



Land Protection Division Voluntary Cleanup Program

These pages last modified February 19, 2010

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Claremore Hospital

(December 9, 2008)

Location: The Site is located northwest of the intersection of East 15th Street and North Florence Avenue in Claremore, Oklahoma. The former landfill occupies an approximate 5.95-acre tract of land located in the NW ¼ of the SW ¼ of the SE ¼ of Section 4, Township 21 North, and Range 16 East.

Background: The planned future use of the Site is a commercial development consisting of a medical office building and parking lot. To the north of the Site is the Will Rogers Public Library. The west side of the Site is adjacent to an intermittent creek. Further to the west is a strip retail center. To the south is a commercial office and Claremore Regional Hospital. Residential properties lie to the east of the Site across North Florence Avenue.

The Regional Hospital has owned the property/landfill since 2003. The property had been utilized as a municipal landfill sometime between 1941 and 1964. A Phase I assessment and several subsurface investigations of soil and groundwater have been conducted since 1992. A Site Characterization Report dated August 5, 2003, identified COCs in the soil and/or groundwater including VOCs and metals that are commonly found in municipal landfills. Subsurface soil, surface soil, groundwater, surface water, and air were assessed.

Previous site investigations indicate fill materials have been encountered in the former landfill up to 13.5 feet below grade surface (bgs). Fill materials observed within the former landfill include: clay, silt, sand, gravel asphalt, rubber, wire, plastic, paper, wood fragments, glass fragments, plastic sheeting and other miscellaneous debris.

Quarterly sampling is currently being performed for two years on groundwater wells EMW-6A, EMW-7A, EMW-9, EMW-10, and EMW-11. A vapor intrusion system is also being implemented at the landfill.

Air: There is a potential for methane vapors to escape the soil. A vapor intrusion system is currently in place.

Soil: Soils at the site are mainly comprised of clays, ranging from layers of silt to shaley clay. Much of the landfill debris is located within a depressed formation surrounded by clay deposits to 12 feet below grade surface. Impacted soil is confined to the area of the former landfill.

The only COC above its respective screening level was 1,2,3-trichloropropane of 0.027 mg/kg. Based on the low level encountered, and there being only one detection, the analyte was dropped by the DEQ as a COC.

Surface Water: The surface water flows to the southwest toward an adjacent intermittent creek. There is no known surface water contamination.

Groundwater: Groundwater has been encountered in the vicinity of the former landfill at depths ranging between 3 feet and 8 feet bgs. Sandstone and shale bedrock materials have generally been encountered at depths ranging between 9 feet and 14.5 feet bgs. Groundwater flow direction is generally to the west or west-northwest with a hydraulic gradient ranging between approximately 0.006 feet/foot (ft/ft) and 0.007 ft/ft. Impacted groundwater is confined to the area of the former landfill. COCs of groundwater include: 1,4-dichlorobenzene, arsenic, chromium, lead, and mercury.

Long term groundwater monitoring is being conducted to detect if potential future threats develop. Groundwater concentrations of COCs are being compared to baseline concentrations prior to construction. The groundwater monitoring consists of gauging groundwater levels and collection and analysis of groundwater samples from the four down-gradient groundwater monitoring wells (EMW-6A, EMW-7A, EMW-10, and EMW-11) and one up-gradient monitoring well (EMW-9) on a quarterly basis for two years (or as otherwise determined by the DEQ). Quarterly monitoring has been occurring since October 2007. All COCs were below laboratory reporting limits or below respective MCLs.

Private/Public Wells: According to the Oklahoma Water Resources Board well record database, there are no wells located in Section 4, Township 21 North, and Range 16 East Indian Meridian where the Site is located.

Vapor Intrusion to Indoor Air: A methane monitoring and ventilation system in the building was installed to mitigate the potential exposure of commercial workers, visitors and patients to methane and/or VOCs migrating from the contaminated soil or groundwater into the building.

The exhaust ventilation system is manually tested on a periodic basis per the manufacturer's specifications, or at least semi-annually. The sump pump is inspected and tested semi-annually.

SITE STATUS – KEY QUESTIONS

DCP MIDSTREAM –CASHION GAS PLANT

DRAFT

Location: Approx three miles west of Cashion and ten miles east-southeast of Kingfisher, Kingfisher County, Oklahoma. NE4 NE4 Section 8, T15 N, R5W; GPS Location 35.7960 N, 97.7470 W

Background: The site began operations in 1979 as a natural gas processing plant under Sunoco. Upgrades were completed in 1991. The site was leased by Duke Energy (now DCP Midstream) until DCP Midstream found petroleum hydrocarbons (BTEX and TPH) in soil and groundwater above screening levels (including PSH) prior to purchasing the site from Conoco, Inc./Mitchell Energy and Dev. Corp. Numerous monitoring wells were drilled and soil and groundwater were sampled. A soil and groundwater remediation system is active at the site and has been effective treating both soil and groundwater.

Air: There are no known air issues which are not under Air Quality's jurisdiction

Soil: Shallow soil is silty clay. The only significant contaminated soil source was connected with the main sump open drain system on the west side of the process area. Several areas displayed slight to strong hydrocarbon odors in the soil column

Surface Water: There is a stock pond approximately 1000 feet due west of the fenced process area. The pond is side gradient to the site plume which runs north-northwest on the west half of the plume. It is unlikely that the pond will be affected by groundwater contaminants from the site.

Groundwater: The aquifer is not considered a major source for the area. Gradient is fairly steep at 0.013 ft/ft (70 ft/mi). Flow direction is northwest and north across the western 2/3 of the site and east-northeast across the eastern 1/3. Groundwater is 20 to 30 feet bgs.

Area Source Wells: There is one onsite source well at the northwest corner of the site. An offsite well, the north Marlow well, is about 850 feet north-northwest of the site. A second offsite well, the south Marlow well, lies on the Morrow residence 1000 feet northwest of the site. The wells have been periodically sampled but to date have shown no contaminant effects from the gas plant.

Vapor Intrusion Issues? None known.

Groundwater Plume Adequately Delineated? Yes. Site characterization is approved but it is refined slightly with each quarterly sampling report. The west plume is offsite nearly half way to the residence west of the site. The east side of the plume has gone offsite and has crossed the road to the adjacent property.

Site Adequately Sampled? Yes, quarterly.

Groundwater Contamination Affecting Nearby Surface Water or Wetlands? No.

Surface Water Sampled? Stock pond 1000 feet west was sampled early in the site characterization. No hydrocarbon contaminants were found above screening levels.

Site Cleanup Levels Protective of Groundwater? Yes, as approved their SAP.

Former Altec Lansing Facility (Oklahoma City)

(10/08/2009)

Location: (Address and Legal)

10500 W Reno Avenue
Oklahoma City, OK

The site is near the northeast corner of I-40 and Sara Road, in Canadian County.
Latitude and Longitude for the gate: 35, 27, 51.09 N; 97, 42, 21.93 W

Background: (include site area, past owners & operators, history, land use, previous work, findings, current status)

The 8.3-acre site was formerly owned and operated by Telex Communications, Inc., which was acquired in 2006 by Robert Bosch LLC. The site was subdivided into three parcels between 1999 and 2003.

Building 1 (to the north) was used as an audio equipment manufacturing plant. A sub grade pit under Building 1 contained a series of tanks, the "Wash Line", used from 1963 to approximately 1998, consisting of an alkaline cleaner tank, two rinse water tanks, an iron phosphate solution tank, and a phosphoric acid solution tank. A tank containing TCE, called the VG tank, was removed from the Wash Line in 1987. A series of tanks used for cadmium and zinc electroplating was also present in the sub grade pit, and used in the 1960s, 1970s and early 1980s. Building 1 is currently occupied by Windward Petroleum, a distributor of petroleum lubricating oils and related specialty products. Building 2 (to the south) was used mainly for finished goods and shipping. It is currently occupied by Platinum Manufacturing, LLC, a transportation equipment manufacturer.

An outdoor chemical storage area, within a concrete secondary storage area, was used for storage of urethane thinner, methyl-ethyl ketone, methylene chloride, and spent paint and spent solvents.

A denuded area in the southeast corner of the property, possibly associated with an adjacent abandoned aboveground storage tank, was excavated in 1999. DEQ approved no further action for the excavation area.

Enercon performed a Site Characterization Report & Remedial Option Evaluation in 1999. Groundwater samples contained 1,1-DCE, TCE, and Vinyl Chloride above respective MCL, and detectable 1,1-DCA, 1,1,1-TCA, C-1,2-DCE, Chloroform, and Bromodichloromethane. Currently, only TCE exceeds the MCL and 1,1-DCA exceeds the EPA Tap Water Screening Level. The report recommended natural attenuation, based on MNA parameters results, the presence of degradation products, and limited distribution of dissolved organics in the groundwater.

Groundwater was monitored quarterly from June 1999-June 2001. In July 2006 Enercon asked to reduce required sampling requirements for natural attenuation for the site to every two years, and proposed a sampling event in September 2006. DEQ denied the proposed sampling

frequency reduction at the time, because no sampling had been done since June 2001. In 2008, DEQ granted the request to reduce the sampling frequency to annual.

Consultant correspondence suggests the owner is unwilling to accept a permanent deed notice, which would be required before DEQ could approve MNA. Consultant continues to monitor GW on an annual basis.

Air: (any known air quality issues.)

Quarterly vapor surveys were done in January and June 2000 using a PID at 27 locations in Building 1. Vapor concentrations were less than 1 ppm.

Soil: (describe soils, gross geology, surface cover)

Norge-Bethany Association, Kingfisher Series, consisting of reddish-brown silt loam over reddish-brown silty clay loam, over red sandstone and shale.

Surface Water: (nearby surface water, typical topography, surface flow directions)

Nearest water bodies are Lake Overholser and the North Canadian River, more than two miles away to the north-northeast. There is a pond approximately 1300 feet to the northeast. There is an ephemeral stream shown 1200 feet to the west-southwest, draining to the south-southeast. Surface drainage is generally to the east. Soil samples were collected from a storm water drainage ditch by the facility receiving/shipping area on the south side of Building 1.

Groundwater: (Regional and local geology and hydrogeology)

Based on Hydrologic Atlas 4, bedrock is Permian-aged Duncan Sandstone, a member of the El Reno Group. Duncan Sandstone is described as red-brown fine-grained sandstone with some mudstone conglomerate and shale. Estimated thickness is 300 feet. GW in the Duncan Sandstone is poor with TDS greater than 500mg/L; low yield rates.

Soil is an upper sandy clay to clayey sand, a middle layer of fine-grained sand to sandstone, and underlying dry silty to sandy shale. Top of shale is at 5 feet on the southeast side, and at 17 feet on the north side.

Groundwater is Shallow, unconfined at approximately 6 feet. Groundwater Gradient maps prepared before 2006 show a groundwater mound under Building 1, with gradient away from the building in all directions.

The plume of groundwater not meeting drinking water standards has been delineated to the west, north, northeast, east and south, and as of 1999, to the southwest. With the destruction of ESMW-9 southwest of Building 1 sometime between 2002 and 2006, the southwest portion of the gradient and groundwater plume has subsequently not been considered.

Private/Public Wells: (On-site and off-site wells)

On-site: ESMW-1 through ESMW-12.

The OWRB lists 3 domestic wells and one industrial well, all discussed below, within 1 mile of the site. They also list 1 observation well, 40 monitoring wells, 1 groundwater test hole and 8 geotechnical borings, all of which, by their nature, are not a concern.

Domestic wells:

#32962, listed owner Richardson Homes, approximately 500 ft NE of property, not a concern as groundwater plume has been delineated to the northeast;
#65914, listed owner Greg Huddleston, approximately 2700 feet SSE of property, not a concern as groundwater plume has been delineated to the southeast; and
#62814, listed owner Roger Blevins, approximately 5100 feet NE of property, not a concern as groundwater plume has been delineated to the northeast.

industrial well:

#24333, listed owner Fred Jones Industries, approximately 4800 feet NE of property, not a concern as the groundwater plume has been delineated to the northeast.

Vapor Intrusion to Indoor Air: (Any known vapor intrusion issues)

A 2006 groundwater concentration of TCE of 391 ug/l in ESMW-06 exceeded the target groundwater concentration for soil vapor screening at 10E-5 risk level of 5.0 ug/l (same as the MCL).

Quarterly vapor surveys were done in January and June 2000 using a PID at 27 locations in Building 1. Vapor concentrations were less than 1 ppm. By itself, this result is inconclusive.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** Yes
- **Has the site been sampled for an adequate list of analytes?** Yes
- **Does soil or waste need to be cleaned up?** Contaminated soil may be present under the building, but groundwater concentrations appear to be decreasing to approach MCL.
- **Has the surface water been sampled?** Not applicable
- **Has the site been cleaned up to levels protective of groundwater?** No. Groundwater monitoring continues.

Baker-Petrolite Tulsa Warehouse

Location: 1818 West 21st Street, Tulsa, Tulsa County,
Lat: 36.1332722222, Long: -96.0127333333

Project Manager: Lacy Rosson, Baker-Petrolite, Houston, Texas (281-275-7354)

Background: The site is located in an industrial area and is a portion of the former OP&RC Refinery which has potentially contributed to petroleum affected soils and groundwater on the site. Historical operations consisted of petroleum chemical blending operations until the 1970's (?) and now serves as a general shipping/ receiving warehouse.

Originally a portion of the Oklahoma Producers & Refining Co. (OP&RC) with a few of the original structures still remaining. Previous investigations indicate historical operations of OP&RC have contributed to known impacts to the site.

Air: No apparent issues known to date.

Soil: A total of 41 soil samples were taken from 1998-2000 with sixteen at depths of 0.5-1 foot above the groundwater table; 21 at depth approximately equal or greater than the level that groundwater was encountered in each soil boring; and four of the samples were collected at depths considered to be above the groundwater table (vadose zone). TPH, BTEX and PAH have been detected in the surface and subsurface soils.

Surface Water: The natural surface drainage is generally easterly towards the Arkansas River approximately 0.9 miles northeast of the site. Yet abundant standing water does pond-up on site after heavy rains.

Groundwater: Groundwater analytical data indicates the presence of petroleum hydrocarbon constituents (BTEX and TPH) across most of the site. VOCs, SVOCs, and PAHs have been identified at concentrations exceeding groundwater screening levels.

Private/ Public Wells: A search of the OWRB data base shows no private or public wells within ½ mile radius.

Vapor Intrusion to Indoor Airspace: Has not been investigated.

General Questions:

- A) Has the groundwater plume been adequately delineated? Yes.
- B) Has the site been sampled for an adequate list of analytes? Yes.
- C) Does soil or waste need to be cleaned up? Yet to be determined.
- D) Has there been any soil remediation? During the Phase II Subsurface Investigation (MAXXIM) performed the following site clean-up activities:
 - Liquids and sludge were pumped from the sump along the northwestern side of the former tank farm pad or concrete containment pad. The waste stream contains approximately 2% oil and organic materials from the Baker-Petrolite

tanks, 90% water and 8% sludge. The waste stream was analyzed and classified as non-hazardous.

- Waste was collected from tank bottoms from around the former building foundation and the solids from the former concrete containment pad and the hazardous waste storage pad located on the northeastern side of the concrete containment pad. This waste comprised of 50% soils and sand from the former tank farm containment and the former building foundation, 25% tank bottoms, and 25% organic sludge from the former tank containment. The waste stream was analyzed and classified as non-hazardous.
- Pipes running from the mixing area inside the new warehouse to the tank battery sump were washed out. Pipe valves were opened and liquids were drained. A pressure washer was used to wash residual materials from the pipes. The waste stream generated was analyzed and classified as hazardous due to the ignitability of the waste stream.
- The new warehouse floor and the concrete containment area were cleaned with a high-pressure steam cleaner; 1,000 gallons of decontamination waste water was generated. The water was subsequently shipped for treatment and disposal.
- Three 750 gallon steel tanks and a steel hopper were removed from the old warehouse building (one story brick building) located in the central portion of the site. The tanks were cut open and sludge was removed. The steel was shipped off-site for recycling.
- A total of 28, 55-gallon drums of waste were generated and disposed of during the cleanup activities.

E) Has the surface water been sampled? Surface water sampling *around the site* was conducted in the ESI by DEQ for the OP&RC investigation.

F) Are there any groundwater impacts to nearby surface water? No.

Best Cleaners
Site Summary
As of 10/21/2009

Location: 6305 N Macarthur Blvd, Oklahoma City, OK;
Lat 35° 32' 6.336" Lon -97° 37' 8.527"

Background: A commercial/retail shopping area with residential areas to the south, east, and west. The release of chlorinated solvents affecting soil and groundwater is associated with Best Cleaners located to the south of a nearby Dollar General store. National Dry Cleaners operated the facility but subsequently went into bankruptcy. 28:19 Inc. is owner of the property and a responsible party.

Air. No known ambient air issues. The vapor intrusion pathway into indoor air has not been adequately investigated. The nearby Dollar General was constructed with a vapor barrier, but there are also nearby residences.

Soil. Some soil by the building significantly exceeds groundwater protection screening levels and probably exceeds regulatory levels for hazardous waste.

Surface Water. Twin Lakes is located about 0.4 miles to the north and an unnamed tributary is located 0.4 miles to the west.

Groundwater. Chlorinated solvents. Groundwater flows to the north-northwest. DTW 14-22 feet. The plume has not been fully delineated and adjoining property owners have not been notified of the contamination below their properties.

Private/Public Wells: All known drinking water wells are located 0.3 to .95 miles to the south or southwest of the site. All of these wells are screened 25 feet or deeper. Water is supplied by the City of Oklahoma City. Shallow groundwater flow is to the northwest so drinking water wells should not be impacted.

Vapor Intrusion to indoor air. Preliminary J&E modeling does not indicate an imminent threat, but this needs better evaluation. The plume has not been adequately delineated. Need to evaluate/monitor plume to ensure it does not affect residential properties.

KEY QUESTIONS:

Has the groundwater contaminant plume been adequately evaluated/delineated? No.

Has the site been sampled for an adequate list of analytes? No, URS only sampled for VOCs and inorganics. Ran limited metals (Fe, Mn, Mg, Ca) for natural attenuation. Need to sample for SVOCs, TPH, and metals. (TPH was only run for one sample and it is an issue).

Does soil or waste need to be cleaned up? Yes. Soil needs to be remediated.

Are there obvious wastes in nearby surface water or wetlands? No.

Are there any groundwater contamination impacts to nearby surface water? No.

Has the surface water been sampled? N/A

Has the site soil been cleaned up to levels protective of groundwater? No.

Enogex Riverside Power Plant

(June 19, 2008)

Location: The legal location is described as the N ½ of the NE ¼ of Section 31, Township 18 North, and Range 13 East Indian Meridian, Tulsa County, Oklahoma.

Background: Enogex operations at the Riverside Power Plant facility include the cleaning and measurement of natural gas as it is delivered to the station. When the station was constructed, mercury meters were utilized to provide measurement of natural gas flow into the power plant. All mercury containing equipment has since been removed and replaced with dry flow measurement equipment. During recent on-site construction activities, free mercury was observed beneath the metering tubes. Subsequent to this observation, a limited site investigation was conducted.

The initial excavation was performed on October 23, 2007. Thirty-four sample points were collected. Analytical results showed thirteen samples were above our target level of 23 mg/kg. They ranged from 29.4 mg/kg to 432 mg/kg. Another excavation event was scheduled.

On November 1, 2007, excavation was completed in the areas identified during the sampling event on October 23rd. Thirteen sample points were collected. Analytical results showed six samples above the target level. They ranged from 71.5 mg/kg to 474 mg/kg. Another excavation event was scheduled. The roll-off box was sampled for disposal. Analytical results were 0.0403 mg/L TCLP mercury. Contents of the roll-off box were non-hazardous.

Eight sample points were collected on November 26, 2007, upon completion of the excavation. Analytical results showed three samples above the target level. They ranged from 45.2 mg/kg to 60.5 mg/kg.

On January 24, 2008, the final excavation and soil sampling was completed at the site. All soil samples were below 23 mg/kg. The DEQ affirmed that no further remediation of soils was needed and backfill of clean soil was granted. Backfill was conducted on May 22, 2008.

The DEQ asked Enogex to obtain information on the groundwater and any wells that may be on site. There were no wells on the property and no information on the groundwater at the site. The DEQ recommended installing two temporary monitoring wells at the site to ensure the groundwater was free from mercury contamination. Currently, Enogex is in the process of scheduling a day to install the wells and sample the groundwater.

Air: There are no air quality issues.

Soil: On March 29, 2005, a total of nineteen soil samples were collected with the aid of a hand auger at a depth of 0-4 inches below ground surface (bgs). Composite samples

consisting of three aliquot samples were collected directly below each of the seven meter sites. The rest of the samples were grab samples collected at high traffic areas within the fenced-in meter station. Free mercury was observed in three of the composite samples. Analytical results showed that concentrations of total mercury in the soil samples ranged from 0.135 mg/kg to 1,110 mg/kg. The highest concentrations of mercury were found in the composite samples collected below the meter stations.

Several excavations and sample collections were performed between October 2007 and January 2008 until all soil was cleaned up to 23 mg/kg. Once soils were cleaned to 23 mg/kg, DEQ gave Enogex permission to backfill the excavated areas with clean soil. Backfill as well as waste removal activities associated with the previous remedial excavation work was performed on May 22, 2008.

Surface Water: There are two surface water bodies near the site. Polcat Creek is located approximately 0.10 mile north of the site. The Arkansas River is located approximately 0.45 mile east of the site. No surface water samples have been collected.

Groundwater: Since soils were excavated and cleaned up to the residential soil screening level of 23 mg/kg instead of the DAF 20 groundwater protection level for soil of 2 mg/kg, groundwater was recommended for investigation. The Arkansas River is located to the east and Polcat Creek is located to the north fairly close to the site. This justified another reason to investigate the groundwater. Two temporary groundwater monitoring wells will be installed just outside the fenced-in gas yard. One will be installed on the east side and the other will be installed on the north side.

Private/Public Wells: There are no wells on the subject property or adjacent properties. According to the Oklahoma Water Resources Board well log database, the closest wells to the site are approximately ½ mile northwest and south-southeast of the site. A domestic well is located northwest of the site in the SE ¼ of the NE ¼ of the SW ¼ of Section 30, Township 18 North, and Range 13 East Indian Meridian. The well has a total depth of 51 feet below ground surface (bgs) and the first water zone is 26 feet bgs. Estimated yield of the well is 30 gallons per minute (gpm). The well located south-southeast of the site is domestic and is located in the SW ¼ of the SE ¼ of the SW ¼ of Section 32, Township 18 North, and Range 13 East Indian Meridian. The well has a total depth of 57 feet bgs and the first water zone is 36 feet bgs. Estimated yield of the well is 0.5 gpm.

Vapor Intrusion to Indoor Air: There are no vapor intrusion issues.

Glenn Oil Fuel Spill

(June 27, 2008)

Location: The Site is located on Highway 29 approximately 2.75 miles east of Marlow, OK. The legal description of the site is the SW ¼ of the SE ¼ of the SE ¼ of Section 14, Township 2 North, and Range 7 West and the NW ¼ of the NE ¼ of the NE ¼ of Section 23, Township 2 North, and Range 7 West of Stephens County. The exact location of the spill is Latitude 34° 38' 16.711" North and Longitude -97° 54' 0.614" West.

Background: On December 12, 2006, the driver of a fuel transport owned by Glenn Oil Company lost control of his vehicle and rolled the truck and trailer along Highway 29 approximately 2.75 miles east of Marlow. The accident resulted in the loss of about 6,000 gallons of gasoline fuel which flowed into the bar ditches on both sides of the highway. The fuel then flowed down the ditch lines about 250 feet and 320 feet on the south and north sides of the highway, respectively. Following the accident, Clearwater excavated approximately 1,000 cubic yards of impacted soil in an effort to remove the spill product.

Based on groundwater monitoring data and under the direction of ODEQ, a total of ten monitoring wells were installed across the site. Monitoring wells MW-1 through 3 were installed on December 26, 2006 and wells MW-5 through 10 were installed on August 28, 2007. Monitoring well MW-4 was installed near the relocated rural water line; south of the spill area. Quarterly groundwater sampling has been conducted since each well has been installed. The most current groundwater results show BTEX and/or TPH-GRO concentrations still located in wells MW-1, MW-2, MW-3, MW-6, and MW-7.

The plan to remediate the groundwater will include in-situ oxygen infusion. Three separate infusion systems will be installed in the vicinity of MW-2, MW-3 and MW-6. One area with affected soil at S-6S will be remediated by injecting a microbial solution at nineteen locations. This method will be used due to fiber optic lines located beneath the soil surface.

Air: There are no air quality issues.

Soil: Approximately 1,000 cubic yards of impacted soil was initially removed from the spill site. Confirmation soil samples were collected and analyzed for BTEX and TPH.

The only soil with concentrations of BTEX and TPH-GRO is S-6S at 3 feet below ground surface (bgs). As of April 14, 2008, Benzene is at 30.80 mg/kg and TPH-GRO is at 981 mg/kg. Toluene, ethylbenzene, and total xylenes are at concentrations of 140 mg/kg, 38.90, and 168 mg/kg respectively. Soils in this area will be remediated by means of microbial inoculation.

Surface Water: McCubbin Creek is approximately 1500 feet west and down gradient of the west end of the spill. The Spill did not reach the creek or come close to the creek.

Groundwater: Depth to groundwater range from 0.01 feet bgs to 9.90 feet bgs based on all gauging data taken from 8/31/07 to 4/8/08. There are ten wells installed at the spill site. Based on the most recent analytical results, wells MW-1, MW-2, MW-3, MW-6, and MW-7 still have concentrations of BTEX and/or TPH-GRO. Wells MW-4, MW-5, MW-8, MW-9, and MW-10 all were nondetect for BTEX and TPH-GRO in the most recent analytical. An additional well is proposed to be installed southwest of MW-2 to ensure COCs are not migrating southward. Oxygen infusion will be the remediation effort for the groundwater. Below is a table of the most recent analytical for groundwater at the site.

April 8, 2008 Groundwater Analytical

Well No.	Benzene	Toluene	Ethylbenzene	Xylene	TPH-GRO
MCL	0.005	1.00	0.70	10.0	1.0
MW-1	0.061	ND	ND	0.60	ND
MW-2	4.55	0.338	0.212	0.099	6.0
MW-3	1.42	0.052	0.152	0.028	3.0
MW-4	ND	ND	ND	ND	ND
MW-5	ND	ND	ND	ND	ND
MW-6	1.28	0.080	0.035	0.094	2.0
MW-7	0.030	0.002	0.001	0.006	ND
MW-8	ND	ND	ND	ND	ND
MW-9	ND	ND	ND	ND	ND
MW-10	ND	ND	ND	ND	ND

Private/Public Wells: A residence is located about 420 feet northeast of the east end of the spill. This property is topographically and hydraulically up gradient of the spill and is not considered at risk from this spill. The owner stated that they have an inactive water well near the residence and that their water needs are supplied by the Stephens County rural water district.

Approximately 800 to 950 feet west and down gradient of the west end of the spill there are two residences. One residence is on the north side of Highway 29. No water wells on this property and that all water needs are supplied by the Stephens County rural water district. Across Highway 29 to the south is where the other residence is located. All its water is supplied by the Stephens County rural water district. An inactive water well is located on the property about 100 feet south of the highway. Another 600 feet beyond these residences is McCubbin Creek.

Oklahoma Water Resources Board well records for Sections 14 and 23 of Township 2 North, and Range 7 West were checked online. The records revealed only one well in the northwest quarter of Section 23 about ½ mile from the spill. This well is listed as a commercial mining well owned by Chesapeake and is or was most likely used as a water supply well for drilling operations.

Vapor Intrusion to Indoor Air: There are no vapor intrusion issues.

