS FOR REPOSITIONING DUE TO SOFT GROUND AREA & LIGHT & POWER POLES ON EITHER SIDE OF PIPE TRUCK, & REQD. ALIGNMENT BETWEEN RIG & PIPE TRUCK. SAFEST OPTION IS TO CONTINUE DRILLING GET WEIGHT OFF PIPE TRUCK & RE-POSITION TO DEGREE POSSIBLE. DRILLERS KNOW THEIR OPERATION MUCH BETTER THEN MYSELF, AND I'M GOING W/ THEIR RECOMMENDATIONS.

ALSO, TWO RAD TECHS (BILL LARKIN & WALEN MICKEY) STOPPED BY TO DISCUSS RAD CHECKS OF EQUIP. AS IT LEAVES SITE

MR [signature] 2/1/08

TAV-MW10 DRILLING 2/1/08 FRI

(DAVE SIDDOWAY NOT IN TODAY). WE AGREED THAT WE'D LEAVE AS MUCH EQUIP. INSIDE TA-V AS POSSIBLE AFTER WEEKEND SO IT COULD BE CHECKED UPON LEAVING AREA NEXT WEEK. ANY EQUIP THAT DOES LEAVE AREA WILL BE TAKEN TO STAGING AREA @ DECON PAD, & CAN BE CHECKED THERE, BEFORE LEAVING SNL PROPERTY.

1140 START TRIPPING 9 5/8 DC INTO HOLE (@ ~200' DEPTH NOW).

1214 LUNCH BREAK.

1330 9 5/8 DC & DRILL PIPE TRIPPED IN TO ~200', START DRILLING w/ 9 5/8 DC.

1345 MIKE SKELLY, SID BRANDWEIN ARRIVE @ SITE

1446 JOHN GOULD, LUIS VALASQUEZ (DOE SSO) ARRIVED ~1415, CHECK OUT OPS, INSPECT SSG-1 SEC. CLEARANCE FORM DEPART. DRILL @ 279'. MISSED 260' SAMPLE DUE TO VISITORS — DAMP SILTY SAND.

1505 STILL @ ~~276~~ 279', STILL PLUGGED UP (INCR SILTY CLAY?).

1525 SKELLY & BRANDWEIN DEPART (GOOD HYDRO DISCUSSION IN TRAILER.

1528 START DRILLING AGAIN @ 279'. DAMP SILTY SAND w/ SPORADIC MINOR GVL ≤ 2", RNDD, <10%.

1543 TO 303'. STILL MAINLY DAMP SILTY SAND w/ <30% MD-CRSE SAND, OCCAS GVL CHUNKS ≤ 2"

1610 LIFTING BELL & COLLAR FOR PILE DRIVER JAMMED TOGETHER. NEED TO LEAVE SITE TO FIX. STOPPED @ 319' FOR DAY.

1700 ALL HANDS DEPART TA-V. PLACED EYEWASH STATION IN T-52, SIGNED DAILY REPORTS THRU 1/31/08

[signature] 2/1/08

TAV-MW10 DRILLING 2/2/08 SAT
PERSONNEL: SANDERS, MACDONALD (SNL)
GREEN, CHAVES, BARE (WDC)
WEATHER: CLEAR, COOL, CALM (40°S-50°S)
TASK-CONTINUE DRILLING BOREHOLE FOR
TAV-MW10 WELL

0700 MEET MACDONALD & CREW @ TAV GATE, START ENTRY PROCEDURE
0818 FILLED IN DEPRESSION (CAUSED PIPE TRUCK TILT YESTERDAY) W/ CUTTINGS & GRAVEL, START DRILLING @ ~~316~~ 319'
0845 DRILLED THRU GRAVELLY LAYER ~ ~~340~~ 343 ~~348~~ 348'. ≤1" MANZANITA MATERIAL (LS, PE RX). BACK INTO SILTY SAND (DAMP) ~345. NO SIGN OF ARG FACIES (VOLCANICS, ETC.)
0907 TO ~~368~~ 363'. SILTY SAND W/ <20% GRAVEL ≤1". NOTE: USING "MATEX" FISH OIL-BASED PIPE JOINT LUBE (DRILLER SAYS IT SUCKS!)
0917 TO ~~378~~ 373'. HOSE OR CYCLONE PLUGGING UP. VY FINE SANDY SILT (NOT CLAY). SLTLY DAMP. 383'
1005 TO ~~380~~ 383'. BLEW OUT RNDD-SUBRDD GRAVEL
(5-10%?) → FRAGS ≤3" ~377-379, IN FINE SILTY
(90+%) → SAND. LS & PE ROCK, NO VOLCANICS.
1032 ~~410~~ 413'. MINOR (1-2%) SMALL CLAYEY BALLS. MAINLY STILL DAMP SANDY SILT W/ <5% CRSE SAND-PEBBLES <2" SUBRDD LS & PE.
1057 TO ~~436~~ 439'. ADD 20'. MIXTURE OF SILTY SAND (60%), F-CRSE SAND (30%), FINE-MD GRAVEL <1" (10%). 444-448
1108 ~~445~~ 448'. GRAVELLY LAYER ~ ~~441-445~~ BACK INTO DAMP SILTY SAND/SANDY SILT @ 445. LS & PE ROCK FRAGS ONLY, NO VOLCANICS.
1116 ~~456~~ 459'. GETTING MORE CLAYEY. CLAYEY SANDY SILT, W/ OCCAS. GRAVEL FRAGS TO 2". NO ARG ROCK TYPES.
MR Sanders 2/2/08

TAV-MW10 DRILLING 2/2/08 SAT

1130 TO ~~470~~ 473' CLAYEY SANDY SILT, SAME AS ABOVE
NO COARSE SAND OR GRAVEL. HOSE PLUGGING
UP. 483'

1147 480' SAME AS ABOVE. SOMEWHAT DAMP, AS BEFORE

1156 490' " " " BUILDING UP IN HOSE
493 & CYCLONE SOMEWHAT, BUT DONT NEED TO
INJECT WATER YET.

1205 496. PASSED FROM DAMP CLAYEY SANDY SILT TO
499 DRY (DUSTY OUT OF CYCLONE) SILT, F-C SAND,
& FINE-MD. GRAVEL @ ~493'.

1215 TD ~~500~~ 503'. PASSED BACK INTO CLAYEY SANDY
SILT @ 498', SO ~ 4' LAYER OF DRY COARSER
MATL.

1223 @ 510' BGS - ENTERING SAT ZONE. SPARSE
513' RETURNS.

