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April 11, 2016

Oklahoma Department of Environmental Quality
Attn: Pamela Brown Dizikes, Attorney
Office of the General Counsel
707 North Robinson
Oklahoma City, Oklahoma 73101-1677

Prepared for:

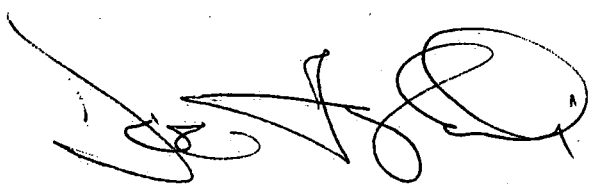
FMRI, Inc.
10 Tantalum Place
Muskogee County, OK 74403

Regarding: Discussion of Data Gap Investigation of the Former Fansteel Property,
10 Tantalum Place
Muskogee County, Oklahoma

Enercon Services, Inc. (ENERCON), was retained by FMRI to conduct a Data Gap Analysis (DGA of the property known as the former Fansteel Muskogee Plant located at 10 Tantalum Place, Muskogee, Oklahoma. The purpose of this study was to compile and review all the readily available data collected at the former Fansteel facility to document and define where environmental impacts exist or where there are data gaps relating to potential environmental impacts from past or current usages of the site. This DGA was a non-invasive study of records and previously collected data. Sampling was not conducted as a part of this study.

If you have any questions or comments regarding this report, please contact us at (405) 722- 7693.

Sincerely,



Jeff Laughlin, P.G.

Project Manager

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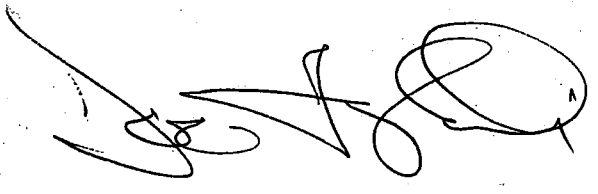

Jeff Laughlin, P.G.

Project Manager

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1.0 Methodology of Data Gap Analysis

In order to identify all the former and current uses at the Fansteel facility, including storage and usage of hazardous materials and petroleum products, the following activities were conducted.

- Interviews with client and tenants
- Review of files and blueprints provided by the client
- Reviews of files available at ODEQ
- Interviews with ODEQ officials knowledgeable about the property
- Reviews of additional files available on NRC webpage as needed
- Reviews of (EDR) Data Base Search results
- Reviews of Aerial Photographs

2.0 Site Location and Background

The former Fansteel facility is located at 10 Tantalum Place, Muskogee County, Oklahoma. The site occupies a portion of Sections 16 and 17 of Township 15 North, Range 19 East, Indian Baseline and Meridian. The site location and vicinity are shown on Figure 1.

From 1956 to 1989, Fansteel produced tantalum and columbium metal products. The Fansteel property, located in Muskogee, Oklahoma, is approximately 110 acres in size and contains numerous structures and contaminated areas, including ponds, buildings, and a waste pile.

Ore and tin slags from tin smelting operations in Thailand were transported to the Fansteel facility by train and truck and were stored in the following locations: the drums storage pad west of Chem "A" building, in areas west of the sodium reduction building and north of pond 8 (ICF Report dated November 15, 2002). Historical Oklahoma Water Resources Board (OWRB) documents reviewed at the Oklahoma Department of Environmental Quality (ODEQ) revealed that ore barrels, ore residue barrels, and other items were stored south of the Service building and south of the Chem "A" building. There is no indication that the area south of the Service building was a paved or curbed storage area. The area south of the Chem "A" building was partially paved, however, there was not a curb to contain residue and stormwater runoff until the OWRB requested that Fansteel install a containment curb in this storage area in 1981. According to the 2002 ICF report and FMRI personnel, an intermediate by-product (termed "gunch") of the metals extraction process was stored in the building called the "Gunch House", located southeast of the Chem "A" Building. After the June 1989 supernatant discharge from Pond 3, WIP was separated from the "acid process water" using

filer presses and the drums containing WIP and other solid process residue were stored on the barrel storage pad west of the Chem "A" building.

Chemical compounds used initially included 70% Hydrofluoric Acid, Sulfuric Acid, Methyl Isobutyl Ketone, Anydric Ammonia, 35% Hydrochloric Acid, 45% liquid caustic potash, Nitric Acid, Sodium Chloride, Potassium Chloride, Metallic Sodium and Aluminum Powder and Barium Peroxide which were part of a dry process and not discharged to waste water. Other compounds included janitorial and maintenance related chemicals.

The initial process that Fansteel used to treat their waste water was to neutralize the acid waste with a caustic solution generated by another process onsite, then settling out of precipitates, prior to discharge to the river. In 1971, Fansteel changed the way that ore was extracted to a liquid-liquid solvent extraction process. The caustic solution was replaced with ammonia, sulfates, and methyl isobutyl ketone (MIBK), and hydrofluoric acid (HF). However this process change also increased the quantity of fluorides in the effluent. Calcium hydroxide (CaOH) was used as treating agent to reduce the fluoride ions in the waste water which causes the precipitation of calcium fluoride in large quantities and, filled the settling ponds onsite relatively quickly. The 4th Bi-monthly progress report dated October 25, 1971, reported that "the cooling water treatment agent originally used and which contained chromates has been replaced by an agent that does not contain toxic chromates....the sanitary disposal problem has been eliminated by connection to the city sewer line which dissects the plant site." This letter also stated that the cooling tower located near the Chemical buildings was redesigned to recycle the cooling water back into the tower instead of discharging to Basin 1.

In 1993, Fansteel conducted a characterization survey to determine existing site contamination. Radioactivity was found throughout the Chemical "C" building, the process ponds, surrounding soils, and groundwater and in isolated areas of other site buildings. Following cleanup activities in 1996, NRC released 35 acres in the northwest portion of the site for unrestricted use, which was transferred to the Muskogee City-County Port Authority in 1999. In 1997, the license was amended so ore, calcium fluoride, and wastewater treatment residues containing uranium and thorium in various site impoundments could be reprocessed and reduced in volume. From 1999–2001, a new chemical extraction process was implemented. In late 2001, Fansteel suspended all operations because of process difficulties and a decline in the price of tantalum, and stated it would remediate the site for release for unrestricted use. The Oklahoma Department of Environmental Quality confirmed the presence of trichloroethene (TCE) on the property in 2007. Site controls are in process related to the observed radiological impacts, however no controls are in place related to the observed chemical impacts.

Excavated WIP material is currently stored in the Thermite building, Chem "A" building, the Chem "C" building, and the Sodium Reduction Building.

3.0 Geological Setting and Topography

The Fansteel Property is situated in the Central Lowlands Physiographic Province. Lowlands or plains mark the weak rock belts and hills or escarpments the areas of resistant rock. Beneath the property is Pennsylvanian sedimentary bedrock, which consists of mostly thin- to massive-bedded sandstone, shale, siltstone, and limestone of Pennsylvanian Age. Units identified in the Muskogee area include the Hartshorne Sandstone, the McCurtain Shale, and the Warner Sandstone, in ascending order. Permeability in this type of bedrock is generally low and groundwater movement depends on secondary porosity (joints and fractures) rather than primary porosity (intergranular).

Bedrock in the area of the Fansteel property is overlain by alluvial deposits. Terrace deposits border the alluvial deposits in segments on both sides of the Arkansas River and range from 20 to 120 feet above the floodplain. Terrace deposits are composed predominantly of silt, fine sand, coarse sand, and gravel near the base. Deposits of alluvium underlying the floodplain consist of clay, silt, sand, and gravel in proportions that vary locally.

Topographically, elevations across the Fansteel property range between 500 to around 555 feet AMSL. The facility buildings are located on higher ground along an east-west oriented ridge line with elevations generally above 540 feet AMSL. Natural drainages are present on the north and south ends of the Fansteel property, creating a groundwater divide that one would expect to result in groundwater movement to the northeast north of the line, and to the southeast south of the line.

4.0 Hydrological Setting

ENERCON reviewed site characterization and investigation reports by Earth Sciences (1993), Matzner (1983), ODEQ (2007), and Terracon (2015), to compile the following summary. Characterization site-specific hydrogeological conditions beneath the Fansteel property. Hydrogeological characterization of the Fansteel property was performed based on data collected from f the Fansteel property was performed based on soil borings and monitoring wells, groundwater elevation data, aquifer tests, and general hydrogeologic literature.

Lithologic descriptions provided on the logs of borings and monitor wells installed on the Fansteel property show the alluvium to consist predominantly of silty or sandy clays, with occasional beds or lenses of sand, mostly just above the top of bedrock (McCurtain Shale). The bedrock is described as a light gray to dark gray shale and silty shale, with occasional zones of sandy shale and thin layers of coal. The underlying shale provides the lower confining boundary of groundwater flow for the alluvial aquifer.

Groundwater flow within the alluvial aquifer occurs predominantly through the courser-grained sand intervals with an eastward gradient toward the Arkansas River of approximately 0.004 ft/ft (ODEQ, 2007), ranging from 0.003 to 0.0076 (Earth Sciences, 1993). Matzner withheld presentation of a potentiometric surface map due to the unknown relationship between the water table and the ponds, but given that coupled with the potential influences of the French drain system, the interceptor trench, and various land disturbances, there would appear to be a need for additional groundwater observation data to evaluate groundwater flow paths beneath former operational areas and known areas of impact. Historical water table elevations are presented in Figure 6.1. The 1993 potentiometric surface map along with an alternative interpretation of the 1993 water table data and a 2015 potentiometric surface map are presented in Appendix D.

The rate of groundwater flow was calculated using the above range of groundwater gradients, hydraulic conductivities ranging between 3.12×10^{-3} and 1.32×10^{-2} cm/sec, and effective porosities of 15 to 20 percent (Earth Sciences, 1993). The average linear groundwater velocities ranged from 6.27×10^{-5} to 2.74×10^{-4} cm/sec (or about 65 to 283 feet/year). The fate of groundwater beneath the Fansteel property is predominantly discharge to the Arkansas River and evapotranspiration.

5.0 Historical Use of Buildings and Present Day Observations

ENERCON personnel visited the former Fansteel Facility on March 16, 2016. A photo documentation log is attached as Appendix A. A discussion of our observations follows:

Sintering Building (1956 to present day)

The Sintering building contained offices, storage, a machine shop, as well as sintering furnaces and vacuum press equipment used to create tantalum or columbium products such as bars, ingots, wires, and sheets of metal. This structure had a large capacity for electricity to power this equipment. A cooling system to cool the process equipment and electrical components included extensive overhead piping which continued through the concrete floor foundation into a cooling water reservoir set within the concrete slab. FMRI

personnel report that this cooling water contained additives to inhibit rust formation, however they are not aware of the actual composition of the cooling water additives. The cooling water ventilation towers were located on the roof in the center of this building. A transformer was also located on the 2nd level of the Sintering building. The tantalum or columbium powders handled at this structure were non-radioactive. Much of the process equipment used by Fansteel was sold and removed from the site.

ENERCON observations on March 16th, 2016: The Sintering building is occupied by Advantage TerraFab which conducts metal fabrication and powder coating and painting of their manufactured products. A Powder Coating enclosure with an associated ventilation system and filtration system were observed in the southern-central portion of the Sintering building. The Sintering building is constructed of concrete blocks with steel girders and a concrete slab foundation. This structure contained a large cooling water reservoir used to store cooling fluid which was used to cool equipment and electrical systems used during the sintering process. Concrete patches in the concrete slab were observed in the former locations of entry points to the former cooling water reservoir. Overhead piping observed above the patched concrete were reportedly part of the former cooling water re-circulation system and the piping previously extended down into the reservoir. Personnel access to the cooling water reservoir was located in the Boiler Room in the north-central portion of the structure. Floor drain inlets were also observed in several places in this building including in the Boiler Room. According to FMRI personnel, the drains in this building are connected to the sewer system. The Boiler Room was being used by Advantage TerraFab for storage of 55-gallon drums containing used motor oil, polyurethane spray foam components, dichloromethane-based paint stripper, and other chemicals stored in less than five-gallon containers. The Northeast portion of the Sintering building is occupied by the metal fabrication shop and has large presses and other types of machines. Oil staining was observed on the concrete floor near and beneath some of these machines. A concrete pad observed on the south side of the Sintering building was reported to be the former location of the steam cleaning equipment. A drain inlet covered by a square grate was observed set in the walkway in front of the concrete pad. FMRI personnel indicated that these drains are connected to the sewer system. One of the data gaps from the 2007 Phase I Environmental Site Assessment conducted by the ODEQ, stated that a "standpipe" was observed on the north side of the Sintering building, the purpose of which was unknown. According to FMRI personnel, this "standpipe" is an observation well which was installed to monitor possible leaks from the cooling water reservoir of the Sintering building.

Service Building (1956 to present day)

The Service building contained offices, storage, a machine shop, a cafeteria and locker rooms for the employees, as well as a metallurgical laboratory. The laboratory was used to measure radioactivity and test

the quality of the product produced at the Fansteel plant. According to FMRI personnel, the laboratory moved from the Service building to the second story of the Chem "A" building in the 1970s, and the laboratory is presently located in the Research and Development building.

ENERCON observations on March 16th, 2016: Advantage TerraFab also occupies the Service building. A paint booth area with collapsible enclosure curtains and ventilation system were observed in the former laboratory and office area of the Service building. The large open space comprising the rest of the building is used for the metal fabrication operations, and many welding stations were observed in this workspace. The propane storage and excess compressed gas that wasn't being actively used was stored outdoors near the northeast corner of the structure. A loading dock and associated ramp were observed in the north-central portion of the Service building. FMRI personnel stated that the loading docks used a spring mechanism, which was confirmed by our inspection. A shed containing an air compressor and the sand blasting area were observed along the external southern wall of the Service building. Two drums were observed near the air compressor shed. The drums had piping which was not connected to anything and were sitting in a secondary containment stand which contained what appeared to be rainwater. The drums were labeled "Part 1" and "Part 2"; contents of these drums is unknown.

Research and Development Building (early 1980s to present day)

The Research and Development (R&D) building is divided into the eastern half of this building which is currently used as a workshop and the western half which is mainly occupied by office. In the past this building included offices, storage rooms, laboratories, and restrooms. The 2002 ICF report stated that several areas of this building were found to exceed levels of alpha and betta/gamma radiation allowable by the total radiation release limit.

ENERCON observations on March 16th, 2016: The R&D Building is currently used as office space and file storage and a maintenance workshop. The eastern side of the building is occupied by the workshop, where numerous hazardous materials or petroleum products were observed in containers ranging from less than 1 gallon up to 55 gallons. During the site inspection, a strip floor drain was observed in the center of the workshop which terminated at a sump located at the north end of the building. According to FMRI employees, this drain and sump are connected to the sanitary sewer. Transformers were observed on a platform outside of the northeast corner of this building. An aboveground storage tank containing propane was observed near the southeast corner of the R&D Building.

Electrical Substation (1956 to present day)

The electrical substation was constructed in 1956 as part of the initial site development.

Electron Beam Building (1989 to present day)

The Electron Beam (EB) building generally an open warehouse with hoists. This building was designed to house an electron beam melting furnace and a vacuum arc furnace (VAF), both of which were used to create high-purity tantalum products through melting and reshaping. The tantalum or columbium powders handled at this structure were non-radioactive. This structure also had a cooling water system which included an internal cooling water reservoir within the concrete slab foundation. The cooling tower was located in the west-central portion of the EB building.

ENERCON observations on March 16th, 2016: Advantage TerraFab also rents the EB building. The processes which occur in the EB building are similar to the metal fabrication operations that they complete in the Sintering and Service building, however, this building is used when they are working on a larger sized product. Hazardous materials and chemical compounds observed in this building included welding gases and several 55-gallon drums which contain a two part polymeric MDI chemicals which are used during powder coating or adhesive processes.

Chem "A" Building (1956 to present day)

The Chem "A" building is a four-and-a-half story building is constructed of cinder blocks, steel girders, and a concrete slab floor. This was where the high purity solutions containing columbium and tantalum were sent after being produced in the Chem "C" building. The process for the columbium solution was to mix it anhydrous ammonia to produce a slurry. Then the slurry was processed to remove the columbium oxide precipitate, and the slurry liquid was stripped of anhydrous ammonia and filtered. The waste solution generated from this process was then transferred to the wastewater treatment plant while the columbium filter press cake was dried and packaged. The process for the tantalum solution first involved mixing the solution with potassium fluoride to form potassium tantalum fluoride crystals, which were then centrifuged to separate the crystals from the liquid. After being separated by the centrifuge the crystals were then dried in a vacuum dryer before being moved to the sodium reduction building. The 2002 ICF report mentions that during their inspection original process units and equipment which were still in place included a belt press, steam heated dryer, mixers, a calciner, and numerous metal storage tanks. ICF also reported that the process materials and solvents had been "de-inventoried" and the metal tanks only appeared to contain

residual water. The 2002 ICF report mention that they reviewed 1993 floor plans of the Chem "A" building which revealed that a pump room was depicted near the southeast portion of this building. The 2002 ICF report also mentions that they observed an add-on connected to the south end of the Chem "A" building which was called the "Ion Exchange" building. The "Ion Exchange" building was constructed as a two-story metal building with a concrete floor. This building's original purpose was to purify scandium recovered from the reprocessing of WIP, however this building was not used for its original purpose. The 2002 ICF report states that the Chem "A" building has many areas, including the trenches [drains], which exhibit levels of alpha and or beta/gamma contamination above the total radiation release limit.

ENERCON observations on March 16th, 2016: During the site inspection ENERCON observed that the floor was heavily cracked. Several floor drains were observed within the concrete slab foundation of the structure. The boiler room for the Chem "A" building is located in the northeast corner of the structure. During the site inspection, a diesel generator and numerous 55-gallon drums of chemicals and hazardous materials were being stored in this room. Labels noted on these drums indicated that the contents included Calumet 400-500 solvent naphtha, Texaco Meropa 68, ammonium fluoride, and flocculent P-831E. Floor plans provided by FMRI employees show several strip trench drains set into the concrete slab and several sumps associated with elevators or other equipment which was used in this building. Numerous pipes and ventilation systems were observed throughout this structure. FMRI also provided "process ventilation" and "process piping" blueprints for these Chem "A" building systems.

Chem "C" Building (1956 to present day)

The Chem "C" building is constructed of metal walls with a concrete slab foundation. Southern portion of this building was constructed in 1956, however, the northern portion of this structure was added around the year 1970. The raw materials including the tin smelting slag, natural ores, and chemically or physically upgraded ores were concentrated, or ground and digested in hydrochloric acid in this building. Tin ore was first pulverized and then transferred into a container containing hydrochloric acid, from their residues for either transfer to a disposal pond or were recycled for further processing. The metals were then separated into an aqueous solution which was then mixed with MIBK and sulfuric acid. The tantalum and columbium metals would bind to the MIBK and then were extracted from the aqueous solution. The aqueous solution "process water" was then discharged to the wastewater treatment plant for neutralization of the acids and removal of fluoride by the addition of calcium and precipitation of calcium fluoride. Then the MIBK-tantalum-columbium solution was sent through a series of mixing and settling chambers to separate out the metals. The building equipment was sold in 1999 and the building is empty of equipment. The 2002 ICF report mentions that during the inspection, they observed an empty sodium sulfate silo near the southwest

corner of the Chem "C" building, and a cooling tower observed near the southeast corner of the building. Several areas of this building, including the sump, were found to exceed levels of alpha and betta/gamma radiation allowable in the total radiation release limit.

ENERCON observations on March 16th, 2016: During our site inspection, this building was being used to store two-ton bags of packaged WIP material which was awaiting transportation and offsite disposal. No other equipment or items were observed inside.

Thermite Building (1970 to present day)

According to the 2002 ICF report, the "Thermite building was used to reprocess high-purity scrap materials such as bar ends, beam melt furnace cleanings, tantalum wire, capacitors,...and other off-specification materials." Hydrofluoric acid and ammonia or used in the scrap dissolving process. The 2002 ICF report mentions that during the inspection, this building was used as a maintenance shop and twenty fifty-five gallon drums wrapped in plastic were being stored on pallets east of this building, however, the contents of the drums were not identified in the ICF report.

ENERCON observations on March 16th, 2016: During our site inspection, this building was being used to store two-ton bags of excavated WIP material which was awaiting transportation and offsite disposal. No other equipment or items were observed. An electrical powered lift was observed in the rafters of the structure. According to FMRI, thermite is a flash powder, and this building was kept mostly clear to be able to ignite the materials that they were processing.

"Gunch" House (1958 to 1990)

According to the 2002 ICF report, the gunch house was a "wooden lean to" structure which was "used to store gunch". FMRI employees informed ENERCON that gunch was an intermediate or process product produced during their operations.

This structure was not present during the March 16th, 2016, site inspection.

Wastewater/Groundwater Treatment Facility (1973 to present day)

The former Waste Water Treatment Plant, Groundwater Treatment Plant or "Evaporator" building was the wastewater treatment plant used by Fansteel for many years to process their waste water. This is a metal building with a concrete floor, set within a series of below-ground concrete tanks. Above-ground holding

tanks and lime silos are also associated with the structure. This structure was re-designed in 1988 to evaporate off water from CAF_2 solutions, however, the volume of wastewater to be treated was too great, creating a need to continue treating wastewater in the setting ponds. The water treatment plant was designed to receive water from the floor drains from the nearby buildings and from the French drain and groundwater Interceptor Trench.

ENERCON observations on March 16th, 2016: During our site inspection, this building was being used to store files related to Fansteel facilities at other locations. Many of the files were water damaged, and were being stored in filing cabinets and inside of the bulk canvas bags. No other equipment or items were observed.

Bertha Building (early 1990s to present day)

The Bertha Building was previously used for bench tests and other research and development laboratory work. The building is located on a concrete pad east of the Chem "A" building. The 2002 ICF report mentions that during the inspection, they observed piles of "junk" which included soil, pallets, corrugated metal, and damaged tanks, drums, and cinder blocks. ICF also reported that several areas of this building were found to exceed the radiation release limit.

ENERCON observations on March 16th, 2016: During our site inspection, this building was being used to store laboratory benches and other equipment. The concrete pad outside of the Bertha Building is covered with scrap metal, old drums, wooden pallets, and other miscellaneous debris. The water treatment area is located to the west of the Bertha building.

AST "Tank Farm" (1956 to late 1980s)

The aboveground storage tank "farm" contained acids and bases and was located west of the Chem "C" building between 1956 until the late 1980s when production at the Fansteel facility was ceased. The ASTs which were recorded to have been at this location included hydrofluoric acid, hydrochloric acid, potassium hydroxide, ammonia, and sulfuric acid. The MIBK tanks were also added to this facility in the early 1970s when the extraction process changed.

Sodium Reduction Building (1971 to present day)

Since the late 1950s, until Fansteel operations ceased, the Sodium Reduction building was where controlled sodium reduction of tantalum powder occurred. The chemical compounds created or used as part of this

process included tantalum powder, potassium pentafluoride, sodium chloride, molten sodium, argon gas, and sodium sulfate. After the material was chemically processed, it would be reduced, crushed, and placed in a large wash tank. An acid washing and screening was also part of these processes conducted in this building. The 2002 ICF report mentions that during the inspection, they observed over 1000 one-ton bags of WIP residue collected from former Pond 5, which was located in the southeastern portion of the facility.

ENERCON observations on March 16th, 2016: During our site inspection, only a portion of this building was accessible to be viewed. This building is being used to store excavated WIP which is awaiting shipment offsite. The portion of the building that projects out from the eastern side of the building was reported by FMRI employees to contain the boiler room and the air compressor. Access to this area was restricted due to the door being stuck shut. Features observed surrounding this structure included a pad-mounted transformer near the northeast corner, diesel aboveground storage tanks, and out of use process aboveground storage tanks and empty 55-gallon drums.

Sodium Bulk Storage Building (mid-1970s to 1999)

The Bulk Sodium Storage Building handled quantities of scrap including residues from ore and slag dissolution processes, sodium reduction residues and off-specification tantalum powder lots and columbium press cake. This structure also stored the WIP which was excavated out of Pond 5 in the early 1990s. During the 1999 tornado event, this WIP material was scattered on the ground in the vicinity of this building, however, the WIP material was recovered and repackaged. This building was destroyed in the 1999 tornado, and was not rebuilt.

This structure was not present onsite during the March 16th, 2016, site inspection.

Machine Shop (1999 to present day)

The Machine Shop was constructed in 1999 and is a metal building with a concrete floor.

ENERCON observations on March 16th, 2016: During our site inspection, this building was used to store equipment, chemical compounds in containers ranging from 55-gallon drums to containers less than one gallon.

White House/Employee Break Room (1970 to present day)

The White House building was primarily used as a break area for Fansteel employees and included locker rooms, showers, and restrooms.

Outfall 001 Building/Weir Building (1980s to present day)

The Weir building or Outflow 001 building is used to monitor NPDES outflow 001 and houses a monitoring system that includes the pH and temperature measurement instruments. This building was constructed on a concrete slab and houses several pumps. According to FMRI employees, this building was constructed over the previous outdoor pump slab.

Table 1: Pond Construction and Historical Details

Basin/Pond	Length, Width, Depth (Feet) at construction	Bottom of Basin Elevation (Feet) at construction	Liner Type	Year placed into service	Year placed out of service	Comments
Basin 1*	80 170 8	526		1957	1978	Previously accepted cooling tower water until the cooling tower was outfitted with a recirculation system in 1971.
Basin 2*	60 90 7	520		1957	1971	Located east of Basin 1
Basin 3*	60 90 7	520		1957	1971	Located east of Basin 1
Basin 4*	150 370 9.5	521	No liner	1957	1978	"Acid Residue" or WIP Pond; Renamed "Covered Pond 2"
Basin 5*	150 370 9.5	521	No liner	1957	1978	WIP placed into Basin 4 and Basin 5 destroyed when Pond 3 was installed
Sewage Lagoon		510	No liner	1957	1978	Located west of Basin 5
Pre-treatment Pond P1 (P1S)	90 80 10		Synthetic	1979/1981	1991	Took CAF_2 and small quantities of WIP material. The 1991 closure included 371 tons of excavated material (Decommissioning Plan, January 15, 2003)
Pre-treatment Pond P4 (P1N)	80 80 10		Synthetic	1979/1981	1991	
Pond 2 (Covered)	350 150 12		"Clay, capped with one PVC sheet, one polyethylene sheet, and 6 to 12 inches of soil" [1]	1979	Present	"Acid Residue" or WIP Pond; Covered but no liner at bottom. Was previously called Basin 4

Pond 3	400 250 25		Synthetic	1979	1990	"Acid Residue" or WIP Pond; a liner failure occurred in 1989, and the use of this pond was discontinued.
Pond 5	200 100 9		Clay	1973	1975/78	Designed as a settling pond similar to Ponds 6 through 9, however, Pond 5 was used shortly to accumulate WIP material while Ponds 2 and 3 were being constructed in the mid-1970s (Decommissioning Plan, January 15, 2003).
Pond 6	200 100 9		Clay	1973	Present	Clarification pond; last pond before outfall 001.
Pond 7	250 150 7		Clay	1975	Present	Basic residue settling pond
Pond 8	350 350 25 or 27		Synthetic 30 mm liner	1978	Present	Basic residue settling pond
Pond 9	600 250 20 to 25		Synthetic 30 mm liner	1985	Present	Basic residue settling pond
Stormwater collection basin	35 feet diameter			Early 1990s	Present	Basic residue settling pond
Lime Neutralization Pond						Details unknown

* = From 1956 Blue prints provided by the client.