**BNSF/(BurkBales)/Phillips Petroleum, a/k/a Phillips Pawnee Site
(City of Pawnee)
(10/15/2009)**

Location: (Address and Legal) Intersection of Harrison Street and 11th Street in northwest Pawnee, OK.

Part of NE/4, SW/4 Sect. 31, T22N, R5E, Pawnee County

Background: (include site area, past owners & operators, history, land use, previous work, findings, current status)

Leased in 1930 by Phillips Petroleum Company. Airphotos in 1938, 1961, 1967, 1973 & 1993 show bulk oil distribution center.

Maltsberger Oil Company operated the site 1968-1994; Burk-Bales Corporation operated 1994- . Burk-Bales entered CO 97-008 in 1/13/1997. Burk-Bales submitted a WP for Site Check and Initial Investigation on 4/17/1997, revised WP on 4/3/1997. Attorney notified DEQ Burk-Bales was not financially able to perform the WP.

Burk-Bales removed ASTs and ancillary equipment in 1998.

Visibly contaminated soil in a 130' x 20' area was excavated to a depth of 2' to 8' in 2000. A UST was discovered during excavation, and was removed in March 2000 and reported to OCC. The 2005 Phase III Delineation Report states impacted soils have been delineated. Benzene and TPH were the COC in soil. The report recommended additional excavation of soil exceeding screening levels (RSL) and collection of confirmation samples.

Whether this excavation and confirmation sampling occurred is unclear.

Contaminants of concern: Benzene, TPH, SVOC (EPA 8310)

Property is in a vacant lot between two railway tracks, and is owned by railroad.

RPs include BNSF (owner), Phillips Petroleum Company (former operator), and Burk-Bales (former operator, insolvent).

ConocoPhillips and BNSF have MACO. Work is delayed while ConocoPhillips and BNSF sort out cost contributions. We received status report letters from ConocoPhillips, who requested meeting, and BNSF, who expressed concern about ConocoPhillips not providing competitive bidding from consultants. ConocoPhillips offered to perform 4 quarters of GW sampling, as recommended by URS.

Air: (any known air quality issues.) Not addressed.

Soil: (describe soils, gross geology, surface cover)

Underlain by alluvium over Pennsylvanian Vanoss Group, possibly Red Eagle Limestone or Americus Limestone. Soil remaining in place may exceed respective screening levels for benzene.

Surface Water: (nearby surface water, typical topography, surface flow directions)

Black Bear Creek is 700 ft to the west. An unnamed ephemeral creek is 300 ft to the east-southeast, but it is across the railroad tracks and unlikely to be impacted by this site.

Groundwater: (Regional and local geology and hydrogeology) The site is underlain by alluvium over Pennsylvanian Vanoss Group, possibly Red Eagle Limestone or Americus Limestone.

Hydro Atlas shows minor aquifer, 0-25 gpm, possibly salty water.

Per 2005 Phase III Report (2005) Shallow GW levels 3.4 ft to 8 ft bgl. The hydraulic gradient is historically to NW or NE at times. Concentrations of Benzene and TPH-DRO exceed MCL / cleanup levels as of 2002. Benzene plume was delineated; TPH-DRO plume was not. No further sampling has been done due to cost allocation disagreements between ConocoPhillips and BNSF Railroad.

Private/Public Wells: (On-site and off-site wells)

Numerous monitor wells are present on-site (i.e. on BNSF property, including between tracks and north and south property lines). Two off-site monitor well were installed, one on west side of 11th Street on Jack Palmer property.

OWRB records show one registered groundwater wells within ½ mile of site (GW test hole installed in 1989, 0.34 mi to NW), and one unregistered well was observed offsite, but it did not have a pump.

As of 2002, the benzene plume was delineated and benzene contamination is not an issue in these wells. The potential for TPH-DRO contamination in these wells has not been determined.

Vapor Intrusion to Indoor Air: (Any known vapor intrusion issues)

Not addressed. The nearest buildings are 250 ft to WNW and NNW, and 160 ft to SE.

Have all known groundwater contaminant plumes been adequately evaluated and delineated? No. GW sampling is proposed to find out.

Has the site been sampled for an adequate list of analytes? Yes.

Does soil or waste need to be cleaned up? Yes. Confirmation sampling done after the excavation in 2000 of contaminated soil showed the presence of Benzene greater than 0.03 ug/kg (max 0.54 ug/kg) and TPH greater than the Tier 2a Industrial cleanup level for TPH-GRO of 500 mg/kg (max total TPH of 6500 mg/kg).

Has the surface water been sampled? Not necessary. Nearby surface water is topographically unlikely to have been impacted by this site.

Has the site been cleaned up to levels protective of groundwater? No. The confirmation samples collected in 2000 showed benzene greater than the DAF20 screening level of 30 ug/kg and the current Groundwater Protection Soil Screening Level (MCL-based) of 2.3 ug/kg. Benzene results from soil samples collected in 2003 were indeterminate because for most analyses the detection limit exceeded screening levels. Additional GW sampling is planned to determine if concentrations have attenuated since 2005.

Boulevard Market / Brite Cleaners

Location: Boulevard Market Center, 101 North Douglas Boulevard (East Reno and Douglas Blvd.), Midwest City, Oklahoma County, Oklahoma. Latitude 35°, 28', 24.10" N, Longitude 97°, 32', 40.60" W.

Background: The site is part of a large multi-tenant retail shopping center on 3.25 acres. The site is surrounded by commercial/industrial properties with a park one block to the south. A residential area is adjacent to the shopping center on the west side. The site was operated as a dry cleaner from 1986 to 1996 but is now a drop-off facility only. Dry cleaners normally handle hazardous chemicals and create hazardous waste. DEQ lists the site as a RCRA conditionally exempt small quantity generator. Several Lust facilities have existed in the immediate area. The general area is essentially flat but the immediate vicinity of the shopping center slopes gently southwest. Surface runoff appears to be south-southwest. The area surrounding the buildings is primarily covered by asphalt and concrete with a few unpaved areas.

Outside Air Issues: None known

Soil: The site rests on the Darnell-Stephenville soil association of shallow to deep, gently to strongly sloping loamy soils. The site overlies Quaternary age alluvium of sand, silt, clay and lenticular gravels. The only known soil contamination, chlorinated solvents, is in the immediate vicinity of the drycleaners and has also affected the groundwater aquifer beneath the site.

Surface Water: There is no surface water in the immediate vicinity of the site.

Groundwater: Depth to first water is variable from approximately 15 feet to 34 feet bgs and flows west-southwest with a gradient of approximately 0.007. Excessive concentrations of chlorinated solvents (PCE, TCE, DCE) are currently the only known groundwater COCs at the site.

Public or Private Water Wells: None are known within 1000 feet of the site. A door-to-door search has not been made but three sides of the site area are commercial, and the fourth side is a residential area on municipal water.

Vapor Intrusion Issues? Possible. The solvent plume underlies several downgradient commercial enterprises and a day care facility. A soil vapor mitigation system was installed in the daycare facility so this is not an issue for the day care. Vapor intrusion will need to be evaluated in the commercial buildings. These will be evaluated. A downgradient dental clinic lies on the southwest edge of the plume.

Has the site been adequately sampled? No. Although the currently existing monitoring wells are being regularly monitored, the downgradient (west) extent of the plume is not

yet defined and will require more wells to adequately characterize the site. It appears that the west end of the plume extends into the residential area west of the shopping center.

Does groundwater contamination affect nearby surface water or wetlands? No.
There are no nearby wetlands or surface water.

Are soil cleanup levels protective of groundwater? The site has not been completely characterized, therefore, a written remediation plan has not been submitted, although the consultant for the PRP has verbally proposed an intercept trench or barrier at the west boundary of the property (approximate west end of the plume). Remediation planning will incorporate cleanup levels protective of groundwater.

Does Soil or Waste Need to Be Cleaned Up? No soil or waste at this time.

Casady Square Dry Cleaners

(January 14, 2009)

Location:

The facility is located at 9205 N. Pennsylvania in The Village, a suburb of Oklahoma City, Oklahoma. The legal location is described as being in the NE ¼ of the NE ¼ of the NE ¼ of Section 31, Township 13 North, and Range 3 West Indian Meridian.

Background:

The Site is no longer a dry Cleaner. Currently the site is used as a furniture store. A Phase II Environmental Site Assessment (ESA) was performed and subsurface contamination of tetrachloroethene (PCE) was found. Since then, ten wells (MW-1 to MW-10) have been installed and monitored for volatile organic compounds (VOCs). Semiannual groundwater sampling is being conducted.

Air: It is unknown if there is vapor intrusion inside the building. The DEQ and client would like to install a sub-slab depressurization system inside the building; however, the owner of the store is uncooperative with installing the system.

Soil:

Soils at the site are reddish-brown and dark brown clay. The only soil samples collected at the Site occurred in 1998 during the Casady Square Shopping Center Phase I ESA. Soil sample results revealed the presence of PCE, toluene, TCE, 1,2,4-Trimethylbenzene, and xylene. PCE was the main contaminant of concern (COC) with significant concentrations. The other contaminants were all below their respective screening levels for residential use. The highest PCE concentrations were found just east, southeast, and northeast of the store. There was a PCE concentration of 1.44 mg/kg at 1 foot below ground surface (bgs) to the southeast (HB-2); 2.14 mg/kg at 1 foot bgs and 2.01 mg/kg at 5 feet bgs to the east (HB-1); and 22.0 mg/kg at 2 feet bgs to the northeast (DC-B).

Surface Water: There is no known surface water contamination.

Groundwater:

The general direction of groundwater flow is towards the north and northwest. Historically, monitoring wells MW-1 to MW-4 have shown PCE and several of its degradation products. Perimeter monitoring wells MW-6 to MW-10 only have detections of PCE. Currently, semiannual sampling is being conducted on all the perimeter wells.

The most recent sampling event on June 11, 2008, showed increased PCE concentrations in MW-8 and MW-9 with respective levels of 1080 ug/L and 92.5 ug/L. In an August 8, 2008 letter, DEQ recommended further delineation in the areas of MW-8 and MW-9 to characterize the extent of the PCE plume.

Private/Public Wells:

Dollar 75 Cleaners nearby reported this information of private/public wells. The nearest wells listed in the OWRB well record database identified four wells located approximately 1500 feet northwest

of the Site in the NE ¼ of the SE ¼ of the SE ¼ of Section 30, Township 13 North, and Range 3 West Indian Meridian. These four wells are identified as being owned by Charles Givins and were completed as two irrigation wells, one domestic supply well, and one heat pump well, each completed to a total depth of 300 feet below the ground surface and installed on March 27-28, 2000. Each well had an estimated yield of 45 gallons per minute (gpm). No other completion details were provided. Public water supply wells are located within approximately one mile of the Site.

Vapor Intrusion to Indoor Air: The table below shows the initial vapor analysis done on the property. The DEQ sent a letter on January 12, 2005 to Carl Edwards mentioning that they will need to follow up on the vapor intrusion to indoor air pathway based on the 2000 results recorded below.

Sub-Floor Perc Vapor Concentrations in 2000

Well	Observed PPM	Mg/M3	ACGIH (PPM)	ACGIH (Mg/M3)
MW-1	0.7	0.9	25	172
MW-2	1.5	1.9	25	172
MW-3	2.5	3.2	25	172
MW-4	4.0	5.1	25	172

Vapor was tested again in May 2001. Based on the above results a vapor extraction test was performed on MW-4, the well with the highest Perc concentration (5.1 ppm). Two test runs were completed. Results from both samples were quite similar 543 ppm and 580 ppm respectively. No other volatiles were reported.

Lakewood Shopping Center
Site Summary

Location: 6807-7103 North May Avenue Oklahoma City OK. Lat 34E32'21"N Lon 97E34' 28"W

Background: A commercial/retail shopping center. The release is associated with Country Club Cleaners formerly located in the shopping center.

Air. No air emissions.

Soil. Some soil by the building exceeds groundwater protection levels screening levels.

Surface Water. Lake Hefner approximately 2000 feet northwest.

Groundwater. Chlorinated solvents. Groundwater flows to the northeast. DTW 14-23'

Private/Public Wells: There are no known drinking water wells nearby. Water is supplied by the City of Oklahoma City.

Vapor Intrusion to indoor air. Plume has not been adequately delineated. Need to evaluate/monitor plume to ensure it does not affect residential properties. Additional monitoring wells have been requested.

OTHER KEY QUESTIONS:

Has the groundwater contaminant plume been adequately evaluated/delineated? No. Additional wells have been requested.

Has the site been sampled for an adequate list of analytes? Yes.

Does soil or waste need to be cleaned up? Some soil needs to be remediated.

Are there obvious wastes in nearby surface water or wetlands? No

Are there any groundwater contamination impacts to nearby surface water? No.

Has the surface water been sampled? N/A

Has the site been cleaned up to levels protective of groundwater? No.

M. I. SWACO

(June 30, 2008)

Location: The Site is located in the NE ¼ of the SE ¼ of the NE ¼ of Section 9, Township 4 South, and Range 16 East, in Antlers of Pushmataha County, Oklahoma.

Background: M.I. SWACO (M-I) is an international company providing products and services to the petroleum exploration production industry. The subject site is a property currently under lease by M-I from the City of Antlers, Oklahoma. The property consists of approximately 2.6 acres used (by various companies) since 1981 for the production, storage, and distribution of petroleum (diesel)-based drilling muds. Prior to 1981, the subject property operated as a State of Oklahoma vehicle and equipment maintenance facility dating back to the 1950's.

M.I. SWACO discontinued operation at the site and has removed all its ASTs off the property. Four of their ASTs used to store oil-based drilling mud, two bulk ASTs used to store calcium chlorite, two bulk ASTs used to store sack bar, and one bulk AST used to store diesel. Additionally, the AST farm used to contain a smaller 300-gallon diesel AST and two pump engines. The tank farm was contained with an approximately 18-inch high, concrete, secondary containment perimeter wall, and lined with a concrete pad foundation. All ASTs inside this enclosed area have been removed. Bulk barite ASTs used to be located adjacent to the northeastern side of the AST farm.

Several burnt 55-gallon drums were once stored on wood pallets adjacent to the northwestern side of the AST farm. Currently, there are approximately eight drums left on the property contained inside the 18-inch high perimeter wall/concrete pad. Four oilfield frac tanks are located on the west side of the property.

A limited Phase I and Baseline Phase II Environmental Site Assessment performed by ENSR in 2001 indicated the presence of petroleum hydrocarbons and metals in the soil near the mixing plant at the site. In January 2008, a site characterization was performed to determine the nature and extent of petroleum hydrocarbons and metals on the site's groundwater and soil. As additional information came in about the site having two underground storage tanks used for fueling an additional site characterization was performed in May of 2008. Results of the January and May 2008 sampling events have not been presented to the DEQ yet.

Air: There are no air quality issues.

Soil: Fifteen soil borings were advanced to depths ranging from 2 to 14 feet below ground surface (bgs). Sampling continued further bgs to delineate the vertical extent of soil impacts or until refusal. RCRA metals, TPH-DRO, and TPH-GRO were analyzed on the borings. A few of the borings were analyzed for BTEX and PAH as well.

Two site characterizations of the soil have been performed in January and May 2008. Results of both sampling events have not been presented to the DEQ yet.

Surface Water: Beaver Creek is approximately a quarter mile south of the property. The next closest surface water body is the Kiamichi River located northeast of the property approximately 1.75 miles. No runoff of contaminant of concern appears to be happening at the site.

Groundwater: Two site characterizations of the groundwater have been performed in January and May 2008. Results of both sampling events have not been presented to the DEQ yet.

Private/Public Wells: According to the Oklahoma Water Resources Board well log database, there are no private or public wells on the property or adjacent properties. The closest well is located in the NE ¼ of the NW ¼ of the NE ¼ of Section 9, Township 4 South, and Range 16 East Indian Meridian. The latitude is 34.229123663 and the longitude is -95.62742166. This domestic well has a total depth of 30 feet and had a water level measured at 11.44 feet below ground surface in 2007. The estimated yield of the well is unknown.

Vapor Intrusion to Indoor Air: There are no vapor intrusion issues.

Claremore Hospital

(January 13, 2009)

Location: The Site is located at 1404 North Florence Avenue in Claremore, Oklahoma. The former landfill occupies an approximate 5.95-acre tract of land located in the NW ¼ of the SW ¼ of the SE ¼ of Section 4, Township 21 North, and Range 16 East Indian Meridian.

Background: The use of the Site is a commercial development consisting of a medical office building and a parking lot. The Regional Hospital to the south has owned the property/landfill since 2003. The property had been utilized as a municipal landfill sometime between 1941 and 1964. A Phase I assessment and several subsurface investigations of soil and groundwater have been conducted since 1992. A Site Characterization Report dated August 5, 2003, identified contaminants of concern (COCs) in the soil and/or groundwater including volatile organic compounds (VOCs) and metals that are commonly found in municipal landfills. Subsurface soil, surface soil, groundwater, surface water, and air were assessed.

Previous site investigations indicate fill materials have been encountered in the former landfill up to 13.5 feet below grade surface (bgs). Fill materials observed within the former landfill include: clay, silt, sand, gravel asphalt, rubber, wire, plastic, paper, wood fragments, glass fragments, plastic sheeting and other miscellaneous debris.

Quarterly sampling is currently being performed for two years (began in October 2007) on groundwater wells EMW-6A, EMW-7A, EMW-9, EMW-10, and EMW-11. A vapor intrusion system has been installed inside the medical office building.

Air: There is a potential for methane vapors to escape the soil. A vapor intrusion system is currently in place.

Soil: Soils at the site are mainly comprised of clays, ranging from layers of silt to shaley clay. Much of the landfill debris is located within a depressed formation surrounded by clay deposits to 12 feet below grade surface. Impacted soil is confined to the area of the former landfill.

The only COC above its respective screening level was 1,2,3-trichloropropane of 0.027 mg/kg. Based on the low level encountered, and there being only one detection, the analyte was dropped by the DEQ as a COC.

Surface Water: The surface water flows to the southwest toward an adjacent intermittent creek. There is no known surface water contamination.

Groundwater: Groundwater has been encountered in the vicinity of the former landfill at depths ranging between 3 feet and 8 feet bgs. Sandstone and shale bedrock materials have generally been encountered at depths ranging between 9 feet and 14.5 feet bgs. Groundwater flow direction is generally to the west or west-northwest with a hydraulic gradient ranging between approximately 0.006 feet/foot (ft/ft) and 0.007 ft/ft. Impacted groundwater is confined

to the area of the former landfill. COCs of groundwater include: 1,4-dichlorobenzene, arsenic, chromium, lead, and mercury.

Long term groundwater monitoring is being conducted to detect if potential future threats develop. Groundwater concentrations of COCs are being compared to baseline concentrations prior to construction. The groundwater monitoring consists of gauging groundwater levels and collection and analysis of groundwater samples from the four down-gradient groundwater monitoring wells (EMW-6A, EMW-7A, EMW-10, and EMW-11) and one up-gradient monitoring well (EMW-9) on a quarterly basis for two years (or as otherwise determined by the DEQ). Quarterly monitoring has been occurring since October 2007. All COCs have consistently been below laboratory reporting limits or below respective MCLs.

Private/Public Wells: According to the Oklahoma Water Resources Board well record database, there are no wells located in Section 4, Township 21 North, and Range 16 East Indian Meridian where the Site is located.

Vapor Intrusion to Indoor Air: A methane monitoring and ventilation system in the building was installed to mitigate the potential exposure of commercial workers, visitors and patients to methane and/or VOCs migrating from the contaminated soil or groundwater into the building.

The exhaust ventilation system is manually tested on a periodic basis per the manufacturer's specifications, or at least semi-annually. The sump pump is inspected and tested semi-annually.

Coltec Industries Site (Sallisaw)

A/K/A "Holley Automotive Plant," BorgWarner Morse Tec" and "BorgWarner Automotive"
(Current RP is EnPro Industries, Inc.; current owner is BorgWarner)
(Last Update 09/22/2009)

Location: 1300 S Opdyke Road, Sallisaw, OK. 74955. Front gate is at 35°26'38.77"N, 94°47'15.37"W.

Legal Description is not available. The site lies within Section 8, T11N, R24E.

Background: (include site area, past owners & operators, history, land use, previous work, findings, current status)

The site is the former Holley Automotive manufacturing facility, previously owned and operated by Coltec Industries, Inc. In May 1996 the facility was sold to Borg-Warner Automotive, which currently operates the facility. The respondent in the Consent Agreement and Final Order (CAFO) 97-056, dated 03/05/1997, is the former owner Coltec Industries, Inc., a subsidiary of Goodrich. Goodrich sold Coltec Industries to EnPro on May 31, 2002. (http://phx.corporate-ir.net/phoenix.zhtml?c=131738&p=irol-newsArticle_print&ID=404669&highlight=)

The Borg Warner Automotive Plant (formerly Coltec) produces automotive parts. Perchloroethylene (PCE) was historically used in degreasing operations but was discontinued in 1995. During construction of a new production line, PCE contaminated soil was discovered near the old degreaser locations. The contaminated soil was excavated and disposed of. Groundwater in several wells was impacted by PCE but appears to be confined to the plant property. Monitoring wells are sampled semi-annually (quarterly when a problem is identified) to evaluate if Monitored Natural Attenuation is a workable solution for the contaminated groundwater.

Air: (any known air quality issues.) Not addressed

Soil: (describe soils, gross geology, surface cover)

NRCS reports most of site is underlain by Spiro silt loam, 3 to 5 percent slopes (silt loam over silty clay loam over very gravelly silty clay loam, over bedrock at 40 inches); from the west edge of the building it is underlain by Stigler silt loam, 0 to 1 percent slopes (silt loam over silty clay loam, over bedrock at 67-74 inches).

Bedrock in the area is Pennsylvanian McAlester Fm. and Hartshorne Fm. (undifferentiated), consisting of shale, sandstone and coal. It yields limited quantities of poor quality water.

Surface cover is lawn, building and paved parking lot.

The PCE-contaminated soil was excavated and disposed of. I was unable to determine if there are any confirmation sample results.

Surface Water: (nearby surface water, typical topography, surface flow directions)

A 2008 airphoto shows a pond 1000 ft NE of the building. USGS quad maps show an ephemeral stream 1000 ft E of the building. The ground slopes to the northeast on the north and west sides of the building and southeast on the east and south sides of the building.

A memorandum dated July 1, 1996 stated “a stream near the plant always has water in it and it will be sampled.” Sampling may or may not have occurred, but we do not have results. Groundwater not meeting MCL has been delineated to the northeast, except for VC in MW-8 which is nearly double the MCL of 2 ug/l.

Groundwater: (Regional and local geology and hydrogeology)

Depth to water is 10 to 17 feet; Hydraulic gradient is to NE, but flattened under the building. Solvents still exceeded MCL in samples collected 01/13/2009: cis-1,2—DCE (4070 ug/l), PCE (1910 ug/l), TCE (400 ug/l), and VC (194 ug/l) in MW-1; VC (3.93 ug/l) in MW-8. Except for VC, groundwater not meeting MCL is delineated.

Private/Public Wells: (On-site and off-site wells)

Other than on-site monitor wells, no wells are reported within a mile of the site.

Vapor Intrusion to Indoor Air: (Any known vapor intrusion issues)

Target groundwater concentrations (10^{-5} risk level) of PCE (11 ug/l), cis-1,2-DCE (210 ug/l), TCE (5 ug/l), and VC (2.5 ug/l) are exceeded in groundwater in MW-1, so vapor intrusion is a concern. It has not been addressed.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** Yes.
- **Has the site been sampled for an adequate list of analytes?** Yes.
- **Does soil or waste need to be cleaned up?** No.
- **Has the surface water been sampled?** Not needed. Groundwater is delineated and the contamination does not reach the surface water.
- **Has the site soil been cleaned up to levels protective of groundwater?** Groundwater is contaminated. Need to look at confirmation sample results from the initial excavation, but otherwise there is not shallow soil known to be impacted.

ConAgra Mill & Elevator Facility

(June 9, 2008)

Location: The ConAgra Mill is located at 425 West Blackwell Avenue in Blackwell, Oklahoma. The legal location of the site is described as being in the Southeast ¼ of Section 22, Township 27 North, and Range 21 West.

Background: The property is an approximate 2.47-acre tract of land owned by ConAgra. The site was reportedly occupied by a grain elevator and other agricultural related operations dating back to 1915. There is no evidence of historical use other than grain storage and flour milling. ConAgra has owned the property since April 26, 1988. In June 2005 EnviroTech Engineering & Consulting, Inc. conducted an investigation that resulted in a Phase I ESA. They reported the presence of tetrachloroethene (PCE) contamination at a concentration of 276 ug/L in a groundwater sample collected from one of three soil boring locations.

Based on the results of the EnviroTech Phase II ESA, ConAgra executed a MACO with the ODEQ. Site Characterization activities were conducted in September and October 2006. This event revealed the presence of PCE in the groundwater samples collected from temporary monitor well EB-1 (49.5 ug/L) and temporary monitor well EB-3 (1.13 ug/L). More delineation was needed based on the results of this sampling event.

Additional Site Characterization activities to further delineate the PCE plume was conducted on-site and on the adjacent Blackwell Northern Gateway Railroad Company (BNGRC) property located east or down-gradient to the site. This event revealed the presence of PCE in monitor wells MW-15 (1.68 ug/L) and MW-17 (10.2 ug/L). More delineation was needed based on the results of this sampling event.

Currently, additional Site Characterization is in the planning stage to be conducted northwest of the site across Blackwell Avenue. Four more monitor wells will be installed to delineate the PCE plume.

Air: There are no air quality issues.

Soil: Terracon's soil sampling program involved submitting one soil sample from each boring drilled on site. Based on the low or non-detectable PID readings, soil samples were collected from the capillary fringe zone. Soils have been tested for arsenic, cadmium, chromium, lead, and VOCs. All soils were well below the Residential Human Health Medium Specific Screening Levels for all constituents. All soils were nondetect for PCE and cadmium, the main contaminants of concern.

Surface Water: There are no surface water bodies within the property or on the adjacent properties. The closest surface water body is Chikaskia River located approximately ¾ of a mile northeast and east of the site. Elevation of the site is approximately 1,020 feet

above Mean Sea Level. Surface water drainage is east/northeast towards the Chikaskia River.

Groundwater: The groundwater flow direction is northeast at a gradient ranging between approximately 0.0004 ft/ft and 0.0016 ft/ft. Based on existing data from past investigations, the source of the PCE impact to groundwater may be located in the vicinity of the warehouse and packing building. Below is a summary of the main findings from each sampling event.

Phase II ESA (June 2005): 276 ug/L of PCE from boring 1.

First Site Characterization (September and October 2006): EB-1 (49.5 ug/L of PCE), EB-3: (1.13 ug/L of PCE)

Second Site Characterization (December and January 2007): MW-15 (1.68 ug/L of PCE), MW-17 (10.2 ug/L of PCE). Total and dissolved metal analysis was performed on the groundwater samples for arsenic, cadmium, chromium, and lead. Cadmium was the only metal of concern in both the total and dissolved metal analysis in all the samples. This was expected due to a cadmium plume extending from the Blackwell Zinc Superfund site located upgradient of the site. A cadmium plume map from Blackwell Zinc shows the plume extending underneath the ConAgra Food Mill site.

Private/Public Wells: According to the Oklahoma Water Resources Board well log database, there are seven domestic wells and one dewatering well located in Section 22, Township 27 North, and Range 1 West Indian Meridian. Two of the domestic wells are located in the same quarter section as the site. The first well has a total depth of 36 feet with a first water zone of 26 feet below ground surface (bgs). The well has an estimated yield of 50 gallons per minute (gpm). The second well has a total depth of 36 feet with a first water zone of 15 bgs. The well has an estimated yield of 20 gpm.