NOTE: 3' LONG SHOE @ BOTTOM OF 9 5/8" DC, SO DEPTHS
BGS NOTED ABOVE (1223 AND BEFORE) NEED TO
BE INCREASED BY 3'. 11 3/4" DC HAD A 1'
SHOE, SO ADJUST NOTED DEPTHS W/ 11 3/4" BY
ADDING 1 FOOT

1238 517'. INJECT WATER TO CLEAN OUT PIPE. GOOD
COARSE SAND, F-MD GRAVEL. 512 ~ 531

1247 520'. INJ. WATER. SPARSE UNRELIABLE RETURNS.
CATCHING SOME GRAVEL TO 1.5" IN CATCHER.
WET SLURRY ACCUMULATING IN HOPPER.

1334 TD 539' (ONLY NEED ~535' OF HOLE).
PASSED FROM FAIRLY THICK (> 80') OF CLAYEY
SANDY SILT INTO GOOD COARSE SAND & GRAVEL @
STARTING ~ 512'. STAYED IN GOOD SAND, SILT &
GRAVEL UNTIL ~ 531' THEN APPEARED TO DRILL
BACK INTO SANDY SILT (?). NO MORE COARSE SAND
& GRAVEL AFTER ~ 531'. WE KNOW CURRENT WATER
LEVEL IN TAV-MW1 (~10' EAST OF THIS BOREHOLE)
WAS 510' BGS 12/07. THEREFORE DECIDED TO SET
TOP OF SCREEN @ 508' BGS (2' OUT OF WATER)
TO SCREEN AS MUCH OF THE GOOD SAND/GRAVEL

M R [illegible] 2/2/08

2/2/08

TAV-MW10 WELL DESIGN, CONSTRUCTION
ZONE AS POSSIBLE, + STILL SCREEN ACROSS
AIR/WATER INTERFACE AS REQD. BY NMED.
THIS WILL ALSO GIVE ~3 EXTRA YEARS OF LIFE
TO THIS WELL, ASSUMING CONTINUING WATER
LEVEL DECLINE OF ~1'/YEAR. WE'LL ALSO GO W/
20-SLOT (@.020") SCREEN + 10/20 GRAVEL
PACK, GIVEN RELATIVELY COARSE NATURE OF
ZONE BEING SCREENED. TAV-MW1 WAS
BUILT LIKE THIS, AND IT PRODUCED WELL.

1415 DRILLERS TRIPPING OUT BIT + DRILL PIPE
BOTTOM OF BOREHOLE ~539'. GIVES ~6'
OF EXTRA HOLE BENEATH BOTTOM OF 5'
SUMP @ 533' BGS (OK, IN CASE SAT SEDS
COME UP SOMEWHAT INSIDE DC)

1430 TRIPPED OUT PIPE + BIT. NO REASON TO
WAIT FOR WATER LEVEL TO STABILIZE SINCE
WE KNOW WATER IS @ 510'. START PREP.
TO RUN CASING.

1455 START RUNNING SUMP, SCREEN, CASING.

1505 SCREEN IN DC, INSTALLED TOP CENTRALIZER

MR Stimson 2/2/08

TAV-MW10 CONSTRUCTION 2/2/08 SAT

1455 PVC CASING TALLY ~~CASING COUNT~~

~~20'~~ 20.2' ✓

PIN

LENGTH MEASURED

19.98' ✓

20.1' ✓

126.01

19.98

5.25 (SUMP) (INSTALLED W/ CENTRALIZER

20.5

20.0 (0.020" SCREEN).

20.0

20.0 99.81'

20.0

20.0

19.81

1520 20.0, 20.0, 19.9, 20.0, 20.0 (99.9')

1526 20.1, 20.0, 20.0, 20.0, 20.1 (100.2)

1537 20.0, 20.0 (40')

9.97, 9.77, 9.76, 9.78, 9.76, 9.75 (58.79')

1551 9.75, 4.74 (14.49)

TOTAL 524.71 + 9.75 + 4.74 = 539.2 TOTAL

= 533.0' IN THE HOLE 6.2' STICKUP.

1555 MEASURE DISTANCE INSIDE WELL W/ WDC TAGGER TO VERIFY TOTAL PIPE + SCREEN LENGTH. WE GET 537.3' (VS. 539.2 W/ INDIV. MEAUREMENTS).

1615 MEASURED INSIDE OF WELL W/ SNL TAGGER (SOLINST CABLE - SHOULD BE VERY ACCURATE) ALSO GOT 537.3' OF PIPE. GREEN CHECKED HIS TAGGER AGAINST A NEW WATER LEVEL PROBE - ACCURATE. SO: 537.3 - 533.0 BGS TO BOTTOM OF WELL = 4.3' OF STICKUP.

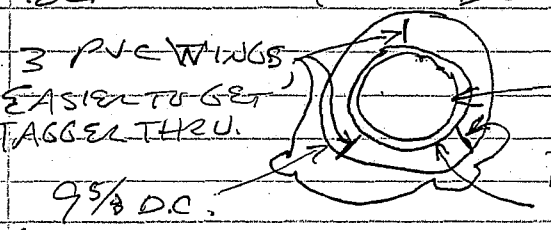
1618 START DUMPING 10/20 SAND INTO HOLE. TOP OF 10/20 TARGET IS ≥5' ABOVE TOP OF SCREEN, OR 503' BGS (TOP OF SCREEN IS 508' BGS.) MOVE RIG (MAST DOWN), SET UP DC PULLER

1707 PULLED 10' OF DC, BOTTOM @ ~530'. HAVING TROUBLE TAGGING 10/20 SAND BEC. OF CENTRALIZERS.

[signature] 2/2/08

TAN-MW10 CONSTRUCTION 2/2/08 SAT

1807, CONT'D BETTER CENTRALIZER DESIGN COULD BE:



* WE NEED TO ALLOW ST. STEEL CENTRALIZERS ABOVE WATER TABLE, & IN GROUT. MORE ROBUST, EASY TO TAG THRU ACCORDING TO DRILLER.

1805 DEPARTED TA-V AFTER FIGHTING APPARENT BROKEN CENT. ABOVE SCREEN (@ ~503') TAGGER HUNG UP. SANDERS BACK TO OFFICE TO DO SAND VOL. CALCS.