= From January 15, 2003, *Decommissioning Plan, Chapter 2* and/or Earth Science Consultants review dated November 24, 1989, *Historical Perspective of Pond Nos. 5,6,7,8, and 9 with respect to their construction and usage.*

6.0 Interviews

Interview with FMRI

A representative of FMRI, Mr. James Burgess (Facility manager), was interviewed over the course of this project by telephone, through email correspondence, and during the site reconnaissance. Additional details provided by Mr. James Burgess is also provided in the site inspection discussion of this report, as appropriate.

According to Mr. Burgess, he has been associate with the Fansteel facility since 1983. Mr. Burgess stated that the laboratory for Fansteel was originally located in in the Service building, however, it was relocated to the second story of the Chem "A" building in the 1970s, and in present day, the R&D building is the location of the FMRI "laboratory. During full operational use of the Fansteel plant, the laboratory was in charge of testing the product which was produced at the various stages of the metal extraction and refinement process. Mr. Burgess indicated that there was a sewer pipe which traveled from the laboratory in the Service building to the Sodium Reduction building, for processing, and after that into a catch trench and hose which flowed to the former Basin 1 which was located east of the Chem "A" building. Basin 1 contained the blue sludge process material also called "WIP". Mr. Burgess indicated that the floor drains of the structures are not connected to the sewer [for the buildings on the eastern side of the facility]. According to Mr. Burgess, FMRI conducts semi-annual sampling of monitoring wells and sumps in relation with their NPDES permit. The water collected from the groundwater interceptor trench and the French Drain system surrounding Pond 3 (pond not in use), are reported by Mr. Burgess to be routed to the water treatment area, and then the water is discharged to Pond 8, 9, 7, and 6, respectively.

According to Mr. Burgess, excavation of the blue sludge WIP material has been going on since November of 2006. Material has been excavated out of Pond 5, Pond 3, and is currently being excavated out of Pond 2. Excavation generally occurs during the summer months, and two-ton bags are stored onsite so that WIP can be shipped out approximately every 10 weeks. To date, Mr. Burgess estimated that approximately 16,340 tons have been shipped off site. The shipments are transported by rail to the International Uranium Corporation's (IUC's) White Mesa Mill near Blanding, Utah. The railroad spur was rebuilt in the 1990s and was last serviced in 2005.

Tenants have been renting the Service, Sintering, and the Electron Beam building since around 2005. The information contained in the table below was provided by Mr. Burgess.

Table 2: Previous tenants of Fansteel Buildings (Provided by FMRI)

DATE START	DATE END	COMPANY	ACTIVITY	BUILDINGS USED
May-2005	May-2008	AI International	Fabrication, Metal, Machine work, mills, lathe, CNC media blasting and Painting	Service, Sintering and Electron Beam Buildings
Oct-2008	Dec-2010	Global Machine	Fabrication Metal work	Service and Electron Beam Buildings
Jun-2013	Mar-2015	Global Machine	Fabrication Metal work and Glass Crushing (2015 only)	Electron Beam Building
Apr-10	Present	Advantage TerraFab	Fabrication, Powder Coating, Sandblasting, Welding, painting, Office space	Sintering Building (since Apr-10), Service Building (since Dec-10) and Electron Beam Building (since Mar-15)

Interview with Tenant

Mr. Andy Morris, the Plant Manager of Advantage TerraFab was interviewed regarding the operations onsite. Advantage TerraFab moved onto the Fansteel property in April of 2011. According to Mr. Morris, his company currently occupies the Sintering Building, the Service Building, and the Electron Beam Building. Operations conducted in the Service and Sintering Building are media blasting, powder coating, and welding. Additionally, the former lab areas of the Service Building are used as a spray painting area which is equipped with forced air and ventilation. The electron Beam building is used for their large projects.

According to Mr. Morris, hazardous materials that they use onsite include paint, methyl ethyl ketone (MEK) solvent used for liquid painting, a powder coat softening paste, and a rust inhibitor used in sand blasting is contained in two small above ground storage tanks (located at rear of service building). Containers range from consumer sized packaging up to 55 gallon drums. Drum storage is mainly in the former boiler room of the Sintering building and in in a former office of the Service building lab. Mr. Morris informed us that Advantage TerraFab did not have permits for the painting activities or for hazardous materials storage or disposal, and indicated that they were exempt due to the small quantities used. Mr. Morris said that they have the local Fire Department inspect the paint booth on a regular basis. Mr. Morris indicated that the only waste generated at their facility is a powder waste generated during media blasting activities; he stated that they only generated small volumes of material now that they use a steel blasting media (previously used garnet media).

Mr. Morris was asked about the tenants that occupied the site in the past. According to Mr. Morris, the company called Global Machine previously occupied the Electron Beam Building and conducted operations similar to Advantage Terrafab. In addition to metal fabrication, Global Machine also provided a service to crush glass jars when a bad batch was produced by local manufacturing companies. Mr. Morris said that AI International formerly operated in the Sintering Building manufacturing motorcycles, which included painting. Mr. Morris said that when AI International vacated the Sintering building, there was paint all over the floors and walls. Mr. Morris said that his employees spent a lot of time to scrap the paint off of the building, prior to moving their operations into the building. According to Mr. Morris, they did not use any chemical to help facilitate removing the paint from the walls and floor of the Sintering building.

Interviews with Regulatory Agencies

A meeting was held on January 6, 2016, with J. Paul Davis, ODEQ, Land Protection Division, and Libby McCaskill, ODEQ, Land Protection Division, Radiation Management Section. The following is a summary of that conversation.

Ms. McCaskill said that Fansteel is still in Phase 1 of the decommissioning process for their NRC license. According to Paul Davis, Pond 3 has been excavated out, however, no confirmation sampling has been conducted during this process. FMRI had contracted with A&M Engineering to perform the excavation of Pond 3. There was a disagreement about handling the waste and waste characterization. Fansteel was excavating out the "blue-hue" sludge material and sending it to be recycled/processed for the residual metals. The sludge/soils which are not blue were deemed to be not be useful for this recycling process, and were stockpiled. Fansteel is now doing their own in-house excavating on the property. Mr. Davis said that Pond 2 had been previously covered but that it was now was being excavated by Fansteel. Ms. McCaskill mentioned that Fansteel is only using visual cues (i.e. the color of the material) to determine when the bottom of the basin or pond is reached, and as the depth to stop excavation. Mr. Davis indicated that Pond 2 soils are being disposed of monthly to White Mesa, Utah, however, they are currently being stored in a building onsite. Others soils being stored onsite include the soils from the installation of the groundwater interceptor trench which were placed on plastic sheeting in a location south of Pond 3.

Mr. Davis indicated that FMRI has a recently re-issued NPDES waste water permit. Waste water was formerly generated from processing ore and from secondary CaF2 processing to absorb the Ur and neutralize the waste water mixture; this process creates CAF2. Mr. Davis indicated that due to the changes in the type of business practices taking place at the facility, there may be different horizons of contaminants which reflect this history. Mr. Davis indicated that there has only been limited sampling of the surface of

the ponds (especially Pond 2), and he would like to see surface and subsurface sampling to delineate impacted horizons if they exist.

When asked about the groundwater at the former Fansteel facility, Mr. Davis said that part of Fansteel's later business operations included recycling tantalum scrap from outside sources which was processed in solvents prior to re-melting. Mr. Davis mentioned that practice may be related to the present-day TCE plume. However, MIBK was the only VOC included in their NRC/NPDES permit, and therefore MIBK is the only VOC constituent tested for in previous groundwater sampling events on the Fansteel property, including the semi-annual groundwater sampling related to their wastewater discharge permit. The April 2015 Terracon investigation of the TCE plume was mapped as migrating toward the northeast. Terracon used old groundwater data (2006, 2010) for the wells located on the northwest property, as well as data collected from borings advanced as part of their study. Mr. Davis suggested a better gradient study should be conducted and all wells to be sampled for a full suite of analytes if possible. Mr. Davis also mentioned that there is Chromium in the groundwater.

7.0 Records Review

Records provided by the client, records available on searchable databases (EDR), and records available through the NRC and ODEQ.

7.1 Regulatory Database Research

The purpose of the records review is to obtain and review records that will help identify recognized environmental conditions in connection with the property. ASTM standard and additional environmental records were obtained from Environmental Data Resources Inc (EDR) of Milford Connecticut. Standard environmental records are those from federal and approximately equivalent state agencies. Additional records are those that can enhance and supplement the standard environmental record sources and generally can be obtained from local governmental and non-governmental agencies. The following sections identify record information that was reviewed from standard federal and state agency sources. Listed sites are grouped according to their ASTM-recommended approximately minimum search distance.

> *FMRI is registered on the OK Tier 2 database. Fansteel Metals is registered under CERCLIS-NFRAP, RCRA NonGen/NLR, and the ICIS database for an enforcement action dated 1987. For additional details please refer to the EDR Radius Map report attached.*

7.2 Blue Prints provided by FMRI

Mr. Burgess provided blue print plans of the former Fansteel facility which are dated 1956 for the entire site, the Sintering building, the Service building, and the Chem "A" building. Plans for the Chem "C" Building were not provided, and the Electron Beam building was not constructed until many years later. These plans were reviewed to more accurately determine the location of utilities, drains inside of structures, and the locations of former chemical storage areas. Where floor drains were identified, they were plotted on the Figures 5.1, 5.2, and 5.3. The former locations of equipment are also noted on Figures 5.1 to 5.3, as appropriate.

8.0 Aerial Photograph Review

Historical Features Discussion (Aerial Photograph/Plot Plan) Summary

Year	Source	Observations
1956	Blue print Site Plan C-1	Utility Paths which were observed on this plan were plotted on Figure 3. The initial site plan shows the locations of the Sintering building, the Service building, the electrical substation, the Chem "A" building, the Chem "C" building, and the first 5 basins or ponds which were used at Fansteel. The basins 1, 2, and 3 were located east of the Chem "A" Building, basin 4 was located to the northeast of the Chem "C" building, while basin 5 was originally located to the northwest of the Chem "C" building.
1958	ODEQ 2007 ESA (NRCC)	This aerial photograph shows the features mentioned in the 1956 plan. A parking area is visible north of the Sintering building and a small structure or feature is visible near the southwest corner of the parking area. The substation is visible between the Sintering building and the Service building. Small features visible south of the Service building suggest this area is being used as a storage area; much of this area appears to be unpaved. It appears that the parking area and the road (Tantalum Place) north of the Sintering and Service buildings are the paved with asphaltic concrete. It is not clear if any additional areas on the property are paved. The five basins used during Fansteel operations are visible. In addition, the sewage lagoon is visible west of Basin 5, the spillway of which is visible along the northeastern side. The railroad spur which enters the site to the north and bends towards the east, appears to terminate at Chem "C" building. The above-ground storage tank area ("tank farm") is visible to the west of the Chem "C" building, north of the railroad tracks.

		The cooling tower structure is visible northeast of the Chem "A" building. Also, what appears to be a square structure or raised feature (possible soil stockpile) is visible to the south of the Chem "A" building. An additional feature which is possibly the "Gunch" house (presently the Groundwater treatment facility) is visible near the southeast corner of the Chem "A" building. Broad strips of slightly curving lineations are visible in the southeastern portion of the facility (potentially areas where soil was reworked or excess soils were spread).
1964	ODEQ 2007 ESA (NRCC)	The 1964 photograph appears similar to the 1958 photograph. A linear feature which appears to originate from near the Sintering and Service buildings and leads northeast, towards the sewage lagoon. A dark line originating the area located south of the Service building suggests that water runoff from this area towards the southwest may have occurred. A small feature which cannot be identified is visible on the area south of the Chem "A" building and west of the "Gunch" house. A small feature is visible near the southern-most portion of Basin 5; review of records has indicated that this feature was a "lime silo."
1971	EDR Aerial Package	Although the resolution of this image is poor, several changes since the 1964 photograph are visible. The Chem "C" building appears to have been expanded to its present day size, and the Thermite building and Sodium Reduction building are visible. The paved "former barrel storage area" is also visible west of Chem "A" building. Two roughly rectangular features are visible in the storage area located to the south of the Service building; these features do not have a shadow and are likely paved areas, or areas of wet or dark soil.
1972	ODEQ 2007 ESA (NRCC)	The 1972 aerial photograph appears similar to the 1971 photograph. However, Basin 2 and 3 are no longer visible east of Basin 1 and the Chem "A" building. In addition to the dark features still visible located to the south of the Service building, what appears to be a rectangular structure is located along the fence to the southwest.
1973	EDR Aerial Package and OWRB files reviewed at ODEQ	The structures and basins observed in the 1972 photograph area still visible. Ponds 5 and 6 are visible on the southeastern portion of the Fansteel facility.
1978	OWRB files reviewed at ODEQ	The Sintering, Service, Chem "A", Chem "C", Thermite, Sodium-Reduction buildings, and Gunch House are still visible in the 1978 aerial photograph. The sewage lagoon, Basin 1, Basin 4, Basin 5, Ponds 5, 6, 7, and 8 are visible. Structures which were constructed since the 1973 photograph include the Sodium Bulk Storage building (west of present day Machine shop), the two MIBK tanks in the AST "tank farm" area, and the two Ammonia ASTs and containment area

		located east of the northern portion of the Chem "A" building. The present day Pond 7 and Pond 8 are also visible in the southeastern portion of the Fansteel Facility. It appears that soil was excavated to build up the new ponds, and beginning the present day "borrow pit" located west of Pond 8.
1979	ODEQ 2007 ESA (NRCC)	With the exception of the addition of the present day White house (former Coffee house) and the Lime Neutralization pond located north of the Ammonia ASTs, the Fansteel facility structures have not changed since the 1979 photograph. It appears that the area south of the Service building is still used for storage. Basin 1 located east of the Chem "A" building has been converted into the "pre-treatment ponds" P1 and P4. Additionally, the previous Basin 4, Basin 5, and the sewage lagoon have been reworked and the present-day orientation of Pond 3 (lined), and Pond 2 (lined and covered) has been achieved north of the Chem "C" building.
1981	EDR Aerial Package and ODEQ 2007 ESA (NRCC)	The 1981 aerial photograph is of poor resolution. However, the Fansteel facility appears similar to the preceding photographs. Lighter colored areas which may represent disturbed soils are visible in the present day location
1984	EDR Aerial Package and ODEQ 2007 ESA (NRCC)	Other than the addition of the Research and Development (R&D) building is visible to the north of the Service building no further changes are apparent from the 1984 photograph.
1987	OWRB files reviewed at ODEQ	The 1987 aerial photograph reveals that Fansteel facility appears to be similar to preceding photographs. Structures visible include the Sintering building, the electrical substation, the Service building, the R&D building, the guard house, the Chem "A" and Chem "C" building, the White House or coffee break building, the Sodium Reduction building, the sodium storage building (or metal shop), the Thermite building and the Gunch house. A small feature visible south of the Thermite building is interpreted to be the Weir house or Outfall 001 building. Ponds which are visible and appear to contain liquid are Pond 3, Pre-treatment Pond P1, Pre-treatment Pond P4, and Ponds 5, 6, 7, 8, and 9. A dark linear feature is visible to the west of Pond 3, in the approximate location of the French drain associated with the installation of Pond 3. The northwest corner of Pond 9 appears to have a light colored path leading to it. The borrow pit located west of pond 8 and 9 appears to be full of liquid or stormwater. Storage areas which are visible in this aerial photograph include the area south of the Service building, the area north of Pond 8, and the paved storage pad located west of the Chem "A" building. The above ground storage tank farm is visible south of pond 3, the ammonia above-ground storage tanks are visible east of the pretreatment ponds P1 and P4. The containment area surrounding the ammonia storage tanks is also visible. Light-colored areas which appear to be exposed

		earth (interpreted as stormwater runoff drainages), are visible originating from south of the Chem "A" building, and near the Thermite and Gunch house, flowing towards the river.
1991	ODEQ 2007 ESA (NRCC)	The 1991 aerial photograph appears similar to the preceding photograph, however, the electron beam building is now visible south of the Sintering Building. The area previously used as storage south of the Service building appears vacant. The use of Pond 3 in the northern portion of the site appears to have ceased. Pond 3 appears to be almost completely devoid of liquid. Pond 5 also appears to have been filled and does not appear to contain any liquid.
1995	EDR Aerial Package	The Fansteel facility appears similar to the preceding photograph. The storage areas located south of the Service building still appear vacant, and the paved storage areas to the west and south of the Chem "A" building also appear to be free of items. Sometime between 1991 and 1995, the Bertha building was constructed south of former Pond 2, and the circular stormwater collection basin was installed southeast of the Chem "A" building. Pond 3 still appears to be dry and the facility structures appear unchanged from the previous aerial photograph.
2003	ODEQ 2007 ESA (NRCC)	The 2003 aerial photograph reveals the groundwater treatment facility and the Machine Shop have been constructed. Equipment is visible on the northeast portion of paved storage pad located west of the Chem "A" building. The soil stockpile from the installation of the groundwater interceptor trench is visible east of the Service building. Also, the Sodium Storage Building is no longer visible (destroyed in 1999 tornado).
2005	EDR Aerial Package	The 2005 aerial photograph reveals the Fansteel facility to be relatively unchanged from the preceding photograph.
2006	EDR Aerial Package	The 2006 photograph reveals that the WIP material had begun to be excavated out of Pond 3. Soil staging or storage areas are visible north of Pond 8 and east of the interceptor trench soil stockpile, and the WIP drying bed area is visible in the former location of the AST "tank farm."
2008	EDR Aerial Package	The 2008 aerial photograph reveals that the site appears very similar to present day. Areas of the facility which appear to be used as storage include the areas south of the Service building, the former ore storage area west of the Chem "A" building, and the concrete pad located east of the Chem "A" building and north of the Bertha building.
2010	EDR Aerial Package	The 2010 aerial photograph reveals the Fansteel facility to be relatively unchanged from the preceding photograph.
2013	USDA NAIPS	The 2013 aerial photograph reveals that the excavation of former Pond 2 had begun.

2015	USDA NAIPS (Figure 2)	The 2015 aerial photograph is used as the background of Figure 2: "Current Day Site Features"

9.0 Discussion of Radiological Data Gaps

The records were provided by the client and were reviewed by ENERCON personnel. A summary of the most pertinent documents follows:

FMRI Licensing Status

Site operations at FMRI are regulated under NRC license SMB-911 Amendment 13 dated September 2002. Operations and decommissioning tasks required of the licensee are specified in license conditions 25 - 26, 29 – 33, and 37 – 43. Each condition specifies actions required by the licensee at various points of the decommissioning process. Of specific note is that these license conditions require licensee actions by specified dates. Decommissioning criteria specified by these conditions are also included.

Phase I Description

The Phase I Implementation Work Plan was prepared in July 2004 to remediate Ponds 2 and 3. Section 4 of the Phase I Implementation Work Plan stated that backfilling of the excavations will not occur until addition characterization is completed at a later date.

Phase I Implementation Work Plan and Status

FMRI began Phase 1 decommissioning in 2005 in accordance with the Phase 1 Implementation Work Plan. Phase 1 includes removal of work-in-progress (WIP) material from Ponds 2 and 3, and transfer of the material to an out-of-state uranium mill for use as alternate feed material. All residual WIP material has been removed from Pond 3. The berms and interior of Pond 3 have been reshaped for erosion control. About 200 tons of bulk WIP material remains in a drying bed near the southeast corner of Pond 3. Approximately 180 two-ton bags of WIP material from Pond 3 remain staged for shipment in the Thermite Building.

Work in Pond 3 was contracted to A&M Engineering. Contractual issues between FMRI and A&M Engineering resulted in the termination of the contract before completion of the work. In a letter from

A&M Engineering to NRC on December 18, 2006, A&M stated that problems had been encountered during remediation of Pond 3 resulting in termination of the contract between FMRI and A&M.

FMRI completed removal of WIP material from Pond 3 in 2010. The side slopes of Pond 3 were reportedly reshaped for erosion control. During 2011, FMRI removed and packaged all remaining Pond 3 material and reshaped the drying bed for erosion control. This reshaping included a physical re-contouring of the surface soils to reduce the steepness of the side slopes. It is also our understanding that no radiological surveys or sampling activities were completed as part of this process.

FMRI started removing WIP material from Pond 2 in August 2011. FMRI suspended this work in December 2011. FMRI resumed waste packaging operations in Pond 2 during July 2012. FMRI subsequently stopped bagging operations in October 2012 because the storage areas (Chem A and Chem C Buildings) were almost full of bagged material. FMRI estimated that it had removed roughly 3,000 tons of WIP material from Pond 2, and that roughly 5,000 tons of material remained. FMRI plans to resume bagging operations when it has sufficient space to store the newly bagged material. FMRI indicated that these excavation and bagging operations may recommence by the summer of 2016.

FMRI previously shipped WIP material to an out-of-state uranium mill in 2006 to 2009. FMRI estimated that it had shipped 13,204 tons of WIP material in 672 individual shipments during this time frame. FMRI resumed shipping operations in late-September 2013. Since September 2013, FMRI has shipped 29 intermodals to the mill in Utah. Each intermodal contained between 18-20 tons of WIP material for processing as alternate feed material by the mill. FMRI shipped the intermodals by truck to the port of Tulsa, by rail to the Salt Lake City area, and by truck to the Utah mill.

It is our understanding that Phase 1 is not complete.

Phase II Description

The Phase II Implementation Work Plan was prepared in December 2006 to remediate Ponds 8 and 9. It is our understanding from later documentation that Phase II has not yet started.

Phase III Description

A Work Plan for Phase III was not provided. However, it may be implied that remediation of Ponds 5, 6, and 7 will be included in Phase III.

Radiological Data Gaps Identification

Data gaps were identified in the ICF Consulting report dated November 15, 2002. Since the Decommissioning Plan was prepared by FMRI and approved by NRC after this report, we have assumed that the data gaps identified in this report were incorporated in the requirements of the Decommissioning Plan.

In February 2011, FRMI prepared the Final Status Survey Plan for the site. Within this document, a detailed listing of planned additional site characterization was provided. This listing, prepared to only address radionuclide contaminants, identified the following:

- The listing only addressed radiological contaminant. Data gaps for other contaminants are addressed separately.
- Ponds 2 and 3 contained the highest amounts of U-238 and Th-232.
- The R&D Building, White House, and Thermite Building were expected to satisfy conditions for unrestricted use. This should be confirmed, especially in the Thermite Building, where bags of radiological waste are stored.
- The Sodium Reduction Building needs a radiological survey to determine its current radiological conditions.
- The Waste Water Treatment Plant needs to be surveyed for direct alpha and direct beta-gamma.
- Characterization of subsurface soils beneath floors is required.
- Characterization of floor drains and joints is required.
- Data gaps were identified regarding characterization of structures. The FSS Plan states that most of this data will be obtained during D & D. Since impacted materials will be shipped off-site for disposal, surveys during decommissioning to separate and manage wastes should be acceptable.
- Decommissioning of Pond 3 began in 2005 and predominately concluded in 2008. The Plan stated that approximately 200 tons of bulk WIP material remained in a drying bed near Pond 3. This Plan stated that an unpublished characterization survey was conducted in 2007 to determine the impacts of Phase 1 decommissioning to surface soils. The characterization consisted of gross gamma survey

and biased soil sampling. The characterization survey identified four impacted areas. No verification surveys or data were available to us to allow verification of this point.

- The plan for additional characterization of groundwater will include a comprehensive program to compile, present, and interpret this additional water quality and water level information.

NRC stated in a letter to FMRI in April 2014 that they did not approve FMRI's Consent Order to close Ponds 6 and 7. One of the stated reasons for the disapproval was the lack of planned radiological surveys before closure.

NRC stated in a letter to FMRI in August 2015 that they did not approve FMRI's revised Derived Concentration Guideline Level ("DCGL") values for the Muskogee site. The NRC 2003 SER indicated that the licensee should revise both sets of DCGLs to account for groundwater pathways. For soils and sediments, FMRI did not revise the DCGLs; but, instead, provided unacceptable justification for continuing to exclude groundwater pathways. For building and component surfaces, FMRI proposed revised DCGLs; but, did not address groundwater pathways. DCGLs are site specific concentration levels that, in total, account for all applicable exposure pathways and are used to demonstrate compliance with the 25 mrem/y unrestricted release criteria discussed in 10 CFR 20.1402. If more than one set of DCGLs are provided, an explanation should also be provided as to how the DCGLs will be applied to assure the 25 mrem/y criteria is met. Although this analysis is not a data collection process, this key task forms the framework to assess radiological data at the site.

10.0 Summary of Areas of Concern and Data Gaps

The following is a discussion of the data gaps found during this and past investigations.

Cooling Water Reservoirs

Cooling water reservoirs and cooling towers were located in the Sintering Building, the Electron Beam Building, and east of the Chemical buildings. Records were not available from J. Burgess for cooling additive purchases, as inventories are in storage. Mr. Burgess informed us that anti-rust additives were added to the cooling water, however, the exact additives are unknown. He informed us that the original cooling water present in the reservoirs in the Sintering building and Electron Beam building have since

been replaced with new water. A 1971 letter from Fansteel to the OWRB indicated that prior to 1971, the water from the cooling tower located near the Chem "A" and Chem "C" buildings contained chromates and that cooling water had previously been discharged to Basin 1 located east of the Chem "A" building. A release of this cooling water from the cooling tower was also reported in the OWRB files. Borings should be advanced near the former locations of the cooling water reservoirs inside of the Sintering and EB buildings, and near the former location of the cooling water towner neat the Chem buildings. These borings should be analyzed for chromates and anti-rust compounds which may have been used between the 1950s to the 1990s.

Hazardous Materials Spills, Storage Areas, and Housekeeping Issues

Areas of general storage or chemical storage include

- the area south of the Service building which was used by both Fansteel and later tenants for storage
- The area surrounding the Sodium Reduction building has been observed to be an area where storage and debris have been present for a long time. During the site inspection of March 16th, scrap metal drums, debris, and diesel ASTs were observed surrounding the building. Minor staining of the soil and gravel was observed beneath an AST which is not currently in use.
- Piles of scrap metal, drums, old process equipment, and other debris were observed on the concrete pad which is located in the water treatment area, south of Pond 2 and east of the Chem "A" building,

Ore Barrel and WIP Storage Locations

Historically, the barrels containing ore, ore residue, or intermediate products were stored:

- on the drums storage pad west of Chem "A" building, in areas west of the sodium reduction building and north of pond 8 (ICF Report dated November 15, 2002).
- south of the Service building and south of the Chem "A" building. There is no indication that the area south of the Service building was a paved or curbed storage area. The area south of the Chem "A" building was partially paved, however, there was not a curb to contain residue and stormwater runoff until the OWRB requested that Fansteel install a containment curb in this storage area in 1981.
- According to the 2002 ICF report and FMRI personnel, an intermediate by-product (termed "gunch") of the metals extraction process was stored in the building called the "Gunch House", located southeast of the Chem "A" Building.

- After the June 1989 supernatant discharge from Pond 3, WIP was separated from the "acid process water" using filer presses and the drums containing WIP and other solid process residue were stored on the barrel storage pad west of the Chem "A" building.

Currently, excavated WIP material is currently stored in the Thermite building, Chem "A" building, the Chem "C" building, and the Sodium Reduction Building.