Vapor Intrusion to Indoor Air: There are no vapor intrusion issues.

SITE STATUS - KEY QUESTIONS

MUSTANG GAS PRODUCTS - DOVER/HENNESSEY GAS PLANT

Location: Three miles south of Hennessey, Oklahoma and approx. ¼ mile west of HW 81. N2, NW 4, Section 1, T18N, R7W. GPS Location: Lat 36, 4, 24.78 N Long 97, 54, 14.40 W

Background: The site, formerly owned by ExxonMobil, is still active as a natural gas processing plant. Hydrocarbon fuel was discovered in an onsite source well. Phase I and II ESAs were performed by Shaw about 2001. Current consultant is Cardinal Engineering. ESAs determined two areas of hydrocarbon fuel spills; one on the west side along N-S railroad tracks (condensate loading) and one near mid-site. Sampling of soil and groundwater included the potential COCs which were VOCs, SVOCs, TPH-DRO/GRO, and RCRA Metals. VOCs (BTEX) are the excessive COC in soil and water and is present in dissolved and free-phase form. IRMs are currently underway with periodic free-phase withdrawal and water treatment from affected wells.

Air: currently existing air issues (permits, etc.) are handled by DEQ air division. If and when soil vapor extraction gets underway, additional air testing is slated.

Soil: Clay, sandy silt and sand. Soil column is BTEX-contaminated at numerous locations across the site. Strong field screen readings from surface to water at many locations.

Surface Water: There is no surface water on the site, although a former cooling tower water impoundment is still present. No surface water in the near vicinity can be identified in aerial photo.

Groundwater: Depth to groundwater is variable across the site from approximately 15 to 35 feet. Flow direction is west. Groundwater is contaminated by dissolved and free-phase BTEX.

Source Wells in Area: One onsite (contaminated) well. There are four nearby offsite downgradient wells to the west. One of the west offsite wells is contaminated. Mustang has purchased at least one of the properties with a well which adjoins the site on the west.

Vapor intrusion: Not known at this time. Probably not a factor since there are no closed structures above the plume.

Groundwater Plume Adequately Delineated? No. It appears that the plume continues to expand westward and is now offsite. Neighbors have been informed.

Site Adequately Sampled? Yes. Quarterly sampling continues.

Does Soil or Waste Need to Be Cleaned Up? Site currently under IRM during site characterization process. SAP will describe remediation of the soil which is the contaminant source for groundwater. Currently, there is no waste to be cleaned up.

Wastes in Nearby Surface Water or Wetlands? Not applicable.

Groundwater contamination Impacts to Nearby Surface Water? Not applicable.

Surface Water Sampled? Not applicable

Site Cleanup Levels Protective of Groundwater? Site cleanup levels not yet established. Site characterization and IRM underway (free product removal and air stripping). Cleanup levels will be established in SAP when Work Plan is submitted.

Norris Sucker Rod
KEY QUESTIONS

Location: 4801 West 49th Street Tulsa, OK SW1/4 S28 T19N R12EIM

Background: Oil and Gas Field Machinery and Equipment Manufacturing. Chlorinated solvent used to degrease pipe threads. Threads were then cleaned with water that drained into sumps that leaked resulting in contamination to soil and groundwater. Initial attempts to treat source area apparently failed. Currently using a bio-treatment wall IRM to control contaminated groundwater. This is not adequately addressing contamination.

Air. Air emissions are not an issue of concern.

Soil. Chlorinated solvents. Not adequately characterized, apparent source zone needs more characterization. Source has not been remediated yet.

Surface Water. No nearby surface water bodies.

Groundwater. Chlorinated solvents. Groundwater flows to the northeast. DTW 1.5-15'

Private/Public Wells: There are no known drinking water wells nearby. Water is supplied by the City of Tulsa.

Vapor Intrusion to indoor air. Need to monitor plume to ensure it does not reach residential properties. Appears that minor off-site breakthrough of the biowall may have occurred.

OTHER KEY QUESTIONS:

Has the groundwater contaminant plume been adequately evaluated/delineated? No. A large central area is unevaluated due to access issues.

Has the site been sampled for an adequate list of analytes? Yes.

Does soil or waste need to be cleaned up? yes. Older reports indicate areas exceeding DAF 20 groundwater protection levels.

Are there obvious wastes in nearby surface water or wetlands? no

Are there any groundwater contamination impacts to nearby surface water? no

Has the surface water been sampled? Yes.

Has the site been cleaned up to levels protective of groundwater? No

ConocoPhillips N Glenpool Terminal (Glenpool)

(10/28/2009)

Location: (Address and Legal)

10600 S Elwood Avenue, Jenks OK. This is just north of the Creek Turnpike, approx. 3/4 mi east of US 75.

Prt Ne/4, Sec. 26, T18N, R12E, Tulsa County (no official legal description, yet)

Background:

The site is a Tank Farm with an estimated area of. 23-25 acres. Unleaded Gasoline leaked from an above-ground Storage Tank.

During a routine inspection, small holes were observed in the bottom of Tank 5, an 80,000-barrel aboveground storage tank containing unleaded gasoline. Corporation Commission (OCC) and DEQ were notified, and according to ConocoPhillips (COP) records, "OCC provided references indicating this may be ODEQ's"

COP did preliminary sampling with geoprobes, determined possible soil and groundwater involvement, and has entered into VCP.

COP submitted Site Characterization Report dated 01-30-2009.

Preliminary sampling was done using geoprobes. Piezometers installed to determine GW depth & gradient.

Initial sampling was 7 geoprobe samples.

PID >100 ppm generally 8 to 14 ft bgl, except GP-5 and GP-6 where it was 0-14 ft bgl, and GP-3 where max PID ws 80 ppm at 10 ft.

Four borings out of 7 (4/7) exceed residential GRO, 1/7 exceeds Industrial GRO at 540 mg/kg.

6/7 exceed shallow (<2 ft) residential DRO, 2/7 exceed deep residential DRO, 1 exceeds Industrial DRO at 6400 mg/kg.

1/7 Det. Lim. exceeds DAF20 SSL (0.03 mg/kg) for Benzene at <0.3 mg/kg. No samples exceed inhalation or dermal SSL.

Per approved preliminary work plan, COP installed monitoring wells. Soil samples from these wells were not delivered to laboratory on time, failed holding times and storage requirements. Analyses showed TPH anyway. I told Mr. Johnson, as long as future samples overlapped area in doubt, delineation should be okay, although some re-sampling may be necessary later.

The first Site Characterization Report is dated January 30, 2009. Hits in up-gradient wells indicate another potential source, and plume chasing is indicated.

Air: (any known air quality issues.) Not applicable.

Soil: (describe soils, gross geology, surface cover) The site lies on the clay, clayey silt and silt of the Wynona Silt Clay Loam, and is about ¼ mile southwest of the Arkansas River alluvium.

Borings were terminated approximately 5 feet below the depth at which groundwater was first observed, and total depths ranged from 17 to 22 feet below ground level. Soil was tested for BTEX, TPH-DRO, TPH-GRO and MTBE, and some samples exceeded screening levels for benzene (DAF20), TPH-DRO and TPH-GRO.

Surface Water: (nearby surface water, typical topography, surface flow directions)

Site lies within a meander of Polecat Creek, which flows north-northeast, then east, then south-southeast around the site before proceeding east to Arkansas River. USGS quad map shows Polecat Creek as permanent, but 2003 airphotos show mostly dry. Closest approach to site is approx 200 ft (from nearest tank to creek).

Arkansas River is approx. 2.2 mi East of site (approx 5 mi downstream along Polecat Creek)

Groundwater: (Regional and local geology and hydrogeology)

Recent piezometers show 2% to 5% hydraulic gradient to East. Although the 2003 airphotos show the creek to be dry, 2008 airphotos and USGS quad maps show the creek as permanent. Even when dry, underflow in the bed of Polecat Creek is expected to be sufficient for the creek to act as a groundwater divide.

Concentrations of benzene exceed the MCL; concentrations of MTBE, TPH-GRO and TPH-DRO exceed respective screening levels for groundwater.

Private/Public Wells: (On-site and off-site wells)

Turnpike Authority has domestic wells approx 0.47 and 0.7 miles ENE of site, across Polecat Creek. A private domestic well lies 0.92 mi ENE of site, across Polecat Creek. These wells are not a concern as all are shallow and across the creek.

OWRB shows areas of active GW use and active dedicated lands, at least 0.3 mi east of site. These are also across the creek, and therefore not a concern.

Vapor Intrusion to Indoor Air: (Any known vapor intrusion issues)

Not known yet. Benzene DL in one out of five GW sample exceeds 1e-05 Target GW concentration. Nearest buildings 1/4 mi to NW, 1.1 mi to ENE, 1/4 mi to S.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** Not yet.
- **Has the site been sampled for an adequate list of analytes?** TPH-GRO, TPH-DRO, BTEX & MTBE, to evaluate known spill of unleaded gasoline. If VOC and SVOC analyses were done, they have not yet been provided.
- **Does soil or waste need to be cleaned up?** Yes.
- **Has the surface water been sampled?** No.
- **Has soil at the site been cleaned up to levels protective of groundwater?** No.

Former Crescent Machine, Former Scott-Macon, Texas Leasehold LLC (Tulsa)

(Updated 01/11/2010)

Location: (Address and Legal)

4140 South 87th East Avenue, Tulsa 74145-3329. Unplatted lot, part of the NE/4 NW/4 Section 25, T19N R13E, Tulsa County.
36° 6'10.60"N, 95°52'48.15"W

Background:

The 1.64 Acre site was owned by an electrical contractor in the 1960s, and first developed in 1976 by Crescent Machinery Company to stock heavy construction equipment. Until recently it was leased (later purchased by?) Scott-Macon, Inc., also to stock heavy construction equipment. Scott-Macon subsequently moved out and site is up for sale.

A Phase II site assessment report dated September 21, 2005 noted the presence of groundwater containing cis-1,2-Dichloroethene (cis-1,2-DCE), trans-1,2- Dichloroethene (trans-1,2-DCE) and Vinyl chloride under most of the property. The greatest concentrations found, higher than the MCLs, were in the southwest, up-gradient corner. The source of the solvent contamination has not been determined.

Consultant requested DEQ give owner and purchaser a release from responsibility for assessment and cleanup of DCE and VC. DEQ-OGC issued comfort letter 1/30/06. TPH-contaminated soil was excavated in May 2006. TPH-contaminated soil was excavated in May 2006. DEQ received a report of the results of remedial action, sent letter 9/28/06 closing TPH issue.

Consultant in 2005-6 provided information suggesting soil contamination by contaminated GW entering from off-site, but this has not been confirmed and the information so far is also consistent with an on-site source for the contamination. The DEQ approached the upgradient neighbor, CGB, LLC, to enter the VCP (01/10/2006) as a first step in tracking down the source of contamination. CGB executed a MACO for Site Characterization in September 2007. CGB's work plan for site characterization was prepared and submitted but DEQ Quality Assurance Project Plan comments were never addressed and the work plan was not approved. Two wells were reportedly installed on the CGB property and reported as dry, but the DEQ does not have boring logs, completion information, etc. Texas Leasehold has submitted plans to install wells on the CGB property to attempt to determine the source of the contaminated groundwater.

Air: (any known air quality issues.) Not addressed.

Soil: (describe soils, gross geology, surface cover)

The site is underlain by Nowata Formation (shale and minor sandstone and limestone, yields only small amounts of fair- to poor-quality water). According to reports for the neighboring property the shale, at a depth of approximately 10 feet, is overlain by silty clay (with some sand) and fill material (clay and silty sand). Depth to groundwater is approximately nine feet. Until

Scott-Macon moved out, heavy construction equipment (“yellow iron”) was parked on the property and its maintenance/repair was done in and around a workshop near the south property line.

Soil samples collected in March and April 2005 contained up to 190 ug/kg of cis-1,2-Dichloroethene (two locations in the southwest corner of the property). Another sample (from a location subsequently excavated, near the workshop) contained n-butylbenzene, sec-butylbenzene, tert-butylbenzene, p-isopropyltoluene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene. The MCL-based Soil Screening Level for cis-1,2-DCE in soil is 21 ug/kg.

Surface Water: (nearby surface water, typical topography, surface flow directions)

An ephemeral watercourse follows the part of the western and northern property lines, eventually emptying to Mingo Creek, approximately 1 mile to the northeast.

Groundwater: (Regional and local geology and hydrogeology)

Shallow groundwater flow in 2005 was to the northeast (i.e. toward Mingo Creek) at a 2% to 4% gradient, following the base of the unconsolidated silty clay layer. Ten temporary monitor wells were installed; all have been removed.

Groundwater from the wells contained: cis-1,2-Dichloroethene 350 to 1700 ug/l in 3 wells (exceeds MCL of 70 ug/l; target GW concentration for SVI of 210 ug/l); Vinyl Chloride 7.7 to 200 ug/l in 3 wells (exceeds MCL of 2 ug/l; target GW concentration of 2.5 ug/l); trans-1,2-dichloroethene (detected in 1 well at 14 ug/l, less than MCL of 100 ug/l and target GW concentration of 180 ug/l). The plume exceeding MCL was delineated to the north and east, but not to the south or west (off-site, up-gradient).

In addition, groundwater from one well (near the workshop) contained TPH in excess of DEQ screening level of 1 mg/l.

Private/Public Wells: (On-site and off-site wells)

No domestic private or public wells are known. The temporary wells on the site were removed. Monitor wells at the Ruhrpumpen site are approximately 1/4 mile to the south; other monitor wells are 1/4 mile to the west, an observation well and three observation wells are approximately 0.6 miles to the east, and one irrigation well is approximately 0.6 miles to the north-northeast.

Vapor Intrusion to Indoor Air: (Any known vapor intrusion issues) Groundwater concentrations in the southwest corner of the property in 2005 exceeded target groundwater concentration screening levels for 10-4 risk of soil vapor intrusion for cis-1,2-Dichloroethene and Vinyl Chloride. Concentrations near the shop did not exceed the screening levels.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** Down-gradient, yes as of 2005. Up-gradient, no.
- **Has the site been sampled for an adequate list of analytes?** Yes.

- **Does soil or waste need to be cleaned up?** Yes. Soil concentrations in the southwest corner of the property exceed DAF-20 screening levels. Soil concentrations further up-gradient are not known as off-site samples have not been collected.
- **Has the surface water been sampled?** Not applicable, as the ditch up-gradient of the property is shallower than the water table, and the groundwater plume is delineated on the down-gradient side.
- **Has the site been cleaned up to levels protective of groundwater?** No.

DRAFT

Cummins Southern Plains (OKC)

(March 30, 2009)

Location: The site is located at 5800 West Reno Avenue in Oklahoma City, Oklahoma. The site latitude and longitude are: 35° 27' 51.1194" North and -97° 37' 2.676" West. The legal location is described as the NW ¼ of the NW ¼ of the NW ¼ of Section 3, Township 11 North, and Range 4 West.

Background: The property is approximately 3.44 acres. The property was purchased in 1967 by Cummins Diesel Sales Corporation (CDSC). Prior to 1967, the property was undeveloped. CDSC leases the property to Cummins Southern Plains, Inc. Cummins operated the facility as a diesel engine repair/maintenance business since 1967. The property consisted of an office/shop building and a steam clean/chassis dynamometer building. Four areas of concern were defined: four former underground storage tanks (USTs), a trench drain, sumps and an oil/water separator. Subsequent sampling indicated subsurface impact in two of the four areas of concern (AOCs). Contamination was limited to slightly elevated TPH and VOC concentrations. Current and anticipated future use of the site is commercial/industrial. Adjacent property use is commercial/industrial.

In July 1988, four underground storage tanks were removed from the site. Three USTs (two 561-gallon tanks and one 300-gallon tank) were located between the chassis/dynamometer building and the engine rebuild area of the main building. The tanks were used to store new oil, used oil and diesel fuel. A fourth tank, located east of the present wash bay was part of the oil/water separator, which was also removed. Approximately 50 cubic yards of petroleum impacted soil was removed.

In July 1998, three 20-foot borings were drilled in the UST area. Soil was collected at 2 feet intervals and two soil samples were taken per boring and analyzed for VOCs, TPH, and Total lead, Chromium, and Cadmium. Hydrocarbon impacted soil was found. VOCs detected were believed to be related to a release from the steam wash room or related to solvent use. Hydrocarbons were diesel range.

In July and October 2001, a Phase I and Phase II were completed at the site. Ten borings were drilled in July 2001 (16-20 feet) within the four AOCs. One to three soil samples were collected at each boring. Nineteen soil samples and five groundwater samples were analyzed for TPH and VOCs. Soil samples were also analyzed for RCRA metals. The highest concentrations of TPH were found in SB-2 at AOC#4 location of the former sumps; and SB-3 in AOC#1 the former location of the USTs; VOCs appear to be associated with AOC#4, the sump area (SB-2) and AOC#1, the former USTs (SB-3 and SB-4); and metals at the same AOCs at SB-2, SB-4, and SB-5.

Four additional borings were drilled in October 2001 based on the findings of the July 2001 investigation. Borings SB-11 and SB-12 were drilled in AOC#4 where additional TPH and VOCs were found. Borings SB-13 and SB-14 were drilled in AOC#1 where TPH, VOCs and metals were detected.

On July 5, 2002, the UST case was closed under the OCC Guidelines. However, the former USTs were the source of the contamination found during the Phase II Assessment. Over 200 mg/L of TPH was found in the groundwater.

In a November 17, 2006 Phase II ESA, four groundwater monitoring wells (MW-1 through MW-4), were sampled. All BTEX concentrations were below actions levels for both soil and groundwater media. A concentration of 2.52 mg/L TPH-GRO was reported in MW-4. In a January 10, 2007 DEQ letter, DEQ requested a down-gradient sample.

In the June 12, 2007 follow-up investigation report, MW-5 was installed. Two soil samples were collected for BTEX, TPH-GRO, and TPH-DRO in MW-5 also. On August 22, 2008, DEQ sent a letter in response to the August 2007 soil and groundwater investigation report indicating the presence of VOCs, PAHs and TPH in groundwater was above regulatory screening levels. This investigation did not find any significant contaminant impact to soils at the property. A subsequent investigation from November 2007 which installed permanent groundwater monitoring wells in the affected areas indicates an elevated TPH concentration above residential soil screening levels near the former sump and wash bay. The VOC and PAH concentrations are below DEQ screening levels. Groundwater samples from this investigation indicated VOC, PAH and TPH contamination above respective MCLs and/or DEQ screening levels near the former sump and wash bay. The impacted areas appeared to be limited in extent.

On August 22, 2008, DEQ suggested an additional round of sampling of all groundwater wells, which would include VOCs, SVOCs, TPH and RCRA metals analysis.

Air: There are no known air quality issues.

Soil: soils are typically unconsolidated sands, with some silt and clay, up to 50 feet thick. Bedrock below the alluvial consists of Permian Aged Hennesey Shale. Locally, underlying soils consists of fine sandy loam classified as well drained with an intermediate water holding capacity. Paved surface cover exists at the site eliminating direct contact to the impacted soils.

Surface Water: The elevation is approximately 1,215 feet above mean sea level. The topography is generally flat. The nearest surface water body is the North Canadian River, located approximately 1.5 miles south of the subject property. No surface water has been observed on or adjacent to the subject property. There are no storm water catch basins on the subject property. Storm water from the south side of the property apparently flows south. The water from the north portion of the subject property flows to the north.

Groundwater: The site is underlain by Quaternary aged alluvial deposits related to the North Canadian River. Bedrock beneath the alluvium consists of Permian Aged Hennesey Shale. Groundwater occurs as shallow as 7 to 25 feet bgs. Based on past results of borings completed at the site, groundwater is approximately 20 feet bgs. Groundwater is anticipated to flow towards the southeast based on general topography around the near vicinity of the site. Groundwater was encountered between 12-20 feet

Private/Public Wells: Surrounding areas are expected to be on municipal water supply, based on preliminary review. According to the Oklahoma Water Resources Board well record database, there is one groundwater well within ½ mile of the site. The domestic well is owned by Ford Audio and is ¼ of a mile southeast of the site. The well is 60 feet in depth. The first water zone and estimated yield are unknown.

Vapor Intrusion to Indoor Air: There are no known vapor intrusion issues.

SITE SUMMARY

OCURA – 4th AND SHARTEL

Location: Southwest Corner 4th Street and North Shartel, Oklahoma City, Oklahoma - NW/4, Sect.33, T12N, R3W; GPS Location 35, 20, 19.24N 97, 31, 29.63W. This urban site was demolished and is currently undeveloped and without vegetation. The site is surrounded by paved streets and commercial buildings.

Background: The site is the former location of an automobile sales and repair facility. It was flanked to the north by a former dry cleaner and to the east, a former gasoline service station. The site currently belongs to the Oklahoma City Urban Renewal Authority (OCURA) who commissioned GMR & Associates to conduct a Phase I ESA. Based on the findings a limited Phase II was conducted. Three borings were advanced and soil and groundwater tested for TPH, VOCs, SVOCs, and RCRA Metals. No groundwater COCs were found in wells B-1 and B-2; however, PCE and TCE were found above their USA EPA MCL of 5 ug/L in B-3. Soil was within acceptable ranges for all COCs. **OCURA plans to use the site for residential development**

Air: There are no air quality issues at this time.

Soil: Soil analysis indicated no detectable COCs in soil samples, or their concentrations were within acceptable ranges for native soils.

Surface Water: There is no surface water on or near the site.

Groundwater: Groundwater beneath the site is contaminated by chlorinated solvents, possibly from the dry cleaner. Flow direction is thought to be to the south. Further characterization is needed.

Source Wells in Area: Unknown at current stage of site characterization

Vapor intrusion: Soil vapor testing will be done before construction. If necessary, engineering controls will be put in place.

Groundwater Plume Adequately Delineated? No. Site not yet thoroughly characterized.

Site Adequately Sampled? SAP submitted. Additional borings will be put in place.

Does Soil or Waste Need to Be Cleaned Up? No known soil contamination.

Wastes in Nearby Surface Water or Wetlands? No

Groundwater contamination Impacts to Nearby Surface Water? No

Surface Water Sampled? No surface water in the area.

Site Cleanup Levels Protective of Groundwater? Work Plan not yet approved

Oklahoma Oil Well Cementing

(January 14, 2009)

Location: The Site is located at 101 South Harmony Road in the City of Cushing, Payne County, OK. The 45-acre Site is described as two tracts of land located in the northeast quarter of Section 2, Township 17 North, and Range 5 West Indian Meridian.

Background: The Site is a down well cement mixing and delivery facility. A cement mix building, cement truck wash pad, and a cement truck wash water retention pond are located on the facility. The property consist of three buildings: a 13,820 square-foot office/shop building (Building #1), a 3,000 square-foot storage building (Building #2), and a 495 square-foot cement mixing building (Building #3). The facility has been operating since 1979. Before operation the Site was undeveloped agricultural land.

The Site is bound to the north by vacant land, followed by residential properties; to the south by vacant land and residential properties; to the east by South Harmony Road, followed by vacant land; and to the west by a baseball and softball complex, followed by vacant land.

A Phase I Site Assessment was conducted on July 3, 2007. The presence of an AST and historical USTs were constituted as recognized environmental conditions (REC). Two 6,000-gallon USTs containing gasoline and diesel floated out of ground in the mid-1980s. The gasoline tank was removed from the facility and the diesel UST was converted to an AST, presently located onsite. No closure reports or soil/groundwater sampling events were available for the USTs. A plugged oil well located southwest of the chemical storage building was constituted as a REC. A petroleum pipeline easement (with at least four pipelines) has been located on the southeastern portion of the site since at least the late 1940s and no information was available regarding ownership of the pipelines. The small retention pond onsite was constituted as a REC.

A subsurface investigation soon followed on August 6, 2007. Seven direct-push soil borings were advanced to depths up to 15 feet below ground surface. Two of the borings were converted to temporary wells. Three borings were completed in the diesel tank area, two borings were completed in the plugged oil well area, and two soil borings were completed adjacent to the retention pond. Soil and groundwater samples collected in the diesel tank area were analyzed for BTEX, TPH-GRO, and TPH-DRO. Samples collected in the plugged oil well area were analyzed for Total Chlorides and TPH. Samples collected in the retention pond area were analyzed for TPH and VOCs. A water sample collected from the retention pond was analyzed for TPH, VOCs, pH, and PCBs. There were a total of seven soil samples, two groundwater samples, and one surface water sample.

Currently, there is a plan for additional investigation at the Site. There is a proposal to install one groundwater monitoring well north of the retention pond onsite. A soil sample of the borehole and groundwater sample will be collected and analyzed for TPH-DRO, TPH-ORO, and chloroform. One surface water sample will be collected from the retention pond and analyzed for pH and chloroform.

Air: There are no air quality issues.

Soil: Laboratory results of all soil samples reported concentrations for all compounds analyzed below regulatory action levels. Boring GP-03 contained 51 mg/kg of TPH-GRO and 200 mg/kg of DRO at eight feet below ground surface.

Surface Water: The Site is a relatively flat tract of land with a slope to the northwest and an elevation of approximately 940 feet above mean sea level. The nearest body of water is an unnamed tributary of Euchee Creek located approximately 0.5 mile west of the subject property. The facility utilizes a small pond located west of the cement mix building for dust control for their compressed air exhaust. The pond also receives water from the on-site truck washing pad located south of the pond. Water from the pond exits by surface discharge to the north towards a growth of cattails located northwest of the cement transfer building. Surface water sample DW-01, collected from the retention pond, contained a pH of 12 and a chloroform concentration of 0.0059 mg/L. TPH and PCBs were non-detect.

Groundwater: Below are the Phase II Limited Investigation results for the groundwater. Well GP-03 was located on the south side of the diesel AST, near the former UST area. Well GP-07 was located north of the retention pond, south of the cattails.

Sample	BTEX (mg/L)	VOCs (mg/L)	TPH (mg/L)	
GP-03	Benzene - 0.054	NA	GRO-BDL	DRO - 4.1
GP-07	NA	Chloroform - 0.00054	ORO - 1.2	DRO - 1.6

Private/Public Wells: No water wells are located on the Site. Potable water and wastewater services for the subject property are supplied by the City of Cushing. According to the Oklahoma Water Resources Board well record database, there are no water wells in Section 2 of Township 17 North, and Range 5 West Indian Meridian.

Vapor Intrusion to Indoor Air: There are no known vapor intrusion issues.

Cummins Southern Plains (Tulsa)

(February 10, 2009)

Location: The site is located at 16525 East Skelly Drive in Tulsa, Oklahoma. The legal location is the Southwest ¼ of Section 35, Township 20 North, and Range 14 East. The site latitude and longitude are: 36° 9' 50.396" North and -95° 47' 39.529" West.

Background: The site was a former diesel truck and engine repair facility from 1975 until 1993 when it was destroyed by a tornado. Before 1993 the site was undeveloped farmland. The site covers 240,000 square feet. All that remained were concrete covered parking areas, 3 concrete building foundations and a grass-covered field area at the rear of the site. Three buildings used to be on-site. Building A contained the office, parts warehouse, fuel pump room, engine component repair and truck repair areas. Building B contained the steam cleaning room, engine dynamometer, and chassis dynamometer. Building C contained the hose assembly operations, offices, and warehouse space.

A Preliminary Site Assessment was performed in May 1995 followed by two rounds of field investigations in June and July of 1995. Environmental concerns included: retention basins that collected runoff from separator and sewage disposal systems; a former oil/water separator; former diesel, used-oil, new-oil USTs; sumps in the engine steam room; a trench beneath the engine dynamometer; and an existing oil/water separator. Sixteen borings were completed and two temporary groundwater wells were installed. Analyses included: Total TPH, TPH-DRO, VOCs and BTEX. Leachable lead, cadmium, and chromium were analyzed in a few areas.

