UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION VI
1445 Ross Avenue
Dallas, TX 75202

January 27, 2011

MEMORANDUM

Subject: Griggs and Walnut Ground Water Plume Superfund Site
Source Area Evaluation at former New Mexico Army National Guard facility
East Hadley Avenue, Las Cruces, New Mexico

From: Vincent Malott, Remedial Project Manager
Superfund Remedial Branch (6SF-R)

To: Charles Faultry, Associate Director
Superfund Remedial Branch (6SF-R)

As discussed in the memorandum dated September 22, 2009, concerning source area contributions of tetrachloroethene (PCE) to the Griggs and Walnut Ground Water Plume Superfund Site, the sample locations beneath the former National Guard Armory property did not provide the data necessary to assess the contribution of PCE to the current plume beneath the Doña Ana County Transportation Department (DACTD) maintenance facility (Attachment 1). As a result, three additional ground water monitoring wells were installed in July 2010 under a task order with EA Engineering Science and Technology, Inc., followed by a sampling event in August 2010. This memorandum summarizes and evaluates the data collected from the additional monitoring wells and the sampling conducted in August 2010.

The three well locations were sited to detect the potential presence of PCE in ground water as a result of past solvent releases at the former Armory property. Permits to install the three new monitoring wells were issued by the New Mexico Office of the State Engineer, and site access was authorized by the City of Las Cruces. Two well locations were sited along the former Armory property boundary on Hadley Avenue and a third well location was located off-site to the east along Hadley Avenue. Ongoing construction of a new aquatics center at the former Armory property limited potential locations for the monitoring wells. The planned well locations are shown on Figure 2 (Attachment 2) from the Sampling and Analysis Plan, Revision1, dated July 7, 2010. Final well locations were adjusted to fit within the parking and road surfaces at the aquatics center. The three new monitoring wells were completed to a depth of 170 feet with screen intervals set from 115 – 165 feet. The well logs for the three new wells are included in Attachment 3.

Sampling of the new monitoring wells was completed using passive diffusion bags set at 5 foot intervals within the well screens to provide a vertical profile of the potential PCE contamination in the ground water. The wells were screened across the estimated water table depth to ensure

representative sample collection of the upper zone of the aquifer. During the well installation activities, efforts to locate the existing monitoring well MW-SF6 that had been covered by surface soil was successfully completed. Passive diffusion bags were also installed in well MW-SF6 and sampled along with the three new wells. The sample intervals and depth to water measurements for each of the four wells are included in Attachment 3. Sampling procedures are described in the site Sampling and Analysis Plan, Revision1, dated July 7, 2010.

A summary of the water level measurements made during the August 2010 sampling event are presented in Table 1. The water level measurements appear consistent with the water level elevation contours presented in Figure 3-12 of the Remedial Investigation Report and Figure 4 of the November 2006 Ground-Water Flow and Solute Transport Model (Appendix A of the Feasibility Study) that depicts ground water flow from west-northwest to the east-southeast within the site area.

Table 1. Summary of Water Level Measurements in New Monitoring Wells

Well	**Date Measured**	**Top of Casing Elevation (feet)**	**Depth to Water (feet)**	**Water Table Elevation (feet)**
NGMW-01	8-10-2010	3975.48	119.04	3856.44
NGMW-02	8-10-2010	3980.79	124.54	3856.25
NGMW-03	8-10-2010	3985.11	129.51	3855.60
MW-SF6	8-10-2010	3978.43	122.12	3856.31

Sampling of the three additional monitoring wells and well MW-SF6 was completed in August 2010. A summary of the PCE data is contained in Attachment 4. Sample analysis was performed through the EPA Contract Laboratory Program under Case No. 40415 and the results were reported for Sample Data Groups F3L04 and F3L05. The target compounds of interest were PCE, trichloroethene, and cis/trans 1,2-dichloroethenes, with a method detection limit of 0.5 µg/L. PCE was the only target compound of interest reported over the detection limit in the field samples.

The PCE concentrations reported for the ground water samples were all below the cleanup goal of 5 µg/L from the four monitoring wells. PCE concentrations decreased vertically within each well from a high of 3.8 µg/L to 1.9 µg/L in well NGMW-01. PCE concentrations were similar in NGMW-02 and the off-site well NGMW-03. PCE was estimated to be present at concentrations less than the method detection limit of 0.5 µg/L in well MW-SF6.

In addition to the ground water samples collected from the four monitoring wells, photoionization detector (PID) measurements were collected from the cuttings during the installation of the three new monitoring wells. The PID measurements record the nonspecific total organic vapors at each of the recorded depth intervals, but do not specifically measure the PCE concentrations. The PID measurements are noted on the individual well logs in Attachment 3. Based on the PID measurements, well NGMW-01 appears to be located within an area containing a past release of volatile organic chemicals, with the highest measurements near the surface. In comparison, the off-site well NGMW-03 recorded zero for all PID measurements, and

the other on-site well NGMW-02 recorded lower total VOCs in the near surface samples that decreased to zero before increasing again near the water table.

The analytical data provided by the three additional monitoring wells indicates that a past release of PCE from the former Armory property has migrated downward to the underlying ground water. This finding is consistent with the results from earlier investigations at the Griggs and Walnut Site that PCE was released to the surface soil at the National Guard Armory and migrated to ground water over time. However, the current measured PCE concentrations in the ground water beneath the former Armory property are below the cleanup goals established in the Record of Decision for the Griggs and Walnut Site.