2/3/08 SUNDAY

PERSONNEL: SANDERS, MACDONALD (SNL) GREEN, CHAVES, BARE (WDC)

WEATHER: OVERCAST CALM, COLD (20°-40°)

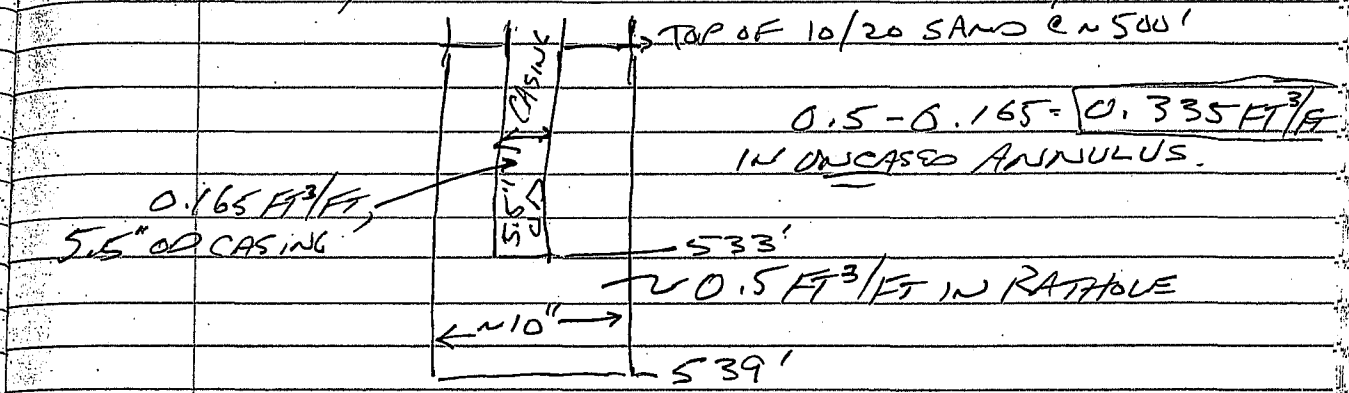
TASK: INSTALL 30/20 & 20/40 SANDS, + ~~1ST LIFT (~100') &~~ 40' BENT. CHIP SEAL, + 1ST LIFT (~100') OF BENT. GROUT IN TAV-MW10

0655 ARRIVE @ TA-V GATE, START CHECK-IN PROCEDURE

0825 FINALLY GOT PEOPLE + EQUIP. INTO AREA. CONTINUE RUNNING SAND. TAGGER IS STUCK IN ANNULUS, CAUGHT UP IN CENTRALIZER ABOVE SCREEN. ~~WILL~~ PLACE SAND BASED ON VOL. CALCS, IF WE CANT FREE TAGGER.

[signature] 2/2/08

TAN-MW10 WEEK CONST 2/3/08 SUN



VOLUME OF SAND TO FILL RATHOLE, & UNCASED ANNULUS TO 500':

1) 539' - 533' = 6' OF RATHOLE, × 0.5 FT³/FT) = 3 FT³ HOLE VOLUME.
2) 533' - 500' = 33' OF UNCASED ANNULUS × 0.335 FT³/FT = 11.1 FT³ OF ANNULUS VOLUME.

TOTAL VOLUME: 3 + 11.1 = 14.1 FT³ / 0.5 FT³/50 LB SACK = 28.2 SACKS 10/20 SAND TO BRING TOP OF 10/20 TO 500'. DRILLER COMES UP WITH SAME # SACKS.

0918 30' OF DC OUT 513' IN HOLE, BOTTOM DC @ ~509' BGS. TAGGED 10/20 w/ SNL TAGGER - 493' BGS. PULL 10 MORE FT DC, TAG AGAIN. SHOOTING FOR ~500. TAGGER NOT HUNG UP

0928 503' DC IN HOLE, 499' IN HOLE, TAGGER (WOC) CAME LOOSE FROM CENTRALIZER @ ~503', AFTER DC RAISED ABOVE IT.

* PVC CENTRALIZERS DOING NO GOOD (TOO WEAK) ONLY CAUSING PROBLEMS.

0935 TAGGED 10/20 AFTER RAISING D.C. - 499' BGS (OK). ADD 21 BAGS (100 LB, 1 FT³) 20/40 SAND. USED 36 BAGS (50 LB 0.5 FT³) 10/20, VS. 28 THEORETICAL BASED ON VOL. CALCS, SO HOLE IS SOMEWHAT LARGER DIAM. THAN 10" (NO BIG SURPRISE) [illegible] 2/3/08

SUN

TAN-MW10 WELL CONSTRUCTION 2/3/08

2 ~~BAGS~~ 100-LB BAGS 40/60 SHOULD FILL ~6' OF ANNULUS PROB. ~5' WITH HOLE ENLARGEMENT NOT TAGGED. FIGURE TOP OF 40/60 IS 494'-5' = 494'

0957 DUMPED 5 50-LB BAGS COARSE VOLCLAY CHIPS (1.5"+ SIZES) INTO ANNULUS, TAGGED 482' BGS SO 494' - 482' = 12'/5 BAGS = ~2.5'/BAG. 483' DC IN HOLE, 479' BGS TO BOTTOM OF D.C.

1018 16 BAGS CHIPS IN, TAGGED 455' BGS (GOOD). SO 494-455 = 39' OF CHIPS FOR SEAL.

1037 511.6 - 3.0' STICKUP: 508.6' BGS. ~~1.5~~ ~1.5' HIGHER THEN NEARBY TAN-MW1, PROB. REFLECTS INFLUENCE OF INJECTED WATER. SHOULD STABILIZE @ ~510' BGS.

(TAGGED WATER LEVEL)

1042 HYDRATED CHIPS W/ ~150 GALS. WELL WAIT 1 HR (AS PER INSTALL. PLAN) FOR 40' OF CHIPS TO HYDRATE.

1150 LUNCH BREAK - SET UP TO RUN FIRST LIFT OF GROUT AFTER HYDRATING CHIP SEAL.

1154 PUMP 1ST LOAD: (9) 50 LB BAGS "QUICK GROUT" (SAND-SIZED PARTICLES) + 300 GALS H_2O. SHOULD FILL ~120 FT OF ANNULUS, ASSUMING HOLE IS 9 5/8 DIAMETER. LESS FOOTAGE IF LARGER DIAMETER HOLE (LIKELY). 300 GALS ~ 7.48 GALS/FT^3 = 40.1 FT^3 VOLUME. 40.1/0.335 FT^3/FT OF ANNULUS = 119.7' OF ANNULUS FILLED.

