Schlumberger

pENV000GW00125

Virgilio Cocianni Remediation Manager

Schlumberger 205 Industrial Boulevard Sugar Land, TX 77478

Tel: (281) 285-4747

March 31, 2015

Mr. Jim Griswold Environmental Bureau New Mexico Oil Conservation Division 1220 South St. Francis Drive Santa Fe, New Mexico 87505

Re: 2014 Annual Groundwater Monitoring Report, Former Dowell Schlumberger Facility, 507 East Richey Avenue, Artesia, Eddy County, New Mexico. Discharge Permit GW-114.

Dear Mr. Griswold,

Enclosed please find the Annual Groundwater Monitoring Report for the Former Dowell Schlumberger Facility in Artesia, New Mexico.

The Discharge Permit GW-114 renewal application was submitted to NMOCD on July 15, 2013 and Schlumberger kindly requests a status update.

Should you have any questions regarding the enclosed submittal or the Discharge Permit renewal, please contact me at (281) 285-4747. I can also be reached by e-mail at cocianni-v@slb.com.

I look forward to our continued work with you.

Sincerely,

Virgilio Cocianni Remediation Manager

Enclosure

c: Jim Strunk, The Dow Chemical Company

Cathy Barnett, CH2M HILL Jeffrey Minchak, CH2M HILL

2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility Artesia, New Mexico

507 East Richey Avenue Artesia, Eddy County, New Mexico

Prepared for

Schlumberger Technology Corporation and The Dow Chemical Company

March 2015

CH2MHILL®

3721 Rutledge Road NE, Suite B-1 Albuquerque, NM 87109 (505) 884-5600

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Acronyms and Abbreviations

bgs below ground surface

COC contaminant of concern

CVOC chlorinated volatile organic compound

1,1-DCA1,1-dichloroethane1,1-DCE1,1-dichloroethene

Dowell a defunct joint venture between Schlumberger Technology Corporation and

The Dow Chemical Company

GAC granular activated carbon

ID inside diameter

ISCO in situ chemical oxidation

IJ injection well

mg/L milligrams per liter

NaMnO₄ sodium permanganate

NEWP National Exploration Wells and Pumps

NMED New Mexico Environment Department

NMOCD New Mexico Oil Conservation Division

NMOSE New Mexico Office of the State Engineer

NMWQCC New Mexico Water Quality Control Commission

NTU nephelometric turbidity units

PCE tetrachloroethene
PVC polyvinyl chloride

SCH40 schedule 40

site Former Dowell Schlumberger Facility, Artesia, New Mexico

STC Schlumberger Technology Corporation

SVE soil vapor extraction

VOC volatile organic compound

USCS Unified Soil Classification System

USEPA United States Environmental Protection Agency

UST underground storage tank

USTB Underground Storage Tank Bureau

ZVI zero-valent iron

Introduction

CH2M HILL has completed the 2014 groundwater monitoring program at the Former Dowell Schlumberger Facility located in Artesia, New Mexico (the site). The site is regulated by the New Mexico Oil Conservation Division (NMOCD) under Discharge Permit GW-114 and is located at 507 East Richey Avenue, Artesia, Eddy County, New Mexico. The site location is shown in **Figure 1**, and the site plan is shown in **Figure 2**.

Site Background

Section 2 provides an overview of the site background, history of operations, geology and hydrogeology, and modifications to the sitewide activities during 2014.

2.1 Site Description and History

The project site is located at 500 East Richey Avenue, Artesia, New Mexico (**Figure 1**) and was used as an oilfield service facility operated by Dowell Schlumberger Incorporated (Dowell; a defunct joint venture between Schlumberger Technology Corporation [STC] and The Dow Chemical Company) between 1969 and 1990 and in the early 2000s. In 1988, the New Mexico Environment Department (NMED) Underground Storage Tank Bureau (USTB) directed response actions in connection with fuel-related volatile organic compound (VOC) releases from underground storage tanks (USTs) at the site. During the early 1990s, NMOCD assumed responsibility for regulatory oversight of the facility. Dowell ceased facility operations during the 1990s. For a limited time between 2000 and 2010, Dowell resumed and then ceased facility operations.

In 1988, fuel-related VOC impacts to site soil and groundwater were discovered during UST removal activities and were regulated by the NMED-USTB. In 1995, a chlorinated VOC (CVOC) groundwater plume was discovered onsite near the former Wash Bay and was determined to be migrating to an adjacent downgradient property. The NMED Groundwater Protection and Remediation Bureau began oversight of the CVOC plume response and continued to regulate the pre-1995 UST impacts. In response to the discovery of the plume, Dowell purchased the downgradient property. Following the purchase of the adjacent land, it was discovered that Eddy County, New Mexico, owns right-of-way property between numerous land parcels and, as of 2014, remains the owner of the right-of-way between the two adjacent properties.

The site is currently inactive. The USTs and acid plant have been decommissioned and removed, but the office, maintenance, and storage buildings remain at the site (**Figure 2**). The remaining property outside the facility fence line is undeveloped other than for limited environmental-related infrastructure.

The adjacent properties include the following:

- Artesia Alfalfa Growers Association property to the north
- Mr. Donald Kiddy and Chase Farms properties to the east
- East Richey Avenue (NM 357) and residential properties to the south
- Southeast Ready Mix Products property to the west

Two prior remediation strategies, soil excavation and soil vapor extraction (SVE), have been implemented to remove the petroleum hydrocarbons and CVOCs from site groundwater and soil surrounding the former USTs, former Wash Bay, and former Acid Plant (Figure 2). During the early to mid-1990s, soil contaminated with fuel-related VOCs and CVOCs was excavated at these locations. Following soil excavation, in January 1994, SVE systems began operation at the location of the former USTs and at the former Wash Bay. The SVE system at the former USTs successfully removed fuel-related VOCs within that area, and the SVE system at that location was decommissioned in the early 2000s. The former Wash Bay SVE system last operated during 2013 and was decommissioned in November 2014. Between 2001 and 2002, pilot-scale zero-valent iron (ZVI) injections were performed in the downgradient portions of the CVOC groundwater plume. Difficulties with the ZVI injections and subsurface distribution were encountered and resulted in no significant changes in CVOC concentrations in the groundwater. A groundwater extraction and treatment system is in operation in the downgradient portion of the plume, located adjacent to monitoring well MW-30. Groundwater is treated using granular activated carbon (GAC), then discharged back into the ground by gravity at the subsurface infiltration gallery located approximately 230 yards upgradient, near the location of MW-31.

The following activities occurred at the site during 2014:

- Semiannual and annual groundwater sampling events were conducted, including depth to water measurements.
- Groundwater samples were collected for dissolved iron and manganese, and sulfate and sulfide at selected locations to determine baseline (pre-substrate injection) conditions in the aquifer to assist with substrate dosing calculations.
- Eight injection wells were drilled and installed in a linear transect near existing monitoring well MW-25, to facilitate the injection of an oxidant substrate (sodium permanganate [NaMnO₄]) into the groundwater. A third extraction well, EW-03, was installed near existing monitoring well MW-28. One monitoring well, MW-34, was installed downgradient of the in situ chemical oxidation (ISCO) treatment zone between the northern end of the injection transect and EW-03. The locations of the new wells are shown on **Figure 2**.
- 22,650 pounds of a 40 percent sodium permanganate solution were injected into the aquifer via the eight injection wells (IJ-1 through IJ-8).
- The former Wash Bay SVE system was permanently decommissioned and completely removed in November 2014.
- A groundwater extraction and treatment system operated in the downgradient portion of the
 plume located at monitoring well MW-30. Groundwater was treated using GAC, then discharged
 back into the ground by gravity at the infiltration gallery located approximately 230 yards
 upgradient, near the location of MW-31.

2.2 Geology and Hydrogeology

2.2.1 Regional Geology and Hydrogeology

The underlying geology in the area includes the east-dipping Permian San Andres Limestone. Overlying the Permian San Andres Limestone are the Artesia Group and Quaternary alluvium (Lyford 1973).

Artesia, New Mexico, is located in the Roswell groundwater basin. The basin is bounded to the north roughly 20 miles north of Roswell, to the south in the Seven Rivers area between Artesia and Carlsbad, to the east by the Pecos River, and to the west roughly 20 miles west of Artesia. The Roswell groundwater basin consists of two aquifers separated by a leaky confining layer. The upper aquifer is contained in the quartzose unit of Quaternary alluvium and the lower aquifer consists of the Permian San Andres Limestone. The upper aquifer is unconfined and is composed of Quaternary alluvial valley fill. The majority of the water-producing zones in the aquifer are located in the quartzose unit. The zones are typically sand and gravel separated by adjacent zones of silt and clay. Most zones are around 20 feet thick (Welder 1983).

The leaky confining layer between the two aquifers is formed from the lower three formations of the Artesia Group, which are mudstones. The moderately permeable layers form a leaky confining layer between the lower and upper aquifers (Hendrickson and Jones 1952). The layers vary in thickness across the basin due to erosion and solution collapse. The lower aquifer is located within the San Andres Limestone and the lower part of the Artesia Group. There are five different water-bearing zones in the deep aquifer. The thickness of the aquifer ranges from 260 to 460 feet, with water-bearing zones typically 50 feet or less in thickness. In the northern part of the basin near Roswell, the middle of the San Andres Limestone is the main water-producing zone. Near Artesia, in the middle of the basin, the main zone of production is the top of the San Andres Limestone. In the southern part of the basin, the main zone of production is the lower part of the Artesia Group (Welder 1983).

The transmissivities of the two aquifers vary due to irregular fractures, solution permeability in the deep aquifer, and erratic occurrences of sand and gravel in the shallow aquifer (Hendrickson and Jones 1952). The transmissivities range from 7,500 to 196,000 square feet per day in the deep aquifer, and 4,200 to

186,000 square feet per day in the shallow aquifer (Welder 1983). The aquifer zone yields vary greatly due to groundwater moving principally through cavities and fractures (Hendrickson and Jones 1952) at various depths. As a result, it is difficult to find specific water-bearing depth intervals in the aquifer during monitoring well installation (Welder 1983). Groundwater moves from the lower aquifer to the shallow, although Welder (1983) states that flow may reverse due to heavy pumping in the lower aquifer. The estimated net rate of upward leakage is around 12,400 acre-feet per month (Welder 1983). Several water-bearing units in the leaky confining layer exist, and wells have been advanced and completed in the zones (Welder 1983). In general in the Roswell basin, groundwater flow is to the east; however, groundwater pumping in the Artesia area has caused a depression in the potentiometric surface of nearly 90 feet.

2.2.2 Site Geology and Hydrogeology

The geology and hydrogeology beneath the site were assessed during an investigation conducted in March 1995 by Western Water Consultants, Inc. Observations made during drilling activities described the predominant lithologies to consist of light-brown to reddish-brown silt and silty clay, interbedded with clay layers and stringers of carbonate rubble. The very fine-grained sediments were deposited in an arid, alluvial overbank environment and can be expected to be more laterally continuous than coarse-grained alluvial channel deposits (Western Water Consultants, Inc. 1995). The carbonate layers are believed to be the result of the evaporation of water containing elevated concentrations of dissolved solids. The 1991 investigation arrived at the conclusion that the stringers of carbonate rubble constitute the primary water-bearing zones. The rubble layers were observed at depths ranging from 20 to 26 feet below ground surface (bgs) (Western Water Consultants, Inc. 1995).

2.3 Modifications to the Sitewide Activities

No modifications to the sitewide activities were requested in 2014. However modifications requested in 2013 were implemented during 2014 and are described below.

On July 9, 2013, STC submitted via email a *Work Plan Amendment for the Schlumberger Oilfield Services Facility—Artesia* (STC 2013a) requesting that reporting frequency for the site be modified to annual and to include activities for the prior calendar year. The work plan amendment was conditionally approved by NMOCD in an e-mail dated July 15, 2013 (**Appendix A**). The conditional approval required that the annual report be submitted by April 1 of each following year.

On August 15, 2013, the *Work Plan Amendment, Soil Investigation and Soil Vapor Extraction System Closure, Former Dowell Schlumberger Facility, Artesia, New Mexico* (STC 2013b) was submitted to NMOCD. The work plan amendment was conditionally approved by NMOCD in an e-mail dated August 22, 2013 (**Appendix A**). The work plan amendment included a provision for taking the former Wash Bay SVE system offline pending the results of the soils investigation. The SVE system was taken offline during the fourth quarter of 2013 and was decommissioned in November 2014. The SVE decommissioning is described in the *Soil Vapor Extraction System Closure Report, Former Dowell Schlumberger Facility, Artesia, New Mexico (GW-114)* (CH2M HILL 2015).

On August 15, 2013, the *Work Plan Amendment, Groundwater Remediation Program Modifications, Former Dowell Schlumberger Facility, Artesia, New Mexico* (STC 2013c) was submitted to NMOCD. The work plan amendment was conditionally approved by NMOCD in an e-mail dated August 22, 2013 (**Appendix A**). The work plan amendment included provisions for modifying the existing groundwater extraction and treatment system and for evaluating and performing ISCO to enhance the removal of VOCs in site groundwater. The conditional approval required monitoring for manganese and sulfate in groundwater to demonstrate the New Mexico Water Quality Control Commission (NMWQCC) standards for those constituents are not exceeded following substrate injection. On September 17, 2013, the *Work Plan Amendment, Modifications to the Groundwater Monitoring Program, Former Dowell Schlumberger Facility, Artesia, New Mexico* (STC 2013d) was submitted to the NMOCD. The work plan amendment was conditionally approved by NMOCD in

an e-mail dated September 18, 2013 (**Appendix A**). The monitoring program modifications implemented in October 2013 and described in the *2013 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico* (CH2M HILL 2014) were continued in 2014.

2014 Site Activities

Section 3 summarizes the 2014 groundwater testing, well drilling and installation, groundwater treatment, and permanganate injection activities at the site.

3.1 Groundwater Monitoring Activities

The following subsections summarize the activities conducted during the semiannual groundwater monitoring events.

3.1.1 Depth-to-Water Measurements and Groundwater Sampling

Depth to water was measured at each of the 27 site wells during the semiannual events (April and October). During October 2014, southern New Mexico received a 500-year rainfall event. There was widespread flooding and localized standing water at the site. Additionally, a broken water line, unrelated to the environmental work at the site, was discovered in October 2014 near MW-9 in the former main operations area of the facility. The broken water line was subsequently repaired by others. Both of these October events resulted in significant anomalies in the depth to groundwater and groundwater table elevations and these measurements were not used to evaluate groundwater gradient and flow direction. In November 2014, the depth to water measurements were again collected at each of the 27 site monitoring wells and used to evaluate the groundwater gradient and flow direction. The groundwater elevation near MW-9 in the former main operations area of the facility remained elevated in November.

The first semiannual groundwater sampling event was conducted in April and included sample collection from 11 of the 27 monitoring wells (MW-12, MW-17C, MW-18, MW-21, MW-25, MW-26, MW-28, MW-30, MW-31, MW-32, and MW-33). The second semiannual groundwater sampling event occurred in October and included sample collection from 19 of the 27 monitoring wells (MW-1, MW-7, MW-8, MW-11, MW-12, MW-15, MW-17C, MW-18, MW-20, MW-21, MW-22, MW-26, MW-28, MW-29, MW-30, MW-31, MW-32, MW-33, and MW-34). A groundwater sample was not collected at MW-25 during the October event, because MW-25 is located adjacent to the injection transect and NaMnO₄ was observed in the well during the injections.

Prior to groundwater sample collection, the monitoring wells were purged with a peristaltic pump using low-flow methods. Field parameters (temperature, pH, conductivity, turbidity, dissolved oxygen, and oxidation-reduction potential) were measured and recorded during purging activities. Groundwater samples were collected following either field-parameter stabilization or the removal of three well-casing volumes. Groundwater samples were submitted for laboratory analysis of VOCs by U.S. Environmental Protection Agency (USEPA) SW-846 Method 8260B.

As a condition of NMOCD's Discharge Permit Work Plan (GW Remediation Program) Amendment Approval (Appendix A) to inject NaMnO₄ at the site, post-injection monitoring for manganese is required. A total of 11 monitoring wells are located within and adjacent to the permanganate injection target treatment zone (MW-18, MW-21, MW-22, MW-25, MW-26, MW-28, MW-29, MW-30, MW-31, MW-32, and MW-34) (Figure 2); these wells were selected for manganese monitoring. During the second semiannual groundwater sampling event, groundwater samples were collected at 10 of the 11 monitoring wells (MW-18, MW-21, MW-22, MW-26, MW-28, MW-29, MW-30, MW-31, MW-32, and MW-34) and submitted for laboratory analysis of dissolved manganese by USEPA Method 6020. Monitoring well MW-25 was not sampled due to the presence of NaMnO₄ in that well. Monitoring well MW-25 is located approximately 63 feet from the nearest injection well and given that injections were underway, the NaMnO₄ was likely not diluted. A decision was made to not collect a sample and send it to the laboratory. Monitoring well MW-25 will be monitored for manganese in the next semiannual event following dispersion of the oxidant beyond the injection zone.

Groundwater extracted during purging activities was contained in a 55-gallon drum and transferred to the GAC drums at the groundwater treatment system and processed through the treatment system.

3.2 Groundwater Treatment System Testing

The groundwater treatment system includes both the extraction pumping, treatment, and infiltration component and the ISCO component. From June 2 through 5, during the planning phases for the pump and treat system improvements and the injections, testing activities were conducted to evaluate aquifer pumping rates, gravity reinjection rates, and to collect groundwater samples from monitoring wells MW-25 and MW-28 for laboratory analyses of dissolved iron, dissolved manganese, sulfate, and sulfide concentrations to assist with selection of the oxidant reagent, dosing, and injection rates.

3.2.1 Groundwater Extraction and Treatment System

The groundwater extraction and treatment system operated continuously through September 18, 2014, when the groundwater treatment infrastructure was modified so the extracted groundwater could be used to deliver the NaMnO₄ to the aquifer via installed injection wells. From January to September the groundwater extraction and treatment system operated continuously except for roughly a 1-hour period during GAC exchanges, which occurred in April. During the monitoring event, the groundwater treatment system was inspected. The system hoses, drums, and equalization tank were examined for possible leaks or malfunctions to minimize the possibility of upset conditions or system failure; no issues were found.

Following the inspection, the system's four GAC drums were disconnected and replaced with new GAC vessels. Four spent GAC drums were transported offsite for disposal on both April 8 and November 25, 2014.

The system was shut down at the completion of injections on October 26, 2014, to allow the NaMnO₄ to remain in contact with the CVOCs in the aquifer.

3.3 Closure of Former Wash Bay SVE System

The former Wash Bay SVE system operated until the fourth quarter of 2013. The SVE system was taken offline in November 2013, in accordance with the NMOCD-approved work plan amendment, as discussed in Section 2.3. The system was decommissioned and completely removed in November 2014. Decommissioning is detailed in the *Soil Vapor Extraction System Closure Report, Former Dowell Schlumberger Facility, Artesia, New Mexico (GW-114)* (CH2M HILL 2015).

3.4 Well Installation

Well permit applications for non-consumptive use of water were submitted to the New Mexico Office of the State Engineer (NMOSE). Well permits were granted by the NMOSE on August 14, 2014, and are included as **Appendix B**. On August 18, 2014, National Exploration Wells and Pumps (NEWP), a licensed New Mexico driller, mobilized to the site to install eight injection wells, one downgradient monitoring well, and one extraction well. Prior to well installation, ground-penetrating radar was used at each drilling location to identify the presence of subsurface utilities within the proposed drilling area.

At the completion of well installation the wells were developed by surging with a surge block followed by bailing out the fine-grained sediment that entered the well screen during the surging step. Following the surging/bailing step, a submersible pump was placed into the well and pumped at a suitable flow rate to prevent the screen interval from dewatering, until the water's turbidity began to decrease. Development was considered complete when the measured turbidity of the groundwater was less than 10 nephelometric turbidity units (NTU). Water removed from the wells during development was containerized and transferred to the GAC system for treatment and reinjection.

3.4.1 Injection Wells

Eight injection wells were installed upgradient of monitoring well MW-25 in a linear transect, spaced 30-feet apart, as shown on **Figure 2**, using a CME 85 hollow-stem auger drill rig with a center plug; soil was logged

using the Unified Soil Classification System (USCS) from auger cuttings. Soil boring logs are included in **Appendix B**.

Injection wells were drilled to a total depth of 32-feet bgs and constructed with 2-inch inside diameter (ID) schedule 40 (SCH40) polyvinyl chloride (PVC) well casing. The screen, consisting of 2-inch ID SCH40 wire-wrapped PVC 0.040-inch slot, was set from approximately 20 to 30-feet bgs. Well construction diagrams are included in **Appendix B** and include filter pack type and size, bentonite seal depth, and grout mixture. Injection wells were finished with an 8-inch diameter steel protective casing and a locking cap within a 4-foot by 4-foot by 4-inch thick concrete well pad.

3.4.2 Extraction Well

An additional extraction well, EW-03, was installed near monitoring well MW-28 to a total depth of 60-feet bgs using a CME 85 hollow-stem auger drilling rig and continuous soil core barrel. The borehole was installed using 4.25-inch ID augers in conjunction with a 3-inch ID, 5-feet long continuous coring barrel. The soil retrieved from the continuous core barrel was logged using the USCS. Upon reaching the total depth of the borehole, 6.25-inch ID augers were used to over-ream the borehole to accommodate the installation of a 4-inch ID SCH40 PVC well. The screen, consisting of 4-inch ID SCH40 wire-wrapped 0.040-inch slot, was set from 15 to 55-feet bgs. The soil boring logs and well construction diagram are included in **Appendix B** and include filter pack type and size, bentonite seal depth, and grout mixture.

The extraction well casing was terminated at 2-feet bgs to accommodate the installation of a 0.5-horsepower submersible Grundfos pump and associated piping and electrical conduit. A 5-feet diameter concrete well vault and manhole was installed.

3.4.3 Monitoring Well

One additional monitoring well, MW-34, was installed to a total depth of 36.5 feet bgs between the northern end of the injection transect and new extraction well EW-03 using a CME 85 hollow-stem auger drilling rig and continuous soil core barrel. The borehole was installed using 4.25-inch ID augers in conjunction with a 3-inch ID, 5-feet long continuous coring barrel. The soil retrieved from the continuous core barrel was logged using the USCS. Upon reaching the total depth of the borehole, 6.25-inch ID augers were used to over-ream the borehole to accommodate the installation of a 4-inch ID SCH40 PVC well. The screen, consisting of 4-inch ID SCH40 0.010-inch mil slot, was set from 17 to 27-feet bgs. The soil boring log and well construction diagram are included in **Appendix B** and include filter pack type and size, bentonite seal depth, and grout mixture.

3.5 Sodium Permanganate Injections

On September 15, 2014, CH2M HILL personnel and a crew from Advanced Environmental Solutions mobilized to the site to begin construction of the temporary injection system. The injection system was installed by modifying the plumbing from the GAC drums inside the groundwater extraction and treatment facility such that treated groundwater from the GAC outlets was used as the water source for the permanganate solution. The treated groundwater was delivered to an above-grade jet pump, mixed with permanganate, and the solution was delivered to the injection wells via a piping manifold. Flow was controlled with various valves throughout the system and digital flow meters were used to measure the volume of solution injected into each well.

Injection of a 0.4 to 0.5 percent NaMnO₄ solution into the groundwater via eight injection wells began on September 18 and continued through October 26, 2014. Due to the 500-year rainfall event and subsequent flooding at the site, the injections did not occur continuously during this period. **Table 1** details volume of permanganate solution injected into each well. At the completion of oxidant injections, 1,000 gallons of treated water was injected into the injection wells to flush the well screens and sandpack of residual oxidant. Injection volumes and flow meter information were submitted to the NMOSE on January 6, 2015, as required by the NMOSE-issued well permits.

The temporary injection system was dismantled and removed from the site at the completion of the injections. During the October groundwater sampling event, the groundwater from monitoring wells in the downgradient portion of the plume, within and adjacent to the injection wells, was checked for the presence of NaMnO₄. The check was made by comparing the groundwater against a white background and observing for purple color, which indicates the presence of NaMnO₄.

Results and Discussion

4.1 Groundwater Elevation and Gradient

The groundwater gradient was 0.004 to 0.007 foot per foot in April, with the overall direction of groundwater flow to the northeast. The gradient and groundwater flow direction were consistent with previous reports.

The groundwater extraction, treatment, and infiltration system had been off for approximately one month at the time the measurements were collected in November. As discussed in Section 3.1.1, a broken potable water line in the northeast portion of the facility artificially increased groundwater elevations in the upgradient portion of the site. Groundwater elevations near the gravity infiltration trench (near MW-31) remained locally high; very little influence was observed elsewhere at the site. The groundwater gradient was 0.006 to 0.010 foot per foot in November, with the overall direction of groundwater flow to the northeast.

Table 2 contains the 2014 groundwater elevation data. Please refer to previous annual monitoring reports for historical groundwater elevation data. Potentiometric surface maps depicting the groundwater elevation measured during the April and November 2014 semiannual gauging events are provided in **Figures 3** and **4**, respectively.

4.2 Groundwater Analytical Results

Table 3 summarizes the groundwater analytical results for 2014. Please refer to previous annual monitoring reports for historical groundwater analytical data. The 2014 laboratory analytical reports are in **Appendix C**, and the results of the data validation process are in **Appendix D**. The groundwater analytical results have been compared to the NMWQCC standards, which are shown on **Table 3**. Other analytes are reported in the analytical data, but do not have NMWQCC standards and are not shown on **Table 3**. **Table 3** generally follows the data format of prior annual reports. **Figures 5** through **11** present concentrations in groundwater for only the contaminants of concern (COCs) that exceeded NMWQCC standards during a given semiannual event. The extent of the exceedance of the NMWQCC standard is shown as an isopleth line on each figure. The following discussion summarizes the COC distribution at the site.

Concentrations of 1,1-dichloroethane (1,1-DCA) exceeded the NMWQCC standard of 0.025 milligrams per liter (mg/L) during the April sampling event at monitoring well MW-12 (**Figure 5**) and did not exceed the NMWQCC standard at monitoring well locations sampled during the October sampling event. Concentrations in wells where 1,1-DCA was detected decreased between the April and October events, except for slight increases in monitoring wells MW-28 and MW-31, however, the concentrations were still well below the NMWQCC standard.

Concentrations of 1,1-dichloroethene (1,1-DCE) exceeded the NMWQCC standard of 0.005 mg/L in multiple wells during the April and October sampling events (**Figures 6** and **7**). The exceedances are limited to the downgradient plume located outside the facility proper. 1,1-DCE is a focus of the oxidant injections and the groundwater extraction and treatment system modifications currently underway.

Concentrations of tetrachloroethene (PCE) exceeded the NMWQCC standard of 0.020 mg/L during the April and October sampling events (**Figures 8** and **9**). The exceedances are limited to the downgradient plume located outside the facility proper. The PCE is being acted upon by the groundwater extraction and treatment system and is a focus of the system modifications and oxidant injections currently underway.

Concentrations of naphthalene exceeded the NMWQCC standard of 0.030 mg/L during the April and October sampling events at MW-12 (**Figures 10** and **11**). Naphthalene concentrations are limited to the facility proper where benzene concentrations have previously exceeded NMWQCC standards.

It appears that the downgradient VOC plume is migrating beyond the current treatment system and moving further downgradient in the area of monitoring wells MW-28 and MW-29. The pumping of groundwater from EW-03 and the oxidant injections are anticipated to address CVOCs in this portion of the plume.

Dissolved manganese and sulfate samples were collected for analyses at monitoring wells MW-25 and MW-28 in June to determine baseline concentrations in the groundwater prior to oxidant injections. Samples were again collected for dissolved manganese analysis in October to demonstrate the injection of NaMnO₄ into the groundwater did not increase the concentration of manganese in the aquifer. No manganese exceedances were found during the October sampling event, however, this sampling event was immediately following the completion of the injections.

Baseline sulfate concentrations in the groundwater exceeded the NMWQCC standard of 600 mg/L, however a persulfate oxidant was not chosen as the injection substrate; sulfate concentrations in the aquifer were not monitored in the October sampling event. The sulfate is believed to be at background concentrations and no further sulfate monitoring is planned.

4.3 Sodium Permanganate Injections

As presented on **Table 1**, a total of 475,810 gallons of NaMnO $_4$ solution were injected into the groundwater via eight injection wells. Each of the eight injection well received an average of 232.3 gallons of NaMnO $_4$ blended with an average 59,244 gallons of treated groundwater.

During the October semiannual groundwater sampling event, the color purple, indicating the presence of NaMnO₄, was observed in MW-25 but was not observed in other monitoring wells at the site.

Conclusions and Recommendations

The following conclusions and recommendations are presented relative to groundwater conditions at the site, based on the potentiometric and analytical data obtained during the 2014 site activities.

5.1 Conclusions

Groundwater monitoring has been conducted at the site since 1991. Most of the groundwater concentrations reported in the 2014 annual groundwater sampling period were stable or showed decreasing concentrations compared to historical data. A review of the historical analytical data indicates that VOC concentrations onsite have significantly decreased because of the former SVE systems and the groundwater extraction, treatment, and infiltration system. Most of the VOCs that persist are just slightly above NMWQCC standards; however, it appears that the downgradient VOC plume extends beyond the current groundwater extraction, treatment, and infiltration system and is moving further downgradient in the area of monitoring well MW-28.

The semiannual October sampling event was conducted less than one month after the completion of NaMnO₄ injections and no changes in VOCs concentrations due to the injections were observed.

5.2 Recommendations for Future Activities

5.2.1 Operate Upgraded Groundwater Treatment Facility

The updated groundwater treatment system was installed during February 2015 and included the following upgrades:

- 1. A larger GAC system that allows for longer time between GAC exchanges and provides an easier and more efficient process for exchanging spent GAC.
- 2. Remote-monitoring telemetry to allow real-time monitoring that will confirm that the system is operating correctly and that will send notifications of upset conditions.
- 3. Startup of the third extraction well, EW-03, near monitoring well MW-28 to manage the plume at the site boundary.

The upgraded system is expected to assist with the distribution of NaMnO₄ through the aquifer to maximize the treatment of CVOCs by the oxidant. Once the oxidant is observed in the extracted groundwater, the GAC will be bypassed in the groundwater system and the extracted groundwater will be sent directly to the infiltration gallery to recirculate the residual oxidant throughout the downgradient plume.

5.2.2 Groundwater Monitoring

The groundwater monitoring program will continue on a semiannual basis following the NMOSE-approved schedule. Monitored analytes will include VOCs and manganese. The monitoring wells in the downgradient portion of the plume, along with the extracted groundwater, will be monitored for the presence of NaMnO₄.

SECTION 6

References

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TABLE 1
Substrate Injection Summary
2014 Annual Groundwater Monitoring Report

Former Dowell Schlumberger Facility, Artesia, New Mexico

	Sub	strate Injection			Maximum	Maximum	
	Total Injection	Total Injection Substrate Substr			Injection Flow	Injection Pressure	
Well ID	Volume (gal)	(lb)	(gal)	Substrate	Rate (gpm)	(psi)	
IJ-1	55,721	2,496	218.5	NaMnO ₄	2.66	2.5	
IJ-2	56,566	2,516	220.3	NaMnO ₄	3.06	3.3	
IJ-3	62,445	2,784	243.8	NaMnO ₄	2.68	4.5	
IJ-4	56,864	2,547	223.0	NaMnO ₄	2.98	9.0	
IJ-5	58,264	2,600	227.7	NaMnO ₄	2.90	8.0	
IJ-6	62,731	2,794	244.7	NaMnO ₄	2.84	2.5	
IJ-7	60,215	2,686	235.2	NaMnO ₄	3.02	2.5	
IJ-8	63,004	2,796	244.8	NaMnO ₄	2.75	4.5	
Totals	475,810	21,219	1,858	Maximum Values	3.06	9.0	

Notes:

gal = gallons

lb = pounds

gpm = gallon per minute

psi = pounds per square inch

NaMnO₄ = sodium permanganate

TABLE 2
Groundwater Elevation Data - 2014
2014 Annual Groundwater Monitoring Report
Former Dowell Schlumberger Facility, Artesia, New Mexico

	cniumberger Facili	Total Depth	Top of Casing Elevation	Depth to Water	
Well ID	Date	(ft btoc)	(ft amsl)	(ft btoc)	(ft amsl)
	4/7/14	30.0	3358.52	13.99	3344.53
MW-1	10/14/14	30.0	3358.52	6.75	3351.77
	11/6/14	30.0	3358.52	7	3351.52
	4/7/14	35.0	3358.80	16.96	3341.84
MW-6	10/14/14	35.0	3358.80	4.36	3354.44
	11/6/14	35.0	3358.80	8.10	3344.53 3351.77 3351.52 3341.84
	4/7/14	35.0	3358.19	16.84	3341.35
MW-7	10/14/14	35.0	3358.19	3.91	3354.28
	11/6/14	35.0	3358.19	8.59	3349.60
	4/7/14	35.0	3359.43	16.85	3342.58
MW-8	10/14/14	35.0	3359.43	5.92	3353.51
	11/6/14	35.0	3359.43	10.42	3349.01
	4/7/14	30.0	3357.29	14.85	3342.44
MW-9	10/14/14	30.0	3357.29	5.42	3351.87
	11/6/14	30.0	3357.29	7.35	3349.94
	4/7/14	30.0	3357.80	15.34	3342.46
MW-10	10/14/14	30.0	3357.80	4.43	3353.37
	11/6/14	30.0	3357.80	7.91	3349.89
	4/7/14	30.0	3356.16	14.83	3341.33
MW-11	10/14/14	30.0	3356.16	0.40	3355.76
	11/6/14	30.0	3356.16	6.68	3349.48
	4/7/14	25.7	3356.45	14.64	3341.81
MW-12	10/14/14	25.7	3356.45	0.70	3355.75
	11/6/14	25.7	3356.45	6.41	3350.04
	4/7/14	34.0	3357.65	14.67	3342.98
MW-15	10/14/14	34.0	3357.65	5.49	3352.16
	11/6/14	34.0	3357.65	7.00	3350.65
	4/7/14	NM	NM	13.75	NM
MW-16	10/14/14	NM	NM	6.20	NM
	11/6/14	NM	NM	6.53	NM
	4/7/14	62.4	3356.49	14.66	3341.83
MW-17C	10/14/14	62.4	3356.49	1.94	3354.55
	11/6/14	62.4	3356.49	6.35	3350.14
	4/7/14	30.1	3356.65	15.82	3340.83
MW-18	10/14/14	30.1	3356.65	3.24	3353.41
	11/6/14	30.1	3356.65	7.94	3348.71
	4/7/14	28.0	3357.02	15.56	3341.46
MW-19	10/14/14	28.0	3357.02	3.13	3353.89
	11/6/14	28.0	3357.02	6.96	3350.06
	4/7/14	28.0	3359.05	17.85	3341.20
MW-20	10/14/14	28.0	3359.05	12.21	3346.84
	11/6/14	28.0	3359.05	13.11	3345.94

TABLE 2
Groundwater Elevation Data - 2014
2014 Annual Groundwater Monitoring Report

Former Dowell Schlumberger Facility, Artesia, New Mexico

Well ID	Date	Total Depth (ft btoc)	Top of Casing Elevation (ft amsl)	Depth to Water (ft btoc)	Groundwater Elevation (ft amsl)
Weilib	4/7/14	17.41	3356.83	15.85	3340.98
MW-21	10/14/14	17.41			
	, ,		3356.83	9.76	3347.07
	11/6/14	17.41	3356.83	11.08	3345.75
MW-22	4/7/14	15.63	3355.11	14.62	3340.49
10100-22	10/14/14	15.63	3355.11	6.40	3348.71
	11/6/14	15.63	3355.11	8.81	3346.30
NAVA / 22	4/7/14	25.0	3355.26	15.08	3340.18
MW-23	10/14/14	25.0	3355.26	4.43	3350.83
	11/6/14	25.0	3355.26	6.32	3348.94
	4/7/14	27.3	3355.61	17.82	3337.79
MW-25	10/14/14	27.3	3355.61	9.68	3345.93
	11/6/14	27.3	3355.61	11.05	3344.56
	4/7/14	27.35	3354.14	17.05	3337.09
MW-26	10/14/14	27.35	3354.14	9.74	3344.40
	11/6/14	27.35	3354.14	10.42	3343.72
	4/7/14	25.0	3354.17	15.29	3338.88
MW-27	10/14/14	25.0	3354.17	7.33	3346.84
	11/6/14	25.0	3354.17	9.44	3344.73
	4/7/14	27.94	3355.88	19.71	3336.17
MW-28	10/14/14	27.94	3355.88	15.25	3340.63
	11/6/14	27.94	3355.88	14.65	3341.23
	4/7/14	20.25	3354.99	19.36	3335.63
MW-29	10/14/14	20.25	3354.99	16.09	3338.90
	11/6/14	20.25	3354.99	15.32	3339.67
	4/7/14	27.89	3354.53	19.52	3335.01
MW-30	10/14/14	27.89	3354.53	15.95	3338.58
	11/6/14	27.89	3354.53	12.62	3341.91
	4/7/14	30.89	3356.32	15.63	3340.69
MW-31	10/14/14	30.89	3356.32	5.42	3350.90
	11/6/14	30.89	3356.32	8.71	3347.61
	4/7/14	38.85	3354.46	18.53	3335.93
MW-32	10/14/14	38.85	3354.46	12.63	3341.83
	11/6/14	38.85	3354.46	12.23	3342.23
	4/7/14	35.0	3349.63	16.98	3332.65
MW-33	10/14/14	35.0	3349.63	12.49	3337.14
	11/6/14	35.0	3349.63	12.78	3336.85
MW-34	10/14/14	32.0	NM	12.81	NM
19199-34	11/6/14	32.0	NM	12.82	NM

ft btoc = feet below top of casing ft amsl = feet above mean sea level

NM = not measured, MW-16 and MW-34 have not been surveyed; groundwater elevation in ft amsl is not calculated.