Impacts to Groundwater

TCE

In September of 2006, the ODEQ installed three temporary monitoring wells which detected volatile organic compounds in the groundwater beneath the "Northwest Property" which was acquired by the Port of Muskogee on June 17, 1999. A previous groundwater analysis conducted in 1993 did not detect VOCs above the elevated laboratory detection limit of 10 µg/L; the elevated laboratory detection limits were above the regulatory screening levels. The September 2006 study detected TCE in the groundwater sampled from boring MPA-2. TCE was also detect in the soil from MPA-2 at concentrations of 3000 µg/kg at 30.5 ft bgs, and 48 µg/kg at 27 ft bgs.

In September of 2007, fMRI analyzed the water sample from Sump #3 for volatile organic compounds by EPA method 8260B. VOCs were not detected above the elevated laboratory detection limit of 10 µg/L; however, the elevated laboratory detection limits were above the regulatory screening levels.

Following the 2006 ODEQ investigation of the "Northwest Property", borings were advanced and temporary monitoring wells were installed in 2010.

Terracon study dated April 23, 2015, used groundwater data collected in the 2006 ODEQ study, the 2010 study, and their samples collected in March of 2015. The plume that was mapped from this data strongly indicated that TCE was originating from the Sintering Building and traveling north-northeast with groundwater samples from monitoring wells located to the east (MW-54s) and monitoring wells to the west (MW-51s) of the Sintering building as non-detect for VOCs. However, the presence of a sewer line located near Monitoring well MW-53s located south of the southwest corner of the Service building detected 313 µg/L of TCE. Shallow soil borings to depths of approximately 10 feet below ground surface were advanced

by Terracon in areas surrounding the Sintering building, the Electron Beam Building, and near the southwest corner of the Service Building.

MIBK

Sampling for Methyl isobutyl ketone (MIBK) is conducted as a part of the semi-annual sampling events conducted under the NPDES permit. MIBK has been detected in MW-74s and in Sump #1 and Sump #2 between 1999 and 2015. The plot of the concentration of MIBK in the MW-74s well shows that the concretion was increasing between 1999 through to 2009, when it peaked at 574,000 µg/L, and it has generally been declining up to present day. Although it appears to have gone down over time, there is no data pertaining to the concentrations in the other wells, and the source location has not been determined.

Number	Data Gap Identified	TEXT EXCERPT or Description:	Where identified:	Resolved?	If NO: Action Needed:	If YES: How/Where resolved:	Comments:
1	Cooling Water additives UNKNOWN	The absence of information concerning additives to the cooling water reservoirs and any releases from the reservoirs is considered a data gap. If additives such as chromium compounds had been used, the groundwater could be affected in the event of a release. The data gap could be satisfied by additional review of Fansteel records, if still extant, concerning additive purchases or by obtaining a copy of the report, if it still exists, of the assessment performed in the late 1980s in association with the piezometer installation mentioned by Burgess (2006).	2007 ODEQ Targeted Brownfield Assessment Phase I ESA	NO	Drill borings near the locations of the cooling water reservoirs and near the cooling tower located near the Chemical buildings to determine soil conditions.	SOMEWHAT: A Letter from Fansteel to the OWRB dated Oct 25, 1971 stated: "The cooling water treatment agent originally used & which contained chromates has been replaced by an agent that does not contain toxic chromates." Same letter also indicated that the cooling water was previously discharged to Basin 1, but was improved to go back into the cooling tower for reuse. However, additives used after 1971 are still UNKNOWN.	Cooling water reservoirs and cooling towers were located in the Sintering Building, the Electron Beam Building and east of the Chemical buildings. Records were not available from J. Burgess for cooling additive purchases, as inventories are in storage. Mr. Burgess informed us that anti-rust additives were added to the cooling water, however, the exact additives are unknown. ****Previous releases from the cooling towers located near the Chem C Building have been documented. A clay pipe underneath the "catch trench" was damaged and discharging and eroding the soils beneath this "catch trench"

2	PCBs in hydraulic fluid in equipment in Sintering Bldg. UNKNOWN	The lack of information concerning the PCB content of fluids used in the hydraulic presses and vacuum pumps in the Sintering Building is considered a data gap. This data gap could be satisfied by determination of the former location of this equipment together with analysis for PCB of wipe samples from the floor in the area.	2007 ODEQ Targeted Brownfield Assessment Phase I ESA	NO	Drill borings through slab floor to determine soil conditions		Inspection of the floor slab during Data Gap Analysis [for former HYDROSTATIC press and other equip locations]. Subsequent borings to collect soil data regarding hydraulic fluid and PCBs will likely be needed to resolve this gap.
3	Tenant operations not observed : AI International	AI International's operations in the Sintering Building have not been inspected, and the requests for follow-up interviews concerning operations there have not been responded to; this is considered a data gap. This data gap could be satisfied by a follow-up inspection and interview.	2007 ODEQ Targeted Brownfield Assessment Phase I ESA	NO	Site inspection and interview of AI International's operations in the Sintering Building		This tenant is no longer operating at the site. This former tenant was not interviewed, however, Mr. Morris of Advantage Terrafab, the current tenant, was interviewed regarding the operations of AI International. Mr. Morris said that AI International formerly manufactured motorcycles, which included painting. Mr. Morris said that when AI International vacated the Sintering building, there was paint all over the floors and walls. Mr. Morris said that his employees spent a lot of time to scrap the paint off of the building, prior to moving their operations into the building. According to Mr. Morris, they did not use any chemical to help facilitate removing the paint from the walls and

							floor of the Sintering building.
4	Tenant operations not observed : Global Machine Co.	The operations at Global Machine Company in the Electron Beam Building have not been inspected, and are considered a data gap. This data gap could be satisfied by a follow-up inspection and interview.	2007 ODEQ Targeted Brownfield Assessment Phase I ESA	NO	Site inspection and interview of Global Machine Company in the Electron Beam Building		This tenant is no longer operating at the site. This former tenant was not interviewed, however, Mr. Morris of Advantage Terrafab, the current tenant, was interviewed regarding the operations of Global Machine. According to Mr. Morris, Global Machine conducted metal fabrication activities similar to Advantage Terrafab.

5	Does the 1995 RA survey satisfy the current MARSSIM standard?	The radioactivity survey of the fields in the northeast corner of the Property, opposite Pond 3, used to justify release of the area from the NRC license, was performed to a different standard than MARSSIM, the current standard. Whether the survey performed in 1995 satisfies the current MARSSIM standard, which was only in draft form in 1997, is not known and is considered a data gap. This data gap could be resolved by comparison of the methods used to the current standard.	2007 ODEQ Targeted Brownfield Assessment Phase I ESA	YES			
6	Pathway UNKNOWN for Natural gas pipeline	The lack of maps showing a natural gas pipeline in the western portion of the property is considered a data gap. This data gap could be satisfied by review of maps by ONG showing the location of the lines.	2007 ODEQ Targeted Brownfield Assessment Phase I ESA	NO	Review site plan or utility plan		All utility pathways should be mapped to evaluate if the may have been a preferential pathway for contamination.
7	PCBs in electrical substation	The PCB status of the transformers in the electrical substation west of the Service Building could not be determined. This is considered a data gap. This data gap could be satisfied by review of FMRI or OG&E records or by inspection and sampling of the equipment for PCB.	2007 ODEQ Targeted Brownfield Assessment Phase I ESA	YES		Terracon analyzed several soil samples in substation and determined no PCBs were present.	Resolved.

8	PVC standpipe of UNKNOWN purpose	The nature of a PVC standpipe was observed and photographed standing at an angle on the ground east of the Electron Beam Building is not known. This is considered a data gap. This data gap could be satisfied by probing and possibly sampling the standpipe.	2007 ODEQ Targeted Brownfield Assessment Phase I ESA	YES		The standpipe was inspected during the March 2016 site visit. According to Mr. Burgess, this standpipe is a water level monitoring and sampling location which was originally installed to monitor if the cooling water reservoirs were leaking into the surrounding areas.	Sampling to be conducted later, if necessary.
9	Lead-based paint, asbestos, etc. may be present.	Pre-1978 construction; also identified in 2007 ODEQ Phase I ESA	Site Reconnaissance	NO	Surveys and/or remediation of this type of material is not planned at this time.		Not a priority as this issue is not related to groundwater or soil impacts.
10	2 Former barrel storage areas located south of Sintering Building	Historical OWRB documents reviewed at the ODEQ revealed that residue barrels and other barrel storage were located in two areas south of the west end of the Sintering Building.		NO			A boring by Terracon in 2015 identified TCE in the groundwater beneath this area. The soil and groundwater in this area should also be sampled and analyzed for impacts from metals or chemicals of concern.
11	Former Ore Barrel Storage located to northwest of Chem "A" Building	Historical OWRB documents reviewed at the ODEQ revealed that residue barrels and other barrel storage were located in two areas south of the west end of the Sintering Building.		NO	The Phase I survey conducted as a part of the decommissioning process did not identify this area as a severely radioactive zone, however, sampling should be conducted for metals, including columbium and tantalum.		
12	What is the sodium in the "sodium AST" dissolved in?	Mr. Burgess informed us that there is a sodium AST located onsite. This AST was kept at high temperature to keep the sodium in liquid form.	Correspondence with FMRI personnel	YES		According to Mr. Burgess, the sodium remained a liquid because it was heated. The fuel to	

						heat the AST was natural gas.	
13	A release from Pond 9 towards the Arkansas River, and other historical surface water runoff violations have been observed.	Historical OWRB documents reviewed at the ODEQ: 1972 Complaint of "yellowish liquid" flowing into river; OWRB Oil or Hazardous Substance, Accidental Discharge Report dated Jan 26, 1988 (Pond 9 is a CAF_2 settling pond, release of slurry water over several hours); Inspection Report by JJ Black from March 17, 1982, which noted contaminated runoff originating from stacked drums located near Chem "A" Bldg. and water from an overflow/observation sump which was periodically pumped back into Pond 3 (may also have been discharging to river); Release from Pond 3 Liner failure and Outfall #003 in June 1989.		NO	No shallow soil remediation or soil sampling was conducted after these releases. Soil sampling should be conducted in the previous areas of runoff from the site.		
14	Previously there were buried drums of solid waste in Pond 5	Historical OWRB documents reviewed at the ODEQ: Indicated that drums were buried in Pond 5.		NO	A subsurface investigation should be conducted in this area to determine if buried materials exist in this area and to determine if the soil has been impacted.		Mr. Burgess says that he does not recall drums ever being removed from Pond 5 and he was present when they excavated out some material out of Pond 5 in 1991.
	Drums of unknown contents are buried beneath the concrete slab north of the Bertha Building	This information provided by Mr. James Burgess during the Site inspection of March 16, 2016.		NO	A subsurface investigation should be conducted in this area to determine the extent of the buried drums and to determine if the soil has been impacted.		

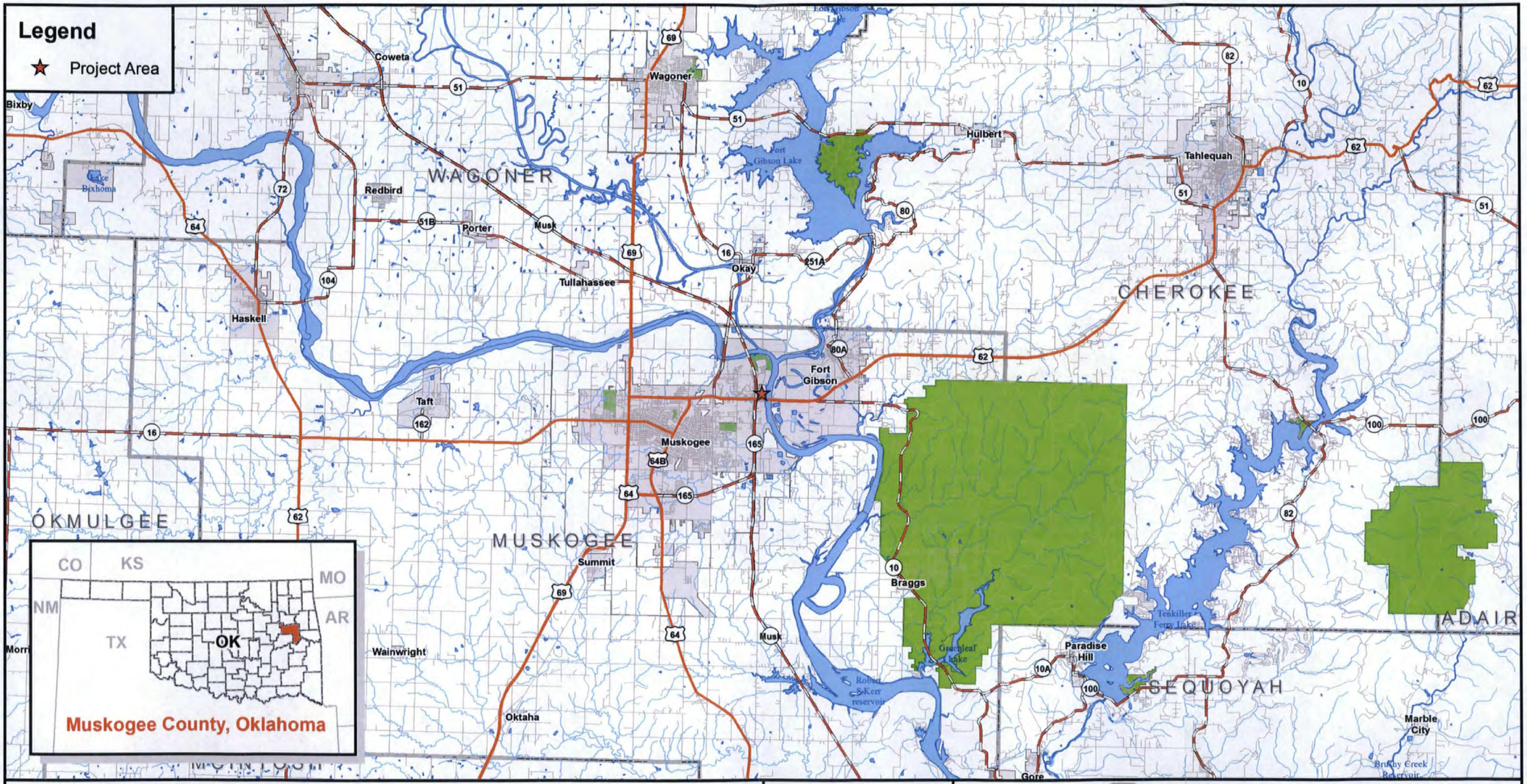
15	Railroad spurs sometimes have represent an environmental impact due to the frequent pesticides and herbicides applied to maintain the track.	Mr. Burgess informed us that the track is well maintained. No other information currently available.		NO	Soil sampling for pesticides, herbicides, and metals should be conducted in the area of the railroad spur.		Resolved by sampling if necessary.
16	Contents of former AST Farm located south of Pond 3 and west of Chem "C" Building; Soil condition beneath this unpaved tank farm is unknown	Historical OWRB documents and plans on file with ODEQ listed tank contents as ammonia, hydrofluoric acid, sulfuric acid, hydrochloric acid, and potassium hydroxide. The MIBK tanks were located west of the acid tanks, south of Pond 3.		YES		Former tank farm which contained acids and MIBK	Soil or GW conditions unknown in former AST farm location. Results from nearby MW-55s should be checked for MIBK analysis.
17	Pond 3 previously unlined- Condition of soils Pond 3 previously had a liner breach in June of 1989	Fansteel Letter to US EPA from the early 1970s, stated that as Pond 2 was newly constructed, Pond 3 contents would be excavated into Pond 2, then covered. Then Pond 3 will be lined prior to use. TAKEAWAY: Pond 3 previously unlined and proposed GW drainage system with catch trench to be installed.	Fansteel Letter to US EPA	NO	Chromium was identified in high quantities in the groundwater. This contaminant should also be mapped in a groundwater survey.		
18	Soil conditions unknown in current and past areas of poor housekeeping practices [debris] and stormwater runoff violations should be sampled		Site Reconnaissance	NO	Soil sampling could be conducted in the vicinity of storage areas and former stormwater runoff violations		
19	The conditions of the soils in the area of the septic lagoon were not characterized prior to closure.	Fansteel used a septic lagoon until 1971, then connected to sanitary sewer per Letter dated Oct 25, 1971. This letter also stated that cooling water from the cooling water tower located north of the Chem "A" Building previously	Letter from Fansteel to OWRB dated Oct 25, 1971	NO	Borings through this area will help to determine if the sewage lagoon or the fill material contained chemicals of concern		The lab used strong acids to digest the ore. According to Mr. Burgess, the water from the laboratories was routed to the waste water treatment plant for processing; all other

		discharged into Basin No. 1 prior to their construction of a recycling system. (for locations of basins see Figure 4.1)					water from floor drains was routed through the sanitary system.
20	Drainage of Chem "A" Building and ore barrel storage pad	The diagram shows the following: floor drain from Chem "A" Building goes to Basin 1, the drain located near the ore barrel storage area goes to Basin 4 (for locations of basins see Figure 4.1)	Contour Elevation and Runoff Flow Diagram dated November 20, 1974	YES			Basin No. 1 was used as an acidic waste storage basin. Basin No. 4 was located in the approximate location of Pond 2m, and was also used as an acidic waste storage basin. Soils in Basin 4 were excavated and placed into Basin 5 as part of the process of Basin 5 was being converted into "Covered Pond 2."
21	Pond 3 was "reshaped" after the WIP was excavated however, no confirmation sampling or radiation surveys were completed. Pond 3 was not closed under the NRC permit.	The December 18, 2006 letter discusses problems encountered during remediation of Pond 3 and termination of the contract between FMRI and A&M. It is our understanding that remediation of Pond 3 was not fully completed and that the excavation cavity was reshaped for erosion control. No sampling was conducted.	Letter from A&M Engineering to NRC December 18, 2006	NO	Sampling of Pond 3 has not occurred and will need to be completed for radioactivity and other chemicals of concern.		

22	Soil that was excavated in 1999 when the interceptor trench was installed were stockpiled south of Pond 3. According to Mr. Burgess, previous sampling conducted on this soil for characterization purposes indicated that the soil was below industrial regulatory screening levels. However, only two samples were collected.	This information provided by Mr. James Burgess during the Site inspection of March 16, 2016	Site inspection	NO	Composite samples appropriate for that amount of soil volume should be conducted prior to disposal and compared to current regulatory standards.		
23	Recycled oil ASTs were formerly located near the northwest corner of the Sintering building and on the eastern outer wall of the southern portion of the Chem "A" Building. No sampling for residual oils in the soil has been conducted in the former locations of these ASTs.	This information provided from interview with Mr. James Burgess during the Site inspection of March 16, 2016.	Information provided by FMRI	NO	Soil and sub slab sampling should be conducted for TPH and metals in this area.		

24	Data Gaps identified in this plan include: • The R&D Building, White House, and Thermite Building are expected to satisfy conditions for unrestricted use. This should be confirmed, especially in the Thermite Building, where bags of radiological waste are stored. • The Sodium Reduction Building will need surveyed to determine its radiological conditions. • The Waste Water Treatment Plant needs to be surveyed for direct alpha and direct beta-gamma. • Requires characterization of subsurface soils beneath floors. • Requires characterization of floor drains and joints. • Data gaps are identified regarding characterization of structures.		Plan for Additional Site Characterization February 2011	NO	Structures need to be re-surveyed for radioactivity after excavation and storage of the WIP is completed.		
25	Bulk WIP material is being stored in 2-ton bags in many of the buildings located onsite	Bulk WIP material is being stored in 2-ton bags in many of the buildings located onsite: the Chem "A" Building, the Chem "C" Building, and the Sodium Reduction Building. Due to this new usage as storage which has been occurring since 2006, there	Site inspection	NO	Structures need to be re-surveyed for radioactivity after excavation and storage of the WIP is completed.		

		may be a need to re-survey these structures for radioactivity after excavation of the WIP is completed.					
26	A TCE groundwater plume which appears to originate from the Sintering Building has been identified during previous investigations.	The extent of the TCE Plume, both laterally and vertically, has not been well resolved.		NO	TCE Plume should be mapped for entire facility.		Sampling investigations have been limited to small portions of the site. A comprehensive sampling investigation of the entire site would be informative.
27	The TCE plume may cross into the French drain system or groundwater interceptor trench in the vicinity of Pond 3.	If the trench is intercepting TCE, then TCE is likely being pumped into the treatment system and the settling ponds.		NO	The Ponds, the French drain sump, and the interceptor trench sump should be sampled for TCE to determine if TCE is inadvertently being discharged to the Arkansas River.		In the event TCE is mixing into the wastewater treatment stream, consultation with regulatory authorities may be required to clarify characterization of mixed waste.
28	An MIBK plume has been identified on the eastern portion of the facility	The MIBK plume is only identified on the eastern portion of the facility. If MIBK is being pumped out of the sumps then it is likely being pumped into the treatment system and the settling ponds.		NO	MIBK Plume should be mapped for entire facility.		



Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

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ENERCON

Figure 1: Vicinity Map

Source: University of Oklahoma
Center for Spatial Analysis

Prepared by: A. Couch; March 29, 2016

0 5 10 20 Miles

Legend

- Cleanout
- Monitoring Wells
- Approximate Outfall Locations
- Sump Locations
- Old French Drain
- Groundwater Interceptor Trench
- Railroad
- Ponds
- Former Ore Barrel Storage Area
- Former WIP Drying Beds/Stockpiles
- Buildings
- Approximate Project Boundary

Map ID	Name
1	Sintering Building
2	Electron Beam Building
3	Service Building
4	R & D Building
5	Machine Shop
6	Sodium Reduction Bulding
7	Thermite Building
8	001 Outfall Building
9	Groundwater Treatment Facility
10	White House
11	Bertha Building
12	Chem "A" Building
13	Chem "C" Building & Annex
14	Storm Water Collection Basin

MW-OW8, MW-75S, MW-69S, MPA-2N, Outfall 3, Pond 3 French Drain Sump, MW-72S, MW-74S, MW-03, GW-02, MPA-2W, MPA-2E, Pond No. 3, Cleanout 1, MW-71S, SMW-2, MW-68S, MW-OW4, Former Recycled Oil AST, MW-70S, Former Pond No. 2, SMW-3, MW-55S, MW-64S, Waste Water Mixing, MW-51S, MW-54S, Sump 2, MW-OW5, MW-65S, MW-67S, Outfall 2, MW-63S, Soil Stockpile, Former Recycled Oil AST Location, Former Compressed Gas Storage Area, Substation, MW-OW1, MW-53S, W53S, MW-OW2, MW-OW6, MW-OW3, Former Pond No. 5, Outfall 1, 2006 to Present, Cleanout 2, MW-62S, MW-52S, Pond No. 8, Pond No. 6, Pond No. 7, MW-57S, Borrow Pit, MW-56S, Sump 3, MW-OW7, Pond No. 9, MW-OW9, MW-60S, Cleanout 4, MW-59S, Sump 4, MW-58S, Cleanout 3, Outfall 5

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

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Figure 2: Current Day Site Features

Source: 2015 USDA NAIP
Muskogee County, Oklahoma

Prepared by: A. Couch; April 11, 2016

0 375 750 1,500 Feet

*Locations are approximate as provided by client.
#Locations are approximate from 1956 Blueprints provided by client.

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

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Figure 3: Approximate Buried Utility Corridors

Source 2015 USDA NAIP
Muskogee County, Oklahoma

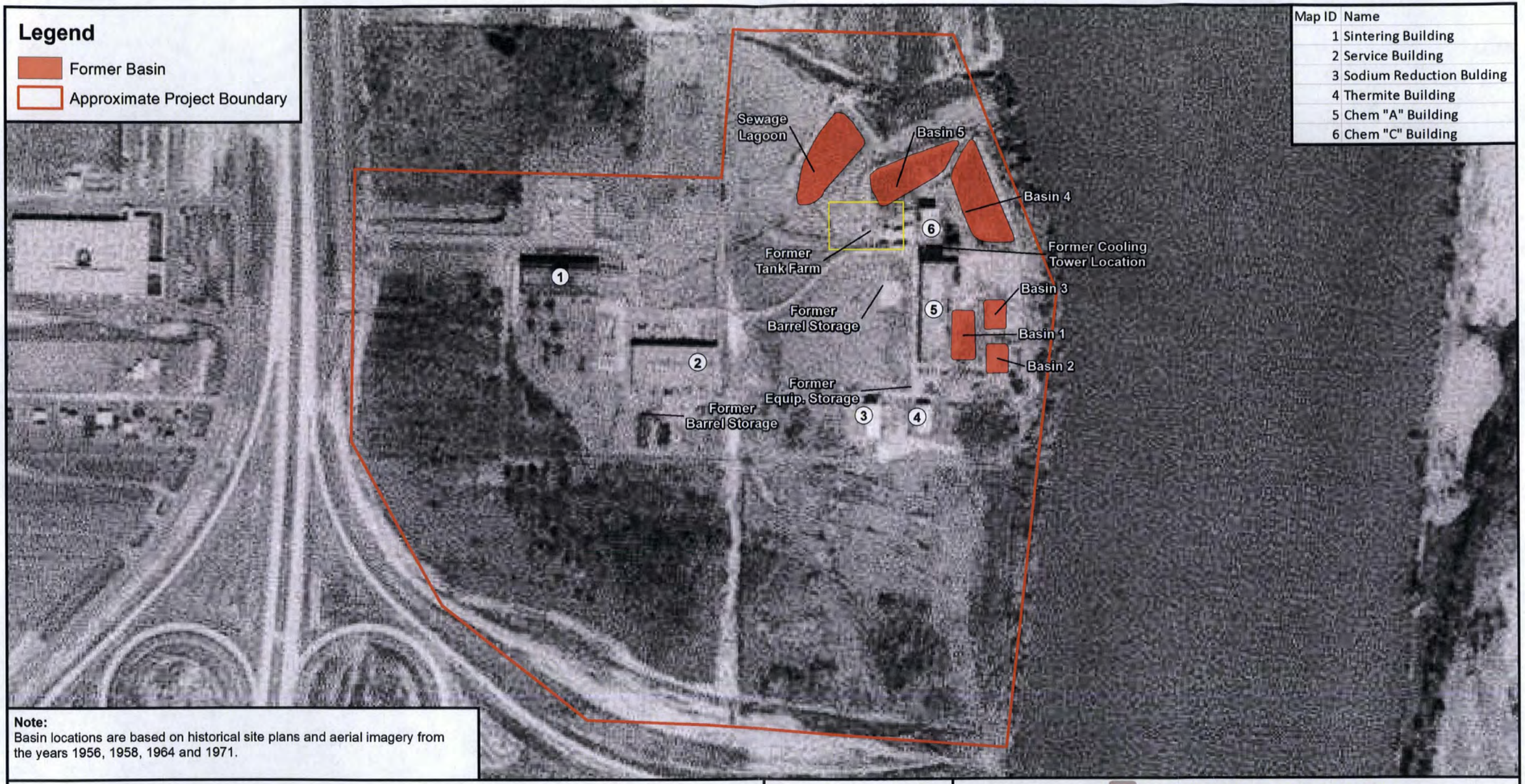
Prepared by: A. Couch; April 11, 2016

0 345 690 1,380 Feet

Legend

- Former Basin
- Approximate Project Boundary

Map ID	Name
1	Sintering Building
2	Service Building
3	Sodium Reduction Bulding
4	Thermite Building
5	Chem "A" Building
6	Chem "C" Building



Note:
Basin locations are based on historical site plans and aerial imagery from the years 1956, 1958, 1964 and 1971.