In order to assess the impact of the past release of PCE from the former Armory property, the new ground water concentration data was compared to the predictive transport simulations contained in the Ground-Water Flow and Solute Transport Model Report for the Griggs and Walnut Superfund Site (November 2006) prepared by John Shomaker and Associates, Inc. and included in the EPA Feasibility Study Report as Appendix A. In the solute transport simulation in scenario 3, the predicted maximum PCE concentration in the ground water beneath the Armory would have exceeded 20 µg/L in the upper flow zone after 1986, and then steadily declined below 5 µg/L by 2006 as the PCE migrated off-site. The August 2010 samples with PCE concentrations less than 4 µg/L in the new monitoring wells appears to be consistent with the predicted decline in the PCE concentration in ground water beneath the former Armory property. Based on the solute transport simulation in scenario 3, the migration of higher PCE concentrations from the former Armory property would have contributed to the PCE plume observed beneath the DACTD maintenance facility.

The percent contribution from the PCE release at the former Armory property to the Griggs and Walnut plume was not identified in prior reports for this Site. The 2006 Ground-Water Flow and Solute Transport Model Report defined scenario 1 and 3 with the following recharge areas with PCE:

- Scenario 1: a primary and secondary recharge area with PCE that did not include the former National Guard Armory property. The total PCE mass simulated was 387 kg.
- Scenario 2: a primary and secondary recharge area and a smaller recharge area that includes the former National Guard Armory property. The total PCE mass simulated was 395 kg.

Given the larger surface areas and applied PCE concentrations for the primary and secondary recharge areas compared with the Armory property, the Armory property is probably a minor source of PCE for the Griggs and Walnut plume. The difference in the simulated mass of PCE between Scenario 3 and Scenario 1 is only 8 kg, which appears to be attributed to the PCE recharge at the former National Guard Armory. A contribution of 8 kg from the Armory property would represent approximately 2% of the total PCE mass of 395 kg simulated in Scenario 3. Based on the available information in the reports for the Site, and the recent ground water data collected in August 2010, the estimated contribution of PCE to the Griggs and Walnut site plume appears to be greater than 1% but less than 10%.

Attachment 1

2009 EPA Memorandum, Review of the Source Area Contributions to the Griggs and Walnut Ground Water Plume Superfund Site

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 6
1445 ROSS AVENUE, SUITE 1200
DALLAS, TX 75202-2733

September 22, 2009

Memorandum

Subject: Review of the Source Area Contributions to the Griggs and Walnut Ground Water Plume Superfund Site

From: Vincent Malott, Remedial Project Manager
Superfund AR/TX Section (6SF-RA)

To: Charles Faultry, Associate Director
Superfund Remedial Branch (6SF-R)

EPA has previously identified three source areas where tetrachloroetheylene (PCE) was released into the environment at the Griggs and Walnut Ground Water Plume Superfund Site (Site). The results and conclusions were first presented in the 2003 report "Identification of PCE Release Areas" (IDRA Report) and again in the 2007 Record of Decision (ROD). These three PCE source areas were described in the 2007 ROD as follows:

1. Near the intersection of East Hadley Avenue and North Walnut Street (along the former Crawford Municipal Airport runway and along the former arroyo that runs parallel to, and south of the former airport runway).
2. At the Doña Ana County Transportation Department (DACTD) maintenance facility on East Griggs Avenue.
3. At the property where the former New Mexico Army National Guard facility was located on East Hadley Avenue.

The 2007 ROD did not attribute the relative contribution from the three source areas to the existing PCE contaminant plume at the Site, and the contaminant mass below the DACTD maintenance facility. The source area contributions to the PCE plume, particularly the armory property, were framed within the following boundaries:

1. The nature of the releases at the former armory property was described in the IDRA Report as possible episodic releases of waste solvents. While a time frame was not directly attributed to these possible episodic releases, the IDRA report did indicate that the releases were more likely to have occurred prior to 1990 when armory operations ceased at the property. Historical information indicates that the armory activities were conducted over a 42-year period between 1948 and 1990, and the PCE releases would

have occurred within this time frame. The 2006 Ground-Water Flow and Transport Model Report for the Site presented a modeling simulation that further narrowed the potential time of the releases over a 25-year period between 1960 and 1985.

2. An estimated quantity of PCE released at each property was not available based on a lack of data. However, a PCE dense non-aqueous phase liquid (DNAPL) was not identified in either the unsaturated zone or in the aquifer at the former armory property.

3. The remaining concentrations of PCE in the unsaturated zone at the armory property did not represent a significant source of ongoing contamination to the groundwater and thus did not warrant remedial action as described in the ROD.

Available data collected from the groundwater monitoring wells, particularly the data from GWMW03 on the former armory property, can be viewed under two possible scenarios:

1. The low PCE concentrations in GWMW03 are not representative of the area beneath the former armory property, but there is insufficient data to determine the contribution of PCE to groundwater from past releases. Each of the following issues individually or taken together could result in underestimating the PCE concentrations beneath the armory property and contribution to the plume area. The potential issues affecting the existing data include the following:

    a. The samples collected from the multi-port well GWMW03 are not representative of the actual groundwater concentrations due to the well location relative to the past releases on the property. While the basis for selecting the monitoring well location was the highest soil vapor concentration detected on the property, the soil gas survey was not comprehensive for the entire property. As a result, potential locations along the south side of the armory property may provide a more accurate representation of the mass migrating from the site.
    b. The depths of the upper sampling port(s) may not have intersected the principal flow paths for the PCE migrating from the unsaturated zone above the water table. The upper port in the GWMW03 well is set within a 10-foot screen and was intended to provide a representative sample for the approximately 80-foot thick upper flow zone. An alternative well construction design utilizing one or more wells with longer screens may allow the detection of higher concentrations beneath the armory property.
    c. The well construction may have suffered some defect during installation that would prevent collection of a representative sample of the upper flow zone. Specific evidence of a potential defect in the well construction has not been identified, however the initial low PCE concentrations present in the upper port declined to one microgram/liter within a short time frame, and may have represented contamination dragged vertically downward from an upper interval.
    d. There is a lack of data points between the GWMW03 well and the City of Las Cruces Well No. 18 that could be used to verify the existence of a contaminant plume migrating from the former armory property. The groundwater data indicates that the main portion of the contaminant mass is currently beneath the DACTD

maintenance facility and there is insufficient data to identify the upgradient edge of the contaminant mass. The interval between these two well locations is approximately 0.45 miles, and an additional well location(s) could be used to assess the presence and contribution of PCE from the armory property to the mass present beneath the DACTD maintenance facility.