TABLE 3

Summary of Groundwater Analytical Results - 2014

2014 Annual Groundwater Monitoring Report

Former Dowell Schlumberger Facility, Artesia, New Mexico

WELL NUMBER	SAMPLE DATE	Iron, Dissolved (mg/L)	Manganese, Dissolved (mg/L)	Sulfate (mg/L)	Sulfide (mg/L)	1,1,1-TCA (mg/L)	1,1,2,2-Tetrachloroethane (mg/L)	1,1,2- Trichloroethane (mg/L)	1,1-DCA (mg/L)	1,1-DCE (mg/L)	1,2-DCA (mg/L)	Benzene (mg/L)	Carbon Tetrachloride (mg/L)	Chloroform (mg/L)
NMWQCC Standards		1.0	0.2	600		0.06	0.01	0.01	0.025	0.005	0.01	0.01	0.01	0.1
MW-1	10/21/14					<0.00015	<0.00022 J	<0.00028	<0.00011	<0.00019	<0.00014	<0.00008	<0.00015	<0.00013
MW-7	10/17/14					<0.00015	<0.00022 J	<0.00028	<0.00011	<0.00019	<0.00014	<0.00008	<0.00015	< 0.00013
MW-8	10/17/14					<0.00015	<0.00022 J	<0.00028	0.00206	0.00125	<0.00014	<0.00008	<0.00015	< 0.00013
MW-11	10/17/14					<0.00015	<0.00022 J	<0.00028	0.000253 J	<0.00019	<0.00014	<0.00008	<0.00015	< 0.00013
MW-12	04/08/14					<0.00075	<0.0011	<0.0014	0.0263	0.00229 J	<0.0007	0.00621	<0.00075	<0.00065
10100-12	10/17/14					<0.00015 J	<0.00022 J	<0.00028 J	0.00434 J	0.000484 J	<0.00014 J	<0.00265	<0.00015 J	<0.00013 J
MW-15	10/17/14					<0.00015	<0.00022 J	<0.00028	0.000119 J	<0.00019	<0.00014	<0.00008	<0.00015	<0.00013
MW-17C	04/08/14					<0.00015	<0.00022 J	<0.00028	0.000221 J	0.000438 J	<0.00014	<0.00008	<0.00015	<0.00013
IVIVV-17C	10/17/14					<0.00015	<0.00022 J	<0.00028	0.000184 J	0.000436 J	<0.00014	<0.00008	<0.00015	<0.00013
MW-18	04/08/14					<0.00015	<0.00022	<0.00028	0.00118	0.00551	<0.00014	<0.00008	<0.00015	<0.00013
IAIAA-19	10/16/14		<0.0116			<0.00015	<0.00022 J	<0.00028	<0.00011	0.00019 J	<0.00014	<0.00008	<0.00015	<0.00013
MW-20	10/16/14					<0.00015	<0.00022 J	<0.00028	0.0121	0.0038	0.000168 J	<0.000211	<0.00015	<0.00013
MW-21	04/08/14					<0.00015	<0.00022	<0.00028	0.000221 J	<0.00019	<0.000187	<0.00008	<0.00015	<0.00013
10100-21	10/16/14		<0.0116			<0.00015	<0.00022 J	<0.00028	0.000195 J	0.000196 J	<0.00014	<0.00008	<0.00015	<0.00013
MW-22	10/16/14		< 0.0116			<0.00015	<0.00022 J	<0.00028	0.00187	0.00489	< 0.00014	<0.00008	<0.00015	<0.00013
MW-25	04/08/14					<0.00015	<0.00022	<0.00028	0.00436	<0.00019	<0.00023	<0.00008	<0.00015	<0.00013
IVIVV 25	06/05/14	<0.0866	0.000894 J	2140	<0.009									
MW-26	04/08/14					<0.00015	<0.00022	<0.00028	0.000219 J	0.0011	<0.000147	<0.00008	<0.00015	<0.00013
IVIVV 20	10/14/14		<0.0116			<0.00015	<0.00022 J	<0.00028	0.000136 J	0.000964 J	<0.00014	<0.00008	<0.00015	<0.00013
	04/08/14					<0.00015	<0.00022	<0.00028	0.00815	0.0241	<0.000322	<0.00008	<0.00015	<0.00013
MW-28	06/05/14	<0.0866	0.00314 J	2340	<0.009									
	10/15/14		<0.0116			<0.00015	<0.00022 J	<0.00028	0.00889	0.0361	0.000196 J	<0.000103	<0.00015	<0.00013
MW-29	10/15/14		<0.0116			<0.00015	<0.00022 J	<0.00028	0.0037	0.0238	<0.00014	<0.00008	<0.00015	<0.00013
MW-30	04/08/14					<0.00015	<0.00022	<0.00028	0.0093	0.0322	<0.000366	0.0000842 J	<0.00015	0.000142 J
10100 30	10/15/14		<0.0116			<0.00015	<0.00022 J	<0.00028	0.00606	0.0221	0.000164 J	<0.00008	<0.00015	<0.00013
MW-31	04/08/14					<0.00015	<0.00022	<0.00028	0.000291 J	<0.00019	<0.00014	<0.00008	<0.00015	<0.00013
10100 31	10/16/14		0.138			<0.00015	<0.00022 J	<0.00028	0.0008 J	0.00122	<0.00014	<0.00008	<0.00015	<0.00013
MW-32	04/08/14					<0.00015	<0.00022	<0.00028	0.00089 J	0.00355	<0.00014	<0.00008	<0.00015	<0.00013
14144 32	10/15/14		<0.0116			<0.00015	<0.00022 J	<0.00028	0.000603 J	0.00296	<0.00014	<0.00008	<0.00015	<0.00013
MW-33	04/08/14					<0.00015	<0.00022	<0.00028	<0.00011	<0.00019	<0.00014	<0.00008	<0.00015	<0.00013
	10/15/14					<0.00015	<0.00022 J	<0.00028	<0.00011	<0.00019	<0.00014	<0.00008	<0.00015	<0.00013
MW-34	10/15/14		<0.0116			<0.00015	<0.00022 J	<0.00028	0.00406	0.0131	<0.00014	<0.00008	<0.00015	<0.00013

NOTES

NMWQCC = New Mexico Water Quality Control Commission

mg/L = milligrams per liter (equivalent to parts per million)

<0.001 = analyte not detected at concentration above detection limit shown

J = analyte detected at concentration above instrument detection limit but below method detection limit

-- = sample not analyzed for this analyte

0.000196 Bolded cells indicate the analyte was positively detected.

0.0241 Shaded cells indicate concentrations exceed their respective NMWQCC standards.

DCA - dichloroethane DCE - dichloroethene PCE - tetrachloroethene

TCE - trichloroethene

TABLE 3

Summary of Groundwater Analytical Results - 2014

2014 Annual Groundwater Monitoring Report

Former Dowell Schlumberger Facility, Artesia, New Mexico

WELL NUMBER	SAMPLE DATE	Ethylbenzene (mg/L)	Ethylene Dibromide (mg/L)	m,p-Xylene (sum of isomers) (mg/L)	Methylene Chloride (Dichloromethane) (mg/L)	Naphthalene (mg/L)	o-Xylene (mg/L)	PCE (mg/L)	Toluene (mg/L)	TCE (mg/L)	Vinyl Chloride (mg/L)	Xylenes, Total (mg/L)
NMWQCC	Standards	0.75	0.0001	0.62	0.1	0.03	0.62	0.02	0.75	0.1	0.001	0.62
MW-1	10/21/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	< 0.00013	<0.00015	<0.00018	<0.00011	<0.00026
MW-7	10/17/14	<0.00011	<0.00018	< 0.00017	<0.00015	<0.00032	<0.00012	0.000161 J	<0.00015	<0.00018	<0.00011	<0.00026
MW-8	10/17/14	<0.00011	<0.00018	< 0.00017	<0.00015	<0.00032	<0.00012	0.00181	<0.00015	0.00108	<0.00011	<0.00026
MW-11	10/17/14	<0.00011	<0.00018	< 0.00017	<0.00015	<0.00032	<0.00012	<0.00013	<0.00015	0.000211 J	<0.00011	<0.00026
MW-12	04/08/14	0.148	<0.0009	0.0486	<0.00075 J	0.0419 J	0.00127 J	0.00113 J	<0.00075	0.00367 J	<0.00055	0.0499
IVIVV-12	10/17/14	0.00379 J	<0.00018 J	0.0554	<0.00015 J	0.104	0.0116 J	0.00083 J	<0.00015 J	0.000851 J	<0.00011 J	0.067
MW-15	10/17/14	<0.00011	<0.00018	< 0.00017	<0.00015	<0.00032	<0.00012	0.00592	<0.00015	0.0154	<0.00011	<0.00026
NAVA 17C	04/08/14	<0.00011	<0.00018	< 0.00017	<0.00015	<0.00032 J	<0.00012	0.0002 J	<0.00015	0.000262 J	<0.00011	<0.00026
MW-17C	10/17/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.000199 J	<0.00015	0.000615 J	<0.00011	<0.00026
NAVA / 10	04/08/14	<0.00011	<0.00018	< 0.00017	<0.00015	<0.00067	<0.00012	0.00564	<0.00015	<0.00018	<0.00011	<0.00026
MW-18	10/16/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.000361 J	<0.00015	<0.00018	<0.00011	<0.00026
MW-20	10/16/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.00263	<0.00015	0.0043	0.000374 J	<0.00026
MW-21	04/08/14	<0.00011	<0.00018	< 0.00017	<0.00015	<0.00032	<0.00012	0.000408 J	<0.00015	<0.00018	<0.00011	<0.00026
IVI VV-21	10/16/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.000134 J	<0.00015	<0.00018	<0.00011	<0.00026
MW-22	10/16/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.00668	<0.00015	0.00135	<0.00011	<0.00026
MW-25	04/08/14	<0.00011	<0.00018	< 0.00017	<0.00015	<0.00032	<0.00012	0.0157	<0.00015	0.00285	<0.00011	<0.00026
IVI VV-25	06/05/14											
NAVA 20	04/08/14	<0.00011	<0.00018	< 0.00017	<0.00015	<0.00032	<0.00012	0.000959 J	<0.00015	0.000369 J	<0.00011	<0.00026
MW-26	10/14/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.000261 J	<0.00015	0.000384 J	<0.00011	<0.00026
	04/08/14	<0.00011	<0.00018	< 0.00017	<0.00015	<0.00032	<0.00012	0.0263	<0.00015	0.00721	<0.00011	<0.00026
MW-28	06/05/14											
	10/15/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.0224	<0.00015	0.00873	<0.00011	<0.00026
MW-29	10/15/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.00884	<0.00015	0.00503	<0.00011	<0.00026
NAVA 20	04/08/14	<0.00011	<0.00018	< 0.00017	<0.00015	<0.00032	<0.00012	0.0413	<0.00015	0.00822	<0.00011	<0.00026
MW-30	10/15/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.0205	<0.00015	0.0058	<0.00011	<0.00026
NAV 24	04/08/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	<0.00013	<0.00015	<0.00018	<0.00011	<0.00026
MW-31	10/16/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.000499 J	<0.00015	0.000258 J	<0.00011	<0.00026
NAVA 22	04/08/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.00538	<0.00015	0.000963 J	<0.00011	<0.00026
MW-32	10/15/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.00341	<0.00015	0.000887 J	<0.00011	<0.00026
NAVA 22	04/08/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	<0.00013	<0.00015	<0.00018	<0.00011	<0.00026
MW-33	10/15/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	<0.00013	<0.00015	<0.00018	<0.00011	<0.00026
MW-34	10/15/14	<0.00011	<0.00018	<0.00017	<0.00015	<0.00032	<0.00012	0.00752	<0.00015	0.00266 J	<0.00011	<0.00026

NOTES

NMWQCC = New Mexico Water Quality Control Commission

mg/L = milligrams per liter (equivalent to parts per million)

<0.001 = analyte not detected at concentration above detection limit shown

J = analyte detected at concentration above instrument detection limit but below method detection limit

-- = sample not analyzed for this analyte

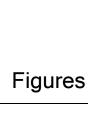
0.000196 Bolded cells indicate the analyte was positively detected.

0.0241 Shaded cells indicate concentrations exceed their respective NMWQCC standards.

DCA - dichloroethane DCE - dichloroethene

PCE - tetrachloroethene

TCE - trichloroethene





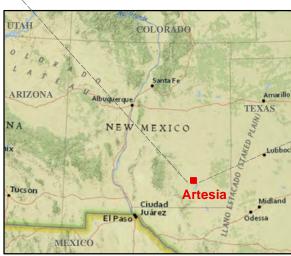
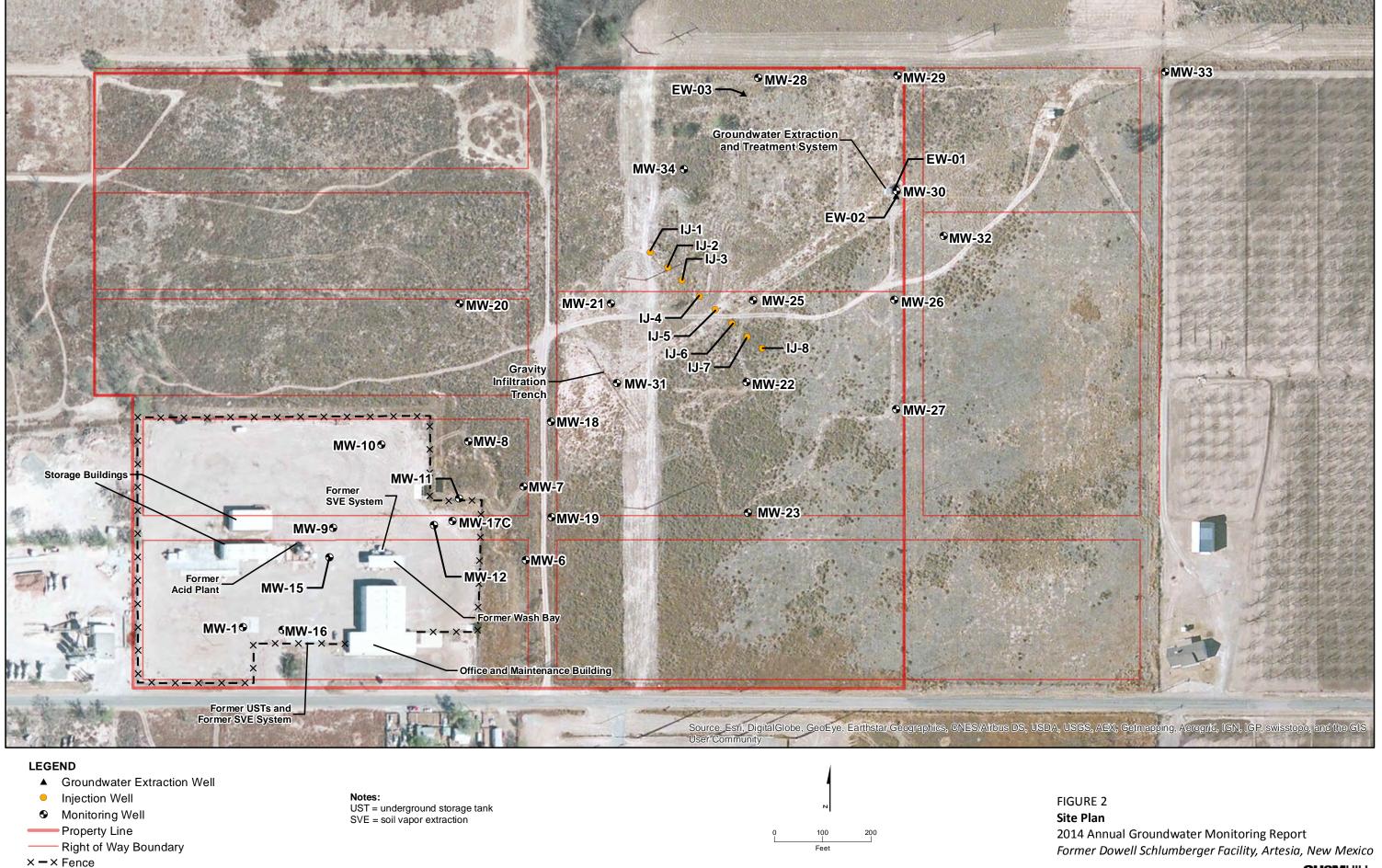
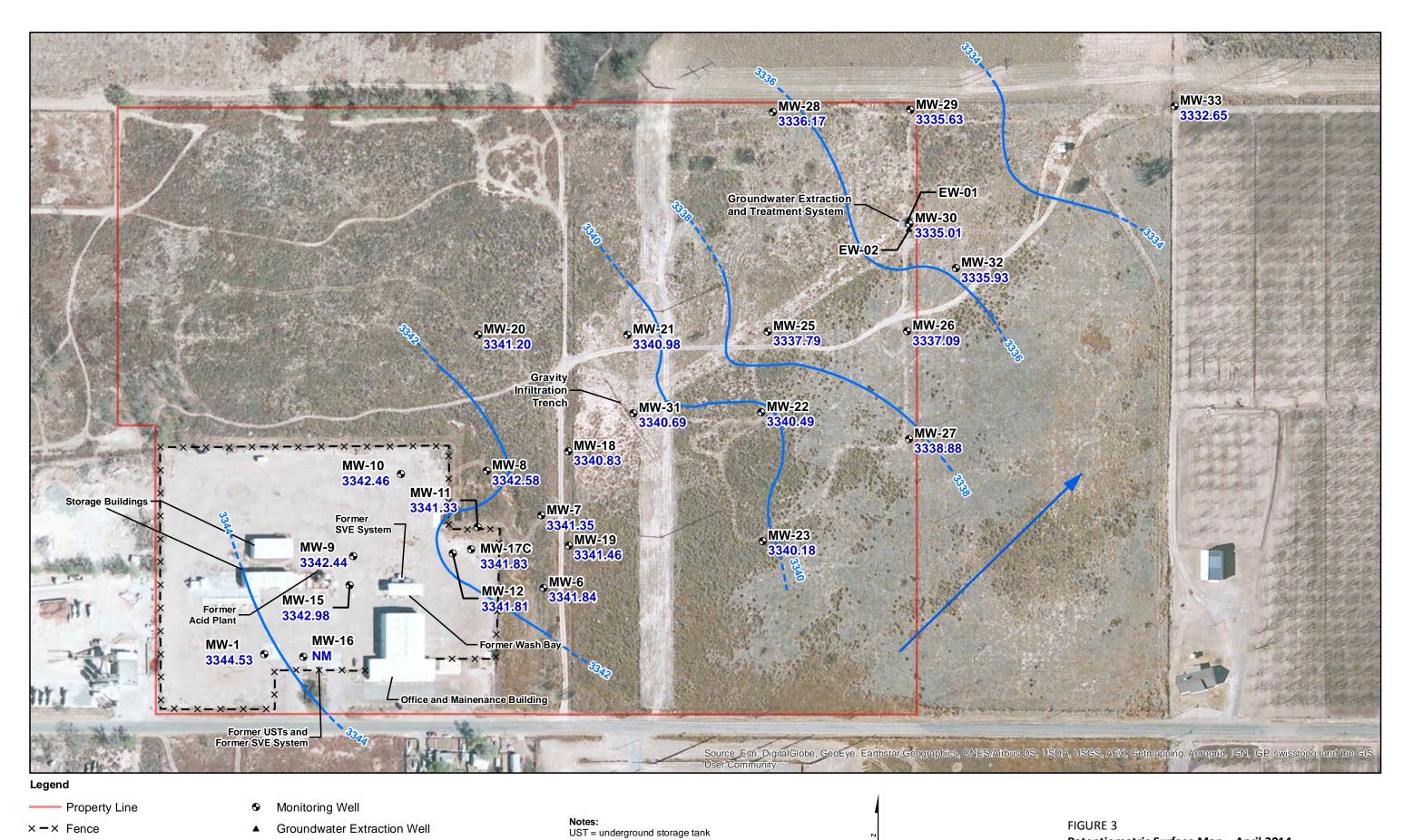
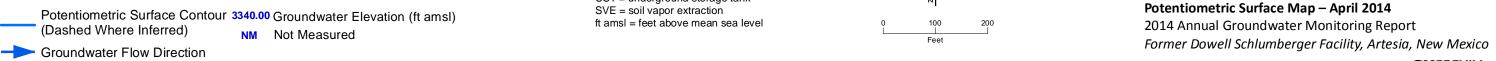
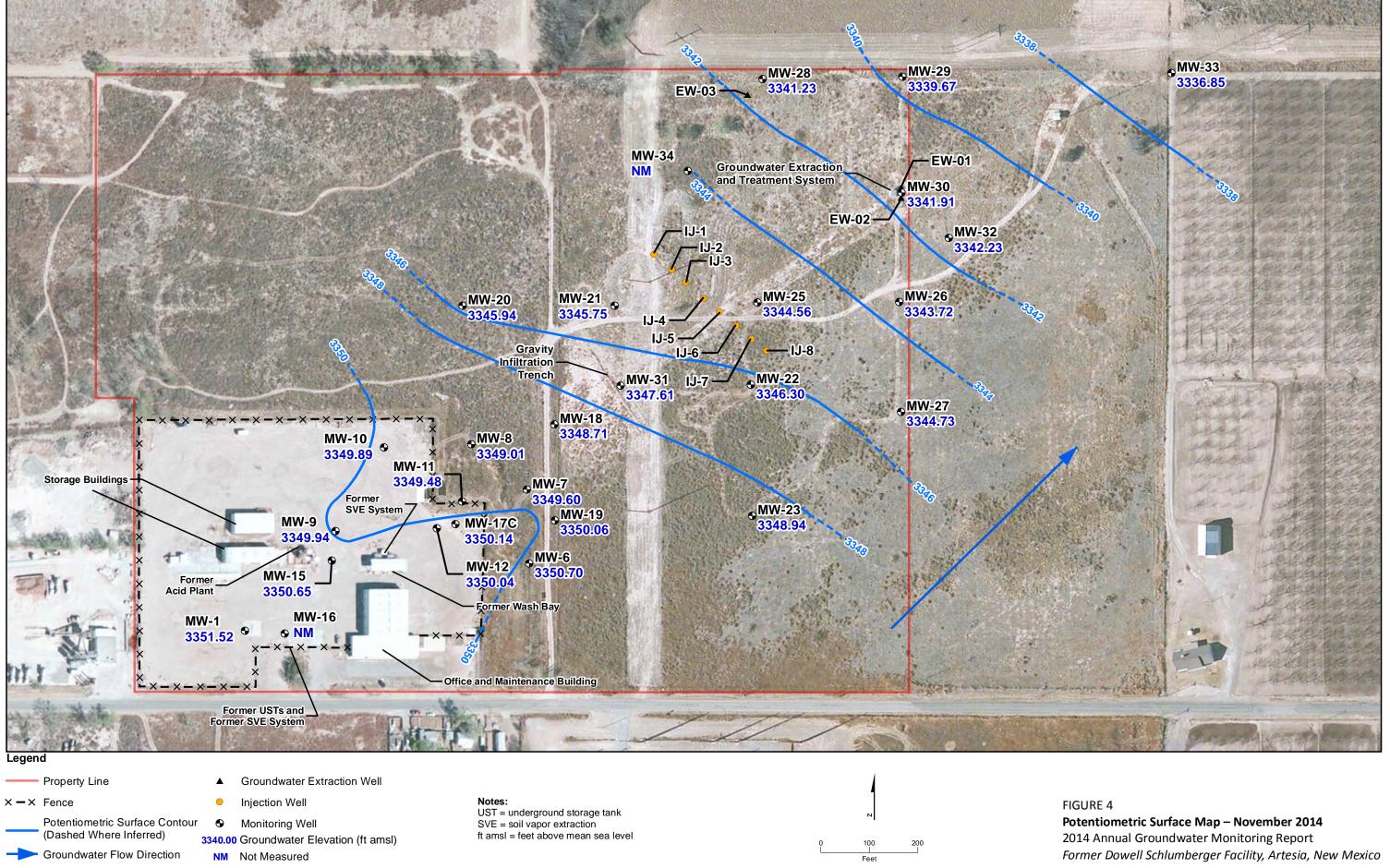


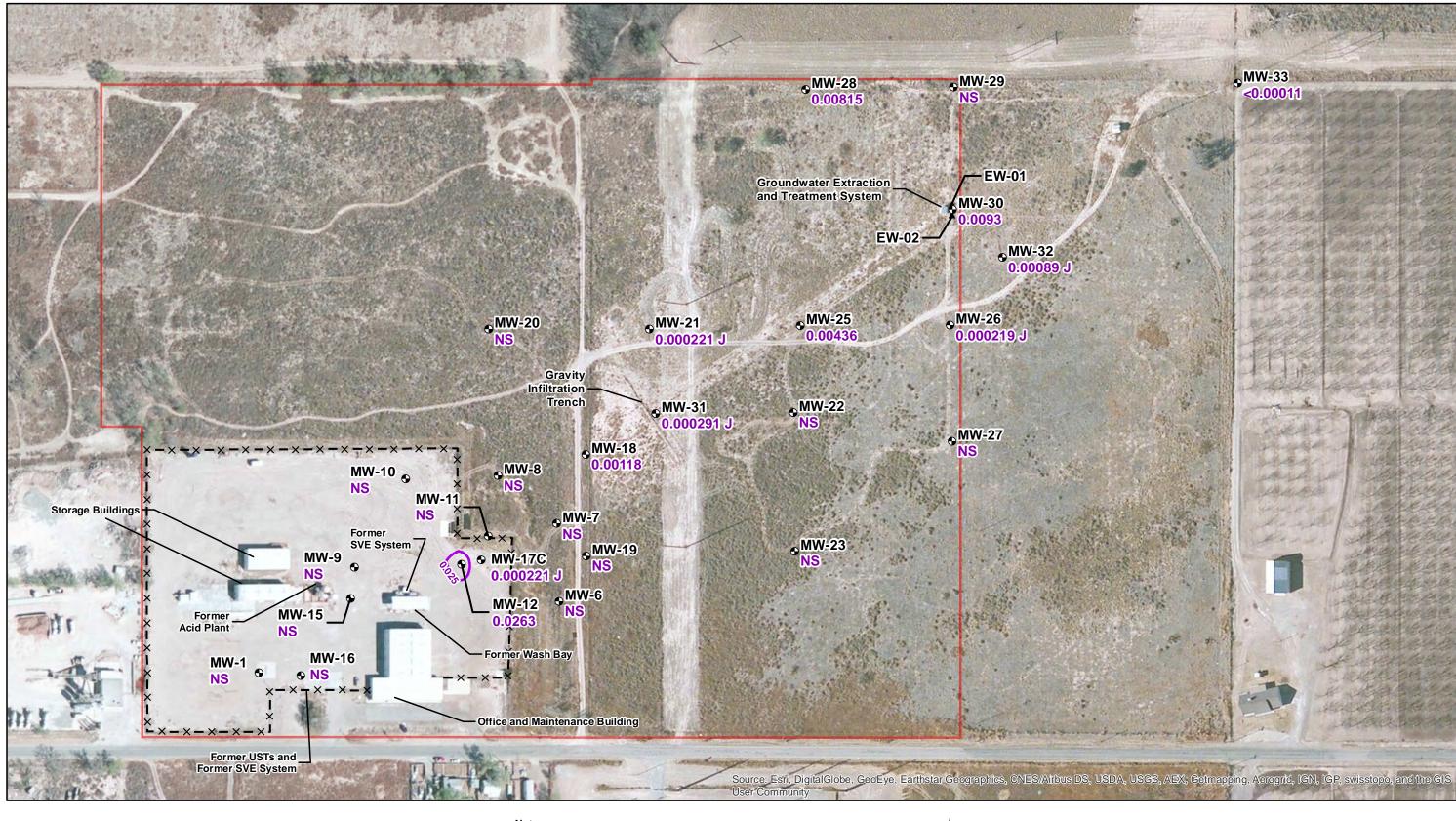
FIGURE 1
Site Location Map
2014 Annual Groundwater Monitoring Report
Former Dowell Schlumberger Facility, Artesia, New Mexico











---- Property Line

 $\times - \times$ Fence

Monitoring Well

Groundwater Extraction Well

0.025 mg/L NMWQCC Standard for 1,1-DCA Isopleth

0.005 1,1-DCA Concentration mg/L NS Not Sampled

Notes:

J = Analyte detected at concentration above instrument detection limit but below method detection limit

<0.001 = analyte not detected at concentration above detection limit shown NMWQCC = New Mexico Water Quality Control Commission

mg/L= milligrams per liter UST = underground storage tank SVE = soil vapor extraction

DCA = dichloroethane

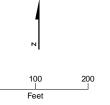
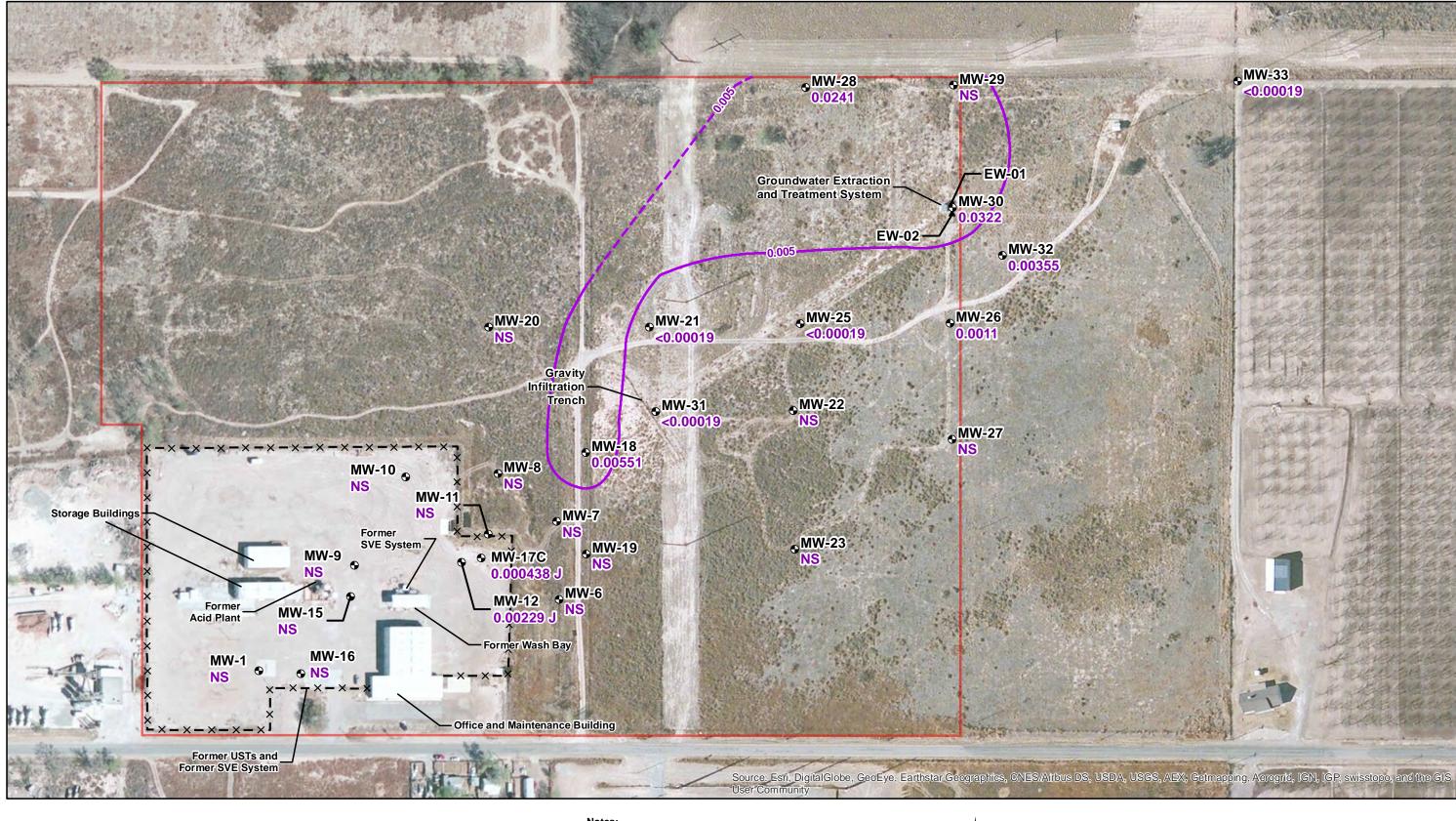


FIGURE 5

Isopleth Map for 1,1-DCA - April 2014

2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico



---- Property Line

 \times - \times Fence

Monitoring Well

Groundwater Extraction Well

0.005 mg/L NMWQCC Standard for 1,1-DCE Isopleth (Dashed where inferred)

0.005 1,1-DCE Concentration mg/L

NS Not Sampled

lotes:

J = Analyte detected at concentration above instrument detection limit but below method detection limit

<0.001 = analyte not detected at concentration above detection limit shown DCE = Dichloroethene

NMWQCC = New Mexico Water Quality Control Commission

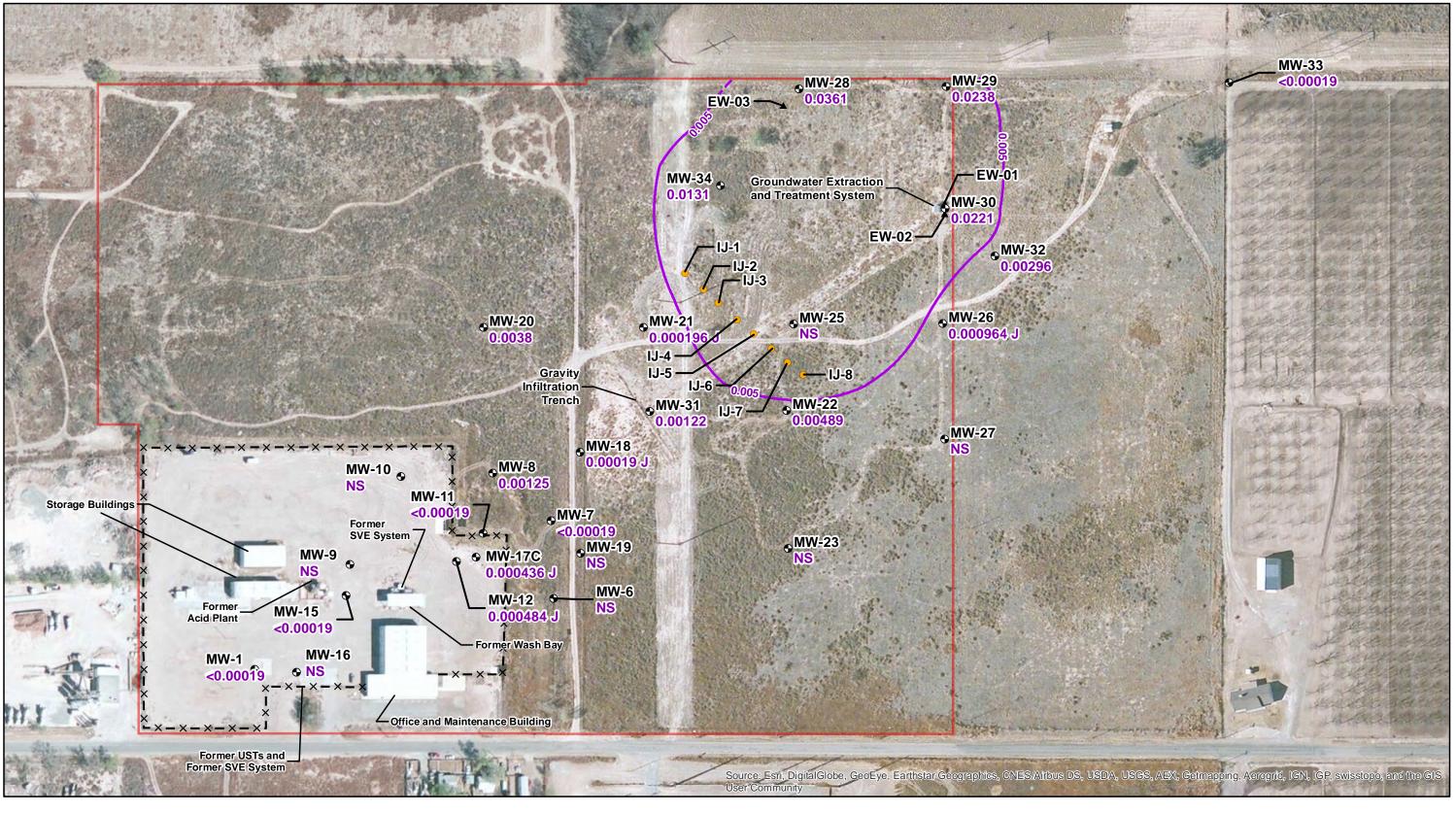
mg/L= milligrams per liter

UST = underground storage tank SVE = soil vapor extraction

FIGURE 6

Isopleth Map for 1,1-DCE – April 2014

2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico



---- Property Line

×-× Fence

▲ Groundwater Extraction Well

Injection Well

Monitoring Well

0.005 mg/L NMWQCC Standard for 1,1-DCE Isopleth (Dashed where inferred)

0.005 1,1-DCE Concentration mg/L

NS Not Sampled

Notes:

J = Analyte detected at concentration above instrument detection limit but below method detection limit

<0.001 = analyte not detected at concentration above detection limit shown DCE = Dichloroethene