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

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ENERCON

Figure 4.1: Historical Site Features 1956-1971

Source: EDR

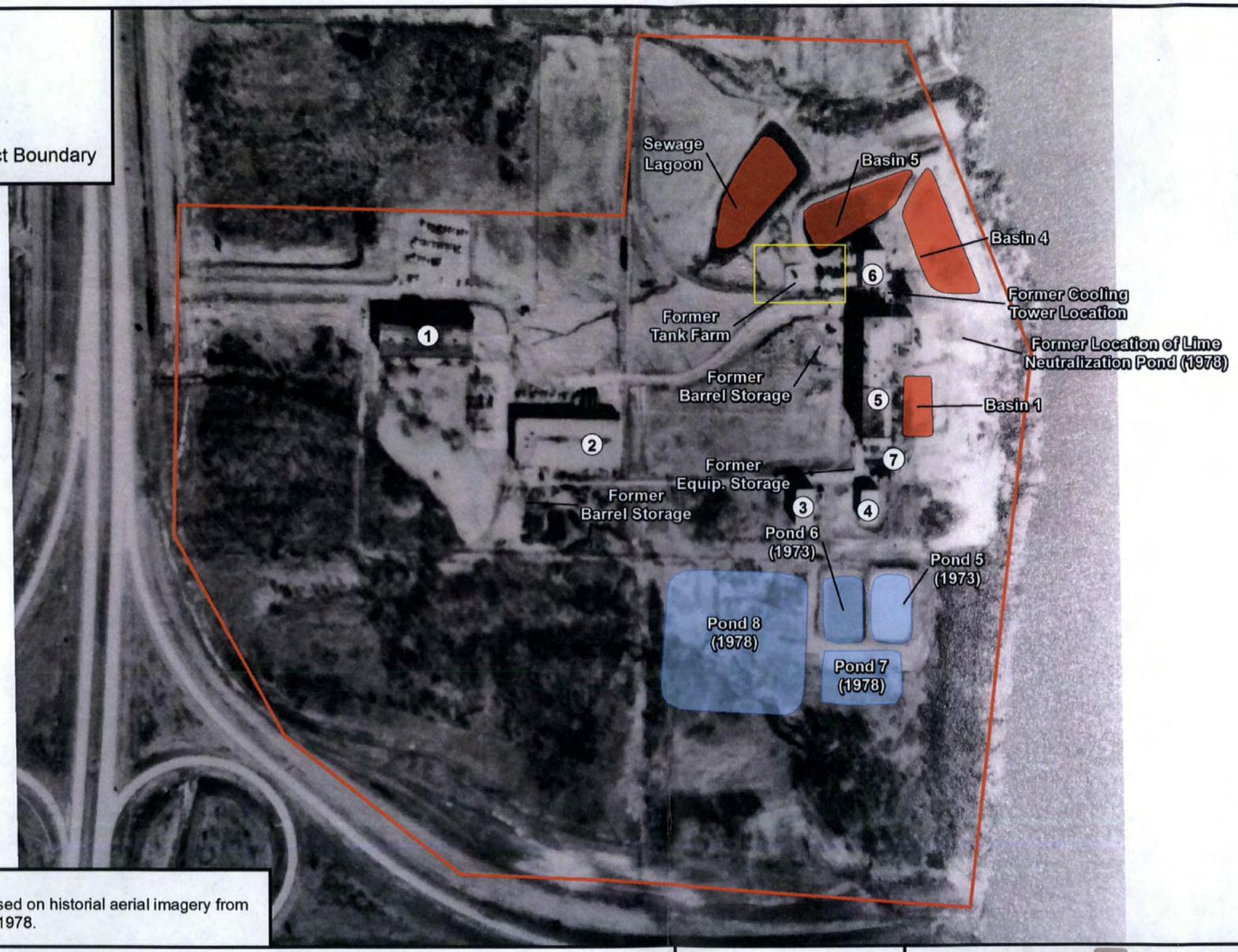
Prepared by: A. Couch; April 10, 2016

0 375 750 1,500 Feet

Legend

- Historical Pond
- Former Basin
- Approximate Project Boundary

Map ID	Name
1	Sintering Building
2	Service Building
3	Sodium Reduction Bulding
4	Thermite Building
5	Chem "A" Building
6	Chem "C" Building
7	Gunch House



Note:
Basin and Pond locations are based on historial aerial imagery from the years 1972, 1973, 1974 and 1978.

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
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Figure 4.2: Historical Site Features 1972-1978

Source: 1973 Aerial - Oklahoma Water Resource Board

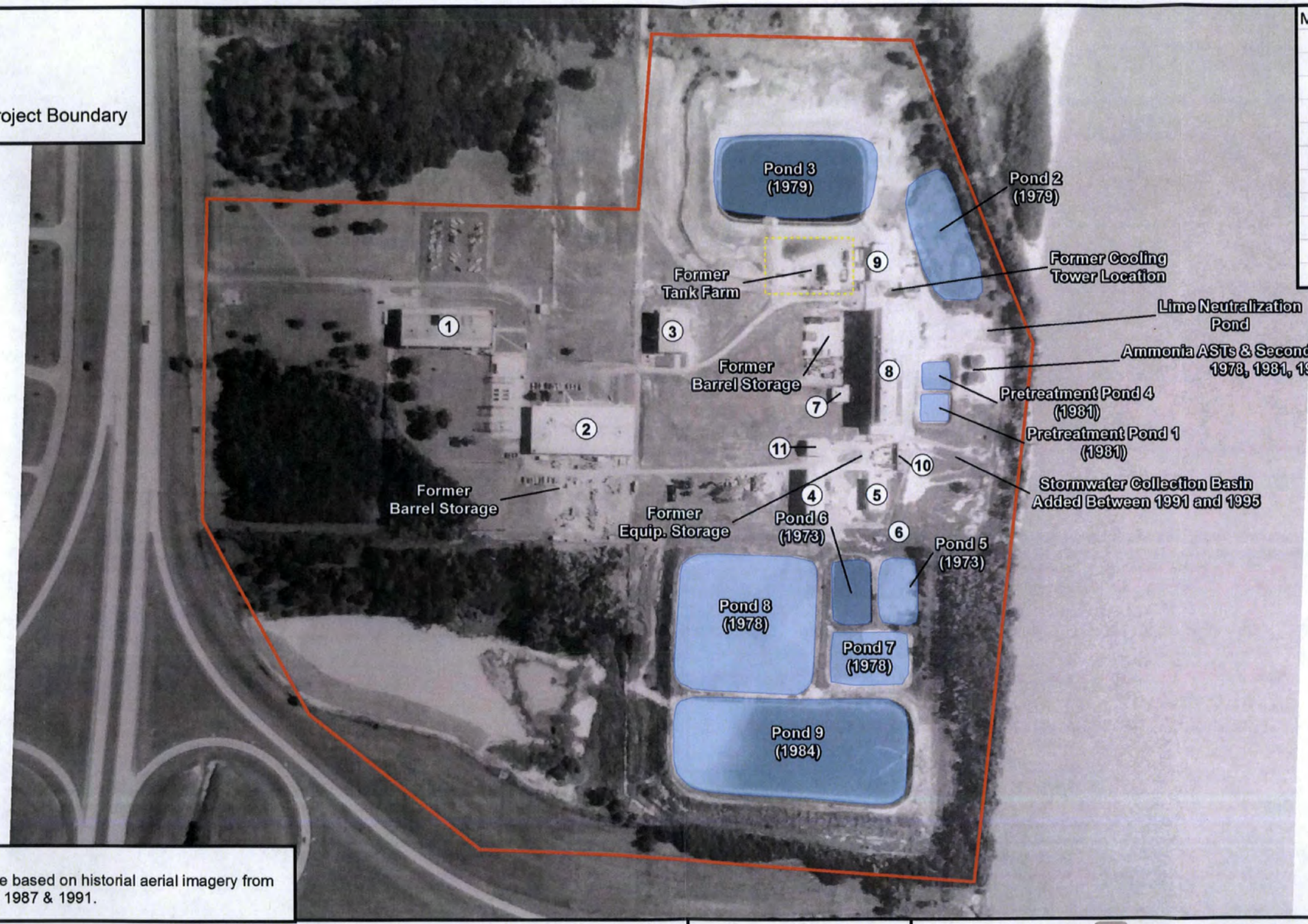
Prepared by: A. Couch; April 10, 2016

0 375 750 1,500 Feet

Legend

- Historical Pond
- Approximate Project Boundary

Map ID	Name
1	Sintering Building
2	Service Building
3	R&D Building
4	Sodium Reduction Bulding
5	Thermite Building
6	001 Outfall Building
7	White House
8	Chem "A" Building
9	Chem "C" Building
10	Gunch House
11	Sodium Storage Building



Note:
Basin and Pond locations are based on historial aerial imagery from the years 1979, 1981, 1984, 1987 & 1991.

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
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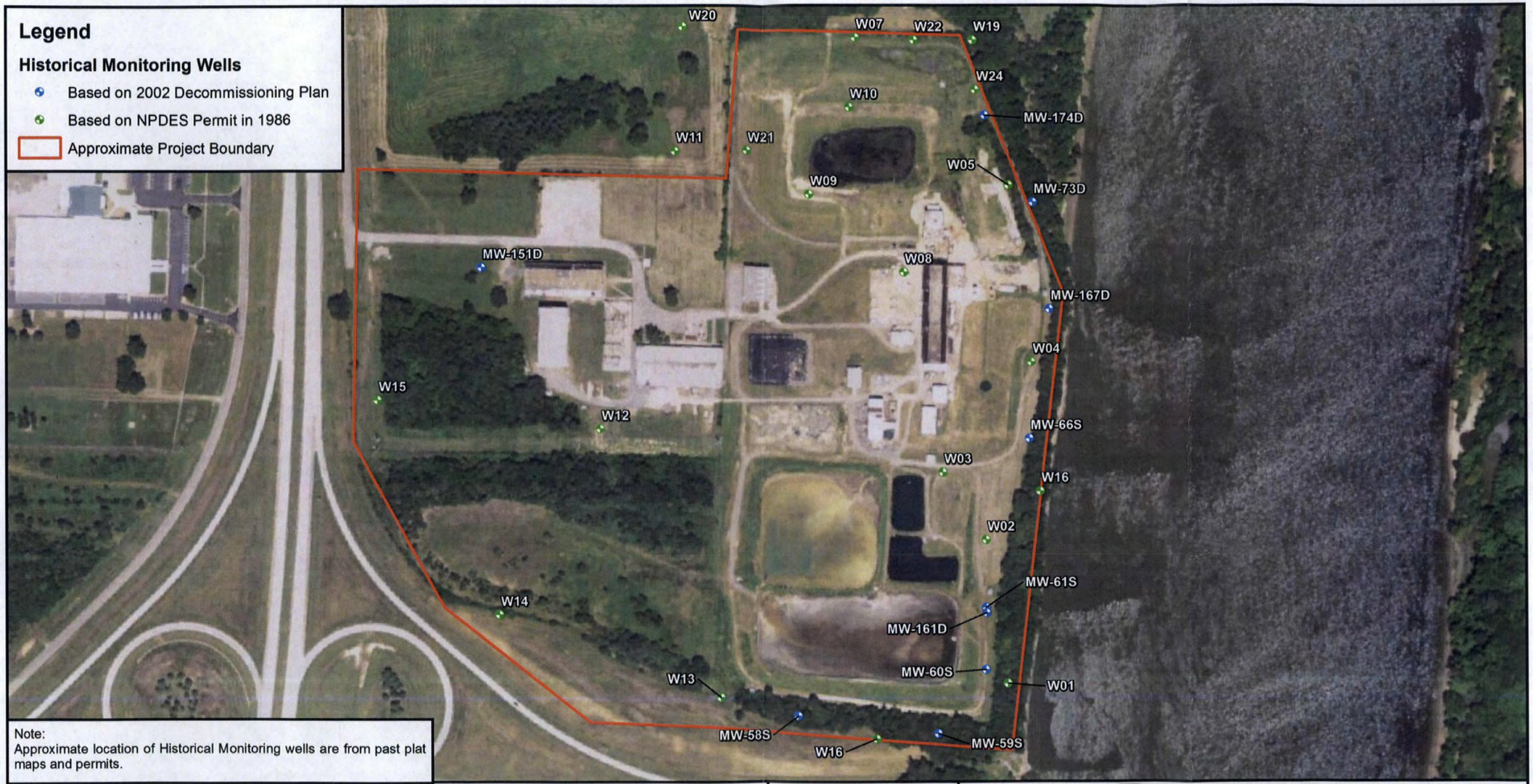
Figure 4.3: Historical Site Features 1979-1991

Source: 1987 Aerial - Oklahoma Water Resource Board

Prepared by: A. Couch; April 11, 2016

0 375 750 1,500 Feet



Note:
Approximate location of Historical Monitoring wells are from past plat maps and permits.

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
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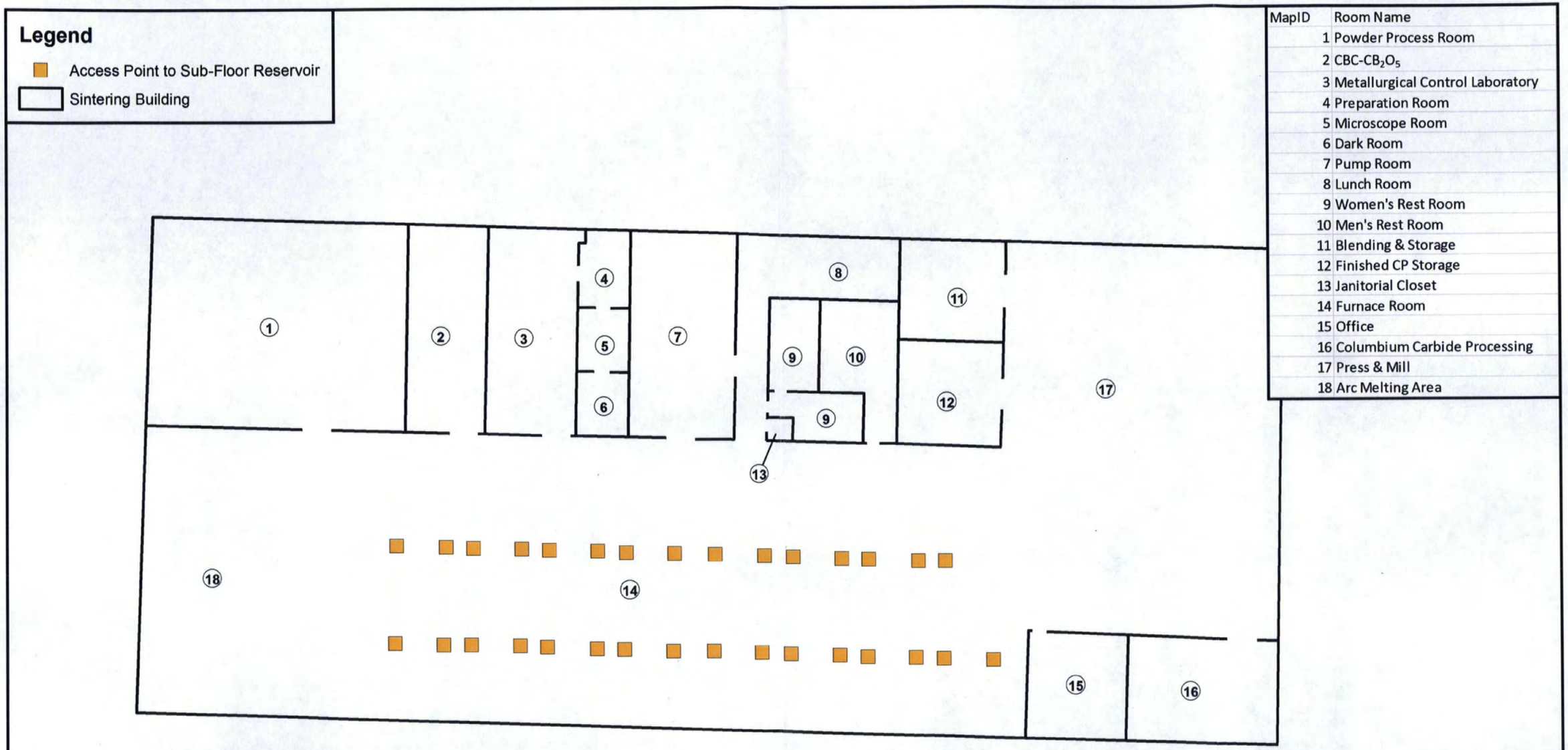
Figure 4.4: Historical Site Locations of Groundwater Monitoring Wells

Source: 2015 USDA NAIP
Muskogee County, Oklahoma
Prepared by: A. Couch; April 10, 2016

0 375 750 1,500 Feet



MapID	Room Name
1	Powder Process Room
2	CBC-CB_2O_5
3	Metallurgical Control Laboratory
4	Preparation Room
5	Microscope Room
6	Dark Room
7	Pump Room
8	Lunch Room
9	Women's Rest Room
10	Men's Rest Room
11	Blending & Storage
12	Finished CP Storage
13	Janitorial Closet
14	Furnace Room
15	Office
16	Columbium Carbide Processing
17	Press & Mill
18	Arc Melting Area

Prepared for: FMRI, Inc.

Subject Property:
Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

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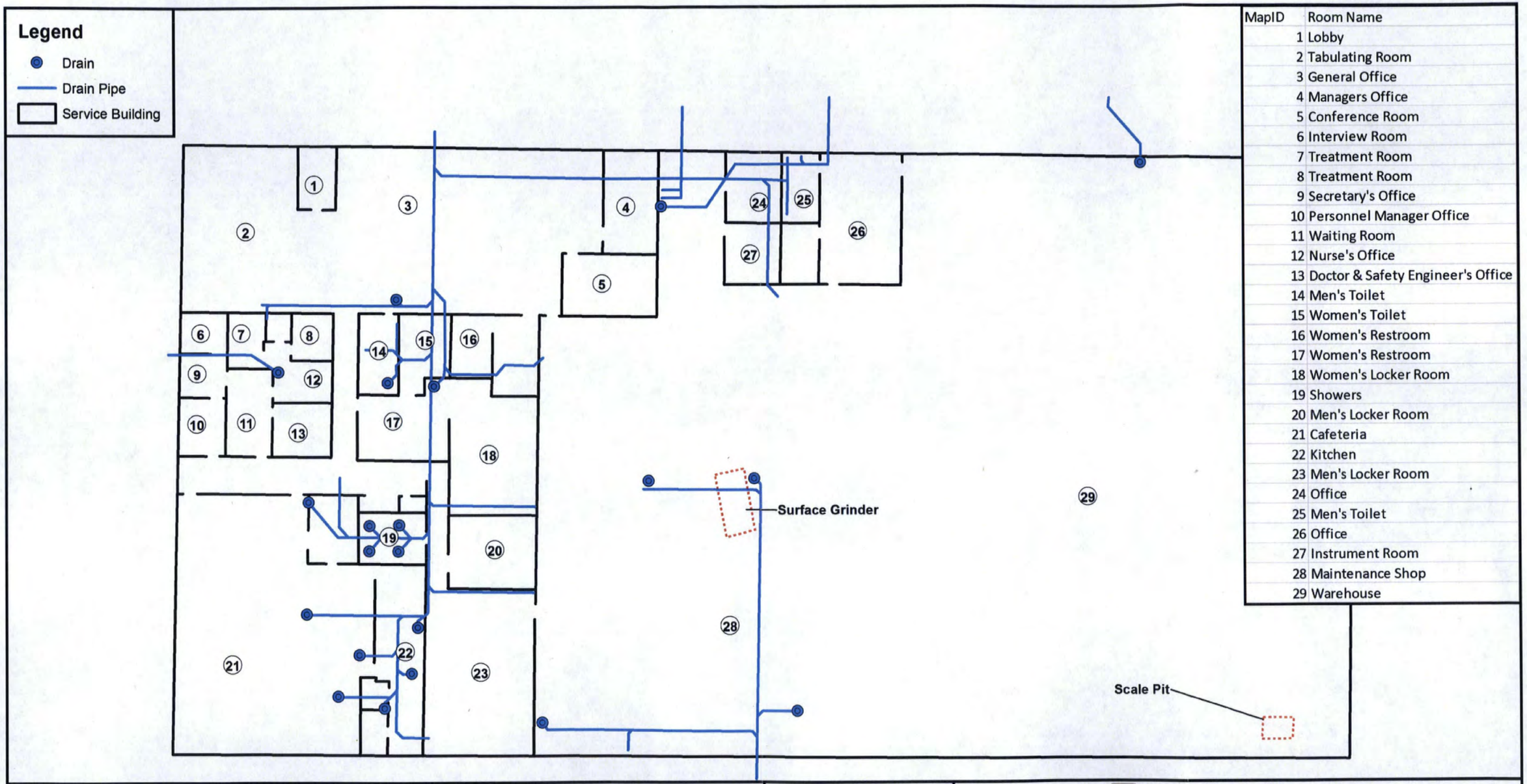
Figure 5.1: Sintering Building Site Plan

Source: Enercon Services, Inc.

Prepared by: A. Couch; March 29, 2016

0 25 50 100 Feet



MapID	Room Name
1	Lobby
2	Tabulating Room
3	General Office
4	Managers Office
5	Conference Room
6	Interview Room
7	Treatment Room
8	Treatment Room
9	Secretary's Office
10	Personnel Manager Office
11	Waiting Room
12	Nurse's Office
13	Doctor & Safety Engineer's Office
14	Men's Toilet
15	Women's Toilet
16	Women's Restroom
17	Women's Restroom
18	Women's Locker Room
19	Showers
20	Men's Locker Room
21	Cafeteria
22	Kitchen
23	Men's Locker Room
24	Office
25	Men's Toilet
26	Office
27	Instrument Room
28	Maintenance Shop
29	Warehouse

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

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ENERCON

Figure 5.2: Service Building Site Plan

Source: Enercon Services, Inc.

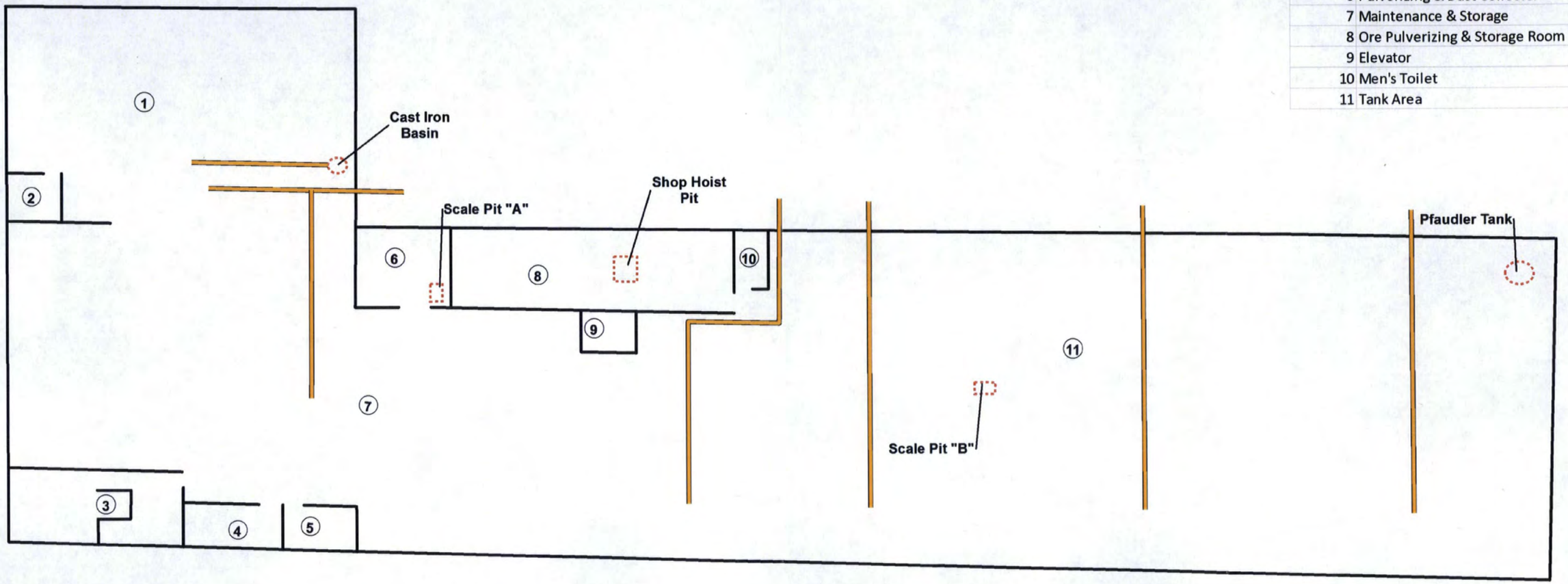
Prepared by: A. Couch; March 29, 2016

0 25 50 100 Feet

Legend

- Trench Drains
- Chem "A" Building

Map ID	Room Name
1	Boiler Room
2	Office
3	Men's Locker Room
4	Stair Well
5	Lunch Room
6	Pulverizing & Dust Collector
7	Maintenance & Storage
8	Ore Pulverizing & Storage Room
9	Elevator
10	Men's Toilet
11	Tank Area



Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

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ENERCON

Figure 5.3: Chem "A" Building Site Plan

Source: Enercon Services, Inc.