2. The low concentrations in GWMW03 are accurate and representative of the area beneath the former armory property and the current distribution of the contaminant mass. As a result, the source area and groundwater impacted beneath the armory property does not require any further remedial action. The limiting factor is the absence of any historic data from wells located at the former armory property. As a result, the starting concentrations or the maximum concentrations are not available. The 2006 Ground-Water Flow and Transport Model Report for the Site presented a modeling simulation that the maximum PCE concentration would have exceeded 20 micrograms per liter in the upper flow zone. The absence of any significant concentration of PCE beneath the former armory property creates the following potential scenarios:
    a. The total mass of PCE released at the armory property was insufficient to create a significant contaminant plume. As a result, the resulting plume may have had a low total mass with a negligible contribution to the current PCE plume present beneath the DACTD maintenance facility.
    b. The age of the PCE release may have significantly preceded the current PCE plume resulting in the loss of contaminant mass through earlier pumping by nearby water supply wells. As a result, the mass of the PCE release has already been reduced or eliminated in the groundwater.
    c. If the total mass released at the armory property was significant, then the groundwater extraction system created by the nearby water supply wells has resulted in complete restoration of the aquifer beneath the armory property. This is a significant assumption on the performance of the extraction system because of the distance separating the armory property and the supply wells, and the absence of a screened interval across the upper flow in the water supply wells resulting in PCE capture through vertical flow along the gravel pack.

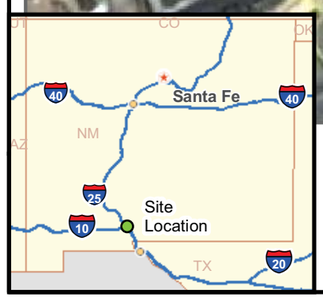
In summary, the sample locations beneath the former armory property do not provide the data necessary to assess the contribution of PCE to the current plume beneath the DACTD maintenance facility. Additional sampling locations would provide the data necessary to assess the past contribution from the armory property to the PCE contaminant plume.

Attachment 2

Site Map with Planned Well Locations

N

0 100 200
Feet



Legend:

- Monitoring well
- Proposed Monitoring Wells

Source: National Agricultural Imagery Program
August 2009, downloaded from RGIS.

Figure 2
Proposed Monitoring Well Locations
Griggs and Walnut Ground Water Plume
Superfund Site
Las Cruces, Dona Ana County, New Mexico

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Attachment 3

Field Borehole Logs, Survey Data, and Water Level Data

EA Engineering, Science, and Technology
405 South Hwy 121
Bldg. C, Ste. 100
Lewisville, TX 75067

FIELD BOREHOLE LOG

BOREHOLE NO.: **NGMW-01**
TOTAL DEPTH: **170 ft**

PROJECT INFORMATION

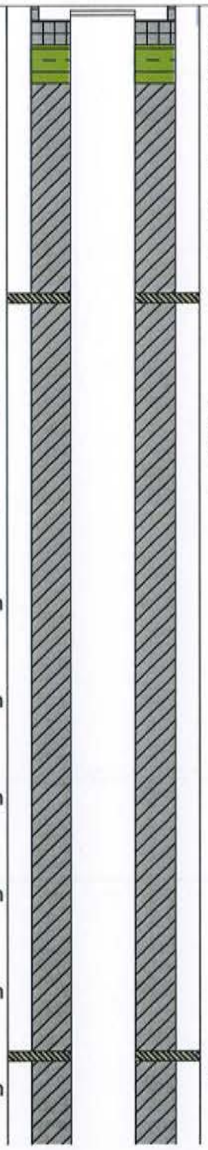
PROJECT:	Griggs & Walnut
SITE LOCATION:	Las Cruces, New Mexico
ADDRESS	Solano & Hadley
LOGGED BY:	Teri McMillan
PROJECT MANAGER:	Teri McMillan
DATES DRILLED:	15-16 July 2010

DRILLING INFORMATION

DRILLING CO.:	WDC
DRILLER:	Greg Gallio
RIG TYPE:	Speedstar 50K
METHOD OF DRILLING:	STRATEX ID 9 5/8"
SAMPLING METHODS:	Cuttings
BOREHOLE SIZE	10"

Water level during drilling Water level in completed well Casing Elevation **3975.48 ft**

DEPTH	SOIL/ROCK SYMBOLS	SAMPLE DESCRIPTION	SAMPLE ID
0		Asphalt-Base Course; cobbles, sand, hand augered	
5		Poorly Graded Gravels (Cobbles) and Fine Sand; 7.5YR7/2, pinkish gray, cobbles up to 3" in diameter, subrounded, dry, loose. GW	PID=144ppm
10		Poorly Graded Sand; 7.5YR5/4, brown, fine to medium grained, minor gravel (pea size), slightly moist, loose. SP	PID=410ppm
15		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained, minor gravel (pea size), slightly moist, loose. SP	PID=241ppm
20		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained, minor gravel (pea size), slightly moist, loose. SP	PID=123ppm
25		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained, minor gravel (pea size), slightly moist, loose. SP	PID=149ppm
30		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained, slightly moist, loose. SP	PID=73.5ppm
35		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained, slightly moist, loose. SP	PID=71.1ppm
40		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained,slightly moist, loose. SP	PID=70.5ppm
45		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained, minor gravel (pea size), slightly moist, loose. SP	PID=32.0ppm
50		Poorly Graded Sand; 7.5YR5/6, strong brown, fine grained, slightly moist, loose. SP	PID=70.9ppm
55		Well Graded Sand; 7.5YR6/6, reddish yellow, fine to coarse grained, slightly moist, loose. SW	PID=44.4ppm



BORING COMPLETION / WELL DETAILS

- Well Vault 0 to -1'
- Concrete 0 to -2'
- Bentonite Hole Plug -2' to -4'
- 4" Schedule 40 PVC Riser -0.5' to -115'
- Centralizer
- Pumpable Bentonite Quick Grout 20% Solids -4' to -98'
- Centralizer

NOTES: "These logs should not be used separately from the original report."