NMWQCC = New Mexico Water Quality Control Commission

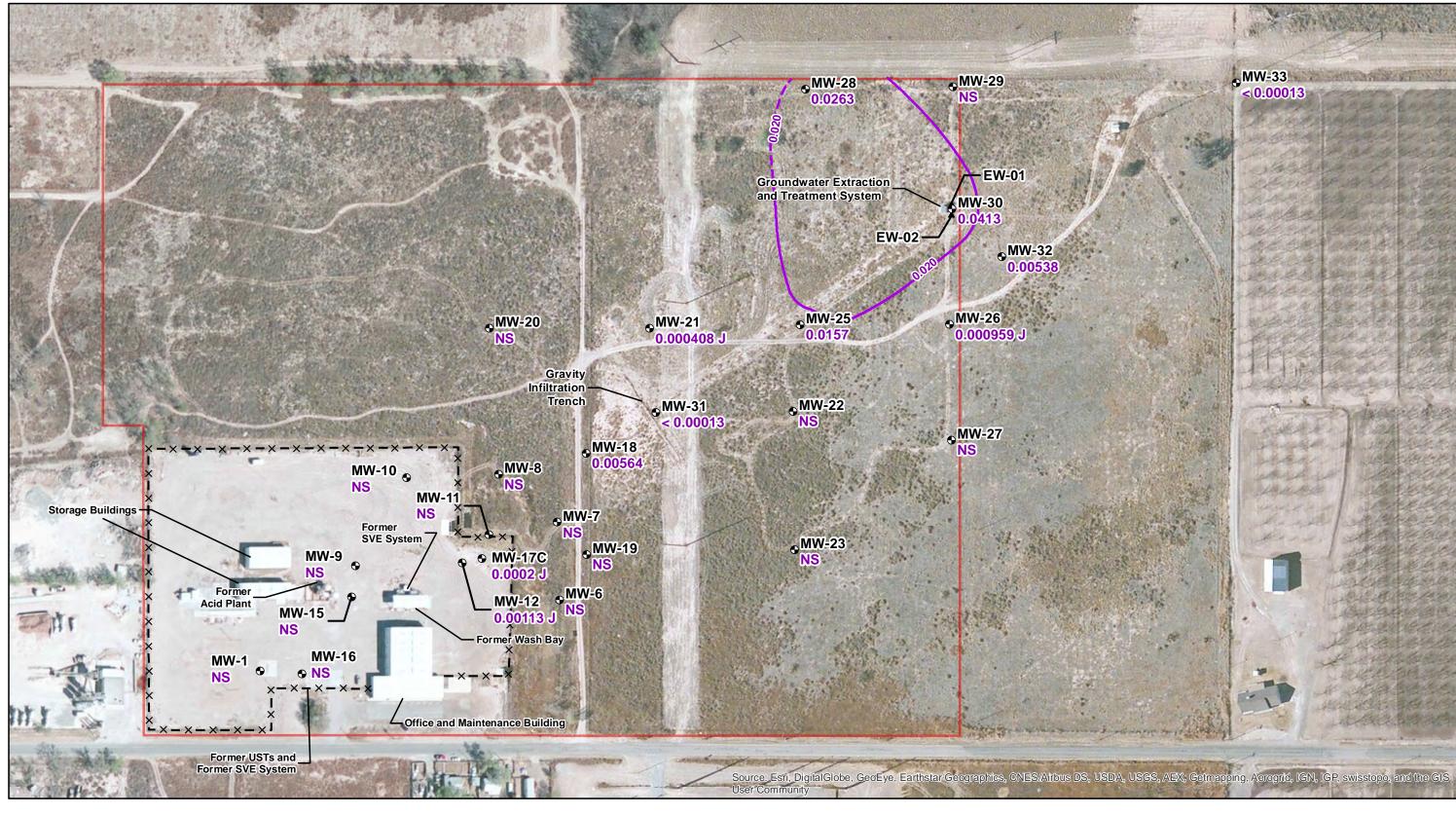
mg/L= milligrams per liter

UST = underground storage tank SVE = soil vapor extraction

FIGURE 7

Isopleth Map for 1,1-DCE – October 2014

2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico



---- Property Line

 $\times - \times$ Fence

Monitoring Well

Groundwater Extraction Well

0.020 mg/L NMWQCC Standard for PCE Isopleth (Dashed where inferred)

0.005 PCE Concentration mg/LNS Not Sampled

Notes:

J = Analyte detected at concentration above instrument detection limit but below method detection limit

<0.001 = analyte not detected at concentration above detection limit shown PCE = tetrachloroethene

NMWQCC = New Mexico Water Quality Control Commission

mg/L= milligrams per liter

UST = underground storage tank SVE = soil vapor extraction

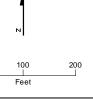
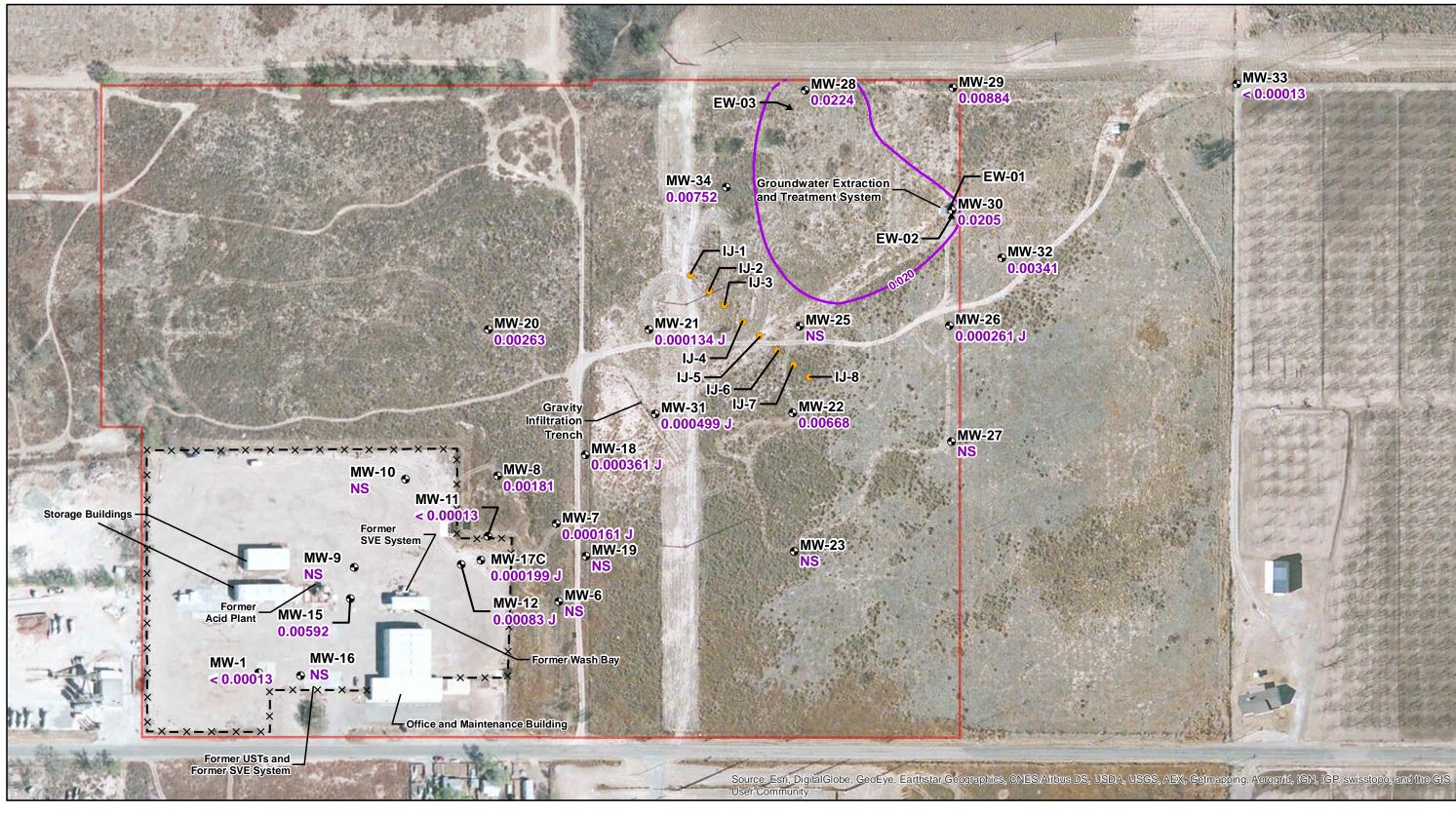


FIGURE 8

Isopleth Map for PCE – April 2014 2014 Annual Groundwater Monitoring Report

Former Dowell Schlumberger Facility, Artesia, New Mexico



---- Property Line

×-× Fence

▲ Groundwater Extraction Well

- Injection Well
- Monitoring Well

0.020 mg/L NMWQCC Standard for PCE Isopleth (Dashed where inferred)

0.005 PCE Concentration mg/L

NS Not Sampled

Notes:

J = Analyte detected at concentration above instrument detection limit but below method detection limit

<0.001 = analyte not detected at concentration above detection limit shown PCE = tetrachloroethene

NMWQCC = New Mexico Water Quality Control Commission

mg/L= milligrams per liter

UST = underground storage tank SVE = soil vapor extraction

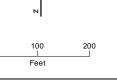
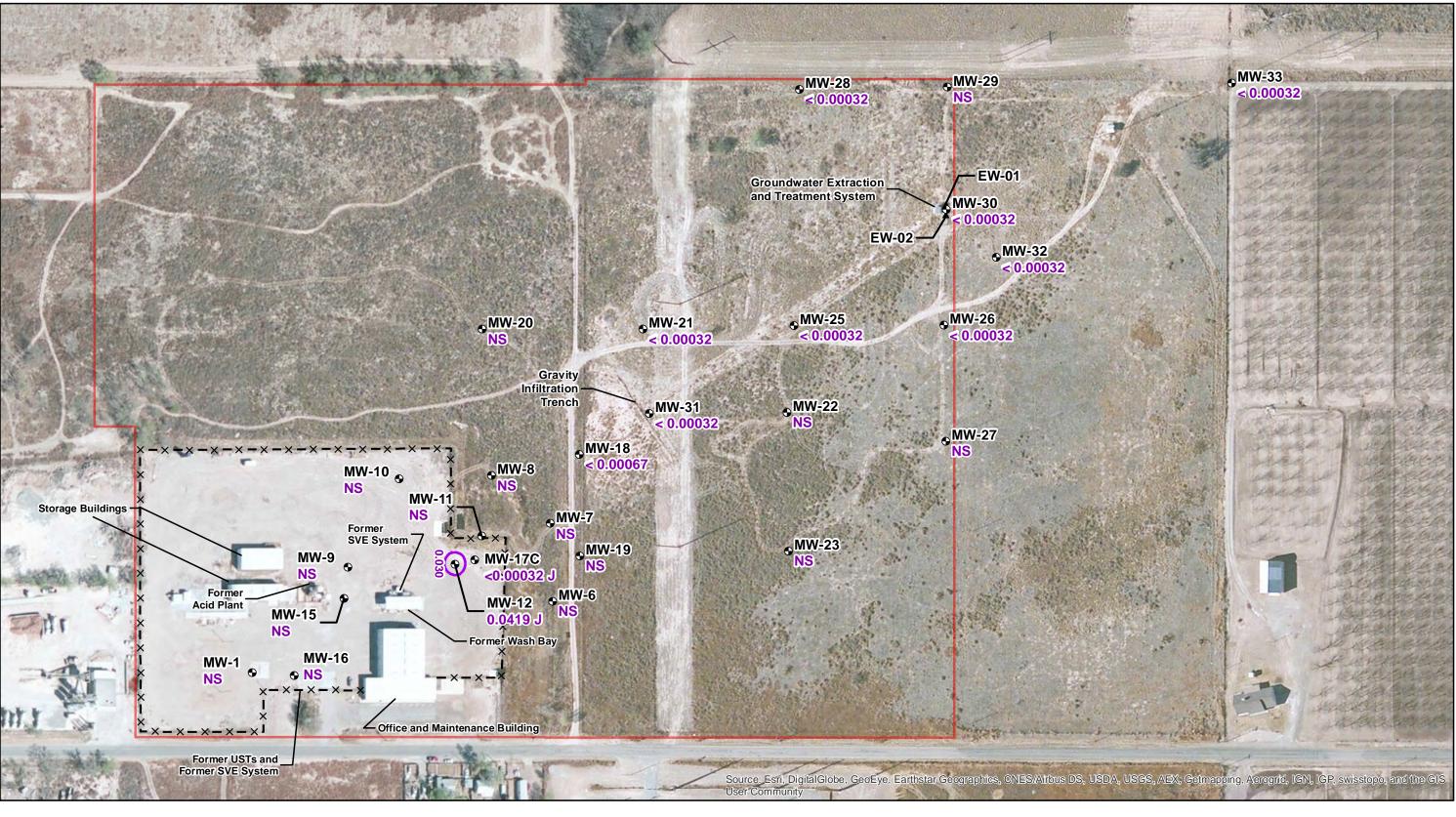


FIGURE 9

Isopleth Map for PCE – October 2014

2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico



---- Property Line

 \times - \times Fence

Monitoring Well

Groundwater Extraction Well

0.030 mg/L NMWQCC Standard for Naphthalene Isopleth

0.030 Naphthalene Concentration mg/LNS Not Sampled

Notes:

J = Analyte detected at concentration above instrument detection limit but below method detection limit

<0.001 = analyte not detected at concentration above detection limit shown NMWQCC = New Mexico Water Quality Control Commission mg/L= milligrams per liter

UST = underground storage tank

SVE = soil vapor extraction

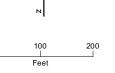
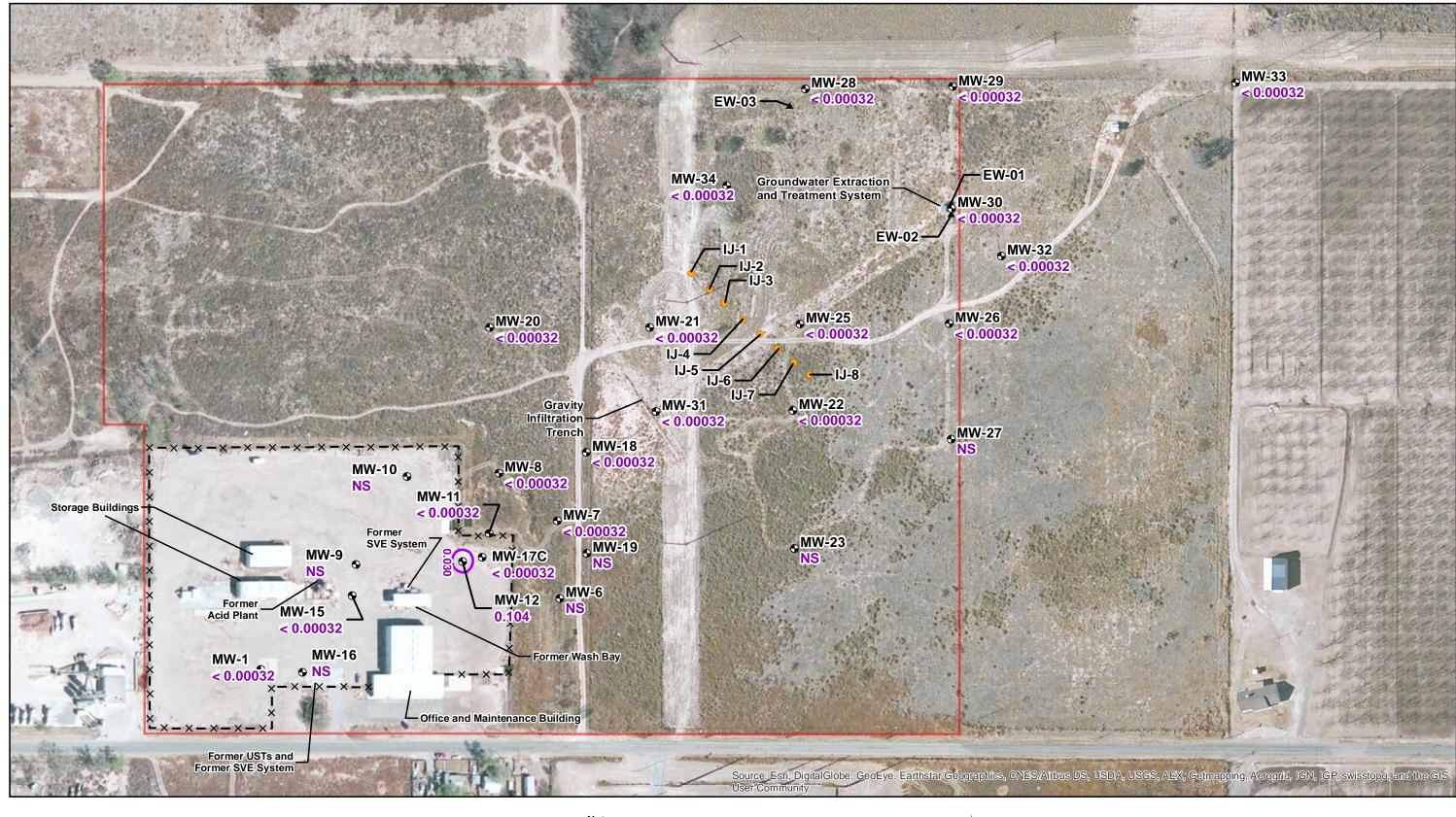


FIGURE 10

Isopleth Map for Naphthalene – April 2014

2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico



---- Property Line

×-× Fence

▲ Groundwater Extraction Well

Injection Well Monitoring Well

Notes:

J = Analyte detected at concentration above instrument detection limit but below method detection limit

<0.001 = analyte not detected at concentration above detection limit shown NMWQCC = New Mexico Water Quality Control Commission

mg/L= milligrams per liter

UST = underground storage tank SVE = soil vapor extraction

FIGURE 11

Isopleth Map for Naphthalene - October 2014

2014 Annual Groundwater Monitoring Report

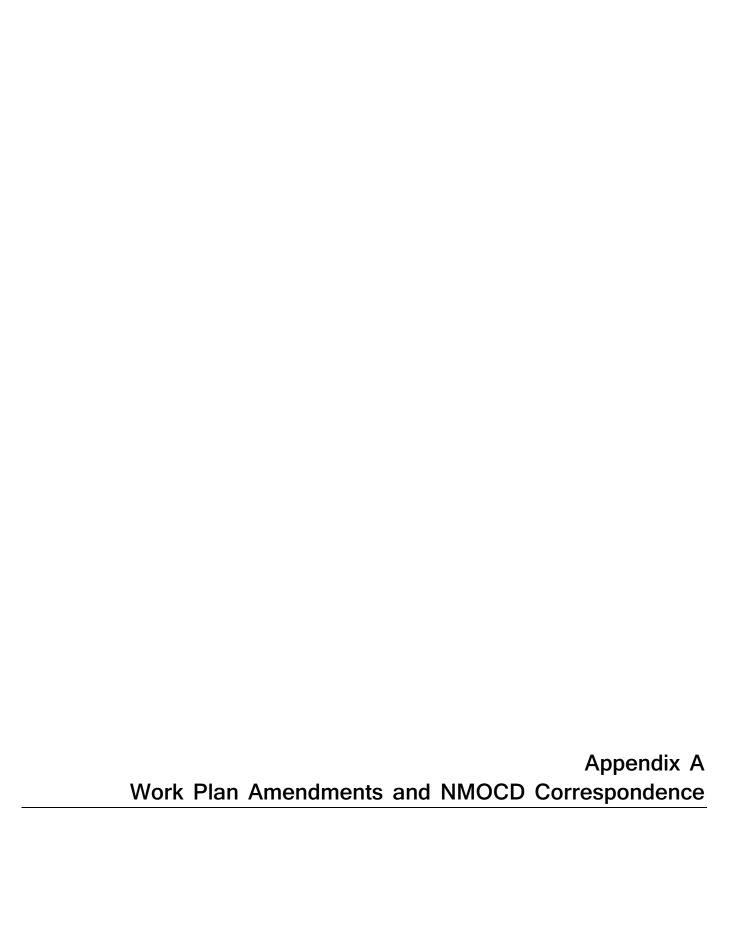
Former Dowell Schlumberger Facility, Artesia, New Mexico

NS Not Sampled

for Naphthalene Isopleth

0.030 Naphthalene Concentration mg/L

0.030 mg/L NMWQCC Standard



From: Hansen, Edward J., EMNRD <edwardj.hansen@state.nm.us>

Sent: Monday, July 15, 2013 2:54 PM

To: Virgilio Cocianni

Cc: VonGonten, Glenn, EMNRD; Strunk Jr, Jim (JStrunkJr@dow.com); Barnett, Cathy/STL;

Minchak, Jeff/ABQ

Subject: Discharge Permit (GW-114) Work Plan Amendment Approval - Schlumberger Oilfield

Services Facility - Artesia

RE: Work Plan Amendment

for the Schlumberger Oilfield Services' Schlumberger Oilfield Services Facility - Artesia 507 E. Richey Ave., Artesia, New Mexico

Discharge Permit (GW-114) Work Plan Amendment Approval

Dear Mr. Cocianni:

The New Mexico Oil Conservation Division (OCD) has received the Work Plan Amendment for the Schlumberger Oilfield Services Facility - Artesia, dated July 9, 2013. The proposed amendment, submitted for the above-referenced site, indicates that the Schlumberger Oilfield Services (Schlumberger) is substantially complying with the requirements of 20.6.2 NMAC [Water Quality Control Commission (WQCC) Regulations]. Therefore, the OCD conditionally approves the amendment to the work plan:

Schlumberger shall continue to submit an annual report to the OCD by April 1 of the following year.

Please be advised that OCD approval of this amendment does not relieve the owner/operator of responsibility should operations pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact at 505-476-3489.

Edward J. Hansen Hydrologist Environmental Bureau

P.S.: The OCD has reviewed the Meeting Minutes of June 18, 2013. The OCD has two amendments to the meeting minutes:

- 1) The groundwater remediation for the site (including any investigation or source control) will continue under the discharge permit; i.e., the WQCC regulations, 20.6.2 NMAC (not NMAC 19.15.29 as stated in the minutes).
- 2) The discharge permit fee for remediation will be \$2,600 (not \$2,400 as stated in the minutes).

From: Virgilio Cocianni [mailto:cocianni-v@slb.com]

Sent: Tuesday, July 09, 2013 6:44 AM

To: Hansen, Edward J., EMNRD; VonGonten, Glenn, EMNRD

Cc: Strunk Jr, Jim (JStrunkJr@dow.com); Cathy Barnett (Cathy.Barnett@CH2M.com); Jeffrey.Minchak@CH2M.com **Subject:** Artesia Meeting Notes

Good morning, Ed and Glenn.

Please find attached the minutes of the meeting we held in your offices on June 18th. Forgive us for the delay in getting these minutes to you. If you have any concerns about the content, please let me know.

As we discussed during the meeting, STC and Dow formally request to cease the quarterly reporting requirement and to continue only with the annual report. With your approval, the Second Quarter Monitoring Results report that you are about to receive will be the last quarterly report.

Have a wonderful week. Best regards, Vic.

Vic Cocianni Schlumberger Remediation Manager Phone: +1-281-285-4747

[&]quot;Courage doesn't always roar. Sometimes courage is the little voice at the end of the day that says I'll try again tomorrow." Mary Ann Radmacher. (Please continue to be patient with me, She is still making me).

From: Hansen, Edward J., EMNRD <edwardj.hansen@state.nm.us>

Sent: Thursday, August 22, 2013 4:39 PM

To: cocianni-v@slb.com

Cc: VonGonten, Glenn, EMNRD; Strunk Jr, Jim (JStrunkJr@dow.com); Barnett, Cathy/STL;

Minchak, Jeff/ABQ

Subject: Discharge Permit (GW-114) Work Plan (Soil Investigation and Soil Vapor Extraction

System Closure) Amendment Approval - Schlumberger Oilfield Services Facility - Artesia

RE: Work Plan Amendment

for the Schlumberger Oilfield Services' Schlumberger Oilfield Services Facility - Artesia 507 E. Richey Ave., Artesia, New Mexico

Discharge Permit (GW-114) Work Plan (Soil Investigation and Soil Vapor Extraction System Closure) Amendment Approval

Dear Mr. Cocianni:

The Oil Conservation Division (OCD) has received the Work Plan Amendment for the Schlumberger Oilfield Services Facility - Artesia, dated August 15, 2013. The proposed amendment, submitted for the above-referenced site, indicates that the Schlumberger Oilfield Services (Schlumberger) is substantially complying with the requirements of 20.6.2 NMAC [Water Quality Control Commission (WQCC) Regulations]. Therefore, the OCD conditionally approves the amendment to the work plan:

Schlumberger shall submit to the OCD for approval a soil investigation report and soil remediation plan prior to the Soil Vapor Extraction System Closure.

Please be advised that OCD approval of this amendment does not relieve the owner/operator of responsibility should operations pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact at 505-476-3489.

Edward J. Hansen Hydrologist Environmental Bureau

From: Hansen, Edward J., EMNRD <edwardj.hansen@state.nm.us>

Sent: Thursday, August 22, 2013 4:44 PM

To: cocianni-v@slb.com

Cc: VonGonten, Glenn, EMNRD; Strunk Jr, Jim (JStrunkJr@dow.com); Barnett, Cathy/STL;

Minchak, Jeff/ABQ

Subject: Discharge Permit (GW-114) Work Plan (GW Remediation Program) Amendment

Approval - Schlumberger Oilfield Services Facility - Artesia

RE: Work Plan Amendment

for the Schlumberger Oilfield Services' Schlumberger Oilfield Services Facility - Artesia 507 E. Richey Ave., Artesia, New Mexico

Discharge Permit (GW-114) Work Plan (GW Remediation Program) Amendment Approval

Dear Mr. Cocianni:

The Oil Conservation Division (OCD) has received the Work Plan Amendment for the Schlumberger Oilfield Services Facility - Artesia, dated August 15, 2013. The proposed amendment, submitted for the above-referenced site, indicates that the Schlumberger Oilfield Services (Schlumberger) is substantially complying with the requirements of 20.6.2 NMAC [Water Quality Control Commission (WQCC) Regulations]. Therefore, the OCD conditionally approves the amendment to the work plan:

Schlumberger shall provide to the OCD for approval a demonstration that the WQCC standards for Manganese (0.2 mg/L) or Sulfate (600.0 mg/L) will not be exceeded in ground water at the site prior to initiation of the ISCO treatment. Also, Schlumberger must monitor for Manganese or Sulfate in ground water depending on the ISCO substrate used for the treatment.

If any other substrate other than permanganate or persulfate is proposed to be used, Schlumberger must obtain OCD approval prior to such use.

Please be advised that OCD approval of this amendment does not relieve the owner/operator of responsibility should operations pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact at 505-476-3489.

Edward J. Hansen Hydrologist Environmental Bureau

From: Hansen, Edward J., EMNRD <edwardj.hansen@state.nm.us>

Sent: Wednesday, September 18, 2013 1:52 PM

To: Virgilio Cocianni

Cc: VonGonten, Glenn, EMNRD; Strunk Jr, Jim (JStrunkJr@dow.com); Barnett, Cathy/STL;

Laggan, Jennifer/DEN; Minchak, Jeff/ABQ

Subject: Discharge Permit (GW-114) Work Plan (GW Monitoring Program) Amendment Approval

- Schlumberger Oilfield Services Facility - Artesia

RE: Work Plan Amendment

for the Schlumberger Oilfield Services' Schlumberger Oilfield Services Facility - Artesia 507 E. Richey Ave., Artesia, New Mexico

Discharge Permit (GW-114) Work Plan (GW Monitoring Program) Amendment Approval

Dear Mr. Cocianni:

The Oil Conservation Division (OCD) has received the Work Plan Amendment for the Schlumberger Oilfield Services Facility - Artesia, dated September 17, 2013. The proposed amendment, submitted for the above-referenced site, indicates that the Schlumberger Oilfield Services (Schlumberger) is substantially complying with the requirements of 20.6.2 NMAC [Water Quality Control Commission (WQCC) Regulations]. Therefore, the OCD conditionally approves the amendment to the work plan:

Schlumberger shall continue to monitoring ground water at MW-1 and MW-20 at least annually.

Schlumberger may discontinue monitoring ground water at MW-19.

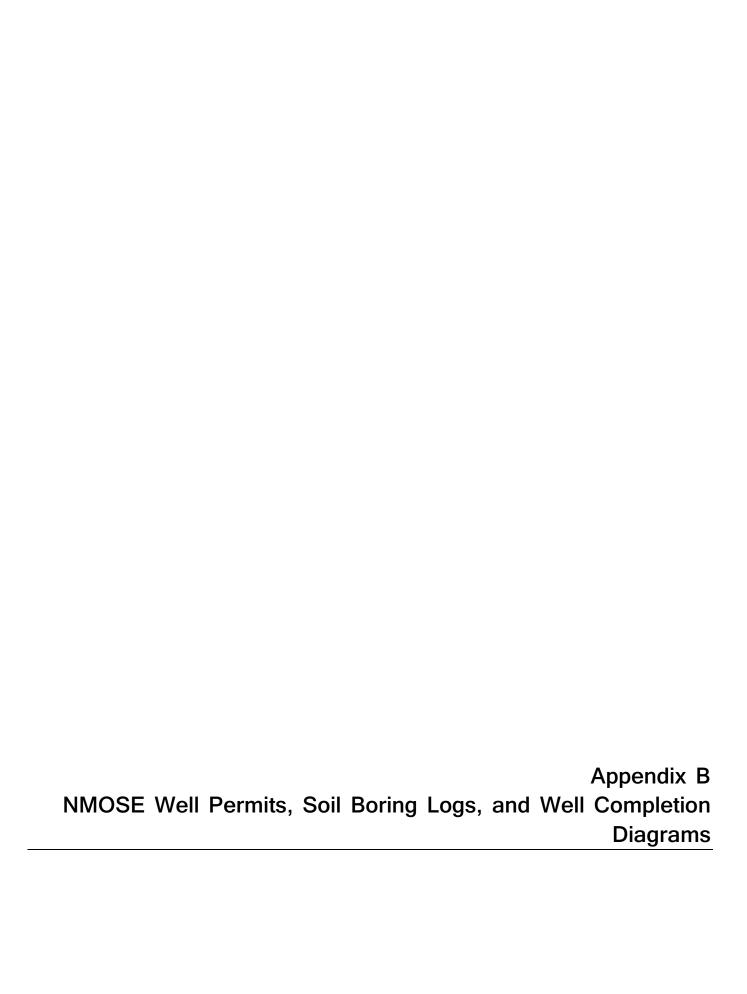
Schlumberger shall use a cement grout with 1% to 3% bentonite and a 3-foot cap of cement to the surface when plugging the monitoring wells.

Schlumberger shall submit to OCD a plugging report within 180 days.

Please be advised that OCD approval of this amendment does not relieve the owner/operator of responsibility should operations pose a threat to ground water, surface water, human health or the environment. In addition, OCD approval does not relieve the owner/operator of responsibility for compliance with any OCD, federal, state, or local laws and/or regulations.

Thank you for your cooperation in this matter. If you have any questions regarding this matter, please contact at 505-476-3489.

Edward J. Hansen Hydrologist Environmental Bureau



Scott A. Verhines, P.E. State Engineer



Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 552041

File Nbr: C 03774 POD1 MONITOR

Aug. 05, 2014

Jeffrey Minchak, P.G. Senior Project Manager CH2M HILL 3721 Rutledge Rd. NE, Suite B-1 Albuquerque, NM 87109

RE: VIRGILIO COCIANNI, SCHLUMBERGER TECHNOLOGY CORP

Greetings:

Enclosed is your copy of the above numbered permit that has been approved subject to the conditions set forth on the approval page. In accordance with the conditions of approval, the well can only be tested for 10 cumulative days, and the well is to be plugged on or before 08/31/2015, unless a permit to use the water is acquired from this office.

A Well Record & Log (OSE Form wr-20) shall be filed in this office within twenty (20) days after completion of drilling, but no later than 08/31/2015.

Appropriate forms can be downloaded from the OSE website www.ose.state.nm.us or will be mailed upon request.

Sincerely,

Andy Morley (575)622-6521

Enclosure

C-5 11	File No.	C-3774
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NEW MEXICO OFFICE OF THE STATE ENGINEER



APPLICATION FOR PERMIT TO DRILL A WELL WITH NO CONSUMPTIVE USE OF WATER



(check applicable box):

Purpose:	Pollution Control And / Or Recover	ery Geo-Thermal	
☐ Exploratory	☐ Construction Site De-Watering	Other (Describe):	
Monitoring	☐ Mineral De-Watering		
A separate permit wil	I be required to apply water to beneficial us	e.	
☐ Temporary Reque	est - Requested Start Date:	Requested	End Date:
Plugging Plan of Ope	erations Submitted? Yes No		18 18
			rid.
			1 2
	anni	Name:	G NEER O
Name: Virgilio Cocia Contact or Agent:	check here if Agent	Name: Contact or Agent:	177
Name: Virgilio Cocia Contact or Agent: Schlumberger Tech	check here if Agent nology Corporation	Contact or Agent:	
Name: Virgilio Cocia Contact or Agent: Schlumberger Tech	check here if Agent		
CALL AND COLUMN	check here if Agent nology Corporation	Contact or Agent:	
Name: Virgilio Cocia Contact or Agent: Schlumberger Tech Mailing Address: 105 City: Sugar Land	check here if Agent nology Corporation	Contact or Agent: Mailing Address:	
Name: Virgilio Cocia Contact or Agent: Schlumberger Tech Mailing Address: 105	check here if Agent inclogy Corporation i Industrial Boulevard Zip Code: 77478	Contact or Agent: Mailing Address: City:	check here if Agent □

FOR OSE INTERNAL USE	Application for Permit, Form wr-07, Rev 4/12/12
File Number: C-3774	Trn Number: 552041
Trans Description (optional): POT	>1 Monitor
Sub-Basin: CUB	***
PCW/LOG Due Date: 8-3	1-15
	Dana 4 of 4

2. WELL(S) Describe the well(s) applicable to this application. Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84). District II (Roswell) and District VII (Cimarron) customers, provide a PLSS location in addition to above. UTM (NAD83) (Meters) ☐ NM State Plane (NAD83) (Feet) □ Lat/Long (WGS84) (to the nearest Zone 12N ☐ NM West Zone 1/10th of second) Zone 13N ☐ NM East Zone □ NM Central Zone Provide if known: -Public Land Survey System (PLSS) (Quarters or Halves, Section, Township, Range) OR X or Easting or Y or Northing Well Number (if known): or Latitude: - Hydrographic Survey Map & Tract; OR Longitude: - Lot, Block & Subdivision; OR - Land Grant Name 32,43942826 SW 1/4, S4, T17S, R26E 103.8945949 MW-34 NOTE: If more well locations need to be described, complete form WR-08 (Attachment 1 - POD Descriptions) Additional well descriptions are attached:

Yes

No If yes, how many_ Other description relating well to common landmarks, streets, or other: Former Dowell Schlumber Facility, 507 East Richey Avenue, Artesia, NM 88210 Well is on land owned by: Schlumberger Technology Corporation Well Information: NOTE: If more than one (1) well needs to be described, provide attachment. Attached? ☐ Yes ☒ No If yes, how many_ Outside diameter of well casing (inches): 4.50 Approximate depth of well (feet): 35.00 Driller License Number: WD-1210 **Driller Name: National Drilling** 3. ADDITIONAL STATEMENTS OR EXPLANATIONS For Item 4 - The monitoring well is required to provide data related to the investigation and remediation of groundwater that contains chlorinated solvents concentrations in exceedance of New Mexico Water Quality Control Commission standards. Monitoring events are performed semi-annually and are expected to continue for up to 5-7 years.

> Application for Permit, Form wr-07 FOR OSE INTERNAL USE File Number: Page 2 of 4

4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application: Pollution Control and/or Recovery: Construction Mine De-Watering: Exploratory: ☐ Include a plan for pollution ☐ Include a plan for pollution De-Watering: ☐ Include a Include a description of the control/recovery, that includes the following: control/recovery, that includes the description of proposed dewatering A description of the need for mine following: any proposed operation. dewatering. A description of the need for the pump test, if pollution control or recovery operation. The estimated duration of ☐ The estimated maximum period of time applicable. ☐ The estimated maximum period of the operation. for completion of the operation. ☐ The source(s) of the water to be diverted. time for completion of the operation. ☐ The maximum amount of ☐ The annual diversion amount. ☐ The annual consumptive use ☐The geohydrologic characteristics of the water to be diverted. A description of the need aquifer(s). ☐The maximum amount of water to be for the dewatering operation, amount. diverted per annum. ☐ The maximum amount of water to be A description of how the The maximum amount of water to be diverted and injected for the duration of diverted water will be disposed diverted for the duration of the operation. the operation. ☐ The method and place of discharge. of. The quality of the water. The method of measurement of Geo-Thermal: The method of measurement of water Monitoring: water produced and discharged. ☐ Include a description of the Include the geothermal heat exchange The recharge of water to the aguifer. ☐ The source of water to be injected. reason for the project. Description of the estimated area of ☐ The method of measurement of monitoring hydrologic effect of the project. water injected. The amount of water to be well, and, ☐ The characteristics of the aquifer. The method and place of discharge. diverted and re-injected for the ☐An estimation of the effects on surface The method of determining the project. duration water rights and underground water rights resulting annual consumptive use of ☐ The time frame for of the planned from the mine dewatering project. water and depletion from any related constructing the geothermal monitoring. A description of the methods employed to heat exchange project, and, stream system. estimate effects on surface water rights and Proof of any permit required from the ☐ The duration of the project. underground water rights. New Mexico Environment Department. Preliminary surveys, design data, and additional ☐Information on existing wells, rivers, An access agreement if the springs, and wetlands within the area of applicant is not the owner of the land on information shall be included to hydrologic effect. provide all essential facts which the pollution plume control or recovery well is to be located. relating to the request. ACKNOWLEDGEMENT I, We (name of applicant(s)), Virgilio Cocianni Print Name(s) affirm that the foregoing statements are true to the best of (my, our) knowledge and belief. Applicant Signature Applicant Signature LI. **ACTION OF THE STATE ENGINEER** This application is: approved. partially approved ☐ denied provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval. 5 4 day of August 20 14 , for the State Engineer, Witness my hand and seal this Scott A Verhines, P.E._____, State Engineer Signature Title: Andy Morley, District II Manager Application for Permit, Form wr-07 FOR OSE INTERNAL USE File Number: Trn Number: <

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

- 4 No water shall be appropriated and beneficially used under this permit.
- The well shall be plugged upon completion of the permitted use, and a plugging report shall be filed with the State Engineer within 10 days.
- 7 The Permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.
 - B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 New Mexico Statutes Annotated.
 - Driller's well record must be filed with the State Engineer within 20 days after the well is drilled or driven. Well record forms will be provided by the State Engineer upon request.
 - C2 No water shall be diverted from this well except for testing purposes which shall not exceed ten (10) cumulative days, and well shall be plugged or capped on or before, unless a permit to use water from this well is acquired from the Office of the State Engineer.
 - P The well shall be constructed, maintained, and operated to prevent inter-aquifer exchange of water and to prevent loss of hydraulic head between geologic zones.
 - LOG The Point of Diversion C 03774 POD1 must be completed and the Well Log filed on or before 08/31/2015.