Prepared by: A. Couch; April 10, 2016

0 25 50 100 Feet

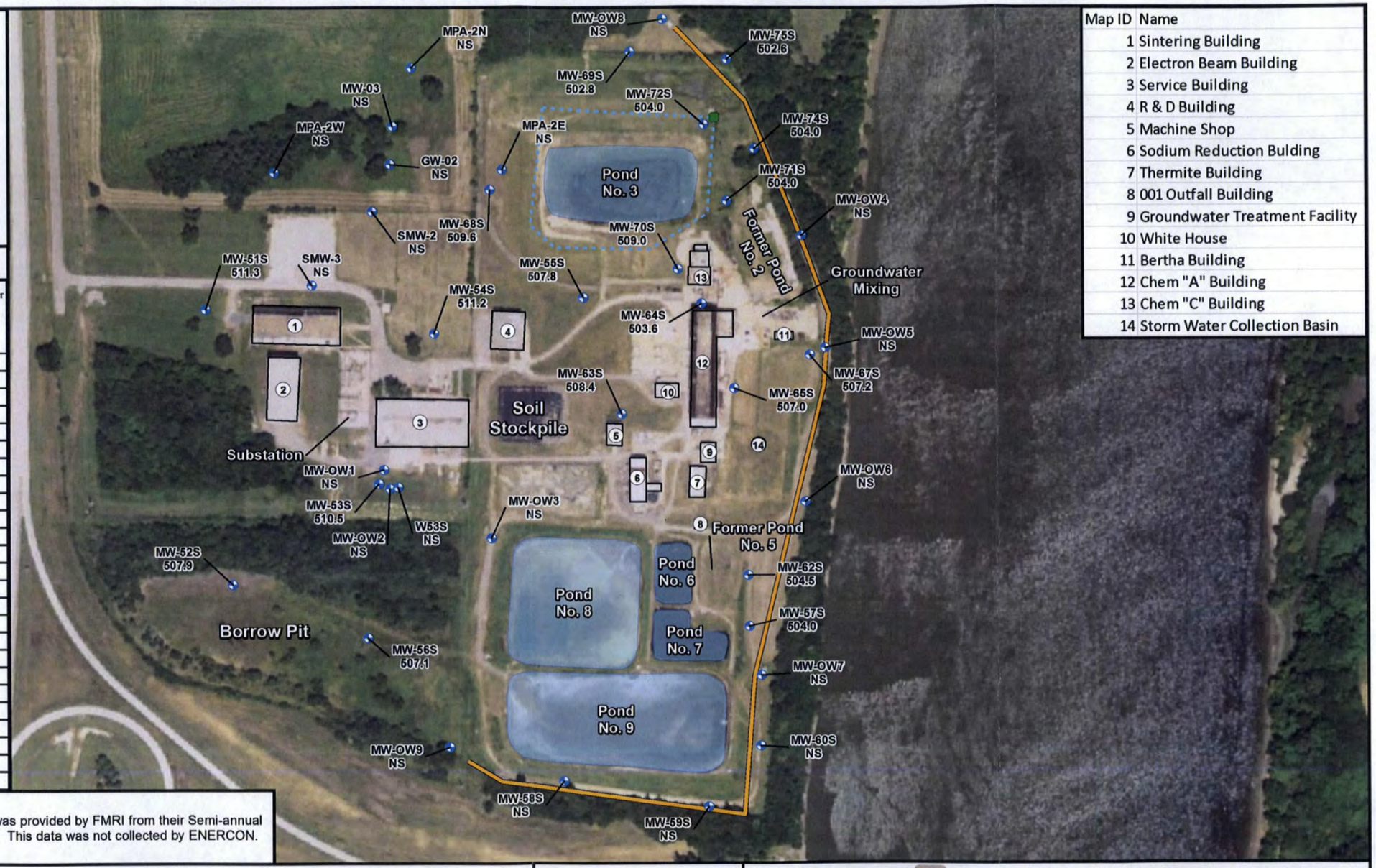
Legend

- Old French Drain Sump
- Monitoring Wells
- Old French Drain
- Groundwater Interceptor Trench
- Ponds
- Buildings

NS = Not Sampled

Monitoring Well Number	Screened Interval (ft bgs)[3]	Ground Surface Elevation (ft amsl)[1]	Depth to Groundwater (ft bgs)[3]	Groundwater Elevation (ft amsl)[3]
MW-51S	13.0-35.0[2]	540.9	31.8	29.6
MW-52S	8.0- 18.0	524.28	18	16.4
MW-53S	18.5-33.5	537.7	33.5	27.2
MW-54S	15.0-30.0	531.8	30	20.6
MW-55S	7.5-22.5	524.6	22.5	16.8
MW-56S	8.0- 18.0	521.89	18	14.8
MW-57S	4.0- 19.0	522.42	19	18.4
MW-58S	8.0-23.0	524.47	23	NM
MW-59S	4.0- 15.5[3]	515.66	15.5	NM
MW-60S	7.0- 17.0	519.88	17	NM
MW-61S	4.0-21.5[3]	522.48	21.5	NM
MW-62S	4.0-20.2[3]	522.66	20.2	18.2
MW-63S	14.5-33.5[3]	534.32	33.5	25.9
MW-64S	16.0- 31.0	532.5	31	28.9
MW-65S	16.5- 31.5[3]	533.55	31.5	26.6
MW-66S	5.0- 22.0[3]	520.83	22	NM
MW-67S	7.5-26.0[3]	526.93	26	19.7
MW-68S	12.0-26.8	527.78	26.8	18.2
MW-69S	3.5- 13.5	515.51	13.4	12.7
MW-70S	12.0- 32.0[3]	533.45	32	24.5
MW-71S	9.0-24.0	526.91	24	22.9
MW-72S	3.5- 19.5[3]	512.12	19.5	8.1
MW-73S	3.5- 14.0[3]	519.82	14	NM
MW-74S	7.0- 17.0	518.62	17	14.6
MW-75S	4.0-9.0	510.81	9	8.2

Note:
The depth to water information used in the figure was provided by FMRI from their Semi-annual Sampling event that occured on October 14, 2015. This data was not collected by ENERCON.



Map ID	Name
1	Sintering Building
2	Electron Beam Building
3	Service Building
4	R & D Building
5	Machine Shop
6	Sodium Reduction Bulding
7	Thermite Building
8	001 Outfall Building
9	Groundwater Treatment Facility
10	White House
11	Bertha Building
12	Chem "A" Building
13	Chem "C" Building
14	Storm Water Collection Basin

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

N
W E
S

1:3,500

ENERCON

Figure 6.1: 2nd Semi-Annual Sampling 2015 Groundwater Level Data Measured On 10-14-2015 As Provided By FMRI

Source: 2015 USDA NAIP
Muskogee County, Oklahoma
Prepared by: A. Couch; April 11, 2016

0 375 750 1,500 Feet

Map ID	Name
1	Sintering Building
2	Electron Beam Building
3	Service Building
4	R & D Building
5	Machine Shop
6	Sodium Reduction Bulding
7	Thermite Building
8	001 Outfall Building
9	Groundwater Treatment Facility
10	White House
11	Bertha Building
12	Chem "A" Building
13	Chem "C" Building & Annex
14	Storm Water Collection Basin

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

N
W E
S

1:3,500

ENERCON

Figure 2: Current Day Site Features

Source: 2015 USDA NAIP
Muskogee County, Oklahoma

Prepared by: A. Couch; April 10, 2016

Feet
0 375 750 1,500

From Terracon Report Dated 4/23/2015

- Existing Monitoring Well with TCE Concentrations in µg/L
- Soil Boring/Temp. Monitoring Well From Current Site Investigation with TCE Concentrations in µg/L
- Temp. Monitoring Well From Previous ODEQ Site Investigationwith TCE Concentrations in µg/L
- Monitoring Wells - Not Sampled for TCE

Boring/Well	Date Sampled
SMW-2	3/26/2015
SMW-3	3/26/2015
MW-51S	3/26/2015
W53S	3/26/2015
W54S	3/26/2015
MW-01	12/2010
MW-02	12/2010
MW-03	12/2010
MW-04	12/2010
MW-05	12/2010
MPA-2W	12/2006
MPA-2N	12/2006
MPA-2N-A	12/2006
MPA-2E	12/2006
GW-02	12/2006

Map ID	Name
1	Sintering Building
2	Electron Beam Building
3	Service Building
4	R & D Building
5	Machine Shop
6	Sodium Reduction Bulding
7	Thermite Building
8	001 Outfall Building
9	Groundwater Treatment Facility
10	White House
11	Bertha Building
12	Chem "A" Building
13	Chem "C" Building
14	Storm Water Collection Basin

Legend

Ponds

Buildings

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

N
W E
S

1:2,500

ENERCON

Figure 6.2: TCE Levels from Past Investigations

Source: 2015 USDA NAIP
Muskogee County, Oklahoma

Prepared by: A. Couch; April 10, 2016

0 250 500 1,000 Feet

Legend

- Monitoring Well Concentration in µg/L
- Sump Locations
- Groundwater Interceptor Trench
- Ponds
- Buildings

Map ID	Name
1	Sintering Building
2	Electron Beam Building
3	Service Building
4	R & D Building
5	Machine Shop
6	Sodium Reduction Bulding
7	Thermite Building
8	001 Outfall Building
9	Groundwater Treatment Facility
10	White House
11	Bertha Building
12	Chem "A" Building
13	Chem "C" Building
14	Storm Water Collection Basin

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

N
W E
S

1:3,500

ENERCON

Figure 6.3: MIBK Values (1st Semi Annual Sampling 4/15/2015)

Source: 2015 USDA NAIP
Muskogee County, Oklahoma
Prepared by: A. Couch; April 10, 2016

0 375 750 1,500 Feet

Map ID	Name
1	Sintering Building
2	Electron Beam Building
3	Service Building
4	R & D Building
5	Machine Shop
6	Sodium Reduction Bulding
7	Thermite Building
8	001 Outfall Building
9	Groundwater Treatment Facility
10	White House
11	Bertha Building
12	Chem "A" Building
13	Chem "C" Building
14	Storm Water Collection Basin

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

N
W E
S

1:3,500

ENERCON

Figure 6.4: MIBK Values (2nd Semi Annual Sampling 9/30/2010)

Source: 2015 USDA NAIP
Muskogee County, Oklahoma
Prepared by: A. Couch; April 10, 2016

Feet
0 375 750 1,500

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

N
W E
S

1:20,000

ENERCON

Figure X: Water Wells Surrounding the Fansteel Property Based on OWRD Records Review

Prepared by: A. Couch; April 11, 2016

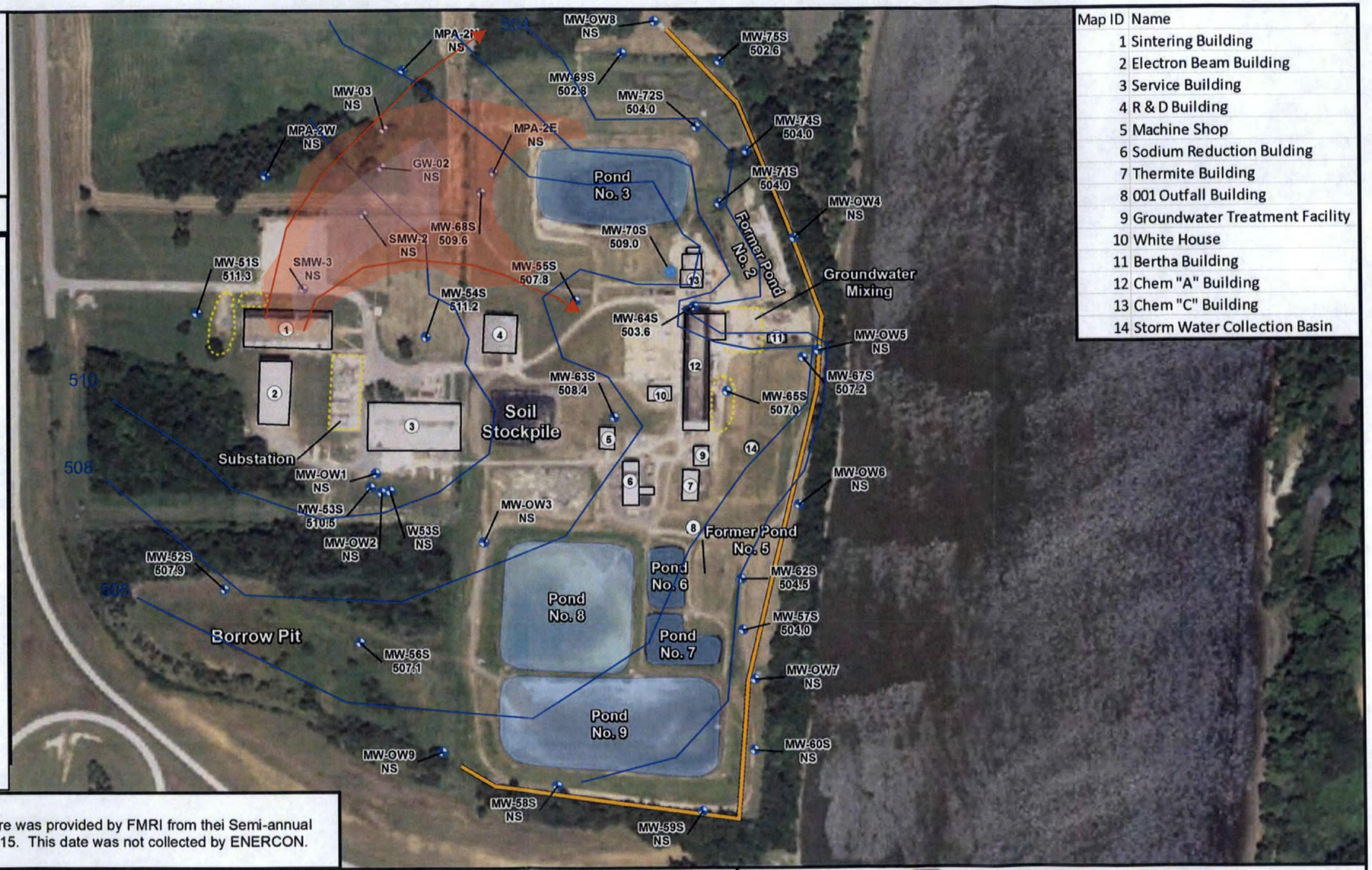
0 0.25 0.5 1 Miles

Legend

- Monitoring Wells
- Groundwater Interceptor Trench
- Ponds
- Buildings

NS = Not Sampled

CI - 2 feet



Map ID	Name
1	Sintering Building
2	Electron Beam Building
3	Service Building
4	R & D Building
5	Machine Shop
6	Sodium Reduction Bulding
7	Thermite Building
8	001 Outfall Building
9	Groundwater Treatment Facility
10	White House
11	Bertha Building
12	Chem "A" Building
13	Chem "C" Building
14	Storm Water Collection Basin

Note:
The depth to water information used in the figure was provided by FMRI from thei Semi-annual Sampling even that occured on October 14, 2015. This date was not collected by ENERCON.

Prepared for: FMRI, Inc.

Subject Property:

Former Fansteel Site
Sections 17 & 16, T15N R 19E
10 Tantalum Place, Muskogee County, Oklahoma

N
W E
S

1:3,500

ENERCON

Conceptual TCE Plume Map Overlying Water Table Map

Source: TCE Data from Terracon, 2015
Water Table Data collected 10/14/2015

0 375 750 1,500 Feet

Appendix A

Photo Log from March 16, 2016 Site Inspection

Photo 1

Row of concrete patches where portions of the former cooling water recirculation system extended beneath the concrete floor. View to the west from the eastern portion of the building. Potential for former use of chromates used for corrosion inhibition.

Photo 2

Piping of former cooling water recirculation system (red pipe). View to the west from the eastern portion of the building.

Photo 3

Portion of the former cooling water recirculation piping (red pipe in background), access to the below ground portion of the system (within yellow railing), and a floor drain (bottom) within the former boiler room of the Sintering Building.

Photo 4

Concrete patch leading to two pipe cleanout covers located on the north side of the building. View to the north from inside the metal fabrication shop.

Photo 5

Pipe cleanout covers located along the north side of the building referenced in Photo 4.

Photo 6

Electric hoist located in the metal fabrication shop.

Photo 7

Former steam cleaning pad located near the southeast portion of the building. View to the southwest.

Photo 8

Portions of old 9x9 tile flooring. Potential asbestos-containing building material.

Photo 9

View of current powder coating operations and location of metal large floor grates (right) located in at the east end of the Sintering Building. View to the north.

Photo 10

View of current powder coating operations. View to the west.

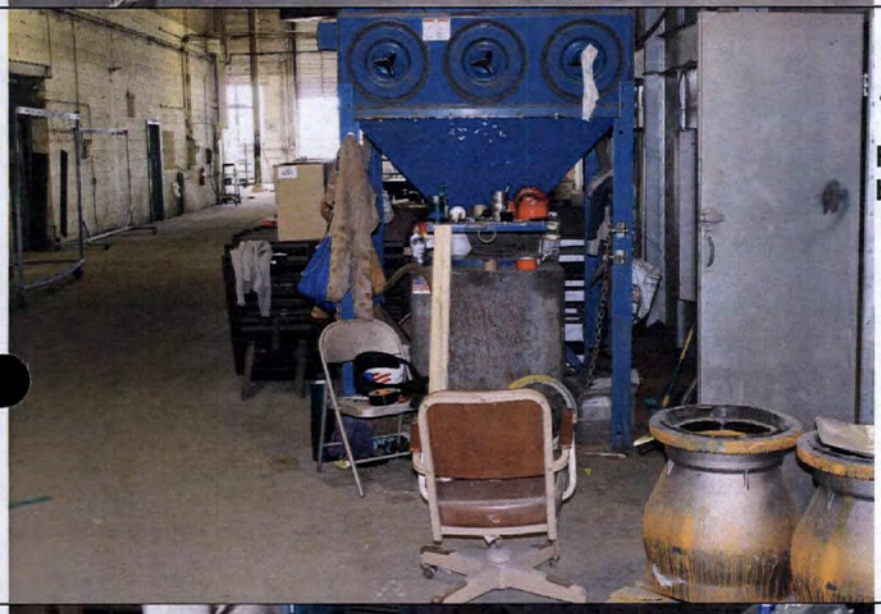


Photo 11

Filter baghouse adjacent to powder coat booth.

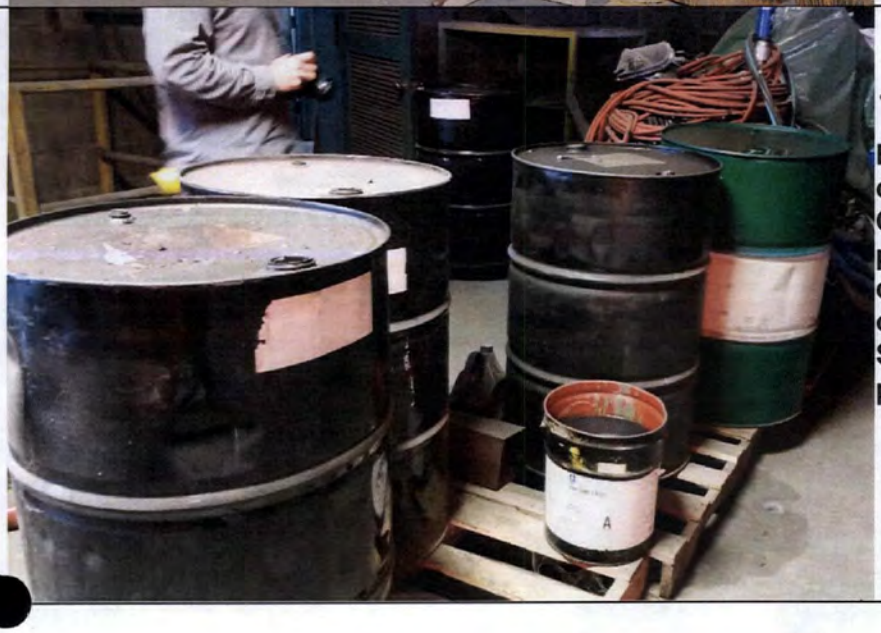


Photo 12

Bulk chemical storage associated with current powder coating operations. Chemicals observed included used motor oil, polyurethane spray foam components, dichloromethane based paint stripper, and an open 5-gallon bucket of unidentified liquid. Solvent odors were present in areas of powder coat spraying.

Photo 13

View of the metal fabrication shop located in the northwest corner of the Sintering Building.

Photo 14

Oil staining in concrete and seams around equipment in the metal fabrication shop.

Photo 15

East-facing view along the north side of the Sintering Building. The concrete pads on the central and left portion of the photograph were the locations of the former recycled-oil above-ground storage tanks.

Photo 16

View to the west along the south side of the Sintering Building, showing the northern portion of the Electron Beam Building. The former steam cleaning pad is visible on the left.

Photo 17

Storage of miscellaneous items along the south side of the building. Rust staining and discoloration of the concrete walkways and driveways surrounding the Sintering Building.

Photo 18

Monitoring well located near the northwest corner of the Sintering Building.

Photo 19

Observation well located along the north-central side of the Sintering Building.

Photo 20

Observation well located near the southeast corner of the Sintering Building (bottom center of photo).

Photo 21

Observation wells located along the south side of the Sintering Building (dark spot in concrete near the center of photo and at the person in the background). View to the east.

Photo 1

Interior of the Electron Beam building looking south from the north end. Concrete patch of former pit visible along the left side of the photograph.

Photo 2

Interior rooms along the west side of the building.

Photo 3

Crumbling tile floor and floor drain located in the restroom.

Photo 4

Containers of polyurethane spray foam insulation components stored along the eastern interior wall of the Electron Beam Building.

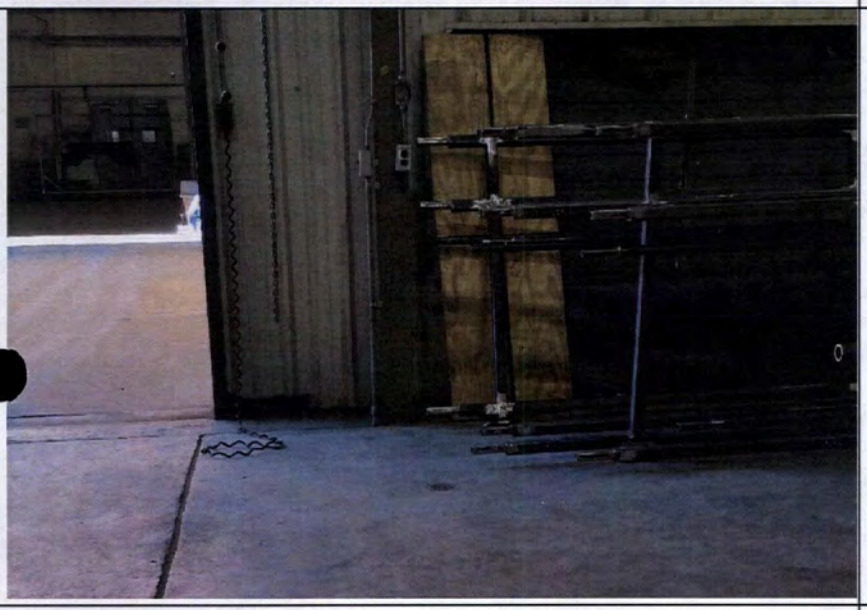


Photo 5

Floor drain located east of the bay door at the north end of the Electron Beam Building.

Photo 1

Concrete lid of out-of-use septic tank (lower left) and an empty IBC (right) located at the southwest corner of the Service Building.

Photo 2

Sand blasting area located on the south side of the Service Building.

Photo 3

Air compressor shed and drum dispensing and containment unit located on the south side of the Service Building.

Photo 4

Close up of drum dispensing and containment unit. The contents of the drums were unknown but were labeled "Part 1" and "Part 2." The secondary containment contained apparent rain water.

Photo 5

Welding gas and propane cylinder storage at the northeast corner of the Service Building.

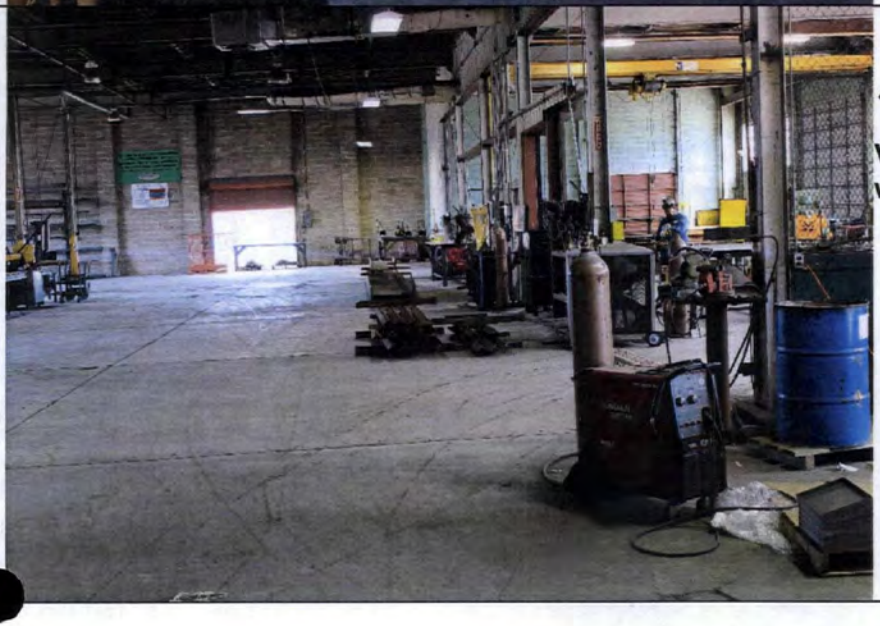


Photo 6

View of current metal fabrication activities within the Service Building.

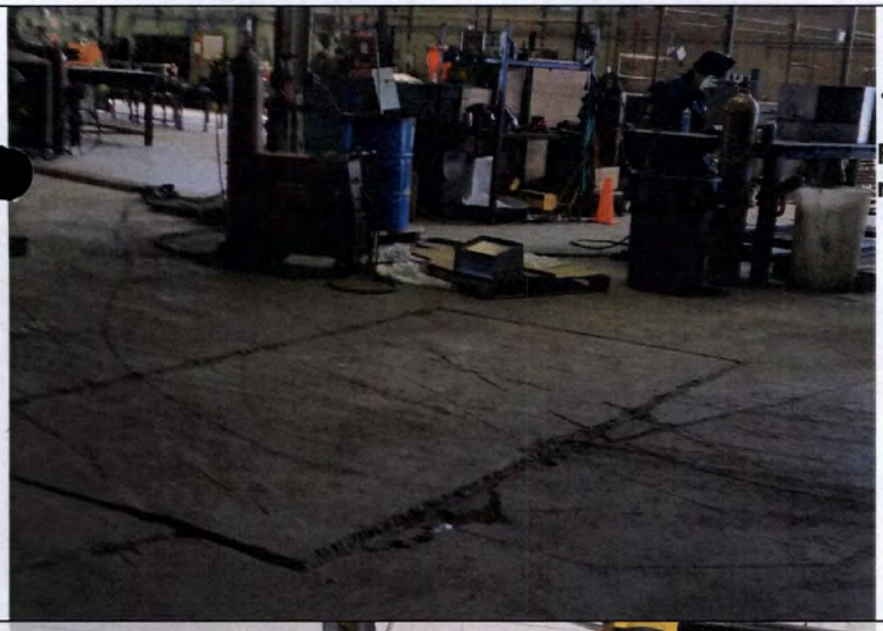


Photo 7

Former surface grinder foundation located near the center of the Service Building.

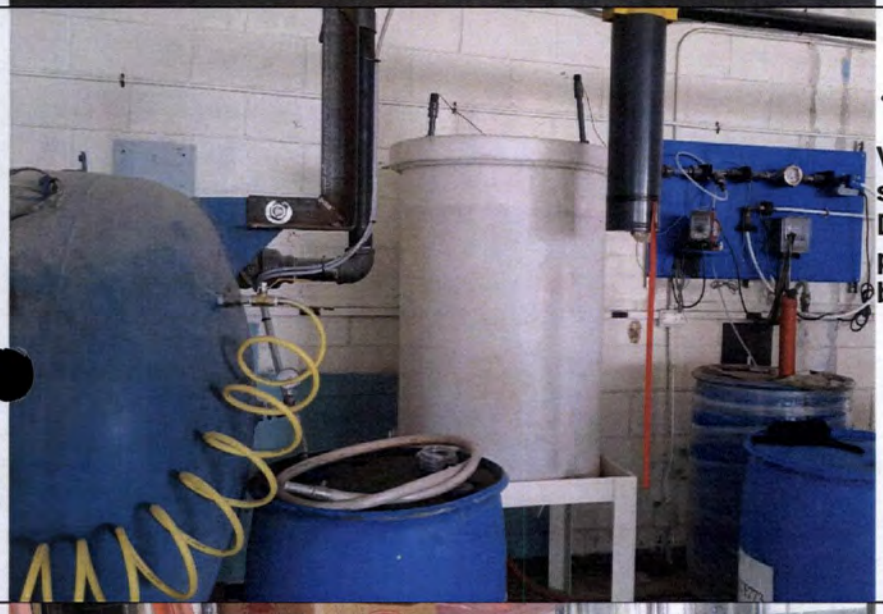


Photo 8

View of process tanks and equipment in the spray painting area of the Service Building. Drums of non-hazardous Hold Blast surface passivator which inhibits rust formation on bare metal surfaces.