EA Engineering, Science, and Technology
405 South Hwy 121
Bldg. C, Ste. 100
Lewisville, TX 75067

FIELD BOREHOLE LOG

BOREHOLE NO.: **NGMW-01**
TOTAL DEPTH: **170 ft**

PROJECT INFORMATION

PROJECT:	Griggs & Walnut
SITE LOCATION:	Las Cruces, New Mexico
ADDRESS	Solano & Hadley
LOGGED BY:	Teri McMillan
PROJECT MANAGER:	Teri McMillan
DATES DRILLED:	15-16 July 2010

DRILLING INFORMATION

DRILLING CO.:	WDC
DRILLER:	Greg Gallio
RIG TYPE:	Speedstar 50K
METHOD OF DRILLING:	STRATEX ID 9 5/8"
SAMPLING METHODS:	Cuttings
BOREHOLE SIZE	10"

Water level during drilling Water level in completed well Casing Elevation **3975.48 ft**

DEPTH	SOIL/ROCK SYMBOLS	SAMPLE DESCRIPTION	SAMPLE ID	BORING COMPLETION	WELL DETAILS
60		Well Graded Sand; 7.5YR6/6, reddish yellow, fine to coarse grained, minor gravel (pea size), slightly moist, loose. SW	PID=0.5ppm		
65		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained, slightly moist, loose. SP	PID=20.0ppm		
70		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained, minor gravel (pea size), slightly moist, loose. SP	PID=6.2ppm		
75		Well Graded Sand; 7.5YR6/4, light brown, fine to coarse grained, slightly moist, loose. SW	PID=0.0ppm		
80		Poorly Graded Sand; 7.5YR7/3, pink, fine grained, slightly moist, loose. SP	PID=136ppm		
85			PID=143ppm		
90		Clayey Sand; 7.5YR5/3, brown, fine grained sand, slightly moist, slightly plastic. SC	PID=221ppm		
95		Poorly Graded Sand; 10YR5/4, yellowish brown, fine grained, minor small angular gravel (1/8" diameter). Added water to lift angular pea sized gravel. SP	PID=45.7ppm		
100		Well Graded Gravel; 10YR4/4, dark yellowish brown, with medium to coarse grained sand, 60% gravel, gravel is subrounded. GW	PID=41.4ppm		Bentonite Hole Plug 3/8" -98' to -110'
105		Well Graded Gravel; 10YR4/4, dark yellowish brown, little to no sand, some cobbles, subrounded. GW	PID=73.4ppm		
110			PID=97.9ppm		10/20 Silica Sand -110' to -175'
115		Well Graded Gravel; 10YR4/4, dark yellowish brown, more sand, no cobbles. GW	No Sample Collected		Centralizer

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Lewisville, TX 75067

FIELD BOREHOLE LOG

BOREHOLE NO.: **NGMW-01**
TOTAL DEPTH: **170 ft**

PROJECT INFORMATION

PROJECT:	Griggs & Walnut
SITE LOCATION:	Las Cruces, New Mexico
ADDRESS	Solano & Hadley
LOGGED BY:	Teri McMillan
PROJECT MANAGER:	Teri McMillan
DATES DRILLED:	15-16 July 2010

DRILLING INFORMATION

DRILLING CO.:	WDC
DRILLER:	Greg Gallio
RIG TYPE:	Speedstar 50K
METHOD OF DRILLING:	STRATEX ID 9 5/8"
SAMPLING METHODS:	Cuttings
BOREHOLE SIZE	10"

Water level during drilling Water level in completed well Casing Elevation **3975.48 ft**

DEPTH	SOIL/ROCK SYMBOLS	SAMPLE DESCRIPTION	SAMPLE ID	BORING COMPLETION	WELL DETAILS
120			PID=110ppm		4" PVC Screen (0.020" slots) -115' to -165'
125			PID=62.3ppm		
130		Poorly Graded Sand; 10YR5/3, brown, fine grained, wet. SP	PID=70.4ppm		
135			PID=30.2ppm		Centralizer
140			PID=0.0ppm		
145			PID=4.7ppm		
150			PID=0.2ppm		
155			PID=0.3ppm		
160			PID=0.3ppm		
165			PID=0.0ppm		4" PVC Sump -165' to -170'
		Poorly Graded Sand; 10YR5/3, brown, fine to medium grained, loose, wet. SP			Centralizer
170			PID=0.0ppm		TD (well) = -170'
175					TD (borehole) = -175'

NOTES: "These logs should not be used separately from the original report."