 Trn Desc:
 C 03774 POD1 MONITOR
 File Number:
 C 03774

 Trn Number:
 552041

Locator Tool Report

General Information:

Application ID:29 Date: 08-04-2014 Time: 15:34:52

WR File Number: C-MW34 Purpose: OTHER

Applicant First Name: VIRGILIO COCIANNI

Applicant Last Name: SCHLUMBERGER TECH CORP

GW Basin: CARLSBAD County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

NE 1/4 of NE 1/4 of SE 1/4 of NE 1/4 of Section 32, Township 21S, Range 30E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 26 Minutes 21.9 Seconds N Longitude: 103 Degrees 53 Minutes 40.5 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,589,682
 E: 603,913

 NAD 1983(92) (Survey Feet)
 N: 11,777,150
 E: 1,981,339

 NAD 1927 (Meters)
 N: 3,589,480
 E: 603,962

 NAD 1927 (Survey Feet)
 N: 11,776,486
 E: 1,981,499

State Plane Coordinate System Zone: New Mexico East

 NAD 1983(92) (Meters)
 N: 159,677
 E: 206,255

 NAD 1983(92) (Survey Feet)
 N: 523,873
 E: 676,689

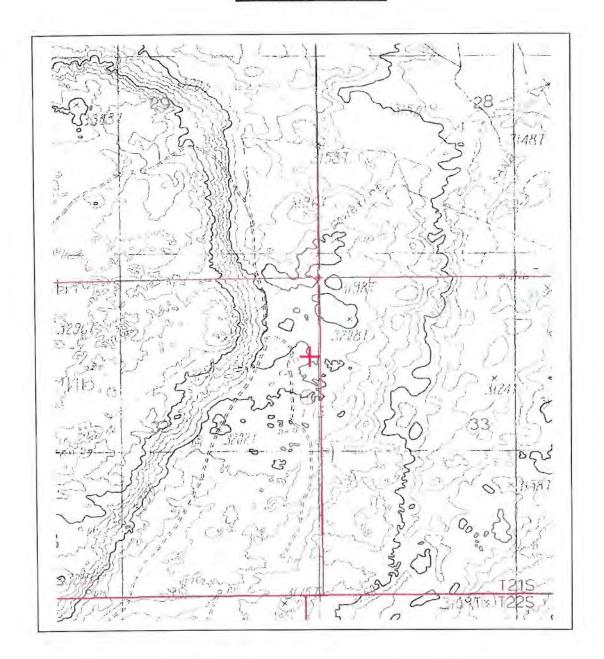
 NAD 1927 (Meters)
 N: 159,658
 E: 193,703

 NAD 1927 (Survey Feet)
 N: 523,812
 E: 635,508

Page 1 of 2 Print Date: 08/04/2014

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report





WR File Number: C-MW34 Scale: 1:19,134

Northing/Easting: UTM83(92) (Meter): N: 3,589,682 E: 603,913

Northing/Easting: SPCS83(92) (Feet): N: 523,873 E: 676,689

GW Basin: Carlsbad

Page 2 of 2 Print Date: 08/04/2014

Scott A. Verhines, P.E. State Engineer



Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 552040

File Nbr: C 03773 POD1 POLLUTION CONTROL

Aug. 05, 2014

Jeffrey Minchak, P.G. Senior Project Manager CH2M HILL 3721 Rutledge Rd. NE, Suite B-1 Albuquerque, NM 87109

RE: VIRGILIO COCIANNI, SCHLUMBERGER TECHNOLGY CORP

Greetings:

Enclosed is your copy of the above numbered permit that has been approved subject to the conditions set forth on the approval page. In accordance with the conditions of approval, the well can only be tested for 10 cumulative days, and the well is to be plugged on or before 08/31/2015, unless a permit to use the water is acquired from this office.

A Well Record & Log (OSE Form wr-20) shall be filed in this office within twenty (20) days after completion of drilling, but no later than 08/31/2015.

Appropriate forms can be downloaded from the OSE website www.ose.state.nm.us or will be mailed upon request.

Sincerely,

Andy Morley (575)622-6521

Enclosure

File No.	C-3773	

NEW MEXICO OFFICE OF THE STATE ENGINEER



APPLICATION FOR PERMIT TO DRILL A WELL WITH NO CONSUMPTIVE USE OF WATER



(check applicable box):

	For fees, see State Engineer v	vebsite: http://www.ose.state.nm.u	1 H8K-S
Purpose:	☑ Pollution Control And / Or Recove	ry Geo-Thermal	
☐ Exploratory	☐ Construction Site De-Watering	Other (Describe):	
☐ Monitoring	☐ Mineral De-Watering		
A separate permit w	Il be required to apply water to beneficial use	Z	
☐ Temporary Requ	est - Requested Start Date:	Requested	End Date:
Plugging Plan of Op	erations Submitted? Yes No		
			3 3
Name: Virgilio Coci Contact or Agent:	check here if Agent	Name: Contact or Agent:	check here if Agent
Name: Virgilio Coci Contact or Agent: Schlumberger Tecl		77	- 171
Name: Virgilio Coci Contact or Agent: Schlumberger Tecl	check here if Agent hnology Corporation	Contact or Agent:	- 171
Name: Virgilio Coci Contact or Agent: Schlumberger Teck Mailing Address: 10	check here if Agent hnology Corporation	Contact or Agent: Mailing Address:	- 171
Contact or Agent: Schlumberger Teck Mailing Address: 10: City: Sugar Land	check here if Agent hnology Corporation 5 Industrial Boulevard Zip Code: 77478	Contact or Agent: Mailing Address: City:	check here if Agent

FOR OSE INTERNAL USE	Application for Permit, Form wr-07, Rev 4/12/12
File Number: (-3773	Trn Number: 55,2040
Trans Description (optional): POD	1 Pol Control
Sub-Basin: CUB	
PCW/LOG Due Date: 8-31	-15
	Daniel at 4

WELL(S) Describe the well(s) applicable to this application. Location Required: Coordinate location must be reported in NM State Plane (NAD 83), UTM (NAD 83), or Latitude/Longitude (Lat/Long - WGS84). District II (Roswell) and District VII (Cimarron) customers, provide a PLSS location in addition to above. ☐ UTM (NAD83) (Meters) ☐ NM State Plane (NAD83) (Feet) □ Lat/Long (WGS84) (to the nearest ☐ NM West Zone Zone 12N 1/10th of second) □Zone 13N ☐ NM East Zone ☐ NM Central Zone Provide if known: -Public Land Survey System (PLSS) (Quarters or Halves , Section, Township, Range) OR X or Easting or Y or Northing Well Number (if known): or Latitude: - Hydrographic Survey Map & Tract; OR Longitude: - Lot, Block & Subdivision; OR - Land Grant Name 32.4399139 SW 1/4, S4, T17S, R26E 103.8941086 EW-03 NOTE: If more well locations need to be described, complete form WR-08 (Attachment 1 - POD Descriptions) Additional well descriptions are attached:

Yes

No If yes, how many Other description relating well to common landmarks, streets, or other: Former Dowell Schlumber Facility, 507 East Richey Avenue, Artesia, NM 88210 Well is on land owned by: Schlumberger Technology Corporation Well Information: NOTE: If more than one (1) well needs to be described, provide attachment. Attached? ☐ Yes ☒ No If yes, how many_ Outside diameter of well casing (inches): 4.50 Approximate depth of well (feet): 60.00 Driller License Number: WD-1210 Driller Name: National EWP 3. ADDITIONAL STATEMENTS OR EXPLANATIONS

FOR OSE INTERNAL USE

Application for Permit, Form wr-07

-3773 File Number:

Trn Number: <

Pollution Control/Recovery Plan Former Dowell Schlumberger Facility 507 East Richey Avenue, Artesia, New Mexico

The following information is provided to captures the applicable items under Section 4. Specific Requirements, of the Application for Permit to Drill a Well with No Consumptive Use of Water.

1. Description of the need for the pollution control or recovery operation.

The remediation system operation is required to remediate chlorinated hydrocarbons present in groundwater as a result of historical site operations as an oil and gas support facility. Chlorinated hydrocarbons are currently present in groundwater at concentrations that exceed New Mexico Water Quality Control Commission standards. The investigation and remediation of the site is being performed under Groundwater Discharge Permit GW-114, under the New Mexico Oil Conservation Division Environmental Bureau.

2. Estimated maximum period of time for completion of the operation.

Injection to be completed in a single operation expected to take 6-8 weeks. Groundwater extraction, treatment, and horizontal well injection system to operate for up to 5 years.

3. Annual diversion amount.

Groundwater extraction, treatment, and horizontal well injection system – 7,884,000 gallons (15 gpm) Injections, 1st year only – 930,000 gallons maximum anticipated. This water is to come from the groundwater extraction system and is included in the 7,884,000 gallons total above.

4. Annual consumptive use amount.

Zero gallons; no consumptive use will occur. The system is a closed-loop and water will be pumped onsite and re-injected onsite using horizontal and vertical injection wells.

5. Maximum amount of water to be diverted and injected for the duration of the operation.

Injections - One time maximum of 930,000 gallons, anticipated during 2014.

Groundwater extraction, treatment, and horizontal well injection -39,420,000 gallons (7,884,000 gallons per year x 5 years)

6. Method and place of discharge

Vertical Injections – 8 injection wells in a linear transect roughly 300 feet long. Each injection well will receive a maximum of 116,250 gallons of 1% potassium permanganate solution.

Horizontal Injection - the groundwater extraction and treatment system discharges to a buried 200 ft long horizontal injection well. The vertical component of the horizontal injection well will be sealed with a bentonite clay seal to prevent downward vertical migration adjacent to the pipe.

4. SPECIFIC REQUIREMENTS: The applicant must include the following, as applicable to each well type. Please check the appropriate boxes, to indicate the information has been included and/or attached to this application: Mine De-Watering: Construction Pollution Control and/or Recovery: Exploratory: ☐ Include a plan for pollution De-Watering: Include a plan for pollution Include a ☐ Include a description of the control/recovery, that includes the following: control/recovery, that includes the description of A description of the need for mine proposed dewatering following: any proposed operation, dewatering. A description of the need for the pump test, if pollution control or recovery operation. ☐ The estimated duration of ☐ The estimated maximum period of time applicable. ☐ The estimated maximum period of the operation. for completion of the operation. ☐ The source(s) of the water to be diverted. time for completion of the operation. ☐ The maximum amount of ☐The geohydrologic characteristics of the ☐ The annual diversion amount. water to be diverted, A description of the need aquifer(s). M The annual consumptive use The maximum amount of water to be for the dewatering operation, amount. diverted per annum. ☐ The maximum amount of water to be ☐The maximum amount of water to be A description of how the diverted and injected for the duration of diverted water will be disposed diverted for the duration of the operation. the operation. ☐ The method and place of discharge. of. The quality of the water. The method of measurement of Geo-Thermal: The method of measurement of water Monitoring: diverted. ☐ Include the water produced and discharged. Include a description of the geothermal heat exchange ☐The recharge of water to the aquifer. The source of water to be injected. reason for the Description of the estimated area of The method of measurement of project, monitoring hydrologic effect of the project. water injected. The amount of water to be well, and, ☐ The characteristics of the aquifer. ☐The method and place of discharge. diverted and re-injected for the ☐ The ☐An estimation of the effects on surface M The method of determining the project. duration resulting annual consumptive use of water rights and underground water rights ☐ The time frame for of the planned from the mine dewatering project. water and depletion from any related constructing the geothermal monitoring. A description of the methods employed to heat exchange project, and, stream system. Proof of any permit required from the estimate effects on surface water rights and ☐ The duration of the project. underground water rights. New Mexico Environment Department. Preliminary surveys, design data, and additional Information on existing wells, rivers, M An access agreement if the springs, and wetlands within the area of applicant is not the owner of the land on information shall be included to hydrologic effect. which the pollution plume control or provide all essential facts relating to the request. recovery well is to be located. **ACKNOWLEDGEMENT** I, We (name of applicant(s)), Virgilio Cocianni Print Name(s) affirm that the foregoing statements are true to the best of (my, our) knowledge and belief. Applicant Signature Applicant Signature **ACTION OF THE STATE ENGINEER** This application is: approved partially approved ☐ denied provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare and further subject to the attached conditions of approval. Witness my hand and seal this 544 day of August 20 14 , for the State Engineer, Scott A Verhines, P.E. _____, State Engineer Print Signature Andy Morley, District II Manager Title: Application for Permit, Form wr-07 FOR OSE INTERNAL USE

File Number:

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

- 4 No water shall be appropriated and beneficially used under this permit.
- A totalizing meter shall be installed before the first branch of the discharge line from the well and the installation shall be acceptable to the State Engineer; the Engineer shall be advised of the make, model, serial number, date of installation, and initial reading of the meter prior to appropriation of water; pumping records shall be submitted to the District Supervisor on or before the 10th of Jan., April, July, and Oct. of each year for the 3 preceding calendar months.
- 7 The Permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.
- B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 New Mexico Statutes Annotated.
- Oriller's well record must be filed with the State Engineer within 20 days after the well is drilled or driven. Well record forms will be provided by the State Engineer upon request.
- No water shall be diverted from this well except for testing purposes which shall not exceed ten (10) sumulative days, and well shall be plugged or capped on or before, unless a permit to use water from this well is acquired from the Office of the State Engineer.

Trn Desc: C 03773 POD1 POLLUTION CONTROL File Number: C 03773
Trn Number: 552040

page: 1

Locator Tool Report

General Information:

Application ID:29 Date: 08-04-2014 Time: 15:36:33

WR File Number: C-EW-03 Purpose: OTHER

Applicant First Name: VIRGILIO COCIANNI

Applicant Last Name: SCHLUMBERGER TECH CORP

GW Basin: CARLSBAD County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SE 1/4 of SE 1/4 of NE 1/4 of NE 1/4 of Section 32, Township 21S, Range 30E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 26 Minutes 23.7 Seconds N Longitude: 103 Degrees 53 Minutes 38.8 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,589,737
 E: 603,958

 NAD 1983(92) (Survey Feet)
 N: 11,777,328
 E: 1,981,487

 NAD 1927 (Meters)
 N: 3,589,535
 E: 604,007

 NAD 1927 (Survey Feet)
 N: 11,776,665
 E: 1,981,647

State Plane Coordinate System Zone: New Mexico East

 NAD 1983(92) (Meters)
 N: 159,731
 E: 206,301

 NAD 1983(92) (Survey Feet)
 N: 524,050
 E: 676,838

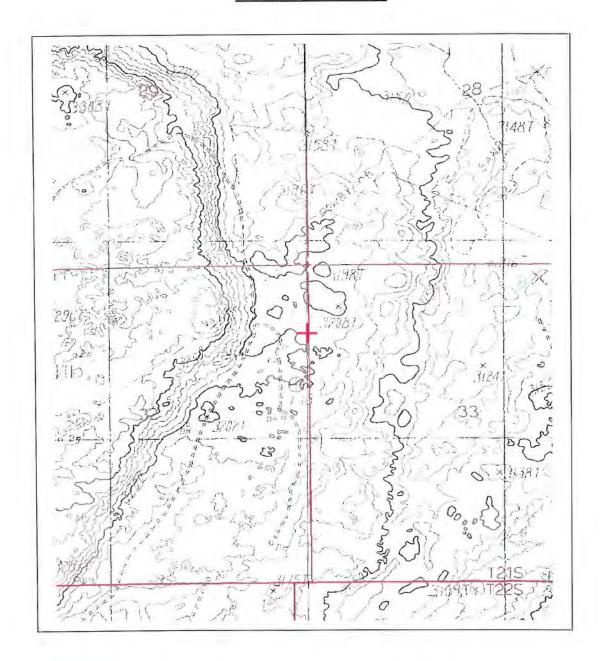
 NAD 1927 (Meters)
 N: 159,712
 E: 193,749

 NAD 1927 (Survey Feet)
 N: 523,990
 E: 635,657

Page 1 of 2 Print Date: 08/04/2014

NEW MEXICO OFFICE OF STATE ENGINEER

Locator Tool Report





WR File Number: C-EW-03 Scale: 1:19,134

Northing/Easting: UTM83(92) (Meter): N: 3,589,737 E: 603,958

Northing/Easting: SPCS83(92) (Feet): N: 524,050 E: 676,838

GW Basin: Carlsbad

Page 2 of 2 Print Date: 08/04/2014



STATE ENGINEER OFFICE Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 552040 File Nbr: C 03773

Well File Nbr: C 03773 POD1

VIRGILIO COCIANNI SCHLUMBERGER TECHNOLOGY CORP 105 INDUSTRIAL BOULEVARD SUGAR LAND, TX 77478

	Well File Nbr: C 03773 POD1	
	Serial Number:	Meter Make:
	Number of Dials: Number of dials that move on the left side of dial on meter.	Multiplier: (0) (00) (000) Circle number of zeros that don't move on right side of dial on meter
	Unit of Measure: (GALLONS) (CUBIC FE. Circle appropriate unit of measure	ET) (BARRELS) (ACRE-FEET) (Specify Oth
	Initial Reading: In	nitial Reading Date:
2.	COMMENTS:	
	Sub	omitted By:



Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 552039

File Nbr: C 03772 POD1-8 POLLUTION CONTROL

Aug. 05, 2014

Jeffrey Minchak, P.G. Senior Project Manager CH2M HILL 3721 Rutledge Rd. NE, Suite B-1 Albuquerque, NM 87109

RE: VIRGILIO COCIANNI, SCHLUMBERGER TECHNOLOGY CORP

Greetings:

Enclosed is your copy of the above numbered permit that has been approved subject to the conditions set forth on the approval page. In accordance with the conditions of approval, the well can only be tested for 10 cumulative days, and the well is to be plugged on or before 08/31/2015, unless a permit to use the water is acquired from this office.

A Well Record & Log (OSE Form wr-20) shall be filed in this office within twenty (20) days after completion of drilling, but no later than 08/31/2015.

Appropriate forms can be downloaded from the OSE website www.ose.state.nm.us or will be mailed upon request.

Sincerely,

Andy Morley (575)622-6521

Enclosure

File No.	C-	3772
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NEW MEXICO OFFICE OF THE STATE ENGINEER



APPLICATION FOR PERMIT TO DRILL A WELL WITH NO CONSUMPTIVE USE OF WATER



(check applicable box):

Purpose:	☑ Pollution Control And / Or Recovery	very Geo-Thermal	
☐ Exploratory	☐ Construction Site De-Watering	Other (Describe)	į.
☐ Monitoring	☐ Mineral De-Watering		
A separate permit will	be required to apply water to beneficial us	se.	
☐ Temporary Reque	est - Requested Start Date:	Requeste	ed End Date:
Plugging Plan of Ope	erations Submitted? Yes No		
			1/4 L
			£ 🕎
APPLICANT(S)			1 2
	nni	Name:	FINEER O
Name: Virgilio Cocia	check here if Agent	Name: Contact or Agent:	check here if Agent
APPLICANT(S) Name: Virgilio Cocia Contact or Agent: Schlumberger Tech Mailing Address: 105	check here if Agent		check here if Agent
Name: Virgilio Cocia Contact or Agent: Schlumberger Tech	check here if Agent nology Corporation	Contact or Agent:	check here if Agent
Name: Virgilio Cocia Contact or Agent: Schlumberger Tech Mailing Address: 105	check here if Agent nology Corporation	Contact or Agent: Mailing Address:	AV II
Name: Virgilio Cocia Contact or Agent: Schlumberger Tech Mailing Address: 105 City: Sugar Land	check here if Agent nology Corporation Industrial Boulevard Zip Code: 77478	Contact or Agent: Mailing Address: City:	check here if Agent

FOR OSE INTERNAL USE	Application for Permit, Form wr-07, Rev 4/12/12
File Number: C-3772	Trn Number: 552039
Trans Description (optional): POT	D-1-8 Pol Control
Sub-Basin: CUB	
PCW/LOG Due Date:	-31-15
	Page 1 of 4

2. WELL(S) Describe the well(s) applicable to this application.

(Lat/Long - WGS84).			State Plane (NAD 83), UTM (NAD 83)	
District II (Roswell) and Dis	strict VII (Cimarron)	customers, provid	de a PLSS location in addition to abo	ove.
☐ NM State Plane (NAD83 ☐ NM West Zone ☐ NM East Zone ☐ NM Central Zone		UTM (NAD83) (Met ⊒Zone 12N ⊒Zone 13N	ers) Lat/Long (WC 1/10 th of second)	GS84) (to the nearest
Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLS (Quarters or Halves, Section, To - Hydrographic Survey Map & Trac - Lot, Block & Subdivision; OR - Land Grant Name	wnship, Range) OR
INJ. WELL	103.8951655	32.43937252	SW 1/4, S4, T17S, R26E	
INJ, WELL	103.8952709	32.43946595	SW 1/4, S4, T17S, R26E	
INJ. WELL	103.8953684	32.43955935	SW 1/4, S4, T17S, R26E	TATE OF THE STATE
INJ. WELL	103.895466	32.43965275	SW 1/4, S4, T17S, R26E	THE ENG
INJ. WELL	103.8955596	32.43974281	SW 1/4, S4, T17S, R26E	100 - 178
INJ. WELL	103.8956532	32.43982955	SW 1/4, S4, T17S, R26E	EER OFF
INJ. WELL	103.8957469	32.43991961	SW 1/4, S4, T17S, R26E	= 15
INJ. WELL	103.8958366	32.44000301	SW 1/4, S4, T17S, R26E	52 10
NOTE: If more well location Additional well description	ns need to be descr	ribed, complete fo	rm WR-08 (Attachment 1 – POD Desc If yes, how many	criptions)
	ell to common landma		er: Former Dowell Schlumber Facility	, 507 East Richey
Well is on land owned by: S	Schlumberger Techn	ology Corporation	i .	
Well Information: NOTE: If If yes, how many	more than one (1)	well needs to be d	escribed, provide attachment. Attack	hed? ☐ Yes ☒ No
Approximate depth of well (f	feet): 32.00	13	Outside diameter of well casing (inches): 2.375
Driller Name: National Ewp	d Comment		Oriller License Number: WD-1210	

3. ADDITIONAL STATEMENTS OR EXPLANATIONS

FOR OSE INTERNAL USE

Application for Permit, Form wr-07

File Number: (-3172

Trn Number: 55 2039

es, to indicate the	IREMENTS: The applicant must include the information has been included and/or att	e following, as applicable to each ached to this application:	well type. Please check the appropriate
Exploratory; Include a description of any proposed pump test, if applicable.	Pollution Control and/or Recovery: ☐ Include a plan for pollution control/recovery, that includes the following: ☐ A description of the need for the pollution control or recovery operation. ☐ The estimated maximum period of time for completion of the operation. ☐ The annual diversion amount. ☐ The annual consumptive use amount. ☐ The maximum amount of water to be diverted and injected for the duration of the operation. ☐ The method and place of discharge.	Construction De-Watering: Include a description of the proposed dewatering operation, The estimated duration of the operation, The maximum amount of water to be diverted, A description of the need for the dewatering operation, and, A description of how the diverted water will be disposed of.	Mine De-Watering: Include a plan for pollution control/recovery, that includes the followin A description of the need for mine dewatering. The estimated maximum period of time for completion of the operation. The source(s) of the water to be diverted. The geohydrologic characteristics of the aquifer(s). The maximum amount of water to be diverted per annum. The maximum amount of water to be diverted for the duration of the operation. The quality of the water.
Monitoring: Include the reason for the monitoring well, and, The duration of the planned monitoring.	 ☑ The method of measurement of water produced and discharged. ☑ The source of water to be injected. ☑ The method of measurement of water injected. ☑ The characteristics of the aquifer. ☑ The method of determining the resulting annual consumptive use of water and depletion from any related stream system. ☑ Proof of any permit required from the New Mexico Environment Department. ☑ An access agreement if the applicant is not the owner of the land on which the pollution plume control or recovery well is to be located. 	Geo-Thermal: Include a description of the geothermal heat exchange project, The amount of water to be diverted and re-injected for the project, The time frame for constructing the geothermal heat exchange project, and, The duration of the project. Preliminary surveys, design data, and additional information shall be included to provide all essential facts relating to the request.	☐ The method of measurement of water diverted. ☐ The recharge of water to the aquifer. ☐ Description of the estimated area of hydrologic effect of the project. ☐ The method and place of discharge. ☐ An estimation of the effects on surface water rights and underground water rights from the mine dewatering project. ☐ A description of the methods employed estimate effects on surface water rights an underground water rights. ☐ Information on existing wells, rivers, springs, and wetlands within the area of hydrologic effect.
	ACF	KNOWLEDGEMENT	
011,121.000	oplicant(s)), Virgilio Cocianni Prir egoing statements are true to the best of (m	nt Name(s) ny, our) knowledge and belief.	
	da.		
pplicant Signatu		Applicant Signature	
opplicant Signatu		OF THE STATE ENGINEER	

Pollution Control/Recovery Plan Former Dowell Schlumberger Facility 507 East Richey Avenue, Artesia, New Mexico

The following information is provided to captures the applicable items under Section 4. Specific Requirements, of the Application for Permit to Drill a Well with No Consumptive Use of Water.

1. Description of the need for the pollution control or recovery operation.

The remediation system operation is required to remediate chlorinated hydrocarbons present in groundwater as a result of historical site operations as an oil and gas support facility. Chlorinated hydrocarbons are currently present in groundwater at concentrations that exceed New Mexico Water Quality Control Commission standards. The investigation and remediation of the site is being performed under Groundwater Discharge Permit GW-114, under the New Mexico Oil Conservation Division Environmental Bureau.

2. Estimated maximum period of time for completion of the operation.

Injection to be completed in a single operation expected to take 6-8 weeks. Groundwater extraction, treatment, and horizontal well injection system to operate for up to 5 years.

3. Annual diversion amount.

Groundwater extraction, treatment, and horizontal well injection system - 7,884,000 gallons (15 gpm)

Injections, 1^{st} year only -930,000 gallons maximum anticipated. This water is to come from the groundwater extraction system and is included in the 7,884,000 gallons total above.

4. Annual consumptive use amount.

Zero gallons; no consumptive use will occur. The system is a closed-loop and water will be pumped onsite and re-injected onsite using horizontal and vertical injection wells.

5. Maximum amount of water to be diverted and injected for the duration of the operation.

Injections - One time maximum of 930,000 gallons, anticipated during 2014.

Groundwater extraction, treatment, and horizontal well injection – 39,420,000 gallons (7,884,000 gallons per year x 5 years)

6. Method and place of discharge

Vertical Injections – 8 injection wells in a linear transect roughly 300 feet long. Each injection well will receive a maximum of 116,250 gallons of 1% potassium permanganate solution.

Horizontal Injection - the groundwater extraction and treatment system discharges to a buried 200 ft long horizontal injection well. The vertical component of the horizontal injection well will be sealed with a bentonite clay seal to prevent downward vertical migration adjacent to the pipe.

litness my hand and seal this day ofAugus	t 20 <u>14</u> ,	for the State Engineer,
Scott A Verhines, P.E.	, State Engineer	
1		
Signature Trely Muly	Print	

Application for Permit, Form wr-07 Trn Number: 552039
Page 4 of 4

FOR OSE INTERNAL USE
File Number: (-3772

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

- 4 No water shall be appropriated and beneficially used under this permit.
- A totalizing meter shall be installed before the first branch of the discharge line from the well and the installation shall be acceptable to the State Engineer; the Engineer shall be advised of the make, model, serial number, date of installation, and initial reading of the meter prior to appropriation of water; pumping records shall be submitted to the District Supervisor on or before the 10th of Jan., April, July, and Oct. of each year for the 3 preceding calendar months.
- The Permittee shall utilize the highest and best technology available to ensure conservation of water to the maximum extent practical.
- B The well shall be drilled by a driller licensed in the State of New Mexico in accordance with Section 72-12-12 New Mexico Statutes
 Annotated.
- Oriller's well record must be filed with the State Engineer within 20 days after the well is drilled or driven. Well record forms will be provided by the State Engineer upon request.
- C2 No water shall be diverted from this well except for testing purposes which shall not exceed ten (10) umulative days, and well shall be plugged or capped on or before, unless a permit to use water from this well is acquired from the Office of the State Engineer.

Trn Desc: C 03772 POD1-8 POLLUTION CONTR File Number: C 03772
Trn Number: 552039

page: 1

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

ACTION OF STATE ENGINEER

Notice of Intention Rcvd: Date Rcvd. Corrected:
Formal Application Rcvd: 08/04/2014 Pub. of Notice Ordered:
Date Returned - Correction: Affidavit of Pub. Filed:

This application is approved provided it is not exercised to the detriment of any others having existing rights, and is not contrary to the conservation of water in New Mexico nor detrimental to the public welfare of the state; and further subject to the specific conditions listed previously.

Witness my hand and seal this 5th day of Aug A.D., 2014

Scott A. Verhines, P.E. , State Engineer

By: Andy Morley

Trn Desc: C 03772 POD1-8 POLLUTION CONTR File Number: C 03772

Trn Number: <u>552039</u> page: 3



STATE ENGINEER OFFICE Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 552039 File Nbr: C 03772

Well File Nbr: C 03772 POD1

VIRGILIO COCIANNI SCHLUMBERGER TECHNOLOGY CORP 105 INDUSTRIAL BOULEVARD SUGAR LAND, TX 77478

1.	WATER METER INFORMATION:
	Well File Nbr: C 03772 POD1
	Serial Number: Meter Make:
	Number of Dials: Multiplier: (0) (00) (000) Number of dials that move on the left side of dial on meter. Multiplier: (0) (00) (000) Circle number of zeros that don't move on right side of dial on meter.
	Unit of Measure: (GALLONS) (CUBIC FEET) (BARRELS) (ACRE-FEET) () Circle appropriate unit of measure. Specify Other
	Initial Reading: Initial Reading Date:
2.	COMMENTS:
	Submitted By:
	Date:



STATE ENGINEER OFFICE Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 552039 File Nbr: C 03772

Well File Nbr: C 03772 POD2

VIRGILIO COCIANNI SCHLUMBERGER TECHNOLOGY CORP 105 INDUSTRIAL BOULEVARD SUGAR LAND, TX 77478

WATER METER INFORMATION:
Well File Nbr: C 03772 POD2
Serial Number: Meter Make:
Number of Dials: Multiplier: (0) (00) (000) Number of dials that move on the left side of dial on meter. Multiplier: (0) (00) (000) Circle number of zeros that don't move on right side of dial on meter.
Unit of Measure: (GALLONS) (CUBIC FEET) (BARRELS) (ACRE-FEET) (Circle appropriate unit of measure. Specify Oth
Initial Reading: Initial Reading Date:
COMMENTS:
Submitted By:
Date:



STATE ENGINEER OFFICE Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 552039 File Nbr: C 03772

Well File Nbr: C 03772 POD3

VIRGILIO COCIANNI SCHLUMBERGER TECHNOLOGY CORP 105 INDUSTRIAL BOULEVARD SUGAR LAND, TX 77478

Well File Nbr: C 03772 POD3	
Serial Number:	Meter Make:
Number of Dials: Number of dials that move on the left side of dial on meter.	Multiplier: (0) (00) (000) Circle number of zeros that don't move on right side of dial on meter
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STATE ENGINEER OFFICE Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 552039 File Nbr: C 03772

Well File Nbr: C 03772 POD4

VIRGILIO COCIANNI SCHLUMBERGER TECHNOLOGY CORP 105 INDUSTRIAL BOULEVARD SUGAR LAND, TX 77478

1.	WATER METER INFORMATION:		
	Well File Nbr: C 03772 POD4		
	Serial Number:	Meter Make:	-
	Number of Dials: Number of dials that move on the left side of dial on meter.	Multiplier: (0) (00) (0 Circle number of zeros move on right side of	that don't
	Unit of Measure: (GALLONS) (CUBIC FEE Circle appropriate unit of measure.	T) (BARRELS) (ACRE-FEET)	() Specify Other
	Initial Reading: In	itial Reading Date:	
2.	COMMENTS:		
	Subm	nitted By:	
		Date:	



STATE ENGINEER OFFICE Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 552039 File Nbr: C 03772

Well File Nbr: C 03772 POD5

VIRGILIO COCIANNI SCHLUMBERGER TECHNOLOGY CORP 105 INDUSTRIAL BOULEVARD SUGAR LAND, TX 77478

1.	WATER METER INFORMATION:		
	Well File Nbr: C 03772 POD5		
	Serial Number:	Meter Make:	
	Number of Dials: Number of dials that move on the left side of dial on meter.	Multiplier: (0) (00) (000) Circle number of zeros that don't move on right side of dial on meter	r.
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	Initial Reading: In:	itial Reading Date:	
2.	COMMENTS:		
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	Subm	itted By:	
		Date:	

METER INSTALLATION AND INSPECTION FORM



STATE ENGINEER OFFICE Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 552039 File Nbr: C 03772

Well File Nbr: C 03772 POD6

VIRGILIO COCIANNI SCHLUMBERGER TECHNOLOGY CORP 105 INDUSTRIAL BOULEVARD SUGAR LAND, TX 77478

1.	WATER METER INFORMATION:		
	Well File Nbr: C 03772 POD6		
	Serial Number:	Meter Make:	_
	Number of Dials: Number of dials that move on the left side of dial on meter.	Multiplier: (0) (00) (0 Circle number of zeros move on right side of	s that don't
	Unit of Measure: (GALLONS) (CUBIC FEE Circle appropriate unit of measure.		() Specify Other
	Initial Reading: In	itial Reading Date:	
2.	COMMENTS:		
	Subm	itted By:	
		Date:	

wellcon5

METER INSTALLATION AND INSPECTION FORM



STATE ENGINEER OFFICE Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 552039 File Nbr: C 03772

Well File Nbr: C 03772 POD7

VIRGILIO COCIANNI SCHLUMBERGER TECHNOLOGY CORP 105 INDUSTRIAL BOULEVARD SUGAR LAND, TX 77478

Well File Nbr: C 03772 POD7	
Serial Number:	Meter Make:
Number of Dials: Number of dials that move on the left side of dial on meter.	Multiplier: (0) (00) (000) Circle number of zeros that don't move on right side of dial on me
Unit of Measure: (GALLONS) (CUBIC FE Circle appropriate unit of measure	
Initial Reading: I	nitial Reading Date:
COMMENTS:	
Sub	mitted By:

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METER INSTALLATION AND INSPECTION FORM



STATE ENGINEER OFFICE Roswell Office 1900 WEST SECOND STREET ROSWELL, NM 88201

STATE OF NEW MEXICO OFFICE OF THE STATE ENGINEER

Trn Nbr: 552039 File Nbr: C 03772

Well File Nbr: C 03772 POD8

VIRGILIO COCIANNI SCHLUMBERGER TECHNOLOGY CORP 105 INDUSTRIAL BOULEVARD SUGAR LAND, TX 77478

L.	WATER METER INFORMATION:
	Well File Nbr: C 03772 POD8
	Serial Number: Meter Make:
	Number of Dials: Multiplier: (0) (00) (000) Number of dials that move on the left side of dial on meter. Multiplier: (0) (00) (000) Circle number of zeros that don't move on right side of dial on meter
	Unit of Measure: (GALLONS) (CUBIC FEET) (BARRELS) (ACRE-FEET) (Circle appropriate unit of measure. Specify Other
	Initial Reading: Initial Reading Date:
2.	COMMENTS:
	Submitted By:
	Date:

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OFFICE OF THE STATE ENGINEER/INTERSTATE STREAM COMMISSION - ROSWELL OFFICE

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INSTRUCTIONS: Indicate the number of actions to the left of the appropriate type of filing. Complete the receipt information. Original to payor; pink copy to Program Support/ASD along with other valid receipts. remains in district office, and goldenrod copy to accompany application being filed. If you make an error, void original and all copies and submit to Program Support/ASD along with other valid receipts.