1157 START PULLING MORE D.C. TOP OF GROUT SHOULD THEORETICALLY BE 455' - 120' = 335'. WE'LL PULL 120-140' OF D.C.

1300 PULLED 140' OF DC. BOTTOM @ 380' (PER DRILLER). KEVIN GRAY CODE 550 DROPS BY TO CHECK PROGRESS.

1315 HEAD TO THE GATE. STANDBY STARTS 1 PM SO: 5.3 TODAY: 1-530 (4.5 HRS), & TOMORROW 7-1 PM (6 HRS).

1324 ALL HANDS DEPART TA-V. [illegible] 2/3/08

TA-MW10 WELL CONST. 2/4/08 MON

PERSONNEL: SANDERS, MACDONALD (SNL)
GREEN, CHAVES, BARE (WDC)
WEATHER: PARTLY CLOUDY, BREEZY, COOL, SOME SNOW + RAIN IN AM
TASK: CONTINUE TA-V MW10 WELL

1300 ARRIVED @ TA-V GATE, MET TERRY MACDONALD & DRILL CREW. CALLED DAVE SIDDOWAY (TA-V RCT) ASKED HIM TO CHECK D.C. ON PIPE TRUCK THAT PULLED OUT YESTERDAY, & NEEDS TO BE UNLOADED @ DECON PAD. TRUCK & PIPE ARE PARKED OUTSIDE TA-V GATE.

1321 SIDDOWAY CHECKED PIPE, NOTHING FOUND. OK TO UNLOAD @ DECON PAD. HE'S ALSO CLEARED TR COMPRESSOR, SO DRILLERS WILL BRING IT OUT NEXT. MACDONALD ESCORTING HIM.

→ NOTE: AT N1230, TALKED TO PAUL FRESHOUR + AMY BLUMBERG IN OFFICE. DISPELLED RUMOR THAT AMY HEARD FROM "MICHELLE" + JIM TODD (DOE SSO) THAT WE HAD TAKEN WASTE (CUTTINGS) CONTAMINATED W/HEAVY METALS FROM TA-V TO TA-III (RIDICULOUS!). ALL CUTTINGS FROM HOLE ARE STORED IN TA-V, IN 2 ROLLOFFS NEAR SITE. AMY ASKED THAT WASTE REMAIN IN TA-V UNTIL WASTE CHAR. SAMPLES ARE COLLECTED & RESULTS AVAILABLE. I AGREED TO THIS IF AND UNTIL SOMEONE ELSE ASKS THAT THEY BE MOVED. I'LL DO WHATEVER IS ULTIMATELY DECIDED NEEDS TO BE DONE.

1359 COMPRESSOR OUT OF TA-V.

1539 DRILLERS ADDED ~~200 MORE~~ 200 GALS MORE OF GROUT. 200 GALS / 7.48 GALS/FT = 26.7 FT³ OF GROUT. 26.7 FT³ / 0.335 FT²/FT OF UNCASED ANNULUS = ~80' ADDL GROUT, ASSUMING PERFECT 95% PLACEMENT IF BELOW OUT (LIKELY) LESS FOOTAGE

AMS 2/4/08

TAV-MW10 WELL CONST. 2/4/08 Mon

1539 FRANZ LAUFFER DROPPED BY,
CONTD TALKING TO HIM WHILE REMAINING
@ 5/8" DC PULLED. ALL WAS OUT BY
~1536. ~~SA~~

1550 START PULLING 11 3/4 DC, BOTTOM @
200' BGS.

1635 ALL HANDS DEPART TA-V, SNOWING
STEADILY.

PERSONNEL: SANDERS, MACDONALD 2/5/08 TUES
GREEN, CHAVES, BALE (WDC)
WEATHER: COLD, WINDY, SNOW ON GROUND 30°
TASK: FINISH CONSTRUCTION OF TAV-MW10,
+P+A OF TAV-MW1

0738 ARRIVE @ TA-V GATE, START ENTRY
PROCEDURES

0830 TRIED TO MEASURE WATER LEVEL,
BUT CAN'T ON PVC CASING PROTRUDING
IN PLACE.

0755 FOUND OUT FROM MARK GREEN THAT
DEVELOPER (JIM WARD) IS ARRIVING
ON SITE TODAY, WILL START DEV.
TOMORROW (WED). CALLED GRIFFITH
+ SKELLY TO LET THEM KNOW, LT.
MESSAGES.

0906 PUMPED MORE GROUT INTO ANNULUS,
START PULLING MORE 11 3/4 DC.
DAVE SIDDOWAY (RCT) CHECKED PIPE
ON PIPE TRUCK (PULLED OUT YESTER-
DAY) EARLY THIS AM - OK TO UNLOAD
@ DRILL PAD

0923 GOT PVC CAP OFF, TAGGED H_2O
@ 509.5' BGS (SIMILAR TO LAST TAG) NO
SIGN OF GROUT INVASION. EXPECT WATER
TO DROP TO 510' WHEN DEVELOPMENT IS
DONE.

Mel Sanders 2/5/08

TAV-MW10 CONSTRUCTION 2/5/08 TUES

0940 MIKE SKELLY, STACY GRIFFITH & ID BRANDWEIN (NMED) ARRIVE @ SITE.

1026 SKELLY, GRIFFITH, BRANDWEIN DEPART SITE. CONTINUING TO ADD GROUT, PULLED 11 3/4" D.C. ALL IS NOW OUT.

1043 TAV-MW10 GROUTED TO SURFACE. DUMPED EXCESS GROUT INTO NEARBY TAV-MW1. DUMPED 4 OR 5 BAGS OF CHIPS INTO TAV-MW10 ANNULUS BEFORE TOPPING OFF GROUT TO SURFACE.

1314 RIG & OTHER EQUIPMENT OFFSITE SCREENED FOR PAD BY SIDDOWAY. START BUILDING PADS FOR TAV-MW1 & MW10.

2/6/08 WED

PERSONNEL: SANDERS (SNL), GREEN, CHAVES, RAVE (WDS)

WEATHER: CALM, CLEAR 45°

TASK: WRAP UP WELL COMPLETION, DECON EQUIPMENT; DRILL RIG & EQUIP. DEPART.

1530 ARRIVE @ TAV, ASSIST DRILL CREW IN COMPLETING TAV-MW10 COMPLETION. DEVELOPMENT DELAYED UNTIL 3/1 DUE TO TAV RESTRICTIONS.