Photo 9

Chemical storage including 5-gallon containers of mineral spirits located in the spray painting area of the Service Building.

Photo 10

Concrete patches along utilities apparently associated with former nurse's office and treatment rooms located in the northwest portion of the Service Building. This area is currently leased by Advantage TerraFab for apparent spray painting operations.

Photo 11

Round metal plate covering former electrical outlets of the underfloor electrical duct system servicing former offices located in the northwest portion of the Service Building. The area is currently leased by Advantage TerraFab.

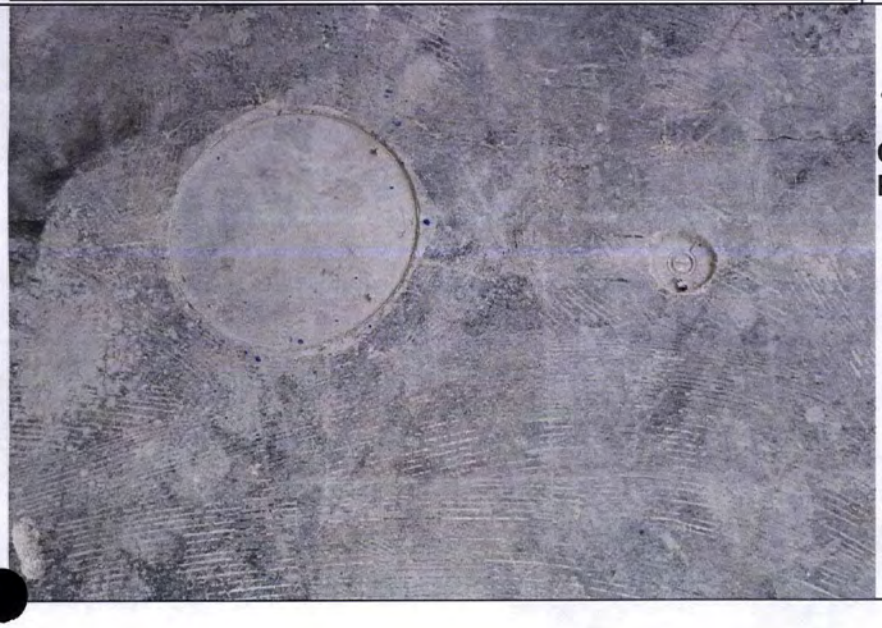


Photo 12

Close of view of the metal plates referenced in Photo 11.

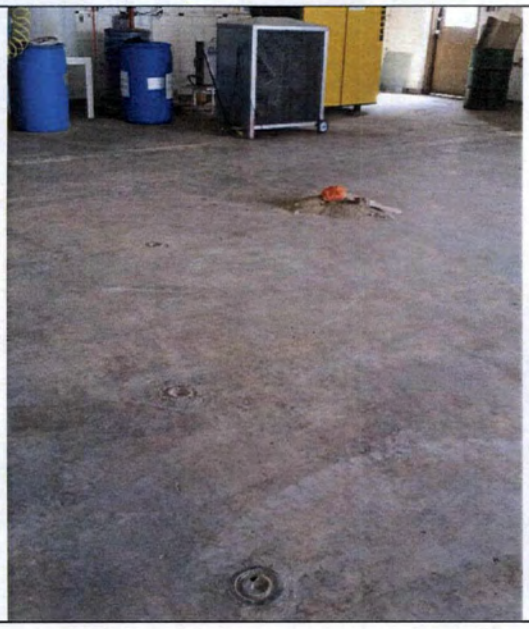


Photo 13

Floor drain cover in the area of the apparent former cafeteria and kitchen, located in the southwestern portion of the Service Building.

Photo 1

Floor drain within the R&D Building. View to the south.

Photo 2

Former R&D Building sump connected to drain located on the north side of the building. Pond 3 is visible in the background, beyond the railroad tracks.

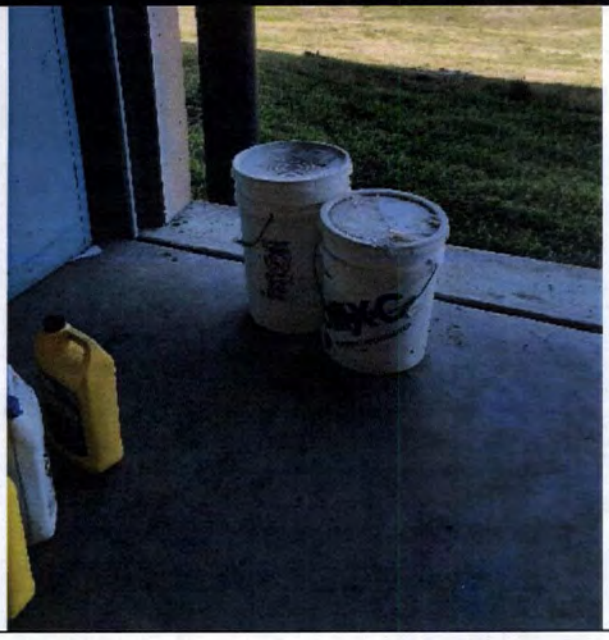


Photo 3

Various chemical containers stored within the R&D Building. Buckets of caustic neutralizer shown in center of photo, with containers of anti-freeze shown in the lower left corner of the photo.

Photo 4

Additional containers of anti-freeze stored within the R&D Building, and various other non-chemical items.

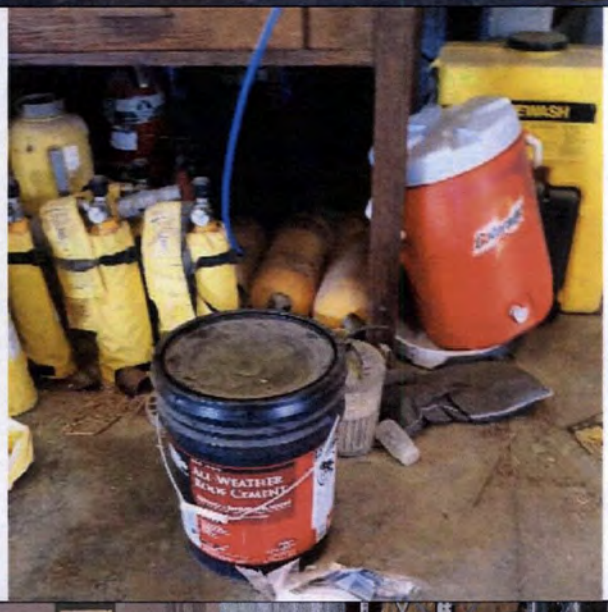


Photo 5

Bucket of roof cement stored within the R&D building with SCBA air tanks, a fire extinguisher, an emergency eye wash station, etc., in the background.

Photo 6

View of a bucket of hydraulic fluid and drum containing used oil stored near the east door of the R&D Building. Minor floor staining was noted around the used oil container.

Photo 7

View of a chemical spray tank stored along the eastern side of the R&D Building.

Photo 8

View of a loader stored along the eastern side of the R&D Building with minor surface staining beneath. View to the north. Transformers were observed on top of the platform visible on the exterior of the northeast corner of the building. No "non-PCB" stickers were noted during the site inspection.

Photo 9

View of a propane tank located near the southeast corner of the R&D Building. View to the west.

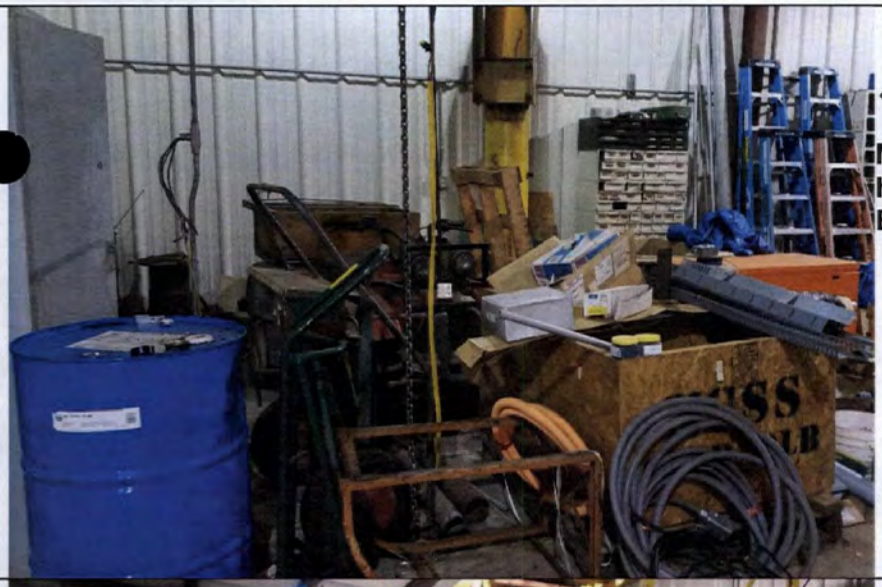


Photo 1

Miscellaneous equipment and a drum of hydraulic fluid stored within the Machine Shop Building.

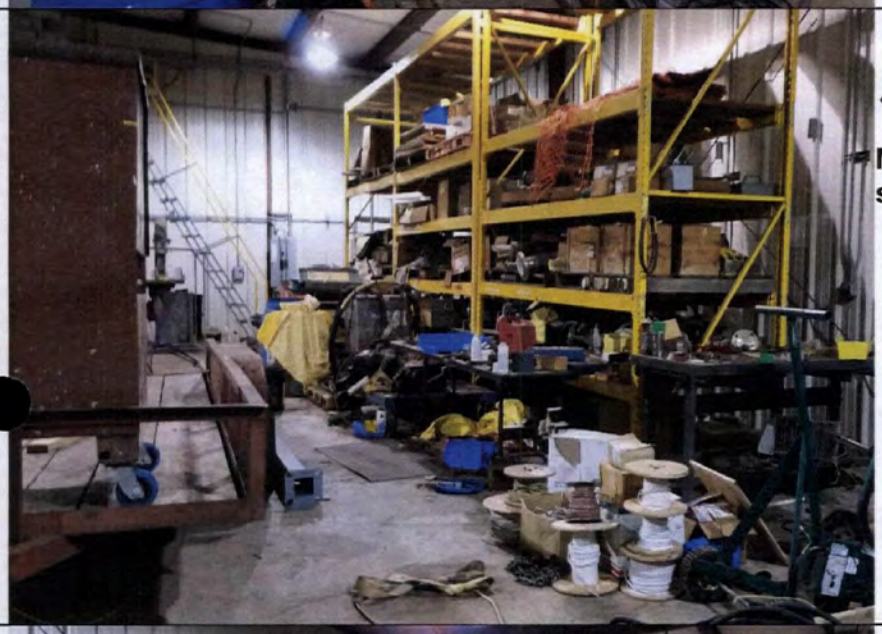


Photo 2

Miscellaneous equipment and chemical storage within the Machine Shop Building.

Photo 3

Miscellaneous equipment and chemical storage within the Machine Shop Building.

Photo 4

Miscellaneous equipment, machining equipment, and chemical spray tank stored within the Machine Shop Building.

Photo 5

Hydraulic fluid stored on the shelves along the east wall of the Machine Shop Building.

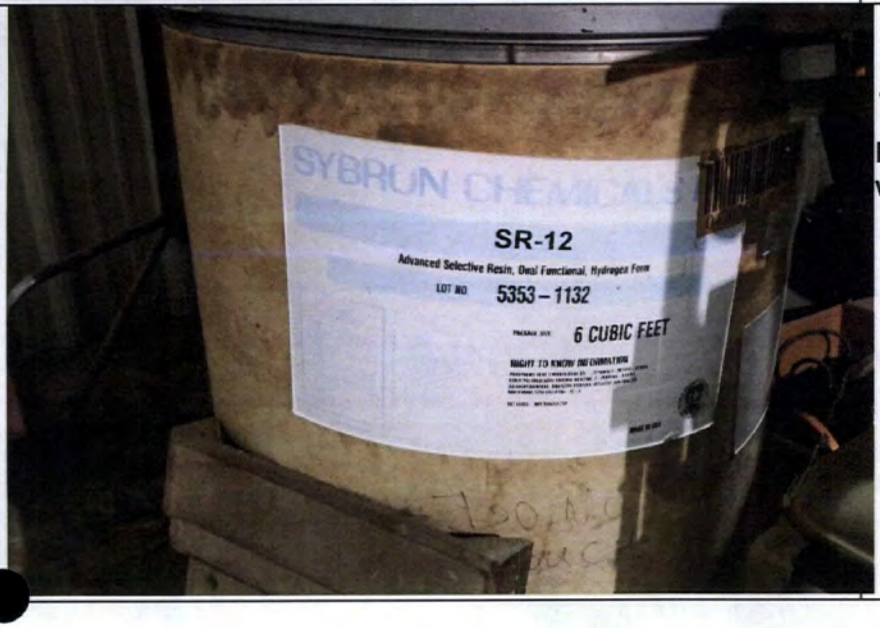


Photo 6

Resin storage container located along the east wall of the Machine Shop Building.

Photo 1

View of fuel ASTs located along the east side of the Sodium Reduction Building. View to the west.

Photo 2

Out-of-use diesel AST located on the east side of the Sodium Reduction Building.

Photo 3

Minor surface staining located beneath the out-of-use diesel AST.

Photo 4

View of the gasoline AST in secondary containment and a portable fuel tank located on the east side of the Sodium Reduction Building with a pad-mounted electrical transformer in the background.

Photo 5

View of apparent algal mat within the gasoline AST secondary containment located on the east side of the Sodium Reduction Building.

Photo 6

Small weep-hole noted in the northeast corner of the gasoline AST secondary containment shown in Photos 4 and 5 above and located on the east side of the Sodium Reduction Building.

Photo 7

Apparent empty drum storage along the east side of the Sodium Reduction Building. One drum was labeled as Calumet Solvent.

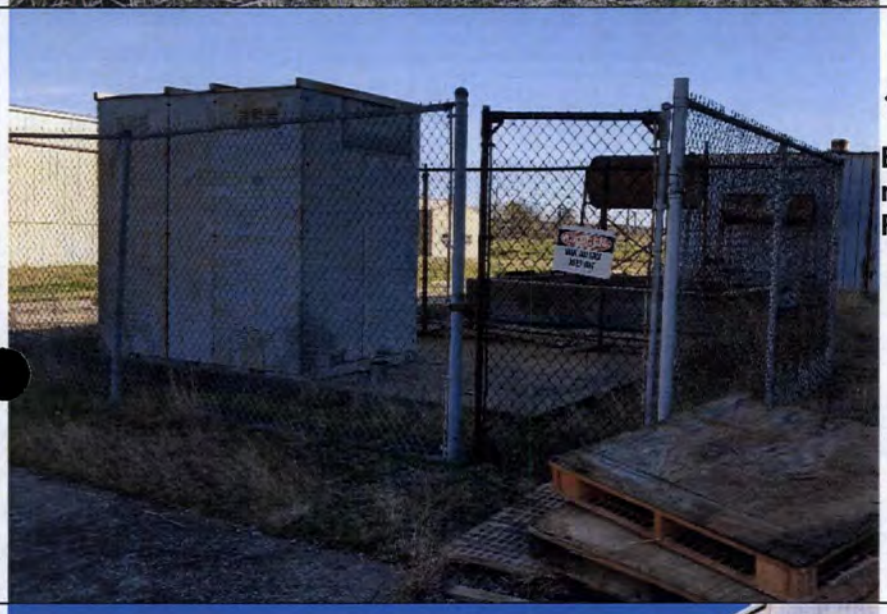


Photo 8

Electrical pad-mounted transformer located near the northeast corner of the Sodium Reduction Building.

Photo 9

Wood and metal debris pile on the west side of the Sodium Reduction Building. View to the north with the Machine Shop visible in the background.

Photo 1

Bulk bags of excavated WIP staged in the Thermite Building, pending transportation and disposal.

Photo 2

Drum of wide spectrum cosmetic grade microbiocide stored within the Thermite Building.

Photo 3

Bucket of hydraulic fluid stored within the Thermite Building.

Photo 1

View of file cabinets stored within the Water Treatment Facility Building.

Photo 2

View of small shed and file storage containers within the Water Treatment Facility Building. The white bulk bags were filled with cardboard file boxes full of records.

Photo 3

Floor drain located along the west side of the Water Treatment Facility Building.

Photo 1

Laboratory benches and fixtures within the Bertha Building.

Photo 2

Debris pile north of the Bertha Building pending radiological survey, sorting, and disposal or recycling. Note concrete containment wall in background. View to the northeast.

Photo 3

View of groundwater treatment mixing pits located west of the Bertha Building with chemical additive storage beyond.

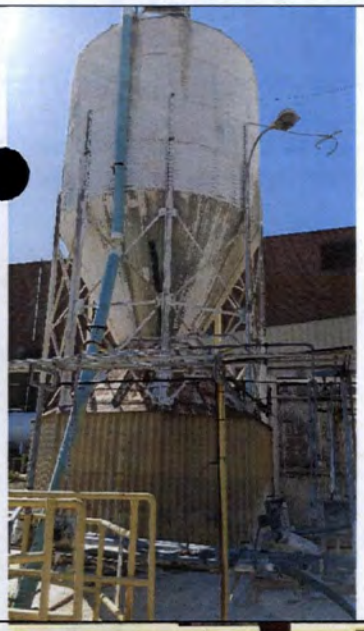


Photo 4

Calcium oxide hopper-silo located at the water treatment pits. The Chem "A" Building is visible in the background. View to the west.

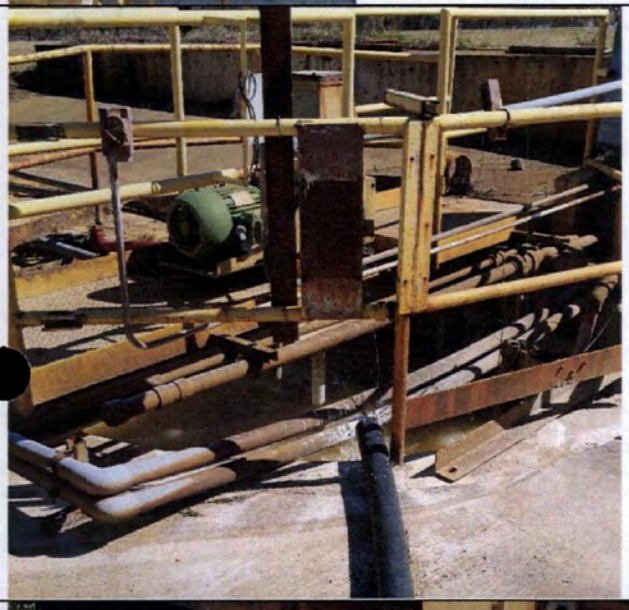


Photo 5

View of a groundwater treatment mixing pit.

Photo 6

View of groundwater agitation within one of the groundwater treatment pits.

Photo 7

Surface staining along the north side of the Bertha Building. View to the east.

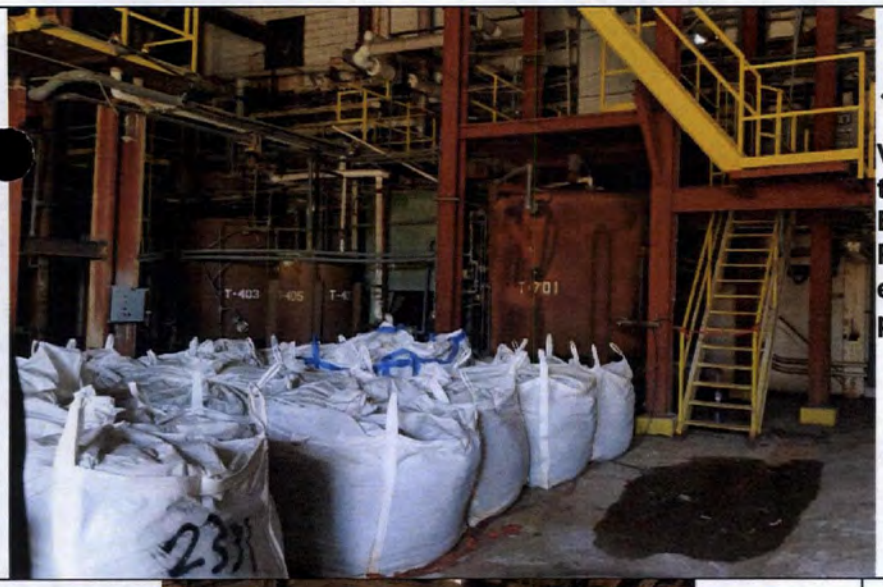


Photo 1

View of bulk bags of excavated WIP staged throughout the ground level of the Chem "A" Building, pending transportation and disposal. Portions of the former equipment used to extract and refine the tantalum/columbium product or to reprocess the WIP.

Photo 2

View of a portion of the defunct groundwater remediation system. View to the north.

Photo 3

Various chemical containers stored within the boiler room located in the northeast portion of the Chem "A" Building, pending characterization and proper disposal.

Photo 4

Drum of Calumet Solvent stored within the boiler room located in the northeast portion of the Chem "A" Building.

Photo 5

Various chemical containers stored within the boiler room located in the northeast portion of the Chem "A" Building, pending characterization and proper disposal. A bucket of gear oil is shown in this photo.

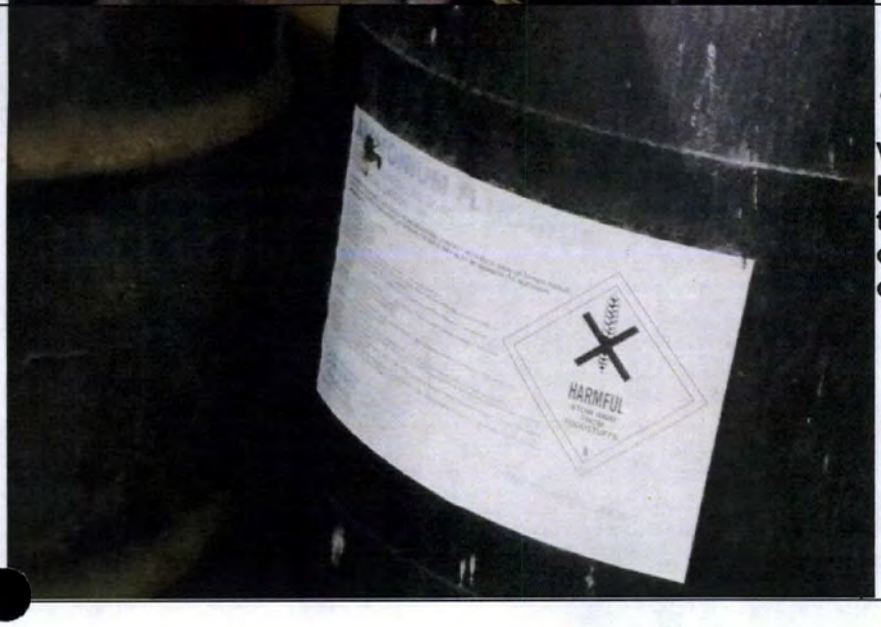


Photo 6

Various chemical containers stored within the boiler room located in the northeast portion of the Chem "A" Building, pending characterization and proper disposal. A drum of ammonium fluoride is shown in this photo.

Photo 7

Various chemical containers stored within the boiler room located in the northeast portion of the Chem "A" Building, pending characterization and proper disposal. Note the floor drain located in the middle of the chemical storage area.

Photo 8

View of the vertical boilers located within the boiler room located in the northeast corner of the Chem "A" Building.

Photo 9

View of the diesel backup generator (left) and a floor drain (lower right) located in the boiler room located in northeast corner of the Chem "A' Building.

Photo 10

View of a laboratory located within the Chem "A" Building. The drum over-pack in the background is for ongoing waste characterization, sorting, and disposal efforts.

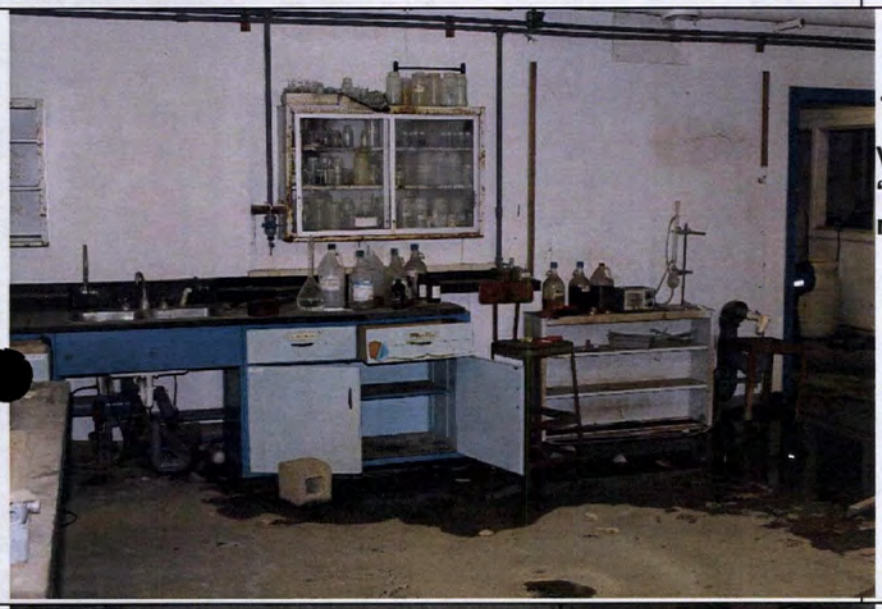


Photo 11

View of a laboratory located within the Chem "A" Building. The liquid on the floor is rainwater from the leaking roof.

Photo 12

View of deteriorated files stored within the Chem "A" Building.

Photo 13

View of the backup generator diesel AST located along the north side to the Chem "A" Building.

Photo 14

Equipment from former operations located along the north side of the Chem "A" Building.

Photo 1

View of the northern portion of the Chem "C" Building.

Photo 2

Bulk bags of excavated WIP staged in the Chem "C" Building pending transportation and disposal.

Photo 3

Scrap metal storage at the southeast corner of the Chem "C" Building. Scrap visible on the right is stored within the former cooling water tower concrete sump. Note the concrete discoloration in this area. View to the northeast.

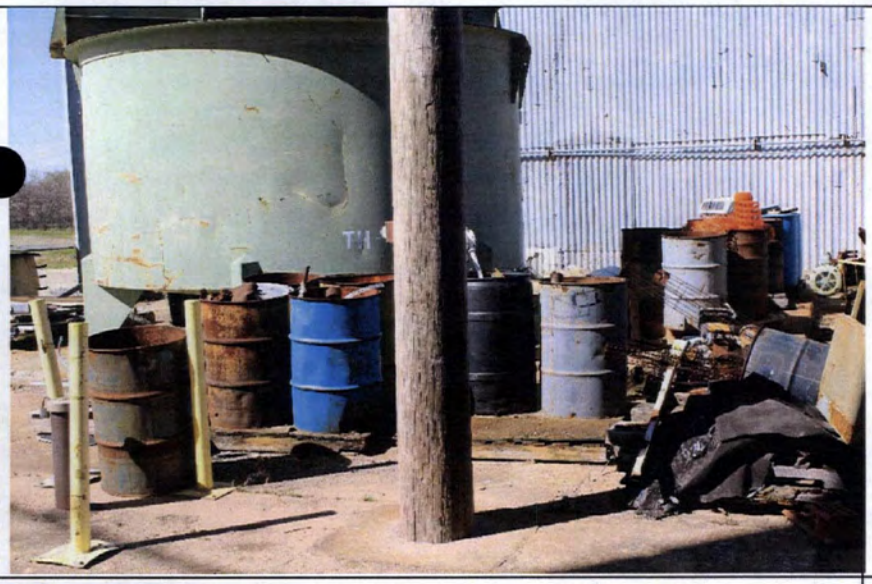


Photo 4

Out-of-use process tank and scrap metal storage at the south end of the Chem "C" Building.