A Limited Site Investigation reported on August 24, 2007, analyzed the oil/water separator (OWS) located north of the main building; Oil/water separator located in the steam clean area; and the sand trap located in the steam clean area. Four soil borings were drilled and terminated at depths ranging from 4.0 to 8.0 feet below ground surface (bgs) on apparent limestone. No groundwater was encountered in any of the wells. Soil samples were collected in the estimated location of the former oil water separator and in the wash bay area. The samples were analyzed for TPH- GRO/DRO VOCs and PAHs. All soil samples were below DEQ screening levels.

On August 22, 2008, DEQ sent a letter in response to the 2007 report. Additional soil and groundwater sampling was recommended using a hollow stem auger to penetrate the subsurface to the shallow aquifer. The investigation would be focused around the present-day building as well as the vehicle wash bay and outside the shop doors. DEQ also required further investigation in the former settling pond areas; spill area on the east side of the property from a "frac tank"; and to the south of the building. Soil and groundwater was to be analyzed for TPH, VOCs, SVOC's and RCRA metals. DEQ asked Cummins to prepare a work plan.

Air: There are no air quality issues.

Soil: Soil is slightly clayey silt, ranging in depth up to approximately 6 feet bgs. Stratigraphy observed below silt was a shaley-clay overlying limestone or unweathered shale bedrock.

Soil samples were collected from beneath two retention basins for VOCs. All OVM readings contained very low readings with the highest reading at 6.5 ppm. Out of the 1995 investigations, three of sixteen soil borings had contamination above DEQ screening and cleanup levels. SB-9 (4 feet bgs), adjacent to the steam cleaning sumps, contained 872 mg/kg of TPH. SB-14 (7 feet bgs), located at the southern part of the former east holding pond, contained 4,959 mg/kg TPH and 557 mg/kg TPH-DRO. SB-15 (7 feet bgs), located at the northern part of the former east holding pond, contained 4,986 mg/kg TPH.

Surface Water: The site is approximately 760 feet above mean sea level. Surface water is towards the south. The nearest surface water bodies are an intermittent stream and farm ponds located approximately 0.50 mile west of the property. Potable water in the area is supplied from surface water from the Mohawk Reservoir, which obtains its water from Lake Spavinaw and Lake Eucha.

Groundwater: A Shallow aquifer is atop shale/limestone bedrock 10 to 20 feet bgs. Groundwater is not used for municipal and industrial purposes. Two temporary wells were installed at the site in July 1995. Well SB-5 was installed south of the former 250-gallon used-oil USTs and well MW-1 was installed northwest of the former oil/water separator and former 250-gallon USTs. Both wells were terminated at 10 feet bgs into shale bedrock and groundwater was found at 4.5 feet bgs.

Groundwater sample SB-5 was analyzed for TPH-DRO, VOCs, and leachable lead, cadmium, and chromium. The only analyte in SB-5 above MCL/cleanup levels was TPH-DRO with a concentration of 124 mg/L. MW-1 was only analyzed for VOCs. All concentrations were below MCLs

Private/Public Wells: No groundwater wells were observed or are known to exist at the subject property. According to the Oklahoma Water Resources Board well record database, there are no wells within ½ mile of the site. Domestic water supplies are provided by the City of Tulsa.

Vapor Intrusion to Indoor Air: There are no known vapor intrusion issues.

Dollar 75 Cleaners

(January 13, 2009)

Location:

The facility is located at 9222 N. Pennsylvania Avenue in The Village, a suburb of Oklahoma City, Oklahoma. The legal location is described as being in the NW ¼ of the NW ¼ of the NW ¼ of Section 32, Township 13 North, and Range 3 West Indian Meridian.

Background:

A 2002 Phase I Environmental Site Assessment of a former Homeland Grocery Store on 9320 N. Pennsylvania identified Dollar 75 Cleaners as being a RCRA Small Quantity Generator (SQG) facility. It was recommended that additional investigation be conducted to evaluate if Homeland had been affected by potential releases of volatile organic compounds (VOCs) from Dollar 75 Cleaners. A Phase II ESA soon afterwards reported concentrations of tetrachloroethene (PCE) and carbon disulfide from the two temporary wells drilled.

Semiannual groundwater sampling and additional well installations have occurred at the Site to monitor and delineate the PCE plume. Unfortunately, the plume has still not been adequately delineated. Currently, access agreements are being finalized with the bank and convenience store to the northwest and Wal-Mart to the northeast to install additional monitoring wells. A sub-slab depressurization (SSD) system was installed inside Dollar 75 Cleaners in November 2008.

Air: The SSD system is eliminating any vapor intrusion issues.

Soil: Contaminants associated with dry cleaning operations were not detected in any of the samples submitted for analysis during the first site characterization. Sample results did not indicate the presence of any VOC or SVOCs in the four borings/monitoring wells of the site characterization. Metals were detected at concentrations well below the preliminary remediation goals for residential land use as developed by Region 9 EPA. Metals identified in the soil are not thought to be the result of any release at the facility.

Surface Water: There is no known surface water contamination.

Groundwater:

Groundwater flow is to the north and northwest. There are currently eight monitoring wells, which all contain PCE. There are no degradation products of PCE and never have been. Once the access agreements are finalized at the bank and convenience store, a couple of monitoring wells will be installed to delineate the plume to the northwest. Several more wells will be installed northeast of the Dollar 75 well network once the access agreement is finalized at the Wal-Mart property.

Private/Public Wells:

The nearest wells identified by the OWRB search were four wells completed approximately 1500 feet northwest of the Site in the NE ¼ of the SE ¼ of the SE ¼ of Section 30, Township 12 North, and Range 3 West. These four wells are identified as being owned by Charles Givins and

were completed as two irrigation wells, one domestic supply well, and one heat pump well, each completed to a total depth of 300 feet below the ground surface and installed on March 27-28, 2000. Each well had an estimated yield of 45 gallons per minute (gpm). No other completion details were provided. Public water supply wells are located within approximately one mile of the Site.

Vapor Intrusion to Indoor Air: There are no known vapor intrusion issues. A SSD system is on continuously to eliminate the vapor intrusion pathway. There are three suction points in the building. Two points are located on the west side of Dollar 75 and one point is located on the east side of the store. There are two fans in the system. One fan runs the east suction point and the other fan runs the west suction points.

Dowell Schlumberger – Tulsa Facility
SITE SUMMARY

Location: The site consists of two parcels of land located at 1150 North Utica Avenue and 1151 North Rockford Avenue in Tulsa Oklahoma. NW1/4 Section 31, Township 20 North Range 13 East, Tulsa County.

Background: The facility manufactured trucks for the oil industry and operated from approximately 1945 to mid 1990's. The site is bordered by railroad tracks and industrial property to the west, light industrial and residential to the north, industrial and residential to the south, and residential properties to the east. There are no buildings currently on the property. Primary COC's are chlorinated solvents.

Air. Incomplete pathway. No receptors on site. Off-site VOC concentrations are non-detect or below screening levels.

Soil. Chlorinated solvents are present in the Utica and Rockford properties. TPH-DRO is present at Utica SB-2 at 1200ppm.

Surface Water. No nearby surface water. An on-site intermittent stream will be sampled.

Groundwater. At the Utica property groundwater generally flows to the northwest on the west side of the property but on the east side the gradient changes to the east. At the Rockford property the groundwater diverges to the northwest and northeast.

Private/Public Wells: There are no nearby private or public wells.

Vapor Intrusion to indoor air. There are no buildings over the contaminant plume.

OTHER KEY QUESTIONS:

Has the groundwater contaminant plume been adequately evaluated/delineated? Yes

Has the site been sampled for an adequate list of analytes? Yes.

Does soil or waste need to be cleaned up? Yes

Are there obvious wastes in nearby surface water or wetlands? No

Are there any groundwater contamination impacts to nearby surface water? No

Has the surface water been sampled? A small drainage area will be sampled.

Has the site been cleaned up to levels protective of groundwater? No

Dowell Schlumberger – OKC Facility
SITE SUMMARY

Location: 13429 North Broadway Extension, Oklahoma City. N1/2 NE1/4 S15 T13N R3W Oklahoma County, OK

Background: The facility operated from the 1940's to early 1990's. It consisted of a large vehicle maintenance building, two storage buildings and a laboratory. The site was razed in the 1990's. It is 8.5 acres in size. It is bordered by the railroad and commercial/industrial property to the west. Commercial properties to the north and south, and the Broadway Extension and commercial properties beyond to the east.

Air. There are no receptors on the property, a VC plume extending to the northeast needs further delineation.

Soil. Soil is contaminated with chlorinated solvents, GRO and metals.

Surface Water. No nearby surface water.

Groundwater. The groundwater gradient can vary from fall direction to the east and the spring gradient generally northeast. The southeast corner of the property remains to the east. Depth to water ranges from 2 to 11 feet BGS.

Private/Public Wells: There are no nearby private or public wells.

Vapor Intrusion to indoor air. There are no receptors on the property, a VC plume extending to the east may need further delineation to confirm there is no effect on the car dealership, but there are no residences nearby.

OTHER KEY QUESTIONS:

Has the groundwater contaminant plume been adequately evaluated/delineated? No, additional wells are needed to the north and east.

Has the site been sampled for an adequate list of analytes? Yes.

Does soil or waste need to be cleaned up? Yes

Are there obvious wastes in nearby surface water or wetlands? N/A

Are there any groundwater contamination impacts to nearby surface water? N/A

Has the surface water been sampled? N/A

Has the site been cleaned up to levels protective of groundwater? No

Warren Petroleum/Chevron
(Former Mocane Gas Processing Plant)
(July 16, 2008)

Location: The site is approximately 49 acres located approximately 8 miles east of Forgan, OK. It is located in the center of Section 18, Township 5 North, and Range 25 East in Beaver County, OK.

Background: The Warren Mocane Gas Plant (now inactive) was a natural gas cryogenic plant located in a sparsely populated area used primarily as range land near Forgan, OK. Warren purchased the property from CIG in December 1958. During the 1960s, a lined brine pit, flare pit and landfill were constructed on the south side of the property. In 1965 the brine pit was used to displace petroleum from the underground storage wells with an estimated flow of 2500 bbls/day. With the removal of the Missouri, Kansas, Texas Railroad tracks in the 1970s, rail loading of propane & butane, and the need for the use of chromates in the treatment ceased. Until 1974, plant operations included fractionation processes for natural gas liquids (NGLs) including propane, butane, ethane, methane, and other NGLs.

Three environmental site assessments were conducted at the Mocane Gas Plant between November 1993 and July 1994. Below are the findings of the investigations.

Geraghy & Miller – Site Inspection & Soil Sampling Investigation, November 1993

This was a Phase I site assessment that included some evasive sampling. Sample results indicated some localized hydrocarbon impacts to soil. No contamination was detected in samples from water supply wells. Sampling of suspected asbestos-containing material was performed as well.

Dames & Moore – Phase II Audit Report, March 1994

This Phase II site assessment was conducted to delineate the extent of any hydrocarbon impacts to the soil. Sample results indicated that hydrocarbon impacts to the soil were minimal; however, hydrocarbon impacts from two small sumps (Sumps 1 & 2, each 4 ft by 4 ft) were found. Soil was impacted below the sumps and at one of the sumps extended downward to the first saturated zone. Groundwater samples from this first zone were not included in the scope of this report; however, the water supply wells were retested and found to be clean.

Geraghty & Miller – Groundwater Quality Investigation, July 1994

This investigation determined the magnitude and extent of groundwater contamination from the installation of five test wells (TW-1 to TW-5). Borings from these test wells and drilling records from the water supply wells indicated the presence of several saturated zones. The uppermost zone is at 155 feet with the lowest zone extending below 400 feet. The water supply wells (WVO-1, WVO-2, and MPCO) produce from zones in the range of 215 feet to 427 feet below ground surface. Three of the test wells (TW-1, -2, & -4) were completed into the upper zone and terminated in the clay underlying this

zone. A fourth well was drilled to approximately the same depth and was dry (TW-3). Samples from the test wells indicated some contamination directly under and to the east of the sump. Free product was not found in any of these test wells. A fifth test well was completed through the upper zone and into the lower zones to a depth of 230 feet (TW-5). This well was double cased to prevent migration from the upper zone. Sample results from the lower zone agreed with results from the water supply wells with no contamination being found.

The source area is presumed to be in the vicinity of wells TW-4 and TW-2. The implication is that a stable plume configuration is present to the east and south of the site. In July 2002, TW-6 and TW-7 were installed southeast of wells TW-1 and TW-2 within the property boundary. From 1994 to 2004, semiannual sampling was conducted. From 2004 to present sampling occurred annually. Vapor extraction and a passive PSH recovery system operates on well TW-4.

No BTEX constituents have been detected in monitoring well TW-5 or water supply well WWO-1, which are screened in deeper groundwater-bearing units of the Ogallala Aquifer.

Air: There was one reported spill at the property on January 9, 1988. An atmospheric release of natural gas of an unknown amount. The spill is listed as caused by a frozen regulator causing a backup of gas. Emissions at the facility were identified as NOX, carbon dioxide, and hydrocarbons. Passive venting equipment was installed on well TW-4 on October 26, 2000.

Soil: A total of 67 samples were collected from 59 locations at various depths. The majority of these samples were below detection levels for BTEX and TPH. Benzene was only detected in 2 samples at low levels of 0.23 ppm and 0.05 ppm. Soil in two areas (PAS, Process area south, and Sump 4-2) had a TPH greater than 50 ppm. Approximately 30 cubic yards and ½ cubic yard of soil, respectively, were removed from these two areas and stockpiled with the drill cuttings for later testing and remediation. In addition, hydrocarbon impacted soils were removed from below Sumps 1 & 2 to a depth of 15 feet. These soils were also stockpiled. All soil remaining within the top 15 feet of ground surface was below detection levels for TPH & BTEX. Subsequent sampling of the stockpiled soils and the Sump 2 drill cuttings indicated low overall TPH levels of 59 ppm and 16 ppm, respectively.

Based on soil borings and the groundwater quality investigation, Sumps 1 & 2 had impacted underlying soils and Sump 1 had impacted the uppermost saturated zone. Even though these impacts were the results of past operating practices and had not occurred recently under current operations, both sumps were removed eliminating the possibility of further impacts. The sumps were replaced with PVC piping designed to provide access to the drain system when needed, but remained sealed during normal operations.

Surface Water: The site is not located within a 100-year floodplain. The closest surface water bodies are the Cimarron River and the Beaver River (North Canadian located

approximately 7 and 5 miles north and south, respectively. Timber Creek is located approximately ¼ mile west-southwest of the plant and flows south towards the Beaver River. No wetlands are on the property or adjacent properties. Local topographic data suggests a gentle, southward regional gradient.

Groundwater: The most recent groundwater gradient on record (January 2008) appears to be directed semi-radially to the north and to the southeast at an approximate gradient of 0.033 ft/ft. The facility is located on tertiary deposits of the Ogallala Formation. The expected source of BTEX contamination, the sump, has been removed. BTEX constituents are located in the uppermost water zone. No BTEX constituents have been found in the saturated or deeper water-bearing zone.

Wells on the Property

TW-1	166.80' TD and Screened at 141.8 - 166.8'
TW-2	165.20' TD and Screened at 140.2 - 165.2'
TW-3	167.70' TD and Screened at 142.7 - 167.7' (dry well)
TW-4	171.35' TD and Screened at 156.35 - 171.35' (aquitarde about at 170+ feet)
TW-5	225.00' TD and Screened at 215 - 225'
TW-6	169.65' TD and Screened at 139.65 - 169.65'
TW-7	167.10' TD and Screened at 137.1 - 167.1'
WWO-1	310.00' TD and Screened at 227 - 310' (water level at 169')
WWO-2	427.00' TD and Screened at 215 - 427' (water level at 163')
MPCO	310.00' TD and Screened interval N/A (part of easement with Mapco.)

In the most recent sampling event (Jan. 2008), wells TW-1, -2, -6, and -7 had detectable concentrations of BTEX. Constituents detected at concentrations exceeding BTEX MCLs were restricted to benzene. Benzene concentrations ranged from a concentration of 2.9 micrograms per liter (ug/L) in well TW-7 to 270 ug/L in well TW-2. Well TW-4 was not sampled due to the presence of LNAPL and TW-3 was not sampled due to insufficient water column, which had been consistently dry since installed in 1994.

Note: The laboratory used to test cooling tower water 2-3 times per week. Reagents used in the analysis include sulfuric acid, thiosulfate, and a hardness solution.

Private/Public Wells: The nearest downgradient well is located more than 2/3 mile from the site. The nearest downgradient permitted well is more than 1 mile from the site. Two onsite wells are upgradient from the contamination.

Vapor Intrusion to Indoor Air: A vapor extraction unit, consisting of a wind-driven turbine ventilator mounted on a 4-inch PVC riser pipe extending approximately 6 feet above ground surface, continually removes vapors from well TW-4. LNAPL is manually removed from TW-4 during groundwater events by bailing.

EMERSON ELECTRIC METER CHECK FACILITY

Location: Emerson Electric is located about 14 miles south of Oklahoma City at 3501 S. I-35 Service Road, Moore, Cleveland County, Oklahoma. 35°18'10.25" North Latitude, and -97° 29' 27.66" West Longitude. NW4 Section 35, Township 10 North, Range 3 West of Indian Meridian, Oklahoma

Background: The facility is comprised of an office building, fabrication shop and meter repair shop on gravel parking and storage of 1.3 acres. The site is fenced. Operations include parts cleaning, meter repair, flow testing, painting and testing. The site was developed around 1968 for construction businesses and was later occupied by Star Pipe and Steel Erectors. The site was purchased by meter check in 1994 and by Emerson Electric in 1997. Land use surrounding the site is primarily agricultural, but the site is zoned light industrial. Area topography is flat. Elevation is 1180 feet amsl. There are no schools, day care centers or parks within a 1.2 mile site radius. Nearest residence is ¼ mile northwest. A phase I ESA was performed on the site, as well as several phase IIs and remedial events. Numerous soil borings and several monitoring wells were installed onsite to sample COCs (TPH, BTEX, metals) which were found at low levels. **The site was closed July 22, 2009.**

Air: There should be no air quality issues at the site which are not under Air Quality jurisdiction.

Soil: Soils around the drum storage area, repair shop stall area and AST were tested. The drum storage area was contaminated to a max of 76 mg/Kg by TPH to about 3.5 feet. Relatively low levels of BTEX were found around the AST and excavation was recommended and performed. Subsurface soil consists of Renfro brown clayey silt to 4 feet bgs. Reddish-brown, stiff, slightly plastic, clayey silt with rock fragments were present to bit refusal at 13 to 15 feet. At refusal, found unconsolidated, laminated, red, shale bedrock which is the upper part of the Leonardian series.

Surface Water: There is no surface water at the site. The nearest surface water is a creek ¼ mile east-southeast.

Groundwater: Groundwater samples revealed low levels of carbon disulfide and 1,3,5-trimethylbenzene and o-xylene but were determined to be below applicable cleanup levels. TPH was not detected in groundwater. Groundwater at the site is found at 11 to 13 feet bgs and appears unconfined with low yield values (wells were bailed dry at one well volume). Flow is north and gradient is nearly flat.

Water Wells in Area?: None known near site.

Groundwater Plume: Not applicable.

Vapor intrusion: There are no known vapor intrusion issues at this time. Intrusion pathways appear incomplete because affected soils are at low levels and not near site buildings.

Groundwater Plume Adequately Delineated? Not Applicable.

Site Adequately Sampled? Yes. Contaminated media and extent sufficiently defined.

Wastes in Nearby Surface Water or Wetlands? None known or observed in the area.

Groundwater Contamination Impacts to Nearby Surface Water? No nearby surface water.

Surface Water Sampled? No surface water onsite or nearby.

Site Cleanup Levels Protective of Groundwater? Yes.

Enid Gasoline Spill, Potter Oil Company (Enid)

(Last updated 12/11/2009)

Location: (Address and Legal)

South side of West Chestnut Avenue, 150 yards West of North Van Buren Street, Enid OK.
Part of NW/4 NE/4 NE/4 Sec 12, T22N R7W, Garfield County OK

Background: (include site area, past owners & operators, history, land use, previous work, findings, current status). This is DEQ Complaint 300-00-00-66452.

In August 2008, a gasoline tanker truck operated by Potter Oil Company rolled over on West Chestnut Avenue west of Van Buren Street (US 81) and spilled 1300 gallons of gasoline when a compartment of the tank was punctured. The gasoline soaked into the soil too quickly to recover by vacuum truck.

Environmental Management Inc. (EMI) responded and excavated gasoline-contaminated soil down to 18 feet bgl. The presence of utilities including sewer, water, fiber optic and high-pressure gas lines prevented excavation of some of the affected soil. Approximate dimensions of the final excavation were: 78 ft long, 10 to 26 ft wide, and up to 20 ft deep. The excavation penetrated below the water table, and before backfilling with clean soil, EMI installed sumps in a packed gravel bed. EMI was able to pump out some 660 gallons of gasoline-water mix. EMI revisited the site several times to pump additional contaminated water from the sumps.

In September 2008 DEQ requested 4 wells around the site to determine GW flow and delineate the plume. Access to BNSF property to install wells south of site was granted in Feb. 2009. Wells were installed the week of Feb. 16, 2009.

First round of GW sampling showed TPH-GRO and Benzene exceeds screening levels in MW-1, 40 ft SE of spill. Based on water levels March 10, 2009, the hydraulic gradient is nearly flat, with a 0.09% gradient to NE. This is not consistent with Wellhead Protection Area for the nearby city wells, which suggest gradient to SE. To verify the gradient independent of remediation activity in the backfilled excavation, three additional monitor wells were installed in July 2009. Water level measurements on 10/29/2009 and 11/12/2009 confirm a 0.0005 ft/ft hydraulic gradient to the NE.

Air: (any known air quality issues.)

Unknown. Nearby businesses were evacuated immediately after the accident due to fire danger.

Soil: (describe soils, gross geology, surface cover)

Site is in terrace deposits some 40 to 50 feet thick. Soil appears to be silty sand and clayey sand. Site cover is grass. West Chestnut Ave. is immediately north of site, and the BNSF Railroad switchyard is south, with little vegetation.

Surface Water: (nearby surface water, typical topography, surface flow directions)

The depth to groundwater near the excavation, and limited extent of groundwater exceeding the MCL show surface water is unlikely to be affected. Drainage ditch on S side of W Chestnut (drains to east) may be impacting groundwater flow at times.

Groundwater: (Regional and local geology and hydrogeology)

Groundwater Table is around 15' to 18' bgl. in terrace deposits of silty sand interbedded with clay. Terrace deposits are typically at least 40 feet thick; one well west of site had shale at 56 ft, another east of site had shale at 45 feet. The city uses the terrace deposits as a water supply; its nearest well is 0.3 mi NW of the site.

The underlying shale may be Bison Shale or Salt Plains Formation, and is not used as a water source.

Private/Public Wells: (On-site and off-site wells)

PWS well Service Area #2 is 0.3 mi NW of site, and draws from the terrace deposits. City of Enid has agreed to shut it in indefinitely.

OWRB shows numerous private wells in the area. DEQ canvassed businesses north and the neighborhood south of the BNSF switchyard, and EMI canvassed the neighborhood SE of site (E of W. Van Buren), to identify private wells. Nearby wells were sampled and TPH was not detected. The Site is not in Wellhead Protection Area, but one is associated with the nearest PWS well NW of site.

The gradient between MW-3 and two new monitor wells, MW-6 and MW- can be used to provide early warning if the cone of drawdown from future pumping in the PWS well threatens to draw contaminated groundwater towards it.

Vapor Intrusion to Indoor Air: (Any known vapor intrusion issues)

Groundwater exceeding target groundwater concentrations for benzene is limited to the immediate vicinity of the spill site. The nearest residences are 0.2 mi south of site. One business is approx. 250 feet west of site.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** Other than up-gradient of the spill site, yes. The one well with benzene concentration greater than the MCL is as close to the BNSF switchyard as BNSF would allow. The closest downgradient wells, MW-3 and MW-4 are less than 200 ft N of the spill site and benzene was ND; the closest possible upgradient site for a well is at least 320 ft S of the site.
- **Has the site been sampled for an adequate list of analytes?** Yes
- **Does soil or waste need to be cleaned up?** Done, except where inaccessible under utility lines.
- **Has the surface water been sampled?** Not applicable
- **Has the soil at the site been cleaned up to levels protective of groundwater?** While most of the contaminated soil was excavated and disposed off-site, soil exceeding protective levels was left in place under the high-pressure gas lines.

Mr. Keen's Cleaner/Epperly Development

Location: 2824 Epperly Drive, Del City, Oklahoma

Background: Historical activities at Mr. Keen's Cleaners indicate reckless operations with solvents at the dry cleaner facility. (Site background is contained in the Initial Site Characterization Report which we do not have.)

Air: No issues known to date.

Soil: Contaminated soil is documented and source removal has been proposed, but not undertaken.

Surface Water: There isn't an issue with surface water.

Groundwater: Tetrachloroethene (PCE), trichloroethene (TCE), cis-1,2-Dichloroethene (DCE), and Trans-1,2-Dichloroethene have been detected in the groundwater. A work plan for groundwater remediation was submitted and approved March 2009, but yet to be implemented. Approval of quarterly monitoring of MW-14 & MW-12 was approved as well.

Vapor Intrusion to Indoor Airspace: Not fully determined. The Christian Heritage School gymnasium at the downgradient edge of the plume. Monitoring needs to be done to determine if concentrations in most downgradient monitoring well establish a trend.

Private/ Public Wells: Information being compiled.

- 1) Has the groundwater contaminant plume been adequately evaluated / delineated? The plume has been delineated laterally as best as possible, with the downgradient edge approaching the gymnasium of the Christian Heritage School.
- 2) Has the site been sampled for an adequate list of analytes? Yes.
- 3) Does soil or waste need to be cleaned up? There has been a proposal for in situ remediation, but no action has occurred as of yet.
- 4) Are there obvious wastes in nearby surface water or wet lands? No
- 5) Are there any groundwater contamination impacts to nearby surface water? No
- 6) Has the surface water been sampled? There isn't any surface water in the area.
- 7) Has the site been cleaned up to levels protective of groundwater? No

ExxonMobil Chemicals Shawnee Films Site
(Shawnee, OK)
(Last Update 09/25/2009)

Location: (Address and Legal)

41501 Wolverine Road, Shawnee OK (a/k/a 555 E Wolverine St.)

Part of NE/4 Sec 19, T11N R04E, Pottawotamie County

Front gate is 35° 25' 11.87"N, 96° 55' 09.63"W

Background: (include site area, past owners & operators, history, land use, previous work, findings, current status)

This is a 96-acre site north of Shawnee, first developed by Mobil Chemicals, now operated by ExxonMobil Chemical Company (XOM). Land use is industrial.

The facility had UST and AST containing chlorinated solvents; these were removed in 1984, at which time visibly-stained contaminated soil was discovered and removed. Confirmation sampling was not done.

Installed Pump & Treat system in 1991, discontinued in 1999 due to low recovery.

2003: Enrolled in VCP

2007-8: AME performed Site Characterization; submitted Site Characterization Report 5/20/2008.

DEQ approved the Site Characterization Report & IRM consisting of removal of contaminated soil. IRM is expected to be complete in October 2009.

Side Issue: Hydraulic Oil Release - 1999

01/1999 - Slitter equipment, which had been operated for 20 years, was removed and evidence of a hydraulic oil release was discovered.

09/1999 - Reported to DEQ the investigation and cleanup of impacted soil and installation of Recovery Wells and MWs. Impacted area is just inside S end of main facility building.