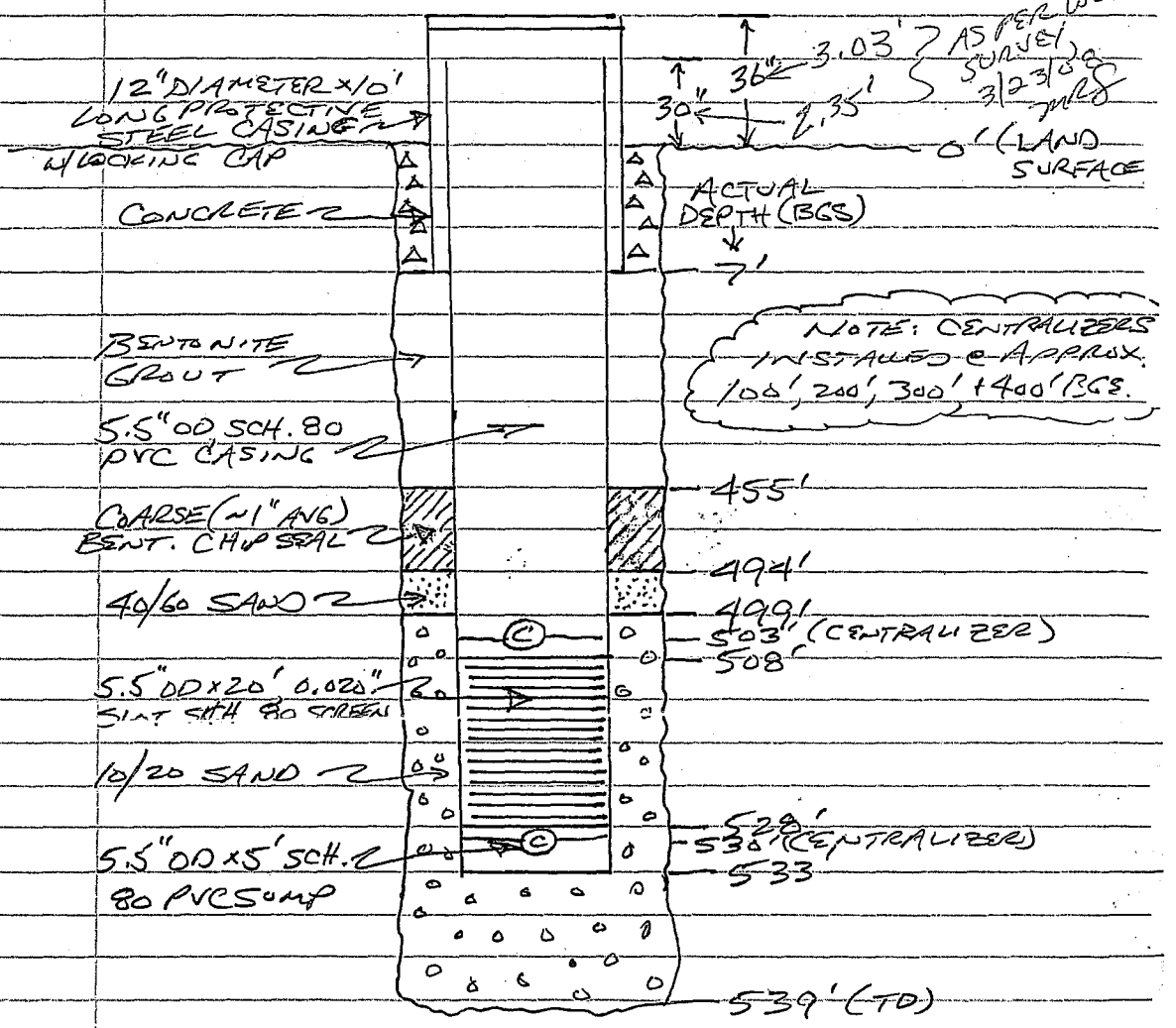
~~1934~~ ~~ALL HANDS DEPART TAV.~~ WELL TAV-MW1 ABANDONMENT COMPLETED BY FILLING ANNULUS TO WITHIN 2 FEET OF THE SURFACE W/ COARSE (~1" AVG SIZE) BENTONITE CHIPS & FILLING REMAINING 2 FEET TO THE SURFACE WITH CONCRETE AND A 2'x2' CONCRETE PAD CENTERED ON ABANDONED PVC CASING (BROKEN OFF ~1' BELOW GRADE) WAS THEN CONSTRUCTED. A BRASS CAP WAS ALSO PLACED IN THE NEW 2'x2' PAD AND WILL BE STAMPED WITH THE WELL NAME, TOTAL DEPTH OF THE WELL, AND DATE OF DECOMMISSIONING.

THE NEW WELL TAV-MW10 WAS COMPLETED BY FILLING THE ANNULUS WITH BENTONITE GROUT & COARSE CHIPS

MR Sanders 2/6/08

WED.

TAV-MW10 CONST. DIAGRAM 2/6/08



1530, CONTD. TO WITHIN 7' OF THE SURFACE. A 10' LONG BY ~12" DIAMETER PROTECTIVE CASING WAS INSTALLED INTO THE ANNULUS WITH 7' BELOW GROUND + 3' ABOVE GROUND. THE LOWER 7' OF PROTECTIVE CASING WAS CEMENTED IN PLACE TO GRADE, RESULTING IN A 36" STICKUP. 3 PROTECTIVE POSTS WERE ALSO INSTALLED AROUND THE NEW 4" THK BY 3' x 3' WELL PAD.

1734 ALL HANDS DEPART TA-V.

MR Sandoval 2/6/08

FINISH TAV-MW10 CONSTRUCTION TUES. 2/19/08

1430 CALLED PAUL SILVA TO VERIFY THAT TA-V ACCESS WAS AVAILABLE ≥ MARCH 1. HE SAID WE WERE GOOD TO GO ANYTIME, BUT TA-V NEEDS ≥1 WEEK ADVANCE NOTICE TO BE PLACED ON PLAN OF THE WEEK.