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405 South Hwy 121
Bldg. C, Ste. 100
Lewisville, TX 75067

FIELD BOREHOLE LOG

BOREHOLE NO.: **NGMW-02**
TOTAL DEPTH: **170 ft**

PROJECT INFORMATION

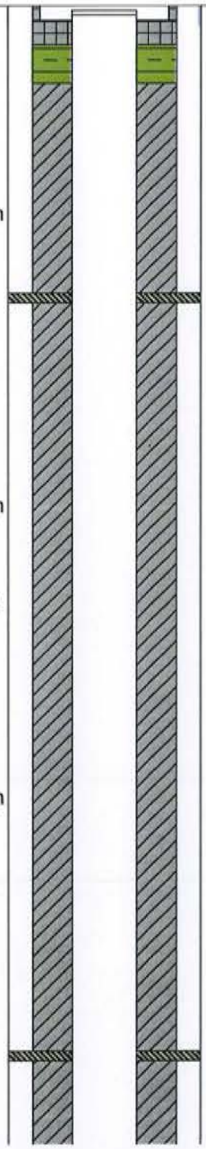
PROJECT:	Griggs & Walnut
SITE LOCATION:	Las Cruces, New Mexico
ADDRESS	Solano & Hadley
LOGGED BY:	Teri McMillan
PROJECT MANAGER:	Teri McMillan
DATES DRILLED:	17-21 July 2010

DRILLING INFORMATION

DRILLING CO.:	WDC
DRILLER:	Greg Gallio
RIG TYPE:	Speedstar 50K
METHOD OF DRILLING:	STRATEX ID 9 5/8"
SAMPLING METHODS:	Cuttings
BOREHOLE SIZE	10"

▽ Water level during drilling ▼ Water level in completed well Casing Elevation **3980.79 ft**

DEPTH	SOIL/ROCK SYMBOLS	SAMPLE DESCRIPTION	SAMPLE ID
0		Asphalt	
		Poorly Graded Sand; fine grained, hand augered. SP	
5		Cobbles, Gravels, and Sand; 7.5YR4/6, strong brown, fine to medium grained sand. GW	PID=0.0ppm
10		Poorly Graded Sand; 7.5YR5/6, strong brown, fine to medium grained, slightly moist, loose. SP	PID=15.7ppm
15			PID=0.0ppm
20		Poorly Graded Sand; 7.5YR5/6, strong brown, fine to medium grained, slightly moist, loose, minor (1%) subrounded gravel (pea gravel size). SP	PID=0.0ppm
25			PID=33.2ppm
30			PID=142ppm
35			PID=0.0ppm
40		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained, less gravel, loose. SP	PID=16.3ppm
45			PID=0.0ppm
50		Poorly Graded Sand; 7.5YR6/4, light brown, fine to medium grained (more fine grained than above), dry, loose. SP	PID=7.0ppm
55		Poorly Graded Sand; 7.5YR6/4, light brown, fine grained, dry, loose, with angular to subangular gravel up to 1.5" in diameter (possible cobbles). SP	PID=0.0ppm



BORING COMPLETION	WELL DETAILS
	Well Vault 0 to -1'
	Concrete 0 to -2'
	Bentonite Hole Plug -2' to -4'
	4" Schedule 40 PVC Riser -0.5' to -115'
	Centralizer
	Pumpable Bentonite Quick Grout 20% Solids -4' to -105'
	Centralizer

NOTES: "These logs should not be used separately from the original report."

EA Engineering, Science, and Technology
405 South Hwy 121
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Lewisville, TX 75067

FIELD BOREHOLE LOG

BOREHOLE NO.: **NGMW-02**
TOTAL DEPTH: **170 ft**

PROJECT INFORMATION

PROJECT:	Griggs & Walnut
SITE LOCATION:	Las Cruces, New Mexico
ADDRESS	Solano & Hadley
LOGGED BY:	Teri McMillan
PROJECT MANAGER:	Teri McMillan
DATES DRILLED:	17-21 July 2010

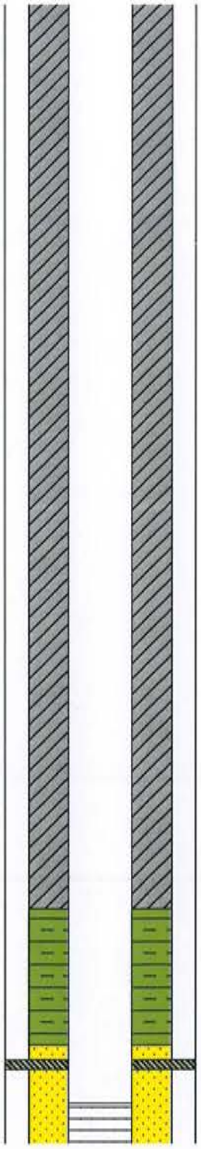
DRILLING INFORMATION

DRILLING CO.:	WDC
DRILLER:	Greg Gallio
RIG TYPE:	Speedstar 50K
METHOD OF DRILLING:	STRATEX ID 9 5/8"
SAMPLING METHODS:	Cuttings
BOREHOLE SIZE	10"

▽ Water level during drilling ▼ Water level in completed well Casing Elevation **3980.79 ft**

DEPTH	SOIL/ROCK SYMBOLS	SAMPLE DESCRIPTION	SAMPLE ID
60		Poorly Graded Sand; 7.5YR6/4, light brown, very fine to fine grained, dry, loose, no gravel. SP	PID=3.6ppm
65		Poorly Graded Sand; 7.5YR6/4, light brown, fine to very fine grained, dry, loose, minor subrounded gravel to 1" in diameter. SP	PID=0.0ppm
70		Poorly Graded Sand; 7.5YR6/4, light brown, fine grained, dry, loose, minor subrounded gravel to 1" in diameter. SP	PID=0.0ppm
75			PID=0.0ppm
80		Poorly Graded Sand; 7.5YR6/4, light brown, dry, with angular to subrounded gravel. SP	PID=0.0ppm
85		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained, slightly moist, loose. SP	PID=0.0ppm
90			PID=0.0ppm
95		Well Graded Sand; 10YR5/4, yellowish brown, fine to coarse grained sand, slightly moist, loose. SW	PID=0.0ppm
100			PID=0.0ppm
105		Poorly Graded Sand; 7.5YR6/4, pink, fine grained sand, with minor gravel (1/8"-1/4", angular to subrounded). SP	PID=0.0ppm
110			PID=0.0ppm
115		Well Graded Gravel; variegated color, little to no sand, gravel (pea gravel to 1/4" to 1" diameter size, angular to subrounded). GW	PID=151ppm

BORING COMPLETION / WELL DETAILS



NOTES: "These logs should not be used separately from the original report."

