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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 <u>cocianni-v@slb.com</u>.

I look forward to our continued work with you.

Sincerely,

V. COLLANN

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



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Acronyms and Abbreviations

bgs	below ground surface
COC	contaminant of concern
CVOC	chlorinated volatile organic compound
1,1-DCA	1,1-dichloroethane
1,1-DCE	1,1-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
NaMnO ₄	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**.

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.

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-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 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 0.5horsepower 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.

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 NaMnO₄ solution were injected into the groundwater via eight injection wells. Each of the eight injection well received an average of 232.3 gallons of NaMnO₄ 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.

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.

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Tables

TABLE 1 Substrate Injection Summary

2014 Annual Groundwater Monitoring Report

Former Dowell Schlumberger Facility, Artesia, New Mexico

	Substrate Injection				Maximum	Maximum
	Total Injection	Substrate	Substrate		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

		Total Depth	Top of Casing Elevation	Depth to Water	Groundwater Elevation
Well ID	Date	(ft btoc)	(ft amsl)	(ft btoc)	(ft amsi)
	4/7/14	30.0	3358.52	13.99	3344.53
IVIV-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	3350.70
	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	Top of Casing Elevation (ft amsl)	Depth to Water	Groundwater Elevation (ft amsl)
WeinD		17.41	2256.82	15.85	3240.08
MW-21	4/7/14	17.41	2256.82	0.76	2247.07
	11/6/14	17.41	2256 92	11.08	2245 75
	11/0/14	17.41	2255.44	11.08	3345.75
NANA/ 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
	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
	10/14/14	32.0	NM	12.70	NM
MW-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

		Iron,	Manganese,					1,1,2-						
		Dissolved	Dissolved	Sulfate	Sulfide	1,1,1-TCA	1,1,2,2-Tetrachloroethane	Trichloroethane	1,1-DCA	1,1-DCE	1,2-DCA	Benzene	Carbon Tetrachloride	Chloroform
WELL NUMBER	SAMPLE DATE	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(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	<0.0008	<0.00015	< 0.00013
MW-7	10/17/14					<0.00015	<0.00022 J	<0.00028	<0.00011	<0.00019	< 0.00014	<0.0008	<0.00015	< 0.00013
MW-8	10/17/14					<0.00015	<0.00022 J	<0.00028	0.00206	0.00125	< 0.00014	<0.0008	<0.00015	< 0.00013
MW-11	10/17/14					<0.00015	<0.00022 J	<0.00028	0.000253 J	< 0.00019	< 0.00014	<0.0008	<0.00015	< 0.00013
NAIN/ 10	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	<0.0008	<0.00015	< 0.00013
	04/08/14					<0.00015	<0.00022 J	<0.00028	0.000221 J	0.000438 J	< 0.00014	<0.0008	<0.00015	< 0.00013
IVIVV-17C	10/17/14					<0.00015	<0.00022 J	<0.00028	0.000184 J	0.000436 J	< 0.00014	<0.0008	<0.00015	< 0.00013
M/M/ 10	04/08/14					<0.00015	<0.00022	<0.00028	0.00118	0.00551	< 0.00014	<0.00008	<0.00015	< 0.00013
ΙΛΙΛΛ-ΤΩ	10/16/14		<0.0116			<0.00015	<0.00022 J	<0.00028	<0.00011	0.00019 J	< 0.00014	<0.0008	<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
NAVA/ 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	<0.0008	<0.00015	< 0.00013
MW-22	10/16/14		<0.0116			<0.00015	<0.00022 J	<0.00028	0.00187	0.00489	< 0.00014	<0.0008	<0.00015	< 0.00013
N410/ 2E	04/08/14					<0.00015	<0.00022	<0.00028	0.00436	<0.00019	< 0.00023	<0.0008	<0.00015	< 0.00013
10100-23	06/05/14	<0.0866	0.000894 J	2140	< 0.009									
M/M/ 26	04/08/14					<0.00015	<0.00022	<0.00028	0.000219 J	0.0011	<0.000147	<0.0008	<0.00015	< 0.00013
10100-20	10/14/14		<0.0116			<0.00015	<0.00022 J	<0.00028	0.000136 J	0.000964 J	< 0.00014	<0.0008	<0.00015	< 0.00013
	04/08/14					<0.00015	<0.00022	<0.00028	0.00815	0.0241	<0.000322	<0.0008	<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	<0.0008	<0.00015	< 0.00013
M/M/_30	04/08/14					<0.00015	<0.00022	<0.00028	0.0093	0.0322	<0.000366	0.0000842 J	<0.00015	0.000142 J
10100-50	10/15/14		<0.0116			<0.00015	<0.00022 J	<0.00028	0.00606	0.0221	0.000164 J	<0.0008	<0.00015	< 0.00013
N/I/N/ 21	04/08/14					<0.00015	<0.00022	<0.00028	0.000291 J	<0.00019	< 0.00014	<0.0008	<0.00015	< 0.00013
10100-51	10/16/14		0.138			<0.00015	<0.00022 J	<0.00028	0.0008 J	0.00122	< 0.00014	<0.0008	<0.00015	< 0.00013
N//N/ 22	04/08/14					<0.00015	<0.00022	<0.00028	0.00089 J	0.00355	<0.00014	<0.0008	<0.00015	< 0.00013
10100-52	10/15/14		<0.0116			<0.00015	<0.00022 J	<0.00028	0.000603 J	0.00296	<0.00014	<0.0008	< 0.00015	< 0.00013
M/M/ 22	04/08/14					<0.00015	<0.00022	<0.00028	<0.00011	<0.00019	<0.00014	<0.00008	<0.00015	< 0.00013
10100-33	10/15/14					<0.00015	<0.00022 J	<0.00028	<0.00011	<0.00019	<0.00014	<0.0008	< 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

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Former Dowell Schlumberger Facility, Artesia, New Mexico

				m,p-Xylene	Methylene Chloride							
		Ethylbenzene	Ethylene Dibromide	(sum of isomers)	(Dichloromethane)	Naphthalene	o-Xylene	PCE	Toluene	TCE	Vinyl Chloride	Xylenes, Total
WELL NUIVIBER	SAMPLE DATE	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(mg/L)	(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
M/M/_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
	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
	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
IVIV-1/C	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
M/M/ 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
10100-10	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
NAVA/ 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
10100-21	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
M/M/ 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
10100-23	06/05/14											
MW 26	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
10100-20	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
M/M/ 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
10100-50	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
M/M/ 21	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
10100-21	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
10100-52	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
M/M/ 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
10100-33	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

Figures



RDD \\ROSWELL\ARCINFO\W_PROJIDOWELL_SCHLUMBERGERIARTESIA_469935\MAPFILES\ANN_GW_MON_2014\FIG1_LOCATION_MAP_AGWM.MXD TARROWOO 11/18/2014 10:23:28 AM



100

Feet

200

- ▲ Groundwater Extraction Well
- 0 Injection Well
- Monitoring Well
- Property Line _
- Right of Way Boundary

× – × Fence

Notes: UST = underground storage tank SVE = soil vapor extraction

RDD \\ROS\WELL\ARCINFO\AV_PROJ\DOWELL_SCHLUMBERGER\ARTESIA_469935\MAPFILES\ANN_GW_MON_2014\FIG2_SITE_PLAN_AGWM.MXD BMOAYYAD 3/2/2015 11:46:44 AM

FIGURE 2 Site Plan 2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico



ft amsl = feet above mean sea level

200

Feet

RDD \\ROSWELL\ARCINFO\AV_PROJ\DOWELL_SCHLUMBERGER\ARTESIA_469935\MAPFILES\ANN_GW_MON_2014\FIG3_POTSURF_APR2014_AGWM.MXD BMOAYYAD 3/9/2015 3:09:20 PM

Not Measured

NM

(Dashed Where Inferred)

----- Groundwater Flow Direction

Potentiometric Surface Map – April 2014 2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico



RDD \\ROS\WELL\ARCINFO\AV_PROJ\DOWELL_SCHLUMBERGER\ARTESIA_469935\MAPFILES\ANN_GW_MON_2014\FIG4_POTSURF_NOV2014_AGWM.MXD BMOAYYAD 3/9/2015 2:46:13 PM

Former Dowell Schlumberger Facility, Artesia, New Mexico



LEGEND

- ----- 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:

10105.			
J = Analyte detected at concentration above instrument detection limit but below	v		
method detection limit			
<0.001 = analyte not detected at concentration above detection limit shown		N	
NMWQCC = New Mexico Water Quality Control Commission		•	
mg/L= milligrams per liter			
UST = underground storage tank	Q	100	200
SVE = soil vapor extraction		Faat	
DCA = dichloroethane		reel	

RDD \\ROSWELL\ARCINFO\AV_PROJ\DOWELL_SCHLUMBERGER\ARTESIA_469935\MAPFILES\ANN_GW_MON_2014\FIG5_ISOCON_DCA_Q2_2014_AGWM.MXD BMOAYYAD 3/9/2015 3:17:45 PM

FIGURE 5 Isopleth Map for 1,1-DCA – April 2014 2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico



×-× 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

method detection limit		
<0.001 = analyte not detected at concentration above detection limit shown	N	
DCE = Dichloroethene		
NMWQCC = New Mexico Water Quality Control Commission		
mg/L= milligrams per liter 0	10	0 200
UST = underground storage tank		
SVE = soil vapor extraction	ге	ei

FIGURE 6 Isopleth Map for 1,1-DCE – April 2014 2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico



SVE = soil vapor extraction

RDD \\ROSWELL\ARCINFO\AV_PROJ\DOWELL_SCHLUMBERGER\ARTESIA_469935\MAPFILES\ANN_GW_MON_2014\FIG8_ISOCON_DCE_Q4_2014_AGWM.MXD BMOAYYAD 3/9/2015 3:31:38 PM

Former Dowell Schlumberger Facility, Artesia, New Mexico

Feet



LEGEND

- ----- 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/L NS Not Sampled

Notes:

J = Analyte detected at concentration above instrument detection limit but belo	w		
method detection limit			
<0.001 = analyte not detected at concentration above detection limit shown		N	
PCE = tetrachloroethene		•	
NMWQCC = New Mexico Water Quality Control Commission			
mg/L= milligrams per liter	0	100	200
UST = underground storage tank			
SVE = soil vapor extraction		Feet	

FIGURE 8 Isopleth Map for PCE – April 2014 2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico



mg/L= milligrams per liter

SVE = soil vapor extraction

UST = underground storage tank

RDD \\ROSWELL\ARCINFO\AV_PROJ\DOWELL_SCHLUMBERGER\ARTESIA_469935\MAPFILES\ANN_GW_MON_2014\FIG10_ISOCON_PCE_Q4_2014_AGWM.MXD BMOAYYAD 3/9/2015 3:35:10 PM

Injection Well

Monitoring Well

•

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

200

Feet



×-× Fence

- Monitoring Well
- Groundwater Extraction Well

0.030 mg/L NMWQCC Standard for Naphthalene Isopleth 0.030 Naphthalene Concentration mg/L NS Not Sampled

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 = milligners por liter	И	
UST = underground storage tank	100	200
SVE = soil vapor extraction	Feet	

FIGURE 10 Isopleth Map for Naphthalene – April 2014 2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico



SVE = soil vapor extraction

Fee

RDD \\ROS\WELL\ARCINFO\AV_PROJ\DOWELL_SCHLUMBERGER\ARTESIA_469935\MAPFILES\ANN_GW_MON_2014\FIG10_ISOCON_PCE_Q4_2014_AGWM.MXD BMOAYYAD 3/9/2015 3:39:33 PM

Monitoring Well

2014 Annual Groundwater Monitoring Report Former Dowell Schlumberger Facility, Artesia, New Mexico
Appendix A Work Plan Amendments and NMOCD Correspondence

From:	Hansen, Edward J., EMNRD <edwardj.hansen@state.nm.us></edwardj.hansen@state.nm.us>
Sent:	Monday, July 15, 2013 2:54 PM
То:	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).

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

" 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></edwardj.hansen@state.nm.us>
Sent:	Thursday, August 22, 2013 4:39 PM
То:	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></edwardj.hansen@state.nm.us>
Sent:	Thursday, August 22, 2013 4:44 PM
То:	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></edwardj.hansen@state.nm.us>
Sent:	Wednesday, September 18, 2013 1:52 PM
То:	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

Appendix B NMOSE Well Permits, Soil Boring Logs, and Well Completion Diagrams 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

		File	No. C-3774
Interstate Stream Commission	NEW MEXICO OFFICE OF APPLICATION FOR PER WITH NO CONSUMPT (check appli	F THE STATE E RMIT TO DRILL A WEL TIVE USE OF WATER cable box):	NGINEER
	For fees, see State Engineer web	site: http://www.ose.state.nm	Jus/ 2-34841
Purpose:	Pollution Control And / Or Recovery	Geo-Thermal	
Exploratory	Construction Site De-Watering	Other (Describe)	5 L
	Mineral De-Watering		
Temporary Reque	est - Requested Start Date:	Requeste	d End Date:
Temporary Reque Plugging Plan of Ope	est - Requested Start Date: arations Submitted? □ Yes ⊠ No	Requeste	d End Date:
Temporary Reque Plugging Plan of Ope	est - Requested Start Date: arations Submitted? Yes No	Requeste	d End Date:
Temporary Reque Plugging Plan of Ope APPLICANT(S)	ast - Requested Start Date: arations Submitted? ☐ Yes ⊠ No	Requeste	ed End Date:
Temporary Reque Plugging Plan of Ope APPLICANT(S) Name: Virgilio Cocia	est - Requested Start Date: arations Submitted? Yes No No	Requeste	ed End Date:
Temporary Reque Plugging Plan of Ope APPLICANT(S) Name: Virgilio Cocia Contact or Agent: Schlumberger Tech	est - Requested Start Date: arations Submitted? Yes No anni check here if Agent nology Corporation	Requeste Name: Contact or Agent:	d End Date:
Temporary Reque Plugging Plan of Ope APPLICANT(S) Name: Virgilio Cocia Contact or Agent: Schlumberger Tech Mailing Address: 105	Anni Check here if Agent Industrial Boulevard	Requeste Name: Contact or Agent: Mailing Address:	d End Date:
Temporary Reque Plugging Plan of Ope APPLICANT(S) Name: Virgilio Cocia Contact or Agent: Schlumberger Tech Mailing Address: 105 City: Sugar Land	anni check here if Agent nology Corporation Industrial Boulevard	Requeste Name: Contact or Agent: Mailing Address: City:	ed End Date:
Temporary Reque Plugging Plan of Ope APPLICANT(S) Name: Virgilio Cocia Contact or Agent: Schlumberger Tech Mailing Address: 105 City: Sugar Land State: TX	Anni Check here if Agent Industrial Boulevard Zip Code: 77478	Requeste Name: Contact or Agent: Mailing Address: City: State:	d End Date:
Temporary Reque Plugging Plan of Ope APPLICANT(S) Name: Virgilio Cocia Contact or Agent: Schlumberger Tech Mailing Address: 105 City: Sugar Land State: TX Phone: Phone: Phone (Work): (281)	Anni Check here if Agent Industrial Boulevard Zip Code: 77478 Home Cell 285-4747	Requeste Name: Contact or Agent: Mailing Address: City: State: Phone: Phone (Work):	d End Date:

FOR OSE INTERNAL USE	Application for Permit, Form wr-07, Rev 4/
File Number: C-3774	Trn Number: 55204
Trans Description (optional): PO	DI Monitor
Sub-Basin: CUB	
PCW/LOG Due Date: 8	31-15

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

Location Required: Coordin (Lat/Long - WGS84). District II (Roswell) and Dis	nate location must b trict VII (Cimarron) c	e reported in NM St sustomers, provide	ate Plane (NAD 83), UTM (NAD 83), <u>or</u> Lati a PLSS location in addition to above.	tude/Lo	ngitude
NM State Plane (NAD83) NM West Zone NM East Zone NM Central Zone	(Feet)	JTM (NAD83) (Mete]Zone 12N]Zone 13N	rs) X Lat/Long (WGS84) 1/10 th of second)	(to the n	earest
Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS) (Quarters or Halves, Section, Township - Hydrographic Survey Map & Tract; OR - Lot, Block & Subdivision; OR - Land Grant Name	o, Range	e) OR
MW-34	103.8945949	32.43942826	SW 1/4, S4, T17S, R26E	(a) _ (MGINE
				sti inv	EROFFI
NOTE: If more well location	ns need to be descri	bed, complete form Yes ⊠ No	WR-08 (Attachment 1 – POD Descriptions if yes, how many)	
Other description relating we Artesia, NM 88210	II to common landmar	ks, streets, or other:	Former Dowell Schlumber Facility, 507 Ea	st Riche	ey Avenue,
Well is on land owned by: So	hlumberger Techno	logy Corporation			
Well Information: NOTE: If If yes, how many	more than one (1) w	ell needs to be des	cribed, provide attachment. Attached?] Yes	🛛 No
Approximate depth of well (fe	eet): 35.00	C	Outside diameter of well casing (inches): 4.50	-	
D III M H H Balli	00		viller License Number: WD-1210		

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.