The second secon	i	surrace water Rights Filling rees		C. Miscellaneous rees	
Declaration of Water Right Application to Appropriate or Supplement Domestic 72-12-1 Well Application for Stock Well Application for Stock Well	\$ 1.00 \$125.00 \$ 5.00	 Declaration of Water Right Amended Declaration Declaration of Livestock Water Impoundment Application for Livestock Water 	\$ 10.00 \$ 25.00 \$ 10.00	Application for Well Driller's License Application for Renewal of Well Driller's License Application to Amend Well Driller's License	\$50.00
72-12-1 Well Application for Replacement 72-12-1 Well	\$ 75.00		\$ 10.00 \$ 25.00 \$ 25.00	D. Reproduction of Documents	
Application to Change Purpose of Use 72-12-1 Well Application to Appropriate Irrig., Mun.,	\$ 75.00	 Application to Change Point of Diversion Application to Change Place and/or 	\$100.00	@ 0.25¢/copy	49
or Comm. Use Application for Supplemental Non 72-12-1 Well	\$ 25.00	Purpose of Use 9. Application to Change Point of Diversion and Place and/or Purpose	\$100,00	Map(s)	\$
Application to Change Location of Non 72-12-1 Well Application to Change Place or		of Use 10. Application to Change Point of Diversion and Place and/or Purpose of	\$200.00	E. Certification	₩.
Purpose of Use Non 72-12-1 Well Application to Change Location of Well and Place and/or Purpose of Use	\$ 25.00	Use from Ground Water to Surface Water 11. Application for Extension of Time	\$ 50.00	E. Other	₩.
5	1111	 12. Supplemental Well to a Surface Right 13. Return Flow Credit 14. Proof of Completion of Works 15. Proof of Application of Water to 16. Beneficial Use 	\$100.00 \$100.00 \$ 25.00 \$ 25.00	G. Comments:	
Application for Test, Expl. Observ. Well Change of Ownership of Water Right Application to Repair or Deepen Non 22-12-1 Well		 Water Development Plan Change of Ownership of Water Right 	\$ 5.00		

General Information:

Application ID:29 Date: 08-04-2014 Time: 15:37:49

WR File Number: C-POD1
Purpose: OTHER

Applicant First Name: VIRGILIO COCIANNI

Applicant Last Name: SCHLUMBERGER TECH CORP

GW Basin: CARLSBAD County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

NW 1/4 of NE 1/4 of SE 1/4 of NE 1/4 of Section 32, Township 21S, Range 30E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 26 Minutes 21.7 Seconds N Longitude: 103 Degrees 53 Minutes 42.6 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,589,676
 E: 603,860

 NAD 1983(92) (Survey Feet)
 N: 11,777,127
 E: 1,981,162

 NAD 1927 (Meters)
 N: 3,589,473
 E: 603,908

 NAD 1927 (Survey Feet)
 N: 11,776,464
 E: 1,981,323

State Plane Coordinate System Zone: New Mexico East

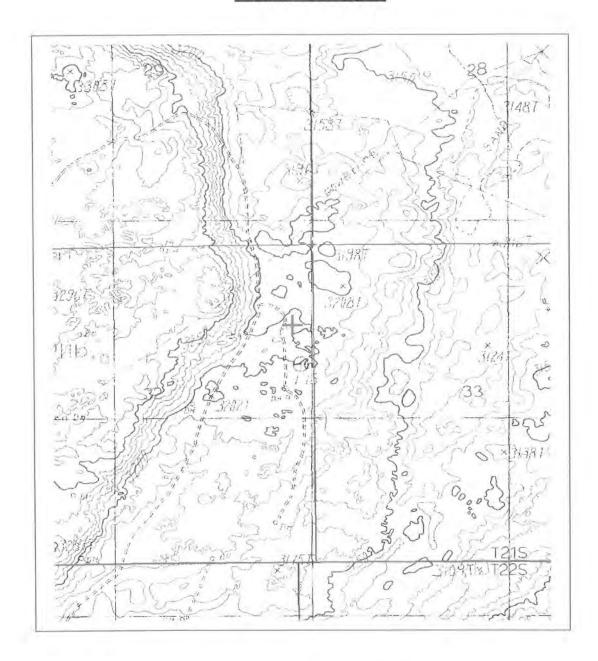
 NAD 1983(92) (Meters)
 N: 159,670
 E: 206,202

 NAD 1983(92) (Survey Feet)
 N: 523,852
 E: 676,513

 NAD 1927 (Meters)
 N: 159,652
 E: 193,649

 NAD 1927 (Survey Feet)
 N: 523,791
 E: 635,331

Locator Tool Report





WR File Number: C-POD1 Scale: 1:19,134

Northing/Easting: UTM83(92) (Meter): N: 3,589,676 E: 603,860

GW Basin: Carlsbad

General Information:

Application ID:29 Date: 08-04-2014 Time: 15:39:09

WR File Number: C-POD2 Purpose: OTHER

Applicant First Name: VIRGILIO COCIANNI

Applicant Last Name: SCHLUMBERGER TECH CORP

GW Basin: CARLSBAD County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SE 1/4 of NE 1/4 of NE 1/4 of Section 32, Township 21S, Range 30E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 26 Minutes 22.1 Seconds N Longitude: 103 Degrees 53 Minutes 43.0 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,589,686
 E: 603,850

 NAD 1983(92) (Survey Feet)
 N: 11,777,161
 E: 1,981,130

 NAD 1927 (Meters)
 N: 3,589,484
 E: 603,898

 NAD 1927 (Survey Feet)
 N: 11,776,498
 E: 1,981,290

State Plane Coordinate System Zone: New Mexico East

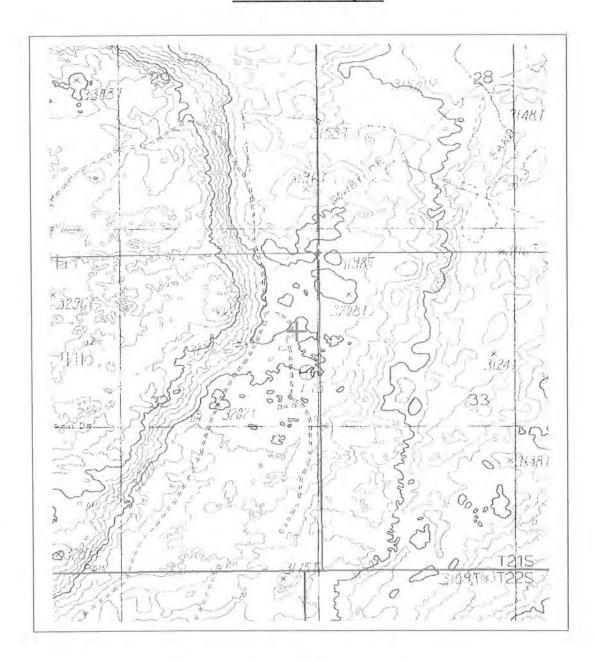
 NAD 1983(92) (Meters)
 N: 159,681
 E: 206,192

 NAD 1983(92) (Survey Feet)
 N: 523,886
 E: 676,481

 NAD 1927 (Meters)
 N: 159,662
 E: 193,639

 NAD 1927 (Survey Feet)
 N: 523,825
 E: 635,299

Locator Tool Report





WR File Number: C-POD2 Scale: 1:19,134

Northing/Easting: UTM83(92) (Meter): N: 3,589,686 E: 603,850

GW Basin: Carlsbad

General Information:

Application ID:29 Date: 08-04-2014 Time: 15:39:52

WR File Number: C-POD3 Purpose: OTHER

Applicant First Name: VIRGILIO COCIANNI

Applicant Last Name: SCHLUMBERGER TECH CORP

GW Basin: CARLSBAD County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SE 1/4 of NE 1/4 of NE 1/4 of Section 32, Township 21S, Range 30E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 26 Minutes 22.4 Seconds N Longitude: 103 Degrees 53 Minutes 43.3 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,589,696
 E: 603,840

 NAD 1983(92) (Survey Feet)
 N: 11,777,195
 E: 1,981,099

 NAD 1927 (Meters)
 N: 3,589,494
 E: 603,889

 NAD 1927 (Survey Feet)
 N: 11,776,532
 E: 1,981,260

State Plane Coordinate System Zone: New Mexico East

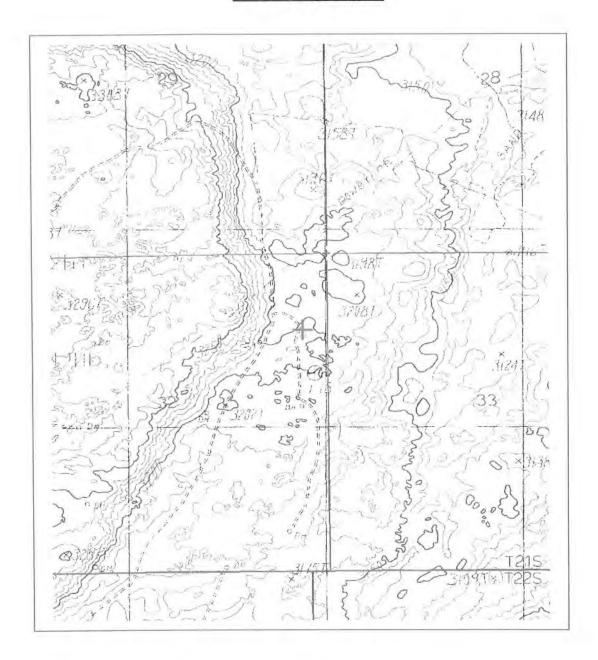
 NAD 1983(92) (Meters)
 N: 159,691
 E: 206,183

 NAD 1983(92) (Survey Feet)
 N: 523,920
 E: 676,450

 NAD 1927 (Meters)
 N: 159,672
 E: 193,630

 NAD 1927 (Survey Feet)
 N: 523,859
 E: 635,269

Locator Tool Report





WR File Number: C-POD3 Scale: 1:19,134

Northing/Easting: UTM83(92) (Meter): N: 3,589,696 E: 603,840

Northing/Easting: SPCS83(92) (Feet): N: 523,920 E: 676,450

GW Basin: Carlsbad

General Information:

Application ID:29 Date: 08-04-2014 Time: 15:40:31

WR File Number: C-POD4 Purpose: OTHER

Applicant First Name: VIRGILIO COCIANNI

Applicant Last Name: SCHLUMBERGER TECH CORP

GW Basin: CARLSBAD County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SE 1/4 of NE 1/4 of NE 1/4 of Section 32, Township 21S, Range 30E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 26 Minutes 22.8 Seconds N Longitude: 103 Degrees 53 Minutes 43.7 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,589,706
 E: 603,831

 NAD 1983(92) (Survey Feet)
 N: 11,777,229
 E: 1,981,069

 NAD 1927 (Meters)
 N: 3,589,504
 E: 603,880

 NAD 1927 (Survey Feet)
 N: 11,776,565
 E: 1,981,229

State Plane Coordinate System Zone: New Mexico East

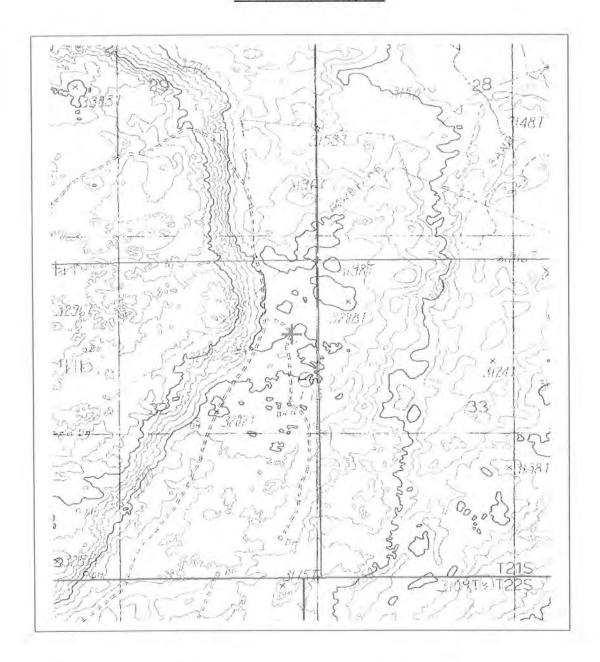
 NAD 1983(92) (Meters)
 N: 159,701
 E: 206,173

 NAD 1983(92) (Survey Feet)
 N: 523,954
 E: 676,420

 NAD 1927 (Meters)
 N: 159,683
 E: 193,621

 NAD 1927 (Survey Feet)
 N: 523,893
 E: 635,238

Locator Tool Report





WR File Number: C-POD4 Scale: 1:19,134

Northing/Easting: UTM83(92) (Meter): N: 3,589,706 E: 603,831

Northing/Easting: SPCS83(92) (Feet): N: 523,954 E: 676,420

GW Basin: Carlsbad

General Information:

Application ID:29 Date: 08-04-2014 Time: 15:41:35

WR File Number: C-POD5 Purpose: OTHER

Applicant First Name: VIRGILIO COCIANNI

Applicant Last Name: SCHLUMBERGER TECH CORP

GW Basin: CARLSBAD County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SE 1/4 of NE 1/4 of NE 1/4 of Section 32, Township 21S, Range 30E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 26 Minutes 23.1 Seconds N Longitude: 103 Degrees 53 Minutes 44.0 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,589,716
 E: 603,822

 NAD 1983(92) (Survey Feet)
 N: 11,777,261
 E: 1,981,040

 NAD 1927 (Meters)
 N: 3,589,514
 E: 603,871

 NAD 1927 (Survey Feet)
 N: 11,776,598
 E: 1,981,200

State Plane Coordinate System Zone: New Mexico East

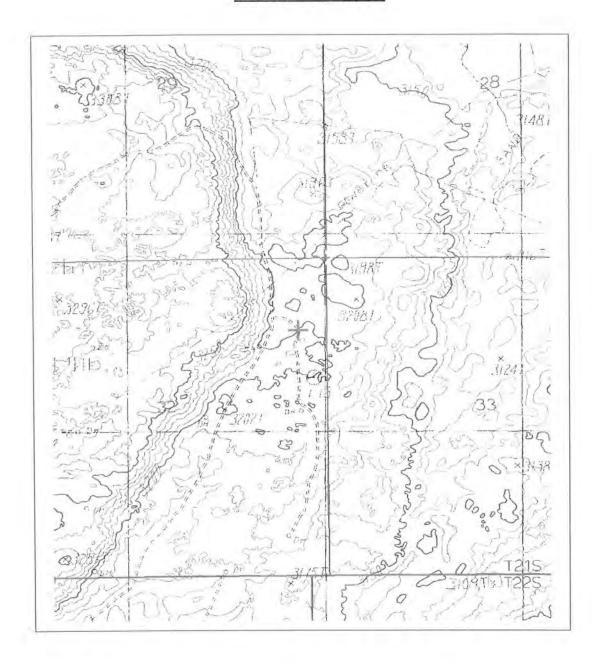
 NAD 1983(92) (Meters)
 N: 159,711
 E: 206,164

 NAD 1983(92) (Survey Feet)
 N: 523,986
 E: 676,391

 NAD 1927 (Meters)
 N: 159,693
 E: 193,612

 NAD 1927 (Survey Feet)
 N: 523,925
 E: 635,209

Locator Tool Report





WR File Number: C-POD5 Scale: 1:19,134

Northing/Easting: UTM83(92) (Meter): N: 3,589,716 E: 603,822

Northing/Easting: SPCS83(92) (Feet): N: 523,986 E: 676,391

GW Basin: Carlsbad

General Information:

Application ID: 29 Date: 08-04-2014 Time: 15:42:16

WR File Number: C-POD6 Purpose: OTHER

Applicant First Name: VIRGILIO COCIANNI

Applicant Last Name: SCHLUMBERGER TECH CORP

GW Basin: CARLSBAD County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SE 1/4 of NE 1/4 of NE 1/4 of Section 32, Township 21S, Range 30E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 26 Minutes 23.4 Seconds N Longitude: 103 Degrees 53 Minutes 44.4 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,589,726
 E: 603,813

 NAD 1983(92) (Survey Feet)
 N: 11,777,293
 E: 1,981,011

 NAD 1927 (Meters)
 N: 3,589,524
 E: 603,862

 NAD 1927 (Survey Feet)
 N: 11,776,629
 E: 1,981,171

State Plane Coordinate System Zone: New Mexico East

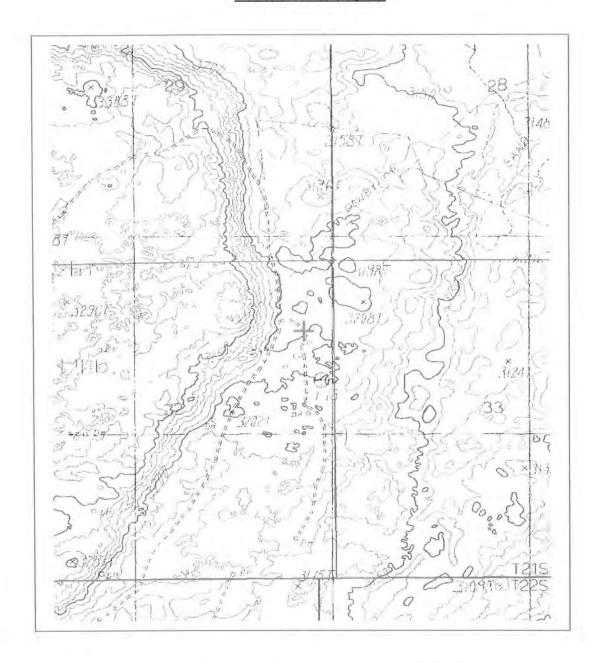
 NAD 1983(92) (Meters)
 N: 159,721
 E: 206,156

 NAD 1983(92) (Survey Feet)
 N: 524,018
 E: 676,362

 NAD 1927 (Meters)
 N: 159,702
 E: 193,603

 NAD 1927 (Survey Feet)
 N: 523,957
 E: 635,180

Locator Tool Report





WR File Number: C-POD6 Scale: 1:19,134

Northing/Easting: UTM83(92) (Meter): N: 3,589,726 E: 603,813

Northing/Easting: SPCS83(92) (Feet): N: 524,018 E: 676,362

GW Basin: Carlsbad

General Information:

Application ID: 29 Date: 08-04-2014 Time: 15:43:00

WR File Number: C-POD7

Purpose: OTHER

Applicant First Name: VIRGILIO COCIANNI

Applicant Last Name: SCHLUMBERGER TECH CORP

GW Basin: CARLSBAD County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SE 1/4 of NE 1/4 of NE 1/4 of Section 32, Township 21S, Range 30E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 26 Minutes 23.7 Seconds N Longitude: 103 Degrees 53 Minutes 44.7 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,589,736
 E: 603,804

 NAD 1983(92) (Survey Feet)
 N: 11,777,325
 E: 1,980,981

 NAD 1927 (Meters)
 N: 3,589,534
 E: 603,853

 NAD 1927 (Survey Feet)
 N: 11,776,662
 E: 1,981,142

State Plane Coordinate System Zone: New Mexico East

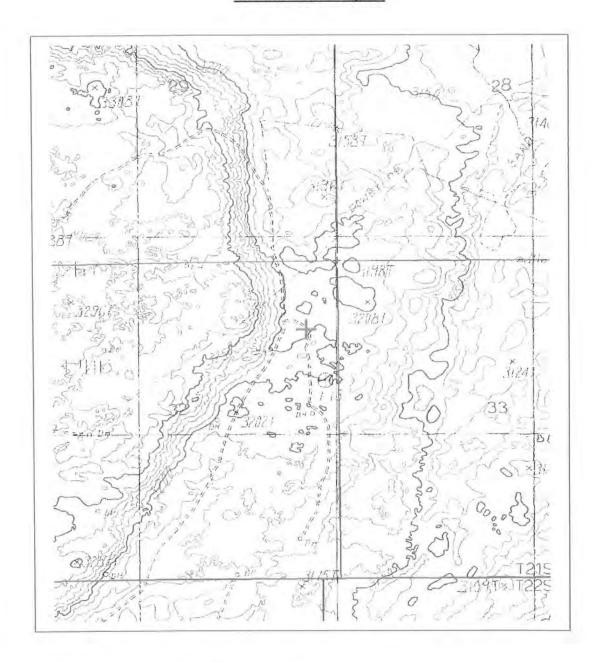
 NAD 1983(92) (Meters)
 N: 159,731
 E: 206,147

 NAD 1983(92) (Survey Feet)
 N: 524,050
 E: 676,333

 NAD 1927 (Meters)
 N: 159,712
 E: 193,594

 NAD 1927 (Survey Feet)
 N: 523,990
 E: 635,151

Locator Tool Report





WR File Number: C-POD7 Scale: 1:19,134

Northing/Easting: UTM83(92) (Meter): N: 3,589,736 E: 603,804

Northing/Easting: SPCS83(92) (Feet): N: 524,050 E: 676,333

GW Basin: Carlsbad

General Information:

Application ID:29 Date: 08-04-2014 Time: 15:43:36

WR File Number: C-POD8 Purpose: OTHER

Applicant First Name: VIRGILIO COCIANNI

Applicant Last Name: SCHLUMBERGER TECH CORP

GW Basin: CARLSBAD County: EDDY

Critical Management Area Name(s): NONE Special Condition Area Name(s): NONE

Land Grant Name: NON GRANT

PLSS Description (New Mexico Principal Meridian):

SW 1/4 of SE 1/4 of NE 1/4 of NE 1/4 of Section 32, Township 21S, Range 30E.

Coordinate System Details:

Geographic Coordinates:

Latitude: 32 Degrees 26 Minutes 24.0 Seconds N Longitude: 103 Degrees 53 Minutes 45.0 Seconds W

Universal Transverse Mercator Zone: 13N

 NAD 1983(92) (Meters)
 N: 3,589,745
 E: 603,796

 NAD 1983(92) (Survey Feet)
 N: 11,777,355
 E: 1,980,953

 NAD 1927 (Meters)
 N: 3,589,543
 E: 603,845

 NAD 1927 (Survey Feet)
 N: 11,776,692
 E: 1,981,114

State Plane Coordinate System Zone: New Mexico East

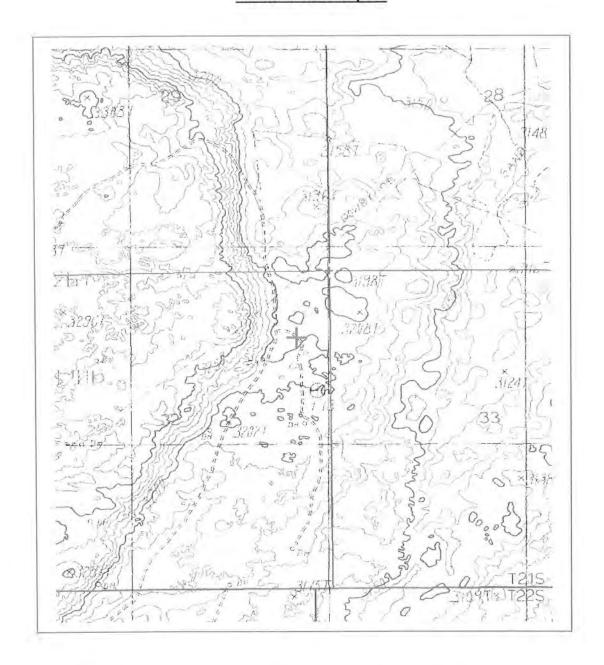
 NAD 1983(92) (Meters)
 N: 159,740
 E: 206,138

 NAD 1983(92) (Survey Feet)
 N: 524,080
 E: 676,305

 NAD 1927 (Meters)
 N: 159,722
 E: 193,586

 NAD 1927 (Survey Feet)
 N: 524,020
 E: 635,123

Locator Tool Report





WR File Number: C-POD8 Scale: 1:19,134

Northing/Easting: UTM83(92) (Meter): N: 3,589,745 E: 603,796

Northing/Easting: SPCS83(92) (Feet): N: 524,080 E: 676,305

GW Basin: Carlsbad



PROJECT NUMBER:	BORING NUMBER:				
469935.14.04.02	EW-03	SHEET	1	OF	2

PROJEC	CT : Form	ner Dov	vell Schlumberger Facility LOCATION : Artesia, New Mexico	
ELEVAT	ION: no	t meas	ured DRILLING CONTRACTOR AND DRILL RIG : National E	exploration Wells and Pumps, CME 85
COORD	INATES	: N 32.	44, E -103.89, (estim) DRILLING METHOD AND EQUIPMENT : 4.25-in ID HS	SA with continuous core
WATER				
DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE	COMMENTS DRILLING DETAILS
GROUNI	RECO	GRAF	DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY Soil removed with hand auger during utility clearance	
- - - 5	0.0			- - -
-			SANDY SILT (ML) light reddish brown (5YR 6/3), dry, low plasticity, cohesive, mottled white-caliche	Soil logged from continuous core
2/11/15	5.0		SILT (ML) white / pinkish gray (5YR 8/1), dry, low plasticity, cohesive, mottled with light red nodules and mottled white-caliche, nodules get fewer grading down core	Headspace=0.0 ppm
			No recovery SILT (ML)	Headspace=0.0 ppm
- 15	3.0		white / pinkish gray (5YR 8/1), dry, low plasticity, cohesive, mottled with light red nodules (as above) with less grading deeper SILTY SAND (SM) reddish brown / moderate brown (5YR 4/4), dry, very loose, mostly very fine grained - up to 10%	Headspace=0.0 ppm - Headspace=0.0 ppm
COMMERCIAL.GLB; COMMERCIAL_PROJECT.GPJ; CH2M GEOTECH_12_CG.GDT; 2/11/15	4.0		medium and coarse grained SANDY LEAN CLAY (CL) reddish brown (2.5YR 5/4), dry, noncohesive, non plastic, mottled grey 1" layer of coarse gravel at top of interval No recovery	Headspace=0.0 ppm
RCIAL_PR			LEAN CLAY (CL) white / pinkish gray (5YR 8/1), partially cemented caliche, laminated, trace black organic stringers SANDY SILT (ML) reddish brown (2.5YR 4/4), dry, low plasticity, cohesive, very fine sand, few (5%) fine gravel,	Headspace=0.0 ppm
SLB; COMME	3.0	* * * /* /	laminated POORLY GRADED SAND (SP) light reddish brown (2.5YR 7/3), moist, loose to dense at shoe, 5% fine gravel No recovery	- -
			WELL GRADED GRAVEL WITH CLAY (GW-GC) reddish brown (2.5YR 5/4), moist, low plasticity, coarse gravel to 4 cm diameter, grading to gravelly clay (CL) SILT (ML) red (2.5YR 5/6) low plasticity, cobesive, laminated, 2% medium gravel	Headspace=0.0 ppm Headspace=0.0 ppm
[2]	5.0		red (2.5YR 5/6), low plasticity, cohesive, laminated, 2% medium gravel LEAN CLAY (CL) red (2.5YR 5/6), low plasticity, cohesive, dense, 2% medium gravel POORLY GRADED SAND (SP) reddish brown (2.5YR 5/4), wet, partially cemented, 5-7% fine gravel WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC) light reddish brown (2.5YR 7/3) to reddish brown (2.5YR 4/4) interbedded with silt, wet, low plasticity, cohesive, silt is stiff and has 5% sand and gravel	- - -
NEW SOIL BORING LOG; CH2M GEOTECH 90 10 11 11 12 13 14 15 16 17 17 18 18 18 18 18 18 18 18	5.0	# # /* /* /* /* /* /* /* /* /* /* /* /* /*	SILT (ML) red (2.5YR 4/6), wet, low plasticity, cohesive, medium stiff SILT (ML) red (2.5YR 4/6), moist, low plasticity, cohesive, very soft, 2% medium gravel WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC) pale red (2.5YR 7/2), wet, very loose, partially cemented at top	Headspace=0.0 ppm Headspace=0.0 ppm
NEW 35			SILT (ML) red (2.5YR 4/6), moist, low plasticity, cohesive, very soft, 2% medium gravel	-



PROJECT NUMBER:	BORING NUMBER:				
469935.14.04.02	EW-03	SHEET	2	OF	2

PROJEC	CT : Forn	ner Dov	vell Schlumberger Facility LOCATION : Artesia, New Mexico	
ELEVAT	ION: no	ot meas	ured DRILLING CONTRACTOR AND DRILL RIG : National E	Exploration Wells and Pumps, CME 85
COORDI	INATES	: N 32.	44, E -103.89, (estim) DRILLING METHOD AND EQUIPMENT : 4.25-in ID H	SA with continuous core
WATER	LEVEL :	not me	easured START : 8/22/14 10:07 END : 8/22/14 12:09	5 LOGGER : Aleeca Forsberg
JW FACE	(ff))G	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW GROUND SURFACE (ff)	RECOVERY (ft)	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DRILLING DETAILS
			SILT (ML) reddish brown (2.5YR 4/4), wet, low plasticity, cohesive, dense, 5-10% clay	
_	5.0		SILT (ML) reddish brown (2.5YR 5/3), wet, low plasticity, cohesive, soft, 1" medium gravel layers (white) at 36' and 37.5'	Headspace=0.0 ppm
40			SILTY SAND (SM) reddish brown (2.5YR 4/4), wet, medium dense, 2% medium gravel, mottled grey, very fine sand CLAYEY SAND (SC)	Headspace=0.0 ppm
			light red (2.5YR 6/6), wet, loose, blocky, very fine sand	
-	5.0		white (2.5YR 8/1), wet, medium plastic, cohesive, very soft	
2/11/15			CLAYEY SAND (SC) reddish brown (2.5YR 4/4), wet, loose, predominantly very fine sand with 5% fine gravel LEAN CLAY WITH SAND (CL)	-
45			variagated reddish brown (2.5YR 4/4), white (2.5YR 8/1), and grey (5YR 6/1) wet, low plasticity, cohesive, soft	_
9 –	-		GRAVELLY SILT WITH SAND (ML) pinkish gray / grayish orange pink (5YR 7/2), wet, partially cemented	
			No recovery	
	4.5		CALICHE	
E			pinkish white (5YR 8/2), wet, cemented to partially cemented	
- G			VEAN CLAY WITH SAND (CL) yellowish red / light brown (5YR 5/6), wet, low plasticity, cohesive, stiff, 10% silt, laminated	
GLB; COMMERCIAL_PROJECT.GPJ; CH2M GEOTECH_12_CG.GDT; 2/11/15 G			POORLY GRADED SAND (SP) light reddish brown (2.5YR 6/4), wet, loose, predominantly fine grained	_
.GPJ			POORLY GRADED SAND (SP)	
	5.0	1111	\light reddish brown (2.5YR 6/4), wet, loose, mostly fine grained POORLY GRADED SAND WITH SILT (SP-SM)	
- IS		7777	reddish yellow (5YR 6/6), wet, loose, thinly bedded, fine grained	
			POORLY GRADED SAND (SP) light greenish gray (10Y 8/1), wet, partially cemented, fine to medium grained	
25		/////	POORLY GRADED SAND WITH CLAY (SP-SC) reddish yellow (5YR 6/6), wet, loose, thinly bedded, fine grained	_
- MA		11111	LEAN CLAY (CL)	
ŏ –			white / yellowish gray (5Y 8/1), wet, non plastic, noncohesive, 5% fine sand	
	5.0		POORLY GRADED SAND (SP) white / yellowish gray (5Y 8/1), wet, very loose, predominantly fine and medium sand, laminated,	
- RCIA			5-7% lean clay LEAN CLAY (CL)	
COMMERCIAL.			reddish brown (5YR 5/4), wet, low plasticity, cohesive, medium dense, gravel to 4 cm diameter \speckled throughout	
			Boring terminated at 60.0 ft bgs.	
핅 _				
GE				
HZH 05				
ට් 65	1			_
9 -	_			
NE -	-			
NEW SOIL BORING LOG; CH2M GEOTECH_12, 6	-			
08/				
M 70				



PROJECT NUMBER:	BORING NUMBER:				
469935.14.04.02	IJ-1	SHEET	1	OF	1

PRO	JEC ⁻	T : Forn	ner Dov	well Schlumberger Facility LOCATION : Artesia, New Mexico	
<u>ELEV</u>	/ATI	ON: no	ot meas	sured DRILLING CONTRACTOR AND DRILL RIG : National I	Exploration Wells and Pumps, CME 85
<u>COO</u>	RDI	NATES	: N 32	.44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT : 4.25-in ID H	SA with center plug
WAT	ERI	LEVEL :	not me	easured START : 8/21/14 09:36 END : 8/21/14 09:5.	2 LOGGER : Aleeca Forsberg
DEPTH BELOW GROUND SURFACE	(¥)	RECOVERY (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DRILLING DETAILS
	-			SILT (ML) pale red (2.5YR 7/2), dry, non plastic, noncohesive, like flour	Soil logged from auger cuttings
5	-				Headspace=4.7 ppm
	-			SILT (ML) pale red (2.5YR 7/2), dry, non plastic, noncohesive, like flour, with white clay/caliche chunks	-
DT; 2/11/15)				Headspace=0.2 ppm
EOTECH 12_CG.GL	-			LEAN CLAY (CL) light reddish brown (2.5YR 6/3), dry, low plasticity, cohesive, trace (5-7%) medium to coarse sand, white clay/caliche chunks (15%)	Headspace=0.0 ppm
NEW SOIL BORING LOG; CHZM GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL_PROJECT.GPJ; CHZM GEOTECH_12_CG.GDT; 2/1/1/15 C	5			LEAN CLAY (CL) reddish brown (2.5YR 4/4), moist, low plasticity, cohesive, few (10-12%) fine to coarse sand	Headspace=0.0 ppm
COMMERCIAL PR	_)			SILT (ML) reddish brown (2.5YR 5/4), wet, low plasticity, cohesive, few (10-12%) fine to coarse sand	
MIMERCIAL GEB;	5				Headspace=0.0 ppm
EOIECH 12 CO	-			SILT (ML) reddish brown (2.5YR 5/4), wet, low plasticity, cohesive, few (10-12%) fine to coarse sand, trace rust colored mottles	Headspace=0.0 ppm
300 (CHZM GI) - -				
BORING	+		111111	Boring terminated at 31.5 ft bgs.	
NEW SOIL					



PROJECT NUMBER:	BORING NUMBER:				
469935.14.04.02	IJ-2	SHEET	1	OF	1

PROJEC	T : Form	ner Dov	vell Schlumberger Facility LOCATION : Artesia, New Mex	xico				
ELEVATION: not measured			ured DRILLING CONTRACTOR AN	DRILLING CONTRACTOR AND DRILL RIG: National Exploration Wells and Pumps, CME 85				
COORDI	NATES:	: N 32	44, E -103.90, (estim) DRILLING METHOD AND EQ	QUIPMENT : 4.25-in ID HSA with center plug				
WATER	LEVEL:	not me	asured START : 8/21/14 08:00	END: 8/21/14 08:19 LOGGER: Aleeca Forsberg				
GROUND SURFACE (ft)	RECOVERY (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DRILLING DETAILS				
			Soil removed with hand auger during utility clearance		_			
5				Soil logged from auger cuttings				
3			SILT (ML) light reddish brown (2.5YR 6/4), dry, non-plastic, noncohesive	Headspace=0.0 ppm	-			
10			SILT (ML) reddish brown (2.5YR 5/4), dry, medium plasticity, cohesive, trace (5-7%) v caliche chunks, little medium to coarse sand	white clay nodules and	-			
15 - -			Not Logged		-			
20			LEAN CLAY (CL) reddish brown (2.5YR 4/4), moist, low plasticity, noncohesive, little (8-12%) sand	Headspace=0.0 ppm	-			
25		<i>(((((((((((((((((((((((((((((((((((((</i>	SILT (ML) reddish brown (2.5YR 4/3), wet, non plastic, noncohesive, trace (5-7%) fine	e to coarse sand	-			
		ШШ	Boring terminated at 31.5 ft bgs.		_			
			coming terminated at 01.0 it bgs.					
-								



PROJECT NUMBER:	BORING NUMBER:				
469935.14.04.02	IJ-3	SHEET	1	OF	1

PROJEC	T : Form	ner Dov	well Schlumberger Facility LOCATION : Artesia, New Mexico				
ELEVATION: not measured			sured DRILLING CONTRACTOR AND DRILL RIG : National	DRILLING CONTRACTOR AND DRILL RIG: National Exploration Wells and Pumps, CME 85			
COORDI	NATES	: N 32	.44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT : 4.25-in ID H	ISA with center plug			
WATER	LEVEL :	not me	easured START : 8/20/14 16:13 END : 8/20/14 04:4	3 LOGGER : Aleeca Forsberg			
GROUND SURFACE (ft)	RECOVERY (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DRILLING DETAILS			
-			SILT (ML) pale red (2.5YR 7/2), dry, non plastic, noncohesive, almost like flour	Soil logged from auger cuttings Headspace=0.0 ppm			
5 <u> </u>			SILT (ML) pale red (2.5YR 7/2), dry, non plastic, noncohesive, almost like flour, trace fine gravel, 5-7% clay	Headspace=0.0 ppm			
10 10 - -			LEAN CLAY (CL) reddish brown (2.5YR 5/3), dry, low plasticity, cohesive, few fine to medium gravel, trace fine to coarse sand	Headspace=0.0 ppm			
- 15 - -			Not logged	_			
20			SILT (ML) reddish brown (2.5YR 5/3), wet, low plasticity, cohesive, trace fine to medium gravel, few fine to coarse sand				
25 <u> </u>			SILT (ML) reddish brown (2.5YR 5/3), wet, low plasticity, cohesive, trace fine to medium gravel, few fine to coarse sand				
30			Boring terminated at 32.0 ft bgs.				
- - 35			Donny tominiated at 02.0 it byo.				