EA Engineering, Science, and Technology
405 South Hwy 121
Bldg. C, Ste. 100
Lewisville, TX 75067

FIELD BOREHOLE LOG

BOREHOLE NO.: **NGMW-02**
TOTAL DEPTH: **170 ft**

PROJECT INFORMATION

PROJECT:	Griggs & Walnut
SITE LOCATION:	Las Cruces, New Mexico
ADDRESS	Solano & Hadley
LOGGED BY:	Teri McMillan
PROJECT MANAGER:	Teri McMillan
DATES DRILLED:	17-21 July 2010

DRILLING INFORMATION

DRILLING CO.:	WDC
DRILLER:	Greg Gallio
RIG TYPE:	Speedstar 50K
METHOD OF DRILLING:	STRATEX ID 9 5/8"
SAMPLING METHODS:	Cuttings
BOREHOLE SIZE	10"

▽ Water level during drilling ▼ Water level in completed well Casing Elevation **3980.79 ft**

DEPTH	SOIL/ROCK SYMBOLS	SAMPLE DESCRIPTION	SAMPLE ID	BORING COMPLETION	WELL DETAILS
120		Poorly Graded Sand; 10YR5/4, yellowish brown, fine grained sand, moist, loose. SP	PID=130ppm		4" PVC Screen (0.020" slots) -115' to -165'
125 ▼		Poorly Graded Sand; 10YR5/4, yellowish brown, fine to medium grained sand, very moist, loose, with subrounded gravel up to 1" in diameter. SP	PID=113ppm		
▽ 130		Poorly Graded Sand; 10YR5/4, yellowish brown, fine to medium grained, loose, no gravel, wet. SP	PID=30.3ppm		
135		Well Graded Sand; 10YR5/4, yellowish brown, fine to coarse grained sand, wet, loose. SW	PID=10.7ppm		
140		Poorly Graded Sand; 10YR5/4, yellowish brown, fine to medium grained, loose, wet, water added to lift cuttings. SP	PID=0.6ppm		
145		Poorly Graded Sand; 10YR5/4, yellowish brown, fine grained, loose, wet. SP	PID=0.0ppm		Centralizer
150			PID=0.0ppm		
155		Poorly Graded Sand; 10YR5/4, yellowish brown, fine to medium grained, loose, wet. SP	PID=0.0ppm		
160		Poorly Graded Sand; 10YR4/4, dark yellowish brown, fine grained, wet. SP	PID=80.1ppm		
165			PID=114ppm		4" PVC Sump -165' to -170'
					Centralizer
170			PID=86.0ppm		TD (well) = -170'
175					

NOTES: "These logs should not be used separately from the original report."

EA Engineering, Science, and Technology
405 South Hwy 121
Bldg. C, Ste. 100
Lewisville, TX 75067

FIELD BOREHOLE LOG

BOREHOLE NO.: **NGMW-03**
TOTAL DEPTH: **175 ft**

PROJECT INFORMATION

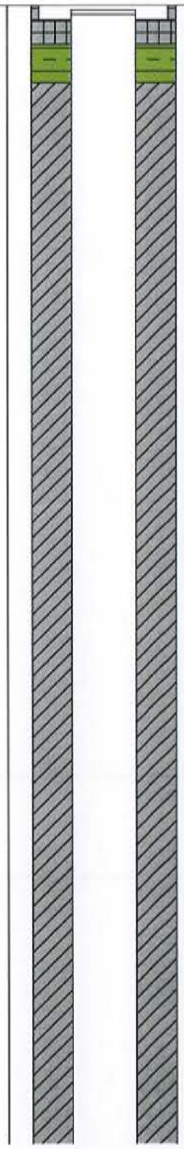
PROJECT:	Griggs & Walnut
SITE LOCATION:	Las Cruces, New Mexico
ADDRESS	Solano & Hadley
LOGGED BY:	Teri McMillan
PROJECT MANAGER:	Teri McMillan
DATES DRILLED:	12-14 July 2010

DRILLING INFORMATION

DRILLING CO.:	WDC
DRILLER:	Greg Gallio
RIG TYPE:	Speedstar 50K
METHOD OF DRILLING:	STRATEX ID 9 5/8"
SAMPLING METHODS:	Cuttings
BOREHOLE SIZE	10"

Water level during drilling Water level in completed well Casing Elevation **3985.11 ft**

DEPTH	SAMPLE DESCRIPTION	SAMPLE ID
0	Asphalt, Sand and Gravel with cobbles; poorly graded fine sands, loose, hand augered. SP	
5	Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained, with angular gravel (up to 1/4" diameter). SP	PID=0.0ppm
10	Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained, with less angular gravel (up to 1/4" diameter) than above. SP	PID=0.0ppm
15	Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained, no gravel, loose. SP	PID=0.0ppm
20	Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained, 5% subrounded gravel, loose. SP	PID=0.0ppm
25	Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained, no gravel, loose. SP	PID=0.0ppm
30	Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained, no gravel, loose, slightly moist. SP	PID=0.0ppm
35	Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained, minor gravel, slightly moist, loose. SP	PID=0.0ppm
40	Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained, no gravel, slightly moist, loose. SP	PID=0.0ppm
45	Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained, minor (<1%) subrounded up to 1/2" diameter gravel, gravel increasing to 2%, slightly moist, loose. SP	PID=0.0ppm
50		PID=0.0ppm
55	Poorly Graded Sand with Pea Sized Gravel; 7.5YR6/6, reddish yellow, 5% subrounded up to 1/4" diameter gravel, loose. SP	PID=0.0ppm



BORING COMPLETION / WELL DETAILS

- Well Vault 0 to -1'
- Concrete 0 to -2'
- Bentonite Hole Plug -2' to -4'
- 4" Schedule 40 PVC Riser -0.5' to -115'
- Pumpable Bentonite Quick Grout 20% Solids -4' to -103.2'

NOTES: "These logs should not be used separately from the original report."