FOR OS	SE INTER	NAL USE
--------	----------	---------

File Number:

C.3774

Application for Permit, Form wr-07

Trn Number: 55204

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:

Exploratory: Include a description of any proposed pump test, if applicable.	Patternation Pollution Control and/or Recovery: lude a Include a plan for pollution ption of control/recovery, that includes the roposed following: test, if A description of the need for the able. Dollution 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.	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 following: 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.
Monitoring: Include the reason for the monitoring well, and, The duration of the planned monitoring.	 The method and place of discharge. 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. 	Or. 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 quality of the water. 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 to estimate effects on surface water rights. Information on existing wells, rivers, springs, and wetlands within the area of hydrologic effect.

	ACKNOWLEDGEMENT	14 14
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,	4
Applicant Signature	Applicant Signature	1 In
	ACTION OF THE STATE ENGINEER	51

This application is:

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 <u>attached</u> conditions of approval.

approved

Witness my hand and seal this	5 K day of Augus	t 20 14	, for the State Engineer,
Scott A Ve	rhines, P.E.	, State Engineer	
By: Signature	7	Print	
Title: Andy Morley, D	istrict II Manager		
	FOR OSE INTE	ERNAL USE	Application for Permit, Form wr-07
	File Number	1.2771	Trn Number CC 2011

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

- 4 No water shall be appropriated and beneficially used under this permit.
- 6 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.
 - C 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: <u>C 03774</u> 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

14. 0,000,002	E. 003,913
N: 11,777,150	E: 1,981,339
N: 3,589,480	E: 603,962
N: 11,776,486	E: 1,981,499
	N: 3,589,082 N: 11,777,150 N: 3,589,480 N: 11,776,486

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

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
 Ei Specked
 Ei Specked

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

Alexandre Store Company	NEW MEXICO OFFICE OF APPLICATION FOR PERI WITH NO CONSUMPTI	THE STATE EI	NGIN .L	IEER
	(check applic	able box):		
	For fees, see State Engineer webs	ite: http://www.ose.state.nm	us/	2-31841
Purpose:	Pollution Control And / Or Recovery	Geo-Thermal		
] Exploratory	Construction Site De-Watering	Other (Describe):		
] Monitoring	Mineral De-Watering			
A separate permit wil	l be required to apply water to beneficial use.			
Temporary Reque	est - Requested Start Date:	Requeste	d End D	Date:
Plugging Plan of Ope	erations Submitted? 🔲 Yes 🛛 No			

1. APPLICANT(S)

Name: Virgilio Cocianni		Name:	
Contact or Agent: Schlumberger Technol	check here if Agent	Contact or Agent:	check here if Agent
Mailing Address: 105 Industrial Boulevard		Mailing Address:	ER OF
City: Sugar Land		City:	2105
State: TX	Zip Code: 77478	State:	Zip Code:
Phone: Phone (Work): (281) 285	-4747	Phone: Phone (Work):	Home Cell
E-mail (optional): cocian	ni-v@slb.com	E-mail (optional):	

FOR OSE INTERNAL USE	Application for Permit, Form wr-07, Rev 4/12/12
File Number: C-3773	Trn Number: 552040
Trans Description (optional): POT	>1 Pol Control
Sub-Basin: CUB	
PCW/LOG Due Date: 8-7	31-15
	Page 1 of 4

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

Location Required: Coordin (Lat/Long - WGS84). District II (Roswell) and Dis	nate location must b trict VII (Cimarron) c	e reported in NM St customers, provide	ate Plane (NAD 83), UTM (NAD 83), a PLSS location in addition to abov	<u>or</u> Latitude/Longitude e.
NM State Plane (NAD83) NM West Zone NM East Zone NM Central Zone	(Feet)	UTM (NAD83) (Mete]Zone 12N]Zone 13N	rs)	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 & Tra - Lot, Block & Subdivision; OR - Land Grant Name	S) ownship, Range) OR ct; OR
EW-03	103.8941086	32.4399139	SW 1/4, S4, T17S, R26E	ouil N
		- 41		NGINES
				The DEEDLe
NOTE: If more well location	ns need to be descri	bed, complete form	WR-08 (Attachment 1 – POD Desci	iptions)
Other description relating we Artesia, NM 88210	Il to common landmar	rks, streets, or other:	Former Dowell Schlumber Facility,	507 East Richey Avenue,
Well is on land owned by: \$	Schlumberger Techn	ology Corporation		
Well Information: NOTE: If If yes, how many	more than one (1) w	ell needs to be des	cribed, provide attachment. Attach	ed? 🗌 Yes 🖾 No
Approximate depth of well (f	eet): 60.00	C	outside diameter of well casing (inches	s): 4.50
Driller Name: National EWP	1.1.	D	riller License Number: WD-1210	

3. ADDITIONAL STATEMENTS OR EXPLANATIONS

FOR OSE INTERNAL USE	Application for Permit, Form wr-07
File Number: C-3773	Trn Number: 552040

Page 2 of 4

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)

INTE FHEINEER OFFIC

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. 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:

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 following: 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.
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 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 to estimate effects on surface water rights. Information on existing wells, rivers, springs, and wetlands within the area of hydrologic effect.

ACKNOWLEDGEMENT

I, We (name of applicant(s)), Virgilio Cocianni		
	Print Name(s)	4 5
affirm that the foregoing statements are true to the best of	f (my, our) knowledge and belief.	552
		- 译
Applicant Signature	Applicant Signature	8
ACTION	N OF THE STATE ENGINEER	يات خ تاقيدان
	This application is:	- ń
🖄 approved	partially approved denied	
provided it is not exercised to the detriment of any other Mexico nor detrimental to the public welfare and further	s having existing rights, and is not contrary to the conser subject to the <u>attached</u> conditions of approval.	vation of water in New
Witness my hand and seal this 5^{4} day of	August 20 14 , for the State Enginee	er,
Scott A Verhines, P.E.	, State Engineer	
By: My May	Print	
Title: Andy Morley, District II Mana	ager	

FOR OSE INTERNAL USE

73

. 3

Trn Number:

File Number:

Application for Permit, Form wr-07

2046

Page 3 of 4

Title:

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

- 4 No water shall be appropriated and beneficially used under this permit.
- 5B 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.
- C 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.

Trn Desc: C 03773 POD1 POLLUTION CONTROL

File Number: <u>C 03773</u> Trn Number: <u>552040</u>

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	Ν
Lonaitude:	103 Degrees	53 Minutes	38.8 Seconds	W

Universal Transverse Mercator Zone: 13N

N: 3,589,737	E: 603,958
N: 11,777,328	E: 1,981,487
N: 3,589,535	E: 604,007
N: 11,776,665	E: 1,981,647
	N: 3,589,737 N: 11,777,328 N: 3,589,535 N: 11,776,665

State Plane Coordinate System Zone: New Mexico East

N: 159,731	E: 206,301
N: 524,050	E: 676,838
N: 159,712	E: 193,749
N: 523,990	E: 635,657
	N: 159,731 N: 524,050 N: 159,712 N: 523,990

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
 E: 603,958
 E: 676,838

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

1.	WATER	METER	INFORMATION:

Well File Nbr: C 03773 POD1

Serial	Number:		Meter Make:	
--------	---------	--	-------------	--

Number of Dials: _ left side of dial on meter. move on right side of dial on meter.

Multiplier: (0) (00) (000) Number of dials that move on the Circle number of zeros that don't

Unit of Measure: (GALLONS) (CUBIC FEET) (BARRELS) (ACRE-FEET) () Specify Other Circle appropriate unit of measure.

Initial Reading: _____ Initial Reading Date: ____

2. COMMENTS:

Submitted By:

Date: _____

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: 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 Albuquergue, 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,

N Andy Morley (575)622-6521

Enclosure

		Linen	U- 110
NEW MEXICO APPLICA WITH I	OFFICE OF TION FOR PERM NO CONSUMPTIN (check applica	THE STATE EN MIT TO DRILL A WELL VE USE OF WATER able box):	IGINEER
For fees, see	State Engineer websit	e: http://www.ose.state.nm.u	2-34841
Purpose:	And / Or Recovery	Geo-Thermal	
Exploratory Construction Site	De-Watering	Other (Describe):	t.
Monitoring Mineral De-Water	ing		
Temporary Request - Requested Start Date:		Requeste	d End Date:
Plugging Plan of Operations Submitted? Yes	No No		
			him 1
APPLICANT(S)			ENGIN
Name: Virgilio Cocianni	N	Name:	A.
Contact or Agent: check here if Schlumberger Technology Corporation	Agent 🗌 🛛 🖸	Contact or Agent:	check here if Agent
Mailing Address: 105 Industrial Boulevard	N	Aailing Address:	
City: Sugar Land	0	City:	
State: TX Zip Code: 7747	8 5	State:	Zip Code:
Phone: Home Phone (Work): (281) 285-4747] Cell F	Phone: Phone (Work):	Home Cell

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

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

 NM State Plane (NAD83 □ NM West Zone □ NM East Zone □ NM Central Zone) (Feet) [UTM (NAD83) (Met]Zone 12N]Zone 13N	ers)	S84) (to the nearest	
Well Number (if known):	X or Easting or Longitude:	Y or Northing or Latitude:	Provide if known: -Public Land Survey System (PLSS (Quarters or Halves, Section, Tow - Hydrographic Survey Map & Trac - Lot, Block & Subdivision; OR - Land Grant Name	5) vnship, Range) OR t; 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	AL P	
INJ. WELL	103.895466	32.43965275	SW 1/4, S4, T17S, R26E	n ma	
INJ. WELL	103.8955596	32.43974281	SW 1/4, S4, T17S, R26E		
INJ. WELL	103.8956532	32.43982955	SW 1/4, S4, T17S, R26E	Tre PR	
INJ. WELL	103.8957469	32.43991961	SW 1/4, S4, T17S, R26E	1	
INJ. WELL	103.8958366	32.44000301	SW 1/4, S4, T17S, R26E	52	
NOTE: If more well locatio Additional well description	ns need to be descr as are attached:	ibed, complete for] Yes 🛛 No	m WR-08 (Attachment 1 – POD Desc If yes, how many	riptions)	
Other description relating we Avenue, Artesia, NM 8821	ell to common landma 0	arks, streets, or othe	er: Former Dowell Schlumber Facility,	507 East Richey	
Well is on land owned by: S	chlumberger Techn	ology Corporation	1		
Well Information: NOTE: If If yes, how many	more than one (1) v	vell needs to be de	escribed, provide attachment. Attach	ed? 🗌 Yes 🖾 No	
Approximate depth of well (f	eet): 32.00	(Outside diameter of well casing (inches): 2.375		

3. ADDITIONAL STATEMENTS OR EXPLANATIONS

FOR OSE INTERNAL USE

File Number:

-3172

Application for Permit, Form wr-07

C

Trn Number: <

230 21 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:

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.	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:
Monitoring: Include the reason for the monitoring well, and, The duration of the planned monitoring.	 diverted and injected for the duration of the operation. The method and place of discharge. The method of measurement of water produced and discharged. The source of water to be injected. The method of measurement of water 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 	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 to estimate effects on surface water rights. Information on existing wells, rivers, springs, and wetlands within the area of hydrologic effect.

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.

approved

Applicant Signature

Applicant Signature

ACTION OF THE STATE ENGINEER

This application is:

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 <u>attached</u> conditions of approval.

Application for Permit, Form wr-07 FOR OSE INTERNAL USE File Number: Trn Number: Page 3 of 4

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.

Witness my hand and seal this 54	(day of	August	20 14	_ , for the State Engineer,	
Scott A Verhin	nes, P.E.	, State	e Engineer		

By: Andy Maa Signature

Print

Title: Andy Morley, District II Manager

Print

FOR OSE INTERNAL USE	Application for Permit, Form wr-07
File Number: C. 3772	Trn Number: 552039
	Page 4 of 4

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

SPECIFIC CONDITIONS OF APPROVAL

- 4 No water shall be appropriated and beneficially used under this permit.
- 5B 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.
- C 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) 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: <u>C 03772</u> Trn Number: 552039

NEW MEXICO STATE ENGINEER OFFICE PERMIT TO EXPLORE

ACTION OF STATE ENGINEER

Notice of Intention Rcvd:Date Rcvd. Corrected:Formal Application Rcvd: 08/04/2014Pub. 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 5^{4} day of Aug A.D., 2014

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

Andy Morley By:

Trn Desc: C 03772 POD1-8 POLLUTION CONTR

File Number: <u>C 03772</u> Trn Number: 552039



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)(000)Number of dials that move on the left side of dial on meter.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 Othe
	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

1. WATER METER INFORMATION:

Serial Number:

Well File Nbr: C 03772 POD2

Meter Make: _

Number of Dials: _ left side of dial on meter. move on right side of dial on meter.

Multiplier: (0) (00) (000) Number of dials that move on the Circle number of zeros that don't

Unit of Measure: (GALLONS) (CUBIC FEET) (BARRELS) (ACRE-FEET) () Specify Other Circle appropriate unit of measure.

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 POD3

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

1. WATER METER	INFORMATION:
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Well File Nbr: C 03772 POD3

_____ Serial Number:

Meter Make: ____

Number of Dials: ____ left side of dial on meter. move on right side of dial on meter.

Multiplier: (0) (00) (000) Number of dials that move on the Circle number of zeros that don't

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 POD4

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

 WATER METER INFORMATION 	τ.
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Well File Nbr: C 03772 POD4

Serial Number:

Meter Make:

Number of Dials: left side of dial on meter.

Multiplier: (0) (00) (000) Number of dials that move on the Circle number of zeros that don't move on right side of dial on meter.

Unit of Measure: (GALLONS) (CUBIC FEET) (BARRELS) (ACRE-FEET) (Specify Other Circle appropriate unit of measure.

Initial Reading Date: Initial Reading:

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 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: left side of dial on meter.

Multiplier: (0) (00) (000) Number of dials that move on the Circle number of zeros that don't move on right side of dial on meter.

Unit of Measure: (GALLONS) (CUBIC FEET) (BARRELS) (ACRE-FEET) (Specify Other Circle appropriate unit of measure.

Initial Reading Date: Initial Reading:

2. COMMENTS:

Submitted 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

Meter Make: Serial Number: ____

left side of dial on meter, move on right side of dial on meter.

Number of Dials: _____ Multiplier: (0) (00) (000) Number of dials that move on the Circle number of zeros that don't

Unit of Measure: (GALLONS) (CUBIC FEET) (BARRELS) (ACRE-FEET) (Specify Other Circle appropriate unit of measure.

Initial Reading Date: _____ Initial Reading:

2. COMMENTS:

Submitted 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

1.	WATER	METER	INFORMATION:	

Well File Nbr; C 03772 POD7

Serial Number:

Meter Make:

Number of Dials: _____ Number of dials that move on the Circle number of zeros that don't left side of dial on meter. move on right side of dial on meter.

Multiplier: (0) (00) (000)

Unit of Measure: (GALLONS) (CUBIC FEET) (BARRELS) (ACRE-FEET) (Specify Other Circle appropriate unit of measure.