Photo 1

View of the 001 Outfall Building from the northwest.

Photo 2

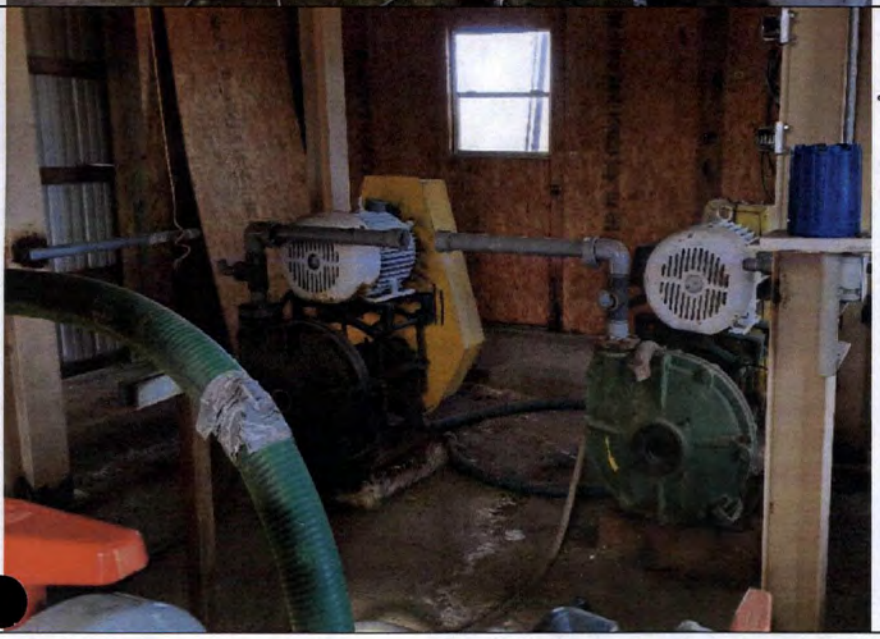


Photo 3

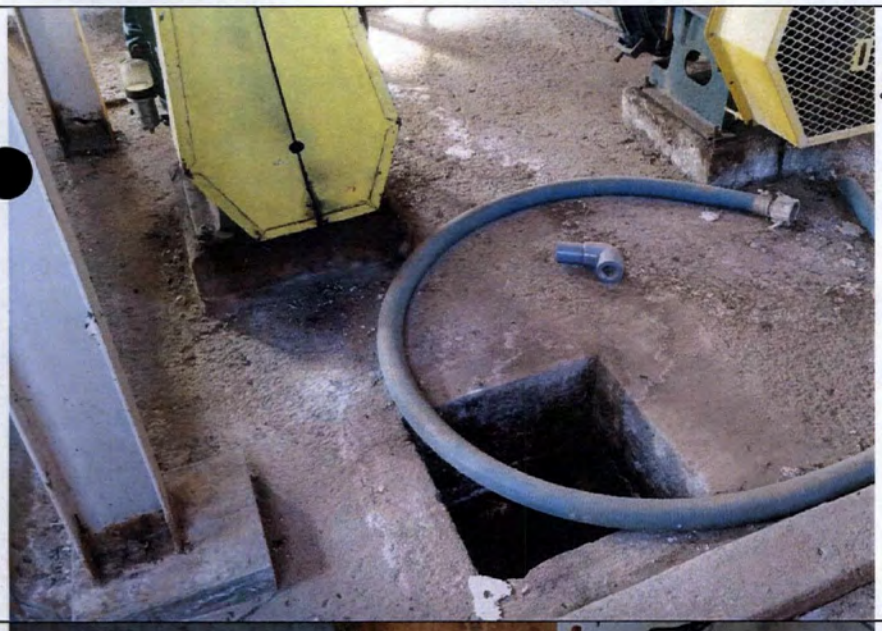


Photo 4

Photo 5

Photo 6

Photo 1

View of the excavation at Pond No. 2 showing the WIP sediment profile on the left side of the photo. View to the north.

Photo 2

View of the WIP sediment profile along the west excavation wall at Pond No. 2.

Photo 3

View of storm water contained in Pond No. 3. View to the northeast.

Photo 4

View to the north from the north-central side of Pond No. 9 showing portions of Pond No. 8 (left), Pond No. 6 (top right), and Pond No. 7 (center right).

Photo 5

View to the northeast from the north-central side of Pond No. 9 showing portions of Pond No. 6 (top) and Pond No. 7 (bottom) with the Arkansas River beyond.

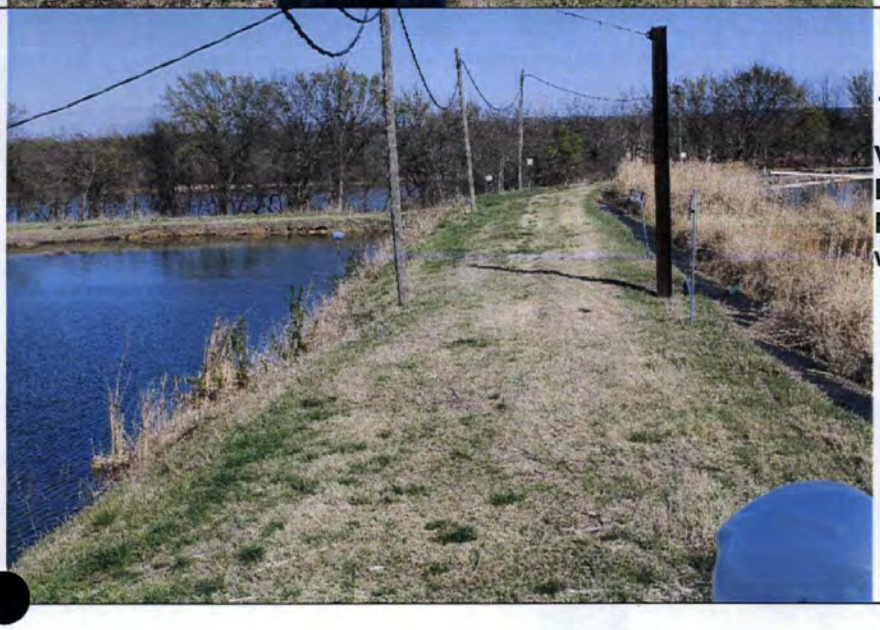


Photo 6

View to the east from the north-central side of Pond No. 9 showing the southern portion of Pond No. 7 (left) a portion of Pond No. 9 (right) with the Arkansas River beyond.

Photo 7

View to the southeast from the north-central side of Pond No. 9 showing a portion of Pond No. 9 with US Highway 62 and the OG&E Power Plant beyond.

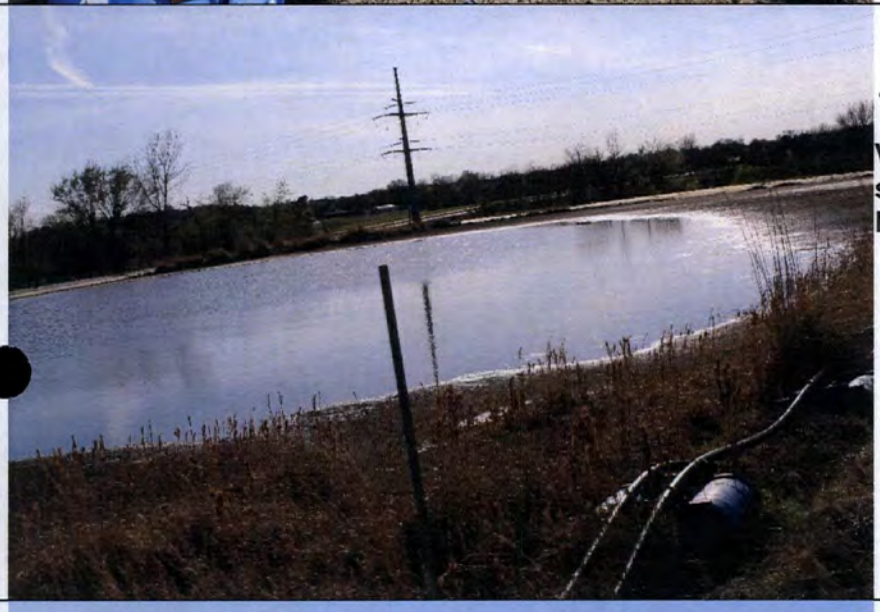


Photo 8

View to the southwest from the north-central side of Pond No. 9 showing a portion of Pond No. 9 with US Highway 62 beyond.

Photo 9

View to the northwest from the north-central side of Pond No. 9 showing a portion of Pond No. 8 with the Electron Beam Building and the Service Building beyond.

Photo 1

French drain sump located northeast of Pond No. 3.

Photo 2

View down French drain sump located northeast of Pond No. 3.

Photo 3

Typical observation well located along the groundwater recovery trench.

Photo 4

Slab located west of the Chem "A" Building with the R&D Building beyond. View to the west.

Photo 5

View of the exposed northeast corner of the soil stockpile. Soils are from the excavation and installation of the groundwater interceptor trench. View to the southeast with the Machine Shop and Sodium Reduction Buildings beyond.

Photo 6

View of the 001 Outfall Building from the northwest.

Photo 7

View of former process component and other discarded materials located southwest of the Service Building.

Photo 8

View of dumpster located southwest of the Service Building.

Photo 9

View of the former ore barrel and ore residue barrel storage lot south of the Service Building showing two groundwater monitoring wells (right of the two men).

Photo 10

View of the on-site electrical substation located east of the Electron Beam Building. View to the south.

Photo 11

Out-of-use process tanks stored along the end of the rail spur located northwest of the Chem "A" Building.

Photo 12

Gravel from former gravel lined secondary containment used for past soil remedial activities.

Appendix B

List of Reviewed Files Provided by Client and ODEQ

File Name	Pages	Date
Site Hydrology Study	43	May, 1983
Water Resources Research (Slug Test Guidelines)	6	Jun-76
Letter from Fansteel to U.S. EPA Enforcement	1	19-Mar-89
Facility Location Plat Maps	2	
Newspaper clippings		12-19 89 & 1-9-90
Letter from Kirkpatrick & Lockhart to U.S. EPA (Fansteel willingness to develop remediation plan)	3	5-Oct-89
Project Outline/ Site Investigation/Remedial Alternative Study (attached to 10-5-89 Letter)	6	No Date
OWRA Telephone Memo (Please call)	1	22-Jun-81
OWRA Telephone Memo (Summary of Issues)	1	23-Jun-82
Record of Communication Fansteel Metals (discussing enforcement conference in Dallas, TX)	1	24-Jun-82
Aerial photo	25	15-Jul-87
Proposed Sampling and Analysis Plan Settling Ponds	3	No date
Letter to OWRB from Earth Sciences Consultants representing Fansteel - containing historical perspective, discussion of sampling plan, monitor well data	1	24-Nov-89
Historical Perspective of Ponds Nos. 5, 6, 7, 8 &9	3	No Date
Discussion of Sampling Plan	1	No Date
Discussion of Groundwater Monitoring Well Data	6	No Date
Letter from Fansteel to U.S. EPA (Carlile to EPA)(Discussing projects in consent decree)	3	14-Jul-89
Letter from Fansteel to U.S. EPA (Carlile to EPA) (Discussing liner failure)	6	7-Jul-89
"Figure 7" Groundwater hydrographs	2	
EPA Record of Communication - on discovery of Fansteel Outfall		22-Mar-82
Fansteel Metals -note for Mr. Peirrett		22-Mar-82
Record of Communication - Ken Holley, verifying validity of two previous inspections	13	22-Mar-82
Site Plans Depicting drainage areas that do not leave Fansteel site.	5	16-Sep-87
Aerial photo Muskogee	2	29-Jan-73
Aerial Photo Muskogee	3	9-May-78
OWRB NPDES Inspection report by Jerry Black	57	17-Aug-81
OK Water Resources Board - Lab analysis	1	19-Mar-81
OK Water Resources Board - Lab analysis	1	26-Feb-81
OK Water Resources Board - Lab analysis	1	12-Feb-80
OK Water Resources Board - Lab analysis	1	20-Aug-80
OK Water Resources Board - Lab analysis	1	26-Feb-81
OK Water Resources Board - Lab analysis	1	2/26/1981
OK Water Resources Board - Lab analysis	1	19-Mar-81
OK Water Resources Board - Lab analysis	1	29-Jul-81
OK Water Resources Board - Lab analysis	1	29-Jul-81
OK Water Resources Board - Lab analysis	1	26-Feb-81
OK Water Resources Board - Lab analysis	1	21-Jan-81
OK Water Resources Board - Lab analysis	1	1/21/1981
OK Water Resources Board - Lab analysis	1	1/21/1981
OK Water Resources Board - Lab analysis	1	26-Feb-81
OK Water Resources Board - Lab analysis	1	26-Feb-81
OK Water Resources Board - Lab analysis	1	26-Feb-81
OK Water Resources Board - Lab analysis	1	19-Mar-81
Letter from Fansteel to OWRB - Photos confidential		4/27/1982

Page 2 of Draft Letter (no page 1 in file)	1	10/29/1956
Fansteel Business Brochure	3	
OK Planning and Resources Board Letter - Discussion of chloride effluent	1	9/6/1956
Standard Specifications for Waste Disposal Pond Fansteel Metals	6	10/19/1978
Report of Soils Investigation Retention Pond Site SE of Plant	13	1/20/1972
Fansteel Metallurgical Corp. Reception		11/8/1956
Boring Logs	3	7/15/1976
Figure Muskogee OK Pond #3 Contour elevation & runoff flow	28	9/8/1978
Fansteel to OWRB - Discuss non-compliance of effluent discharge	9	2/15/1971
Harry Hansen Env. Planning Specialist with OWRB - Memo to the File	1	1/15/1971
Harry Hansen OWRB to CL Brown Fansteel - Certified mail; plant discharge out of compliance	1	1/7/1971
Fansteel Letter to OWRB -company had applied for permit to discharge to Arkasas River through Dept of Army	1	11/30/1970
Letter to Fansteel from OWRB noting that discharge is illegal and there is no record of Dept Of Army approval	1	11/17/1970
Approval by OWRB of Waste Disposal Permit W-69-020	1	6/10/1969
OWRB description of Plant activities	1	2/22/1967
OWRB response to proposed change in waste treatment	2	9/15/1989
Fansteel submitting corrected Flow Diagram	2	8/24/1989
Fansteel submitting proposed changes to flow process	3	8/18/1989
OWRB concerns related to Closure Plan	2	7/28/1987
Fansteel to OWRB - revised closure plan for surface impoundments	1	5/22/1987
Fansteel proposal to dispose of Ammonia in deep well	1	4/21/1987
OWRB to Fansteel - Rejecting proposal to discharge addititional ammonia	1	4/20/1987
Fansteel to OWRB - request to increse ammonia load	1	4/10/1987
Meeting notes re: stormwater & products extracted	3	3/11/1987
OWRB -Telephone Memo to the File, closure plan concerns	1	2/20/1987
Fansteel Letter to OWRB, Surface Impound Closure Plan	1	2/16/1987
Fansteel Ltr to OWRB re; freeboard violation Pond #8	1	2/3/1987
Fansteel Ltr to OWRB re; freeboard violation Pond #8	2	11/24/1986
OWRB Certified re lagoons 5, 7, and 8	1	12/8/1986
OWRB Approval of Waste Disposal Pemit CW-69-020	1	11/12/1986
Fansteel cover letter and Arkansas River sampling data	3	8/11/1986
OK Water Resources Board Inspection Report	4	7/15/1986
OWRB Meeting with Fansteel at OK State Dept of Health	4	5/6/1981
U.S. EPA to USF&WS Re Draft NPDES Permit OK0001643	2	9/11/1984
OWRB Approval of waste disposal permit	1	9/12/1984
OWRB Certiufied mail approval of revised waste disposal permit	1	8/21/1984
Fansteel ltr to USEPA objecting to stringent effluent limits	3	7/30/1984
OWRB to USEPA requesting additional time to certify NPDES permit	1	7/25/1984
Letter from USDI USF&W - noting incomplete data in Public Notice	1	7/18/1984
Fansteel ltr to OWRB Re: Sulfate concentrations and TOC	3	7/17/1984
OWRB Comments of Self montoring Letter of self monitoring report	3	4/13/1984
Gene Chou, OWRB Memo to the files re SO4 and TOC	1	7/29/1983
Fansteel ltr to OWRB, Thanks for approval, request for relief on SO4 and TOC, glossary and monitoring requirements	8	7/5/1983
Telephone Memo to the File - Gene Chou re: Fansteel failure to make timely Self Monitoring Reports	1	12/6/1983
EPA certified mail to Fansteel - re discharge monitoring reports	1	11/30/1983

EPA Certified Mail to Fansteel requesting 3 years of production data & Outfall 002 analysis data	1	11/3/1983
OWRB approval notice for Permit #CW-69-020	1	6/21/1983
OWRB Telephone Memo to the File re: SO4 average pounds	1	6/3/1983
OWRB Telephone Memo to File re: COD, TOC, SO4	1	6/2/1983
OWRB notes - discussion of lagoon construction rationale	5	5/31/1983
Fansteel ltr to OWRB - amending NRC license SMB-911. Need to construct lined pond including proposal details.	10	5/20/1983
OWRB Telephone memo to file & internal note to expedite Fansteel Request	3	5/20/1983
Telephone Memo to the File re NRC call discussion of jurisdiction	1	5/11/1983
memo - OWRB / NRC Meeting	1	5/3/1983
Donna Metalf OWRB memo re NRC / OWRB / Fansteel meeting at Fansteel to discuss new pond	3	6/2/1983
Letter from Fansteel to U.S. Nuclear Regulatory Commission - resubmit	1	3/22/1983
Fansteel request to NRC to modify permit/ license	1	3/4/1983
OWRB Inspection Report	4	12/3/1982
Metlab Testing Services	6	12/5 to 12/14/82
OWRB Telephone Memo - Fansteel to apply for contaminated stormwater run-off permit and EPA to modify NPDES permit quickly using Draft OWRB permit	1	7/8/1982
OWRB ltr remitting a proof set of confidential photos	1	4/27/1982
Fansteel ltr to USEPA , completion of repairs and modifications required by EPA	1	4/22/1982
Inspection Report addendum	1	8/18/1981
Fansteel/Metals application for waste disposal permit	1	5/8/1981
USEPA Ltr to Fansteel Re: application No. OK0001643, apllication complete	1	4/24/1981
OWRB ltr re: permit no CW-69-020, permit has expired	1	4/15/1981
USEPA ltr to Fansteel re: NPDES Permit pending issuance	1	4/6/1981
OWRB Memo - Replace BOD with COD and TOC in state permit	1	9/18/1980
USEPA ltr to OWRB- Fansateel is a "major"	1	7/7/1977
Fansteel to USEPA - second interim report	1	6/20/1977
Fansteel to OWRB - re; operating procedures at pond 2 and ammonia storage	1	6/13/1977
Fansteel to USEPA re: May 31 77 compliance report	1	6/13/1977
Fansteel ltr to USEPA - flow monitor modifications complete	1	4/1/1977
Fansteel to USEPA re: proposed modifications to flow monitor	2	3/8/1977
USEPA to Fansteel re: Facility in violation of permit conditions	2	2/11/1977
Fansteel to USEPA Re: construction progress report, treating facilities	1	2/7/1977
Fansteel to USEPA: Interim progress report on pond construction	1	2/7/1977
Fansteel to OWRB: notification that pond construction is underway	2	11/15/1976
Fansteel to USEPA - 3rd progress report on constrruction of treating facilities	2	10/12/1976
OWRB to Fansteel - approving construction providing water of state are protected	1	9/9/1976
Fansteel to OWRB - Seeking permit to construct process pond	2	8/30/1976
OWRB to Fansteel - Approval of plans to construct waste treat facilities	1	7/13/1976
OWRB to Fansteel - waste treatment plans to be approved next meeting	1	6/11/1976
Fansteel to USEPA - Interim report on progress to address corrective actions required in Administrative Order	1	5/20/1976
Fansteel to USEPA - narrative of proposed waste treatment process	3	4/13/1976
Fansteel to OWRB -letter regarding changing the amount of ammonia values in draft	1	4/2/1976
OWRB to Fansteel re: changing daily average and maximum ammonia loads	1	3/29/1976
OWRB - summary of 3-5-1976 public hearing	1	3/5/1976
Fansteel to OWRB - confirming phone discussion on ammonia loads	1	2/7/1976

OWRB authorized to advertize and hold pblic meeting for application number cw-69-020	1	1/28/1976
Notice by publication (published trwo weeks 2-12 to 2-19-76)	1	3/5/1976
Fansteel to OWRB - cover letter for monitoring reports	1	9/22/1975
OWRB to Fansteel - violation; failure to provide monitoring reports	1	9/15/1975
OWRB to Fansteel - advising that a copy of NPDES Enforcement monitoring reported was submitted to USEPA	1	9/8/1975
Fansteel to OWRB - requesting extension of OWRB permit CW-69-020 with sam conditions as USEPA NPDES Permit No OK0001643	2	9/3/1975
Fansteel to USEPA - 1st progress report on corrective actions	2	7/11/1975
USEPA - stipulations from adjudicatory hearing on NPDES Permit	2	No Date
USEPA to Fansteel -granting rquest to hold adjuducatory hearing	1	12/4/1974
Fansteel to OWRB - requesting that progress reports for USEPA and OWRB be coordinated	1	11/15/1974
OWRB to USEPA - certifying water quality for proposed NPDES permit	1	11/12/1974
USEPA NPDES Determination (permit to be issued)	1	10/7/1974
USF&W to OWRB - Biologist (Jim Smith) comments on potential dangers to fisheries	3	10/4/1974
Fansteel to USEPA - objecting to proposed effluent limmitations	2	9/26/1974
USEPA to Fansteel - Public hearing and issuance of NPDES Permit	1	9/6/1974
Fansteel to OWRB re: Phase 2 report on improving process controls	2	2/18/1974
Fansteel to OWRB - description of pond prcocess flows	1	11/5/1973
OWRB to Fansteel - pond full of precipitates, remove and place at suitable site	1	10/15/1973
OWRB internal request for technical assistance	1	8/9/1973
Fansteel to OWRB - Phase I Waste Water Quality and Quantity Characterization complete	2	6/5/1973
OWRB to Fansteel - approval of an extension on permit with conditions	2	5/15/1973
OWRB to Oksate Health Dept - effluent discharge parameters	1	2/28/1973
OWRB interal communication - recommendations for permit extension	1	2/13/1973
Fansteel to OWRB - discussion of progress and request to extend peremit	3	2/7/1973
Fansteel to OWRB - 11th monthly monitor report and visit by USEPA	1	1/22/1973
Fansteel to OWRB - discussing overflow of Pond 6 (Technical release 100-1)	1	1/12/1973
OWRB to Fansteel letter to confirm revised meeting 1-31-1973	1	1/8/1973
OWRB to Fansteel - free insufficient on ponds 2, 5, and 6 (less than 3 feet)	1	12/13/1972
Fansteel to OWRB - requesting extension of Interim Permit	1	12/8/1972
Fansteel to OWRB - cover ltr transmitting documents provided to USEPA	7	11/30/1972
USEPA to Fansteel: EAP to sample discharge at muskogee plant ok-076-oyi-2-2000459	1	11/7/1972
Fansteel to OWRB - 9th monitoring report , no data	1	9/14/1972
Fansteel to OWRB - confirming phone conversation re: relocated discharge point to Arkansas River	1	8/11/1972
OWRB Memo - Fansteel relocated discharge to river downsteam 1000'	1	8/10/1972
Fansteel to OWRB - 7th monitoring report, process improvements	1	5/16/1972
Fansteel to OWRB - 6th monitoring report, process difficulties	1	3/3/1972
OWRB to Fansteel - approval to construct "impermeable pond"	1	1/26/1972
Fansteel to OWRB - verify phone call re construction of Thai Slag residue pond	1	1/18/1972
Fansteel to OWRB -5th bi monthly progress report on wastedisposal program	1	12/23/1971
OWRB to Fansteel - approval of Waste Disposal Permit W-69-020	2	12/22/1971
Fansteel to OWRB letter with chk number for Waste Disposal Permit	1	12/20/1971
OWRB to Fansteel - approval of Waste Dispsoal Permit	1	12/17/1971
Public Hearing was held at OWRB, conditions of permit	1	11/9/1971

Fansteel to OWRB - 4th bi monthly progress report, discussing bulk lime, "toxic chromates", sanitary sewer, effluents	2	10/25/1971
Fansteel to OWRB - submitting 3 copies of application for Waste Disposal Permit	1	10/20/1971
memo re: All Industries on Notice for Violation of Oklahoma Water Quality Standards are required to have waste disposal permits	1	8/31/1971
memo re: All Industries on Notice for Violation of Oklahoma Water Quality Standards are required to have waste disposal permits	1	8/31/1971
Fansteel to OWRB -3rd bi monthly progress report,	2	8/23/1971
Fansteel to OWRB -2nd bi monthly progress report	2	6/22/1971
Fansteel to OWRB - 1st by monthly progress report	2	4/21/1971
Location Plat of Fansteel Metals (CW-69-020)	1	8/3/1984
USEPA - NPDES Determination, approve pending state certification	1	7/3/1979
USEPA NPDES Permit NO OK0001643, extended one year pending promogulation of BAT Guidelines	1	3/16/1979
EPA Form 7550-8 (page 2?)	2	4/9/1979
Fansteel to OWRB -copies of info submitted to the nuclear reg commission	2	10/17/1978
OWRB to Sverdrup, Parcel and Assoc, copies od Discharge Monitoring Reports	1	7/24/1978
USEPA to Fansteel - requesting thoughput values in million lbs for NPDES permit no ok0001654	1	3/19/1984
USEPA to Fansteel - NPDES Permit to be issued	1	5/9/1979
USEPA to Fansteel - copy of public notice of agencies final decision re application to discharge to waters of the US	1	9/28/1984
USEPA to Fansteel - Public Notice,Draft Permit, Fact Sheet, and draft NPDES permit	1	6/25/1984
Dept Of Army, Corp of Engineers, Application to discharge or work in Navigable waters	37	7/16/1971
Fansteel to USEPA - application and check to extend NPDES permit	1	4/13/1979
EPA Form 7550-8 (page 1?)	1	No date
OWRB - Response to Public comments	3	6/30/1984
EPA to DOJ - Headquarters approval Fansteel consent decree (4/8/88)	19	4/26/1988
State Water Quality Lab to OWRB - analytical results Various Fansteel locations	15	2/26/1981
Fansteel Plat Map	1	6/3/1983
OSDH Radiation Protection Div, Gross Alpha, Beta, and Radium results	5	2/23/1982
Well #1-20 & Test Pipe Pond 8 - Data Log for pH, NH3-Na, F	21	7/15/1982
Record of Communication OWRB - Halley/Chou on rad testing	4	6/11/1982
OWRB Halley to Chou - Record of Communication	11	3/22/1982
OWRB Internal Field Report, Black to Cain, includes lab, boring logs and ASTM references	64	8/17/1981
Fan steel to OWRB - NRC Regulatory Guide - Construction of embankments at Uranium mills	9	12/1/1977
Fansteel to OWRB - Process Diagram	2	7/2/1974
USEPA Notice of deficiency NPDES Inspection	1	3/26/1987
USNRC request for additional info to renew NRC License	4	5/12/1987
USNRC request for additional info for license renewal	4	5/12/1987
NRC / NMSS trip report	2	4/20/1987
OWRB Spill Report SP-88-104 - accidental discharge report 9000 g to Arkansas River from Pond 9	1	1/26/1988
OWRB to Fansteel: NOV - unauthorized release of waste stream matieral	2	2/4/1988
Fansteel to OWRB explanation of Unauthorized release	2	2/1/1988
Radian Corp to Fansteel Pond 8 Sludge analytical results	2	3/27/1987
Page 2 of ? Spill SP-88-104 (Guessed at date)	1	2/1/1988
USEPA to Fansteel service of Administrative Order docket no. VI-85-101	1	5/15/1985