EA Engineering, Science, and Technology
405 South Hwy 121
Bldg. C, Ste. 100
Lewisville, TX 75067

FIELD BOREHOLE LOG

BOREHOLE NO.: **NGMW-03**
TOTAL DEPTH: **175 ft**

PROJECT INFORMATION

PROJECT:	Griggs & Walnut
SITE LOCATION:	Las Cruces, New Mexico
ADDRESS	Solano & Hadley
LOGGED BY:	Teri McMillan
PROJECT MANAGER:	Teri McMillan
DATES DRILLED:	12-14 July 2010

DRILLING INFORMATION

DRILLING CO.:	WDC
DRILLER:	Greg Gallio
RIG TYPE:	Speedstar 50K
METHOD OF DRILLING:	STRATEX ID 9 5/8"
SAMPLING METHODS:	Cuttings
BOREHOLE SIZE	10"

▽ Water level during drilling ▼ Water level in completed well Casing Elevation **3985.11 ft**

DEPTH	SOIL/ROCK SYMBOLS	SAMPLE DESCRIPTION	SAMPLE ID	BORING COMPLETION	WELL DETAILS
60		Poorly Graded Sand; 7.5YR6/4, light brown, fine to medium grained, no gravel, slightly moist, loose. SP	PID=0.0ppm		
65		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained, slightly moist, loose. SP	PID=0.0ppm		
70		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained, <1% subrounded gravel to 1" diameter, slightly moist, loose. SP	PID=0.0ppm		
75		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained sand, subrounded gravel to 1/8" diameter, slightly moist, loose. SP	PID=0.0ppm		
80		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained sand, slightly moist, loose. SP	PID=0.0ppm		
85		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine to medium grained sand, slightly moist, loose. SP	PID=0.0ppm		
90		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained sand, slightly moist, loose, minor subrounded gravel to 1/4" diameter. SP	PID=0.0ppm		
95		Poorly Graded Sand; 7.5YR6/6, reddish yellow, fine grained sand, slightly moist, loose. SP	PID=0.0ppm		
100			PID=0.0ppm		
105			PID=0.0ppm		Bentonite Hole Plug 3/8" -103.2' to -111.9'
110		Poorly Graded Sand; 10YR5/4, yellowish brown, fine grained sand, slightly moist to dry, loose. SP	PID=0.0ppm		
115		Well Graded Gravel; 10YR5/3, brown, little to no sand, angular to subrounded pea gravel size (1/8" to 1/2"). GW	No Sample Collected		10/20 Silica Sand -111.9' to -172'

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FIELD BOREHOLE LOG

BOREHOLE NO.: **NGMW-03**
TOTAL DEPTH: **175 ft**

PROJECT INFORMATION

PROJECT:	Griggs & Walnut
SITE LOCATION:	Las Cruces, New Mexico
ADDRESS	Solano & Hadley
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DRILLING INFORMATION

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METHOD OF DRILLING:	STRATEX ID 9 5/8"
SAMPLING METHODS:	Cuttings
BOREHOLE SIZE	10"

▽ Water level during drilling ▼ Water level in completed well Casing Elevation **3985.11 ft**

DEPTH	SOIL/ROCK SYMBOLS	SAMPLE DESCRIPTION	SAMPLE ID	BORING COMPLETION	WELL DETAILS
▽ 120		Well Graded Gravel; 10YR5/3, brown, medium to coarse grained sand to 3/4" diameter gravel with cobbles, wet, added water to drill. GW	PID=0.0ppm		4" PVC Screen (0.020" slots) -115' to -165'
125		Well Graded Gravel; 10YR5/3, brown, fine to medium grained sand, 60% subrounded pea size gravel, some cobbles. GW	PID=0.0ppm		
▼ 130		Poorly Graded Sand with Gravel; fine grained sand, 20% subrounded to angular pea sized gravel, wet. SP	PID=0.0ppm		
135		Well Graded Gravel; fine to medium grained sand, <1/8" to 1/4" angular to subrounded, little to no sand. GW	PID=0.0ppm		
140		Well Graded Gravel with sand; 10YR5/3, brown, fine grained sand, 1/8" to 1/2" angular to subrounded, wet, loose. GW	PID=0.0ppm		
145		Poorly Graded Sand; 10YR4/4, dark yellowish brown, fine to medium grained sand, wet, loose. SP	PID=0.0ppm		
150			PID=0.0ppm		
155			PID=0.0ppm		
160			PID=0.0ppm		
165			No Sample Collected		4" PVC Sump -165' to -170'
170		Poorly Graded Sand; 10YR5/3, brown, fine to medium grained, 10% subrounded gravel up to 1/2" diameter, loose, wet. SP	PID=0.0ppm		TD (well) = -170' TD (boring) = -174'
175					

NOTES: "These logs should not be used separately from the original report."