Initial Reading Date: _____ Initial Reading: ____

2. COMMENTS:

Submitted 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 POD8

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

1.	WATER	METER	INFORMATION:

Well File Nbr: C 03772 POD8

Serial Number:

Meter Make:

Number of Dials: left side of dial on meter. move on right side of dial on meter.

Multiplier: (0) (00) (000) Number of dials that move on the Circle number of zeros that don't

Unit of Measure: (GALLONS) (CUBIC FEET) (BARRELS) (ACRE-FEET) () Specify Other Circle appropriate unit of measure.

Initial Reading: _____ Initial Reading Date: _____

2. COMMENTS:

Submitted By: _____

Date:

wellcon5

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SSION - ROSWELL OFFICE	Is submit to Program Support/ASD along with other w C. Miscellaneous Faes C. Miscellaneous Faes D. Miller's License 3. Application for Kenewal of Well 3. Application to Amend Well Driller's License 0. 254/copy Map(s) E. Certification E. Other G. Comments A. J. A. J. A.	
HILE NO	formation. Origi and all copies and \$ 10.00 \$ 10.00 \$ 10.00 \$ 25.00 \$ 25.00 \$ 25.00 \$ 25.00 \$ 25.00 \$ 25.00 \$ 25.00 \$ 25.00 \$ 25.00 \$ 5.00 \$ 5.00	
DATE OLID 4, BOLY	e appropriate type of filing. Complete the receipt in catton being filed. If you make an error, void original B. Surface Water Rights Filing Feee J. Declaration of Water Right 2. Amended Declaration 3. Declaration of Livestock Water Impoundment 5. Application for Livestock Water Impoundment 6. Notice of Intent to Appropriate 5. Application to Change Point of 7. Application to Change Point of 8. Application to Change Point of 7. Diversion 8. Application to Change Point of 7. Diversion and Place and/or Purpose 6. Use 7. Application to Change Point of 7. Diversion and Place and/or Purpose 7. Burpose of Use 7. Application to Change Point of 7. Diversion and Place and/or Purpose 7. Burpose of Use 7. Application to Change Point of 7. Diversion and Place and/or Purpose 7. Burpose of Use 7. Application to Change Point of 7. Diversion and Place and/or Purpose 7. Burpose of Use 7. Application to Change Point of 7. Diversion and Place and/or Purpose 7. Burpose of Use 7. Application for Extension of Time 7. Application for Extension of Time 7. Supplemental Well to a Surface Right 7. Proof of Completion of Works 7. Proof of Completion of Works 7. Proof of Completion of Works 7. Proof of Completion of Water to 8. Return Flow Credit 7. Proof of Completion of Water to 8. Return Flow Credit 7. Proof of Completion of Water to 8. Return Flow Credit 7. Proof of Completion of Works 7. Proof Of Comple	
STATE ENGI 34841 RECEIVED: A C C C	actions to the left of th copy to accompany appli- \$ 1.00 \$ 1.00 \$ 5.00 \$ 75.00 \$ 75.00 \$ 75.00 \$ 25.00 \$ 25.0	
OFFICE OF THE FICIAL RECEIPT NUMBER: 2- ITAL: 50	 STRUCTIONS: Indicate the number of nains in district office, and goldenrod. Ground Water Rights Filing Ground Water Rights Filing J. Declaration of Water Right ment Domestic 72-12-1 Well J. Application to Appropriate or Su ment Domestic 72-12-1 Well J. Application for Stock Well T. Application to Repair or Deepen 72-12-1 Well F. Application to Repair or Deepen 72-12-1 Well P. Application to Change Purpose of Application to Change Purpose of Non 72-12-1 Well J. Application to Change Purpose of Non 72-12-1 Well Application to Change Location of Non 72-12-1 Well Application to Change Location of Non 72-12-1 Well Application to Change Location well and Place and/or Purpose of Us Application to Change Place of Purpose of Us Application to Change Place of Vell Application to Change Place of Non 72-12-1 Well 	

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

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	r): N: 3,589,676	E: 603,860
Northing/Easting: SPCS83(92) (Fee	t): N: 523,852	E: 676,513
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

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 S	Scale: 1:19,134	
Northing/Easting: UTM83(92) (Meter): N: 3,589,686	E: 603,850
Northing/Easting: SPCS83(92) (Feet	:): N: 523,886	E: 676,481
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	Ν
Lonaitude:	103 Degrees	53 Minutes	43.3 Seconds	W

Universal Transverse Mercator Zone: 13N

77,195 E: 1,981,099
39,494 E: 603,889
76,532 E: 1,981,260

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) (Mete	er): N: 3,589,696	E: 603,840
Northing/Easting: SPCS83(92) (Fee	et): 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

N: 159,701	E: 206,173
N: 523,954	E: 676,420
N: 159,683	E: 193,621
N: 523,893	E: 635,238
	N: 159,701 N: 523,954 N: 159,683 N: 523,893



Locator Tool Report



WR File Number: C-POD4	Scale: 1:19,134	
Northing/Easting: UTM83(92) (Mete	er): N: 3,589,706	E: 603,831
Northing/Easting: SPCS83(92) (Fee	et): N: 523,954	E: 676,420
GW Basin: Carlsbad		

General Information:

Application ID:29 Date

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
The second s		

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 Se	cale: 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

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
NAD 1927 (Survey Leer)	14. 020,007	L. 000,100

Locator Tool Report





WR File Number: C-POD6 S	Scale: 1:19,134	
Northing/Easting: UTM83(92) (Meter	:): N: 3,589,726	E: 603,813
Northing/Easting: SPCS83(92) (Feel	t): 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

N: 159,731	E: 206,147
N: 524,050	E: 676,333
N: 159,712	E: 193,594
N: 523,990	E: 635,151
	N: 159,731 N: 524,050 N: 159,712 N: 523,990

Locator Tool Report





WR File Number: C-POD7	Scale: 1:19,134	
Northing/Easting: UTM83(92) (Meter	r): N: 3,589,736	E: 603,804
Northing/Easting: SPCS83(92) (Fee	t): 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
Lonaitude:	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

N: 159,740	E: 206,138
N: 524,080	E: 676,305
N: 159,722	E: 193,586
N: 524,020	E: 635,123
	N: 159,740 N: 524,080 N: 159,722 N: 524,020

Locator Tool Report





WR File Number: C-POD8	Scale: 1:19,134	
Northing/Easting: UTM83(92) (Meter	r): N: 3,589,745	E: 603,796
Northing/Easting: SPCS83(92) (Fee	t): N: 524,080	E: 676,305
GW Basin: Carlsbad		



PROJECT NUMBER: BORING 469935.14.04.02 EW-03

BORING NUMBER:

SHEET 1 OF 2

PROJE	CT : Form	ner Dow	Vell Schlumberger Facility LOCATION : Artesia, New Mexico		
ELEVAT	ION : no	t meas	ured DRILLING CONTRACTOR AND DRILL RIG : National I	Exploration Wells and Pumps, CME 85	
COORDINATES : N 32.44, E -103.89, (estim)		: N 32.4	44, E -103.89, (estim) DRILLING METHOD AND EQUIPMENT : 4.25-in ID H	DRILLING METHOD AND EQUIPMENT : 4.25-in ID HSA with continuous core	
WATER	LEVEL :	not me	asured START : 8/22/14 10:07 END : 8/22/14 12:0	5 LOGGER : Aleeca Forsberg	
OW	/ (ft)	0G	SOIL DESCRIPTION	COMMENTS	
DEPTH BEL GROUND SUF	RECOVERN	GRAPHIC L	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DRILLING DETAILS	
			Soil removed with hand auger during utility clearance		
-	-			-	
-	0.0			-	
-	-			-	
-	-			-	
5	_		SANDY SILT (ML) light reddish brown (5YR 6/3), dry, low plasticity, cohesive, mottled white-caliche	Soil logged from continuous core	
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	
⊼ ∺ 10_				Headspace=0.0 ppm	
G.GD			No recovery		
12 C					
- OTECH	3.0		SILT (ML) white / pinkish gray (5YR 8/1), dry, low plasticity, cohesive, mottled with light red nodules (as above) with less grading deeper	Headspace=0.0 ppm	
- GE	-		SILTY SAND (SM)	-	
15_ 15_			medium and coarse grained	_ Headspace=0.0 ppm	
CT.GPJ;			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	- Headspace=0.0 ppm	
OJEC -	4.0			-	
H -			white / pinkish gray (5YR 8/1), partially cemented caliche, laminated, trace black organic stringers	Headspace=0.0 ppm	
MERCIAI			SANDY SILT (ML) reddish brown (2.5YR 4/4), dry, low plasticity, cohesive, very fine sand, few (5%) fine gravel, laminated		
COM	-		POORLY GRADED SAND (SP)	-	
B'B'	3.0	× * /*/*	No recovery	-	
-	-		WELL GRADED GRAVEL WITH CLAY (GW-GC)		
- AERO	-		gravelly clay (CL)	_ Headspace=0.0 ppm _	
W0 25_			SILI (ML) red (2.5YR 5/6), low plasticity, cohesive, laminated, 2% medium gravel		
- 15	-	<u>* * * / / / / / / / / / / / / / / / / /</u>	LEAN CLAY (CL)		
- HOL		6 /6 /6/ 9 /9 /9 /9	POORLY GRADED SAND (SP)	-	
- EOTI	5.0	,,,,,	reddish brown (2.5YR 5/4), wet, partially cemented, 5-7% fine gravel	-	
- 5W G	-		light reddish brown (2.5YR 7/3) to reddish brown (2.5YR 4/4) interbedded with silt, wet, low		
HO 30			plasticity, cohesive, silt is stiff and has 5% sand and gravel		
- LOG			(2.5YR 4/6), wet, low plasticity, cohesive, medium stiff	Headspace=0.0 ppm	
RING	1	6 /6 /6/ 6 /6/4/	ן אובו (אוב) רופל (2.5YR 4/6), moist, low plasticity, cohesive, very soft, 2% medium gravel		
L BOI	5.0		WELL GRADED GRAVEL WITH CLAY AND SAND (GW-GC)	Headspace=0.0 ppm	
/ SOI			SILT (ML)		
Served 35			(2.5YR 4/b), moist, low plasticity, conesive, very soft, 2% medium gravel		



PROJECT NUMBER: 469935.14.04.02 BORING NUMBER: EW-03

SHEET 2 OF 2

	PROJEC	CT : Forn	ner Dow	vell Schlumberger Facility LOCATION : Artesia, New Mexico	
	ELEVATION : not measured DR		ot meas	ured DRILLING CONTRACTOR AND DRILL RIG : National	Exploration Wells and Pumps, CME 85
	COORDINATES N 32 44 E -103 89 (estim)		N 32		SA with continuous core
			not	Environment Environment	
		LEVEL	not me	asured START: 8/22/14 10:07 END: 8/22/14 12:0	
	FAC	(ŧ)	g	SOIL DESCRIPTION	COMMENTS
	SUR ()	ERY	CLO	SOIL NAME, USCS GROUP SYMBOL,	DRILLING DETAILS
	HT SON	NO:	PH	COLOR, MOISTURE CONTENT, RELATIVE	
	SOU	REC	GRV	STRUCTURE, MINERALOGY	
	GF				
	_			SILI (ML) reddish brown (2.5YR 4/4) wet low plasticity cohesive dense 5-10% clay	
				SILT (ML)	Handanana-0.0 nom
	-	5.0		reddish brown (2.5YR 5/3), wet, low plasticity, cohesive, soft, 1" medium gravel layers (white) at	Headspace=0.0 ppm
	-	0.0		36 and 37.5	
	_				_
	40			SILTY SAND (SM)	Hoodepage=0.0 ppm
	40			CLAYEY SAND (SC)	
	-	-		light red (2.5YR 6/6), wet, loose, blocky, very fine sand	-
	_			LEAN CLAY (CL)	d
		5.0		white (2.5YR 8/1), wet, medium plastic, cohesive, very soft	
/15	-			clate Sand (SC)	-
2/11	-	-	Y///	LEAN CLAY WITH SAND (CL)	r
Ë	45			variagated reddish brown (2.5YR 4/4), white (2.5YR 8/1), and grey (5YR 6/1) wet, low plasticity,	
9.6					r -
ö	-	1		pinkish gray / gravish orange pink (5YR 7/2), wet, partially cemented	r.
-1	-			No recovery	
БÇ	_	4.5		CALICHE	r.
EOT				pinkish white (5YR 8/2), wet, cemented to partially cemented	
Ъ	-			vellowish red / light brown (5YR 5/6), wet, low plasticity, cohesive, stiff, 10% silt, laminated	
CH2N	50			POORLY GRADED SAND (SP)	
÷	_	-		light reddish brown (2.5YR 6/4), wet, loose, predominantly fine grained	
Ъ.				POORLY GRADED SAND (SP)	r -
EC	_	5.0	말라	POORLY GRADED SAND WITH SILT (SP-SM)	r -
ROJ	-	-	1.7.17	reddish yellow (5YR 6/6), wet, loose, thinly bedded, fine grained	r
۲ ا	-	-	<u>, , , , ,</u>	POORLY GRADED SAND (SP)	r -
CIA	55			POORLY GRADED SAND WITH CLAY (SP-SC)	
MER				reddish yellow (5YR 6/6), wet, loose, thinly bedded, fine grained	
WO	-		11/1/		ſ
ы В	-	-	V////	White / yeilowish gray (5Y 8/1), wet, non plastic, noncohesive, 5% fine sand	
Ŀ,	_	5.0		white / yellowish gray (5Y 8/1), wet, very loose, predominantly fine and medium sand, laminated.	
CIAL				5-7% lean clay	
MER	-	1	V////	LEAN CLAY (CL) reddish brown (5YR 5/4) wet low plasticity cohesive medium dense, gravel to 4 cm diameter	
OMN	60		<u> </u>	speckled throughout	,L
0 N	-			Boring terminated at 60.0 ft bgs.	
Ξ	_				
ЩЩ	-				
3EO	-	1			
N	-	-			
Ü	65				_
ő					
Ľ D	-	1			
JRIN	-	-			
, BC	_				
SOIL					
Ň		1			
z	70				



 PROJECT NUMBER:
 BORING NUMBER:

 469935.14.04.02
 IJ-1
 SHEET 1 OF 1

PROJECT : Former Dowe	ell Schlumberger Facility LOCATION : Artesia, New Mexico			
ELEVATION : not measu	red DRILLING CONTRACTOR AND DRILL RIG : Nationa	Exploration Wells and Pumps, CME 85		
COORDINATES : N 32.4	4, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT : 4.25-in ID	DRILLING METHOD AND EQUIPMENT : 4.25-in ID HSA with center plug		
WATER LEVEL : not mea	Isured START : 8/21/14 09:36 END : 8/21/14 09:	52 LOGGER : Aleeca Forsberg		
COW RFACE (ft)	SOIL DESCRIPTION	COMMENTS		
DEPTH BEL GROUND SUI (f) RECOVER'	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DRILLING DETAILS		
	SILT (ML) pale red (2.5YR 7/2), dry, non plastic, noncohesive, like flour	Soil logged from auger cuttings		
_		Headspace=4.7 ppm		
5	SILT (ML) pale red (2.5YR 7/2), dry, non plastic, noncohesive, like flour, with white clay/caliche chunks			
- 11/1/2 		Headspace=0.2 ppm		
ITECH 12_CG.GD	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		
	LEAN CLAY (CL) reddish brown (2.5YR 4/4), moist, low plasticity, cohesive, few (10-12%) fine to coarse sand			
		Headspace=0.0 ppm		
AL.GLB; COMMER	SILT (ML) reddish brown (2.5YR 5/4), wet, low plasticity, cohesive, few (10-12%) fine to coarse sand	Headspace=0.0 ppm		
 ЭМ 25	SII T (MI)	- -		
	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		
さ 30 じ 30		-		
	Boring terminated at 31.5 ft bgs.			
Z 35				



 PROJECT NUMBER:
 BORING NUMBER:

 469935.14.04.02
 IJ-2
 SHEET 1 OF 1

PROJE	CT : Forr	ner Dov	vell Schlumberger Facility LOCATION : Artesia, New Mexico	
ELEVA	FION : no	ot meas	ured DRILLING CONTRACTOR AND DRILL RIG : National E	Exploration Wells and Pumps, CME 85
COORE	NATES	: N 32.	44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT : 4.25-in ID H	SA with center plug
WATER	RLEVEL	: not me	easured START : 8/21/14 08:00 END : 8/21/14 08:19	D LOGGER : Aleeca Forsberg
DEPTH BELOW SROUND 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	-			
11/15	-		SILT (ML) light reddish brown (2.5YR 6/4), dry, non-plastic, noncohesive	Headspace=0.0 ppm
TECH_12_CG.GDT; 2/	-		SILT (ML) reddish brown (2.5YR 5/4), dry, medium plasticity, cohesive, trace (5-7%) white clay nodules and caliche chunks, little medium to coarse sand	-
LECT.GPJ; CH2M GEC 	-		Not Logged	-
GLB; COMMERCIAL_PRO	-		LEAN CLAY (CL) reddish brown (2.5YR 4/4), moist, low plasticity, noncohesive, little (8-12%) fine to coarse angular sand	Headspace=0.0 ppm
20MMERCIAL	-		SILT (ML)	-
<u>3 LOG; CH2M GEOTECH 12 C</u>	-		reddish brown (2.5YR 4/3), wet, non plastic, noncohesive, trace (5-7%) fine to coarse sand	- - - - -
ORIN.	_		Boring terminated at 31.5 ft bgs.	-
L BC	-			-
os Man 35				-



PROJECT NUMBER: BORING NUMBER: 469935.14.04.02 IJ-3 SHEET

SHEET 1 OF 1

PROJECT : Fo	rmer Dov	vell Schlumberger Facility LOCATION : Artesia, New Mexico	
ELEVATION :	not meas	ured DRILLING CONTRACTOR AND DRILL RIG : National Ex	xploration Wells and Pumps, CME 85
COORDINATE	S: N 32.	44, E -103.90, (estim) DRILLING METHOD AND EQUIPMENT : 4.25-in ID HS	A with center plug
WATER LEVE	L : not me	asured START : 8/20/14 16:13 END : 8/20/14 04:43	LOGGER : Aleeca Forsberg
TH BELOW UD SURFACE (ft) OVERY (ft)	PHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE	COMMENTS DRILLING DETAILS
GROUN REO	GRA	DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SILT (ML) pale red (2.5YR 7/2), dry, non plastic, noncohesive, almost like flour	
- - - 5		SILT (ML)	Headspace=0.0 ppm
07; 2/11/15 		pale red (2.5YR 7/2), dry, non plastic, noncohesive, almost like flour, trace fine gravel, 5-7% clay	Headspace=0.0 ppm -
1 GEOTECH 12_CG.GI		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 -
CIAL_PROJECT.GPJ: CH2A		Not logged	
DMMERCIAL GLB: COMMER		SILT (ML) reddish brown (2.5YR 5/3), wet, low plasticity, cohesive, trace fine to medium gravel, few fine to coarse sand	-
ING LOG; CH2M GEOTECH 12_CC		SIL 1 (ML) reddish brown (2.5YR 5/3), wet, low plasticity, cohesive, trace fine to medium gravel, few fine to coarse sand	-
New Solt BOR		Boring terminated at 32.0 ft bgs.	-



 PROJECT NUMBER:
 BORING NUMBER:

 469935.14.04.02
 IJ-4

SHEET 1 OF 1

-	PROJEC	T : Form	ner Dov	ell Schlumberger Facility	LOCATION : Artesia, Ne	w Mexico		
	ELEVATION : not measured			ured	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 : 4.250-in ID HSA with center plug			
-	WATER	LEVEL :	not me	asured	START : 8/20/14 14:52	END	: 8/20/14 15:10	LOGGER : Aleeca Forsberg
	UL CE			5000-5000 SOU				COMMENTS
	IRFA	للا بر	LOG	SUL	DESCRIPTION			CONNENTS
	H BE (ff)	VER	E	SOIL NAME, U COLOR MOISTI	JSCS GROUP SYMBOL,	ſF		DRILLING DETAILS
	DUNI	U U U U	RAP	DENSITY OF	CONSISTENCY, SOIL	L		
	GR(G	Ľ	0	STRUCT	JRE, MINERALOGY			
				SILT (ML)	atia nanashasiya trass	nadium araual		
	-			light reduish brown (2.51R 7/5), dry, non pla	astic, nonconesive, trace i	neulum graver		Soil logged from auger cuttings
	_							Headspace=0.0 ppm
	_							-
	_							
	5							
				SILT (ML)	atia nanashasiya trasa	modium grouol	with white	
	_			caliche-like nodules/chunks up to 2.54 cm d	iameter though some are	very soft and fri	iable	Headspace=0.1 ppm
	_				0			
5	_							-
111	_							
1 1	10							
GD.				LEAN CLAY (CL)		ite nedules (eb.		
ö	_			above	ly, conesive, abundant wi	inte nouules/chu	IIIKS dS	Headspace=0.1 ppm
Ξ	_							-
Ē	_							-
0 EO	_							-
I2M 0	15							_
Ъ.				LEAN CLAY (CL)	city cohecive 5% fine to	coaree sand		
GPJ	_							Headspace=0.0 ppm
ECH.	_							-
ROJ	_							
L ال	_							-
RC	20							_
MME	_			reddish brown (2.5YR 5/3), moist, low plasti	city, cohesive, 5-7% fine t	o coarse sand		
CO								Headspace=0.0 ppm
<u>B</u> B;	-							-
IAL.C	-							-
ERC	-							-
MMC	25		μ					_
20	_			reddish brown (2.5YR 5/3), wet, low plasticit	y, cohesive, 5-7% fine to	coarse sand, 10	0% silt	
Ξ				· · · · ·				Headspace=0.0 ppm
TEC	_							-
GEC	-		V////					
42M	-							-
C C	30		V////					_
Ľ	-		V/////	Boring terminated at 21.0 ft bac				
SING	_			Domig terminated at ST.U IL DQS.				
BOI								
SOIL								
Ň								
z	35							



PROJECT NUMBER: BORING NUMBER: 469935.14.04.02 IJ-5

SHEET 1 OF 1

PROJECT : Former Dowell Schlumberger Facility LOCATION		LOCATION : Artesia, New Me	CATION : Artesia, New Mexico		
ELEVATION : not mea	sured	DRILLING CONTRACTOR AI	ND DRILL RIG : National E	Exploration Wells and Pumps, CME 85	
COORDINATES : N 32	2.44, E -103.90, (estim)	DRILLING METHOD AND EQUIPMENT : 4.25-in ID HSA with center plug			
WATER LEVEL : not m	easured	START : 8/19/14 11:51	END : 8/19/2014	LOGGER : Aleeca Forsberg	
IRFACE SY (ft) LOG	SOI	L DESCRIPTION		COMMENTS	
DEPTH BE GROUND SU (ft) RECOVEF GRAPHIC	SOIL NAME, COLOR, MOIST DENSITY C STRUCT	USCS GROUP SYMBOL, 'URE CONTENT, RELATIVE R CONSISTENCY, SOIL 'URE, MINERALOGY		DRILLING DETAILS	
	SILT (ML) light reddish brown (2.5YR 6/3), dry, non p	lastic, noncohesive, few mediur	n sands	Soil logged from auger cuttings Headspace=0.1 ppm	
2/11/15	SILT (ML) reddish brown (2.5YR 5/4), dry, non plasti	c, noncohesive, few medium sa	nds, 5-7% clay	Headspace=0.2 ppm	
- 01ECH 12 CG 601.	LEAN CLAY (CL) light reddish brown (2.5YR 6/3), moist, nor	plastic, noncohesive, trace fine	e sands	Headspace=0.1 ppm	
	LEAN CLAY (CL) reddish brown (2.5YR 4/4), wet, non plasti	c, cohesive, few medium sand		Headspace=0.2 ppm	
- 02 COMMERCIAL	SILT (ML) reddish brown (2.5YR 5/3), wet, low plastic	ity, cohesive, 10% clay		Headspace=0.1 ppm	
25 - UT 25	SILT (ML) reddish brown (2.5YR 5/4), wet, low plasti	city, cohesive, few well graded s	ands	Headspace=0.6 ppm	
	Boring terminated at 31.5 ft bgs.			- - - -	



 PROJECT NUMBER:
 BORING NUMBER:

 469935.14.04.02
 IJ-6

SHEET 1 OF 1

ELEVATION: normessared DPRLING CONTRACTOR AND PRLING IS National Experiation Wiles and Pumps, CNE 85 COODRIGHTES: N2 44 E-103.00, (estim) DRILLING METHOD AND EQUIPMENT: 42.514 10.44 END: 6/1914 10.55 LGGERR: Attess Frankerg Image: Stand in the image in the i	-	PROJEC	CT : Form	ner Dov	vell Schlumberger Facility LOCATION : Artesia, New Mexico			
COORDINATES : N 32.4.E : 103.00, destim DRILLING METHOD AND EQUIPMENT : 4.2.5% IN USA with contar plan YMTER LEVEL, not measured START : 6/18/14 10.44 END. 8/18/14 10.58 LOGGER : Adects Foraberg Solu Solu Solu Solu EXEMPTION COMMENTS Solu Solu Solu Solu Solu EXEMPTION COMMENTS DRILLING DETAILS DRILLING DETAILS DRILLING DETAILS DRILLING DETAILS DRILLING DETAILS Solu Solu COMMENTS Truth EXEMPTION COMMENTS DRILLING DETAILS DRILLING DETAILS DRILLING DETAILS DRILLING DETAILS DRILLING DETAILS Solu Solu COMMENTS DRILLING DETAILS DRILLING DETAILS DRILLING DETAILS DRILLING DETAILS Solu Solu COMMENTS DRILLING DETAILS DRILLING DETAILS Solu COMMENTS DRILLING DETAILS DRILLING DETAILS Solu COMMENTS DRILING DETAILS DRILLING DETAILS Solu COMMENTS DRILING DETAILS DRILT (ML) Truth		ELEVATION : not measured		t meas	ured DRILLING CONTRACTOR AND DRIL	DRILLING CONTRACTOR AND DRILL RIG : National Exploration Wells and Pumps, CME 85		
TWATER LEVEL: coll messured STATE: 81914 10.44 END: 81914 10.53 LOGGER: Alecca Forsberg Soll DESCREPTION Soll DESCREPTION COMMENTS DRILING DETAILS Bigging Bigging Bigging Comments DRILING DETAILS Soll DESCREPTION COLOR, MOIST UNE: CONTENT, RELATIVE DESCREPTION DRILING DETAILS Soll degade from auger cultings Headspace=0.1 ppm F Soll degade from auger cultings Paid of D. STR 6/2, dry, non plastic, noncohesive, roots Soll degade from auger cultings Bigging Soll degade from auger cultings Paid of D. STR 6/2, dry, non plastic, noncohesive, dray nodules up to 2.5 cm - white with motified gray and reddiab brown when broken Indicate fine gravel LEAN CLAY (CL) paid red (Z-STR 6/2, dry, non plasticly, noncohesive, while dray modules to 1 cm, few cearse Indicate fine gravel LEAN CLAY (CL) mediab brown (Z-STR 4/3), wet, low plasticity, noncohesive, trace fine to medium sand Indicate fine gravel Headspace=0.2 ppm Indicate brown (Z-STR 6/4), wet, low plasticity, cohesive, few fine gravel Headspace=0.3 ppm Indicate brown (Z-STR 6/4), wet, low plasticity, cohesive, few fine gravel Headspace=0.3 ppm Inditate brown (Z-STR 6/4), wet, low plasticity, cohesive, few		COORDINATES : N 32.44, E -103.90, (estim)			44, E -103.90, (estim) DRILLING METHOD AND EQUIPME	DRILLING METHOD AND EQUIPMENT : 4.25-in ID HSA with center plug		
Soli, DESCRIPTION COMMENTS Soli, DESCRIPTION SOLI, NAME, LUSCS GROUP SYNHOL, COLOR, MAIL, MAIL, MAIL, LUSCS GROUP SYNHOL, COLOR, MAIL, TAGE fine gravel Soli logged from auger cuttings Headspace=0.1 ppm 10 LEAN CLAY (CL) pelle red (2,5YR 5/2), dry, Low plasticity, noncohesive, trace fine to medium sand Headspace=0.2 ppm Headspace=0.2 ppm 15 SILT (ML) redistin brown (2,5YR 5/4), wet, Low plasticity, cohesive, few fine gravel Headspace=0.3 ppm 20 SILT (ML) redistin brown (2,5YR 5/4), wet, Low plasticity, cohesive, few fine gravel Headspace=0.3 ppm 21 SILT (ML) redistin brown (2,5YR 5/4), wet, Low plasticity, cohesive, few fine gravel Headspace=0.3 ppm 22 SILT (ML) redistin brown (2,5YR 5/4), wet, Low plasticity, cohesive, few fine gravel <td>-</td> <td>WATER</td> <td>LEVEL :</td> <td>not me</td> <td>easured START : 8/19/14 10:44 Et</td> <td>ND : 8/19/14 10:58</td> <td>LOGGER : Aleeca Forsberg</td>	-	WATER	LEVEL :	not me	easured START : 8/19/14 10:44 Et	ND : 8/19/14 10:58	LOGGER : Aleeca Forsberg	
State State State State State State State 1 - - - - - - 10 - - - - - 10 - - - - - 10 - - - - - 10 - - - - - 10 - - - - - 10 - - - - - 10 - - - - - 10 - - - - - 10 - - - - - 10 - - - - - 10 - - - - - 10 - - - - - 10 - - - - - 10 - - - - - 115 - - - - - 12 - - - - - 12 - - - - </td <td>[</td> <td>CE</td> <td></td> <td></td> <td></td> <td></td> <td>COMMENTS</td>	[CE					COMMENTS	
Bigger Bigger <td></td> <td>IRFA</td> <td>۲۲ (ft</td> <td>L0G</td> <td>SOIL DESCRIPTION</td> <td></td> <td>COMMENTS</td>		IRFA	۲۲ (ft	L0G	SOIL DESCRIPTION		COMMENTS	
LESS TO CONSISTENCY Solution Status Second Status Second Status Second Status Second Status Second Status Second Status Second Status Second Status Second Status Second Status Second Status Second Status Second Status Second Status Second Status Second Status<		H BE D S C	VER	HIC	SOIL NAME, USCS GROUP SYMBOL,		DRILLING DETAILS	
10 1 SAUDY SLT (NL) reddish brown (2.5YR 4/3), dry, non plastic, noncohesive, roots Soll logged from auger cuttings Headspace=0.1 ppm 5 -		DUNI		RAF	DENSITY OR CONSISTENCY, SOIL			
Sol Logget from auger cuttings Sol Logget from auger cuttings Sol Logget from auger cuttings Headspace=0.1 ppm Sol Logget from auger cuttings Headspace=0.1 ppm Headspace=0.1 ppm Headspace=0.1 ppm Headspace=0.1 ppm Headspace=0.1 ppm Headspace=0.2 ppm Headspace=0.2 ppm Headspace=0.2 ppm Headspace=0.3 ppm Headspace=0.3 ppm Headspace=0.3 ppm Headspace=0.3 ppm Headspace=0.3 ppm		GRG	Ľ.	0	STRUCTURE, MINERALOGY			
Soli logget from ager cuttings Soli logget from ager cuttings Headspace=0.1 ppm Soli logget from ager cuttings Headspace=0.1 ppm Headspace=0.2 ppm Headspace=0.2 ppm Headspace=0.2 ppm Headspace=0.2 ppm Headspace=0.2 ppm Headspace=0.3 ppm Headspace=0.3 ppm Headspace=0.3 ppm Headspace=0.3 ppm Boring terminated at 31.0 ft bgs.					SANDY SILT (ML)			
5 - Headspace=0.1 ppm 6 - - 7 - - 8 - - 10 - - 10 - - 10 - - 10 - - 10 - - 10 - - 11 - - 12 - - 13 - - 14 - - 15 - - 16 - - 17 - - 18 - - 19 - - 10 - - 15 - - 16 - - 17 - - 18 - - 19 - - 10 - - 12 - - 14 - - 15 <		-			requisit brown (2.5 fR 4/3), dry, non plastic, nonconesive, roots		Soil logged from auger cuttings	
5 SILT (ML) pair red (2,5YR 62), dy, non plastic, noncohesive, clay nodules up to 2.5 cm - while with motiled grey and reddish brown when broken Headspace=0.1 ppm 10 LEAN CLAY (CL) pair red (2,5YR 62), dy, 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 21 SILT (ML) reddish brown (2,5YR 5/4), wet, low plasticity, cohesive, few fine gravel Headspace=0.3 ppm 22 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. Boring terminated at 31.0 ft bgs. Headspace=0.3 ppm		_	-				Headspace=0.1 ppm	
5 Str (ML) motified 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 day nodules to 1 cm, few coarse sard, trace fine gravel Headspace=0.2 ppm 15 LEAN CLAY (CL) nection gravel Headspace=0.2 ppm 16 LEAN CLAY (CL) nection gravel Headspace=0.2 ppm 15 SiLT (ML) nection fine gravel Headspace=0.2 ppm 20 SiLT (ML) nection brown (2.5YR 4/3), wet, low plasticity, cohesive, few fine gravel Headspace=0.3 ppm 30 SiLT (ML) nection brown (2.5YR 5/4), wet, low plasticity, cohesive, few fine gravel Headspace=0.3 ppm 30 Boring terminated at 31.0 ft bgs. Boring terminated at 31.0 ft bgs.		_	-					
5 SILT (M.) 10 Def red (2.5 YR 6/2), dry, non plastic, noncohesive, clay nodules up to 2.5 cm - white with motiled grey and reddish brown when broken 10 LEAN CLAY (CL) pale red (2.5 YR 6/2), dry, low plasticity, noncohesive, white day nodules to 1 cm, few coarse and, trace fine gravel 15 LEAN CLAY (CL) 16 LEAN CLAY (CL) 17 LEAN CLAY (CL) 18 Tedish brown (2.5 YR 4/4), moist, low plasticity, noncohesive, trace fine to medium sand 18 SILT (ML) 19 SILT (ML) 10 SILT (ML) 10 SILT (ML) 11 Tedish brown (2.5 YR 4/3), wet, low plasticity, cohesive, few fine gravel 10 SILT (ML) 11 Tedish brown (2.5 YR 4/3), wet, low plasticity, cohesive, few fine gravel 12 Boring terminated at 31.0 ft bgs.		_	-				-	
10 SLT (ML) 10 LEAN CLAY (CL) 10 LEAN CLAY (CL) 15 LEAN CLAY (CL) 16 LEAN CLAY (CL) 17 LEAN CLAY (CL) 18 LEAN CLAY (CL) 19 reddish brown when broken 16 LEAN CLAY (CL) 17 LEAN CLAY (CL) 18 reddish brown (2.5YR 4/4), moist, low plasticity, noncohesive, while day nodules to 1 cm, few coarse 18 LEAN CLAY (CL) 19 Readspace=0.2 ppm 19 LEAN CLAY (CL) 19 reddish brown (2.5YR 4/4), moist, low plasticity, noncohesive, trace fine to medium sand 19 SILT (ML) 10 SILT (ML) 11 reddish brown (2.5YR 4/3), wet, low plasticity, cohesive, few fine gravel 10 SILT (ML) 11 SILT (ML) 12 SILT (ML) 130 SILT (ML) 140 Boring terminated at 31.0 ft bgs. 150 Boring terminated at 31.0 ft bgs.		5						
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10 LEAN CLAY (CL) pale red (2 SYR 8/2), dry, low plasticity, noncohesive, white clay nodules to 1 cm, few coarse Headspace=0.2 ppm 15 LEAN CLAY (CL) 16 LEAN CLAY (CL) 17 LEAN CLAY (CL) 18 Silt (ML) 19 Silt (ML) 19 Silt (ML) 10 Silt (ML) 11 Silt (ML) 12 Silt (ML) 13 Silt (ML) 14 Silt (ML) 15 Silt (ML) 16 Silt (ML) 17 Silt (ML) 18 Boring terminated at 31.0 ft bgs.		_	-		mottled grey and reddish brown when broken		Headspace=0.1 ppm	
10 LEAN CLAY (CL) 11 LEAN CLAY (CL) 15 LEAN CLAY (CL) 15 LEAN CLAY (CL) 16 LEAN CLAY (CL) 16 LEAN CLAY (CL) 16 LEAN CLAY (CL) 16 Redispace=0.2 ppm 16 LEAN CLAY (CL) 17 redish brown (2.5YR 4/4), moist, low plasticity, noncohesive, trace fine to medium sand 18 SILT (ML) 19 SILT (ML) 19 SILT (ML) 10 SILT (ML) 10 SILT (ML) 11 SILT (ML) 12 SILT (ML) 13 reddish brown (2.5YR 5/4), wet, low plasticity, cohesive, few fine gravel 14 Headspace=0.3 ppm 15 Boring terminated at 31.0 ft bgs. 15 Boring terminated at 31.0 ft bgs.		-	-				-	
10 LEAN CLAY (CL) pale red (2.5YR 6/2), dry, low plasticity, noncohesive, white day nodules to 1 cm, few coarse 15 LEAN CLAY (CL) redish brown (2.5YR 4/4), moist, low plasticity, noncohesive, trace fine to medium sand 20 SILT (ML) redish brown (2.5YR 4/3), wet, low plasticity, cohesive, few fine gravel Headspace=0.2 ppm SILT (ML) redish brown (2.5YR 5/4), wet, low plasticity, cohesive, few fine gravel Headspace=0.3 ppm 30 Boring terminated at 31.0 ft bgs.	5	_	-				-	
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. Boring terminated at 31.0 ft bgs.	11/1	_						
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15 Image: Site (2.5 Yr 62), dy, low plasticity, nonconesive, while day nodules to 1 cm, tew coarse and, trace fine gravel Headspace=0.2 ppm 15 Image: Site (2.5 Yr 62), dy, low plasticity, nonconesive, trace fine to medium sand Headspace=0.2 ppm 20 Image: Site (2.5 YR 4/4), moist, low plasticity, noncohesive, trace fine to medium sand Headspace=0.2 ppm 20 Image: Site (ML) reddish brown (2.5 YR 4/3), wet, low plasticity, cohesive, few fine gravel Headspace=0.3 ppm 25 Image: Site (ML) reddish brown (2.5 YR 5/4), wet, low plasticity, cohesive, few fine gravel Headspace=0.3 ppm 30 Image: Site (ML) reddish brown (2.5 YR 5/4), wet, low plasticity, cohesive, few fine gravel Headspace=0.3 ppm 30 Image: Site (ML) reddish brown (2.5 YR 5/4), wet, low plasticity, cohesive, few fine gravel Headspace=0.3 ppm	GD				LEAN CLAY (CL)	f		
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. Boring terminated at 31.0 ft bgs.	ő	-	-		sand, trace fine gravel	tew coarse	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) 10 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.	₽ _	_	-					
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20 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 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. SILT (ML) reddish brown (2.5YR 5/4), wet, low plasticity, cohesive, few fine gravel	ZN O	15						
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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 - - - - 30 - - - - 30 - - - - 31 - - - - 32 - - - -	GPJ	_			readish brown (2.51R 4/4), moist, low plasticity, nonconesive, trace line to medium	n sano	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. Boring terminated at 31.0 ft bgs.	CH.	-					-	
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25 - - Headspace=0.3 ppm 25 - - - - 30 - - - - 30 - - - - 30 - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - <	CIA	20						
25 - </td <td>ШШ</td> <td></td> <td></td> <td></td> <td>SILT (ML)</td> <td></td> <td></td>	ШШ				SILT (ML)			
25 - 25 - 25 - 25 - 25 - 25 - 25 - 25 -	NON	-	1		requisit brown (2.3 re 4/3), wel, iow plasticity, conesive, lew line gravel		Headspace=0.3 ppm	
25 - 25 - 25 - 25 - 25 - 25 - 25 - 25 -	Ë	-	-				-	
25	ÅL.G	-	-					
25 Headspace=0.3 ppm	RCL	-						
30 - - Headspace=0.3 ppm 30 - - - - - - -	MME	25						
Headspace=0.3 ppm	õ				SILT (ML) reddish brown (2.5VR 5/4) wet low plasticity cohesive few fine group			
30 - </td <td>12</td> <td>-</td> <td>1</td> <td></td> <td>Toucion proven (2.0 m or), wet, low pradicity, concerve, new line graver</td> <td></td> <td>Headspace=0.3 ppm</td>	12	-	1		Toucion proven (2.0 m or), wet, low pradicity, concerve, new line graver		Headspace=0.3 ppm	
30 Boring terminated at 31.0 ft bgs. 35	ECF	-					-	
30 Boring terminated at 31.0 ft bgs.	EOT	-						
30 30 Boring terminated at 31.0 ft bgs. - - - - - - - - - - - - - - - - - - - -	Ω Σ	-	-					
Boring terminated at 31.0 ft bgs.	CH2	30						
Boring terminated at 31.0 ft bgs.	Ю О							
	ЧU	_			Boring terminated at 31.0 ft bgs.			
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	N SC	-	-					
	Ш́ Z	35						



PROJECT NUMBER: BORING NUMBER: 469935.14.04.02 IJ-7

SHEET 1 OF 1

PROJECT : Former Dowell Schlumberger Facility		er Dow	vell Schlumberger Facility LOCATION : Artesia, New Mexico	LOCATION : Artesia, New Mexico			
	ELEVATION : not measured		t meas	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 H	DRILLING METHOD AND EQUIPMENT : 4.25-in ID HSA with center plug		
	WATER	LEVEL :	not me	asured START : 8/19/14 10:00 END : 8/19/14 10:12	2 LOGGER : Aleeca Forsberg		
	DEPTH BELOW SROUND 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		
	0			No recovery, soil removed with hand auger during utility clearance			
	-				Soil logged from auger cuttings		
	5			SILT (ML)	-		
)Т; 2/11/15	- - - 10			5% fine gravel	Headspace=0.2 ppm -		
GEOTECH_12_CG.GD	-			LEAN CLAY (CL) reddish brown (2.5YR 5/3), dry, low plasticity, noncohesive, 5-10% silt, 5% medium sands	Headspace=0.2 ppm		
_PROJECT.GPJ; CH2M	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		
RCIAL.GLB; COMMERCIAL	20			SILT (ML) reddish brown (2.5YR 5/4), wet, medium plasticity, cohesive, few coarse sand	Headspace=0.2 ppm		
SEOTECH_12_COMMEF	25 			SILT (ML) reddish brown (2.5YR 5/4), wet, medium plasticity, cohesive, few coarse sand, few fine gravel	Headspace=0.1 ppm		
G LOG; CH2M G	 30			Boring terminated at 31.0 ft bgs.			
JIL BORIN	-				-		
NEW SC	35				-		



 PROJECT NUMBER:
 BORING NUMBER:

 469935.14.04.02
 IJ-8
 SHEET 1 OF 1

PROJECT : Former Dov	vell Schlumberger Facility LOCATION : Artesia, New Mexico			
ELEVATION : not meas	ured DRILLING CONTRACTOR AND DRILL RIG : Nationa	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 : not me	easured START : 8/19/14 08:50 END : 8/19/14 09	:06 LOGGER : Aleeca Forsberg		
DEPTH BELOW SROUND 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		
0	No recovery, soil removed with hand auger during utility clearance			
		Soil logged from auger cuttings		
5	Not logged			
BEOTECH_12_CG.GDT: 2/1	LEAN CLAY (CL) light reddish brown (2.5YR 6/3), dry, low plasticity, noncohesive, 10-15% clay, little medium gravel			
15 140JECT.GPU; CH2M 0	LEAN CLAY (CL) reddish brown (2.5YR 5/3), moist, low plasticity, noncohesive, few medium sands	Headspace=0.1 ppm		
CCIAL GLB: COMMERCIN	SILT (ML) weak red (2.5YR 4/2), wet, low plasticity, noncohesive, few medium sands, 5-10% fine sand	Headspace=0.0 ppm		
25	SILT (ML) reddish brown (2.5YR 4/4), wet, medium plasticity, cohesive, 5-7% fine sand, trace coarse sand	Headspace=0.0 ppm		
	Boring terminated at 30.5 ft bgs.			
OS				



PROJECT NUMBER: BORING NUMBER: 469935.14.04.02 MW-34

SHEET 1 OF 1

PROJECT : Former Dowell Schlumberger Facil	ity LOCATION : Artesia, New Me	lew Mexico		
ELEVATION : not measured	DRILLING CONTRACTOR A	ND DRILL RIG : National Exploration Wells and Pumps, CME 85		
COORDINATES : N 32.44, E -103.89, (estim)	DRILLING METHOD AND EQ	QUIPMENT : 4.25 ID HSA With Continuous Core		
WATER LEVEL : not measured	START : 8/21/14 13:30	END : 8/21/14 14:50 LOGGER : Aleeca Forsberg		
BEPTH BELOW SROUND SURFACE (f) RECOVERY (ft) GRAPHIC LOG 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 rem	oved with hand auger during utility clearance			
		Soil logged from continuous core		
5 5.0 5.0 5.0 5.0 5.0 5.0 5.0 5.	5YR 7/1), dry, non plastic, noncohesive, caliche-like t 5YR 7/1), as above, less caliche-like 7, non plastic, noncohesive, hard			
Sile Sile <th< td=""><td>non plastic, noncohesive, white caliche-like through</td><td>out, laminated at top 2 ft, Headspace=0.0 ppm</td></th<>	non plastic, noncohesive, white caliche-like through	out, laminated at top 2 ft, Headspace=0.0 ppm		
15 No recovery POORLY GRADED yellowish red / light b 4.5 5-10% silt, very fine s WELL GRADED GR light reddish brown / light reddish brown	SAND (SP) rown (5YR 5/6), moist, laminated, very loose, laminated and AVEL WITH CLAY (GW-GC) ight brown (5YR 6/4), moist, subrounded gravel orange pink (5YR 7/2), moist, low plasticity, cohesive	ted mottled-oxidized, // // // // // // // // // // // // //		
2.5 SILT (ML) reddish brown (2.5Y ZZZZ CALICHE 25 pale red (2.5YR 7/2),	R 4/4), wet, low plasticity, cohesive, soft, 10% mediur			
2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5	R 4/4), moist, low plasticity, cohesive, stiff SAND (SP) non plastic, very loose, very fine 			
35 - Boring terminated at 3	36.5 ft bgs.	Juy, conesive, 10-12%		



2/11/1 CH2M GEOTECH_12_CG.GDT; PROJECT.GPJ; COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL

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WELL DIAGRAM IS NOT TO SCALE


WELL DIAGRAM IS NOT TO SCALE

COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL_PROJECT.GPJ; CH2M GEOTECH_12_CG.GDT; 2/1/1

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WELL DIAGRAM IS NOT TO SCALE

COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL_PROJECT.GPU; CH2M GEOTECH_12_CG.GDT; 2/1/1/

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2/11/1 PROJECT.GPJ; CH2M GEOTECH_12_CG.GDT; COMPLETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL



PROJECT.GPJ; CH2M GEOTECH_12_CG.GDT; LETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL COMPL

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WELL DIAGRAM IS NOT TO SCALE



3/2/1 CH2M GEOTECH_12_CG.GDT; PROJECT.GPJ; LETION DIAGRAM; CH2M GEOTECH_12_COMMERCIAL.GLB; COMMERCIAL COMPI

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WELL DIAGRAM IS NOT TO SCALE