TAV-MW10 DEVELOPMENT WED 3/12/08

PERSONNEL: NICHOLAS COOPER (WDC), MIKE SANDERS (6765/GRAM INC)
WEATHER: CLEAR, CALM, 60s
TASK: COMPLETE TAV-MW10 DEVELOPMENT

0730 ARRIVE @ TA-III DECON PAD, DEVELOPER DECONNING EQUIPMENT PRIOR TO HEADING TO TA-V.

TAV-MW10 BORE VOL. CALCS:

GRAVEL PACK: 539' - 509.75' DTW BGS = 29.25' SAT. GRAVEL PACK
29.25' × 0.5454 FT³/FT IN 10" HOLE = 15.95 FT³ OF GRAVEL PACK (INCLUDING VOL. OF CASING TEMPORARILY)
WELL CASING (5.5" OD): 533' BOT OF CASING - 509.75' DTW = 23.25' OF SCREEN & SUMP IN WATER. 23.25' × 0.1650 FT³/FT FOR 5.5" OD CASING = 3.83 FT³ OF SCREEN & SUMP.
NET GRAVEL PACK VOL: 15.95 FT³ - 3.83 FT³ = 12.12 FT³
12.12 FT³ × 7.48 GALS/FT × 30% POROSITY = 27.2 GALS IN 30% POROUS GRAVEL PACK.
CASING VOL (5" ID): 23.25' × 1.02 GALS/FT = 23.7 GALS IN CSG.
1 BV = 27.2 + 23.7 = 50.9 GALS 5 BVs = ~255 GALS.

0930 ARRIVE @ TAV-MW10 LOCATION SET UP EQUIP, COMPLETE TAILGATE H&S ORIEN.

0946 TAGGED WATER LEVEL: 512.2' BELOW TOP OF STOVEPIPE - 2.45' STICKUP = 509.75' DEPTH TO WATER ~~BGS~~ BELOW WELL PAD. WELL PAD ~~9.4~~ 4" HIGH AVG. SO ~ ~~510~~ 509.42' DTW BGS - RIGHT ON TARGET

MC Sanders 3/12/08

WED

TA-MW10 DEVELOPMENT 3/12/08

1018 BAILED 50 GALS H_2O - VY TURBID, NO SIGN OF GRAVEL PACK INFILTRATION (GOOD!), WELL APPEARS TO BE RECOVERING QUICKLY AS EXPECTED GIVEN RELATIVELY COARSE SAND & GVL THAT MOST (~18') OF SCREEN IS SET IN.

1105 150 GALS BAILED, STILL TURBID (>1000 NTUs) SWAB A 2ND TIME.

1125 FINISH SWABBING (2ND TIME)

1146 200 GALS BAILED, STILL TURBID (>1000 NTUs)

1206 250 " " " "

1322 300 " " " " (~1000 NTU)

1335 START 3RD SWAB

1410 COMPLETE 3RD SWAB

1430 350 GAL OUT, STILL TURBID (>1000 NTUs)

1501 400 " " " " "

1530 450 " " " SOMEWHAT TURBID (~1000 NTUs)

1541 DAVE SIDDOWAY (RCI) COMES OUT TO RAD-CHEC EQUIPMENT (OK) PREPARE TO INSTALL SUBM PUMP.

1550 CALLED MIKE SKELLY, RE STATUS.

1700 PUMP & PIPE IN WELL. (25) 21-FT JTS + 2.5' PUMP - 2.5' STICKUP = 525' BGS TO BOT OF PUMP.

1725 PUMP READY TO GO, DEPART TA-V.

3/13/08 WED

0738 PULL INTO TA-V.

PERSONNEL: NICHOLAS COOPER (WOC), MIKE SANDERS

WEATHER: CLEAR, CALM IN AM, 60s.

TASK: FINISH WELL DEVELOPMENT

0850 PUMPED TOTAL OF 650 GALS FROM WELL. MAIN PARAMETERS (TEMP, CONDUCTIVITY, pH, TURBIDITY) STABILE AFTER 3 BVs PUMPED.

[signature] 3/13/08

THURS 3/13/08

TAV-MW10 WELL DEVELOPMENT

1057 TAGGED WATER AFTER PUMPING - 5/2.05 TO TOP OF PROT CASING, - 2.45' STICKUP = 509.60 BGS TO WATER, VS. 510' TARGET. CLOSE ENOUGH! WELL RECOVERED QUICKLY.

1117 DANE SIDDOWAY (RCT) RAD-SCANNED EQUIPMENT - OK. LV. TA-V TO GRAB 1 DRUM @ WELL MWL-BW2 LOCN.

1250 DECON @ TA-III DECON PAD DANE FILLED 13 DRUMS w/ DECON WATER @ TAV-MW10 LOCN

1305 DEPARTED DECON PAD AFTER SIGNING PAPERS

4/16/08 WED

PERSONNEL: SANDERS, ROBT. RIVERA, JOAQUIN ?, + ONE OTHER FROM HUMF.

TASK: CHECK SOIL IN ROLLOFFS @ TA-V, FROM WELL TAV-MW10 BOREHOLE

1430 ARRIVE @ TA-V. INSPECT ROLLOFFS, UNZIP "BURRITO BAGS" TO INSPECT WETNESS OF SOIL. CONCLUSION: SOIL WILL BE HAULED + DUMPED CTA-III BORROW PIT THIS FRIDAY. RIVERA WILL COORDINATE WITH TA-III BORROW PIT ~~AND~~ MANAGER DAVE HENDRIX RE LOCN TO DUMP ROLLOFFS.

1507 DEPART TA-V, AFTER SEEING NEW MON. WELL

MR Sanders 4/16/08

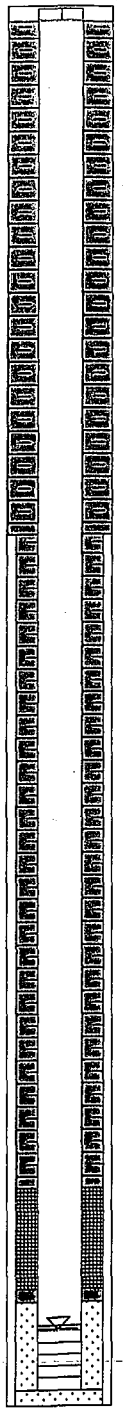
ATTACHMENT D

Combination Lithologic and Well Construction Details for TAV-MW10

Sandia National Laboratories/New Mexico
Environmental Restoration Department
TAV-MW10

Geologist: *Mike Sanders*
Drilling Date: *January 31 to February 2, 2008*
Well Installation Date: *February 6, 2008*