05/2000 - XOM monitored GW

01/2005 - GW Monitoring and Sampling Reports

05/2005 - Closure Request

06/2005 - DEQ granted Closure Request.

Air: (any known air quality issues.)

Not addressed, no air quality issue expected.

Soil: (describe soils, gross geology, surface cover)

Fill (includes clayey silt some locations, gravel in others) 0' to 1' thick. Gravel fill under a sidewalk on east side of buildings.

The site is underlain by clay and silt 1' to 4' thick, except where it pinches out on east side of site. Below this is sandstone of the Oscar Group, 10' thick, except where it pinches out on east side of site.

Surface cover includes lawn, roads, paved apron, a concrete pad with silos for granular feedstock, and the factory building.

Surface Water: (nearby surface water, typical topography, surface flow directions)

Pond on north side of property. Two intermittent streams: one to north and one to east. Dissolved solvents observed in pools along watercourse. RP states VOCs observed in the stream only when not flowing and surface water confined to pools. Will need to substantiate. Possible stormwater issues. No OPDES permit.

Groundwater: (Regional and local geology and hydrogeology)

Fill and clay form a bowl, with a spill point where they pinch out on the east and north.

Fill (includes clayey silt some locations, gravel in others) 0' to 1' thick

Clay and Silt 1' to 4' thick, except where it pinches out on east side of site.

The permeable unit is at the base of the clay and silt, or in the top few inches of the sandstone.

The Clay and silt form a confining layer.

Sandstone 10' thick, except where it pinches out on east side of site. The sandstone dips gently to the east, overlying shale (dense, red, fine grained), with occasional sand lenses.

Sandstone and shale outcrop on slope forming east side of the property.

The sandstone and shale are part of Permian Oscar Group, in north described as red-brown to gray shale and orange-brown fine-grained cross-bedded sandstone.

Private/Public Wells: (On-site and off-site wells)

The DEQ data viewer shows Leedar Inc PWS well #1, 1/4 to 1/2 mi to SE of site. Most of the new wells on site were temporary wells installed in hand auger borings.

The Hydrologic Atlas shows one well 75 ft TD, 20 feet to water, 1-2 mi north of site. GWQ generally good, calcium bicarbonate type, TDS <500 mg/l.

The OWRB WIMS GIS viewer show 7 groundwater wells within 0.5 miles of the site, including one irrigation well and one domestic well both 270 feet deep, 0.08 miles north of the site on an industrial property, 3 other domestic wells 0.15 to 0.35 miles NE of the site, 130 to 200 feet deep, and one domestic well that may actually be in OKC.

The nearest Wellhead Protection Areas are 1 miles and 1.5 miles to the northeast.

Vapor Intrusion to Indoor Air: (Any known vapor intrusion issues)

Not addressed. Concentrations may be a concern within the plant site.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** No.
- **Has the site been sampled for an adequate list of analytes?** Yes.
- **Does soil or waste need to be cleaned up?** Yes, in progress as IRM. This will remove most, but will leave small pocket of contaminated soil under the concrete pad forming the base for silos containing granular plastic feedstock.
- **Has the surface water been sampled?** Yes.
- **Has the site been cleaned up to levels protective of groundwater?** No.

Mike Monroney Aeronautical Center
Site Summary 10/15/09

Location: 6500 S. MacArthur Blvd., Oklahoma City, OK

Project Manager: Jim Long, FAA-MMAC, (405-954-5430)

Background: The FAA's Mike Monroney Aeronautical Center (MMAC) is located west of and adjacent to the Will Rogers World Airport in southwestern Oklahoma City, Oklahoma. The facility includes approximately 1,000 acres with runways, parking lots, and approximately 54 buildings on both the east and west sides of South MacArthur Boulevard between South 59th and South 89th Streets. MMAC, originally established in 1946, functions as a support and service facility for the FAA and has served as a logistical center, training facility, supply depot, research center, and aircraft maintenance and modification center. Many of the historical activities at MMAC included the use of hazardous materials, including chlorinated solvents, and the generation of various wastes. Solvents typically used at aircraft maintenance facilities include tetrachloroethene (PCE) and trichloroethene (TCE); however, the exact number and types of solvents historically used at MMAC are not known. Based on the shape of the chlorinated organic plume (COP), the variety of compounds, and the concentration of constituents, it appears that the chemicals were released from multiple locations. In 1993-1994 there were 17 'Sites' identified to have environmental issues – 6 sites required on further action at that time and to date, all issues have been resolved with the exception of the COP groundwater plume.

Air: No known issues.

Soil: The area of the MMAC is characterized by recent alluvium and Quaternary-age terrace deposits which overlie Permian-aged shale sands and siltstones of the Hennessey Group. The northern area of the site consists of a surficial layer (0.5-2 feet) of sand/silty sand, which appears to be a fill material, and it grades downward to a loam/clayey loam about 0.5 foot thick. The loam grades to a gray mottled clay slightly moist from 7- 14 feet thickness. Immediately beneath the clay is red-brown shale with siltstone layering, which appears to be the upper portion of the Bison Formation. The groundwater flow in the Bison Formation appears to occur within fissures and fractures within the weathered shale and siltstones.

Surface Water: The site has an extensive storm water sewer system along with run-off from runways into 6 outfalls about the property. These outfalls feed into the north and south tributaries that feed into Lake Peachy, south of the FTC.

Groundwater: Chlorinated organic plume with multiple tunnel and building sumps at MMAC affecting basic groundwater flow. Leading edge of the plume is being partially captured by the FTC 5000 linear feet of foundation de-watering system and sumps.

Private/ Public Wells: Unknown- good assignment for a Temp.

Vapor Intrusion to Indoor Airspace: Previous investigations indicate that there is not an issue with the pedestrian tunnel airspace being affected by vapor intrusion.

Key Questions:

- A) Has the groundwater plume been adequately delineated? Yes
- B) Has the site been sampled for an adequate list of analytes? Yes.
- C) Does soil or waste need to be cleaned up? No.
- D) Has there been any soil remediation? No.
- E) Has the surface water been sampled? Yes, outfalls that feed into Cow Creek and Lake Peachy are sampled annually.
- F) Are there any groundwater impacts to nearby surface water? No.

Former FACET International Site (Tulsa)

(05/08/2009)

Location: (Address and Legal)

2929 E. Apache Street
Tulsa, OK 74150

The site consists of three tracts of land located in SW/4 of SE/4 of Section 20, T20N, R13E, Tulsa County OK, more specifically:

The East 208.71 feet of the South 258.71 feet of the Southeast Quarter of the Southwest Quarter of the Southeast Quarter (SE/4 SW/4 SE/4) of Section Twenty (20), Township Twenty (20) North, Range Thirteen (13) East of the Indian Base and Meridian, Tulsa County, State of Oklahoma, according to the United States Government Survey thereof, LESS AND EXCEPT the South 50 feet thereof for road purposes, AND

The North 1061.29 feet of the East Half of the Southwest Quarter of the Southeast Quarter (E/2 SW/4 SE/4) of Section Twenty (20), Township Twenty (20) North, Range Thirteen (13) East of the Indian Base and Meridian, Tulsa County, State of Oklahoma, according to the United States Government Survey thereof, AND

A tract of land in the East Half of the Southwest Quarter of the Southeast Quarter (E/2 SW/4 SE/4) of Section Twenty (20), Township Twenty (20) North, Range Thirteen (13) East of the Indian Base and Meridian, Tulsa County, State of Oklahoma, according to the United States Government Survey thereof, being more particularly described as follows, to wit: Beginning at a point on the South line of said Section 20, 391.29 feet East of the Southwest Corner of the E/2 SW/4 SE/4; thence North 258.71 feet; thence East 60 feet; thence South 258.71 feet; thence West 60 feet to the point of beginning.

(The site is not the same as the current FACET International location, approx. 5.3 mi NE of site)

Background: (include site area, past owners & operators, history, land use, previous work, findings, current status)

The Facet International site is 16.22 acres located in a predominantly industrial area in north-central Tulsa. During a real estate site investigation, soil and groundwater contamination was discovered resulting from a spill thought to be at least 12 years old, and the property owners Mark IV Industries reported the discovery of hydrocarbon and chlorinated solvent contamination to DEQ and National Response Center on July 23, 1996. The property was sold to Dolphin Manufacturing Co. with an agreement that Facet (and Mark IV) would take responsibility for the environmental issues. Facet entered the Tulsa Brownfield Program as a Pilot Project, with an MOA submitted in November 1998 and signed February 27, 1998.

Facet designed, manufactured and tested fuel filtration systems, mainly for aviation. Soil & GW contamination with HC and chlorinated solvents found during real estate assessment; possibly from spills in 1980s. Four regions were defined: West Building Area, and Testing Area: Areas #1, #2 and #3.

1. West Building (Solvents from former fabrication shop).
2. Testing Area, Area #1 (mainly Jet A Fuel – current max 741 mg/l TPH-DRO & 4.05 mg/l TPH-GRO - in Area #1, some solvents in Areas #2 and #3);
3. Testing Area, Area #2 is off-site (immediately north of Area #1).

4. Testing Area, Area #3 is farther off-site. Mark IV Industries just completed a 3-year GW monitoring program identified GW contamination with carbon tetrachloride (CCL4), chloroform (CHCL3), 1,1-dichloroethane (1,1-DCA), 1, 2-dichloroethane (1,2-DCA), 1,1-dichloroethene (1,1-DCE), tetrachloroethylene (PCE), and 1,1,1-trichloroethane (1,1,1-TCA).

10/21/2005 DEQ letter said TPH concentration in GW now below Remedial Goal level of 334 mg/l.

A combined Groundwater Recovery System and Soil Vapor Extraction system was installed under the West Building in 1999, and a Groundwater Recovery System was installed under the Testing Area Building in 2005.

Annual groundwater monitoring was done in December 2007. Groundwater must be monitored quarterly in monitoring well MW-5, where cis-1,2-dichloroethylene (cis-1,2-DCE) remains at a concentration of 98.2 µg/L (110 µg/L in the duplicate sample). The MCL for cis-1,2-DCE is 70 ug/l.

A Remedial Goal Level (RGL) for TPH was set at 334 mg/l. This exceeds the Simple Site Specific Cleanup Level for groundwater. A recordable notice to the deed may be required.

In Areas #2 and #3 (both off-site) GW contamination with PCE, TCE and other chlorinated VOC exceeds MCL and RGL.

Mark IV has requested to waive quarterly and semi-annual sampling for calendar year 2009. Mark IV Industries announced April 30, 2009 it had voluntarily filed for Chapter 11 Bankruptcy protection (<http://www.markivrestructuring.com/>).

Air: (any known air quality issues.)

Indoor air was sampled in 1997, met OSHA standards.

Soil: (describe soils, gross geology, surface cover)

According to Oklahoma Geological Survey Hydrogeologic Atlas 2, the site is located on the Seminole Formation, predominantly shale sandstone and thin coal beds which yield only small amounts of fair to poor quality water. Soil cover is relatively 8 feet thick. Borings at the site encountered groundwater at depths ranging from 3.5 feet to 8 feet below ground level.

Boring logs show the soil is mainly brown silty clay or, at a few locations up to 4.4 feet of black, loose, poorly graded fine sand, overlying dark yellowish brown clay.

Surface Water: (nearby surface water, typical topography, surface flow directions)

An intermittent stream heads northerly from the north end of the site, starting at an OPDES outfall just outside the fence line.

Groundwater: (Regional and local geology and hydrogeology)

Top of bedrock is approximately 10 feet below ground. GW recovery systems (horizontal wells) were installed on top of the bedrock at the Testing Area (Area 1) and the West Building Area. Recovered GW is run through air-stripper, then polished with GAC, then discharged to POTW.

Away from the GW recovery systems, GW flow is generally northerly to northwesterly.

Private/Public Wells: (On-site and off-site wells)

Numerous monitoring wells are present on-site and immediately off-site in Areas #2 and #3. In addition, there are two sets of horizontal GW recovery wells, one under the Testing Building and another under the West Building.

No permitted wells are present within a mile of the site. The City of Tulsa has a domestic well approximately 0.7 mi North of the site, and Texaco has a monitor well approximately ½ mi E of that. The plumes are delineated so there should be no issue with these wells.

Vapor Intrusion to Indoor Air: (Any known vapor intrusion issues)

West Building: Active Mitigation. Indoor air samples were collected in the West Building in 1997 and were inconclusive (less than OSHA PELs and ACGIH TLVs, but PEL and TLV are 2 to 5 orders of magnitude higher than indoor air screening levels). However, combined GW and SVE system are operated under the West Building and are expected to serve as mitigation, provided it continues to operate.

Testing Area #1: Not addressed, as contaminant is mainly Jet Fuel (TPH)

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** Plume spread in Area 2-3 may indicate need for more wells.
- **Has the site been sampled for an adequate list of analytes?** Yes
- **Does soil or waste need to be cleaned up?** Done
- **Has the surface water been sampled?** Ephemeral stream crosses off-site. Don't know if sampled.
- **Has the site been cleaned up to levels protective of groundwater?** No.

FARMLAND (ADM) GRAIN ELEVATORS AB

Location: 10th and Walnut, Enid, Garfield County, Oklahoma. Latitude 36.414672°, Longitude -97.854844°. S/2 NE4 Section 5, T22N, R6W. The site is surrounded by industrial properties and undeveloped land. There is a residential area approximately 1000 feet to the south but groundwater is flowing eastward and should not affect this area.

Background: The site, built in the 1960's, contains two large contiguous grain storage elevators. Carbon tetrachloride was used for several decades as a fumigant to kill insects and other pests. Gradual penetration plus several spills eventually reached the groundwater creating a contaminant plume approximately 1000 feet long flowing eastward. The plume also has high concentrations of chloroform, a degeneration product of carbon tetrachloride.

Air: There are no air quality issues. All soil samples were below EPA screening levels for the inhalation pathway. DEQ's Air Quality Division determined that an air quality permit was not needed for the small quantity of volatiles coming off the pump and treat system.

Soil: There is no known soil contamination at this time.

Surface Water: There are no nearby surface water bodies although there are three large storage/treatment ponds at the east margin of the state school one mile to the east. These ponds will be sampled in 2010. The pump and treat system discharges water to a borrow ditch on 16th Street to the east of the property. This discharge is monitored under an NPDES permit.

Groundwater: Flow is predominantly eastward. Initially, the groundwater plume was approximately 1200 feet long and was presumed to extend offsite to the east but the railroad (eastern neighbor) would not give access to delineate the plume to the east. A pump and treat system was installed to remediate the contaminant plume (see Surface Water above).

Private/Public Wells: There are no nearby private or public wells as based on OWRB well records and physical observations. There has not been a door to door survey for wells but all the neighboring properties are industrial.

Vapor Intrusion to Indoor Air: There are no buildings over the contaminant plume. Also, levels in the groundwater plume were only slightly above the 10⁻⁶ screening levels for Vapor Intrusion to Indoor Air during the last test.

Groundwater Contaminant Plume Adequately Evaluated/Delineated? No. Access to the east (railroad property) could not be obtained. In the past, there was up to 94 ug/L on the property line, but it is now below MCLs. It is reasonable that anything that has gone offsite has or will attenuate naturally.

Site Summary
ADM Grain Elevators AB
1-13-10

Has the Site Been Analyzed for an Adequate List of Analytes? Yes. The area was initially sampled for VOCs and SVOCs. Metals were not considered a COC.

Does Soil or Waste Need to be Cleaned Up? No. There is no known soil contamination at this time.

Is there Obvious Wastes in Nearby Surface Water or Wetlands? No.

Are There Groundwater Contamination Impacts to Nearby Surface Water? None known.

Has the Surface Water Been Sampled? Yes. There is no nearby surface water other than the NPDES water from the pump and treat system that is discharged to a borrow ditch on 16th Street. The NPDES discharge is periodically sampled if the system is running. The three storage/treatment ponds one mile east will be sampled in 2010. The creek one-half mile north and east of the site was found to be contaminated by COCs from elevators YZ but it is unlikely that COCs from elevators AB are contributors.

Has the Site Been Cleaned Up to Levels Protective of Groundwater? Yes.

FARMLAND (ADM) GRAIN ELEVATORS YZ

Location: The YZ Grain Elevators are located at 1001 North Brush College Road, Enid, Garfield County, Oklahoma. 36°25'26.70" North Latitude, and -97°51'30.22" West Longitude. SW4 NE4 SE4 Section 32 Township 23 North, Range 6 West.

Background: The former Farmland YZ grain elevators, currently owned by ADM Grain, are combined into two joined concrete structures capable of storing some 37 million bushels of grain. The facility has been in operation for about 50 years. It is served by a spur of the Burlington Northern Railroad. The facility and surrounding areas were treated with carbon tetrachloride over several decades to control rodents and other pests. The pesticide-laden soil eventually became the source of groundwater contamination. The resulting plume of carbon tetrachloride and its degeneration product, chloroform, is almost a mile long moving downgradient to the east. The site, as well as the areas to the east, contain numerous monitoring wells although the site is still being characterized and wells are still being drilled as far as a mile away. A remediation system consisting of groundwater withdrawal and treatment wells is active at the site as an interim remedial measure (IRM).

Air: There should be no air quality issues at the site which are not under Air Quality jurisdiction.

Soil: The soil is generally red to reddish-brown to brown silty, sandy clay to clayey, slightly loamy, sand and silt. Soil borings did not indicate any soil contamination.

Surface Water: There is no surface water at the site, although there are creeks and retention ponds within one mile to the east (downgradient).

Groundwater: Groundwater beneath and east of the site is contaminated with carbon tetrachloride and chloroform. Groundwater is generally found at 15 to 20 feet in the vicinity of the site and gradient is to the east at about 0.008 ft/ft. Groundwater is being withdrawn, treated and released in an area about one-quarter mile downgradient from the contaminant source.

Water Wells in Area: Unknown.

Groundwater Plume: The plume of carbon tetrachloride and its degeneration product, chloroform, extend at least one mile downgradient to the east. The end of the plume has yet to be determined. The plume continues to move and is, therefore, unstable.

Vapor intrusion: There are no known vapor intrusion issues at this time.

Groundwater Plume Adequately Delineated? Yes, to the extent possible at this time. Delineation continues. Three new monitoring wells were drilled downgradient in the spring of 2009.

Site Adequately Sampled? Yes. Groundwater is sampled quarterly and reported semi-annually.

Wastes in Nearby Surface Water or Wetlands? None known or observed in the area.

Groundwater Contamination Impacts to Nearby Surface Water? Limited sampling has been conducted on nearby creek water with negative results; however, additional sampling of downgradient creeks and ponds approximately one mile to the east is being considered at this time. Three creek samples were taken in spring 2009. One sample had a trace of carbon tetrachloride

Surface Water Sampled? See above.

Site Cleanup Levels Protective of Groundwater? Yes. The Work Plan was approved and is being adhered to.

HOME DEPOT - TULSA

Location: 4041 S. Sheridan Road, Tulsa, Tulsa County, Oklahoma. SW SW SW Section 23, T 19 N, R 13 E of Indian Meridian: GPS Location: Lat 36° 18.01' 39" N, Long 95° 54.07' 36" W

Background: The site covers about 11.5 acres in an area zoned light industrial. Land surface is flat and sloping gently eastward. Home Depot is a national retailer of household, construction and gardening supplies, materials and equipment serving business, industry and the general public. Historically, the site was occupied by electrical, power house, oil switch, foundry and fire stopping services, equipment and materials through 1999. A Phase I ESA was conducted for Home Depot in January 2001, followed by several Phase II ESAs in 2001. Numerous soil borings and monitoring wells were installed prior to construction of the Home Depot shortly after 2001. Groundwater at the site is contaminated by chlorinated solvents, i.e., TCE, DCEs and vinyl chloride.

Air: There should be no air quality issues at the site which are not under Air Quality jurisdiction

Soil: Numerous soil borings were sampled for VOCs, SVOCs, and metals including Zn, Cu, Ni and cyanide, none of which exceeded screening levels for these COCs. Site soils are comprised of silty and sandy clays with scattered, thin sand lenses interbedded with fill material to about 20 feet. A hard sandstone formation interbedded in places with shale is found below 20 feet.

Surface Water: Recent aeriels show no surface water in the immediate vicinity of the site.

Groundwater: Groundwater is contaminated by TCE, DCEs and vinyl chloride at levels exceeding National Primary Drinking Water Standards. Groundwater is unconfined and flow is northeastward at .012 feet/foot at a depth of approximately 10-15 feet bgs. Perched water has been found at the site. Groundwater field measurements (temperature, conductivity and pH) and general groundwater chemistry indicate good promotion of natural attenuation, the current remedial choice. A reducing environment exists as evidenced by the negative to low oxygen reduction potential (ORP). Groundwater characteristics are relatively stable from one purging event to the next. Induced bioremediation is currently under consideration to enhance MNA.

Public / Private Wells in Area: None known in the immediate area which would be affected by contaminated groundwater beneath the site.

Vapor intrusion: There are no known vapor intrusion issues.

Groundwater Plume Adequately Delineated? Site characterization continues but general plume configuration is established. The annual GW sampling update report comprised of the semi-annual GW sampling events for 2009 are due in February 2010 and will upgrade plume extent and configuration. May need additional delineation to the north.

Site Adequately Sampled? The site was not sampled adequately for a period of several inactive years but is now being sampled semi-annually. See above.

Wastes in Nearby Surface Water or Wetlands? There is no nearby surface water or wetlands.

Groundwater Contamination Impacts to Nearby Surface Water? See above

Surface Water Sampled? - Not Applicable

Site Cleanup Levels Protective of Groundwater? National Primary Drinking Water Standards are applied as cleanup levels for the site.

Koch / OneOK Custer Gas Plant (Custer City)

(Last Update 12/14/2009)

Location: (Address and Legal)

SW/4, SW/4, NW/4, Sect. 34, T14N, R16W, Custer County
0.9 mi W, 1.17 mi S of Custer City, on N 2300 Road, Custer County, OK
35°38'51.25"N, 98°53'52.99"W

Background: (include site area, past owners & operators, history, land use, previous work, findings, current status)

Active gas plant built approx. 1971, operated by Koch Industries. Koch sold plant to ONEOK, and current MACO is being performed by Koch subsidiary Reiss Remediation as part of the sales agreement.

Phase I and Phase II assessments turned up concentrations of hydrocarbons in soil greater than screening levels and in groundwater greater than MCLs, around a former product tank at the Lean Oil Plant and a former water/slop oil tank location).

IRM in 2000 included removal of contaminated soil near the former product tank and former water/slop oil tank and installation of additional monitor wells and soil borings. Composite samples were collected as confirmation samples from the soil excavation; this approach was approved 09/14/2001.

Results of Additional Site Characterization Activities report, received 6/12/2006, showed the presence of GW with benzene conc. > MCL and TPH-GRO and TPH-DRO > OK Simple Site-Specific Cleanup Levels, and Phase-Separated Hydrocarbon (PSH) in two wells, MW-2 and MW-9, but all are delineated and confined to the property boundary.

Risk Assessment Work Plan, Remedial Option Evaluation & Remediation Work Plan, received 7/3/07, proposed high-vacuum extraction followed by passive PSH recovery to remove the PSH, and groundwater monitoring to support Monitoring for Natural Attenuation. Addendum received 8/21/07 proposed annual monitoring for RCRA metals but did not address how PSH removal would be demonstrated, only PSH reduction.

Air: (any known air quality issues.)

None known.

Soil: (describe soils, gross geology, surface cover)

NRCS soils map show soil is Carey Silt Loam, 1-3 percent slopes, consisting Sandy and silty residuum weathered from sandstone and siltstone, typically 42-48 inches thick.

Surface Water: (nearby surface water, typical topography, surface flow directions)

An unnamed, intermittent stream is 0.07 mi W of the site, drains to the south. Ultimately this empties to Beaver Creek. The creek bed may be 20 feet lower than the site, based on contours on the quad map.

The dikes of the Custer City Lagoons, 0.12 mi NW of the site are higher than the ground at the site; these are listed as Total Retention Facilities.

Groundwater: (Regional and local geology and hydrogeology)

The site overlies the Rush Springs aquifer and Washita Alluvium. The Permian Rush Springs Formation is described as orange-brown, cross-bedded fine-grained sandstone with some dolomite and gypsum beds. Borings in the site showed generally silty clay and clayey silt, overlying 15 to 20 feet of weathered to partially weathered siltstone/claystone (with lenses of siltstone and fine-grained sandstone), over gypsum at depth. The hydraulic gradient approx. 0.5% to 2%, converges from north, east and south towards the truck loading rack, then slopes westward, off-site, from there. Groundwater levels range from 12 to 28 feet bgs.

Private/Public Wells: (On-site and off-site wells)

No known domestic use wells nearby. USGS owns one well for "Mining", TD 420 ft, 0.9 mi ENE of the site. OWRB record is not clear whether the well is plugged and abandoned, but lists it as grouted with cement.

Monitor wells around wastewater treatment ponds NW of the plant; nearest well 0.12 mi NW of site.

Koch has installed 12 monitor wells on the property.

Vapor Intrusion to Indoor Air: (Any known vapor intrusion issues)

Not evaluated. One storage building is close to wells with historical benzene > MCL.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** Yes.
- **Has the site been sampled for an adequate list of analytes?** Almost. Have requested GW analysis for RCRA Metals.
- **Does soil or waste need to be cleaned up?** Not determined.
- **Has the surface water been sampled?** Not required, as groundwater > MCL has been delineated.
- **Has soil at the site been cleaned up to levels protective of groundwater?** Analytical results are indeterminate:- Detection limits for Benzene in the composite samples used as confirmation samples from the soil excavations were 0.011 mg/kg to 0.012 mg/kg while current 2009 EPA groundwater protection SSLs for Benzene are .0028 mg/kg (MCL-based) and 0.00023 mg/kg (risk-based). However, the presence of benzene over the MCL in the groundwater and the presence of hydrocarbon sheen in some wells (although diminishing) suggest the soil has *not* been cleaned up to levels protective of groundwater.

OneOK El Reno Gas Plant
(Former Koch Industries El Reno Gas Plant) (El Reno)
(12/11/2009)

Location: (Address and Legal)

Lat/Lon 35, 38, 40.50N; 97, 57, 32.50W

NW/4, NW/4, SW/4, Sect. 33, T14N, R7W, Canadian County

on east side of US 81, 7.9 mi north of El Reno, and 3.5 mi S of S.H. 3

Background: (include site area, past owners & operators, history, land use, previous work, findings, current status)

This is an active distillation, cryogenic compression and sales facility.

Soil borings in flare pit area in 1994 showed hydrocarbon levels below OCC thresholds (OAC 165.25). In 1998 BTEX was found in soil in B-6 by the flare pit. In 2000 Geoprobe borings SB-1 thru SB-5: BTEX & TPH in GW but not soil. In 2001 installed MW-1 thru MW-4.

In 2006, Arcadis proposed drilling 4 more monitoring wells. Proposed locations were approved on July 10, 2006.

Per 11/22/1999 work plan, soil near the old flare pit (50x70 ft) was to be excavated in 2000. The excavation has not yet been done.

Benzene > DAF-20 in 2 borings; detection limits > DAF-20 in 2 locations, GP-9 and GP-12, both on Brodersen property east of the site.

TPH-GRO > Screening Levels near flare pit in boring soil samples "A-2" (2-7 ft bgs) ("10'N, 20'W of SE Corner of Plant Vent System Containment Area") and A24-B6-2 (0-2 ft bgs) (near former flare).

RP submitted Work Plan for Complete Characterization Activities, dated May 31, 2006.

DEQ review suggested moving proposed sentinel wells MW-6 and MW-7 on Brodersen property south and east in case existing locations miss GW plume. The last reported benzene concentrations near the east property boundary (MW-3 and MW-4) were 2.8 Mg/l and 0.86 mg/l, respectively, in December 2007.