OFFICE OF THE STATE ENGINEER

OCATION	OSE POD NU Pod-1 MV WELL OWN Schlumb	imber (weli N-34 er name(s) erger Tecl	number) hnology Corpora	tion			OSE FILE NUI C-3774 PHONE (OPTI	MBER(S) ONAL)			
D WELL L	well own 105 Indu:	er mailing a strial Boul	address evard Sugar Lan	d			сптү Sugar Lan	d ī	state ГХ	77478	ZIP 3
1. GENERAL AND	WELL LOCATIO (FROM GF DESCRIPTION	N LATI PS) LONG	DEGREES TUDE 32. GITUDE 103. ELL LOCATION TO STREET	MINUTES 439 894 ADDRESS AND COMMO	SECOND 42826 5949 N LANDMARKS - PLS	S N W S (SECTION, T	* ACCURACY * DATUM RE OWNSHJIP, RANG	REQUIRED: ONE TENT QUIRED: WGS 84 (E) WHERE AVAILABLE	TH OF A SECC	DND	
	LICENSE NU WD-1210	JMBER	NAME OF LICENSED Bryan Nydoske	DRILLER	DWELL (ET)	1 BORE HO	I E DEPTH (ET)	NAME OF WELL DRI National EWP	ILLING COMP	ANY	
	COMPLETE	D WELL IS:	-21-14	C dry hole	SHALLOW (UNC	36.5		NA STATIC WATER LEV	'EL IN COMPI	ETED WE	LL (FT)
MATION	DRILLING F	LUID:	C AIR		ADDITIVES – SPE	ECIFY:		Augor			
SING INFOR	DEPTH FROM	(feet bgl)	BORE HOLE DIAM (inches)	CASING MATER GRAI (include each cas: note sections	CABLE TOOL UAL AND/OR DE ing string, and of screen)		ASING NECTION FYPE	CASING INSIDE DIAM. (inches)	CASING THICK	WALL NESS es)	SLOT SIZE (inches)
& CA	0	17	8 1/4	PVC		Flush		4	40		
2. DRILLING	17 27	27 32	8 1/4 8 1/4	PVC PVC		Flush Flush		4	40 40		.040
ERIAL	DEPTH	(feet bgl)	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL MATERIAL AN GRAVEL PACK SIZE-RANGE BY INTER			AND ERVAL	AMOUNT (cubic feet)		METHOD OF PLACEMENT	
3. ANNULAR MATI											
FOI	I R OSE INTEI E NUMBER	L RNAL USE		1	POD NUMBER	٤	WR-2 TRN	20 WELL RECORD NUMBER	& LOG (Ver	rsion 06/0	8/2012)

FROM	feet bgl) TO	THICKNESS (feet)	COLOR AND INCLUDE WATER (attach supp	TYPE OF MATERIAL ENCOUNTE -BEARING CAVITIES OR FRACTU lemental sheets to fully describe all 1	RED - JRE ZONES units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER- BEARING ZONES (gpm)
			See Attached	Namental (, , , , , , , , , , , , , , , , , ,		CYCN	
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						$O^{Y} O^{N}$	
. <u></u>						$O^{Y} O^{N}$	
METHOD U	JSED TO E T	STIMATE YIELI BAILER C	OF WATER-BEARING	STRATA: C PUMP	TOT WE	AL ESTIMATED LL YIELD (gpm):	
The second distance of	TEST	RESULTS - AT	ACH A COPY OF DAT/	A COLLECTED DURING WELL TE	STING, INCLUD	ING DISCHARGE	METHOD,
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#### OFFICE OF THE STATE ENGINEER

WELL LOCATION	OSE POD NU Pod-1 EW WELL OWNI Schlumbe WELL OWNI 105 Indus	mber (wel /-03 er name(s) erger Tec er mailing strial Bou	L NUMBER) hnology Corpora address levard Sugar Lanc	tion		OSE FILE NUM C-3773 PHONE (OPTIC CITY Sugar Land	MBER(S) ONAL) d l	state TX 7747	ZIP 8
. GENERAL AND	WELL LOCATIO (FROM GP DESCRIPTION	N LAT S) LON N RELATING W	DEGREES 32. ITTUDE 103. VELL LOCATION TO STREET	MINUTES SECOND 439 42826 894 5949 ADDRESS AND COMMON LANDMARKS - PLS	N W S (SECTION, T	* ACCURACY * DATUM REG OWNSHJIP, RANG	REQUIRED: ONE TENT QUIRED: WGS 84 E) WHERE AVAILABLE	TH OF A SECOND	<u></u>
2. DRILLING & CASING INFORMATION	LICENSE NU WD-1210 DRILLING S 8-22-14 COMPLETEI DRILLING F DRILLING F DRILLING M DEPTH FROM 0 15 55	MBER TARTED X WELL IS: LUID: LUID: LUID: (feet bgl) TO 15 55 60	NAME OF LICENSED I Bryan Nydoske DRILLING ENDED 3-22-14 ARTESIAN AIR NOTARY BORE HOLE DIAM (inches) 12 1/4 12 1/4 12 1/4	DRILLER DEPTH OF COMPLETED WELL (FT) 55 C DRY HOLE C SHALLOW (UNCO MUD ADDITIVES – SPI C HAMMER C CABLE TOOL CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen) PVC PVC PVC	BORE HO 61 ONFINED) ECIFY: C. CON Flush Flush Flush	LE DEPTH (FT)	NAME OF WELL DRI National EWP DEPTH WATER FIRS NA STATIC WATER LEV NA Auger CASING INSIDE DIAM. (inches) 4 4 4	ILLING COMPANY ST ENCOUNTERED (FT) TEL IN COMPLETED WE CASING WALL THICKNESS (inches) 40 40 40	LL (FT) SLOT SIZE (inches) .040
3. ANNULAR MATERIAL	DEPTH FROM	(feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL M GRAVEL PACK SIZE-RANC See Attached	ATERJAL Æ BY INTI	AND ERVAL	AMOUNT (cubic feet)	METHO	D OF AENT
FOR FILI	OSE INTER E NUMBER CATION	RNAL USE		POD NUMBER	2	WR-2 TRN	0 WELL RECORD NUMBER	& LOG (Version 06/0	)8/2012) -1-OF 2

DEPTH (	feet bgl)		COLOR AND	TYPE OF MATERIAL ENCO	OUNTERED -	WATER	ESTIMATED VIELD FOR
FROM	ТО	THICKNESS (feet)	INCLUDE WATER	-BEARING CAVITIES OR F	RACTURE ZONES ibe all units)	BEARING? (YES / NO)	WATER- BEARING
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⊖ AIR LIF	тС	BAILER C	OTHER - SPECIFY:			CEL TIEED (gpin).	
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K OSE INTEL	GNAL USE			POD NUMBER	TRN NUMBER		0.3011 00/00/2012

LOCATION	

PAGE 2 OF 2

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DEPTH BELOW SURFACE (FT)		AND TYPE	RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMB MOISTURE CONTENT, RELATIVE OR CONSISTENCY, SOIL STRUCT MINERALOGY	iol, color, Density Iure,	COMMENTS DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION	
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CH2MIHILL

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BORING NUMBER

### SOIL BORING LOG

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#### OFFICE OF THE STATE ENGINEER

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	LICENSE NU	JMBER	]]	NAME OF LICENSED	DRILLER	<u>ter de la company de la com</u>			NAME OF WELL DR	ILLING COM	1PANY	
ise e de Antes est	WD-1210	)		Sryan Nydoske			·····			an Dicolbi	TEDED (FT)	
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1415/211				L			<u></u>		STATIC WATER LEV	VEL IN COM	PLETED WE	LL (FT)
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AL	FROM	ТО	)	DIAM. (inches)	GRAVEL PA	CK SIZE-RANC	E BY INT	ERVAL	(cubic feet)		PLACEN	MENT
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FOI	R OSE INTE	RNAL U	SE				2	WR-	20 WELL RECORD	o & LOG (V	ersion 06/0	18/2012)
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FROM	(feet bgl)	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERI INCLUDE WATER-BEARING CAVITIES OR FRACTUR (attach supplemental sheets to fully describe all un	ED - WATER YIELD I E ZONES BEARING? WATE (YES / NO) BEARI ZONES (
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METHOD	USED TO E	STIMATE YIELI BAILER C	OF WATER-BEARING STRATA: O PUMP	TOTAL ESTIMATED WELL YIELD (gpm):
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10	STAF			WIN OVER THE TESTING TERIOD.
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		PROJECT NUMBER 41/0935.14,04.02	WELL NUMBE	R Sheet 1	OF 1
	CH2IVITILL	GROUND WATER M		L COMPLETION DIAGRAM	1
PROJECT : [	Dowell-schlumberger, H	1 LOI	ATION : HV HSTA,	NM	
ELEVATION: DRILLING ME	NM ETHOD AND EQUIPMENT USED: ()	DRILLING CONTR HEEG, WAZE IN ID HSP	WCTR PIUS	PESAPIEN	~
WATER LEVI	LS: Dive (1247 Rep.	poment Costo	8/23/1-081	D	
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		2- To	of casing elevation	<u>kih</u>	
		3- We	Ilhead protection cover ty	pe B" y 5/4 Stel Storep	1 PC
	15	a) ( b) ( d	irain tube? oncrete pad dimensions apth of surface concrete		
		4- Diz	Jtype surface casing	- MA	
		5- Dia	Aype of well casing		
				ZINSH 90 PVC	
(31)	5)	6- Ty	e/slot/size of screen	2119 50 HAD, 0.040 WR	-5107
	+ (1-3)	7- Tyj qu	e screen filter inlity used	0-16 colorado alica a	sand
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		De	velopment time	Rept Stb + EDAN	Ym
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CH2MHILL

No.

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SOIL BORING LOG

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ELEVATI	ON	MM			DRILLING CONTRACTOR NEWP ESEPTEN					
DRILLIN	G METH			MENT CHE-	25 HOT NAILSIN augersa	CTR PICO				
WATERI	EVELS	104	1	r	START 22114 0:30 FINISH 2414	CML LOGGER AT OF DIOLOG				
SF.	Ē	SAMPLE		STANDARD	SOIL DESCRIPTION	COMMENTS				
BEL(CE (F	AL	щщ	'ERY	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTUBE CONTENT, BELATIVE DENSITY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS,				
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1:20					Κ	0350				



OFFICE OF THE STATE ENGINEER

1. GENERAL AND WELL LOCATION	OSE POD NU Pod-2 IJ-2 WELL OWNE Schlumbe WELL OWNE 105 Indus WELL LOCATIO (FROM GP DESCRIPTION	MBER (WELL 1 2 SR NAME(S) erger Tech strial Boule N LATIT S) LONGI I RELATING WEL	NUMBER) nology Corpora DDRESS evard Sugar Land DEGREES UDE 32. UDE 103. ITUDE 103.	tion d 439 895 Address and common	SECOND 6595 2709 N LANDMARKS - PLS	S N W S (SECTION, T	OSE FILE NUN C-3772 PHONE (OPTION CITY Sugar Land * ACCURACY * DATUM REG	MBER(S) ONAL) d 7 REQUIRED: ONE TENT QUIRED: WGS 84 E) WHERE AVAILABLE	STATE FX 7	ZIP 7478
MATION	LICENSE NU WD-1210 DRILLING S 8-21-14 COMPLETEI DRILLING F	MBER F FARTED 8-2 D WELL IS: (LUID: (NAME OF LICENSED Bryan Nydoske DRILLING ENDED 21-14 : ARTESIAN	DRILLER DEPTH OF COMPLETEI 30 C DRY HOLE C MUD	RILLER DEPTH OF COMPLETED WELL (FT) BORE HOLE D 31.5 Dry Hole MUD ADDITIVES - SPECIFY:			NAME OF WELL DRI National EWP DEPTH WATER FIRS NA STATIC WATER LEV NA	ILLING COMPAN [*] ST ENCOUNTERE 'EL IN COMPLETI	Y D (FT) ED WELL (FT)
DRILLING & CASING INFORM	DRILLING METHOD:ROTARYDEPTH (feet bgl)BORE HOLEFROMTO020.3020.38 1/420.330.38 1/4		CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen) CAL CONN T ¹ PVC Flush PVC Flush		ASING NECTION IYPE	NG CTION E CASING INSIDE DIAM. (inches) 2 40 2 40		ALL SLOT SIZE (inches) .040		
(AL 2.1	DEPTH	(feet bgl) TO	BORE HOLE DIAM. (inches)	LIST ANN GRAVEL PA	NULAR SEAL M ACK SIZE-RANG	ATERIAL	AND ERVAL	AMOUNT (cubic feet)	MI PL	ETHOD OF ACEMENT
3. ANNULAR MATERI				See Attached						
FOI FIL	1 R OSE INTEF E NUMBER CATION	L RNAL USE	1		POD NUMBER	٤	WR-2 TRN	20 WELL RECORD NUMBER	& LOG (Versio	n 06/08/2012) PAGE 1 OF 2

	DEPTH (1 FROM	èet bgl) TO	THICKNESS (feet)	COLOR ANI INCLUDE WATEI (attach supp	D TYPE OF MATERIAL ENCOUN R-BEARING CAVITIES OR FRAC plemental sheets to fully describe a	TERED - TURE ZONES 11 units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER- BEARING ZONES (com)
				See Attached			C Y C N C Y C N	
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	METHOD U	ISED TO E	STIMATE YIELD BAILER O	OF WATER-BEARING OTHER – SPECIFY:	GSTRATA: C PUMP	TO WI	TAL ESTIMATED ELL YIELD (gpm):	
N	WELL TES	T TEST	RESULTS - ATT AT TIME, END TI	ACH A COPY OF DAT ME, AND A TABLE SH	A COLLECTED DURING WELL T IOWING DISCHARGE AND DRA	IESTING, INCLUI WDOWN OVER T	DING DISCHARGE HE TESTING PERIO	METHOD,)D.
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\$ 	Mark Gre	en						
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LO	CATION							PAGE 2 OF 2

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SEE John L. PENTINGION Soil NAME, USCS GROUP SYMBOL, COLOR, MONITUME, USCS GROUP SYMBOL, COLOR, MONITUME, USCS GROUP SYMBOL, COLOR, MONITUME, USCS GROUP, SOIL STRUCTURE, MILETIS AND INSTRUMENTATION Mais Under Construction, Soil STRUCTURE, MILETIS AND INSTRUMENTATION Soil NAME, USCS GROUP SYMBOL, COLOR, MILETIS AND INSTRUMENTATION Mais Under Construction, Soil STRUCTURE, MILETIS AND INSTRUMENTATION MILETIS AND INSTRUMENTATION Soil NAME, Construction, Soil STRUCTURE, MILETIS AND INSTRUMENTATION Soil Construction, Soil STRUCTURE, MILETIS AND INSTRUMENTATION Soil NAME, Soil Construction, Soil STRUCTURE, MILETIS AND INSTRUMENTATION Soil Construction, Soil STRUCTURE, MILETIS AND INSTRUMENTATION Soil NAME, Soil Construction, Soil STRUCTURE, Soil Construction, Soil STRUCTURE, MILETIS, Soil Construction, Construction, Soil Structure, MILETIS, AND INSTRUMENTATION Soil T(Leo), 2 Soil K (MILETIS), Soil STRUCTURE, MILETIS, Soil Construction, C	>_				STANDARD			COMME	NTS	
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OFFICE OF THE STATE ENGINEER