PROJECT NUMBER:	BORING NUMBER:	
469935.14.04.02	IJ-4	SHEET 1 OF 1

PROJE	CT : Forn	ner Dov	well Schlumberger Facility LOCATION : Artesia, New Mexico	
ELEVAT	TION: no	ot meas	sured DRILLING CONTRACTOR AND DRILL RIG : National B	Exploration Wells and Pumps, CME 85
COORD	INATES	: N 32	.44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT : 4.250-in ID I	HSA with center plug
WATER	R LEVEL :	not me	easured START : 8/20/14 14:52 END : 8/20/14 15:10	LOGGER : Aleeca Forsberg
ELOW	RY (ft)	5010	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (ft)	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DRILLING DETAILS
-	-		SILT (ML) light reddish brown (2.5YR 7/3), dry, non plastic, noncohesive, trace medium gravel	Soil logged from auger cuttings Headspace=0.0 ppm
	-		SILT (ML) light reddish brown (2.5YR 7/3), dry, non plastic, noncohesive, trace medium gravel, with white caliche-like nodules/chunks up to 2.54 cm diameter though some are very soft and friable	Headspace=0.1 ppm
OTECH_12_CG.GDT; 2 01 01 01 01 01 01 01 01 01 01 01 01 01	-		LEAN CLAY (CL) light reddish brown (2.5YR 7/3), low plasticity, cohesive, abundant white nodules/chunks as above	Headspace=0.1 ppm
(OJECT. GPJ; CHZM GEC	-		LEAN CLAY (CL) reddish brown (2.5YR 5/3), moist, low plasticity, cohesive, 5% fine to coarse sand	Headspace=0.0 ppm
NEW SOIL BORING LOG; CHZM GEOTECH_12_COMMERCIAL, GLB; COMMERCIAL_PROJECT.GPJ; CHZM GEOTECH_12_CG.GDT; 2/1/1/15 90 91 91 92 93 94 95 96 96 97 97 98 98 99 90 90 90 90 90 90 90 90 90 90 90 90	-		SILT (ML) reddish brown (2.5YR 5/3), moist, low plasticity, cohesive, 5-7% fine to coarse sand	Headspace=0.0 ppm
EOTECH_12_COMMER	-		LEAN CLAY (CL) reddish brown (2.5YR 5/3), wet, low plasticity, cohesive, 5-7% fine to coarse sand, 10% silt	Headspace=0.0 ppm
10 LOG; CH2M G	-		Boring terminated at 31.0 ft bgs.	-
NEW SOIL BORING	-			



PROJECT NUMBER:	BORING NUMBER:				
469935.14.04.02	IJ-5	SHEET	1	OF	1

	PROJEC	CT : Form	ner Dov	well Schlumberger Facility LOCATION : Artesia, New Mexico	
	ELEVAT	ION: no	t meas	Bured DRILLING CONTRACTOR AND DRILL RIG : National E	exploration Wells and Pumps, CME 85
	COORD	INATES	: N 32	.44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT : 4.25-in ID HS	SA with center plug
	WATER	LEVEL :	not me	easured START : 8/19/14 11:51 END : 8/19/2014	LOGGER : Aleeca Forsberg
	ACE:	(£)	၂ ၅	SOIL DESCRIPTION	COMMENTS
	DEPTH BELOW GROUND SURFACE (ft)	RECOVERY	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DRILLING DETAILS
	-			SILT (ML) light reddish brown (2.5YR 6/3), dry, non plastic, noncohesive, few medium sands	Soil logged from auger cuttings Headspace=0.1 ppm
	5			SILT (ML) reddish brown (2.5YR 5/4), dry, non plastic, noncohesive, few medium sands, 5-7% clay	Headspace=0.2 ppm
GLB; COMMERCIAL_PROJECT.GPJ; CH2M GEOTECH_12_CG.GDT; 2/11/15	- - 10		<i>,,,,,</i>	LEAN CLAY (CL)	-
	- - -			light reddish brown (2.5YR 6/3), moist, non plastic, noncohesive, trace fine sands	Headspace=0.1 ppm
_PROJECT.GPJ; CH2M	15 - - -			LEAN CLAY (CL) reddish brown (2.5YR 4/4), wet, non plastic, cohesive, few medium sand	Headspace=0.2 ppm
				SILT (ML) reddish brown (2.5YR 5/3), wet, low plasticity, cohesive, 10% clay	Headspace=0.1 ppm
NEW SOIL BORING LOG; CH2M GEOTECH_12_COMMERCIAL	25 - - -			SILT (ML) reddish brown (2.5YR 5/4), wet, low plasticity, cohesive, few well graded sands	Headspace=0.6 ppm
IG LOG; CHZM C	30				_
JEW SOIL BORING	- - - 35			Boring terminated at 31.5 ft bgs.	



PROJECT NUMBER:	BORING NUMBER:				
469935.14.04.02	IJ-6	SHEET	1	OF	1

PROJEC	T : Form	ner Dov	well Schlumberger Facility LOCATION : Artesia, New Mexico				
ELEVATION: not measured			sured DRILLING CONTRACTOR AND DRILL RIG : National I	DRILLING CONTRACTOR AND DRILL RIG: National Exploration Wells and Pumps, CME 85			
COORD	INATES	: N 32	.44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT : 4.25-in ID H	SA with center plug			
WATER	LEVEL :	not me	easured START : 8/19/14 10:44 END : 8/19/14 10:5	8 LOGGER : Aleeca Forsberg			
GROUND SURFACE :	RECOVERY (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DRILLING DETAILS			
			SANDY SILT (ML) reddish brown (2.5YR 4/3), dry, non plastic, noncohesive, roots	Soil logged from auger cuttings Headspace=0.1 ppm			
5			SILT (ML) pale red (2.5YR 6/2), dry, non plastic, noncohesive, clay nodules up to 2.5 cm - white with mottled grey and reddish brown when broken	Headspace=0.1 ppm			
- 10 			LEAN CLAY (CL) pale red (2.5YR 6/2), dry, low plasticity, noncohesive, white clay nodules to 1 cm, few coarse sand, trace fine gravel	Headspace=0.2 ppm			
- 15 - -			LEAN CLAY (CL) reddish brown (2.5YR 4/4), moist, low plasticity, noncohesive, trace fine to medium sand	Headspace=0.2 ppm			
20			SILT (ML) reddish brown (2.5YR 4/3), wet, low plasticity, cohesive, few fine gravel	Headspace=0.3 ppm			
25 			SILT (ML) reddish brown (2.5YR 5/4), wet, low plasticity, cohesive, few fine gravel	Headspace=0.3 ppm			
30			Boring terminated at 31.0 ft bgs.				
-							



PROJECT NUMBER:	BORING NUMBER:				
469935.14.04.02	IJ-7	SHEET	1	OF	1

PROJEC	T : Form	ner Dov	vell Schlumberger Facility LOCATION : Artesia, New Mexico	
ELEVATION: not measured			ured DRILLING CONTRACTOR AND DRILL RIG : National	Exploration Wells and Pumps, CME 85
COORDI	INATES	N 32.	44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT : 4.25-in ID I	HSA with center plug
WATER	LEVEL :	not me	easured START : 8/19/14 10:00 END : 8/19/14 10:	12 LOGGER : Aleeca Forsberg
LOW	√ (ft)	FOG	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (ft)	GRAPHICLOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DRILLING DETAILS
_			No recovery, soil removed with hand auger during utility clearance	Soil logged from auger cuttings
5			SILT (ML)	
_ _ 			light reddish brown (2.5YR 7/3), dry, non plastic, noncohesive, 10-15% fine and medium sands, 5% fine gravel	Headspace=0.2 ppm
10			LEAN CLAY (CL) reddish brown (2.5YR 5/3), dry, low plasticity, noncohesive, 5-10% silt, 5% medium sands	Headspace=0.2 ppm
15 - - -			LEAN CLAY WITH SAND (CL) reddish brown (2.5YR 5/4), moist, low plasticity, cohesive, fine to coarse sands, few fine angular gravel with 2.5YR 5/6, dark red nodules	Headspace=0.1 ppm
20			SILT (ML) reddish brown (2.5YR 5/4), wet, medium plasticity, cohesive, few coarse sand	Headspace=0.2 ppm
25			SILT (ML) reddish brown (2.5YR 5/4), wet, medium plasticity, cohesive, few coarse sand, few fine gravel	Headspace=0.1 ppm
30			Boring terminated at 31.0 ft bgs.	
-				



PROJECT NUMBER:	BORING NUMBER:					
469935.14.04.02	IJ-8	SHEET	1	OF	1	

PROJECT : Former Dowell Schlumberger Facility LOCATION : Artesia, New Mexico							
				ured DRILLING CONTRACTOR AND DRILL RIG : National E	DRILLING CONTRACTOR AND DRILL RIG : National Exploration Wells and Pumps, CME 85		
	COORDINATES: N 32.44, E -103.90, (estim)			44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT : 4.25-in ID HS	DRILLING METHOD AND EQUIPMENT : 4.25-in ID HSA with center plug		
ı	WATER	LEVEL :	not me	easured START: 8/19/14 08:50 END: 8/19/14 09:06	LOGGER : Aleeca Forsberg		
	DEPTH BELOW GROUND SURFACE (ft)	RECOVERY (ft)	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DRILLING DETAILS		
	-			No recovery, soil removed with hand auger during utility clearance	Soil logged from auger cuttings		
/15	5			Not logged	- - - -		
GLB; COMMERCIAL_PROJECT.GPJ; CH2M GEOTECH_12_CG.GDT; 2/11/15	- 10 - -			LEAN CLAY (CL) light reddish brown (2.5YR 6/3), dry, low plasticity, noncohesive, 10-15% clay, little medium gravel	- - - -		
юлест. GРJ; СН2М GE	- 15 - -			LEAN CLAY (CL) reddish brown (2.5YR 5/3), moist, low plasticity, noncohesive, few medium sands	Headspace=0.1 ppm		
	_ 20 _ _ _			SILT (ML) weak red (2.5YR 4/2), wet, low plasticity, noncohesive, few medium sands, 5-10% fine sand	Headspace=0.0 ppm		
2M GEOTECH_12_COMMERC.				SILT (ML) reddish brown (2.5YR 4/4), wet, medium plasticity, cohesive, 5-7% fine sand, trace coarse sand	Headspace=0.0 ppm		
NEW SOIL BORING LOG; CH2M GEOTECH_12_COMMERCIAL.	30			Boring terminated at 30.5 ft bgs.			



PROJECT NUMBER:	BORING NUMBER:				
469935.14.04.02	MW-34	SHEET	1	OF	1

	PROJEC	T : Form	er Dow	rell Schlumberger Facility L	OCATION: Artesia, New Mexico		
	ELEVATION : not measured			ured <u>[</u>	DRILLING CONTRACTOR AND DRILL RIG: National Exploration Wells and Pumps, CME 85		
	COORDINATES: N 32.44, E -103.89, (estim)			44, E -103.89, (estim) [DRILLING METHOD AND EQUIPMENT: 4.25 ID HSA With Continuous Core		
	WATER	LEVEL :	not me	asured S	START: 8/21/14 13:30	END: 8/21/14 14:50	LOGGER : Aleeca Forsberg
	DEPTH BELOW GROUND SURFACE (ff)	RECOVERY (ft)	GRAPHIC LOG	SOIL NAME, US COLOR, MOISTUR DENSITY OR O	ESCRIPTION CS GROUP SYMBOL, E CONTENT, RELATIVE CONSISTENCY, SOIL		COMMENTS DRILLING DETAILS
	D GR(Υ.	o l	STRUCTUR	RE, MINERALOGY		
	-	0.0		No recovery, soil removed with hand auger du	ring utility clearance		Soil logged from continuous core
2_COMMERCIAL.GLB; COMMERCIAL_PROJECT.GPJ; CH2M GEOTECH_12_CG.GDT; 3/2/15	5 - - - 10	5.0		SILT (ML) light reddish gray (2.5YR 7/1), dry, non plastic SILT (ML) light reddish gray (2.5YR 7/1), as above, less LEAN CLAY (CL) white (2.5YR 8/1), dry, non plastic, noncohesis SILT (ML) light reddish gray (2.5YR 7/1), dry, non plastic	caliche-like ve, hard		- - - -
	- - - 15	3.0		No recovery SILT (ML) red (2.5YR 5/6), dry, non plastic, noncohesive chunky at bottom foot			
		4.5		No recovery POORLY GRADED SAND (SP) yellowish red / light brown (5YR 5/6), moist, la 5-10% silt, very fine sand WELL GRADED GRAVEL WITH CLAY (GW. light reddish brown / light brown (5YR 6/4), mostilt (ML) pinkish gray / grayish orange pink (5YR 7/2), i	-GC) bist, subrounded gravel		Headspace=0.0 ppm
	- - - 25	2.5		No recovery SILT (ML) reddish brown (2.5YR 4/4), wet, low plasticity CALICHE pale red (2.5YR 7/2), dry, hard			- - - Headspace=0.0 ppm
	30	2.5		LEAN CLAY (CL) reddish brown (2.5YR 4/4), moist, low plastici POORLY GRADED SAND (SP) pink (2.5YR 8/4), dry, non plastic, very loose, No recovery SILT (ML) light reddish brown / light brown (5YR 6/4), we	very fine] 	- - -
NEW SOIL BORING LOG; CH2M GEOTECH_12_COMMERCIAL	- - - 35			SILTY SAND (SM) light reddish brown (5YR 6/3), wet, very loose SILT (ML) light reddish brown (5YR 6/4) to reddish brown fine to medium sand No recovery	e, predominantly fine sand	ohesive, 10-12%	- - - -
NEW SOIL BOR	- - - 40			Boring terminated at 36.5 ft bgs.			- -



PROJECT NUMBER:	WELL NUMBER:
469935.14.04.02	EW-03

PROJECT : Former Dowell Schlumberger Facility

LOCATION : Artesia, New Mexico

ELEVATION : not measured

DRILLING CONTRACTOR AND DRILL RIG : National Exploration Wells and Pumps, CME 85

COORDINATES : N 32.44, E -103.89, (estim)

DRILLING METHOD AND EQUIPMENT : 6.25-in ID HSA with center plug

WATER LEVEL : 18.75 ft bgs (measured before development)

START : 8/22/14 14:38

END : 8/23/2014

LOGGER : A. Forsberg

Well pad is 5 feet diameter, concrete vault

NOTES:

CH2M GEOTECH_12_CG.GDT;

PROJECT.GPJ;

COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL

ALL DEPTHS ARE REPORTED AS DEPTH IN FEET BELOW GROUND SURFACE UNLESS OTHERWISE NOTED.

COMMENTS:

Borehole overdrilled with CME-85 6.25 ID HSA with center plug

TOP OF SCREEN 15.0 _

BOTTOM OF SCREEN 55.0 _

BOTTOM OF SUMP 60.0 _

WELL CONSTRUCTION & SCREEN DETAILS

3.0 TOP OF GROUT, Portland Cement with bentonite gel, 270 pounds of cement, 1.5 pounds high yield bentonite gel

BOREHOLE DIAMETER: 10.5 inches

FILTER PACK TYPE: FILTER PACK, 8-16 silica sand

WELL CASING: BLANK, 4" SCH40 PVC

SCREEN LENGTH: 40 feet

SCREEN DESCRIPTION: 4" SCH40 PVC 0.040

wire-wrapped Slot

11.0 TOP OF SEAL, 3/8" bentonite chips 200 pounds, 4 bags

13.0 TOP OF FILTER PACK, 8-16 silica sand 2200 pounds, 44 bags

60.0 BOTTOM OF BOREHOLE

WELL DIAGRAM IS NOT TO SCALE



PROJECT NUMBER:	WELL NUMBER:
469935.14.04.02	IJ-1

PROJECT: Former Dowell Schlumberger Facility LOCATION: Artesia, New Mexico ELEVATION: not measured TOC: not measured DRILLING CONTRACTOR AND DRILL RIG: National Exploration Wells and Pumps, CME 85 COORDINATES: N 32.44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT: 4.25-in ID HSA with center plug WATER LEVEL: 17.20 ft bgs (measured before development) START: 8/21/14 09:56 END: 8/23/14 08:10 LOGGER: A. Forsberg TOP OF PROTECTIVE CASING 3 ft ags Well pad is 4 ft. x 4 ft. wide, 4 inches thick TOP OF CASING 2 ft ags 2.0 TOP OF GROUT, Portland Cement with bentonite gel 270 pounds cement, 1.5 pounds high yield bentonite gel NOTES: ALL DEPTHS ARE REPORTED AS **WELL CONSTRUCTION & SCREEN DETAILS** DEPTH IN FEET BELOW GROUND SURFACE UNLESS OTHERWISE **BOREHOLE DIAMETER: 8.5 inches** NOTED. FILTER PACK TYPE: FILTER PACK, 8-16 silica sand CASING STICKUPS ARE REPORTED AS DISTANCE ABOVE WELL CASING: BLANK, 2" SCH40 PVC GROUND SURFACE (ags). SCREEN LENGTH: 10 feet SCREEN DESCRIPTION: 2" SCH40 wire-wrapped PVC 0.040-inch slot 15.0 TOP OF SEAL, 3/8" bentonite chips 75 pounds, 1.5 18.0 TOP OF FILTER PACK, 8-16 silica sand 500 pounds, 10 bags TOP OF SCREEN 20.3 _ BOTTOM OF SCREEN 30.3 _ BOTTOM OF END CAP 31.3 ___ 31.5 BOTTOM OF BOREHOLE

WELL DIAGRAM IS NOT TO SCALE

COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL



PROJECT NUMBER:	WELL NUMBER:
469935.14.04.02	IJ-2

PROJECT: Former Dowell Schlumberger Facility LOCATION: Artesia, New Mexico ELEVATION: not measured TOC: not measured DRILLING CONTRACTOR AND DRILL RIG: National Exploration Wells and Pumps, CME 85 COORDINATES: N 32.44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT: 4.25-in ID HSA with center plug WATER LEVEL: 17.42 ft bgs (measured on 8/21/14) START: 8/21/14 08:21 END: 8/21/2014 LOGGER: A. Forsberg TOP OF PROTECTIVE CASING 3 ft ags Well pad is 4 ft. x 4 ft. wide, 4 inches thick TOP OF CASING 2 ft ags 2.0 TOP OF GROUT, Portland Cement with bentonite gel 270 pounds cement, 10 pounds high yield bentonite gel NOTES: ALL DEPTHS ARE REPORTED AS **WELL CONSTRUCTION & SCREEN DETAILS** DEPTH IN FEET BELOW GROUND SURFACE UNLESS OTHERWISE **BOREHOLE DIAMETER: 8.5 inches** NOTED. FILTER PACK TYPE: FILTER PACK, 8-16 silica sand CASING STICKUPS ARE REPORTED AS DISTANCE ABOVE WELL CASING: BLANK, 2" SCH40 PVC GROUND SURFACE (ags). SCREEN LENGTH: 10 feet SCREEN DESCRIPTION: 2" SCH40 wire-wrapped PVC 0.040-inch slot 15.0 TOP OF SEAL, 3/8" bentonite chips 75 pounds, 1.5 18.0 TOP OF FILTER PACK, 8-16 silica sand 500 pounds, 10 bags TOP OF SCREEN 20.5 _ BOTTOM OF SCREEN 30.5 _ BOTTOM OF END CAP 31.5 ___ 31.5 BOTTOM OF BOREHOLE

WELL DIAGRAM IS NOT TO SCALE

COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL



PROJECT NUMBER:	WELL NUMBER:
469935.14.04.02	IJ-3

PROJECT: Former Dowell Schlumberger Facility LOCATION: Artesia, New Mexico ELEVATION: not measured TOC: not measured DRILLING CONTRACTOR AND DRILL RIG: National Exploration Wells and Pumps, CME 85 COORDINATES: N 32.44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT: 4.25-in ID HSA with center plug WATER LEVEL: 16.68 ft bgs (measured on 8/21/14) START: 8/20/14 16:50 END: 8/21/14 10:25 LOGGER: A. Forsberg TOP OF PROTECTIVE CASING 3 ft ags Well pad is 4 ft. x 4 ft. wide, 4 inches thick TOP OF CASING 2 ft ags 2.0 TOP OF GROUT, Portland Cement with bentonite gel 270 pounds cement, 10 pounds high yield bentonite gel NOTES: ALL DEPTHS ARE REPORTED AS **WELL CONSTRUCTION & SCREEN DETAILS** DEPTH IN FEET BELOW GROUND SURFACE UNLESS OTHERWISE **BOREHOLE DIAMETER: 8.5 inches** NOTED. FILTER PACK TYPE: FILTER PACK, 8-16 silica sand CASING STICKUPS ARE REPORTED AS DISTANCE ABOVE WELL CASING: BLANK, 2" SCH40 PVC GROUND SURFACE (ags). SCREEN LENGTH: 10 feet SCREEN DESCRIPTION: 2" SCH40 wire-wrapped PVC 0.040-inch slot COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL 15.0 TOP OF SEAL, 3/8" bentonite chips 75 pounds, 1.5 18.0 TOP OF FILTER PACK, 8-16 silica sand 550 pounds, 11 bags TOP OF SCREEN 20.0 _ BOTTOM OF SCREEN 30.0 _ BOTTOM OF END CAP 31.0 ___ 32.0 BOTTOM OF BOREHOLE

WELL DIAGRAM IS NOT TO SCALE



COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL

WELL DIAGRAM IS NOT TO SCALE

PROJECT NUMBER:	WELL NUMBER:
469935.14.04.02	IJ-4

Well Completion Diagram

PROJECT: Former Dowell Schlumberger Facility LOCATION: Artesia, New Mexico ELEVATION: not measured TOC: not measured DRILLING CONTRACTOR AND DRILL RIG: National Exploration Wells and Pumps, CME 85 COORDINATES: N 32.44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT: 4.25-in ID HSA with center plug WATER LEVEL: 16.74 ft bgs (measured before well development) START: 8/20/14 15:21 END: 8/20/14 15:40 LOGGER: A. Forsberg TOP OF PROTECTIVE CASING 3 ft ags Well pad is 4 ft. x 4 ft. wide, 4 inches thick TOP OF CASING 2 ft ags 2.0 TOP OF GROUT, Portland Cement with bentonite gel 270 pounds cement, 15 pounds high yield bentonite gel NOTES: ALL DEPTHS ARE REPORTED AS **WELL CONSTRUCTION & SCREEN DETAILS** DEPTH IN FEET BELOW GROUND SURFACE UNLESS OTHERWISE **BOREHOLE DIAMETER: 8.5 inches** NOTED. FILTER PACK TYPE: FILTER PACK, 8-16 silica sand CASING STICKUPS ARE REPORTED AS DISTANCE ABOVE WELL CASING: BLANK, 2" SCH40 PVC GROUND SURFACE (ags). SCREEN LENGTH: 10 feet SCREEN DESCRIPTION: 2" SCH40 wire-wrapped PVC 0.040-inch slot 15.0 TOP OF SEAL, 3/8" bentonite chips 75 pounds, 1.5 18.0 TOP OF FILTER PACK, 8-16 silica sand 525 pounds, 10.5 bags TOP OF SCREEN 20.0 _ BOTTOM OF SCREEN 30.0 _ BOTTOM OF END CAP 31.0 ___ 31.0 BOTTOM OF BOREHOLE



COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL

WELL DIAGRAM IS NOT TO SCALE

PROJECT NUMBER:	WELL NUMBER:
469935.14.04.02	IJ-5

Well Completion Diagram

PROJECT: Former Dowell Schlumberger Facility LOCATION: Artesia, New Mexico ELEVATION: not measured TOC: not measured DRILLING CONTRACTOR AND DRILL RIG: National Exploration Wells and Pumps, CME 85 COORDINATES: N 32.44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT: 4.25-in ID HSA with center plug WATER LEVEL: 15.00 ft bgs (measured after well development) START: 8/20/14 07:53 END: 8/20/14 09:03 LOGGER: A. Forsberg TOP OF PROTECTIVE CASING 3 ft ags Well pad is 4 ft. x 4 ft. wide, 4 inches thick TOP OF CASING 2 ft ags 2.0 TOP OF GROUT, Portland Cement with bentonite gel 180 pounds cement, 10 pounds high yield bentonite gel NOTES: ALL DEPTHS ARE REPORTED AS **WELL CONSTRUCTION & SCREEN DETAILS** DEPTH IN FEET BELOW GROUND SURFACE UNLESS OTHERWISE **BOREHOLE DIAMETER: 8.5 inches** NOTED. FILTER PACK TYPE: FILTER PACK, 8-16 silica sand CASING STICKUPS ARE REPORTED AS DISTANCE ABOVE WELL CASING: BLANK, 2" SCH40 PVC GROUND SURFACE (ags). SCREEN LENGTH: 10 feet SCREEN DESCRIPTION: 2" SCH40 wire-wrapped PVC 0.040-inch slot 16.0 TOP OF SEAL, 3/8" bentonite chips 100 pounds, 2 18.0 TOP OF FILTER PACK, 8-16 silica sand 500 pounds, 10 bags TOP OF SCREEN 20.5 _ BOTTOM OF SCREEN 30.5 _ BOTTOM OF END CAP 31.5 ___ 31.5 BOTTOM OF BOREHOLE



WELL COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL_PROJECT.GPJ; CH2M GEOTECH 12_CG.GDT; 2/11/15

WELL DIAGRAM IS NOT TO SCALE

PROJECT NUMBER:	WELL NUMBER:
469935.14.04.02	IJ-6

Well Completion Diagram

PROJECT - Former Downell Schlumberger Facility LEEVATION : not measured TOC : not measured TOC : not measured TOC : not measured DRILLING CONTRACTOR AND DRILL RIG : National Exploration Wells and Pumps, CME 85 COCORDINATES : Not 246, E-1033 (Neeth) DRILLING METHOD AND EQUIPMENT: 4.25-ii. ID HSA with center plug START : 820/14 08 24 END : 8/20/2014 LOGGER : A Forsberg Well pad is 4 ft. x 4 ft. wide, 4 inches thick TOP OF PROTECTIVE CASING 3 ft ags TOP OF CASING 2 ft ags Well pad is 4 ft. x 4 ft. wide, 4 inches thick WELL CONSTRUCTION & SCREEN DETAILS BOREHOLE DIAMETER 8.5 inches NOTES: ALL DEPTHS ARE REPORTED AS DEPTHS IN FEET BELOW GROUND SURFACE UNLESS OTHERWISE NOTED. CASING STICKUPS ARE REPORTED AS DISTANCE ABOVE GROUND SURFACE (ags). WELL CONSTRUCTION & SCREEN DETAILS BOREHOLE DIAMETER 8.5 inches FILTER PACK 177PE: FILTER PACK, 8-16 silice sand WELL CASING: BLANK; 2" SCH40 PVC SCREEN LENGTH: 10 feet SCREEN DESCRIPTION: 2" SCH40 wire-wrapped PVC 0.040-inch slot TOP OF SCREEN 20.2 BOTTOM OF SCREEN 30.2 BOTTOM OF SCREEN 30.2 BOTTOM OF SCREEN 31.2 BOTTOM OF BOCKERD IS.2				
DORILLING METHOD AND EQUIPMENT: 4.25-in ID HSA with center plug WATER LEVEL: 10.60 ft bgs (measured before well development) TOP OF PROTECTIVE CASING 3 ft ags TOP OF PROTECTIVE CASING 3 ft ags TOP OF CASING 2 ft ags TOP OF CASING 2 ft ags NOTES: ALL DEPTHS ARE REPORTED AS DEPTH IN FEET BELOW GROUND SURFACE (ags). ALL DEPTHS ARE REPORTED AS DEPTH IN FEET BELOW GROUND SURFACE (ags). WELL CONSTRUCTION & SCREEN DETAILS BOREHOLE DIAMETER: 8.5 inches FILTER PACK 17 YPE: FILTER PACK, 8-16 silica sand WELL CASING: BLANK; 2" SCH40 PVC SCREEN LENGTH: 10 feet SCREEN DESCRIPTION: 2" SCH40 wire-wrapped PVC 0.040-inch slot TOP OF SCREEN 20.2 BOTTOM OF SCREEN 30.2	PROJECT : Former Dowell Schlumberger Facility	LOCATION : Artesia, New	Mexico	
WATER LEVEL; 16.60 ft bgs (measured before well development) TOP OF PROTECTIVE CASING 3 ft ags TOP OF CASING 2 ft ags Well pad is 4 ft. x 4 ft. wide, 4 inches thick Well pad is 4 ft. x 4 ft. wide, 4 inches thick Well pad is 4 ft. x 4 ft. wide, 4 inches thick Well pad is 4 ft. x 4 ft. wide, 4 inches thick Well pad is 4 ft. x 4 ft. wide, 4 inches thick Well pad is 4 ft. x 4 ft. wide, 4 inches thick Well pad is 4 ft. x 4 ft. wide, 4 inches thick Well pad is 4 ft. x 4 ft. wide, 4 inches thick Well pad is 4 ft. x 4 ft. wide, 4 inches thick Well pad is 4 ft. x 4 ft. wide, 4 inches thick Well pad is 4 ft. x 4 ft. wide, 4 inches thick Well pad is 4 ft. x 4 ft. wide, 4 inches thick Well pad is 4 ft. x 4 ft. wide, 4 inches thick ### OF PROTECTIVE CASING STORED TO PROVE	ELEVATION: not measured TOC: not measured	DRILLING CONTRACTOR	R AND DRILL RIG : National Ex	ploration Wells and Pumps, CME 85
TOP OF PROTECTIVE CASING 3 ft ags TOP OF CASING 2 ft ags Well pad is 4 ft, x 4 ft, wide, 4 inches thick ### Can the pad is 4 ft, x 4 ft, wide, 4 inches thick ### Can the pad is 4 ft, x 4 ft, wide, 4 inches thick ### Can the pad is 4 ft, x 4 ft, wide, 4 inches thick ### Can the pad is 4 ft, x 4 ft, wide, 4 inches thick ### Can the pad is 4 ft, x 4 ft, wide, 4 inches thick ### Can the pad is 4 ft, x 4 ft, wide, 4 inches thick ### Can the pad is 4 ft, x 4 ft, wide, 4 inches thick ### Can the pad is 4 ft, x 4 ft, wide, a life to pad is 4 ft, x 4 ft, wide, a life to pad is 4 ft, x 4 ft, wide, a life to pad is 4 ft, x 4 ft, wide, a life to pad is 4 ft, x 4 ft, wide, a life to pad is 4 ft, x 4 ft, wide, a life to pad is 4 ft, x 4 ft, wide, a life to pad is 4 ft, x 4 ft, wide, a life to pad is 4 ft, x 4 ft, wide, a life to pad is 4 ft, x 4 ft, wide, a life to pad is 4 ft, x 4 ft, wide, a life to pad is 4 ft, x 4 ft, a life to pad is 4 ft, x 4 ft, a life to pad is 4 ft, x 4 ft, a life to pad is 4 ft, x 4 ft, a life to pad	COORDINATES: N 32.44, E -103.90, (estim)	DRILLING METHOD AND	EQUIPMENT : 4.25-in ID HSA	A with center plug
NOTES: ALL DEPTHS ARE REPORTED AS DEPTH IN FIELD BY ALL SINCE STANKS AND STILLESS OTHERWISE NO SINCE STANKS AND STILLESS OTHERWISE REPORTED AS DISTANCE ABOVE GROUND SURFACE (ags). WELL CONSTRUCTION & SCREEN DETAILS BOREHOLE DIAMETER: 8.5 inches FILTER PACK TYPE: FILTER PACK, 8-16 silica sand WELL CASING: BLANK, 2" SCH40 PVC SCREEN LENGTH: 10 feet SCREEN DESCRIPTION: 2" SCH40 wire-wrapped PVC 0,40-inch slot 15.5 TOP OF SEAL, 3/8" bentonite chips 87.5 pounds, 1.75 bags 18.0 TOP OF FILTER PACK, 8-16 silica sand 550 pounds, 11 bags TOP OF SCREEN 20.2 BOTTOM OF SCREEN 30.2 BOTTOM OF SCREEN 30.2 BOTTOM OF END CAP 31.2	WATER LEVEL : 16.60 ft bgs (measured before well development	nt) START: 8/20/14 09:24	END: 8/20/2014	LOGGER : A. Forsberg
NOTES: ALL DEPTHS ARE REPORTED AS DEPTH IN FEET BELOW GROUND SURFACE UNLESS OTHERWISE NOTED. CASING STICKUPS ARE REPORTED AS DISTANCE ABOVE GROUND SURFACE (ags). BOREHOLE DIAMETER: 8.5 inches FILTER PACK TYPE: FILTER PACK, 8-16 silica sand WELL CASING: BLANK, 2" SCH40 PVC SCREEN LENGTH: 10 feet SCREEN DESCRIPTION: 2" SCH40 wire-wrapped PVC 0.040-inch slot 15.5 TOP OF SEAL, 3/8" bentonite chips 87.5 pounds, 1.75 bags 12.0 TOP OF FILTER PACK, 8-16 silica sand 550 pounds, 1.1 bags BOTTOM OF SCREEN 30.2 BOTTOM OF END CAP 31.2	TOP OF CASING 2 ft ags		— 2.0 TOP OF GROUT, Po	ortland Cement with bentonite gel
TOP OF SCREEN 20.2 BOTTOM OF SCREEN 30.2 BOTTOM OF END CAP 31.2	ALL DEPTHS ARE REPORTED AS DEPTH IN FEET BELOW GROUND SURFACE UNLESS OTHERWISE NOTED. CASING STICKUPS ARE REPORTED AS DISTANCE ABOVE		WELL CONSTRUCT BOREHOLE DIAMETE FILTER PACK TYPE: I WELL CASING: BLAN SCREEN LENGTH: 10 SCREEN DESCRIPTION	TION & SCREEN DETAILS ER: 8.5 inches FILTER PACK, 8-16 silica sand K, 2" SCH40 PVC
I DOLIONI OF DOKETOLE	BOTTOM OF SCREEN 30.2		1.75 bags 18.0 TOP OF FILTER PA	ACK, 8-16 silica sand 550



PROJECT NUMBER:	WELL NUMBER:
469935.14.04.02	IJ-7

Well Completion Diagram

PROJECT : Former Dowell Schlumberger Facility	LOCATION	N : Artesia, New M	exico	
ELEVATION: not measured TOC: not r	measured DRILLING	CONTRACTOR A	AND DRILL RIG : National Explo	oration Wells and Pumps, CME 85
COORDINATES: N 32.44, E -103.90, (estim)	DRILLING	METHOD AND E	QUIPMENT : 4.25-in ID HSA w	vith center plug
WATER LEVEL: 15.86 ft bgs (measured on 8/21/14)	START: 8	/20/14 11:20	END: 8/20/14 14:06	LOGGER : A. Forsberg
TOP OF PROTECTIVE CASING 3 f	_		Well pad is 4 ft. x 4 f	it. wide, 4 inches thick
				and Cement with bentonite gel ih yield bentonite gel
NOTES: ALL DEPTHS ARE REPORTED AS DEPTH IN FEET BELOW GROUND SURFACE UNLESS OTHERWISE NOTED. CASING STICKUPS ARE REPORTED AS DISTANCE ABOVE GROUND SURFACE (ags).			BOREHOLE DIAMETER FILTER PACK TYPE: FIL WELL CASING: BLANK, SCREEN LENGTH: 10 fe	TER PACK, 8-16 silica sand 2" SCH40 PVC
TOP OF SCREEN BOTTOM OF SCREEN	30.0		15.0 TOP OF SEAL, 3/8" b bags 18.0 TOP OF FILTER PAC pounds, 9 bags	entonite chips 75 pounds, 1.5
BOTTOM OF END CAP	31.0		- 04 0 DOTTOM OF DOTT	101 F
			31.0 BOTTOM OF BOREH	OLE

WELL DIAGRAM IS NOT TO SCALE

WELL COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL_PROJECT.GPJ; CH2M GEOTECH 12_CG.GDT; 2/11/15



PROJECT NUMBER:	WELL NUMBER:
469935.14.04.02	IJ-8

Well Completion Diagram

PROJECT: Former Dowell Schlumberger Facility LOCATION: Artesia, New Mexico ELEVATION: not measured TOC: not measured DRILLING CONTRACTOR AND DRILL RIG: National Exploration Wells and Pumps, CME 85 COORDINATES: N 32.44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT: 4.25-in ID HSA with center plug WATER LEVEL: 15.14 ft bgs (measured on 8/21/14) START: 8/20/14 12:43 END: 8/20/2014 LOGGER: A. Forsberg TOP OF PROTECTIVE CASING 3 ft ags Well pad is 4 ft. x 4 ft. wide, 4 inches thick TOP OF CASING 1.5 ft ags 2.0 TOP OF GROUT, Portland Cement with bentonite gel NOTES: ALL DEPTHS ARE REPORTED AS **WELL CONSTRUCTION & SCREEN DETAILS** DEPTH IN FEET BELOW GROUND SURFACE UNLESS OTHERWISE **BOREHOLE DIAMETER: 8.5 inches** NOTED. FILTER PACK TYPE: FILTER PACK, 8-16 silica sand CASING STICKUPS ARE REPORTED AS DISTANCE ABOVE WELL CASING: BLANK, 2" SCH40 PVC GROUND SURFACE (ags). SCREEN LENGTH: 10 feet SCREEN DESCRIPTION: 2" SCH40 wire-wrapped PVC 0.040-inch slot 15.0 TOP OF SEAL, 3/8" bentonite chips 75 pounds, 1.5 18.0 TOP OF FILTER PACK, 8-16 silica sand 500 pounds, 10 bags TOP OF SCREEN 19.5 _ BOTTOM OF SCREEN 29.5 _ BOTTOM OF END CAP 30.5 __ 30.5 BOTTOM OF BOREHOLE

WELL COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL_PROJECT.GPJ; CH

WELL DIAGRAM IS NOT TO SCALE



PROJECT.GPJ;

WELL DIAGRAM IS NOT TO SCALE

PROJECT NUMBER:	WELL NUMBER:
469935.14.04.02	MW-34

Well Completion Diagram

PROJECT: Former Dowell Schlumberger Facility LOCATION: Artesia, New Mexico ELEVATION: not measured TOC: not measured DRILLING CONTRACTOR AND DRILL RIG: National Exploration Wells and Pumps, CME 85 COORDINATES: N 32.44, E -103.89, (estim) DRILLING METHOD AND EQUIPMENT: 4.25 ID HSA With Continuous Core WATER LEVEL: 18.10 ft bgs START: 8/21/14 13:30 END: 8/22/2014 LOGGER: A. Forsberg TOP OF PROTECTIVE CASING 3 ft ags -Well pad is 4 ft. x 4 ft. wide, 4 inches thick TOP OF CASING 2 ft ags 2.0 TOP OF GROUT, Portland Cement with bentonite gel 270 pounds cement, 15 pounds high yield bentonite gel **NOTES:** ALL DEPTHS ARE REPORTED AS **WELL CONSTRUCTION & SCREEN DETAILS** DEPTH IN FEET BELOW GROUND SURFACE UNLESS OTHERWISE **BOREHOLE DIAMETER: 10.5 inches** NOTED FILTER PACK TYPE: FILTER PACK, 10-20 silica sand CASING STICKUPS ARE REPORTED AS DISTANCE ABOVE WELL CASING: BLANK, 4" SCH40 PVC GROUND SURFACE (ags). SCREEN LENGTH: 10 feet SCREEN DESCRIPTION: SCREEN, 4" SCH40 PVC 0.010 mil slot **COMMENTS:** Borehole overdrilled with CME-85 6.25 ID HSA with center plug COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL 13.0 TOP OF SEAL, 3/8" bentonite chips 100 pounds, 2 15.0 TOP OF FILTER PACK, 10-20 silica sand 1200 pounds, 24 bags TOP OF SCREEN 17.0 _ BOTTOM OF SCREEN 27.0 _ BOTTOM OF SUMP 32.0 ___ 36.5 BOTTOM OF BOREHOLE