RP secured off-site access to install monitor wells off-site to the north to establish sentinel wells and to access them one month per year after annual harvest. On 3/18/2008 Mr. Fienhage said the owner to east (Mr. Charles Brodersen) wants to limit access to one month per year access after harvest, but ending in 2010. Off-site wells to the north were installed in the summer 2009 and sampled July 27, 2009.

On October 5, 2009 Mr. Brodersen filed a complaint (300-00-00-69371) with ECLS, transferred to LPD. I spoke to him, and agreed to include him on correspondence concerning his property. He said he and his brother Clark Brodersen each have a half interest in the property east of the site. I expect access to install wells should become easier to obtain. The complaint was closed on 12/11/2009.

In letter dated 12/11/2009 I requested a meeting to discuss interim measures.

Air: (any known air quality issues.)

Not addressed

Soil: (describe soils, gross geology, surface cover)

Permian age Chickasaw Fm, variegated mudstone conglomerate and red-brown silty shale and sandstone, with minor orange-brown fine sandstone. Site is industrial. Neighboring property to north and east is wheat farms. US Highway 81 to west.

Surface Water: (nearby surface water, typical topography, surface flow directions)

Surface water has not been assessed. A dry watercourse draining to a stock pond is approx. 700 ft WSW of the property; the stock pond is approx. 1300 ft W of the property.

Groundwater: (Regional and local geology and hydrogeology)

Found clayey silt and silt, underlain by weathered to partly-weathered siltstone with very fine-grained sandstone at 25 ft below ground level (bgl). Top of bedrock is fairly flat.

Gradient is 0.03 ft/ft to the east. GW encountered at base of overburden at top of weathered bedrock. Static water levels are approximately 6-8 ft bgl.

Temporary geoprobe well results are not consistent with monitor well results.

Highest benzene concentrations were in MW-3 (1700 ug/l) at NE corner flare pit tract and MW-4 (1900 ug/l) at Se corner of the flare pit tract. Proposed new wells would be 100 ft and 250 ft east of center of east edge of flare pit tract, down-gradient of former flare pit, on Broderson property.

Private/Public Wells: (On-site and off-site wells)

No registered off-site wells are within 1/4 mi of the site. One irrigation well is 0.6 mi NW of site. Being hydraulically up-gradient of the site, it is not a concern.

Vapor Intrusion to Indoor Air: (Any known vapor intrusion issues)

Nearest building is control room ~450 ft SW of SW corner of flare pit tract and therefore ~450 ft SW of any known benzene > MCL.

Land use on neighboring properties is wheat farming; no buildings exist in the nearby fields.

Soil Vapor Intrusion to Indoor air is not a concern.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** No. Plume may have moved off-site to east and northeast. Delineation of plume to northeast is pending; access issues have delayed delineation of plume to east.
- **Has the site been sampled for an adequate list of analytes?** Yes.
- **Does soil or waste need to be cleaned up?** Yes. Koch had proposed excavation of soil from the flare pit, but this has not yet been done.
- **Has the surface water been sampled?** Not applicable.
- **Has soil at the site been cleaned up to levels protective of groundwater?** No.

LINDSAY SLACK/GEFFRE BIOCELL *(Constructed to contain contaminated soil from the Slack Conoco UST leak)*

Location: 208 Northwest 4th Street, Lindsay, Garvin County, Oklahoma – NW NW NEQ Sec 10, T4N, R4W IM - GIS Location: 34 50' 22.55" N, 97 36' 22.61" W

Background: The Slack Conoco site at 411 West Cherokee Street, Lindsay, Oklahoma, formerly owned and operated by Larry Slack, (currently owned by the Webb Oil Company) fell under the jurisdiction of the Oklahoma Corporation Commission's Leaking Underground Storage Tank (LUST) Program in 2002 when a gasoline release from a leaking underground storage tank(s) was discovered. The tanks were removed and the gasoline-contaminated soil was temporarily placed onsite near the excavation. A local resident, and business owner, Sebastian Geffre, operating three blocks north of the spill site volunteered his 3.5 acre plot, zoned commercial, for construction of a biocell to treat the contaminated soil. His stated reason was that he needed the soil to level his property and increase its value. All parties involved agreed and the construction and operation of the biocell fell under the jurisdiction of the Oklahoma Department of Environmental Quality (ODEQ). The biocell work plan was approved by the DEQ and the cell was constructed with a downgradient monitoring well just outside the berm. The gasoline-contaminated Slack site soil was placed in the cell to aerate and was soon grid-sampled and a groundwater sample taken. Sampling results were non-detect. The consultant submitted a supplementary work plan in April 2009 for additional testing of soil and groundwater, surficial waste removal, re-seeding and monitor well plugging prior to closure. The site was closed in October 2009.

Air: There are no existing air issues at the site.

Soil: The soil was contaminated by gasoline from a leaking underground storage tank before being placed in the biocell. The soil was successfully bioremediated and spread over the surrounding surface for fill. The soil was brown, firm, silty clays from 0 - 2.5' and brown, plastic, moist silt and clay to 5'.

Surface Water: There is no surface water on or near the site. The Washita River is approximately one mile south of Lindsay.

Groundwater: No plume exists beneath the site. Depth to groundwater across the site is approximately 20 feet. Flow direction is unknown because only one well, was drilled at the site. General flow is probably toward the Washita River approximately one mile to the south.

Private / Public Wells in Area: None known in the immediate vicinity of the biocell site. Since there is no plume beneath the biocell, area source wells would not be affected.

Vapor intrusion: There are no structures nearby to have been affected by vapor intrusion.

Groundwater Plume Adequately Delineated? There is no plume beneath the biocell.

Site Adequately Sampled? Soil and groundwater sampling was conducted for TPH-GRO and lead. The one onsite monitoring well was also sampled. All results were non-detect or below levels established for the site.

Does Soil or Waste Need to Be Cleaned Up? The biocell has been leveled and the liner removed. The monitoring well which was placed just outside the bermed area when the biocell was constructed has been plugged

Wastes in Nearby Surface Water or Wetlands? No

Groundwater Contamination Impacts to Nearby Surface Water? Not applicable. There is no surface water nearby and no plume is present to spread contaminants.

Surface Water Sampled? Not applicable. No surface water nearby.

Site Cleanup Levels Protective of Groundwater? Yes. Site closed.

Lucky Used Cars (Tulsa, OK)

12-18-09

Location: 13454 E 11th Street Tulsa, OK 74128, NW NE NW of Section 9, Township 19N, Range 14W

Background: 0.66 acres. Automotive repair shop operated from 1960's until 2003; auto body shop from 2003 to present; septic system was onsite (unknown if it still exists); leaking compressor on west side of building (oil staining).

Air: No known air quality issues.

Soil: DRO detected on the west side of the building near compressor, they plan to excavate the soil in this area and do confirmation sampling afterward.

Surface Water: No surface water bodies are onsite or nearby, ditches were not sampled.

Groundwater: Groundwater not encountered in soil borings, groundwater is estimated to be present 20 feet below ground surface (bgs). Direct Push met refusal at 3 to 5 feet bgs.

Private/Public Wells: No public or private wells located onsite or nearby.

Vapor Intrusion to Indoor Air: No known vapor intrusion issues.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** No, the soil probe hit shale at 3 to 5 feet and no groundwater was encountered. It is unknown if groundwater is contaminated at this site. Soil contamination seems very minor at this site, so it is unlikely that the groundwater is impacted.
- **Has the site been sampled for an adequate list of analytes?** No, additional sampling has been requested.
- **Does soil or waste need to be cleaned up?** Yes.
- **Has the surface water been sampled?** No.
- **Has soil at the site been cleaned up to levels protective of groundwater?** No.

Marathon Boynton Refinery

Project Manager: Mark Ehrman, Findley Ohio, 1.317.872.3200

Location: The Boynton Refinery site is located ½ mile east of Highway 72 on Kenefick Road, Boynton, Muskogee County. The geographical coordinates of the site are 35°39' 10.3" north latitude and 95° 38' 34.1" west longitude. The legal description is Northeast ¼ Northeast ¼ Section 31 Township 14 North Range 16 East.

Background: The site consists of 47.5 acres and includes the entire operation of the Marathon Refinery and United Clay Products. The site was known as Boynton Refining Company from 1917 to 1919, then as Transcontinental Oil Company from 1921 to 1930, and as Marathon Oil Company from 1931 to 1936. The site was abandoned in 1936. During the refinery's operational years, a variety of oil products such as paraffin wax, motor oil, gasoline, and kerosene were produced. Daily production averaged between 2,500 and 3,000 gallons of crude oil used per day. Also within the southwestern boundary of the site was the United Clay Producers Corporation Plant #2. Records of the brick plant were destroyed years ago at Boynton's old city hall due to a flood. A site characterization has been conducted and remedial options are being evaluated.

Air: There aren't any potential releases to the air, but there will be a potential odor situation once the remediation of the acid tar pit begins.

Soil: There are several areas of effected soil which are under evaluation for remediation options.

Surface Water: Surface water impacts have been noted in the un-named intermittent stream north of the tar impoundment. Booms are in place to capture the free product and the booms are replaced periodically.

Groundwater: Groundwater exhibits exceedances in arsenic and dissolved manganese, and is high in dissolved solids.

Private/ Public Wells: According to the OWRB database, there are no private or public groundwater wells within five miles of the site.

Vapor Intrusion to Indoor Airspace: Not an issue, no private or public buildings on the site.

General Questions:

- A) Has the groundwater been adequately delineated? Yes...
- B) Has the site been sampled for an adequate list of analytes? Yes
- C) Does soil or waste need to be cleaned up? Yes.
- D) Has there been any soil remediation? No.
- E) Has the surface water been sampled? Yes.
- F) Are there any groundwater impacts to nearby surface water? Yes.

Martin Marietta Red River Asphalt Plant

(January 14, 2009)

Location:

The Red River Asphalt Plant is located 7 miles north of Sawyer, OK adjacent to Martin's Sawyer Quarry. The legal location and address is unknown.

Background:

The Plant was demolished in 2003. After demolition of the plant, an area of hydrocarbon-stained soil was excavated and disposed of to a depth of approximately 6 feet, 55 feet long, and 30 feet wide on November 21, 2003. Approximately 550 cubic yards of affected soils were excavated, analyzed for TPH and BTEX. BTEX concentrations were below detection limits and Total Petroleum Hydrocarbons (TPH) was above. Excavation was concluded after reaching a TPH cleanup level of 500 mg/kg.

On December 22, 2003, Martin Marietta installed 3 temporary groundwater monitoring wells to assess the presence and depth of groundwater at site. On December 24, 2003, samples were collected and analyzed for TPH by method 8015 DRO and volatile organic compounds (VOCs) by method 8260B. No VOCs were detected in any of the wells. However, well B-2 had a TPH (DRO) concentration of 3.33 mg/l. Casings were pulled and boreholes were plugged immediately after sampling.

An installation of four permanent monitoring wells was conducted on June 16, 2004, to further investigate the presence or absence of plume contamination at the site. Four soil and four groundwater samples were collected from the installation of the wells. BTEX and TPH (GRO/DRO) analysis were tested on the monitoring wells. Out of all the analysis, TPH (DRO) in monitoring well MW-2 was the only contaminant above the ODEQ cleanup levels. MW-2 had a TPH (DRO) concentration of 2.66 mg/l, which is above the 1.0 mg/L level for the Tier 1 Generic TPH cleanup.

No additional investigation has been conducted since 2004. All four monitoring wells are no longer on the property. The DEQ asked that two borings be installed in the location of the excavated area and one boring/temporary groundwater well be installed in the vicinity of MW-2. The DEQ wanted the analysis of TPH (DRO), SVOCs, and metals from each collected boring and groundwater sample. New information was discovered as well that there were areas on the Site that at one time had retention ponds.

Air: There are no air quality issues.

Soil: The soils are generally sandy clays and clayey sands. Excavated Soils were cleaned up to the Industrial TPH level of 500 mg/kg. BTEX and VOC were below detection levels.

Table for soil results

MW-1 – soil sample taken at 24 feet

MW-2 – soil sample taken at 12.5 feet

MW-3 – soil sample taken at 12 feet
MW-4 – soil sample taken at approx. 9.5 feet

On November 18, 2004, over excavation was conducted around well MW-2 and a composite soil sample was taken to be analyzed for BTEX/GRO and TPH. Analysis results showed that all the BTEX and TPH compound concentrations were nondetect.

Surface Water: There is no known surface water contamination.

Groundwater:

December 24, 2003 Temporary Wells

Wells	Total Depth (feet)	Water Depth (feet)	TPH (DRO) (mg/l)	VOCs
B-1	23.5	Dry	Dry	Dry
B-2	16.25	14.44	3.33	Nondetect
B-3	9.25	6.67	<0.294	Nondetect

June 16, 2004 Monitoring Wells Installed and Samples Collect on August 5, 2004
BTEX and TPH were analyzed only since VOCs were not detected in the December 2003 sampling event.

Wells	Total Depth (feet)	Water Depth (feet)	TPH (DRO) (mg/l)
MW-1	23.5	18.0	0.375
MW-2	12.5	8.5	2.66
MW-3	12	Dry when encountered	0.248
MW-4	8.63	Dry when encountered	0.355

Note: MW-2 is less than 30 ft. away from B-2 (2.66 mg/l and 3.33 mg/l respectively).

Private/Public Wells: The plant site is abutted by the residence of the landowner, Mr. Bumpas. This residence is in excess of 500 feet from the monitor well locations on site. This residence obtains its drinking water from a deep well; this aquifer is protected from the shallow aquifer at the plant site by many feet of well-cemented of sandstone. After the Bumpas residence, the nearest residence is approximately ¼-mile to the north of the plant site. There were no OWRB wells in that area. No wells in the OWRB search for Choctaw County had Mr. Bumpas as the owner.

Vapor Intrusion to Indoor Air: There are no known vapor intrusion issues.

Michelin / BFG (Miami)

(12/04/2009)

Location: (Address and Legal) 1000 Goodrich Blvd., Miami OK

Total area 246 acres in S/2 of Section 24, T28N, R-22E, Ottawa County. Area 4 Landfill approx. 95 acres in SE/4 of Section 23, T28N, R-22E, Ottawa County.

Background: (include site area, past owners & operators, history, land use, previous work, findings, current status)

Former B.F. Goodrich Facility, acquired by Michelin North America, Inc.

Waste tires were disposed in Area 4 Landfill.

Contaminated groundwater has migrated off-site.

Benzene in groundwater has historically been attributed to leaks from UST in the northeast part of the plant area.

New anecdotal information from a former employee (Evelina Morales spoke to this former employee at a conference in Tulsa in March 2008) suggests a more significant benzene source in the southwest part of the plant area. A third-hand summary follows; this information could not be confirmed:

During 1930s and 1940s a mixture of clay and benzene was used in the tire vulcanizing process [perhaps as a parting agent to prevent the rubber from sticking to the molds? -- JPTD] The equipment was washed off in an area north of Goodrich Blvd, approximately between projections of L Street and N Street. Later, foundation preparation for a building in the area was delayed when the contractors found shallow water table (1-2 ft bgl) and strong benzene odor. Soil was excavated until strong odor was eliminated, and the foundation was then laid and the building constructed.

This area may be more significant as a source of benzene than was the UST area. A pump-and-treat system was operated for several years in the area, with limited success.

Consent Order, 97-324, dated 10/10/1997 provides that Michelin agrees to conduct a risk-based remediation at the site. Paragraph 16:

• A. Evaluate the need for site-specific risk assessment and use DEQ's PRGs or calculate site-specific remediation goals subject to DEQ approval. Portion of site is limited to areas of concern or potential concern (AOC/AOPC) identified in the final Work Plan or as mutually agreed. AOC/AOPC are:

- Area 1: Plant Storm and Process Water Lagoon;
- Area 2: Former UST Area;
- Area 3: Plant Deep Production Water Wells;
- Area 4: Landfill;
- Area 5: Former Main Switchyard;
- Area 6: Waste Oil Tank;
- Area 7: Off-Site Residential Area; (possibly identified later)
- (Background Soil and Ground-Water)

• B. Develop and implement a Work Plan for DEQ Approval.

• C. DEQ and Michelin are to prepare a mutually-agreeable Remedy. Once the Remedial Design Plan is approved, Michelin to begin Remedial Action in accordance with the Work Plan.

Letter dated 04/01/2004 not approving the Work Plan, with concerns about sampling at 1126 L Street, 1119 L Street; request for interim measures at these locations, requesting additional sampling at 1125 L Street; evaluate vapor intrusion pathways at all properties within the footprint of the benzene plume; request work plan for active remediation of the contaminant plume below the residential area, even though Michelin would prefer to do a risk assessment on the GW prior to implementing the remediation plan.

Petition for Declaratory Ruling, dated 04/16/2004, in which Michelin complains about a DEQ decision documented in a letter dated 04/01/2004, alleging the decision to unilaterally abrogate the terms of the Consent Order, to not be based on existing analytical data, to preclude Michelin from generating important data, and to require deadlines too short for Michelin to perform proper QA/QC.

UST Removal Report received; approved 01/12/2009. Soil excavated from the UST area was excavated, hauled to a Soil Treatment Cell to the northwest (approximately the southeast corner of the northward projection of P Street NW and the westward projection of 19th Ave NW) and tilled and allowed to off-gas.

Michelin/BFG advised DEQ on 12/1/2009 that not only are they seeking reimbursement from the Indemnity Fund, but they also have decided to ask the Corporation Commission to take over oversight of the groundwater cleanup. The Corporation Commission has not accepted oversight.

Air: (any known air quality issues.)

Asbestos is a concern within the plant / building area. Jon Reid has been tasked with addressing this.

Soil vapor intrusion is being investigated off-site

DEQ 2009 review of quarterly and semiannual GW results suggest plume of GW exceeding 5 ug/l Benzene is much smaller than in 2002. This change in size may reduce the area requiring SVI evaluation.

Soil: (describe soils, gross geology, surface cover)

Surface Water: (nearby surface water, typical topography, surface flow directions)

An unnamed creek runs immediately northwest of Area 4 Landfill. Wetlands lie immediately south of the landfill and east of the landfill.

Neosho River is on or close to the south side of the western portion of the property. Tar Creek is approximately 0.9 miles east of the site.

Groundwater: (Regional and local geology and hydrogeology)

Area 4 Landfill: Shallow groundwater near Area 4 Landfill is 2 to 15 feet below ground level. Published reports show GW 10-25 ft bgl in plant area. The hydraulic gradient is S or SW towards the Neosho R.

Area 2 and Area 7: Current groundwater monitoring show a gradient to the northwest from the landfill and towards the southwest or west-southwest from the plant area.

(as of 1999, affected GW had not been delineated and DEQ noted residential exposure scenario may need to be considered)

ORC Injection Points: An interim Groundwater Remediation Workplan, approved in August 2007, calls for several lines of ORC injection wells: "A" near the former UST Pit, and "B", "C"

and "D" diagonally crossing Goodrich Blvd south of the Plant Building. I have not seen a map showing actual locations of ORC injection points, but in the 02/29/2008 Site Wide Study Status Report, Fig. 1 shows lines that may be relevant, but are different from the locations shown in the Interim Groundwater Remediation Workplan. Injection was done in September 2007. DEQ 2009 review of quarterly and semiannual GW results suggest the area of the plume of GW exceeding 5 ug/l Benzene is much smaller than in 2002. This change in size may reduce the area requiring SVI evaluation. Much of the change precedes the ORC injection.

NAPL: Non-aqueous phase liquid, resembling light mineral spirit, was observed in MR-38, MW-55 and MW-67 in Area 2. It was removed by bailing between 02/21/2007 and 03/14/2007, and five wells (MW-55, MW-56, MW-67, MW-68 and MW-70) are being sampled quarterly to check for impact.

Private/Public Wells: (On-site and off-site wells)

There are no nearby shallow drinking water wells in use.

The City of Miami owns five deep production wells in Rubidoux Fm sandy & cherty dolomite, 1000-1250 ft bgs but these are unlikely to be affected by the shallow groundwater.

Vapor Intrusion to Indoor Air: (Any known vapor intrusion issues) Assessment is ongoing.

Off-site area south of plant (Area 7) was studied in 2003 concerning potential for benzene vapor intrusion to residences. [Area 7 Vapor Intrusion to Indoor Pathway Evaluation-Phase II Assessment, 11/1/2003] Benzene concentrations as far west as MW-59, between "N" and "O" Streets exceeded MCL and Target Groundwater Concentration for 1e-06 risk level in July 2007 sampling event.

DEQ 2009 review of quarterly and semiannual GW results suggests the area of the plume of GW exceeding 5 ug/l Benzene is much smaller than in 2002. This change in size may reduce the area requiring SVI evaluation to approx. 1/2 a city block. Much of the change precedes the ORC injection.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** Yes
- **Has the site been sampled for an adequate list of analytes?** Yes
- **Does soil or waste need to be cleaned up?** Contaminated soil may remain under the building in Area 2. Contaminated groundwater migrating southward from under the building must pass through ORC-treated soil.
- **Has the surface water been sampled?** Yes.
- **Has the site been cleaned up to levels protective of groundwater?** No.

SITE STATUS

MUSTANG GAS PRODUCTS - DOVER/HENNESSEY GAS PLANT

Location: Three miles south of Hennessey, Oklahoma and approx. ¼ mile west of HW 81. N2, NW 4, Section 1, T18N, R7W. GPS Location: Lat 36, 4, 24.78 N Long 97, 54, 14.40 W

Background: The site, formerly owned by ExxonMobil, is still active as a natural gas processing plant. Hydrocarbon fuel was discovered in an onsite source well. Phase I and II ESAs were performed by Shaw about 2001. Current consultant is Cardinal Engineering. ESAs determined two areas of hydrocarbon fuel spills; one on the west side along N-S railroad tracks (condensate loading) and one near mid-site. Sampling of soil and groundwater included the potential COCs which were VOCs, SVOCs, TPH-DRO/GRO, and RCRA Metals. VOCs (BTEX) are the excessive COC in soil and water and is present in dissolved and free-phase form. IRMs are currently underway with periodic free-phase withdrawal and water treatment from affected wells.

Air: currently existing air issues (permits, etc.) are handled by DEQ air division. If and when soil vapor extraction gets underway, additional air testing is slated.

Soil: Clay, sandy silt and sand. Soil column is BTEX-contaminated at numerous locations across the site. Strong field screen readings from surface to water at many locations.

Surface Water: There is no surface water on the site, although a former cooling tower water impoundment is still present. No surface water in the near vicinity can be identified in aerial photo.

Groundwater: Depth to groundwater is variable across the site from approximately 15 to 35 feet. Flow direction is west. Groundwater is contaminated by dissolved and free-phase BTEX.

Water Wells in Area: One onsite (contaminated) well. There are four nearby offsite downgradient wells to the west. One of the west offsite wells is contaminated. Mustang has purchased at least one of the properties with a well which adjoins the site on the west.

Vapor intrusion: Should not be an issue at this time. There are no closed structures above the plume.

Groundwater Plume Adequately Delineated? No. It appears that the plume continues to expand westward and is now offsite. Neighbors have been informed.

Site Adequately Sampled? Yes. Quarterly sampling continues.

Does Soil or Waste Need to Be Cleaned Up? Site currently under IRM during site characterization process. SAP will describe remediation of the soil which is the contaminant source for groundwater. Currently, there is no waste to be cleaned up.

Wastes in Nearby Surface Water or Wetlands? Not applicable.

Groundwater contamination Impacts to Nearby Surface Water? Not applicable.

Surface Water Sampled? Not applicable

Site Cleanup Levels Protective of Groundwater? Site cleanup levels not yet established. Site characterization and IRM underway (free product removal and air stripping). Cleanup levels will be established in SAP when Work Plan is submitted.

Normandy Creek, Norman- Cleveland County

Location: 2224-2296 West Main Street, Norman, Oklahoma

Project Manager/Contact: Steve Williams, Dillard Group – 405.366.7707

Background: The Normandy Creek Shopping Center consists of approximately 71,400 square feet of retail commercial space, located on approximately 7.58 acres of land. The tenant space located at 2272 W. Main was occupied by Band Box Cleaners from at least 1981 through the early 1990's. A Phase I Environmental Site Assessment reported staining and popped floor tiles, indicative of spillage, were observed in this space during this investigation. The Phase I & II reports indicate no levels of PCE were under the slab of the building space or on the north side (front) of the building.

Air: No issues known to date.

Soil: The Phase I and II reports do not indicate contamination of subsurface soils under the cemented alleyway at the rear of the building, but groundwater had been affected.

Surface: Water: Merkle Creek runs north/south on the east boundary of the site. Prior to urbanization, Merkle Creek consisted of a sharply cut deep banked intermittent stream, now it is basically an urban drainage ditch with a 'cemented' channel bed. Storm water from numerous parking lots north and south of Main Street and Main Street feed into Merkle Creek.

Groundwater: Depth to groundwater ranges from approximately 13 to 19 feet below ground surface. The groundwater contaminant plume has not been completely characterized as of yet.

Private/ Public Wells: There are not any private or public groundwater wells in close proximity to the site according to the OWRB database.

Vapor Intrusion to Indoor Airspace: Has not been investigated, but the Phase I indicated the soil beneath the slab was reported to be below screening levels; therefore no issues are expected.

- 1) Has the groundwater contaminant plume been adequately evaluated / delineated? No.
- 2) Has the site been sampled for an adequate list of analytes? Yes.
- 3) Does soil or waste need to be cleaned up? No.
- 4) Are there obvious wastes in nearby surface water or wet lands? No.
- 5) Are there any groundwater contamination impacts to nearby surface water? No.
- 6) Has the surface water been sampled? No.
- 7) Has the soil been cleaned up to levels protective of groundwater? Soil does not appear to be impacted.

SITE SUMMARY

OCURA – 4th AND SHARTEL

Location: Southwest Corner 4th Street and North Shartel, Oklahoma City, Oklahoma - NW/4, Sect.33, T12N, R3W; GPS Location 35, 20, 19.24N 97, 31, 29.63W. This urban site was demolished and is currently undeveloped and without vegetation. The site is surrounded by paved streets and commercial buildings.

Background: The site is the former location of an automobile sales and repair facility. It was flanked to the north by a former dry cleaner and to the east, a former gasoline service station. The site currently belongs to the Oklahoma City Urban Renewal Authority (OCURA) who commissioned GMR & Associates to conduct a Phase I ESA. Based on the findings a limited Phase II was conducted. Three borings were advanced and soil and groundwater tested for TPH, VOCs, SVOCs, and RCRA Metals. No groundwater COCs were found in wells B-1 and B-2; however, PCE and TCE were found above their USA EPA MCL of 5 ug/L in B-3. Soil was within acceptable ranges for all COCs. **OCURA plans to use the site for residential development**

Air: There are no air quality issues at this time.

Soil: Soil analysis indicated no detectable COCs in soil samples, or their concentrations were within acceptable ranges for native soils.

Surface Water: There is no surface water on or near the site.

Groundwater: Groundwater beneath the site is contaminated by chlorinated solvents, possibly from the dry cleaner. Flow direction is thought to be to the south. Further characterization is needed.

Source Wells in Area: Unknown at current stage of site characterization

Vapor intrusion: Soil vapor testing will be done before construction. If necessary, engineering controls will be put in place.

Groundwater Plume Adequately Delineated? No. Site not yet thoroughly characterized.

Site Adequately Sampled? SAP submitted. Additional borings will be put in place.

Does Soil or Waste Need to Be Cleaned Up? No known soil contamination.

Wastes in Nearby Surface Water or Wetlands? No

Groundwater contamination Impacts to Nearby Surface Water? No

Surface Water Sampled? No surface water in the area.