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WELL LO	well own 105 Indu	er mailing strial Bou	ADDRESS levard Sugar Lan	d			CITY Sugar Lan	d -	state TX 774	ZIP 78
KERAL AND	WELL LOCATIC (FROM GH	IN LAT PS) LON	DEGREES TTUDE 32. IGITUDE 103.	MINUTES 439 895	MINUTES SECONDS 439 5935 N * ACCURACY REQUIRED: ONE TENTH OF A SECONDS 895 3684 W * DATUM REQUIRED: WGS 84					
1. GET	DESCRIPTIO	N RELATING W	ELL LOCATION TO STREE	T ADDRESS AND COMMO	N LANDMARKS - PLS	S (SECTION, T	OWNSHJIP, RANG	E) WHERE AVAILABLE		
	LICENSE NU WD-1210	JMBER)	NAME OF LICENSED Bryan Nydoske	DRILLER				NAME OF WELL DR	ILLING COMPANY	
	DRILLING S 8-20-14	TARTED 8	DRILLING ENDED 3-20-14	DEPTH OF COMPLETE	D WELL (FT)	BORE HO	RE HOLE DEPTH (FT) DEPTH WATER FIRST ENCOUNTERE .5 NA			T)
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FROM	то	THICKNESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTERED - INCLUDE WATER-BEARING CAVITIES OR FRACTURE ZON (attach supplemental sheets to fully describe all units)	ES WATER BEARING? (YES / NO)	VIEI WA BEA
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METHOD U	T C T TEST STAR	RESULTS - ATT AT TIME, END TI	ACH A COPY OF DATA COLLECTED DURING WELL TESTING, IN ME, AND A TABLE SHOWING DISCHARGE AND DRAWDOWN O'	CLUDING DISCHARGE M VER THE TESTING PERIO	IETHO D.
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					S	SOIL BORING LOG					
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ELEVAT		MM		J	DRILLING CONTRACTOR NEW	PIISup	nen '		an fan mar wei an yf far yw ym ymae ym ar yw		
DRILLIN	IG METH		D EQUIP	MENT CHE	-85 HSA W 4.25 IN ID V	UCTP-PIVE	3- 14 Malka	-APr	Che March		
WATER	LEVELS	S TANT			STAHT CAMIT 1995 F	INISH 444	E HUM / LOGGE				
SE.		SAMPLE	<u>≻</u>	STANDARD PENETRATION TEST	SOIL DESCRIPTION		DEPTH OF CAS	ING DRI			
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	<u>}_</u>	24	<u>u</u>)		SILTCHUS 2.542712, palepin	Fidrig,	PID=0.0par	n			
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OFFICE OF THE STATE ENGINEER

	OSE POD NU	MBER (WEL	L NUMBER)			OSE FILE NU	MBER(S)		
NO	Pod-4 IJ-4	1				C-3772			
ATI	WELL OWNE	ER NAME(S)				PHONE (OPTI	ONAL)		
LOC	Schlumbe	erger lec	hnology Corpora	tion					
WELL I	WELL OWNE 105 Indus	er mailing strial Bou	Address levard Sugar Land	Ł		CITY Sugar Lan	d 7	STATE ΓΧ 7747	8
AND	WELL	N	DEGREES	MINUTES SECON 439 5275	DS N	* ACCURACY	REQUIRED: ONE TEN	TH OF A SECOND	
ERAL	(FROM GP	S) LON	IGITUDE 103.	895 5466	W	* DATUM RE	QUIRED: WGS 84		
1. GEN	DESCRIPTION	NRELATING W	VELL LOCATION TO STREET	ADDRESS AND COMMON LANDMARKS - PL	SS (SECTION, T	OWNSHJIP, RANG	SE) WHERE AVAILABLE		
	LICENSE NU WD-1210	MBER	NAME OF LICENSED I Bryan Nydoske	DRILLER			NAME OF WELL DR	ILLING COMPANY	
	DRILLING S 8-19-14	TARTED 8	DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	BORE HO 31.5	LE DEPTH (FT)	DEPTH WATER FIR	ST ENCOUNTERED (FT)	
7	COMPLETEI) WELL IS:	C ARTESIAN		STATIC WATER LEV	VEL IN COMPLETED WE	LL (FT)		
ATIO	DRILLING F	LUID:	C air	С мид Additives – Si	PECIFY:				
DRM	DRILLING M	IETHOD:	C ROTARY	C HAMMER C CABLE TOOL	💽 отн	ER - SPECIFY:	Auger		
Ĕ	DEPTH	(feet bgl)	BORE HOLE	CASING MATERIAL AND/OR	С	ASING	CASING	CASING WALL	SLOT
ASING	FROM TO		DIAM (inches)	(include each casing string, and note sections of screen)	CON	NECTION TYPE	INSIDE DIAM. (inches)	THICKNESS (inches)	SIZE (inches)
S S S	0	20.3	8 1/4	PVC	Flush		2	40	
DN 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 M	MATERIAL	AND	AMOUNT	METHO	D OF
IAL	FROM	TO	DIAM. (inches)	GRAVEL PACK SIZE-RAN	GE BY INT	ERVAL	(cubic feet)	PLACE	MENI
TER				See Attached					
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DNN									
3. A									
FOI	L OSE INTER	I NAL USE		1		WR-	20 WELL RECORD	& LOG (Version 06/0)8/2012)
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LO	CATION			I				PAGE	E 1 OF 2

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	DEPTH (1	eet bgl)	THICKNESS	COLOR AND TYPE OF MATERIAL ENCO)UNTERED -	WATER	ESTIMATED YIELD FOR			
	FROM	TO	(feet)	INCLUDE WATER-BEARING CAVITIES OR FI (attach supplemental sheets to fully descr	RACTURE ZONES ibe all units)	BEARING? (YES / NO)	WATER- BEARING ZONES (gpm)			
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	METHOD U	ISED TO E	ESTIMATE YIELD	O OF WATER-BEARING STRATA: $()$ PUMP		ELL YIELD (gpm):				
	○ AIR LIF	г С	BAILER C	OTHER – SPECIFY:						
3	WELL TES	T TEST	Γ RESULTS - ΑΤΊ RT TIME, END TI	ACH A COPY OF DATA COLLECTED DURING WE ME, AND A TABLE SHOWING DISCHARGE AND I	ELL TESTING, INCLUE DRAWDOWN OVER T	DING DISCHARGE HE TESTING PERIO	METHOD, OD.			
RIG SUPERVISI	MISCELLA	NEOUS IN	JFORMATION:							
ST;	DDINIT NAA	IE(S) OF 1	DOILT DIC SUDE	PVISOD(S) THAT PROVIDED ONSITE SUPERVISIO	N OF WELL CONSTR	UCTION OTHER T	HAN LICENSEE			
5. TF	Mark Green									
NATURE	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:									
SIG		10	n/	mary Grey	5	1-8-14				
ં		SIGNA	TURE OF DRILL	ER / PRINT SIGNEE NAME	F	DATE				
FO	R OSE INTER	NAL USE			WR-20 WELL F	ECORD & LOG (V	ersion 06/08/2012			
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LOCATION

PAGE 2 OF 2

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PROJECT NUMBER	BORING NUMBER			,
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SOIL BORING LOG

PROJEC ELEVATI DRILLIN WATER I	TA ON G METH _EVELS	MCI- M HOD AN	Schlu DEQUIP MT	Mb <i>urger</i> . Ment CME	Artesia DRILLING CONTRACTOR NEWP ISA 85 HSTAN 425 IN IDAUGUS 4 (START 849/14 1452 FINISH 849/14	HESA MM PIEM HEPIURD- HEDI LOGGER AFENSDANCE
≩c		SAMPLE		STANDARD	SOIL DESCRIPTION	COMMENTS
DEPTH BELO	NTERVAL	NUMBER	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
		24			SILTCHU) 25YR713 light reduch	PID=0.0ppm
					brownidry. Non plste, non cohesive trace med grave 1 -	sainged from angers
5 -	energia i i con constantivos .				same as above, white aduche-luce- noduces chunkes up to 2.54cm drame- Humon 4me are very self thable _	PID=0.1ppm
10-		-	L		Mato Miller 2 5 18 112 Haller Walder	1454
-					brown, imposte, Conessive, abundante Mute nocules Ichunks as abuve	PiD:0.1ppm
						ititis u
- 6	-				moist, I av piste, Conesive, 57. Fine to course scinct -	pi0:0.0ppm
	-				-	
20-	- 				SILICHUD 25542513, heddish brown morst, lavpistz, conesive, 5-71; -	490 PID=0.0ppm
		а. Х				
200	1				en normander sold with the sold over a sold of the sold of	isa.
49-					brown, wet, low piste, Coheside, 5-71. Fine to occurse scind, 101. Silt	PID=2:0 ppm Note throttle cable disconnected stop diricling to fix
	-					
30_				<u> </u>	<u>1</u>	





LOCATION

WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

LOCATION	OSE POD NL Pod-5 IJ-5 WELL OWN Schlumb	MBER (WELL 5 ER NAME(S) erger Tech	NUMBER) Inology Corpora	tion	OSE FILE NUMBER(S) C-3772 PHONE (OPTIONAL)				
VELL L(well own 105 Indu	er mailing a strial Boule	DDRESS evard Sugar Land	d		CITY STATE Sugar Land TX 77			ZIP 78
1. GENERAL AND	WELL LOCATIO (FROM GF DESCRIPTION	N LATIT (S) LONG N RELATING WE	DEGREES TUDE 32. HTUDE 103.	MINUTES SECOND 439 4281 895 5596 ADDRESS AND COMMON LANDMARKS - PLS	N W S (SECTION, T	J * ACCURACY REQUIRED: ONE TENTH OF A SECOND W * DATUM REQUIRED: WGS 84 J, TOWNSHJIP, RANGE) WHERE AVAILABLE			
ASING INFORMATION	LICENSE NU WD-1210 DRILLING S 8-19-14 COMPLETEI	TARTED 8-	NAME OF LICENSED D Bryan Nydoske DRILLING ENDED 19-14	DRILLER DEPTH OF COMPLETED WELL (FT) 30 C DRY HOLE C SHALLOW (UNC	LE DEPTH (FT)	NAME OF WELL DRILLING COMPANY National EWP DEPTH WATER FIRST ENCOUNTERED (FT) NA STATIC WATER LEVEL IN COMPLETED WELL (FT)			
	DRILLING F	LUID: ((ETHOD: (AIR ROTARY	MUD ADDITIVES - SPI	ecify: othi	ER – SPECIFY:	Auger	T	
	FROM	TO	BORE HOLE DIAM (inches)	GRADE (include each casing string, and note sections of screen)	CON	ASING NECTION ГҮРЕ	CASING INSIDE DIAM. (inches)	CASING WALI THICKNESS (inches)	SLOT SIZE (inches)
2. DRILLING & (0 20.3	20.3 30.3	8 1/4 8 1/4	PVC PVC	Flush Flush		2 2	40 40	.040
TERIAL	DEPTH (feet bgl) BORE HOLE FROM TO			LIST ANNULAR SEAL MATERIAL AND GRAVEL PACK SIZE-RANGE BY INTERVAL See Attached		AND ERVAL	AMOUNT (cubic feet)	METT	HOD OF EMENT
3. ANNULAR MAI									
FOF	I R OSE INTE E NUMBER	I RNAL USE		POD NUMBE	R	WR- TRN	20 WELL RECORD NUMBER	& LOG (Version 0	6/08/2012) GE 1 OF 2

	DEPTH (f	reet bgl) TO	THICK NESS (feet)	COLOR AND TYPE OF MATERIAL ENCOUNTER INCLUDE WATER-BEARING CAVITIES OR FRACTUR (attach supplemental sheets to fully describe all ur	ED - RE ZONES nits)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER- BEARING ZONES (gpm)
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	C AIR LIF	T C	BAILER C	OTHER - SPECIFY:	WI	ELL YIELD (gpm):	
	WELL TES	T TES	ſ RESULTS - AT RT TIME, END T	TACH A COPY OF DATA COLLECTED DURING WELL TES IME, AND A TABLE SHOWING DISCHARGE AND DRAWD	TING, INCLUI OWN OVER TI	DING DISCHARGE HE TESTING PERIO	METHOD, DD.
	MISCELLA	NEOUS IN	IFORMATION:				
	PRINT NAI Mark Gre	ME(S) OF I	DRILL RIG SUPE	RVISOR(S) THAT PROVIDED ONSITE SUPERVISION OF W	ELL CONSTR	UCTION OTHER T	HAN LICENSEE:
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6. SIG		SIGNA		FR / PRINT SIGNEE NAME		17-14 DATE	
	L	010142					
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					SOIL BORING LOG				
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ELEVAT	ON	NH			DRILLING CONTRACTOR NEWF) I	capren	n an	
DRILLIN WATER	G METH	IOD AND	FOUIP	MENT CHE	START 8/2/14 /161 F	Inish 2014	A ROU LOGGER AT	ivslauve	
SAMPLE STANDARD					SOIL DESCRIPTION		COMMENTS	S	
			RECOVERY FT)	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBO MOISTURE CONTENT, RELATIVE OR CONSISTENCY, SOIL STRUCT MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION			
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OFFICE OF THE STATE ENGINEER

NOI	OSE POD NU Pod-6 IJ-6	imber (well 5	NUMBER)		OSE FILE NUMBER(S) C-3772							
OCATI	well own	^{ER NAME(S)} erger Tech	nology Corpora	tion	PHONE (OPTIONAL)							
MELL I	WELL OWN 105 Indu	er mailing a strial Boule	address evard Sugar Land	d	спу Sugar Land		STATE TX 7747	ZIP 8				
RAL AND 7	WELL LOCATIO (FROM GF	N LATIT	DEGREES <u>TUDE</u> 32. NUTUDE 103.	MINUTES SECONDS 439 2955 N 895 6532 W		ACCURACY REQUIRED: ONE TENTH OF A SECOND ADATUM REQUIRED: WGS 84			<u>e de la constant de la constant</u>			
1. GENE	DESCRIPTION RELATING WELL LOCATION TO STREET ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSHJIP, RANGE) WHERE AVAILABLE											
	LICENSE NU WD-1210	MBER	NAME OF LICENSED I Bryan Nydoske	DRILLER			NAME OF WELL DR	ILLING COMPANY				
SING INFORMATION	DRILLING STARTED 8-19-14 8		DRILLING ENDED	DEPTH OF COMPLETED WELL (FT)	OF COMPLETED WELL (FT) BORE HOLE DEPTH (1 31.5		T) DEPTH WATER FIRST ENCOUNTERED (FT) NA					
	COMPLETEI	D WELL IS: (ARTESIAN	C dryhole C shallow(und	CONFINED)	STATIC WATER LEVEL IN CO NFINED) NA			OMPLETED WELL (FT)			
	DRILLING F	LUID: (AIR									
	DRILLING N	iethod: (C ROTARY	C HAMMER C CABLE TOOL	💽 отн	ER – SPECIFY:	Auger		1			
	DEPTH (feet bgl) FROM TO		BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)	C. CON	ASING NECTION TYPE	CASING INSIDE DIAM. (inches)	CASING WALL THICKNESS (inches)	SLOT SIZE (inches)			
& CA	0	20.3	8 1/4	PVC	Flush		2	40				
ILLING	20.3	30.3	8 1/4	PVC	Flush		2	40	.040			
2. DR					· · · · · · · · · · · · · · · · · · ·	·····						
	DEPTH (feet bgl) BORE HOLE			LIST ANNULAR SEAL N	AND	AMOUNT (cubic feet)	METHO	METHOD OF				
ERIAL	FROM	ТО	DIAM. (Inches)	See Attached	GE BY INT	EKVAL						
AR MAT												
3. ANNUI												
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FOI FIL	R OSE INTEI E NUMBER	RNAL USE		POD NUMBE	R	WR-2 TRN	20 WELL RECORD NUMBER	& LOG (Version 06/	2012)			
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	DEPTH (f FROM	feet bgl) TO	THICKNESS (feet)	COLOR ANI INCLUDE WATE (attach sup	D TYPE OF MATERIAL ENCO R-BEARING CAVITIES OR FR plemental sheets to fully descrit	UNTERED - ACTURE ZONES De all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER- BEARING ZONES (gpm)	
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iri 	Mark Green								
	THE UNDE	THE UNDERSIGNED HEREBY CERTIFIES THAT, TO THE BEST OF HIS OR HER KNOWLEDGE AND BELIEF, THE FOREGOING IS A TRUE AND CONDUCT DECOND OF THE ADOVE DESCRIPTED HOLE AND THAT HE OP SHE WILL BE STUDY WELL DECOND WITH THE STATE DISCUSSED							
URF	AND THE P	PERMIT HO	DLDER WITHIN	20 DAYS AFTER COM	PLETION OF WELL DRILLING				
NAT		-							
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e		SIGNA	- FURE OF DRILLI	ER / PRINT SIGNEE	NAME		DATE	. <u></u>	
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FO	R OSE INTER	NAL USE				WR-20 WELL	RECORD & LOG (Ve	ersion 06/08/2012)	
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PAGE 2 OF 2