												
	OSE POD NU	JMBER	(WELL	NUMBER)				OSE FILE NU	MBER(S)			
Š	Pod-1 M\	N-34						C-3774				
(T)	WELL OWN	ER NAM	AE(S)					PHONE (OPTI	ONAL)			
70C	Schlumb	erger	Tech	nology Corpora	ation							
1. GENERAL AND WELL LOCATION	WELL OWN	ER MAI	LING A	DDRESS				CITY		STATE		ZIP
	105 Indu	strial	Boule	evard Sugar Lan	d			Sugar Lan	d ·	ΓX	77478	3
* 0				DEGREES	S MINUTES	SECOND	90					
ANI	WELL			32.	439	42826		* ACCURACY	REQUIRED: ONE TEN	TH OF A SE	COND	
ΨŢ	LOCATIO	-	LATIT	UDE			N .	1	QUIRED: WGS 84	11101 1102		
ER	(FROM GI	2S)	LONG	HTUDE 103.	894	5949	W	* DATONI KE	QOIRED: WG3 84			
EN	DESCRIPTION	N RELAT	ING WE	LL LOCATION TO STREE	T ADDRESS AND COMM	ON LANDMARKS - PLS	S (SECTION, T	OWNSHJIP, RANG	SE) WHERE AVAILABLE			
	LICENSE NU		- 1	NAME OF LICENSED	DRILLER				NAME OF WELL DR	ILLING CO	MPANY	
	WD-1210 Bryan Nydoske			Bryan Nydoske					National EWP			
1 1	DRILLING S	TARTE	i	DRILLING ENDED	DEPTH OF COMPLET	ED WELL (FT)	1	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOU	NTERED (FT)	
	8-21-14 8-21-14				32		36.5		NA			
								STATIC WATER LEV	EL IN COM	IPLETED WE	LL (FT)	
z	COMPLETED WELL IS: C ARTESIAN C DRY HOLE C SHALLOW (UNCONFINED)											
110	DRILLING F	THID:			O MUD	ADDITIVES – SPI	ECIFY:		.L.,,			
ΜĀ								ER - SPECIFY:	Augor			
OR							U OIH	ER – SPECIFY:	Augei	7		ř
Ŗ	DEPTH (feet bgl)			BORE HOLE		ERIAL AND/OR ADE	C	ASING	CASING		IG WALL	SLOT
CASING INFORMATION	FROM TO		O	DIAM	(include each casing string, and		1	NECTION	INSIDE DIAM.	1	1	SIZE (inches)
				(inches)	note sections of screen)		-	ГҮРЕ	(inches)	(In	(inches)	
ತ	0	17		8 1/4	PVC		Flush		4	40		
ပ္ခဲ့	17	27		8 1/4	PVC		Flush		4	40		.040
2. DRILLING	27	32		8 1/4	PVC		Flush		4	40		
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	DEPTH	(feet b	gl)	BORE HOLE		INULAR SEAL M			AMOUNT		METHO	
AL	FROM	Γ	О	DIAM. (inches)	GRAVEL I	PACK SIZE-RANC	GE BY INTI	ERVAL	(cubic feet)		PLACEM	1EN I
ANNULAR MATERIAL		1			See Attached	See Attached						
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FOF	R OSE INTE	RNAL	USE					WR-2	20 WELL RECORD	& LOG (V	Version 06/0	8/2012)

POD NUMBER

FILE NUMBER

LOCATION

TRN NUMBER

PAGE 1 OF 2

	DEPTH (f	ro	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZO (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER- BEARING ZONES (gpm)		
				See Attached	\bigcirc Y \bigcirc N			
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HYDROGEOLOGIC LOG OF WELL					O Y O N			
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					$O_A O_N$			
	METHOD U	ISED TO E	STIMATE YIELD	OF WATER-BEARING STRATA: PUMP	TOTAL ESTIMATED WELL YIELD (gpm):			
	C AIR LIF	г С	BAILER C	OTHER - SPECIFY:	WEEL TIELD (gpin).			
NO	WELL TEST TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD.							
TEST; RIG SUPERVISION	MISCELLA	NEOUS IN	IFORMATION:					
ST;	PRINT NA	ME(S) OF I	ORILL RIG STIPET	RVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL (CONSTRUCTION OTHER T	HAN LICENSEE:		
S. T.	Mark Gre							
SIGNATURE	THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:							
SIGN.			Mir	Many Great	7-8-14	<i>'</i>		
Ġ		SIGNA	TURE OF DRILLI	ER / PRINT SIGNEE NAME	DATE			
FO	R OSE INTER	NAL USE		WR-20	WELL RECORD & LOG (V	ersion 06/08/2012)		

FOI	R OSE INTERNAL USE		WR-20 WELL RECORD & LOG (Ver	sion 06/08/2012)
FIL	E NUMBER	POD NUMBER	TRN NUMBER	
LO	CATION			PAGE 2 OF 2
LO	CATION			PAGE 2 OF 2

PROJECT NUMBER 469935,44.04.02 BORING NUMBER はW-34

SHEET

OF

SOIL BORING LOG

			$\leq (n)$	Unibereje	LOCATION TY	esvi, MM
ELEVATION	M NC	<u> </u>			DRILLING CONTRACTOR NEWP ISS	plen
DRILLING	S METH	OD AND	EQUIP	MENT COME	TEST 4,26 IN FRAM CONT COVE	MASC LOGGER ATTYSPICES
		AMPLE	Ī	STANDARD	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW SURFACE (FT)	INTERVAL	NUMBER AND TYPE	RECOVERY (FT)	PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
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Б <u> </u>	3		5	NA	SILITEME) ZEGYR THE 1911 TRANSMERIED, any monphery pengent to careful tilk throughout the annual red careful tilk throughout the careful tilk throughout throughou	
- 10	12		0'		NO recovery Surcery 28 y125/6 redicing, numprastics - non conceive, while cancing the through the party of the conceive the through the conceive th	P117=0.0ppm
F	15		N.S.	wen	Atoli No recovery Recovery Character of CSP) Explay Continues in recovery Character of Contract of C	
25	V 3				NO (ECCULY) SILTCHED 2:54 RAILA recidists brands, wet, wanted CALCETE, 264 RAIL 2 Palle recidists bring most has CALCETE, 264 RAIL 254 RAILE CALISTOPH, most has TERRY CHARLES SAND (SP) 264 REIL, PINCE PORT, NUMBER, NEUTOSIASE MANTES, 181 Y FOR	
	125 14		25	N.	No recovery Sinceres ye gla It radigit bin, we r, low silvery stands) 5 yr 6/3 It redens to bre, wet, very 1602, predem five second sinceres), 5 yr 6/4 to 5 yr 5/4 light recover by to reddight by n, wet 1 am piste. conside, 10-12/4 30 the to mad sainel	BEV 12/01 FORM D1586

	``\			PROJECT NUMBER	4.02 FW-3		
	66)2 141)2	CHZM		Section of the sectio	ATER MONITORING WELL	COMPLETION DIAGRAM	
The same and same	HON: N NG MÉT	THOO AND EQUIPME	NTUSED: N	SOCHE-ES-LYA START VIL	LOCATION: AT (SKIL) NING CONTRACTOR: WEEK NEWS	T. T. Calabaris	
		3b	一大が	1921	SC 1696		
					1- Ground elevation at well 2- Top of casing elevation	NM	
Argumenta distribution despitatoris più describito scientifica del servizione del segmenta del segmenta del se	And the second s		- 9		3- Wellhead protection cover typ a) drain tube? b) concrete pad dimensions; depth of surface concrete 4- Dia //type surface casing	DE STOVEDAIDE EINXCOFT AND ANXAFXAF NIT	
AND				5	5- Dia./type of well casing	Agn Sch 10 pvc	
	W	C ₂)		3	6- Type/slot/size of screen	AM 0.010 Mid Slot RHACE	PV()
		↓ (<u>155</u>)			 Type screen filter quantity used 	1920 colorado sitica seral 24 x 50 10 la 35	1
			- generated		8- Type of seal quantity used	3/8-14 bentonce Chaps	
	Andrews of the state of the sta				9- Grout a) Grout mix used b) Method of placement c) Vol of surface casing grout d) Vol. of well casing grout	3x, Solle Las Pertanei Type IIII froe pour	gal the
	***************************************			6	Development method	snababail + bverpump	
					Development time Estimated purge volume	2 hRS	
				7	comments druled to pulled to 12.27 A lays		
		n		est some			
						Illustration not to scale.	



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Z	Pod-1 EW		ELL NUMBER)			C-3773				
110	WELL OWN		5)			PHONE (OPTI	ONAL)			
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27	WELL OWN	-				CITY		STATE	ZIP	
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D W			DEGREES	S MINUTES SECOND	S					
AN	WELL LOCATIO	N .	32	439 42826	N	* ACCURACY	REQUIRED: ONE TEN	TH OF A SECOND		
GENERAL AND WELL LOCATION	(FROM GP	i,Si	ONGITUDE 103.	894 5949 W * DATUM REQUIRED: WGS 84						
GEN	DESCRIPTION	N RELATING	WELL LOCATION TO STREE	T ADDRESS AND COMMON LANDMARKS - PLS	S (SECTION, T	OWNSHJIP, RANG	SE) WHERE AVAILABLE			
≓										
	LICENSE NU	MBER	NAME OF LICENSED	DRILLER			NAME OF WELL DR	ILLING COMPANY		
	WD-1210	1	Bryan Nydoske				National EWP			
	DRILLING S' 8-22-14	TARTED	DRILLING ENDED 8-22-14	DEPTH OF COMPLETED WELL (FT) 55	BORE HO	LE DEPTH (FT)	DEPTH WATER FIRE	ST ENCOUNTERED (FT)		
· •	COMPLETEI	O WELL IS:	(ARTESIAN	O DRY HOLE O SHALLOW (UNC	ONFINED)	STATIC WATER LEVEL IN COMPLETED WELL (FT) NA				
110	DRILLING F	I I IID:	C AIR	O MUD ADDITIVES - SPI	ECIFY:		L		w	
MA	DRILLING M		C ROTARY	C HAMMER C CABLE TOOL		ER - SPECIFY:	Auger			
FOF		(feet bgl)		CASING MATERIAL AND/OR				T CLERYON IN TA		
Z U	FROM	TO	BORE HOLE DIAM	GRADE		ASING NECTION	CASING INSIDE DIAM.	CASING WALL THICKNESS	SLOT SIZE	
CASING INFORMATION			(inches)	(include each casing string, and note sections of screen)	1	ГҮРЕ	(inches)	(inches)	(inches)	
ઝ	0	15	12 1/4	PVC	Flush		4	40		
NG	15	55	12 1/4	PVC		4	40	.040		
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	DESTI	(feet bgl)		LIST ANNULAR SEAL M	ATEDIAI	A NID	AMOUNT) A COUNTY	D OF	
7	FROM	(Teet ogi)	BORE HOLE DIAM. (inches)	GRAVEL PACK SIZE-RANG			(cubic feet)	METHO PLACEN		
RIA	See Attached					- '				
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Z X										
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ANNULAR MATERIAL										
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FOR	OSE INTER	NAL US	 E			WR-2	20 WELL RECORD	& LOG (Version 06/0	08/2012)	

POD NUMBER

FILE NUMBER

LOCATION

TRN NUMBER

PAGE-1-OF 2

	DEPTH (f	eet bgl) TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCO INCLUDE WATER-BEARING CAVITIES OR F (attach supplemental sheets to fully descr	RACTURE ZONES	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER- BEARING ZONES (gpm)
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N	METHOD U	SED TO E	STIMATE YIELD	OF WATER-BEARING STRATA: PUMP	1	FAL ESTIMATED (gpm):	
(AIR LIF	r C	BAILER C	OTHER - SPECIFY:	WI	SEL FIELD (gpii).	
VISION	WELL TES	T TEST	RESULTS - ATT RT TIME, END TI	ACH A COPY OF DATA COLLECTED DURING WI ME, AND A TABLE SHOWING DISCHARGE AND	ELL TESTING, INCLUD DRAWDOWN OVER TE	DING DISCHARGE HE TESTING PERIO	METHOD, OD.
	MISCELLA	NEOUS IN	IFORMATION:				
TEST; RIG SUPER							
ST:]				THE STATE OF THE S	ON OF THE L. CONCERN	HOTION OTHER T	TANTICENCE
	PRINT NAN Mark Gre		ORILL RIG SUPE	VISOR(S) THAT PROVIDED ONSITE SUPERVISION	ON OF WELL CONSTR	UCTION OTHER T	HAN LICENSEE:
ш (CORRECT	RECORD (OF THE ABOVE I	IES THAT, TO THE BEST OF HIS OR HER KNOW DESCRIBED HOLE AND THAT HE OR SHE WILL F O DAYS AFTER COMPLETION OF WELL DRILLII	FILE THIS WELL RECO	THE FOREGOING I RD WITH THE STA	S A TRUE AND ATE ENGINEER
SIGN	7	~///		Marli Gran		9-8-14	1
· 6		SIGNA	TURE OF DRILLI	ER / PRINT SIGNEE NAME		DATE	

FOR OSE INTERNAL USE		WR-20 WELL RECORD & LOG (VG)	31011 00/00/2012)
FILE NUMBER	POD NUMBER	TRN NUMBER	
LOCATION			PAGE 2 OF 2

PROJECT NUMBER

400935.44.44.02

BORING NUMBER

SHEET OF 2

SOIL BORING LOG

DEPTH BELOW SURFACE (FT)	NTERVAL	NUMBER AND TYPE AND TYPE	RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
			- 53°		port removed whand -	
6 -	5.7 1.10		5		SHTYSAK, SADAY SILTCHIO) SYR UP IIGHT reddish bray ary lawpisk, conesive, — mothed whole -colone SILTCHIO ENREIN White, day, lawpiste, conesive, modaled with photocol, - modales opt lass gradue, down	7.03.20.C)
- 0)	-10-12 0			No recovery -	PIDEO	
3	いる	CV.	3		SUTCHE) SEME AS ALOVE (07-10) SULYSTOCKET EXPERT, RESISTORY, AND IN- SULYSTOCKET EXPERIENCE TO THE IN- SULYSTOCKET EXPERIENCE TO THE INTERPORT TO THE CONTROL OF THE PROPERTY AND AND THE INTERPORT IN YOUR OVERLY	P10:0.0 mode (corregrain
19	19/16 17.5 19.20	8	A		ieson chayed S. 4281 white, per hairy corrented culture, laming specific trace. Shings of trace shints of the continuous strace of the continuous strace of the continuous strace of the continuous arms of the correct campaged to 2000 GRADED SANDLED 2. Sync 1/3/treads	P10=0 P10=0
70-	War are	6			Margaret, 1002 dancesuce, 51 finegrave! No recovery Margarets Gaves Mccongen +2) 25 ye of readistribrown, opering, to Gaverry Cran (CO), most, med lauples, ransite	B
142	15 VA	<u> </u>		SILTEMA	CARD CHARGED 215 YE ETGER TOWNISH, CITY CONTROL OF THE PROPERTY OF THE PROPERT	der the dense of in

BORING NUMBER OF Z PROJECT NUMBER SHEET 15N-01 060975, 14.04.02

SOIL BORING LOG

LOCATION ATTESIA, NIM PROJECT ATTESKI DEWELL-SCHILLIMBERESET DRILLING CONTRACTOR NEW IT SUPER DRIVEN CONTRACTOR NEW IT START 8/22/14 1007 FINISH 8/20/19 1245 LOGGER AFOYS ACTO WATER LEVELS NY COMMENTS SOIL DESCRIPTION STANDARD PENETRATION SAMPLE <u>}</u>(€ DEPTH OF CASING, DRILLING RATE, SOIL NAME, USCS GROUP SYMBOL, COLOR, TEST RESULTS DRILLING FLUID LOSS. RECOVERY (FT) DEPTH BEL SURFACE (F NUMBER AND TYPE MOISTURE CONTENT, RELATIVE DENSITY TESTS AND INSTRUMENTATION INTERVAL OR CONSISTENCY, SOIL STRUCTURE, 6"-6"-6" MINERALOGY (N) SIXTUE 2.5 2 416 VECT, MOIST, MUN PIST, MAZ TURESIVE, VERY SCIT, MOTHERSON D. MET ENGINE (100) 0.0 观别 15/12 712 pare real, met very terre, parthady contented to top かった goza.c SIUT(HIL) as above Si 20 SUTCHE) 2.5 YEAR TENAISH DEN, MAREYNE F SUTCHE) 2.5 YES 2 Leddish brown, 4044 Hzobreak 30.15 11. wet, lowpiste, conesive, soft, PIDOD n'y I'm medianive layers (while) 60 861 \$ 37.5. F topose the send 6 ×1-40 W avai AT-MILES CUTEFIVE, VIDEOT CHHACTA SILL MENDEN (MA) & Ar 115 hurien mes, 10 (mes) Long (Mes) 4.63 47 3,670 HEME deen me bornered cenantery MA-AS Dischalter Marchet, our els pinkien un ne, com need to me need to me need to the person of the sellouser real to the sell This inacted Chrother Stops, easier divilling d suct, love plate, eviusive, shift, 101.52 1+ au.c 200 poorly araded samex sp) by kula & T 11690 135 鲍 fine grained PEDRUG GRADED SAND(SP), SCHILL ELS 功 kn sile Trosty GRADED GEDD whomy (GP-SM) Gyre of, honograined by redding yellow the furthering with property and some of the property 61.5 12.5 22.5-5 63-4A 5,4-6,4 162 met, renjace production & med sind, lay minated 5 71.01 aij LEAST CITY (CL) = 5 YE = 1 & reaches hern, ivet, low piste, correstor, mud dense, 550 CHO 16) grave to dien speckled throughout M W REV 12/01 FORM D1586 151 pulling root

		<u> </u>	PROJECT NUMBER	CONTRACTOR OF THE STREET, STRE	WELL NUMBER		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	
()	CHZN		460005,140	4.02	1 5v-03	<u> </u>	HEET 1	OF 1
		'81" L. L.	analysis :	JÁTED MONE	TORING WELL	COMPLETIO	NIDIAGDA	\N/
			i					Zivi
IECT (mell-civilu	intercer,	Artesia Artesia ME 06 W6,25 Devilopmentart:	LOCATIO	ON: Artesici, NA	اب		
/ATION:	NH	MENTILLED (UNE OF W/O, 263	ING CONTRACTO	DR: WOON GAP	ITSUPIET	1	
LING ME ER LEVE	LS: 8.75A	bas valive	CLEVE LOONE AFTART : 4)	22 MEND 9	12/14	LOGGER:	NOVEM 4	use
	3、		. •	1830	•			
			y 2					
	3b			audicograma.				
1				1. Ground	elevation at well	MM		1
	12-18			2- Top of c	asing elevation	MM		
					d protection cover type	e Challed IV	1 send	
				a) drain	tube?			Ī
	11				ete pad dimensions; of surface concrete	NV		1
	1			4. Dia lune	surface casing	Nik		ł
				4. Signiffic	substitute dodning	. aprila prima i di Angelia (Angelia) (Angelia	and the purposition of the last of the section of t	
	1 2 1			5- Dia /type	e of well casing	A din City	W.	
and the state of t			. 5			4-11/5640	10	
(0))		8	6- Type/slo	t/size of screen	0.040 5/01	112 At	119H 40
	13		. 8					
	1(2)			7 - Type sc quantity		8-10 color	6 m35	100
				8- Type of	seal	7/2/11/be		1
		200000		quantity		4		
				9'- Grout		51452	1	المساؤمة الأثار المرسا
					t mix used od of placement	Free pon	12 OX 201	ks fatta
				c) Val.o	f surface casing grout	TNA		- 415/8
					of well casing grout	land do da	bran	CAMMAC
	16-42		_{(**} ** 6 ₎	Develo	pment method	bau & Sula		house
				Develo	pment time	<u> </u>		_ 7:
				Estimat	ed purge volume	55grings	も士る	nogu
			~ 7	Comme	ents dietrika pub	npro, pu	lled pu	riρ
				Lipi	<u>5-10 fr. Wher</u> To be measu	LHYPRIDA	y Mas	114
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GENERAL AND WELL LOCATION			oulevard Sugar Lar	nd			Sugar Lan	d	ГХ	77478	1
2	WELL		DEGREE		SECOND	S					
LA	LOCATIO	N L	ATITUDE 32.	439	7252	N	1	REQUIRED: ONE TEN	TH OF A S	ECOND	
ERA	(FROM GP		ONGITUDE 103.	895							
1. GEN	DESCRIPTION	N RELATING	WELL LOCATION TO STREE	T ADDRESS AND COMMO	ON LANDMARKS - PLS	S (SECTION, T	OWNSHJIP, RANG	E) WHERE AVAILABLE			
	LICENSE NU	IMBER	NAME OF LICENSED			777		NAME OF WELL DR	ILLING C	OMPANY	
	WD-1210)	Bryan Nydoske					National EWP			
	DRILLING S' 8-21-14	TARTED	DRILLING ENDED 8-21-14	DEPTH OF COMPLET	ED WELL (FT)	31.5	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOU	INTERED (FT)	
7	COMPLETEI	O WELL IS	: C ARTESIAN	C DRY HOLE C	SHALLOW (UNC	ONFINED)		STATIC WATER LEV	EL IN CO	MPLETED WEI	LL (FT)
TIOI	DRILLING F	LUID:	C AIR	C MUD	ADDITIVES – SPI	ECIFY:					
ORMA	DRILLING M	IETHOD:	C ROTARY	C HAMMER C	Отні	ER - SPECIFY:	Auger				
NFC	DEPTH	(feet bgl)	BORE HOLE	CASING MATE		C	ASING	CASING		NG WALL	SLOT
DRILLING & CASING INFORMATION	FROM TO		DIAM (inches)	(include each ca	sing string, and		NECTION ГҮРЕ	INSIDE DIAM. (inches)	1	CKNESS inches)	SIZE (inches)
77 % X	0	20.3	8 1/4	PVC		Flush		2	40		
NG	20.3	30.3	8 1/4	PVC		Flush		2	40		.040
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	DEPTH	(feet bgl) BORE HOLE	LIST AN	INULAR SEAL M	IATERIAL	AND	AMOUNT		METHO!	
ΑΓ	FROM	ТО	DIAM (inches)	GRAVEL I	PACK SIZE-RANG	BE BY INT	ERVAL	(cubic feet)		PLACEM	IENT
ERI				See Attached							
MAT											
AR											
ANNULAR MATERIAL											
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	:									AT : 06'0	0(2012)
FOF	R OSE INTER	RNAL US	SE				WR-	20 WELL RECORD	& LOG	(Version 06/0	8/2012)

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	DEPTH (f	eet bgl)	THICKNESS	COLOR AND TYPE OF MATERIAL ENCOUNTER INCLUDE WATER-BEARING CAVITIES OR FRACTUR		WATER BEARING?	ESTIMATED YIELD FOR WATER-
	FROM	ТО	(feet)	(attach supplemental sheets to fully describe all un		(YES / NO)	BEARING ZONES (gpm)
-				See Attached		O Y O N	
						O Y O N	
1						O A O N	
						O A O N	
						$O^{Y} O^{N}$	
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AET						$O_A O_N$	
9. F	***************************************					O A O N	
\display \rightarrow \rightarr						$O_A O_N$	
5						$O_A O_N$	
50						$O_A O_N$	
EOI						$O^{Y} O^{N}$	
806						$O^{Y} O^{N}$	
4. HYDROGEOLOGIC LOG OF WELL						$O^{Y} O^{N}$	
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						$O_A O_N$	
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						$O^{Y} O^{N}$	
						$O_A O_N$	
	METHOD U	SED TO E	STIMATE YIELD	OF WATER-BEARING STRATA: PUMP	1	TAL ESTIMATED	
	C AIR LIF	г С	BAILER (OTHER - SPECIFY:	WE	ELL YIELD (gpm):	
NO	WELL TES	T TEST	results - att rt time, end ti	ACH A COPY OF DATA COLLECTED DURING WELL TES ME, AND A TABLE SHOWING DISCHARGE AND DRAWDO	TING, INCLUD OWN OVER TI	ING DISCHARGE HE TESTING PERIO	METHOD, OD.
TEST; RIG SUPERVISION	MISCELLA	NEOUS IN	IFORMATION:				
PER							
ns :							
R.							
EST	PRINT NAM	ME(S) OF I	ORILL RIG SUPE	RVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF W	ELL CONSTRU	JCTION OTHER T	HAN LICENSEE:
iri E	Mark Gre	en					
SIGNATURE	CORRECT :	RECORD (OF THE ABOVE I	FIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE A DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THE 20 DAYS AFTER COMPLETION OF WELL DRILLING:	AND BELIEF, T S WELL RECO	THE FOREGOING I RD WITH THE STA	S A TRUE AND ATE ENGINEER
GNA	_		2		Q	0 - 12 6	
6. SIC			M	man Coreu		5.14	
		SIGNA	TURE OF DRILL	ER / PRINT SIGNEE NAME		DATE	
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450			PROJECT NUMBER 460935.14,04.0	1	SHEET 1 OF 1
	CHZI	WHILL	40000000	<u> </u>	21.22.7. 31.1.
-	and the second of the				L COMPLETION DIAGRAM
PROJECT : D	owell-schlu	imberner, Art	(5)(1)	LOCATION: HY 1819, CONTRACTOR: WOOD NEW OF HEAD: BOTH TO BE	NT
ELEVATION:	M		DRILLING	CONTRACTOR : WOENEW	f It Sapien
DRILLING ME	THOD AND EQUI	PMENT USED: ()	START (17)	A END: (STOTHAN)	LOGGER: AFTYSIZE
WATER LEVE	LO. [7] (1)	shore develor	ment foci	a altalicras	5
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	3b \	1 (*)	r∋a 2		
			Hasi		
1	1-12-18	8 888/		1 - Ground elevation at well	NM
	127				Mn
	•	4		2- Top of casing elevation	And the second s
	口包	- [8] - g		Wellhead protection cover to their tyles?	type BY X SEA STOCK STONE POPUL
				a) orain moe?	
	15			 b) concrete pad dimensions depth of surface concrete 	
	112			• ·	
				4- Dia /type surface casing	<u> </u>
	-				
	(3)			5- Dia Aype of well casing	21118H 90 PVC
		Language Company	!		ananno ruo
(31,5				6- Type/slot/size of screen	
31/5	, , l	8			2111 SHAO, 0.040 WR Slot
	+17			7- Type screen filter	8-16 colorado alver cand
	1 (100	²		quantity used	8-14 colorado alica sand
		H		8- Type of seal	
				quantity used	3/8/11 bentome chips
1.					
				Grout a) Grout mix used	17961 th o x 3x 9016 Axtrine
1 1				b) Method of placement	- Nec Diver
				c) Vol. of surface casing gro	
	20,3			d) Vol. of well casing grout	
	(20.3)		i	Development method	grabilail + pump
				Development time	2004 Sto 4 Errich
				Doorgioping a mare	25 X YY J
		H:H		Estimated purge volume	25hus K
			7	Comments	
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SOIL BORING LOG

		well-	Sch	lumberge	r -Artesia LOCATION AV	tesia, NM
ELEVATION	ON	MM.) EOLHE	MENT (ILIE-	DRILLING CONTRACTOR NEWP ISU	/ North 1310200
WATER		A 54	1	1012111	START 22114 0030 FINISH 22114	1962 LOGGER ATOV Slave
ã		SAMPLE		STANDARD	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW SURFACE (FT)	NTERVAL	NUMBER AND TYPE	RECOVERY (FT)	PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
					SUTCHO, 7.54f 1/2 paleral, ding, non piste, noncohesive, like flanz, -	Soul logged from augus
			1			B2=0.0
						Pro-117ppm

C		angelighteen zeinemens		· · · · · · · · · · · · · · · · · · ·		D936 _
15-					SINTEME , Same as above, il wine	
-					claylcatiche chunks	170-0.2 ppm
					_	
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-					ICHY	09AD
(0-	Mag ella de Josephole	1	and an extension and an extension	Company Mari Saccion de Company de Grand Company	cay(CL) 2548 6/3 light reddishbrown,	
_					oling, lauplete, conesive, trace (5-71)-	PID>0.3
-					med recourse same, white day - carche chunks (15%)	-
_					_	-
-					-	10942
15_	carl ocurbe adapageathig an	-	angeligen der einstelligen (der einstelle	Control of Manager Control	DEANGLAYCOU ZISYRA/4 redaish	
1					brown, mast, low piste, consider, few (10-121.) fine to course some	P10 > 0.0
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20	Edward Carlotte		re an in a simple contribute (star	and the second s	SILT(M) 254121/4 reddishbrown,	1474 J
		\	\downarrow		wer, lawpisk, cohesive, poti21.	
	4		1		fine to course sand saind.	P10=0:0
	-					
	_					Opera
252	minusiana (1969)		ggage of League was a trans		SIUTCHUS ZISYR 5/4 redelish brown,	
	4	1	1		THE LAW DISTZ CONESIVE, 10-1211	- P10:00.0
					fine lo course sand, trad rust	-
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CAT	WELL OWNE		s) echnology Corpora	ation			PHONE (OPTI	UNAL)			
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AND WELL LOCATION	WELL OWNE 105 Indus		oulevard Sugar Lan	d			Sugar Lan	d 7	STATE ΓΧ 7747		
é	WELL	I	DEGREES	MINUTES	SECONE	S					
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GENERAL	(FROM GP	S) L	ONGITUDE 103.	895							
1. GEN	DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHJIP, RANGE) WHERE AVAILABLE										
	LICENSE NU	MBER	NAME OF LICENSED	DRILLER		Wall Line Land		NAME OF WELL DR	ILLING COMPANY	<u> </u>	
	WD-1210	1	Bryan Nydoske					National EWP			
	DRILLING S' 8-21-14	TARTED	1	DEPTH OF COMPLETED 30	O WELL (FT)	31.5	LE DEPTH (FT)	DEPTH WATER FIRS	ST ENCOUNTERED (FT)		
z	COMPLETE	O WELL IS	: C ARTESIAN	O DRYHOLE O	SHALLOW (UNC	ONFINED)		STATIC WATER LEV	VEL IN COMPLETED WE	LL (FT)	
110	DRILLING F	LUID:	C AIR	C MUD	ADDITIVES - SP	ECIFY:					
RMA	DRILLING METHOD: C ROTARY C HAMMER C CABLE TOOL • OTHER – SPECIFY: Auger										
NFO	DEPTH	(feet bgl)	BORE HOLE	CASING MATER			ASING	CASING	CASING WALL	SLOT	
DRILLING & CASING INFORMATION	FROM TO		DIAM (inches)	GRAD (include each casi note sections	ng string, and	COM	NECTION TYPE	INSIDE DIAM. (inches)	THICKNESS (inches)	SIZE (inches)	
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	DEPTH	(feet bgl)	BORE HOLE	LIST ANN	IULAR SEAL M	ATERIAL .	AND	AMOUNT	METHO		
ΨΓ	FROM	TO	DIAM. (inches)	GRAVEL PA	CK SIZE-RANC	GE BY INTI	ERVAL	(cubic feet)	PLACE	MENT	
ANNULAR MATERIAL				See Attached							
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THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AN CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING: 1-8-14		DEPTH (f	eet bgl) TO	THICKNESS (feet)	INCLUDE WATER-BEAF	OF MATERIAL ENCOUNTERED - UNG CAVITIES OR FRACTURE ZONE: al sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER- BEARING ZONES (gpm)
C Y O N C Y	-				See Attached		OYON	
CYCN CYCN CYCN CYCN CYCN CYCN CYCN CYCN	-						$O \times O N$	
METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA: WELL TEST TEST RESULTS - ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLUDING DISCHARGE METHOD, START TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD. MISCELLANEOUS INFORMATION: PRINT NAME(S) OF DRILL RIG SUPERVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONSTRUCTION OTHER THAN LICENSE MARK Green THE UNDERSONNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGH AND BELIEF, THE FOREGOING IS A TRUE AN CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILL THIS WELL RECORD WITH THE STATE ENGINEE AND THAT PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING: THE UNDERSONNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGH AND BELIEF, THE FOREGOING IS A TRUE AN CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILL THIS WELL RECORD WITH THE STATE ENGINEE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING: THE UNDERSONNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGH AND BELIEF, THE FOREGOING IS A TRUE AN CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILL THIS WELL RECORD WITH THE STATE ENGINEE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING: THE UNDERSONNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGH AND BELIEF, THE FOREGOING IS A TRUE AN CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILL THIS WELL RECORD WITH THE STATE ENGINEE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING: THE UNDERSONNED HEREBY CERTIFIES THAT. TO THE BEST OF HIS OR HER KNOWLEDGH AND BELIEF, THE FOREGOING IS A TRUE AN CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILL THIS WELL RECORD WITH THE STATE ENGINEE AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:	-				A STATE OF THE STA	1 - 1/2/2007	$O \times O N$	
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ROJECT : 1)	lowell-schlumb	ereir-Av	tess co	LOCATION	Artesia, NH	JI. Supren DLOGGER: AFOVSK	
LEVATION:	NM THOD AND FOURM	ENT USED:	WAT MUE-815	RILLING CONTRACTOR	10 year	II. Supren	
VATER LEVE	15:17.42 or	18/21	START	924 4 END: 6/2	11/4	LOGGER: AFONSK	5
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	15			b) concrete	pad dimensions: surface concrete		
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(3)	9)		3	6- Type/slot/s	aze of screen	8-16 sand	\sim
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	LICENSE NU	UMBER		NAME OF LICENSED	DRILLER					NAME OF WELL DR	ILLING	G COMPANY	
	WD-1210)	В	Bryan Nydoske						National EWP			
	DRILLING S	STARTED	_	DRILLING ENDED	DEPTH OF COMPLETI	ED WELL (FT)	BORE HO	LE DEPTI	H (FT)	DEPTH WATER FIR	ST EN	COUNTERED (FT)	
	8-20-14		8-2	20-14	30		31.5			NA			
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OR	DRILLING N			ROTARY	C HAMMER C		• отні	ER - SPEC	IFY:	Auger			
Z		(feet bgl)		BORE HOLE	CASING MATE			ASING		CASING		SING WALL	SLOT
& CASING INFORMATION	FROM	ТО		DIAM (inches)	(include each ca	sing string, and		NECTIO FYPE	N	INSIDE DIAM. (inches)	1	HICKNESS (inches)	SIZE (inches)
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PAGE I OF 2

	DEPTH (1	feet bgl)	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER- BEARING ZONES (gpm)
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JEO J					$O^{Y}O^{N}$	
RO					$O^{Y} O^{N}$	
4. HYDROGEOLOGIC LOG OF WELL					$O_A O_N$	
4					$O^{Y} O^{N}$	
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	METHOD U	SED TO ES	STIMATE YIELD	***	OTAL ESTIMATED	
	C AIR LIF	г С	BAILER C	OTHER - SPECIFY:	WELL YIELD (gpm):	
VISION	WELL TES	T TEST STAR	RESULTS - ATT T TIME, END TI	ACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCL ME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER	UDING DISCHARGE I THE TESTING PERIC	METHOD, DD.
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RIC						
EST	PRINT NAM	ME(S) OF D	RILL RIG SUPE	RVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONST	RUCTION OTHER TH	IAN LICENSEE:
5. T	Mark Gree	en				
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IGN.	1	ny		Mark Green	V-8-14	
6. S	/_	SIGNAT	CURE OF DRILLE	ER / PRINT SIGNEE NAME	DATE	

FOR OSE INTERNAL USE WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER POD NUMBER TRN NUMBER

LOCATION PAGE 2 OF 2

PROJECT NUMBER

ALGO 35. 14.04.02

SOIL BORING LOG

PROJECT DON'ELL SCHLUMBERGER ATTESICA ArtisaNH LOCATION DRILLING CONTRACTOR NEWP II Suprem DRILLING METHOD AND EQUIPMENT CHE 85 HSA W 4.25 IN ID WICTEPING START 8/2014 16/3 FINISH 8/2014 1/643 LOGGER AFOY SLOWE WATER LEVELS MM SAMPLE STANDARD SOIL DESCRIPTION COMMENTS DEPTH BELOW SURFACE (FT) PENETRATION RECOVERY (FT) DEPTH OF CASING, DRILLING RATE, TEST RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR, NUMBER AND TYPE NTERVAL MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION 6"-6"-6" (N) **MINERALOGY** SILTURO 2.542712, palepink, drig, DID=0.0ppm sou logged from nop pists, non cohesive, almost like Flund 1115 N same as above triace fine gravet 90000ppm 5-79. clary G_f 1010 Epon City (CL) Lisyes 13, reddish brown, 05230.0 dry, low pisc, rechesive, far fine to \$10:0.0ppm med gravel, trace fine to coarse sand 1619 15 NUT lapsed went roget cornera for Finoto of Fraged cable 1621 W. SIGCHS 254R513, reddish brown, Wet, low piste, cohesive, trace. transdeable in dominal hannerfine so mid gravel, few fine wars. removed hammer to Sound 64 1026 SIJCHU)25 YIZ 5/3 reddish brown, 19 same asabve 1020 ηŪ