Site Cleanup Levels Protective of Groundwater? Work Plan not yet approved

O G & E Mustang Generating Station
Site Summary 10/15/09

Location: S/2 of the S/2 of the NE ¼ and the N ½ of the SE ¼ of Section 37, Tsp 12 N, Range 5 W, Canadian County, Oklahoma; [501 Mustang Plant Road, OKC, OK 73127].

Project Manager: Ken Raymond, OKC (405.553.3177)

Lat. & Long: 35.4702N - 97.6730W

Background: In December 1991, OG&E discovered soil contamination adjacent to the Unit No. 4 Fuel Oil tank and the OWRB was notified. From February to November 1992 discrepancies in fuel inventory records discovered. December 1992 a Hydrogeologic investigation revealed hydrocarbon impact to soil and groundwater. In 1993, OG&E initiated a Corrective Action Plan of free product recovery and unsaturated soil remediation via a vapor extraction system, approved by the OWRB on June 24, 1993.

Air: No known issues.

Soil: Soil type is not mentioned in any report in the file, but might be in a file that was submitted to the OWRB. Possible leak in an abandoned pipe could be attributed to a rise in the BETX levels shown in the most recent groundwater sampling event, demonstrating a source of contaminated soils.

Surface Water: Unknown if this item is an issue at this site or not.

Groundwater: Previously had free product removal actions and presently has BETX issues.

Private/ Public Wells: There are 15 industrial water wells ranging in depth from 36' to 70' bgs on the OG&E property, and 2 irrigation wells at a depth of 44' and 57' bgs. There are 2 domestic wells northeast of the site (upgradient), one commercial well east of the SE corner of the property and 1 irrigation well and 1 domestic well due south of the OG&E property. No public wells are listed in the ½ mile vicinity of the property. Source of information: OWRB database.

Vapor Intrusion to Indoor Airspace: Not an issue.

General Questions:

- A) Has the groundwater plume been adequately delineated? Yes
- B) Has the site been sampled for an adequate list of analytes? Yes
- C) Does soil or waste need to be cleaned up? No
- D) Has there been any soil remediation? There was a soil vapor extraction system in place and running from (?) late 1990's to early 2002(?).
- E) Has the surface water been sampled? No.
- F) Are there any groundwater impacts to nearby surface water? No.

OKC Schools - SE Grand Ave Site
a/k/a Chavez Elementary School and Oklahoma City Educare
(Oklahoma City)
(Last Update 11/24/2009)

Location: (Address and Legal)

Educare: 500 SE Grand Blvd, Oklahoma City, OK 73129

LOTS 37 THRU 49 PLUS E/W ALLEY ADJ TO N OF SD LOTS PLUS VINE ST VACATED 33FT BY 399.44FT N OF BLK 18 DESC AS BEG NW/C SE4 SEC 15 11N 3W TH E399.44FT S33FT W399.44FT N33FT TO BEG IN FRUITLAND ADD & BLK 18 EX BEG 33FT S & 399.03FT E OF NW/C SE4 SEC 15 11N 3W TH E266.34FT S291.28FT W266.69FT N289.65FT TO BEG IN FRUITLAND ADD (Educare)

Chavez Elementary: (no address yet)

PT OF BLK 18, Fruitland Addition: BEG 33FT S & 399.03FT E OF NW/C SE4 SEC 15 11N 3W TH E266.34FT S291.28FT W266.69FT N289.65FT TO BEG; and West 110 feet of Block 17, Fruitland Addition; and W/2 EX W110FT & EX A TR IN NE/C W/2 BEING 50FT E&W BY 147.8FT N&S in Block 17, Fruitland Addition.

Background

According to a Phase I Assessment performed in July 2004, the 17-acre site was used as a field office, oilfield pipe yard and tank battery for Eason Oil Production from the 1930s through 1970s, and was vacant since then. A triangular lot, adjacent to the site on the northwest of the site was used as a salvage yard or auto repair shop. The triangular lot was included in the Phase I Assessment but was not made part of the site.

A Limited subsurface investigation (in November 2004) and additional subsurface investigations (August 2005) showed the presence of Total Petroleum Hydrocarbons in excess of residential screening levels in the soil. Because the intended use included playgrounds for a daycare and an elementary school, screening levels appropriate for residential use were selected. A Surface Investigation (June 2006) showed the TPH-DRO exceeded residential screening levels across most of the site. Each soil sample location represented a 100 ft x 100 ft area.

In July 2006 a remedial plan was developed and approved. To comply with Tier 2 residential levels, visibly-contaminated soil and soil observed to contain more than 500 ug/kg of TPH-DRO was over-excavated. The approved remedy was to have soil beneath buildings and parking lots less than 500 mg/kg TPH and any accessible soils in the top 2 feet be less than 50 mg/kg. Soil below two feet would also be less than 500 mg/kg.

Subsequently, the western portion of the property was sold to Educare with the understanding that a deed notice would be required and excavation and groundwater use would be restricted. The Educare facility was completed in the summer of 2009.

Air: No air quality issues are known.

Soil: The top two feet of accessible soil was remediated to less than 50 mg/kg TPH. Soil below two feet or below buildings and parking lots was cleaned up to less than 500 mg/kg TPH.

Surface Water: The site is generally flat, and drains to ditches to the north and south.

Groundwater:

The site lies near the top of the Fairmont Shale. A thin (1'-4') layer of sand covers interbedded sandstone and red shale. Groundwater is at 4' to 9' below ground. The direction and magnitude of the hydraulic gradient was not determined. Benzene concentrations were less than the MCL except MW-1 in the triangular lot in the northwest corner of the original site. The triangular lot was not purchased and is not a part of this cleanup.

TPH-DRO exceeded 1 mg/l in wells in the southwest region of the site. The southern and western margins of the plume were not delineated. This was addressed by deed notice.

Private/Public Wells: Abandoned oil wells on the property were identified and plugged in accordance with Corporation Commission and OWRB requirements. There are no nearby private or public drinking water wells of record. The nearest off-site wells are monitoring wells ¼ mile to the SW.

Vapor Intrusion to Indoor Air: Benzene in the groundwater is less than MCL, so vapor intrusion is not a concern.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** Groundwater plumes of TPH DRO were identified. No MCL exists for TPH-DRO. In lieu of delineation, institutional controls are being applied.
- **Has the site been sampled for an adequate list of analytes?** Yes.
- **Does soil or waste need to be cleaned up?** It was cleaned up to risk-based levels.
- **Has the surface water been sampled?** Yes.
- **Has soil at the site been cleaned up to levels protective of groundwater?** Yes.

Lakewood Shopping Center
Site Summary
As of 10/20/2009

Location: 6807-7103 North May Avenue Oklahoma City OK. Lat 34E32'21"N Lon 97E34' 28"W

Background: A commercial/retail shopping center. The release is associated with Country Club Cleaners formerly located in the shopping center.

Air. No air emissions.

Soil. Some soil by the building exceeds groundwater protection levels screening levels.

Surface Water. Lake Hefner approximately 2000 feet northwest.

Groundwater. Chlorinated solvents. Groundwater flows to the northeast. DTW 14-23'

Private/Public Wells: There are no known drinking water wells nearby. Water is supplied by the City of Oklahoma City.

Vapor Intrusion to indoor air. Plume has not been adequately delineated. Need to evaluate/monitor plume to ensure it does not affect residential properties. Additional monitoring wells have been requested.

OTHER KEY QUESTIONS:

Has the groundwater contaminant plume been adequately evaluated/delineated? No. Additional wells have been requested.

Has the site been sampled for an adequate list of analytes? Yes.

Does soil or waste need to be cleaned up? Some soil needs to be remediated.

Are there obvious wastes in nearby surface water or wetlands? No

Are there any groundwater contamination impacts to nearby surface water? No.

Has the surface water been sampled? N/A

Has the site soil been cleaned up to levels protective of groundwater? No.

Former Pure Oil Refinery, Ardmore, Oklahoma

As of 10/15/09

DEQ is working with UNOCAL/Chevron on this project

Location: The refinery is located in the Southeast Quarter of Section 20, Township 4 South, and Range 2 east and is bounded on the west by Refinery Road, on the south by State Highway 199, on the east by a Burlington Northern Santa Fe Railway, and on the north by a salvage yard and vacant property. Approx. 70 acres

The former crude oil tank farm is located in the eastern half of the southwest quarter of Section 20, Township 4 south, and Range 2 east and is bounded by Refinery Road to the east, on the south by a vacant land and an auto salvage yard, on the west by residential properties and on the north by an intermittent drainage ditch. Approx. 60 acres

Background: Pure Oil Company operated a refinery at the Site from 1916 to 1936 which consisted of a refining area (process area) surrounded by bulk storage operations. The bulk storage operations consisted of approximately 19 above storage tanks that contained fuel oil, benzene butts, gas oil, refined oils, stripped crude, crude oil, and gasoline. Other areas of concern are the 2 ponds, coke piles (mostly removed in 2007), D-008 pit (tar pit with elevated lead, removed in 2007).

The crude oil Tank Farm consisted of four above ground storage tanks, two 55,000 barrel tanks on the south property, and two 35,000 barrel tanks on the north property. The northwest quadrant was developed in the late 50's early 60's know as Hooper Addition. The northeast quadrant is owned by Habitat for Humanity with a residential development planned. The southern half is owned by Valero Refinery.

Soil: Sampling data to date, shows surface soils and some areas of subsurface soils have been affected by the refining processes throughout the site. The Habitat for Humanity Property has been remediated to unrestricted residential levels and the Hooper Addition is being investigated.

Surface Water: To date, the surface waters do not show any impacts.

Groundwater: The majority of wells are dry, but there are isolated groundwater monitoring wells that show impact. The groundwater is isolated to localized perched groundwater.

Air: No issues with air, with the exception of strong odors during remedial efforts.

Private/ Public Wells: No private groundwater wells were identified on the OWRB data base.

Vapor Intrusion to Indoor Airspace: This has not yet been evaluated.

General Questions:

- A) Has the groundwater plume been adequately delineated? Locally perched groundwater pockets.
- B) Has the site been sampled for an adequate list of analytes? Yes.
- C) Does soil or waste need to be cleaned up? Yes.

D) Has there been any soil remediation? Yes, in the Habitat for Humanity Area and in localized portions of the refinery site..

E) Has the surface water been sampled? Yes. No impacts.

F) Are there any groundwater impacts to nearby surface water? No.

Ringling Gasoline Spill

Fuel Spill
(January 11, 2010)

Location: The fuel spill area is located at the intersection of OK state Highway 70 and U.S. Highway 89 in Ringling, Jefferson County, Oklahoma. The legal description is the Northwest ¼ of Section 35, Township 4 South, and Range 4 West Indian Meridian.

Background: The following are a chronology of events:

2/23/09	Accident resulted in the discharge of 7,500 gallons of gasoline. Emergency activities resulted in the mitigation of imminent threats to human health and the environment.
2/23-26/09	Remediation crews utilized vacuum trucks to recover all phase-separated gasoline present along the spill path.
2/26-3/20/09	Excavation of impacted soils conducted across Site.
3/4/09	Excavation near Mattor house indicates gasoline has migrated beneath house. Soil samples collected from beneath Mattor house.
3/16-20/09	Piping system installed for potential remediation use.
4/2/09	Majority of backfilling operations completed.
4/3/09	All excavated areas hydromulched.
4/6-7/09	Nine monitor well installed.
4/8/09	First round of groundwater samples collected.
4/13/09	Highway surface removed and replaced.
6/8/09	Monitor wells MW-10 through MW-13 installed.
6/8/09	Second set of groundwater samples collected.
6/29/09	First set of quarterly groundwater samples collected.
8/14/09	Vapor intrusion sampling investigation conducted.
9/27/09	Recovery system brought on-line.
9/28/09	Third set of quarterly groundwater samples collected.

A fourth set of quarterly groundwater samples were recently collected in December 2009. The recovery system was shut off for several weeks due to high mineral content in the groundwater. It has been turned back on and will operate for 60 days. After 60 days (sometime in February) groundwater will be tested and vapor sampling will occur at the Mattor residence.

Air: There are no air quality issues; however there was a minor vapor intrusion issue. See Vapor Intrusion to Indoor Air section.

Soil: Soil was excavated all along the ditches and above the shallow groundwater table where effected. The areas excavated were backfilled. Due to the fluctuation of the water table, soil could be contaminated again by the groundwater. Once the groundwater remediation is complete, confirmation samples of the soil will be collected.

Surface Water: There are no known surface water issues. There is an ephemeral creek approximately 0.10 mile west of the actual fuel spill. The gasoline did not reach the creek.

Groundwater: There are 12 monitoring wells at the site. There was an additional well; however, it was destroyed accidentally during City utility work. Seven of the 12 wells have concentrations of either benzene and/or TPH-GRO. Benzene concentrations in wells have generally decreased in each subsequent monitoring event. TPH-GRO in wells has been fluctuating from one monitoring event to the next. The highest benzene concentration, as of date, is located in MW-12 at 4.4 mg/L. The highest concentration of TPH-GRO, as of date, is located in MW-11 at 25 mg/L.

Groundwater is very shallow at the site. Depth to water levels range from 1.3 feet below ground surface (bgs) to 9.05 feet bgs. A recovery extraction system is located in the area to recover contaminated groundwater and vapors. Groundwater is treated and then discharged, under permit, to the City of Ringling waste water treatment system.

Private/Public Wells: According to the Oklahoma Water Resources Board well record database, there are three groundwater wells in the same Section as the fuel spill site. In the SE $\frac{1}{4}$ of the SE $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Section 35 is a domestic well approximately $\frac{1}{2}$ mile southeast of the site. A public water supply well is located in the SE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of the NE $\frac{1}{4}$ of Section 35 and is approximately $\frac{1}{4}$ mile east of the site. A domestic well is located in the SW $\frac{1}{4}$ of the SE $\frac{1}{4}$ of the SW $\frac{1}{4}$ of Section 35 and is approximately $\frac{1}{2}$ mile south of the site. The contaminant plume is largely defined and these wells are not expected to be impacted.

Vapor Intrusion to Indoor Air: Vapor intrusion sampling occurred at the Mattor and Sanner residences and Cowboy Cleaners. Only one vapor sample, at the Mattor residence, was above the EPA screening level of 3.1 ug/m³. The sample collected had a concentration of 3.3 ug/m³. In February 2010 another vapor sampling event will occur inside and underneath the Mattor residence.

Sun Container (Tulsa, OK)

Last Updated 1-12-09

Location: 3717 W 21st Street Tulsa, Oklahoma

Background: The 4.3 acre site is immediately adjacent to the Holly Refinery (formerly Sunoco Refinery) in Tulsa. The site was formerly occupied by two drum recycling companies from 1960 to 1974 and one new drum manufacturer from 1974 to 1985. The Holly Corporation recently purchased the refinery and the Sun Container site. According to the consultant, Sunoco retained environmental liability for the Sun Container Site. The site reportedly received containers with hydrocarbons, solvents, caustic soda, herbicides, and other chemicals. During recycling, drums were washed with acids, solvents, and chemicals containing chromium. Two phase I's, one phase II, and a site assessment have been conducted at the site. Ground penetrating radar and an electromagnetic conductivity survey have been performed onsite and found buried drums. The buried drums have been removed, onsite buildings have been demolished, hazardous material has been removed from the flush-out ditch, the liquid/sludge in the waste pit was removed and sent to the Sunoco Refinery wastewater treatment unit. Dioxin/furan contamination was capped in place, and material was excavated from a sludge trench. Some contamination still remains onsite.

Air: No known air quality issues

Soil: Soil contamination onsite: metals, VOCs, SVOCs, and dioxins/furans. Dioxins/Furan waste has been capped in place with concrete. The total dioxin/furan concentration within the cap ranges from 0.057 to 0.277 ug/kg.

Surface Water: The Arkansas River is about 0.5 miles to the north of the site. The Sunoco Refinery lies between the site and the Arkansas River. A trench, called the moat, lies in the southernmost area of the property and runs parallel to Cherry Creek. The moat receives surface water runoff from the site and has been known to overflow into Cherry Creek. The moat sediments contain dioxins, mercury, VOCs, and SVOCs. TEQ levels for dioxins in the moat sediments are below the current EPA action level of 10 ug/kg for commercial/industrial sites.

Groundwater: Groundwater flow is north-northwest toward the Arkansas River. Depth to groundwater is 15.5 to 18 feet below ground surface. Groundwater was encountered at 2 to 4 feet below ground surface in one boring near the waste pit area. The degree of groundwater contamination is currently being evaluated.

Private/Public Wells: All wells located within one mile of the site are used for commercial or irrigation purposes.

Vapor Intrusion to Indoor Air: No known vapor intrusion issues

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** No
- **Has the site been sampled for an adequate list of analytes?** Yes
- **Does soil or waste need to be cleaned up?** A site characterization report is being evaluated.
- **Has the surface water been sampled?** Yes
- **Has soil at the site been cleaned up to levels protective of groundwater?** The site characterization report is currently being evaluated.

Tronox (Formerly Kerr-McGee) Cleveland Refinery Site
(Cleveland, OK)
(Last Update 01/06/2009)

Location: (Address and Legal)

NE/4 and Part of SE/4, Section 18, T21N, R8E, Pawnee County

500 South Swan Drive, south of US Highway 64, Cleveland, Pawnee County, Oklahoma. Site is west of Swan Drive, and southwest of Cleveland, OK

Background:

This is a 170-acre site owned by Tronox Corporation, formerly Kerr-McGee Corporation.

Ownership History:

Property was Johnson Refinery, operated pre-1920 to 1956.

There was also an Acme Brick plant on the south side of the property.

Koch had operations on the property.

Williams Brothers had operations on the property.

Kerr-McGee Oil Industries, 1956-(??)

Kerr-McGee Corporation, (??)-1975

Kerr-McGee Refining Co., 1975-1992

Kerr-McGee Corporation, 1992-2005

Tronox Worldwide, LLC, 2005-present

In 2005, Kerr McGee Corporation assigned responsibility for this and other sites to a Tronox Corporation, a wholly-owned subsidiary. Tronox was subsequently spun off and Kerr McGee Corporation was acquired by Anadarko Corporation.

Remediation History:

Plant was closed in 1972 except that crude oil pipelines and tanks were in use until 1995. Process units and tanks have been dismantled and removed.

Kerr-McGee Refining Co. entered into a Consent Order (issued by the Pawnee County Court) with the Oklahoma Department of Health (later the DEQ) in 1992. The Consent Order requires Tronox to implement appropriate remedial actions to protect "... health and the environment through the prevention or reduction of any release or threatened release, or potential migration of waste material, to the groundwater, surface water, air, and soil..." in and around the former Cleveland Refinery Site.

DEQ issued a Record of Decision (ROD) dated November 24, 2004, summarizing site history and a selected remedy for soil and wastes. Groundwater is to be addressed as a separate operable unit.

Interim Remedial Measures implemented include placement of certain contaminated soil in WP-6, treatment and discharge of leachate from WP-6 through an NPDES-permitted outfall, and neutralization of acidic seepage using lime rip-rap in the West Tributary.

The selected remedy for soil and wastes was excavation, treatment and disposal in an on-site cell to be constructed near the north end of the site. The Remedial Design was submitted and approved, and an Amended Remedial Design was subsequently submitted and approved, but Tronox declared bankruptcy before it could be implemented.

Future remediation at the site will depend on the decision of the bankruptcy court, and the outcome of impending litigation between Tronox, EPA and the US Department of Justice against Anadarko Corporation and Kerr McGee Corporation.

Air: (any known air quality issues.)

Not applicable. The refinery has been shut down and the tanks, piping and equipment removed. operations are limited to site maintenance, e.g. leachate recovery and treatment, which are not expected to create air quality issues.

Soil: (describe soils, gross geology, surface cover)

Some contaminated soil was cleaned up; other contaminated soil remains. This was delineated in preparation to execution of Final Remedial Design Work Plan, but has not been excavated.

Surface Water: (nearby surface water, typical topography, surface flow directions)

Cedar Creek runs northwards and eastwards through the site and forms part of the southern boundary. Cedar Creek discharges to Keystone Lake, and LNAPL is occasionally seen in the creek. The West Tributary and East Tributary drain southwards across the site into Cedar Creek. Tronox has a surface water monitoring plan to address this. Approximately one-third of the site is in the floodplain for Keystone Lake, and is flooded from time to time.

Groundwater: (Regional and local geology and hydrogeology)

Complex, with aquifers stacked: Upper "A" Sandstone Aquifer, over Upper Sandstone Aquifer, over Lower Sandstone Aquifer. Seeps occur at some locations on the site. Groundwater flow is generally SE towards Cedar Creek, with minor deviations within the site. Downward vertical gradients exist in the aquitards between the aquifers.

Contaminated groundwater and free product (NAPL) are present at the site. LNAPL recovery was ongoing, at least as of end-2009. As achieving Drinking Water Standards (MCL) did not seem achievable, Preliminary Remediation Goals of 10 times the respective health based standards were proposed. Unless MCL are achieved, notices to the deed to restrict groundwater use will be needed. The following parameters (Total metals may be associated mainly with sediments) exceed the MCL (Upper Sandstone or Upper A Sandstone) or 10x the PRG (lower sandstone or terrace deposits):

- Upper A Sandstone:
 - Benzene up to 22000 ug/l
 - Bis(2-ethylhexyl)phthalate up to 14 ug/l;
- Upper Sandstone

- Aluminum up to 30900 ug/l (PRG 870 ug/l, sec. MCL 200 ug/l, ORNL – Aquatic Life: 87 ug/l); Lead up to 25.3 ug/l (PRG 110 ug/l, MCL 15 ug/l); Manganese up to 2220 ug/l (PRG 17700 ug/l, Sec. MCL 50 ug/l);
- Benzene up to 12000 ug/l; Chloroform up to 130 ug/l; Ethylbenzene up to 1000 ug/l; Methylene Chloride up to 720 ug/l; Toluene up to 3500 ug/l;
- 1,2-Dichlorobenzene up to 1000 ug/l; 2,4-Dimethylphenol up to 58000 ug/l; Benzo(a)pyrene up to 10000 ug/l; Benzo(b)fluoranthene up to 10000 ug/l; Bis(2-ethylhexyl)phthalate up to 10000 ug/l;
- Chrysene up to 10000 ug/l
- Aluminum up to 94900 ug/l; Antimony up to 8.9 ug/l; Arsenic up to 509 ug/l (Redox may mobilize from biodegradation of Hydrocarbons); Barium, Beryllium, cadmium slightly above MCL; Chromium up to 198 ug/l; Lead up to 178 ug/l; Manganese up to 8060 ug/l; Nickel up to 254 ug/l;
- Lower Sandstone
 - Aluminum up to 95800 ug/l
- Terrace Deposits
 - Aluminum up to 521000 ug/l; Chromium up to 500 ug/l; Copper up to 901 ug/l; Lead up to 927 ug/l; Manganese up to 35600 ug/l; Vanadium up to 1140 ug/l; Zinc up to 2820 ug/l

Private/Public Wells: (On-site and off-site wells)

Nearest off-site water well is ¾ mi NE of site but is upgradient to the site. Numerous geothermal wells within ½ mile of site.

Numerous monitor wells exist on-site, including QMW series (set in alluvial deposits), UAMW series (in Upper A Sandstone), UMW series (in Upper Sandstone), CMW series (in shale/sandstone unit), LMW series (in Lower Sandstone). Some wells on-site are equipped with belt skimmers to remove floating petroleum hydrocarbons (LNAPL).

Vapor Intrusion to Indoor Air: (Any known vapor intrusion issues)

Not Addressed.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** Additional delineation was planned after completion of the approved Amended Remedial Design.
- **Has the site been sampled for an adequate list of analytes?** Yes.
- **Does soil or waste need to be cleaned up?** Yes.
- **Has the surface water been sampled?** Yes.
- **Has soil at the site been cleaned up to levels protective of groundwater?** No.

Trumbull Asphalt Plant (Oklahoma City)

(04/03/2009)

Location: 3400 NE 4th Street, OKC.

Approximately 8 acres, located in NW/4 NE/4 SW/4 of Sec 31, T12N R2W. Of this, approximately 1.5 acres is north of NE 4th Street; the remainder is south of the street.

Background:

A former refinery site, the Trumbull Asphalt site is currently active and located within a commercial/industrial area. The owner is Owens Corning. The site is bordered on the west by the North Canadian River, on the north and east by undeveloped property, and on the south by railroad tracks and right of way. Thompson Lake lies south of the right of way. The Asphalt Producers Inc. plant is located NE of the site, north of NE 4th Street.

Suspected hydrocarbon impacts were found in a preliminary site assessment dated January 11, 2001. Additional characterization summarized in an "Initial Site Characterization Report" dated January 30, 2004 included 8 monitoring wells, water and phase-separated hydrocarbon (PSH, a/k/a LNAPL) measurements and analyses of soil, groundwater and PSH. PSH was observed in wells at the west boundary of the site. 7 more monitoring wells were added in 2005 and 5 more in 2006, summarized in "Results of Additional Site Characterization Activities" dated November 14, 2005, and "Site Characterization Report" dated January 19, 2007.

Beside the PSH, the Contaminants of Concern are mainly TPH-DRO and TPH-GRO. VOCs detected in groundwater include: chlorobenzene, benzene, 1,1,2-trichloroethane, and 1,2,3-trichloropropane. Contaminated groundwater is present off-site to the west.

Interim Measures were proposed in September 2007 and approved in October 2007. Interim measures include groundwater monitoring for VOC, TPH-GRO and TPH-DRO, and two high vacuum extraction events to remove the PSH, followed by installation of absorbent socks in selected wells. In September 2008, PSH thickness was less than 0.10 feet in 4 wells. One off-site well, MW-17, was damaged in 2007 and was to be replaced.

Air: Not evaluated.

Soil: The site is underlain by 40 feet of alluvium, with some construction fill. The Garber Sandstone lies underneath. Little vegetation is present at the site. Compounds present above screening levels in soil include Chlorobenzene, Benzene, Ethylbenzene, Benzo(a)anthracene, Benzo(a)pyrene. TPH-DRO, TPH-GRO and Mercury also exceed screening levels in soil.

Surface Water: The North Canadian River flows to the northeast, west of the site. The western property line more or less follows the river levee. Off-site monitor wells are located in the floodplain.

Groundwater: (The alluvium at the site consists of very fine to medium sand with little silt and trace clay, with thin lenses of silty clay. This overlies Garber Sandstone.

The water table is approximately 15 feet below ground level at the site, and is approximately level with the Canadian River level, except at flood stage. Groundwater gradient is approximately 0.006 ft/ft towards the river. A layer of PSH is present under much of the site, and is the subject of the Interim Measures.

Private/Public Wells: (On-site and off-site wells)

20 monitor wells have been installed, of which 4 are in the floodplain (i.e. off-site), and 7 which were originally considered on-site but may be off-site based on the property description in County Land Records.

Off-site wells registered with OWRB (within 0.5 mi. of site) include one domestic well and one commercial well on the far side of Eagle Lake, neither of which is a concern because of the presence of the lake and the distance from the site. OWRB shows another two wells nearby which may in fact be located elsewhere: one shown in the floodplain at the southwest corner of the site is listed with a finding location of Cashion; another in the floodplain 2000 SW of the site is listed with a Midwest City address which is in the corresponding section in the next range to the west.

Vapor Intrusion to Indoor Air: Vapor intrusion was not evaluated, as only two groundwater samples collected June 2008 exceeded EPA target groundwater screening level at risk level of 1×10^{-6} . They did not exceed the screening levels at a risk level of 10^{-5} . The samples were MW-11 (Benzene, 0.0083 mg/l) and MW-10 (1,1,2-Trichloroethane, 0.011 mg/l)

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** Yes.
- **Has the site been sampled for an adequate list of analytes?** Yes.
- **Does soil or waste need to be cleaned up?** Contaminated soil may be present under existing structures such as above-ground storage tanks.
- **Has the surface water been sampled?** No.
- **Has soil at the site been cleaned up to levels protective of groundwater?** No.