COORDINATES AND ELEVATIONS FOR MONITORING WELLS

Point	Northing	Easting	Existing Northing	Existing Easting	Well Eleva	Existiing Well Eleva	Diff Elevation	Pad Elevation	Discriptiion
ENG			478576.452	1483322.848	4034.49				NAIL/SHINNER BM 1988, CONTROL BM
GWMW-03	479519.408	1480643.523	479519.7	1480641.7	3975.76	3975.2	0.56	3976.45	
MW-SF6	479653.645	1480847.99	479654.463	1480848.365	3978.43	3976.72	1.71	3979.06	
NGNW-01	479405.241	1480889.087			3975.48			3976.03	
NGNW-02	479459.438	1481007.085			3980.79			3981.22	
NGNW-03	479368.806	1481387.331			3985.11			3985.71	

HENRY MAGALLANEZ
NEW MEXICO
18078
LICENSED PROFESSIONAL SURVEYOR

I, A NEW MEXICO PROFESSIONAL SURVEYOR CERTIFY THAT I CONDUCTED AND AM RESPONSIBLE FOR THIS SURVEY, AND THAT THIS SURVEY MEETS THS MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO

18078

TABLE 1. GAGING DATA AND DEPTH INTERVALS FOR PASSIVE DIFFUSION BAGS
GRIGGS AND WALNUT SUPERFUND SITE, LAS CRUCES, NEW MEXICO

Well	Date Measured	Depth to Water (feet btc)	Total Depth (feet btc)	PDB Inverval (feet btc)	PDB Sample Identification
SF-06	7/21/2010	122.12	132.00	124-126	SF-06-125
	8/10/2010	122.12		127-129	SF-06-128
				129-131	SF-06-130
NGMW-01	7/21/2010	119.06	169.00	121-123	NGMW-01-122
	8/10/2010	119.04		126-128	NGMW-01-127
				131-133	NGMW-01-132
				136-138	NGMW-01-137
				141-143	NGMW-01-142
				146-148	NGMW-01-147
				151-153	NGMW-01-152
				156-158	NGMW-01-157
				161-163	NGMW-01-162
				166-168	NGMW-01-167
NGMW-02	7/22/2010	124.55	169.07	126-128	NGMW-02-127
	8/10/2010	124.54		131-133	NGMW-02-132
				136-138	NGMW-02-137
				141-143	NGMW-02-142
				146-148	NGMW-02-147
				151-153	NGMW-02-152
				156-158	NGMW-02-157
				161-163	NGMW-02-162
				166-168	NGMW-02-167
NGMW-03	7/21/2010	129.46	169.70	131-133	NGMW-03-132
	8/10/2010	129.51		136-138	NGMW-03-137
				141-143	NGMW-03-142
				146-148	NGMW-03-147
				151-153	NGMW-03-152
				156-158	NGMW-03-157
				161-163	NGMW-03-162
				166-168	NGMW-03-167

Notes:
btc = below top of casing

Attachment 4

Sampling Data Summary

Monitoring Well	PDB Sample Depth Below Ground Surface (feet)	Station Location	Analyte	Detection Limit	Result	Units
NGMW-01	122	NGMW-01-122	Tetrachloroethene	0.50	3.8	ug/L
	127	NGMW-01-127	Tetrachloroethene	0.50	3.5	ug/L
	132	NGMW-01-132	Tetrachloroethene	0.50	3.6	ug/L
	137	NGMW-01-137	Tetrachloroethene	0.50	3.0	ug/L
	127	NGMW-01-137 D	Tetrachloroethene	0.50	3.2	ug/L
	142	NGMW-01-142	Tetrachloroethene	0.50	2.9	ug/L
	147	NGMW-01-147	Tetrachloroethene	0.50	2.6	ug/L
	152	NGMW-01-152	Tetrachloroethene	0.50	2.6	ug/L
	157	NGMW-01-157	Tetrachloroethene	0.50	2.5	ug/L
	162	NGMW-01-162	Tetrachloroethene	0.50	2.5	ug/L
	167	NGMW-01-167	Tetrachloroethene	0.50	1.9	ug/L
Screen Interval		**115-165 ft**				
Sump		**165-170**				
NGMW-02	127	NGMW-02-127	Tetrachloroethene	0.50	2.3	ug/L
	132	NGMW-02-132	Tetrachloroethene	0.50	2.4	ug/L
	137	NGMW-02-137	Tetrachloroethene	0.50	2.3	ug/L
	142	NGMW-02-142	Tetrachloroethene	0.50	2.0	ug/L
	142	NGMW-02-142 D	Tetrachloroethene	0.50	1.8	ug/L
	147	NGMW-02-147	Tetrachloroethene	0.50	2.2	ug/L
	152	NGMW-02-152	Tetrachloroethene	0.50	2.0	ug/L
	157	NGMW-02-157	Tetrachloroethene	0.50	1.5	ug/L
	162	NGMW-02-162	Tetrachloroethene	0.50	1.6	ug/L
	167	NGMW-02-167	Tetrachloroethene	0.50	1.5	ug/L
Screen Interval		**115-165 ft**				
Sump		**165-170**				
NGMW-03	132	NGMW-03-132	Tetrachloroethene	0.50	2.7	ug/L
	137	NGMW-03-137	Tetrachloroethene	0.50	2.7	ug/L
	142	NGMW-03-142	Tetrachloroethene	0.50	2.5	ug/L
	147	NGMW-03-147	Tetrachloroethene	0.50	2.0	ug/L
	152	NGMW-03-152	Tetrachloroethene	0.50	1.6	ug/L
	157	NGMW-03-157	Tetrachloroethene	0.50	1.9	ug/L
	162	NGMW-03-162	Tetrachloroethene	0.50	2.2	ug/L
	167	NGMW-03-167	Tetrachloroethene	0.50	1.2	ug/L
Screen Interval		**115-165 ft**				
Sump		**165-170**				
State Well SF-06	125	SF-06-125	Tetrachloroethene	0.50	0.16	ug/L
	128	SF-06-128	Tetrachloroethene	0.50	0.13	ug/L
	128	SF-06-128 D	Tetrachloroethene	0.50	0.50	ug/L
	130	SF-06-130	Tetrachloroethene	0.50	0.50	ug/L
Screen Interval		**116.5-131.5 ft**				