LOCATION
CH2MHILL

PROJECT NUMBER	BORING NUMBER		
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SOIL BORING LOG

PBO IEC	t Onm	1-50	intum	bernir A	VIELA G LOCATION -A	HESIGNM	
FLEVATION NH DRILLING CONTRACTOR NOWP - I Savan							
DRILLING METHOD AND EQUIPMENT CHE 85 HIST WOR PING 4.25-19 1D anguis							
WATERL	EVELS		MM		START 21914 1014 FINISH 21914	1 1050 LOGGER AHOrSDEVES	
3c		SAMPLE		STANDARD	SOIL DESCRIPTION	COMMENTS	
EPTH BELO URFACE (F1	VTERVAL	UUMBER NID 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	
		24			SANDY SINC (ML) 2.5YRA [3, reldish bm,	PID=0.1ppm	
- 					any, non-piste, non-cohesive, roots -	Sou lagged from augors	
- - - -							
5 - -					SILECTIC) 2.5412 6/2, pink, dry, han pistz, non conssive, Clay noclulus - up to 2.5 cm - white of moddled grees avaid isto brown when broken	PLD= Oilppm -	
- 10				107	1000 2.54R 6/2, Palle rad, dry, Monoplar, nonwhesive, Walk ciay nothes includes to 1000, few coarce sand, tra	- 10416	
- 15					uponi CURY(CU) 2.54 R-4/4 reddish brn, mast, Ow pisto, nonconesive, trave fine to med sand	-1050 PID2012ppm B2=0.0ppm	
.20 -					SILTCHED, ZIS YE AB3 reddish brin, Wet, lowpiste, cohesive, few of time growel	1032 DID=0.3 ppm	
25-					SILTCHE) 253 YR 514, reddisin Lorn, with, impiste, conesive, two fine gravel	-+453 PID=0.3ppm	
50	-					-	





WELL RECORD & LOG

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CATION	OSE POD NUMBER (WELL NUMBER) Pod-7 IJ-7 WELL OWNER NAME(S) Schlumberger Technology Corporation							OSE FILE NUMBER(S) C-3772 PHONE (OPTIONAL)				
WELL LO	well owner Mailing Address 105 Industrial Boulevard Sugar Land							d	state TX 774	ZIP 178		
I. GENERAL AND	WELL DEGREES LOCATION LATITUDE 32. (FROM GPS) LONGITUDE 103. DESCRIPTION RELATING WELL LOCATION TO STREET			S MINUTES 439 895 T ADDRESS AND COMMON	MINUTES SECONDS 439 1961 N 895 7469 W ADDRESS AND COMMON LANDMARKS - PLSS (SECTION, TOWNSH)			REQUIRED: ONE TEN QUIRED: WGS 84 E) WHERE AVAILABLE	TH OF A SECOND			
	LICENSE NUMBER WD-1210 Bryan Nydoske DRILLING STARTED 8-19-14 Britting Ended 8-19-14			DRILLER DEPTH OF COMPLETEI 30) WELL (FT)	NAME OF WELL DRI National EWP BORE HOLE DEPTH (FT) DEPTH WATER FIRS 31.5 NA		ILLING COMPANY ST ENCOUNTERED (FT)			
ATION	COMPLETEI DRILLING F	D WELL IS:	C ARTESIAN	C DRY HOLE C	SHALLOW (UNC	ONFINED) ECIFY:		NA	VEL IN COMPLETED	WELL (F1)		
JRM	DRILLING M	IETHOD:	C ROTARY	C HAMMER C	CABLETOOL	• OTHE	R - SPECIFY: Auger					
ASING INFO	DEPTH (feet bgl) FROM TO		BORE HOLE DIAM (inches)	CASING MATER GRAI (include each casi note sections	MATERIAL AND/OR GRADE each casing string, and sections of screen)		ASING NECTION FYPE	CASING INSIDE DIAM. (inches)	CASING WALI THICKNESS (inches)	L SLOT SIZE (inches)		
& C	0	20.3	8 1/4	PVC		Flush		2	40			
2. DRILLING	20.3	30.3	8 1/4	PVC		Flush		2	40	.040		
					•							
	DEPTH	(feet bgl)	BORE HOLE	LIST ANN	LIST ANNULAR SEAL MATERIAL AND		ND AMOUNT		METI	HOD OF		
ATERIAL	FROM	ТО		See Attached	GRAVEL PACK SIZE-RANGE BY INTERVAL See Attached		ER VAL	(cubic feet)				
3. ANNULAR M												
FOF	OSE INTER	NAL USE	3				WR-2	0 WELL RECORD	& LOG (Version 0	6/08/2012)		
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LOC	CATION								PAG	GE 1 OF 2		

	DEPTH (f	eet bgl)		COLOR AN	D TYDE OF MATERIAL		TEDED		ESTIMATED
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LES1	PRINT NAM	IE(S) OF D	RILL RIG SUPEI	RVISOR(S) THAT PRO	VIDED ONSITE SUPERV	VISION OF	WELL CONSTRU	UCTION OTHER TH	IAN LICENSEE:
Ŀ.	Mark Gree	en		······					
	THE UNDER	RSIGNED	HEREBY CERTIN	FIES THAT, TO THE B	EST OF HIS OR HER KN	IN FILE T	E AND BELIEF, T	THE FOREGOING IS	A TRUE AND
URF	AND THE P	ERMIT HO	DLDER WITHIN :	20 DAYS AFTER COM	PLETION OF WELL DRI	ILLING:		NI WILLI III JIA	IL LINDINEER
IAI									
SIG	7	~70	1~	AVIN	4 Greek		9	1-8-14	
6.		SIGNAT	FURE OF DRILLI	ER / PRINT SIGNEE	NAME			DATE	
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FIL	E NUMBER				POD NUMBER		TRN NUMBER		

PAGE 2 OF 2

LOCATION

CH2MHILL					PROJECT NUMBER 469935.14.04.02	BORING N	UMBER	SHEET	OF
						SOIL BOR	ING LOG		
	T Dr	Nell-c	Chivr	Nerraer -	Artesia	LOCATION P	ortesta, n	1H	
ELEVATI	ON	M				WP I	sapren'		
DRILLIN	G METH	IOD ANI		MENT HSA	- w4-12-in ID angers w	Ctr plugs	× 101-7 -	4/D.	velarm
WATER	LEVELS		<u>r 1</u>		START VIU 1000	FINISH (414)	ar IUIC	LOGGER4 12	· or uj
<u>S</u> E		SAMPLE		STANDARD PENETRATION	SOIL DESCRIPTION	4001 0000			
EPTH BE	VTERVAL	ND TYPE	RECOVER FT)	6"-6"-6" (N)	SUIL NAME, USCS GHOUP SYI MOISTURE CONTENT, RELATI OR CONSISTENCY, SOIL STRU MINERALOGY	VIEUL, CULUH, VE DENSITY CTURE,	DRILLIN TESTS #	G FLUID LOSS, AND INSTRUMENT	ATION
	=		<u><u><u></u></u></u>		NOT WELLED		Cont 1000	Mat from and	ixiS
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-				and the second sec					
19-	. vouverbaltermetroe	$\overline{\mathbf{x}}$			514 (ML) 2.54R 113 119h	t redulish	B2=0.0	ppm	
-	1				brown, dry, non-plste, none	bonesive, Bon. Fine	-1PID=0.2	Phan	
-				K	Gravel Gravel	ar triff			
-	-				· ·		-		
-	-				PARS		-		
(0-	<u>+</u>	$\overline{\mathbf{\nabla}}$			DLAYCOLD 2.5YREA3, reddish	brown,	T\$983-0.72	-ppm	
-	1				ANINON PISTE, noncorrestive, 151. med sands	9701-211			
-	-								
-	-						-		
-	4				Vary wisand (02-97)		-	a	
15-			+	<u> </u>	amergo 2.542514, reldish 1	mwn,	-1000an	pm	
-	-		K	and the second se	moist in pister cohesive, I grands few his arouel Can	hne to coarse andar)			
· ·	4			L	1 2.5 YR 5/6, dark red, 1	ioduls			
-	-						-		
	4						-		
20-		\leftarrow	+	and the second	SILT(HIL) 2.54R 514, reddis	nbrown, -	-1008 a PID=0.24	ipm	
	-		K		wer, med plate, cohosive, fer	vcaarse	-		
	-			l	Sand		**		
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	-						-		
25		1		+>	SILT(HL) 254R514 reddu	sh brn, wef	=1010am) mar	
	4		\mathbf{k}		med pisre, concisive, prococi	use saind,		e	
	-				En cofine gravel				
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- Sitter	an a	PROJECT NUMBER	WELL NUMBER	R	
	CH2MHILL	469935, 14. 04.02	<u> </u>	SHEET 1	OF 1
		GROUND WATER MOI	NITORING WELL	COMPLETION DIAG	GRAM
·		A. Alat. Co	Anderall	NM	
PROJECT :	NM	DRILLING CONTRAC	TION : AV & SUM	Plisapien	
DRILLING MI	THOD AND EQUIPMENT USED: CHE	-85 44.25-11 augurs START: 12/14 END:	9/2014	LOGGER AFTENSE	acres
WATER LEVI	to the off off	li2D	1400		
	1 W	Ĩ			
	30 72970	3512			
		1- Groun	id elevation at well	NM	
	2	2- Top o	f casing elevation	NM	
		3- Wellh	ead protection cover tv	De Q'XS' Grat Cust	Nas
		a) dra	in tube?	NO	-
	15	dep	th of surface concrete	<u> </u>	
		4- Dia <i>l</i> h	ype surface casing	MA	
		5- Dia./bj	ype of well casing	211 SCH 40	
	0.6	6. Tural	chilsize of erroon	ni Francis, stranov, s a kalendar (* 1999) 1997 - Santa Sa	
64		8	and and a second	0,040 Min may	aperl
	‡(16)	7- Type quant	screen filter ity used	8-16 colorado si 9 x Sollo bas	4 ca sand
		8- Type quan	of seal lity used	3/0 (n bentomike 1.5 × 50 105	chips and
		9- :Grou	t	all in a off.	N 2-90165 100
		a) Gr b) Me	out mix used athod of placement	Tree pour	-
		c) Võ d) Võ	Lof surface casing grou Lof well casing grout	n <u>NA</u>	
	M 95	- 6 Deve	lopment method	build smar to	verpinp
		Deve	lopment time	مى يەرىكىرىكە رىكىرىكە بىرىكى بىرى	
		Estim	nated purge volume	5590 + 50g	al
		· 7 Com	ments	-> × \	
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WELL RECORD & LOG

OFFICE OF THE STATE ENGINEER

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OCATION	OSE POD NU Pod-8 IJ- WELL OWN Schlumb	JMBER (WELI 8 ER NAME(S) erger Tecl	L NUMBER) hnology Corpora	tion	OSE FILE NUMBER(S) C-3772 PHONE (OPTIONAL)					
VELL L	well own 105 Indu	er mailing . strial Boul	address levard Sugar Lan	d		с пу Sugar Lan	d ⁻	STATE TX	77478	ZIP 3
1. GENERAL AND V	WELL DEGREES LOCATION LATITUDE 32. (FROM GPS) LONGITUDE 103.			MINUTES SECO 439 0301 895 8366 ADDRESS AND COMMON LANDMARKS - 1	* ACCURACY REQUIRED: ONE TENTH OF A SECOND * DATUM REQUIRED: WGS 84 OWNSHJIP, RANGE) WHERE AVAILABLE					
NC	License number NAME OF LICENSED DRILLER NAME OF WELL DRILLING COMPANY WD-1210 Bryan Nydoske National EWP DRILLING STARTED DRILLING ENDED DEPTH OF COMPLETED WELL (FT) BORE HOLE DEPTH (FT) DEPTH WATER FIRST ENCOUNTERED (FT) 8-19-14 8-19-14 30 31.5 NA COMPLETED WELL IS: ARTESIAN DRY HOLE SHALLOW (UNCONFINED) NA									
MATIC	DRILLING F	LUID:		MUD ADDITIVES - :	SPECIFY:	ER - SPECIFY:	Auger			
ASING INFOR	DEPTH (feet bgl) FROM TO		BORE HOLE DIAM (inches)	CASING MATERIAL AND/OR GRADE (include each casing string, and note sections of screen)		ASING NECTION FYPE	CASING INSIDE DIAM. (inches)	CASING THICI (inc	G WALL KNESS ches)	SLOT SIZE (inches)
2. DRILLING & C	0 20.3	20.3 30.3	8 1/4 8 1/4	PVC PVC	Flush Flush		2 2	40 40		.040
AL AL	DEPTH	(feet bgl)	BORE HOLE DIAM. (inches)	LIST ANNULAR SEAL GRAVEL PACK SIZE-RAI	MATERIAL ANGE BY INTI	AND ERVAL	AMOUNT (cubic feet)		METHO PLACEM	D OF ÆNT
3. ANNULAR MATERIA				See Attached						
FOF FILI	L OSE INTER E NUMBER	NAL USE		POD NUMB	ER	WR-2 TRN	20 WELL RECORD NUMBER	& LOG (V	ersion 06/0 PAGE	8/2012)

	DEPTH (f	Yeet bgl) TO	THICKNESS (feet)	COLOR AND TYPE (INCLUDE WATER-BEAR (attach supplementa	OF MATERIAL ENCOU ING CAVITIES OR FRA Il sheets to fully describe	NTERED - CTURE ZONES all units)	WATER BEARING? (YES / NO)	ESTIMATED YIELD FOR WATER- BEARING ZONES (gpm)
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	C AIR LIFT	r C	BAILER C	OTHER – SPECIFY:	Α. <u>(</u>) ΤΟΙΝΗ	WE	ELL YIELD (gpm):	
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; RIG SUPERVISI	MISCELLAI	NEOUS IN	FORMATION:					
EST	PRINT NAM	1E(S) OF D	RILL RIG SUPER	RVISOR(S) THAT PROVIDED C	NSITE SUPERVISION	OF WELL CONSTRU	JCTION OTHER TH	IAN LICENSEE:
5. T	Mark Gree	en						
ATURE	THE UNDE CORRECT F AND THE P	RSIGNED RECORD C ERMIT HO	HEREBY CERTIN DF THE ABOVE I DLDER WITHIN 2	TES THAT, TO THE BEST OF H DESCRIBED HOLE AND THAT 20 DAYS AFTER COMPLETION	HS OR HER KNOWLED HE OR SHE WILL FILE I OF WELL DRILLING:	OGE AND BELIEF, T THIS WELL RECO	HE FOREGOING IS RD WITH THE STA	A TRUE AND TE ENGINEER
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PAGE 2 OF 2

LOCATION

CH2MHILL

PROJECT NUMBER	BORING NUMBER
409935.14.04.02	II-B

A6993514.04.02

OF

SOIL BORING LOG

LOCATION ATTESTCI, NH 0-5 Artsia PROJECT NEWP NN 1 DRILLING CONTRACTOR ELEVATION DRILLING METHOD AND EQUIPMENT HERE (ME 85 4/4110 (MAU) RV) 146 WATER LEVELS NM START 0950 8/9/14 - 100 I. Samen Driller START 0850 8/9/15 FINISH MOW 8/19/14 LOGGER A FEVSILONG SOIL DESCRIPTION COMMENTS SAMPLE STANDARD 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 DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION OR CONSISTENCY, SOIL STRUCTURE, 6"-6"-6" MINERALOGY (N) Sul lagra from outside of NOT LOGGED Augers 5 NOT LOGGED 18AT any and Vrown, dry, 100 plate, 100 her ved ush 10-15-1. etaz, 1. utle med gravel 10 12MM CURY (CD), 2.5412513 reddish brown, mast, low piste, nonconesive, tow 15 VOCS=01ppm 32-00.0pm med sands SUTCHE) 254RA12, weak red, we F. 10W piste, nonconesive, few mud scind, 5-107. Ane scind. 20 0.202 VX5=0.0 SILT(ML) 25YRAH reddish brown, 2004 257 Wet, med place, Ochesive, 5-17. 1. fine seend, trace overse same! VOGSO. O 0006

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