Unarco Industries / Thorco (Wagoner)

(Last Update 12/08/2009)

Location: (Address and Legal)

4000 SE 15th Street, Wagoner OK 74467.

Part of NE/4 Sec 22 T17N R18E, Wagoner Co., OK

Abbreviated Legal Description begins "22-17-18 PT OF NE LYING E OF RR ROW DESC AS COMM AT COMM AT NE COR O F SD SEC 22 -N89DEG55'59"W ALONG NRLY LN OF SD SEC 225' TO A SET PK NAIL SD PT ALSO BEING POB OF SD TR -S00DEG00' 52'E PAR W/ ERLY LN OF SD SEC 435' TO SET 3/8' IRON PIN -S 89DEG55'..." (the description available on-line was incomplete)

Lat/Lon (driveway): 35° 56' 39.24" N, 95° 22' 27.21" W

Background:

1978-1985: International Harvester offices & mfr. diesel trucks;

1985- : Unarco - mfr. shopping carts, using electroplating baths and plating lines (Cr, Zn, Ni).

2/26/1999: Unarco reported seepage into the basement of groundwater containing hexavalent Chromium (CrVI). Unarco submitted an Emergency Phase II Environmental Assessment & Site Characterization Report with recommendations for remediation using a trench to be installed in the basement. A MACO for Site Characterization was signed August 19, 1999. A February 15, 2000 letter mentions the basement filling up with liquid (somebody borrowed the pump), and measures planned to avoid a recurrence. A pump intake hose was installed below the sub-basement floor. Unarco states the release is confined to "pre-construction fill" between undisturbed native clay and the basement. MW# 2i thru MW#8i are installed in the basement, and MW#1 thru MW#18 are installed outside the building. Unarco has changed its process from using CrVI to trivalent chromium (CrIII) . In addition, Unarco removed the baths ("Baker Unit") before the March 6, 2007 sampling event.

GW Monitoring: annual 3/1999 to 3/2004; quarterly 8/2004-6/2005 for Total Cr, CrVI, Ni, pH, SC, Salinity since 3/2005, "dissolved" (lab-filtered) Cr 6/2005 for MW#10, MW#18., Total Cr, Total Ni, T, pH, SC, Salinity for other outside wells.

Concentrations (Total) have been consistently dropping except in MW#10, MW#18; "dissolved" concentrations are much lower. Because lab filtration using 0.45 micron filters would also remove any colloidal chromium, which could be mobile, for 2006Q4 and 2007Q1 Unarco used 5 micron filters instead for lab filtration and got the same results.

Nov. 5, 2007 approved revised work plan with reduced monitoring: semi-annual sampling with reduced monitoring well network. The most recent semi-annual report was received 11/18/2009.

Air: N/A. Release was dissolved metals.

Soil: Affected soil is under building and inaccessible.

Surface Water: The site lies on a very low ridge trending NE-SW. Site is 0.9 mi W of nearest ponds, 0.1 mi E of a NW-flowing intermittent stream, and 1.8 mi W of Ft Gibson Lake. Potential contamination of surface water is not a concern as the plume of chromium exceeding

MCL (0.1 mg/l) in groundwater is delineated to the west and groundwater flow under the site is away from surface water on the east.

Groundwater:

In outside wells, water levels range from 3.79 to 16.64 ft bgl. Hydraulic gradients outside the building are from the northeast generally to the west-southwest (on south side of building) or to the northwest (northwest corner of building). Gradients in inside wells do not correlate well to outside gradients. Inside gradients are generally westerly to northwesterly towards sump equipped with pump and water level controls.

Based on well logs, a 10 to 18-foot plastic clay layer overlies shale with a gypritic zone observed in two wells. Part of the building has a basement (est. 10-12 feet deep) and compacted fill underlies part of the building to a depth up to 18 feet.

Groundwater samples show Cr above MCL in unfiltered samples. Filtered samples (5 micron and 0.45 micron) were generally below MCL.

GW below building seems to be independent of GW outside building. GW Recovery system (sump) deep under building maintains drawdown cone, and recovered GW is treated and released. Interior gradients are generally westerly towards the sump.

Private/Public Wells: (On-site and off-site wells)

Nearest private well reported to be 0.85 mi SSE of site: domestic, 100' TD. The address given is in Broken Arrow, so the reported location of the well is suspect.

Next nearest well 1 mi NNE: monitoring wells, 27' TD. Being NNE of the site, it is hydraulically up-gradient of the site, and therefore should not be a concern.

Vapor Intrusion to Indoor Air: Not evaluated – issue is metals.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** Yes
- **Has the site been sampled for an adequate list of analytes?** Yes
- **Does soil or waste need to be cleaned up?** Under building, so just addressing GW.
- **Has the surface water been sampled?** Not a concern as GW plume is delineated.
- **Has soil at the site been cleaned up to levels protective of groundwater?** No.

UP Yukon Train Wreck Site (Yukon)
“OK March 7, 2006 Derailment, Yukon Oklahoma Mile Post 503.5”
(Last updated October 28, 2009)

Location: (Address and Legal)

Along Union Pacific Railroad line approximately 100 yards east of Richland Road.

Located in SW/4 of Sec. 13, T12N R6W, Canadian County

The legal description in the Memorandum of Agreement and Consent Order (MACO) reads:

"M.P. 503.5 Oklahoma Subdivision (4300 block North Richland Road), Oklahoma. "

Background:

The site is undeveloped except for the railroad track. Union Pacific Railroad (UPRR) states it owns the property. The USGS quadrangle map shows an old feed lot to north. Airphotos show an electrical substation to the southeast. UPRR pointed out the presence of old tanks, tank cradles and drums on the property to the north.

Based on the report by United Professional Services, Ltd., on March 7, 2006 an eastbound train hauling crushed rock collided with a dump truck on Richland Road, west of Yukon, OK. Two locomotives were damaged. Each was carrying approximately 1,000 gallons of red-dyed diesel fuel, and much of that was released. Approximately 700 gallons of diesel was recovered.

The locomotive batteries were found adjacent to the locomotives; the batteries were righted and soil visibly affected by battery fluids was removed.

Diesel-impacted soil totaling 250 cubic yards was removed; including 60 cubic yards during the initial response, the rest in April 2007, from two excavation areas, one north and one south of the track. Soil close to the tracks was not excavated to avoid undermining the track and damaging a fiber optic line 20-25 feet to the south.

Four monitor wells were installed; two are north and two are south of the tracks. Union Pacific Railroad (UPRR) and DEQ executed a MACO for Site Characterization on July 30, 2008. DEQ received a work plan for site characterization dated September 24, 2009.

Air: (any known air quality issues.)

Not Applicable

Soil:

The site straddles the old C, RI and P Railroad tracks. NRCS soils maps show “Dale Silt Loam, 0 to 1 percent slopes, rarely flooded”. The site is at the southern margin of the floodplain of the North Canadian River, and the southern margin of alluvium is described as “...sand, silt, clay and lenticular beds of gravel. Thickness ranges from about 30 to 200 feet, and probably averages about 50 feet along major streams.” Surface cover is typically sparse grasses along the dirt road beside the tracks. While away from the tracks the soil visibly contaminated was removed, diesel-contaminated soil close to the tracks was left in place to avoid making them unstable.

Surface Water:

Shell Creek is approximately 1500 feet east of the site, along the tracks, and drains to the North Canadian River, which is approximately 2500 feet north of the site. Ponds associated with a quarry are approximately 1440 feet north of the site. Based on the extent of the initial removal of visibly-contaminated soil, diesel fuel is not believed to have reached surface water.

The general slope is from the southwest to the north and east. The railroad embankment interrupts this slope and diverts any overland flow to the east.

Groundwater:

Area is at the south edge of the alluvium along the North Canadian River. Bedrock should be Duncan Sandstone, but this is not confirmed because monitor wells in the area only go to 15 feet total depth. Wells in the area show shale at about 35 to 50 feet depth.

Water levels in four monitor wells range from 3.5 to 4.4 feet bgs. Wells were screened in brown silty, low-plasticity clay with some loose, wet fine sand and silt. As an Interim Measure, standing water in soil excavations was mixed with ferric chloride and H₂O₂ before backfilling.

Gradients In 2007 and early 2008 were eastward, south of the track, and southward to southeastward on the north side of the track. Between the September 2007 and November 2008 measurements, groundwater level elevations have dropped between 1.09 feet (MW-3) and 1.91 feet (MW-4). The greater drop in MW-2 and MW-4 relative to the drop in MW-1 and MW-3 has resulted in a reversal of the apparent hydraulic gradient from southeasterly to northwesterly.

The presence of the embankment and infiltration of trapped overland flow may be the cause of variability of groundwater gradients and flow directions.

Groundwater was analyzed for BTEX and TPH DRO and GRO. Benzene was below MCL. TPH ranged from less than 1 mg/l, TPH-DRO up to 24.4 mg/l. Contaminated groundwater is not yet delineated.

Private/Public Wells:

Off-site private wells:
5000 feet ESE: 103366
2460 feet ENE: 5856
1150 feet WNW: 98405
2460 feet SSW: 5861

While contaminated groundwater has not been delineated, these wells are far enough away from the site not to be an immediate concern.

Vapor Intrusion to Indoor Air:

Not an issue. Benzene was below screening levels and other volatiles are not suspect with diesel.

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** No.
- **Has the site been sampled for an adequate list of analytes?** No. (BTEX and OK-DRO only)
- **Does soil or waste need to be cleaned up?** Contaminated soil was left in place under the track.
- **Has the surface water been sampled?** No.
- **Has soil at the site been cleaned up to levels protective of groundwater?** No. Contaminated soil was left in the railroad ballast to preserve the stability of the tracks.

V & S Schuler Tubular Products, Muskogee
As of 10/29/09

Location: 420 S. Frankfort Road, Muskogee, Oklahoma 74403; Muskogee County, Oklahoma

Project Manager: Gary Lallo, (Voigt & Schweitzer Group) Columbus, OH -614.340.6294

Lat. & Long: 35.7400° N - 95.3641° W [35° 44' 27.6" N - 95° 21' 55.4"W]

Background: The subject property consists of developed industrial property, with an elevation 575 Above Mean Sea Level. Facility is abandoned; building is deteriorating, with partial loss of the roofing. The former occupant of the property was V & S Schuler Tubular Products. The main process performed at this location was fabrication and welding of steel structures [Muskogee Irons Works, late 1880's to 1983]. Union Metals occupied the site from mid-1980's to mid-1990's when ProGalv, Inc. began galvanizing operations. Progalv (former name of V & S Schuler) ceased operations in 1999-2000. The Site was formerly used for hot-dip galvanizing operations [mid 1990's – 1999/2000].

The February 2004 Phase I revealed evidence of the following environmental conditions: A) Approximately 7,200 gallons of a low pH liquid in a concrete containment dike located beneath an aboveground storage tank labeled 'sulphuric acid'. A sample of the liquid analytical results indicated the liquid had a pH level of approximately 2.0 S.U. The liquid had stained soil and concrete in this area. This liquid is no longer present, but DEQ has no details on its disposition. B) Galvanizing and painting operations were performed at the facility during and up to the late 1990's. The spray booth and oven are located in the main facility building to the east of the painting operations. C) Former paint waste storage areas throughout the main facility and southeast portion of the warehouse [the warehouse building has been removed]. D) Former drum storage area. E) A sump.

Air: No known air issues.

Soil: Some soil with PCE above groundwater protection levels and some lead above acceptable levels. The site soil has not been completely characterized.

Surface Water: Topography slopes slightly to the south and directs surface drainage to Frankfort Street.

Groundwater: Depth to groundwater is variable on the site from 4' to 6.5' on the north portion of the site, to 11'. PCE up to 1,600 ug/L was detected. TCE and lead have also been identified in the groundwater. As of 10/29/09 RP has submitted a work plan for further groundwater delineation.

Private/ Public Groundwater Wells: (1) OK 1020422 – Federal Type C; State Type C; Public Water Supply approximately ½ mile northwest of the site. Shallow groundwater flow is believed to be to the south, so this well should not be an immediate issue.

Vapor Intrusion to Indoor Airspace: As of 10/29/09 DEQ is evaluating a work plan to evaluate Vapor Intrusion. Groundwater flow is to the south, but there is also a residential area to the south. RPs opinion is that affected groundwater is being channeled/ (captured)/diverted in the underground utility trench (water line) and/or the sanitary sewer excavation fill, thus eliminating the groundwater from migrating across the street, however this has not been confirmed yet.

General Questions:

- A) Has the groundwater plume been adequately delineated? No. Additional delineation has been proposed.
- B) Has the site been sampled for an adequate list of analytes? No.
- C) Does soil or waste need to be cleaned up? Preliminary information indicates some soil is contaminated for PCE and lead.
- D) Has there been any soil remediation? No.
- E) Has the surface water been sampled? Not applicable. No nearby surface water.
- F) Are there any groundwater impacts to nearby surface water? No nearby surface water.

Valco Manufacturing

Metals Contamination

(January 5, 2010)

Location: The legal location of Valco Manufacturing is in the SW ¼ of the NW ¼ of the SE ¼ of Section 5, Township 1 North, and Range 7 West Indian Meridian. The facility is located at 925 Boren Boulevard in Duncan, Stephens County, OK.

Background: Valco Manufacturing operates a manufacturing facility specializing in sheet metal forming/fabrication, component assembly, heat treatment, chemical processing, painting and swage-tubing. Valco has been in operation since 1989 supplying military, commercial and general aviation needs worldwide. Past investigatory soil sampling of the north facility identified elevated levels of RCRA 8 Hazardous Metals. Lead concentrations in soil have historically exhibited levels well above EPA-Soil Screening Levels (SSL). Past investigations have also identified copper, zinc, and chromium in soil but not necessarily above EPA-SSL's.

Valco will be conducting a soil sampling event to test for the 8 RCRA Hazardous Metals. Grid sampling composed of 16 composite samples in a 0.93 acre area of the facility will be evaluated.

Air: There are no air quality issues.

Soil: In the past it has been identified that there are elevated levels of metals, particularly lead. Soil sampling will be occurring in the next few months at 0-6 feet below ground surface and analyzed for the 8 RCRA metals. A liner at 6 feet below ground surface is underneath the soil being sampled.

Surface Water: There are no known surface water issues. Stage Stand Creek is approximately a quarter of a mile west of the facility. A storm water drainage system will be constructed after the sampling is completed to abide by RCRA standards.

Groundwater: There are no known groundwater issues.

Private/Public Wells: According to the Oklahoma Water Resources Board well record database, there are no groundwater wells in the same section, township, and range as the subject property. The nearest private/public groundwater well is a half mile away.

Vapor Intrusion to Indoor Air: There are no vapor intrusion issues.

Warren Petroleum/Chevron
(Former Mocane Gas Processing Plant)
(January 14, 2009)

Location: The site is approximately 49 acres located approximately 8 miles east of Forgan, OK. It is located in the center of Section 18, Township 5 North, and Range 25 East in Beaver County, OK.

Background: The Warren Mocane Gas Plant (now inactive) was a natural gas cryogenic plant located in a sparsely populated area used primarily as range land near Forgan, OK. Warren purchased the property from CIG in December 1958. During the 1960s, a lined brine pit, flare pit and landfill were constructed on the south side of the property. In 1965 the brine pit was used to displace petroleum from the underground storage wells with an estimated flow of 2500 bbls/day. With the removal of the Missouri, Kansas, Texas Railroad tracks in the 1970s, rail loading of propane & butane, and the need for the use of chromates in the treatment ceased. Until 1974, plant operations included fractionation processes for natural gas liquids (NGLs) including propane, butane, ethane, methane, and other NGLs.

Three environmental site assessments (ESA) were conducted at the Mocane Gas Plant between November 1993 and July 1994. The ESA's indicated minimal hydrocarbon impacts to the Site's soils, particularly from two small sumps (Sumps 1 & 2, each 4 ft by 4 ft). Soil was impacted below the sumps and at one of the sumps extended downward to the first saturated zone. A groundwater investigation determined the magnitude and extent of groundwater contamination from the installation of five test wells (TW-1 to TW-5).

Borings from the test wells and drilling records from the water supply wells indicated the presence of several saturated zones. The uppermost zone is at 155 feet with the lowest zone extending below 400 feet. The water supply wells (WWO-1, WWO-2, and MPCO) produce from zones in the range of 215 feet to 427 feet below ground surface. Samples from the test wells indicated some contamination directly under and to the east of the sump. Free product was not found in any of the test wells.

The source area is presumed to be in the vicinity of wells TW-4 and TW-2. The implication is that a stable plume configuration is present to the east and south of the site. From 1994 to 2004, semiannual sampling was conducted. From 2004 to present sampling has occurred annually. Vapor extraction and a passive PSH recovery system operates on well TW-4.

Air: There was one reported spill at the property on January 9, 1988. An atmospheric release of natural gas of an unknown amount. The spill is listed as caused by a frozen regulator causing a backup of gas. Emissions at the facility were identified as NOX, carbon dioxide, and hydrocarbons. Passive venting equipment was installed on well TW-4 on October 26, 2000.

Soil: A total of 67 samples were collected from 59 locations at various depths. The majority of these samples were below detection levels for BTEX and TPH. Benzene was only detected in 2 samples at low levels of 0.23 ppm and 0.05 ppm. Soil in two areas (PAS, Process area south, and Sump 4-2) had a TPH greater than 50 ppm. Approximately 30 cubic yards and ½ cubic yard of soil, respectively, were removed from these two areas and stockpiled with the drill cuttings for later testing and remediation.

Based on soil borings and the groundwater quality investigation, Sumps 1 & 2 had impacted underlying soils and Sump 1 had impacted the uppermost saturated zone. Both sumps were removed eliminating the possibility of further impacts.

Surface Water: The site is not located within a 100-year floodplain. The closest surface water bodies are the Cimarron River and the Beaver River (North Canadian located approximately 7 and 5 miles north and south, respectively). Timber Creek is located approximately ¼ mile west-southwest of the plant and flows south towards the Beaver River. No wetlands are on the property or adjacent properties. Local topographic data suggests a gentle, southward regional gradient.

Groundwater: The groundwater gradient appears to be directed semi-radially to the north and to the southeast at an approximate gradient of 0.033 ft/ft. The facility is located on tertiary deposits of the Ogallala Formation. BTEX constituents are located in the uppermost water zone. No BTEX constituents have ever been found in the saturated or deeper water-bearing zone. Approximate water depth of the monitoring wells is 155 feet below ground surface. There are seven wells (TW-1 to TW-7) in the uppermost water zone and three wells (WWO-1, WWO-2, and MPCO) in the deeper water-bearing zone.

In the most recent sampling event (Jan. 2008), wells TW-1, -2, -6, and -7 had detectable concentrations of BTEX. Constituents detected at concentrations exceeding BTEX MCLs were restricted to benzene. Benzene concentrations ranged from a concentration of 2.9 micrograms per liter (ug/L) in well TW-7 to 270 ug/L in well TW-2. Well TW-4 was not sampled due to the presence of LNAPL and TW-3 was not sampled due to insufficient water column, which had been consistently dry since installed in 1994.

Private/Public Wells: The nearest downgradient well is located more than 2/3 mile from the site. The nearest downgradient permitted well is more than 1 mile from the site. Two onsite wells are upgradient from the contamination.

Vapor Intrusion to Indoor Air: A vapor extraction unit, consisting of a wind-driven turbine ventilator mounted on a 4-inch PVC riser pipe extending approximately 6 feet above ground surface, continually removes vapors from well TW-4. LNAPL is manually removed from TW-4 during groundwater events by bailing.

Weyerhaeuser Wright City

SITE SUMMARY

(June 10, 2008)

Location: The mill complex is located immediately south of Wright City, Oklahoma. It encompasses approximately 375 acres and is bounded by residential and light commercial properties on the north, the Wright City sewage disposal ponds on the east, and other property west, south, and east of the mill owned by the Southeastern Oklahoma Industries Authority (SOIA). The former dip tank site, which is the actual site, is located in the northwest corner of the Wright City mill complex.

Background: The facility was originally constructed in 1910 and operated by Dierks Forest, Inc. until Weyerhaeuser purchased it in 1969. Weyerhaeuser formerly treated wood products using a solution containing polychlorinated Phenols (PCP). The proprietary formulations at the time typically consisted of five percent PCP by volume, water repellants such as paraffin, and petroleum-based carriers such as mineral spirits or #2 diesel fuel (73%) by volume. Preservation of wood products at the facility took place between approximately 1950 and 1972, after which the tanks and associated piping were dismantled. No commercial wood treating activities have been performed on site since 1972. The former dip tanks, which was located immediately north of the existing Dress/Package shed, was 20 feet long by 5 feet wide and 6 feet deep. The wood treating solution was brought on site by tank car and unloaded in an area north of the dip tank. PCP solution was transferred by hose to a storage tank located a few feet south of the dip tank. PCP solution flowed from the storage tank to the dip tank by means of an above ground 2-inch line.

In 1992, contaminated soil was discovered during a construction project, and approximately 200 cubic yards of PCP-impacted soil were reportedly excavated from the former storage and treating area and shipped off site to an authorized facility for disposal. The discovery led to a limited investigation, which confirmed groundwater impact, and a subsequent site investigation.

In 1996, a site investigation report of the dip tank site described the extent of soil and groundwater impacts associated with the former operation. After the Site investigation report, the DEQ required that groundwater monitoring be conducted for a period of five years to document the status of the PCP plume. Weyerhaeuser conducted semi-annual groundwater monitoring from May 1998 to October 2006, when the program was suspended pending negotiation of the MACO.

On December 4, 2007, a new MACO was negotiated to characterize and find the location of the source of PCP contamination. Based on the historical analytical results, the plume was moving further offsite. Currently, the site characterization is being performed, which includes two phases of work. The Phase I work includes soil and groundwater sampling to better-define the extent of the source area. The Phase II work will be the installation of new monitoring wells based on the results of the Phase I.

Air: There are no known air quality issues.

Soil: Soil samples from 19 borings advanced to depths ranging from 4 to 23 feet bgs were collected and analyzed for PCP and total petroleum hydrocarbons (TPH) during the 1992 investigation. PCP was detected in 27 of 84 samples submitted to the laboratory for analysis. Twenty of these samples were collected from depths less than 5 feet bgs with concentrations ranging from 4.7 to 3,000 mg/kg. The maximum PCP level was detected in the 4-foot sample from boring B1 collected below the fill material at the location of the former dip tank. Two samples that were collected from the saturated zone (Stratum 2) at the location of boring B2 ranged in concentration from 8.8 to 32 mg/kg, but PCP was not detected in other boring samples collected from Stratum 2. The remaining five samples were collected from soils at depths from 8 to 12 feet bgs and ranged in concentration from 2.8 mg/kg to 29 mg/kg.

Total petroleum hydrocarbon (TPH) data show a similar relationship with concentrations in the upper 5 feet of soil ranging from 12 to 22,000 mg/kg with the maximum TPH level measured in the 4-foot sample from B1. TPH concentrations in the saturated zone at B2 range from 100 mg/kg to 300 mg/kg, and TPH was detected at two other locations in the saturated zone (B12 and B13) with concentrations of 19 mg/kg and 23 mg/kg, respectively. TPH concentrations ranging from 8 to 25 mg/kg were measured at intermediate depths in Stratum 1.

Currently, soils are being characterized again in the proximity of the source area.

Surface Water: The closest surface water bodies to the site are Horse Head Creek, Little River, and Cypress Creek. Horse Head Creek is approximately 1 mile east of the site. Little River is approximately $\frac{3}{4}$ of a mile south of the site. Cypress Creek is approximately 1 mile west of the site.

Groundwater: Groundwater and the contaminant plume are moving in a west-southwest direction. Groundwater occurs under unconfined to semi-confined conditions and represents the uppermost water-bearing unit beneath the site. Currently, the monitoring well network consists of 12 monitoring wells installed in the sand and gravel aquifer. Biodegradation of PCP with its degradation byproducts is occurring. However, continued increasing trends in the PCP data at locations within and down gradient of the source areas, and the westerly groundwater flow component has become more significant as indicated by the presence of PCP in well W210, where there is an apparent increasing trend in the PCP data. In addition there is an order of magnitude difference in PCP concentrations between source area wells and down gradient well locations, and the location of the center of the plume is uncertain. Additional investigation to delineate the groundwater plume will include analysis of SVOCs (including PCP), VOCs, and metals.

Private/Public Wells: According to the Oklahoma Water Resources Board, there are no private/public wells on the site or on the adjacent properties. The closest well is for domestic use located approximately half a mile northwest of the site. The well has a total

depth of 202 feet below ground surface (bgs) and a first water zone of 160 feet bgs. Estimated yield is 10 gallons per minute.

Vapor Intrusion to Indoor Air: There are no vapor intrusion issues.

Wiley Post/OCAT (Bethany, OK)

Site Summary
As of 12-18-09

Location: 50th and Rockwell south of the Wiley Post Airport, Bethany, Oklahoma

Background: Site area about 48 acres. Former Aerocommander plant now owned by the Oklahoma City Airport Trust. Aerocommander aircraft parts were manufactured and painted at this facility. There was a small foundry located onsite. Wiley Post Airport is located to the north, an equestrian field owned by Southern Nazarene University to the west, and residential to the east and south.

Air: No known air quality issues.

Soil: Benzo (a) pyrene, arsenic, and Aroclor-1260 were detected in the surface soil. Benzo (a) pyrene, benzo (a) anthracene, benzo (b) fluoranthene, benzo (k) fluoranthene, indeno (1,2,3-cd) pyrene, and arsenic was detected in the subsurface soil. Lead and Antimony in the sediment in storm drains near the former foundry.

Surface Water: Lake Overholser is about 1.3 miles to the southwest, topography is generally flat and slopes to the southwest. Arsenic, antimony, and Aroclor-1260 were detected in sediment in onsite stormwater ditches. Surface water samples were not collected.

Groundwater: Groundwater is contaminated with TCE, 1,1-DCA, 1,1-DCE, cis-1,2-DCE, 1,1,1-TCA, vinyl chloride, benzo (a) anthracene, benzo (b) fluoranthene, benzo (k) fluoranthene, benzo (a) pyrene, dibenz (a,h) anthracene, indeno (1,2,3-cd) pyrene, and naphthalene. Groundwater flow is to the southwest. Depth to water is unknown, boring logs will be requested. The plume has not been fully delineated and there were some detection limits issues, this has been mentioned in a comment letter.

Private/Public Wells: There are domestic wells near the site. TCE and PCE were detected above the MCL in a domestic well about 0.35 miles west of the site. The well is no longer in use. A unimpacted sentinel well is in place. The well with the detection is on the edge of a wellhead protection area for the City of Bethany. Offsite wells were recently re-sampled and only TCE was detected.

Vapor Intrusion to Indoor Air: Indoor air monitoring detected benzene, TCE, PCE, and carbon tetrachloride above the USEPA risk screening levels (1×10^{-6}). More delineation of the subsurface and piping below the buildings is needed. Concrete samples were taken and Aroclor 1260 was the only contaminant found above detection limits (concs ranging from 0.19-26 mg/kg).

Key Questions:

- **Have all known groundwater contaminant plumes been adequately evaluated and delineated?** No, but the site is being investigated.
- **Has the site been sampled for an adequate list of analytes?** Yes
- **Does soil or waste need to be cleaned up?** Yes
- **Has the surface water been sampled?** No, but the sediment was sampled in onsite stormwater ditches. Nearby ditches need to be sampled to determine if contamination is leaving off-site.
- **Has soil at the site been cleaned up to levels protective of groundwater?** No