Well Completion Data | Depth (FBGS) | Lithology | Lithologic Description



Casing stickup: ~2.5 above ground surface.
Concrete Pad

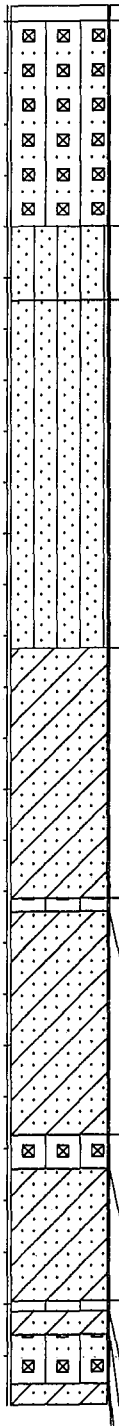
Well Construction:
Casing OD: 5.5 inches (in)
Casing ID (in.): 4.75 in
Casing Material: Schedule 80 PVC
Well Depth: 533 feet below ground surface (FBGS)
Borehole Diameter: 11.75 in from surface to 200 FBGS
9.625 in from 200 FBGS to total depth
Borehole Depth: 539 FBGS

Grout/Backfill Interval: 0 - 455 FBGS, concrete, bentonite grout and chips

Reduction in borehole at 200 FBGS

Seal Interval: 455 - 494 FBGS, coarse bentonite chips

Secondary Pack Interval: 494 - 499 FBGS, 40/60 sand
Primary Pack Interval: 499 - 539 FBGS, 10/20 sand
Initial water level: 509.42 FBGS (3/12/08)
Screen Interval: 508-528 FBGS, 0.02-in slot schedule 80 PVC
Sump Interval: 528 - 533 FBGS



0' - 80': GM, gravel-sand-silt mixture, 30% fine - medium gravel angular - subrounded, < 1.5 inches limestone and precambrian gneiss and quartize, 40% fine - coarse sand, 30% silt (light brown, 5YR 6/4).

80' - 109': SM, silty sand, light brown 5YR 5/6, slightly damp.

109' - 245': SM, silty sand, light brown 5YR 6/4, slightly damp with sporadic lenses medium - coarse sand < 10% of interval. Occasional gravel lenses with subangular, subrounded fragments < 2 inches, especially at 175 FBGS, limestone and precambrian rocktypes.

245' - 343': SC, clayey sandy silt, light brown 5YR 6/4 to 5YR 5/6. Sporadic medium - coarse sand lenses, especially at 300 - 303 FBGS. Limestone and precambrian gravel fragments < 2 inches, subangular - subrounded. Cyclone hose plugged at 279 FBGS (increasing clayey silt).

343 ' - 348': GM, gravel-sand-silt mixture, 60% fine - medium gravel, < 1 inch limestone and pre-cambrian rocktypes, 20% fine - coarse sand, 20% silt, light brown, 5YR 4/4.

348' - 435': SC, clayey sandy silt, light brown 5YR 6/4 to 5YR 5/6. Sporadic medium - coarse sand lenses. Limestone and precambrian gravel fragments < 2 inches, subangular - subrounded.

435' - 448': GM, gravel-sand-silt mixture, 20% - 50% gravel (increased gravel 444 - 448 FBGS). Gravel fragments < 1.5 inches, angular - subrounded, limestone and precambrian fragments. Remainder is fine - coarse sand and silt (light brown 5YR 4/4).

448' - 499': SC, clayey sandy silt, light brown 5YR 6/4 to 5YR 5/6. Sporadic medium - coarse sand lenses, damp. Cyclone hose plugging at 473 FBGS.

499' - 503': GM, gravel-sand-silt mixture, dusty out of cyclone, fine - medium gravel 50%, subangular - subrounded limestone and precambrian rock types only, 30% fine - coarse sand, 20% silt, light brown, 5YR 6/4.

503' - 512': SC, clayey sandy silt, light brown 5YR 6/4 to 5YR 5/6. Sporadic medium - coarse sand lenses, damp. Tight formation.

512' - 531': GM?, in saturated zone, inject water, fines washing thru sample sieve. Abundant medium - coarse sand and fine - coarse gravel caught in sieve, so relatively coarse interval. Limestone and precambrain fragments and pebbles , 3-inches subangular - subrounded.

531' - 539': SC?, inject water, unreliable returns, but no medium - coarse sand or gravel caught in sieve. After 531 FBGS assume SC similar to 503 to 512 FBGS interval.

ATTACHMENT E

Well Construction Diagram for TAV-MW10

WELL DATABASE SUMMARY SHEET

Project Name:	ENVIRONMENTAL RESTOR	**Geo Location:**	SNL/NM TA-V
ER ADS #:		**Well Completion Date:**	06-FEB-2008
Well Name:	TAV-MW10	**Completion Zone:**	ALLUVIAL MATERIAL
Owner Name:	U.S. DEPT OF ENERGY	**Formation of Completion:**	SANTA FE GROUP
Date Drilling Started:	31-JAN-2008	**Well Comment:**	11 3/4 INCH AND 9 5/8 INCH BOREHOLE DIAMTERS.
Drilling Contractor:	WDC EXPLORATION & WELLS		
Drilling Method:	AIR ROTARY CASING HAMMER		
Borehole Depth:	539		
Casing Depth:	533		

Survey Data

Survey Date: 23-MAR-2008

Surveyed By: SNL/NM

State Plane Coordinates

(X) Easting: 414691.2

(Y) Northing: 1454662.43

Surveyed Elevations (FAMSL)

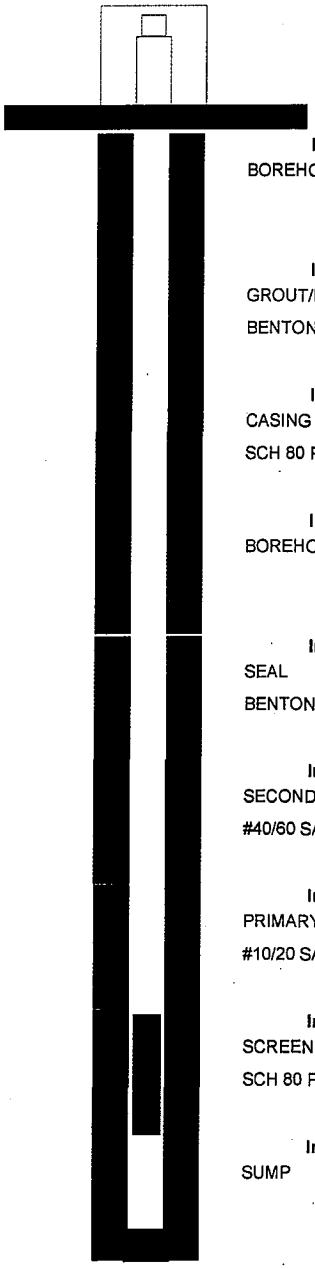
Protective Casing:	5434.98
Top of Inner Well Casing:	5434.3
Concrete Pad:	5432.55
Ground Surface:	5431.95