	FERRENCES ASSESSMENT
	CHIZMHILL
- Address	
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PROJECT NUMBER 46035: 14.04.02

WELL NUMBER

SHEET 1

OF 1

	GROUND WATER MONITORING WELL COMPLETION DIAGRAM
PROJECT: DOWN-Schlumberger Avtosig ELEVATION: NM DRILLING METHOD AND EQUIPMENT USED: CMF 85	LOCATION: Artesia, NM DRILLING CONTRACTOR: WOO NEWP T.CAPICM U 4.25 IN 10 H57AW CTR PING START: G2014 END: 97814 LOGGER: A FTY SECTOR 1050 1025
WATER LEVELS: NAC 1008 100 100 100 100 100 100 100 100 10	1650 1025
10-21. Al (3)	(Dese
3b That	<u>) </u>
	1 - Ground elevation at well NH
4	2- Top of casing elevation VH
15	3. Wellhead protection cover type
	4- Dia./type surface casing NA
5	5- Dia./type of well casing 2 M SCH 40 PVC
(32)	6- Type/slot/size of screen 2/N SCH 40 0.090 WZ
1 1 2	7- Type screen filter 9-16 Colorado Silica quantity used 11 x 50 b lags
- accept	8- Type of seal quantity used 1.5 x50165 bags
	9- Grout a) Grout-mix used b) Method of placement c) Vol. of surface casing grout d) Vol. of well casing grout
(20-30)	Development method Swaby 2001, NUT PLYMP
	Development time
	Estimated purge volume 35gul + 45gyl
7	Comments
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VII.	WELL OWN	ER NAME(S)			PHONE (OPTI	ONAL)			
700	Schlumb	erger Te	echnology Corpor	ation						
AND WELL LOCATION			ig Address Julevard Sugar Lar			CITY Sugar Lan	d -	STATE ΓΧ 7747	ZIP 8	
D V	WELL	T	DEGREE	S MINUTES SECOND	MINUTES SECONDS					
A	LOCATIO	N L	ATITUDE 32.	439 5275 _N * ACC		* ACCURACY	REQUIRED: ONE TEN	TH OF A SECOND		
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	LICENSE NU WD-1210		NAME OF LICENSED Bryan Nydoske	DRILLER			NAME OF WELL DR National EWP	ILLING COMPANY		
	DRILLING S 8-19-14	TARTED	DRILLING ENDED 8-19-14	DEPTH OF COMPLETED WELL (FT) 30	воке но 31.5	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOUNTERED (FT))	
z	COMPLETE	D WELL IS	ARTESIAN	C DRY HOLE C SHALLOW (UNC	ONFINED)		STATIC WATER LEV	EL IN COMPLETED WE	ELL (FT)	
TIO	DRILLING F	LUID:	C AIR	C MUD ADDITIVES – SPI	ECIFY:					
RMA	DRILLING M	METHOD:	C rotary	C HAMMER C CABLE TOOL	• отні	ER - SPECIFY:	Auger			
& CASING INFORMATION	DEPTH (feet bgl) FROM TO		BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	CON	ASING NECTION IYPE	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)	
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PAGE 1 OF 2

See Attached	DEPTH (feet bgl) FROM TO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONE (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER- BEARING ZONES (gpm)
METHOD USED TO ESTIMATE YIELD OF WATER-BEARING STRATA: VELL TEST TEST RESULTS: ATTACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCLIDING DISCHARGE METHOD, STRAT TIME, END TIME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER THE TESTING PERIOD. MINCELLANEOUS INFORMATION CY CN CY			See Attached	\bigcirc Y \bigcirc N	24 (BF)
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CORRECT RECORD OF THE ABOVE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RECORD WITH THE STATE ENGINEER AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING: The completion of the above described hole and that he or she will file this well record with the state engineer AND THE PERMIT HOLDER WITHIN 20 DAYS AFTER COMPLETION OF WELL DRILLING:	Mark Green				
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1 OTOTALIONE OF PROPERTY AND ADDITIONS	SIGNA	TURE OF DRILL		DATE	

FOR OSE INTERNAL USE WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER POD NUMBER TRN NUMBER

LOCATION PAGE 2 OF 2

PROJECT NUMBER

#09035.14.04.02

SOIL BORING LOG

PROJECT	. Dav	veil-	schlu	nberger.	Artesia Location AV	tesa pur
ELEVATIC	N N	M			DRILLING CONTRACTOR NEWP LISA	pen
DRILLING	METH	IOD ANI	EQUIP	MENT CHE	STARTE DIA 1952 FINISH STEPLE	CHEPIUS
WATER L	EVELS		M	A designed of the William of	START 8/19/14 1992 FINISH 8/19/19	1 1510 LOGGER AFORShare
$\overline{}$		SAMPLE		STANDARD	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW SURFACE (FT)	NTERVAL	NUMBER AND TYPE	RECOVERY (FT)	PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
ΩØ		ZA	<u> </u>		SILTCHE 25YR713 light reddish	PID=0.0ppm
-					brown,dry . Non Plate, non cohesive trace med grave !	
						-
5					same as above, if white outsche-luce nodules chunks up to 2.54cm dianne- Though some are very soft of Grable	P10:01 ppm -
10-						- 1454
-					brown, lowpiste, Cohesive, abundant white northes chunks asabore	\$10:0.1ppm -
-					···	
(6 -					must, 1 on pistz, Conesiae, 5%. fine to course send	P10:0,0 ppm
-					-	- - -
20-					moist, laupiste, conesive, 57%. fine to covere sand	P10=0.0ppM

25-			components and the Control of	en general general et en egen et en	brown, wet, low pisk, cohes we. 5-71. fine to occurse seemed, wit. Silt	PID-2:0 PPM Note throttle entire disconneces stop directions to his
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	Secretary W.	B. I. S. Sandana	0	ROUND WATE	R MONITO	RING WELL	COMPLE	TION DIAGR	AM	
PROJECT:	Donall-Schle	mberger-1	artesici	DBULING	LOCATION:	Artena, N	77 17 18 18 18	to C		
ELEVATION: DRILLING ME	ETHOD AND EQUIPN	MENTUSED: (ME-85	DRILLING O	SIN ID W	Chepius	Ir stric	TIS Attack		
WATER LEVI	LS: 10-14	CN 8/21		START: 8/20/19	END:8/20	114	LOGGE	R: Attrisber	<u>~</u>	
klove and	JD-2761		1	1921		(5)				
develor	3b	-1 1-21	7027							
		44000								
1					1 - Ground elev	ation at well	- NT	1		
	2	4			2- Top of casin	g elevation	NT	1		
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	16					urface concrete		<u> </u>		
THE STATE OF THE S					4- Dia/type sur	face casing	NA	COLUMN AL PRINCIPATE AND ARTHUR AND ARTHUR AND ARTHUR ARTH		
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(3)	()		2		6- Type/slot/siz	e of screen	0.04051	of WR, 21	15CH40	PVC
	1/2		ļ		7- Type screen	filter				
	+(2)				quantity use		10,5 x	nd Scildary	S .	
					8 Type of seal quantity use		3ein	bentovited 5016 bag	hips S	
					9- Grout			any receil by		
					a) Grout mix b) Method o		3x00161	has purtane	1, 17gw T	10
	and the second				c) Vol.of sur	face casing grou				
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	0030		6		Developme	nt method		vabtoverp		
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					Estimated p	urge volumë			<u>.</u>	
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07	WELL OWN	_		· · · ·		CITY STATE ZIP				
AND WELL			ulevard Sugar Lar	nd		Sugar Lan	d	TX 7747	8	
é	WELL		DEGREE	S MINUTES SECON	DS					
L AJ	LOCATIO	N LA	ATITUDE 32.	439 4281	N	* ACCURACY	REQUIRED: ONE TEN	TH OF A SECOND		
GENERAL	(FROM GP	PS) LO	DNGITUDE 103.	895 5596	w	* DATUM RE	QUIRED: WGS 84			
1. GEN	DESCRIPTION	N RELATING	WELL LOCATION TO STREE	T ADDRESS AND COMMON LANDMARKS - PL	SS (SECTION, T	OWNSHJIP, RANG	GE) WHERE AVAILABLE			
	LICENSE NU WD-1210		NAME OF LICENSED Bryan Nydoske	DRILLER			Name of Well Dr National EWP	ILLING COMPANY		
	DRILLING S 8-19-14	TARTED	DRILLING ENDED 8-19-14	DEPTH OF COMPLETED WELL (FT) 30	BORE HO 31.5	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOUNTERED (FT))	
z	COMPLETE	O WELL IS:	ARTESIAN	O DRY HOLE O SHALLOW (UNC	CONFINED)		STATIC WATER LE	VEL IN COMPLETED WE	ELL (FT)	
TIO	DRILLING F	LUID:	C AIR	MUD ADDITIVES – SI	PECIFY:		<u></u>			
RMA	DRILLING M	METHOD:	C ROTARY	CABLE TOOL	Отн	ER - SPECIFY:	Auger			
NFO	DEPTH	(feet bgl)	BORE HOLE	CASING MATERIAL AND/OR		ASING	CASING	CASING WALL	SLOT	
CASING INFORMATION	FROM	ТО	DIAM (inches)	GRADE (include each casing string, and note sections of screen)	CON	NECTION TYPE	INSIDE DIAM. (inches)	THICKNESS (inches)	SIZE (inches)	
7) %	0	20.3	8 1/4	PVC	Flush		2	40		
NG.	20.3	30.3	8 1/4	PVC	Flush		2	40	.040	
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	DEPTH	(feet bgl)	BORE HOLE	LIST ANNULAR SEAL N	MATERIAL	AND	AMOUNT	метно	DD OF	
٩٢	FROM	TO	DIAM. (inches)				(cubic feet)	PLACE		
ANNULAR MATERIAL				See Attached						
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POD NUMBER

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PAGE 1 OF 2

	feet bgl)	THICKNESS	COLOR AND TYPE OF MATERIAL ENCOUNTERED -					
FROM	то	(feet)	INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONI (attach supplemental sheets to fully describe all units)	ES BEARING? (YES / NO)	WATER- BEARING ZONES (gpm)			
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METHOD U			OF WATER-BEARING STRATA: PUMP	TOTAL ESTIMATED WELL YIELD (gpm):				
(AIR LIF	т С	BAILER C	OTHER - SPECIFY:	WILLS TIESS (gp.m).				
	TES	T RESULTS - ATT RT TIME, END TI	ACH A COPY OF DATA COLLECTED DURING WELL TESTING, IN ME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN O	NCLUDING DISCHARGE VER THE TESTING PERIO	METHOD, OD.			
WELL TES	5171							
		NFORMATION:						
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FOR OSE INTERNAL USE WR-20 WELL RECORD & LOG (Version 06/08/2012)
FILE NUMBER POD NUMBER TRN NUMBER

LOCATION PAGE 2 OF 2

PROJECT NUMBER

ALGOSSI, 14.04.02

BORING NUMBER

IJ-5

SHEET

OF

SOIL BORING LOG

LOCATION Artesia, NH PROJECT DUNEIL Schlumberger Arksia DRILLING CONTRACTOR NEWS I STATE WIGHT LIST I agren START 8/2/14 /161 FINISH 8/12/14 1200 LOGGER ATTENSIVE VE STANDARD PENETRATION TEST RESULTS COMMENTS SAMPLE SOIL DESCRIPTION DEPTH BELOW SURFACE (FT) RECOVERY (FT) DEPTH OF CASING, DRILLING RATE, SOIL NAME, USCS GROUP SYMBOL, COLOR, NUMBER AND TYPE NTERVAL MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION 6"-6"-6" **MINERALOGY** (N) SIUTCHU) 25 YELD THAT FINDISH BITH, PID=10 lppin dry, nonpiste, nonconesive, few med sou larged from angers scinds 1152 GITCHED 254K 514 readish lam, dry 5 PID=0 2ppm norphster non cohesive, few med samels. BATTLE CLOWY 565 CLAY (CL) 25 YE 613, light readish born, PIDEOLOPM was painsty in piste, nuncohesive, frace fine sand 5 167 TENVOLMY(CU), 2.5/124/4, redustrong 15 PIDOC. ZAPPM met, romplates corresing few 1200 SIJUL 254R 513, reddish brown, PID=0.1 ppm 20 WET, LOWPISTE, HE CONESIVE some light rigo huter & 122 / 10/5 101. CIAUX . 1202 SILTCHED, 2.54/2014, redaish brown, 25 P1020.6 wet now plaste coursesive few well arracted sounds

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	V		ZM		1_					RING WFI I	COMPLET	ION DIAGRA	м	
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ELEV	ATION:	NH	FOUIPME	ENT USE	o: Ch	16-86	> HSA	W4.2	STRACTOR:	wockenp ingers 114	Tyrchie	7) .		
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		‡ :	1 is (2)						7- Type screen quantity use		8165a	nd old pan-	>	
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	LICENSE NU	JMBER	NAME OF LICENSED	DRILLER				NAME OF WELL DR	ILLING COMPANY			
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RMA	DRILLING METHOD: C ROTARY C HAMMER C CABLE TOOL OTHER - SPECIFY: Auger											
Ę,	DEPTH	(feet bgl)	BORE HOLE	CASING MATERIAL	AND/OR		ASING	CASING	CASING WALL	SLOT		
DRILLING & CASING INFORMATION	FROM TO		DIAM (inches)	GRADE (include each casing st		CONI	NECTION TYPE	INSIDE DIAM. (inches)	THICKNESS (inches)	SIZE (inches)		
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, L		(feet bgl)	BORE HOLE DIAM. (inches)	LIST ANNULA GRAVEL PACK				AMOUNT (cubic feet)	METH PLACE			
ANNULAR MATERIAL	FROM	ТО		See Attached			 					
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3. A.		 										
FO	R OSE INTE	RNAL US	E				WR-2	20 WELL RECORD	& LOG (Version 06	/08/2012)		

POD NUMBER

FILE NUMBER

LOCATION

TRN NUMBER

PAGE 1 OF 2

DEPTH (feet bgl)	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTE INCLUDE WATER-BEARING CAVITIES OR FRACTU (attach supplemental sheets to fully describe all	URE ZONES	WATER BEARING? (YES/NO)	ESTIMATED YIELD FOR WATER- BEARING
			See Attached		$O^{Y}O^{N}$	ZONES (gpm)
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METHOD U	JSED TO E	STIMATE YIELD	OF WATER-BEARING STRATA: PUMP	1	AL ESTIMATED	L
C AIR LIF	т О	BAILER C	OTHER - SPECIFY:	WE	LL YIELD (gpm):	
WELL TES	TEST STAF	RESULTS - ATT RT TIME, END TI	ACH A COPY OF DATA COLLECTED DURING WELL TE ME, AND A TABLE SHOWING DISCHARGE AND DRAWI	STING, INCLUDI DOWN OVER TH	NG DISCHARGE E TESTING PERIC	METHOD, DD.
MISCELLA	NEOUS IN	FORMATION:				
				:		
	` '	ORILL RIG SUPE	RVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF	WELL CONSTRU	CTION OTHER TH	HAN LICENSEE:
Mark Gre	en					
CORRECT	RECORD (OF THE ABOVE I	FIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE DESCRIBED HOLE AND THAT HE OR SHE WILL FILE TH 20 DAYS AFTER COMPLETION OF WELL DRILLING:	AND BELIEF, TI IIS WELL RECOR	HE FOREGOING IS D WITH THE STA	S A TRUE AND TE ENGINEER
	MIA	V	Marl. Correh	<u> </u>	1-8-14	
	SIGNA'	TURE OF DRILL	ER / PRINT SIGNEE NAME		DATE	
R OSE INTER	NAL USE			WR-20 WELL RE	CORD & LOG (Ve	ersion 06/08/2012)

FILE NUMBER POD NUMBER TRN NUMBER

LOCATION PAGE 2 OF 2

BORING NUMBER

H09955.14.04.02

SOIL BORING LOG

ROJEC	r DONNE	યાન્ડ	hlum i M	bergir A	DRILLING CONTRACTOR NEWP - T SQ BS HSA WCY PLUS 425-IN ID START WITH JOHN FINISH DIGHT	rtesigNM
RILLING	METH	OD AND	, ÉÖÜlb	MENT CHE	85 HSA WOT PIND 4.25 IN ID	angers 10 chim
VATER L	EVELS	and a second of the second	NN_		START WISH DOWN FINISH BISH	1 1090 LOGGER ATO(SDEAR)
. 1		SAMPLE		STANDARD	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW SURFACE (FT)	NTERVAL	NUMBER AND TYPE	RECOVERY (FT)	PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
400					SAUDY SIDE (ML) 254 RA/3, reldish bm,	PID=0.1ppm
4					any, non-piste, non-cohesive, roots -	sou lagged from augers
-					_	-
_ 1						1096
ら ー					SILICHE) 2.54R b/2,pink,dry, nan pistz, non colusive, Claynocluss - up to 2.5cm - while of moddledgrees_ graddish brown when broken	PID=Oilppm
					avadelists brown when broken	-
io =					LENN	10946
-				lon	outy(c) 2.54k /2. pale red, dry, notices to iam, few coarse sand, trained to train the coarse sand, trained to the coarse sand, the c	P10:0,2ppm
					meetfine grove.	
					leani -	-105C
15 _					(OVANCU) 2.54 R4/4 reddish brn, most, low piste, nonconside, trave fine to	PID=0,2ppm B2=0,0ppm
					med sand -	
					-	
20 -				anakan ngapipanga panganga pangangan kanakan na pan gan i na bahil	SILTCHO, ZEYRAB reddish brn, Wet, lowpiste, cohesive, for office.	1052 P10=0.3 ppm
-					gravel	
25-					SILTCHID 25 yr 5/4, reddish brn, wet, impiste, conesive, tow fine gravel	P10=0.3 PPM
	-				Towney (tower see)	-
		And the second second second				- -
125					\	

GH	21VI	LL

PROJECT NUMBER
46935.4.04.02

WELL NUMBER

SHEET 1

OF 1

GROUND WATER MONITORING WELL COMPLETION DIAGRAM

PROJECT: DOWN! Schlumberger tresa	LOCATION: AV KS141	PITCABEN
project: Dovell schlumberger Artesia elevation: pm drilling method and equipment used: CHEES, HEA M 4:29 water levels: 10 w ft bas before start \$200 dovelapment 0724	5-11 1D 4 END: 8/20/14	LOGGER: Afterstang
dovelapment 0724	_{entr} ecisionium manginium manginium sainteinium de manginium de manginium de manginium de manginium de manginium	
2400 2 25 an		
3b // 2		
	1. Ground elevation at well	NPI
	2- Top of casing elevation	NM
12.5	Wellhead protection cover to a) drain tube? b) concrete pad dimensions depth of surface concrete.	single-framework and the second secon
	4- Dia./type surface casing	NA
5	5- Dia ltype of well casing	2111 SCH 40
(34.15)	6- Type/slot/size of screen	0.000 Mre wap
+ 1	7- Type screen filter quantity used	6-16 colorado silica il X50 16 dass
	8- Type of seal quantity used	3/8 in bentonik Chips
	9- Grout a) Grout mix used b) Method of placement c) Vol. of surface casing grout d) Vol. of well casing grout	1516s hygnyuddgente, 17gwtto 2 x 9016 laugs Partlan Free famre WH
25.15 6	Development method	Swaptbaut + Over pimp
	Development time Estimated purge volume	What HE Man
	Comments	- Jagar Taley
	COLLEGE COLLEG	
	gai maka ngadali in in maka na panahin in inganahin ana maka na panahin inganahin inganahin inganahin inganahin Manganahin sa	
in are		
195		Illustration not to scale.

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7	Pod-7 IJ-	,	LL NUMBER)			OSE FILE NU	MBER(S)		
[]	WELL OWN					C-3772 PHONE (OPTI	ONAL		
CA	i .		, chnology Corpora	ation		PHONE (OF II	ONAL)		
2	WELL OWN	-				CITY		STATE	ZIP
GENERAL AND WELL LOCATION			ılevard Sugar Lan	nd	d		d	TX 7747	
9	WELL		DEGREE:	S MINUTES SECONE	DS .				
Z I	LOCATIO	ON LA	TITUDE 32.	439 1961	N	* ACCURACY	REQUIRED: ONE TEN	TH OF A SECOND	
VERA	(FROM GI	PS)	NGITUDE 103.	895 7469	· W	* DATUM RE	QUIRED: WGS 84		
1. GEI	DESCRIPTIO	N RELATING V	WELL LOCATION TO STREE	T ADDRESS AND COMMON LANDMARKS - PLS	S (SECTION, T	OWNSHJIP, RANG	SE) WHERE AVAILABLE		
	LICENSE NU		NAME OF LICENSED	DRILLER			NAME OF WELL DR	ILLING COMPANY	
	WD-1210)	Bryan Nydoske				National EWP		
	DRILLING STARTED 8-19-14 8		DRILLING ENDED 8-19-14	DEPTH OF COMPLETED WELL (FT) BORE HOLE DEPTH (I 31.5		LE DEPTH (FT)	DEPTH WATER FIRST ENCOUNTERED (FT) NA		
z	COMPLETE	D WELL IS:	C ARTESIAN	O dry hole O shallow (unco	ONFINED)	STATIC WATER LEVEL IN COMPLETED NA			ELL (FT)
T10	DRILLING F	LUID:	C AIR	C MUD ADDITIVES – SPI	ECIFY:				
SM.	DRILLING N	METHOD:	ROTARY	C HAMMER C CABLE TOOL		ER – SPECIFY:	Auger		
(F)	DEPTH	(feet bgl)	BORE HOLE	CASING MATERIAL AND/OR	T .		CASING	GLOBIO WILL	
2. DRILLING & CASING INFORMATION	FROM	ТО	DIAM (inches)	GRADE (include each casing string, and note sections of screen)	CON	ASING NECTION TYPE	INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)
Ç	0	20.3	8 1/4	PVC	Flush		2	40	
Ğ	20.3	30.3	8 1/4	PVC	Flush		2	40	.040
T									
DRI									
.5									
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		<u> </u>							
۔		(feet bgl)	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL M. GRAVEL PACK SIZE-RANG			AMOUNT (cubic feet)	METHO PLACE	
ZIA.	FROM	ТО	Dir tivi: (inches)	See Attached		ACTAL	(cubic rect)	12.102.	
Z				Jee Attached					
X		ļ							
LAR									
ANNULAR MATERIAL									
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EOF	OCE INTER	NIAL LICE	<u> </u>			U/D 7	A WELL DECORD	& LOG (Varaion 06#	18/20121
rOb	R OSE INTER	KNAL USE	L.			WK-Z	O WELL RECORD	& LOG (Version 06/0	J8/2012)

POD NUMBER

FILE NUMBER LOCATION

TRN NUMBER

PAGE 1 OF 2

	DEPTH (1	eet bgl)		COLOR AND TV	PE OF MATERIAL ENCOUNTERED -	WATER	ESTIMATED
	FROM	то	THICKNESS (feet)	INCLUDE WATER-BE	EARING CAVITIES OR FRACTURE ZONE ental sheets to fully describe all units)	DE L DE LOS	YIELD FOR WATER- BEARING ZONES (gpm)
		······		See Attached		OYON	
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						$O_A O_N$	
						$O_A O_N$	
4						$O_A O_N$	
OF WELL						$O_A O_N$	
OF						$O_A O_N$	
507						$O^{Y} O^{N}$	
77						$\bigcirc \ ^{Y} \ \bigcirc \ ^{N}$	
TOC						$\bigcirc \ ^{\rm Y} \ \bigcirc \ ^{\rm N}$	
GEO						\bigcirc $^{\text{Y}}$ \bigcirc $^{\text{N}}$	
DRO						\bigcirc Y \bigcirc N	
4. HYDROGEOLOGIC LOG						$O_A O_N$	
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						$O_A O_N$	
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						$O_A O_N$	
						\bigcirc^{Y} \bigcirc^{N}	
		(ann me n		OT WARDED DEAD DIG OF	DATE NIBO		· · · · · · · · · · · · · · · · · · ·
				OF WATER-BEARING ST	RATA: PUMP	TOTAL ESTIMATED WELL YIELD (gpm):	
	AIR LIF	г ()	BAILER O	OTHER - SPECIFY:		(81-11)	***************************************
NO	WELL TES	T TEST STAR	RESULTS - ATT TTIME, END TI	ACH A COPY OF DATA COME, AND A TABLE SHOW	DLLECTED DURING WELL TESTING, INC ING DISCHARGE AND DRAWDOWN OV	CLUDING DISCHARGE I ER THE TESTING PERIC	METHOD,)D.
VISION	MISCELLA	NEOUS IN	FORMATION:				
TEST; RIG SUPER							
G ST							
B							
[ES]	PRINT NAN	ME(S) OF D	RILL RIG SUPER	RVISOR(S) THAT PROVIDE	ED ONSITE SUPERVISION OF WELL COM	STRUCTION OTHER TH	IAN LICENSEE:
iri	Mark Gree	en					
SIGNATURE	CORRECT 1	RECORD C	OF THE ABOVE I	DESCRIBED HOLE AND TH	OF HIS OR HER KNOWLEDGE AND BEL IAT HE OR SHE WILL FILE THIS WELL F TION OF WELL DRILLING:		
SIGN		111	1	A Virl	Greek	4-8-14	
6.3		SIGNAT	TURE OF DRILLE	ER / PRINT SIGNEE NAM		DATE	- vy vy
					WD 00 AV	TI DISCORD A LOCAL	. 05/00/0010

FOR OSE INTERNAL USE WR-20 WELL RECORD & LOG (Version 06/08/2012)

FILE NUMBER POD NUMBER TRN NUMBER

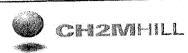
LOCATION PAGE 2 OF 2

PROJECT NUMBER
469935.14.04.02

BORING NUMBER
SHEET OF

SOIL BORING LOG Artesta, NH PROJECT DOWELL-SCHLUMBERGEN ATTESTO LOCATION -I Sapien DRILLING CONTRACTOR NEW P ELEVATION DRILLING METHOD AND EQUIPMENT HER WATER LEVELS NH CTR PINOS START BILLING TO FINISH CAPILLY FINISH PO 4 1012 LOGGER AForskurg SAMPLE STANDARD PENETRATION SOIL DESCRIPTION COMMENTS DEPTH BELOW SURFACE (FT) RECOVERY (FT) DEPTH OF CASING, DRILLING RATE, TEST RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR, NUMBER AND TYPE MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, NTERVAL DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION 6"-6"-6" MINERALOGY coul luyes from angers NOT WGGED 5 SIJ (ML) 2.5yr 1/3 light reddish B2=0.0ppm brown, dry non-plate, noncharesing, PID=0.2 Ppm Gravel 1983-0,2 ppm LAYCOLD LEYRE 3, reldish brown, 10 dry, low piste, noncolvesive, 5-101.5.11 Enry Weard (CL-9P) 1006am F1D=0.1 ppm ouniced 2.5 yests, raddish brown, 15 muist, your pister conesive, fine to course ganes, ten his gravel (angular) W12.542 516, dark red, hodules 1008 am SILTCHID 25 YR 514, reddish brown, 20 P10=0.2ppm wer, med piste, consider, few cooks Gand SILT(HL) 254R514, reddish bra, Juf, Ploso.1 ppm 25 med piere, conceive, fen course sand

Pew cofine or ravel



PROJECT NUMBER

469935,14.04.02

WELL NUMBER

SHEET 1

OF 1

GROUND WATER MONITORING WELL COMPLETION DIAGRAM

	GROUND WATER MONITORING WELL COM ELTISIS DIRECTION
PROJECT: Ownell-Schlumberger-	PORKSICI LOCATION: AVKSICI, NIM
DRILLING METHOD AND EQUIPMENT USED: CHEWATER LEVELS: 10,000 CM 812	START: 17214 END: 9/2014 LOGGER: AFTER Share
WATER ELECTION	1120 1900
3/1/	
3b 1 -2970	0 2
	1 · Ground elevation at well NM
, •	2- Top of casing elevation NM
	And the second s
9	a) drain tube?
	b) concrete pad dimensions; k' X A' X A'
1 15	depth of surface concrete
	4- Dia Atype surface casing NA
	5- Dia Aype of well casing
	2 In ScH 40
0.95	6- Type/slot/size of screen
120.915	
‡ <u>1196</u>	7. Type screen filter 8-16 Colarado Sulca Sainel
	7- Type screen filter 8-16 Colorado SULCA Sand quantity used 9 x 5016 bass
	8- Type of seal 3/0 (n kinforuk chips
in contents	8- Type of seal 3/8 (n kinformic Chips quantity used 1.5 X 50 lbs kin)
	9- Grout The state of the 2 government of the second of th
	a) Grout mix used (15/15 gal) 1 gab 150 38.
	b) Method of placement Free Powr c) Vot of surface casing grout NK
H H	d) Vol. of well casing grout
N 95	6 Development method build Swab + Werpump
	Dévelopment time
	Estimated purge volume 5500 + 5000
	7 Comments
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- special -	
hearing 1	
J. passer	
a matter	
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1 11430	imp
	
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LOCATION

	OSE POD NU	JMBER (WE	LL NUMBER)			OSE FILE NUI	MBER(S)						
Z	Pod-8 IJ-	8				C-3772							
X	WELL OWN	ER NAME(S)			PHONE (OPTI	ONAL)						
Č	Schlumb	erger Te	chnology Corpor	ation									
GENERAL AND WELL LOCATION	well own 105 Indu		g address ulevard Sugar Lai	nd		CITY STATE ZIP Sugar Land TX 77478							
2	WELL	T	DEGREE	S MINUTES SECON	S MINUTES SECONDS								
CAD	LOCATIO	ON LA	TITUDE 32.	439 0301	N	* ACCURACY	REQUIRED: ONE TEN	TH OF A SECOND					
ERA	(FROM GI	1 201	NGITUDE 103.	895 8366	W	* DATUM REQUIRED: WGS 84							
1. GE	DESCRIPTIO	N RELATING	WELL LOCATION TO STRE	ET ADDRESS AND COMMON LANDMARKS - PL	LSS (SECTION, T	OWNSHJIP, RANG	GE) WHERE AVAILABLE						
	LICENSE NU WD-1210		NAME OF LICENSEI Bryan Nydoske				NAME OF WELL DR National EWP	ILLING COMPANY					
	DRILLING S 8-19-14	1	DRILLING ENDED 8-19-14	DEPTH OF COMPLETED WELL (FT) 30	31.5	LE DEPTH (FT)	NA	ST ENCOUNTERED (F					
Z	COMPLETE	D WELL IS:	(ARTESIAN	C DRY HOLE C SHALLOW (UNC	CONFINED)		STATIC WATER LEV	VEL IN COMPLETED W	ELL (FT)				
TIC	DRILLING F	LUID:	C AIR	MUD ADDITIVES – SI									
RMA	DRILLING N	DRILLING METHOD: C ROTARY C HAMMER C CABLE TOOL OTHER - SPECIFY: Auger											
NFC	DEPTH	(feet bgl)	BORE HOLE	CASING MATERIAL AND/OR	C	ASING	CASING	CASING WALL	SLOT				
CASING INFORMATION	FROM	ТО	DIAM (inches)	GRADE (include each casing string, and note sections of screen)	CON	NECTION FYPE	INSIDE DIAM. (inches)	THICKNESS (inches)	SIZE (inches)				
7) & C	0	20.3	8 1/4	PVC	Flush		2	40					
Š	20.3	30.3	8 1/4	PVC	Flush		2	40	.040				
DRILLING													
)RII													
2.1													
	DEPTH	(feet bgl)	BORE HOLE	LIST ANNULAR SEAL N			AMOUNT	METH PLACE					
IAL	FROM	TO	DIAM. (inches)		GE BY INTI	ERVAL	(cubic feet)	PLACE	EMIENI				
TER				See Attached									
MA													
AR													
ANNULAR MATERIAL													
AN													
က်													
}													
	R OSE INTE	RNAL USI	3				20 WELL RECORD	& LOG (Version 06	/08/2012)				
FIL	E NUMBER			POD NUMBE	ER	TRN	NUMBER						

PAGE 1 OF 2

	DEPTH (f	rO	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZONES (attach supplemental sheets to fully describe all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER- BEARING ZONES (gpm)
				See Attached	OYON	(BF-==)
					OYON	
		***************************************			O λ O N	
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4. HYDROGEOLOGIC LOG OF WELL					$\begin{array}{c c} O & O & N \\ \hline O & O & O & N \\ \hline \end{array}$	
H.					$\begin{array}{c c} O & O & N \\ \hline O & O & N \\ \hline \end{array}$	
					\bigcirc $\stackrel{\text{O}}{\circ}$ $\stackrel{\text{N}}{\circ}$	
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	METHOD U	SED TO E	 STIMATE YIELD	OF WATER-BEARING STRATA: PUMP	OTAL ESTIMATED	
	C AIR LIFT		BAILER C	OTHER - SPECIFY:	WELL YIELD (gpm):	
NO	WELL TEST	TEST STAR	RESULTS - ATT T TIME, END TI	ACH A COPY OF DATA COLLECTED DURING WELL TESTING, INCL ME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN OVER	UDING DISCHARGE THE TESTING PERIC	METHOD,)D.
VISION	MISCELLAI	NEOUS IN	FORMATION:			
TEST; RIG SUPER						
1; R						
TES	PRINT NAM	IE(S) OF D	RILL RIG SUPER	RVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF WELL CONS	TRUCTION OTHER TH	HAN LICENSEE:
5.	Mark Gree	en				
SIGNATURE	CORRECT F	RECORD C	F THE ABOVE I	FIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIED DESCRIBED HOLE AND THAT HE OR SHE WILL FILE THIS WELL RE 20 DAYS AFTER COMPLETION OF WELL DRILLING:	F, THE FOREGOING IS CORD WITH THE STA	S A TRUE AND TE ENGINEER
SIGN	~~ ~	5/	21	Mark Green	4-8-14	
9.9		SIGNAT	TURE OF DRILLE	ER / PRINT SIGNEE NAME	DATE	
	·					

FOR OSE INTERNAL USE WR-20 WELL RECORD & LOG (Version 06/08/2012)
FILE NUMBER POD NUMBER TRN NUMBER

LOCATION PAGE 2 OF 2

PROJECT NUMBER

A6993514.C4.OZ

BORING NUMBER

SHEET OF

SOIL BORING LOG

PROJEC	T	O.	-5	rresia	DRILLING CONTRACTOR NEWP	leski, NH
T CMATS	ONI	NI	o par se anni programa de la compansión		DRILLING CONTRACTOR_NEWP	7 (2 5.115)
RILLING	G METH	OD ANI	D EQUIP	PMENT 11514	CIME 85 4/4/11/10 (Mply 24) 146 START 0850 8/9/14 FINISH 0906	ellelle 10000 Attribute
			AL PLANT TO BE A STATE OF THE S			
DEPTH BELOW SURFACE (FT)		SAMPLE		STANDARD PENETRATION	SOIL DESCRIPTION	COMMENTS DEPTH OF CASING, DRILLING RATE,
GE	VAL	EB YPE	VER	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY	DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
EPT.	NTERVAL	NUMBER AND TYPE	RECOVERY (FT)	6"-6"-6" (N)	OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	1ESTS AND INSTRUMENTATION
<u>0</u> 0		ZK	<u> </u>	1.7		Sullagrafrom outside of
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10 -		1			brown, dry, law plate, romes ive	
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-			1000	A STATE OF THE STA		
-				No. A. Control of the		
-				100	BUN	
15 -	Cargain Ingels (644cm				CURYCO, 2.5412513 reddisin brown,	1005=01ppm B20.0ppm
-		`			mast, low pists, noncones, ve, few med sainds	320.0pm
			1		The contract of the contract o	· · · · · · · · · · · · · · · · · · ·
-	1					••••••••••••••••••••••••••••••••••••••
-					,	-
20-	_	\forall		***	SILTCHE) 254RA/2, WEEK red, WET.	0%7 -
-	1	\			SILTCHE) 25/RA/2, Weak red, Wet. low piste, nonconesive, few med send, 5-10% fine sound.	- VIX5=0.0
	-			_	1 101. 11 1. 11 10 Sweller	
	-					_
	-					-
123-		-			SUT(ML) 254RAH raldish brann,	10004
	-	- The state of	1		and mad plate, rates V4. 5 Th	- VOG=0.0
	_		1		met, med place, Ochesive, 5 Ff. fine sund, Frace ocherge same!	_
	1					_
30					1	
					(8.30)	0906 REV 12/01 FORM D150

GH	2.1/3	

PROJECT NUMBER

46903514.04.02

WELL NUMBER

SHEET 1

OF 1

GROUND WATER MONITORING WELL COMPLETION DIAGRAM

	GROUND WATER MOINTORING WELL COMPLETION BINGSOM
PROJECT: ELEVATION:	DRILLING CONTRACTOR: WOO NEWP I Sapien CHE-05 W4.25 in ID HSA augers
DRILLING METHOD AND EQUIPMENT USED: C	START: 8/2014 END: 8/2019 LOGGER: A TOVS DOCTOR
WATER LEVELS OF CH TILL	1243 1- Ground elevation at well 2- Top of casing elevation 3- Weithead protection cover type 6-10 x 5ff skal cush was a drain tube? b) concrete pad dimensions: depth of surface concrete
	4- Dia./type surface casing NA
	5- Dia Aype of well casing 21n SCHAU PVC
(30.5)	X (1) 0 d
1 (1.5)	quantity used
	8- Type of seal quantity used Sign Suntant Chars 9- Grout Sign Sign
95.24.5	6 Development method SWWYDWY-Werywn P Development time
	Estimated purge volume 550/4 + 80 grul
1 Ft. Simp	7 Comments
2.45	A DD Illustration not to scale.