Calculated Depths and Elevations

Initial Water Elevation: (FAMSL)	4924.7	
Initial Depth To Water: (FBGS)	509.6	
Last measured water level was	4922.58	**FASL**
measured on	12-MAY-2008	

Date Updated: 02-MAY-08

Date Printed: 06-JUN-2008



Completion Data Measured Depths (FBGS)

Casing Stickup: 1.75

Interval	Start	Stop		
BOREHOLE	0'	200'	O.D.	11.75"
GROUT/BACKFILL BENTONITE GROUT	0'	455'		
CASING SCH 80 PVC	0'	533'	I.D. 4.767"	O.D. 5.563"
BOREHOLE	200'	539'	O.D.	9.625"
SEAL BENTONITE CHIPS	455'	494'		
SECONDARY PACK #40/60 SAND	494'	499'		
PRIMARY PACK #10/20 SAND	499'	539'		
SCREEN SCH 80 PVC	508'	528'	Slot Size	.02"
SUMP	528'	533'		

WELL DATABASE SUMMARY SHEET

Project Name:	ENVIRONMENTAL RESTOR	**Geo Location:**	SNL/NM TA-V
ER ADS #:		**Well Completion Date:**	06-FEB-2008
Well Name:	TAV-MW10	**Completion Zone:**	ALLUVIAL MATERIAL
Owner Name:	U.S. DEPT OF ENERGY	**Formation of Completion:**	SANTA FE GROUP
Date Drilling Started:	31-JAN-2008	**Well Comment:**	11 3/4 INCH AND 9 5/8 INCH BOREHOLE DIAMTERS.
Drilling Contractor:	WDC EXPLORATION & WELLS		
Drilling Method:	AIR ROTARY CASING HAMMER		
Borehole Depth:	539		
Casing Depth:	533		

[redacted]

Interval	Start	Stop
PLUG BACK	533'	539'
#10/20 SAND		

Additional Comments

ATTACHMENT F

Well Development Forms for TAV-MW10

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: TAV-MW10 WELL DEVELOPMENT	Project No.:
Well I.D.: TAV-MW10	Date: 3/13/08
Weather	
Method: Portable pump _____ Dedicated pump	Pump depth: ~525' BGS

PURGE MEASUREMENTS

Depth to Water (FT)	Time 24 hr	Vol. L (gls)	Temp °C	mS/cm³	ORP MV	pH	Flow L gls	Turb NTU	DO %	DO mg/L ~~Color and appearance~~
	0830	570	21.14	0.585	27.7	7.6		2.5	16.1	1.42
	0837	600	20.86	0.579	32.0	7.56		1.56	16.6	1.48
	841	620	21.6	0.578	24.6	7.51		1.46	20.4	1.80
	844	635	21.65	0.580	24.3	7.49		1.86	24.3	2.13
	847	650	21.54	0.580	27.3	7.47		1.66	25.9	2.28

COC number(s):

Sample number(s):

Purge Volume Calculations

Well Diameter

2" well: 0.16 gal/ft X____ (height of water column) = _____ gallons
4" well: 0.65 gal/ft X____ (height of water column) = _____ gallons
6" well: 1.47 gal/ft X____ (height of water column) = _____ gallons

Tubing Diameter

1/4" OD: 2.4 ml/ft X____ (length of tubing) = _____ millileters
3/8" OD: 9.7 ml/ft X____ (length of tubing) = _____ millileters
1/2" ODl: 2 1.6 ml/ft X____ (length of tubing)) = _____ millileters

FIELD MEASUREMENT LOG FOR GROUNDWATER SAMPLE COLLECTION

Project Name: TAV-MW10 WELL DEVELOPMENT	Project No.:
Well I.D.: TAV-MW10	Date: 3/12/08 - 3/13-08
Weather CLEAR, CALM, 50s - 60s.	
Method: BAILER (3/12/08) Portable pump SUBM PUMP (3/13/08) Dedicated pump	Pump depth: ~525'/365

PURGE MEASUREMENTS

Depth to Water (FT) BGS	Time 24 hr	Vol. L gls	Temp °C	mS/cm³	ORP MV	pH	Flow L gls	Turb NTU	DO %	DO mg/L ~~Color and appearance~~
509.75	1021	50	19.56	0.583	145.2	8.02		>1000	11.5	1.06
(3/12/08)	1040	100	20.27	0.584	147.1	7.82		>1000	14.9	1.35
	1100	150	20.50	0.582	169.8	7.79		>1000	15.5 ~~10.24~~	1.38
	1146	200	20.55	0.582	192.7	7.75		>1000	14.3	1.29
	1206	250	20.66	0.585	197.3	7.73		>1000	14.1	1.27
	1322	300	20.80	0.583	215.9	7.65		1000	13.4	1.21
	1432	350	21.01	0.586	211.1	7.62		>1000	12.6	1.13
	1501	400	20.81	0.584	215.0	7.59		>1000	13.8	1.24
	1528	450	20.63	0.582	222.2	7.58		1000	13.2	1.18
3/13/08:	804	455	17.39	0.588	136.5	8.15		82	7.3	0.71
	808	475	20.42	0.582	64.6	7.94		17	11.1	1.00
	814	500	20.45	0.584	48.7	7.83		5.98	11.9	1.07
	820	520	20.95	0.583	44.1	7.71		3.29	13.7	1.22
	826	550	21.45	0.579	26.8	7.67		2.4	15.0	1.32

COC number(s):

Sample number(s):

← SUBM. PUMP ↑ SWAB + BAIL ↑

Purge Volume Calculations

Well Diameter

2" well: 0.16 gal/ft X____ (height of water column) = _____ gallons
4" well: 0.65 gal/ft X____ (height of water column) = _____ gallons
6" well: 1.47 gal/ft X____ (height of water column) = _____ gallons

Tubing Diameter

1/4" OD: 2.4 ml/ft X____ (length of tubing) = _____ millileters
3/8" OD: 9.7 ml/ft X____ (length of tubing) = _____ millileters
1/2" ODl: 2 1.6 ml/ft X____ (length of tubing)) = _____ millileters