USEAP Administrative Order Related VI-85-101	3	5/15/1988
OWRB Memo to the files	2	3/4/1988
Fansteel to OWRB - transmitting signed consent decree pending public hearing and DOJ signatures	19	4/29/1988
Fansteel to OWRB re: violation dated 11-10-1986, checking on feasibility of closing ponds 5,7, & 8	2	11/24/1986
Fansteel to OWRB - Packet of info related to plant issues	8	2/17/1988
Fansteel to USEPA npdes permit no ok0001643 / Consent decree progress	4	10/13/1989
Fansteel to USEPA npdes permit no. ok0001643 /Consent Decree Progress	9	7/14/1989
Fansteel to USEPA: 1/26/88 unauthorized release of waste stream material	4	2/1/1988
OWRB to Fansteel - review of the revised closure plan for surface impoundments	2	7/28/1987
USEPA Administrative Order Re Docket VI-82-048, findings of EPA site visit	3	7/21/1982
OWRBs Jerry Black Photos	17	3/17/1982
Fansteel to OWRB - Site Photographs confidential	1	5/14/1982
Radian Corp -revised closure plan for surface impoundments	31	May-87
OWRB - request for technical assistance 6/7/72 release	5	6/13/1972
USEPA to Fansteel Administrative Order related to Docket VI-85-101 is closed	1	3/11/1986
Fansteel to OWRB - copy to owrb of USEPA submittal 6/18/88 liner failure	9	10/9/1989
USEPA TO Fansteel - re Docket VI-88-471-C failure to report completion of Item 3 in the Consent Decree	1	4/19/1989
USEPA TO Fansteel - re Docket VI-88-471-C failure to report completion of Item 3 in the Consent Decree	1	4/19/1989
Fansteel to USEPA - re 1/26/88 unauthorized release to Aarkansas River	4	2/1/1988
USEPA TO Fansteel -NOV Outfall 2 - Nitrogen, Fluoride ave and max exceed permit	2	9/13/1990
Fansteel to USEPA - Reporting total retention pond synthetic liner failure	3	6/23/1989
OWRB Inspect using USEPA form - NPDES compliance inspection report	7	12/9/1988
OWRB telephone memo Citizen complaint (cavern)	1	11/2/1988
Fansteel to OWRB descripotion of construction activiteis to meet consent order and found Cavern.	4	11/4/1988
ansteel to USEPA - report describing the status of Consent Decree projects	5	10/14/1988
OWRB to Fansteel - NPDES compliance inspection report for 1/29/88 included	13	4/19/1988
Fansteel to OWRB reporting Uranium and radioactivity counts	2	2/16/1988
Fansteel to USEPA re 1/26/88 unauthorized release of waste stream material (hose)	5	2/1/1988
USEPA NPDES Compliance Report	4	3/26/1987
Fansteel to USEPA Reporting corrective action on notice of deficiency	3	4/10/1987
3 Plant plats Guess on date)	3	6/15/1986
Joint OWRB / USEPA Inspection Report	32	6/17/1986
USEPA to Fansteel - Request for permit renewal is incomplete	1	5/17/1989
Fansteel to USEPA Reporting compliance to consent decree	4	4/25/1989
Fansteel to USEPA Reporting compliance to consent decree re MIBK	2	4/4/1989
OWRB to Fansteel - Copy of 11/13/85 NPDES Compliance Insp Rpt	14	1/2/1986
USEPA NPDES Compliance Inspection Rpt	6	9/9/1985
OWRB npdes inspection report conducted 10/23/84	12	12/5/1984
USEPA NPDES compliance inspection report	5	8/20/1984
OWRB to Fansteel NPDES compliance inspection report	17	5/17/1983
OWRB - NPDES compliance inspection report	16	4/28/1982
OWRB - NPDES compliance inspection report	12	1/21/1981
OWRB - NPDES compliance inspection report	13	8/29/1981
OWRB State Permit Compliance report CW-69-020	5	8/17/1981
USEPA to Fansteel - certified mail letter - re: sample preservation	1	6/3/1981

USNRC to Fansteel - work plan for characterization of ponds with comments	3	12/2/1991
USEPA Compliance Monitoring Report - Details several plant operations issues	3	9/16/1981
Earth Science Consult to Fansteel - work plan for characterization of ponds	13	12/19/1991
Earth Sciences Consult to USEPA - comments on Draft NPDES Permit	4	7/27/1990
OWRB to USEPA - agree to shallower freeboard on Pond 9	1	7/24/1990
Earth Science Consult to USEPA - Transmitting additonal info	2	5/1/1990
Eartrh Science Consult to USEPA letter comments and information regarding draft npdes permit	15	4/4/1990
NRC to Fansteel - Trip report and comments on proposed decommissioning activities	10	7/18/1994
Fansteel to ODEQ requesting permission to P&A deep wells	6	6/21/1994
letter for second request effort to the US Nuclear Regulatory commission		6/21/1994
ODEQ memorandum -- planning meeting to addrss all Fansteel issues related to continued use of site and remediation of issues	4	5/10/1994
Fansteel to ODEQ - per phone call, transmitting info related to closing Outfall 004	4	11/1/1993
USEPA to Fansteel - final permit mofdification decision and comments	1	9/10/1993
USEPA to Fansteel allowing modification of certiain permit conditions	1	5/7/1993
USNRC to Fansteel noting amendments to 10CFR Part 20 that affect all permitees	2	5/7/1993
Fansteel to OWRB - P&A complete for 14 old wells, 15 new wells to be included in reporting	1	5/3/1993
USNRC to Fansteel - request that FC revise and resubmit renewal application for Source Material License SMB-911	3	2/10/1993
OWRB to Fansteel - comments on final remedial assessment work plan	2	8/28/1992
Fansteel To USEPA - request to incorporate Outfall 005 to NPDES Permit	1	8/13/1992
Fansteel to OWRB - Leasee has ceased operations, request to close Outfall 004	1	8/11/1992
Fansteel to OWRB - work plan to close ponds 6, 7, 8, and 9	1	12/19/1991
OWRB to Earth Science Consult - letter comments of supplemental letter to Remedial Assessment work plan	2	12/17/1991
OWRB to Earth Science Consult - letter comments of supplemental letter to Remedial Assessment work plan	2	12/17/1991
Fansteel to OWRB re P&A of 11 wells	2	8/27/1991
USEPA to Fansteel re pages to replace those with administrative errors	3	3/29/1991
OWRB to USEPA re approving Earth Science request for freeboard change	1	7/24/1990
OWRB to USEPA re approving Earth Science request for freeboard change	1	7/24/1990
USEPA to Fansteel - public notice, fact sheet, and a copy of the permit	1	6/20/1990
USEPA to OWRB date for certification of propsed permit extended to 3/16/90	1	2/15/1990
OWRB Earth Sciences proposed sampling plan submitted for closure of Ponds 5, 6, 7, 8, and 9	2	2/12/1990
Fansteel to USEPA - re: submitting corrected water flow diagram	2	8/24/1989
Fasnsteel to ODEQ - asking whether recent request to modify NPDES Permit is minor or major modifcifcation, includes analytical	12	12/15/2000
ODEQ to Fansteel -summarizing results of meeting on 3/28/00 to discuss TRE	2	4/20/2000
ODEQ to Fansteel -requiring TRE (toxicity reduction evaluation) based on recent wet test results	1	4/17/2000
ODEQ to Fansteel - request for modification to NPDES Permit approved	6	5/3/1999
Fansteel to ODEQ request for modification to NPDES permit no ok0001643	42	11/24/1998
USEPA Fact Sheet - related to NPDES permit modification	3	3/25/1993
authorization to discharge under the national polluant discharge	1	9/10/1993
USNRC to Fansteel - objecting to closure of deep aquifer wells	2	4/25/1994

USNRC to Fansteel - requesting submittal of application for new source material license SMB-911	3	2/10/1993
USNRC to Fansteel - scheduling meeting to discuss decommissioning of facility	2	5/14/1992
Fansteel to OWRB - application to renew waste disposal permit	10	9/23/1991

#	File Name
1	1CONFIDENTIALITY NOTICE.docx
2	land.txt
3	LP Brownfields Program Fansteel Targeted Brownfields Assessment request Muskogee Muskogee Co. Targeted Brownfields Assessme.tif
4	LP Brownfields Program Muskogee Port Authority Correspondence financial review request Muskogee Muskogee Co. Technical Serv.tif
5	LP Brownfields Program Muskogee Port Authority Correspondence FMRI letter Muskogee Muskogee Co. Technical Service Correspon.tif
6	LP Brownfields Program Muskogee Port Authority EPA Bevill Amendment issues training Muskogee Muskogee Co. Technical Service.tif
7	LP Brownfields Program Muskogee Port Authority Letter to FMRI Muskogee Muskogee Co. Technical Service Correspondence 1_14_2.tif
8	LP Brownfields Program Muskogee Port Authority Letter to NRC - variance request Muskogee Muskogee Co. Technical Service Cor.tif
9	LP Brownfields Program Muskogee Port Authority Letter to NRC Muskogee Muskogee Co. Technical Service Correspondence 7_24_20.tif
10	LP Brownfields Program Muskogee Port Authority Meeting minutes and sign in sheet Muskogee Muskogee Co. Technical Service Mi.tif
11	LP Brownfields Program Muskogee Port Authority Northern Portion of FMRI NW property Memo TCE in groundwater on adjacent pr2.tif
12	LP Brownfields Program Muskogee Port Authority Northern Portion of FMRI NW property Memo TCE in groundwater on adjacent pro.tif
13	LP Brownfields Program Muskogee Port Authority Northern Portion of FMRI NW property Site characterization report Muskogee 2.tif
14	LP Brownfields Program Muskogee Port Authority Northern Portion of FMRI NW property Site characterization report Muskogee M.tif
15	LP Brownfields Program Muskogee Port Authority Northern Portion of FMRI NW property Targeted Brownfield Assessment letter 2.tif
16	LP Brownfields Program Muskogee Port Authority Northern Portion of FMRI NW property Targeted Brownfield Assessment letter 3.tif
17	LP Brownfields Program Muskogee Port Authority Northern Portion of FMRI NW property Targeted Brownfield Assessment letter 4.tif
18	LP Brownfields Program Muskogee Port Authority Northern Portion of FMRI NW property Targeted Brownfield Assessment letter M.tif
19	LP Brownfields Program Muskogee Port Authority NRC approval of FMRI's decommissioning Muskogee Muskogee Co. Technical Servi.tif
20	LP Brownfields Program Muskogee Port Authority NRC inspection report Muskogee Muskogee Co. Technical Service Correspondence.tif
21	LP Brownfields Program Muskogee Port Authority Pre-closure sampling and analysis report Muskogee Muskogee Co. Technical Ser.tif
22	LP Brownfields Program Muskogee Port Authority Preclosure samping and analysis report - pond 6 and 7 Muskogee Muskogee Co. .tif
23	LP Brownfields Program Muskogee Port Authority Site characterization report addendum Muskogee Muskogee Co. Targeted Brownfi.pdf
24	LP Brownfields Program Muskogee Port Authority Site characterization report yellow sheet Muskogee Muskogee Co. Targeted Bro.tif
25	LP Brownfields Program Port of Muskogee a_k_a Muskogee Port Authority a_k_a MPA a_k_a FMRI Northwest Property SITE CHARA2.pdf
26	LP Brownfields Program Port of Muskogee a_k_a Muskogee Port Authority a_k_a MPA a_k_a FMRI Northwest Property SITE CHARA3.pdf
27	LP Brownfields Program Port of Muskogee a_k_a Muskogee Port Authority a_k_a MPA a_k_a FMRI Northwest Property SITE CHARAC.pdf
28	LP Brownfields Program Port of Muskogee Expansion a_k_a Muskoge Port Authority Expansion Phase I TBA and cover letter Musk2.pdf
29	LP Brownfields Program Port of Muskogee Expansion a_k_a Muskoge Port Authority Expansion Phase I TBA and cover letter Musko.pdf
30	LP Brownfields Program Port of Muskogee Muskogee Muskogee Co. Certification Program Correspondence 10_7_2011 (System Ident2.tif
31	LP Brownfields Program Port of Muskogee Muskogee Muskogee Co. Certification Program Correspondence 10_7_2011 (System Identi.tif
32	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix A site maps Muskogee Muskoge2.zip
33	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix A site maps Muskogee Muskoge3.zip
34	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix A site maps Muskogee Muskogee.zip

35	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix B Property Ownership History .zip
36	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix B Property Ownership History2.zip
37	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix B Property Ownership History3.zip
38	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix C Site Photographs Muskogee 2.zip
39	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix C Site Photographs Muskogee 3.zip
40	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix C Site Photographs Muskogee M.zip
41	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix D Historical Research Docume2.zip
42	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix D Historical Research Docume3.zip
43	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix D Historical Research Documen.zip
44	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix E Regulatory Records Documen2.zip
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46	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix E Regulatory Records Document.zip
47	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix F Interview Documentation Mu2.zip
48	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix F Interview Documentation Mu3.zip
49	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix F Interview Documentation Mus.zip
50	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix G Boring Logs Muskogee Musko2.zip
51	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix G Boring Logs Muskogee Musko3.zip
52	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix G Boring Logs Muskogee Muskog.zip
53	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix H Environmental Professional .zip
54	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix H Environmental Professional2.zip
55	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Appendix H Environmental Professional3.zip
56	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Phase I Environmental Site Assessment .zip
57	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Phase I Environmental Site Assessment2.zip
58	LP Brownfields Program Southern portion of FMRI (Fansteel Metals) Northwest Property Phase I Environmental Site Assessment3.zip
59	LP Brownfields Program Southern Portion of the Northwest FMRI Property Memo for Radiation Survey Muskogee, OK Muskogee Co. .tif
60	LP Brownfields Program Southern Portion of the Northwest FMRI Property Memo for Radiation Survey Muskogee, OK Muskogee Co.2.tif
61	LP Radiation Acknowledgement of Receipt of Containment Cell Amendment Request (TAC No. L31255) Remediation Site Corresponde.tif
62	LP Radiation Acknowledgment of License amendment request Remediation Site Correspondence FMRI 4_18_2006 (System Identifier.tif
63	LP Radiation Acknowledgment of Reply to NRC Inspection Report Remediation Site Correspondence FMRI 12_15_2005 (System Ident.tif
64	LP Radiation Additional Radiation Survey Activities Northwest Property Area Remediation Site Correspondence FMRI_Fansteel 1.tif
65	LP Radiation Aerial Overflights of Hazardous Waste Disposal Sites Remediation Site Correspondence FMRI_Fansteel 12_1_1981 (.tif
66	LP Radiation Affidavit of E. Jonathan Jackson Remediation Site Correspondence FMRI 12_1_2006 (System Identifier_ 1409745).tif
67	LP Radiation Agenda for May 31, 2000 Management Meeting Remediation Site Correspondence FMRI_Fansteel 5_11_2000 (System Id2.tif
68	LP Radiation Agenda For May 31, 2000 Management Meeting Remediation Site Correspondence FMRI_Fansteel 5_11_2000 (System Ide.tif
69	LP Radiation Amendment Request For SMB-911, Dated 10_20_95, TAC NO. L30819 Remediation Site Correspondence FMRI_Fansteel 12.tif

70	LP Radiation Amendment Request for SMB-911, Dated January 25, 1995 (TAC No. L30756) Remediation Site Correspondence FMRI_Fa.tif
71	LP Radiation Amendment Request for SMB-911, Dated October 20, 1995 (TAC No. L30819) Remediation Site Correspondence FMRI_Fa.tif
72	LP Radiation Amendment Request To Process Calcium Fluoride Reidues (Tac No. L30990) Remediation Site Correspondence FMRI_Fa.tif
73	LP Radiation Amendment Request To Process Calcium Fluoride Residues (Tac No. L30990) Remediation Site Correspondence FMRI_F.tif
74	LP Radiation Amendment to Authorize Processing of Wastewater Treatment Residues Remediation Site Correspondence FMRI_Fanste.tif
75	LP Radiation Amendment to Reduce Groundwater Sampling Frequency in License SMB-911 (TAC No. 31141) Remediation Site Corresp.tif
76	LP Radiation Amendment to Reduce GW Sampling Frequency in License SMB-911 (TAC NO. L31141) Remediation Site Correspondence .tif
77	LP Radiation Amendment to Revise Part I of License (TAC No. L31191) Remediation Site Correspondence FMRI_Fansteel 5_20_1999.tif
78	LP Radiation Amendment to SMB-911 to Include Final Hazard Analysis Report and Integrated Safety Manual Remediation Site Cor.tif
79	LP Radiation Amendment to Source Material License No. SMB-911 Remediation Site Correspondence FMRI_Fansteel 12_21_1992 (Sys.tif
80	LP Radiation Ammonia and Radioactivity Concerns-Draft permit for Fansteel, Inc., Muskogee, OK, NPDES Permit No. OK0001643, .tif
81	LP Radiation Analysis of Fansteel Inc. Radiological Data Remediation Site Correspondence FMRI_Fansteel 10_28_1986 (System I.tif
82	LP Radiation Answer in Opposition to the Request for Hearing Filed by the State of Oklahoma Remediation Site Correspondence.tif
83	LP Radiation Application for License Amendment Remediation Site Correspondence FMRI 3_31_2006 (System Identifier_ 1409699).tif
84	LP Radiation Application for Modification of OPDES Permit No. OK0001643 Remediation Site Correspondence FMRI_Fansteel 2_5_1.tif
85	LP Radiation Application for Modification of OPDES Permit No. OK0001643 Remediation Site Correspondence FMRI_Fansteel 5_3_1.tif
86	LP Radiation Application for Withholding Trade Secret and Business Confidential Information From Public Disclosure Remedia2.tif
87	LP Radiation Application for Withholding Trade Secret and Business Confidential Information From Public Disclosure Remediat.tif
88	LP Radiation Approval of Deep Monitoring Well Plugging at Fansteel Inc Remediation Site Correspondence FMRI_Fansteel 4_14_1.tif
89	LP Radiation Approval of Deep Monitoring Well Plugging at Fansteel Inc Remediation Site Correspondence FMRI_Fansteel 4_14_2.tif
90	LP Radiation Approval of Deep Monitoring Well Plugging at Fansteel Inc. Remediation Site Correspondence FMRI_Fansteel 4_17_.tif
91	LP Radiation Approval of Deep Monitoring Well Plugging at Fansteel, Inc. Remediation Site Correspondence FMRI_Fansteel 4_14.tif
92	LP Radiation Attendence at Meeting re Fansteel Inc, Facility in Muskogee, OK Remediation Site Correspondence FMRI_Fansteel .tif
93	LP Radiation Authorization to Discharge Under the National Pollutant Discharge Elimination System Remediation Site Corresp.tif
94	LP Radiation BMP Annual Report for Outfalls 003 and 005 Remediation Site Correspondence FMRI 1_15_2008 (System Identifier_ .tif
95	LP Radiation BMP Annual Report For Outfalls 003 And 005 Remediation Site Correspondence FMRI_ Fansteel 1_15_2008 (System Id.tif
96	LP Radiation Change in Project Management Remediation Site Correspondence FMRI_Fansteel 10_28_1999 (System Identifier_ 1228.tif
97	LP Radiation Change in the Plant Radiation Safety Officer (PRSO) Position (TAC No. L31216) Remediation Site Correspondence .tif
98	LP Radiation Chart Remediation Site Correspondence FMRI_Fansteel (System Identifier_ 1230522).tif
99	LP Radiation Classification Of Ground Water Underlying The Fansteel Site Near Muskogee Oklahoma Remediation Site Correspond.tif
100	LP Radiation Closure of Deep Aquifer Wells Remediation Site Correspondence FMRI_Fansteel 4_25_1994 (System Identifier_ 122.tif
101	LP Radiation Closure of Deep Aquifer Wells Remediation Site Correspondence FMRI_Fansteel 4_25_1994 (System Identifier_ 1227.tif
102	LP Radiation Closure of Deep Aquifer Wells Remediation Site Correspondence FMRI_Fansteel 4_25_1994 (System Identifier_ 1230.tif
103	LP Radiation Closure of Deep Aquifer Wells Remediation Site Correspondence FMRI_Fansteel 4_25_1994 (System Identifier_ 1232.tif
104	LP Radiation Closure of Deep Aquifer Wells Remediation Site Correspondence FMRI_Fansteel 8_9_1994 (System Identifier_ 12288.tif

105	LP Radiation Closure of Deep Wells (Tac No. L30707) Remediation Site Correspondence FMRI_Fansteel 2_23_1995 (System Identif.tif
106	LP Radiation Closure of Deep Wells Remediation Site Correspondence FMRI_Fansteel 3_30_1995 (System Identifier_ 1228938).tif
107	LP Radiation Closure Plan (OPDES OK0001643, NRC SMB-911) Ponds 6 and 7 Remediation Site Correspondence FMRI _ Fansteel 10_1.pdf
108	LP Radiation CLP Data Review Remediation Site Correspondence FMRI_Fansteel 8_5_1986 (System Identifier_ 1230175).tif
109	LP Radiation Complaint Investigation Fansteel Metals Inc BC - Photos Remediation Site Correspondence FMRI_Fansteel 2_16_199.tif
110	LP Radiation Complaint Number_ 292-99-95-00114 Remediation Site Correspondence FMRI_Fansteel 1_23_1995 (System Identifier_ .tif
111	LP Radiation Conference Call Between Fansteel & NRC on January 1, 1996 - TAC NO. L30706 Remediation Site Correspondence FMR.tif
112	LP Radiation Conference Call Between Fansteel and NRC on January 1, 1996 (TAC No. L30706) Remediation Site Correspondence F.tif
113	LP Radiation Consent Order, (re OPDES Permit) Case #12-208 Remediation Site Compliance FMRI _ Fansteel 3_26_2013 (System Id.pdf
114	LP Radiation Consideration Of A License Amendment For Fansteel, Inc., Muskogee, Oklahoma And Opportunity For A Hearing Reme.tif
115	LP Radiation Consideration Of Approval of A Revision To The Phase 2 Decommissioning Plan For The Kaiser Aluminum Facility I.tif
116	LP Radiation Construction Certification Report Excavation and on-site management of radiolocially affected soils and constr.pdf
117	LP Radiation Construction Certification Report Excavation And On-Site Mangement Of Radiologically Affected Siols And Constr.tif
118	LP Radiation Construction Permit Number 94-329-C Rare Earth Elements Plant Permit Writer_ Phillip Fielder Remediation Site .tif
119	LP Radiation Correspondance Remediation Site Correspondence FMRI_Fansteel 8_31_2000 (System Identifier_ 1228178).tif
120	LP Radiation Correspondence Remediation Site Correspondence FMRI_Fansteel 3_17_2000 (System Identifier_ 1228768).tif
121	LP Radiation Decommissioning Funding Plan (TAC No. 30705) Remediation Site Correspondence FMRI_Fansteel 10_16_1995 (System .tif
122	LP Radiation Decommissioning Funding Plan TAC No L30705 Remediation Site Correspondence FMRI_Fansteel 10_16_1995 (System I2.tif
123	LP Radiation Decommissioning Funding Plan TAC No L30705 Remediation Site Correspondence FMRI_Fansteel 10_16_1995 (System Id.tif
124	LP Radiation Decommissioning Overview Remediation Site Correspondence FMRI_ Fansteel 5_29_1996 (System Identifier_ 1227488).tif
125	LP Radiation Decommissioning Overview Remediation Site Correspondence FMRI_Fansteel 1_1_1996 (System Identifier_ 1227585).tif
126	LP Radiation Decommissioning Overview Remediation Site Correspondence FMRI_Fansteel 1_1_1996 (System Identifier_ 1227749).tif
127	LP Radiation Decommissioning Plan Remediation Site Correspondence FMRI_Fansteel 2_1_1991 (System Identifier_ 1228871).tif
128	LP Radiation Decommissioning Plan Remediation Site Correspondence FMRI_Fansteel 2_1_1991 (System Identifier_ 1228876).tif
129	LP Radiation Decommissioning Plan and Request for Additional Information Remediation Site Correspondence FMRI_Fansteel 3_31.tif
130	LP Radiation Decommissioning Plan for the Remediation Under Site Decommissioning Management Plan (SDMP) Action Plan Remedia.tif
131	LP Radiation Decommissioning Plan Remediation Site Correspondence FMRI_Fansteel 12_1_1998 (System Identifier_ 1230636).tif
132	LP Radiation Decommissioning Plan Remediation Site Correspondence FMRI_Fansteel 6_1_1999 (System Identifier_ 1228215).tif
133	LP Radiation Decommissioning Plan Remediation Site Correspondence FMRI_Fansteel 7_1_1998 (System Identifier_ 1230669).tif
134	LP Radiation Decommissioning Plan Remediation Site Correspondence FMRI_Fansteel 8_1_1999 (System Identifier_ 1228869).tif
135	LP Radiation Decommissioning Plan Revision TAC No. L31037 License No. SMB-911 Fansteel Inc., Muskogee, OK Remediation Site .tif
136	LP Radiation Decommissioning Plan U.S. Nuclear Regulatory Commision License No. SMB-911 Eastern Property Area Fansteel, Inc.tif
137	LP Radiation Decommissioning Plan U.S. Nuclear Regulatory Commission License No. SMB-911 Eastern Property Area Fansteel, In.tif
138	LP Radiation Decommissioning Plan U.S. Nuclear Regulatory Commission License No. SMB-911 Eastern Property Area Remediation .tif
139	LP Radiation Decommissioning Remediation Site Correspondence FMRI_Fansteel 3_21_1995 (System Identifier_ 1227701).tif

140	LP Radiation Decommissioning Trust Agreement for Muskogee Site Remediation Site Correspondence FMRI_Fansteel 10_22_2003 (Sy.tif
141	LP Radiation Demand For Information Remediation Site Correspondence FMRI_Fansteel 1_7_1994 (System Identifier_ 1229830).tif
142	LP Radiation Demand for Information Remediation Site Correspondence FMRI_Fansteel 1_7_1994 (System Identifier_ 1230519).tif
143	LP Radiation DEQ Draft Comments On Non-Radiological Decommissioning Plan For The Fansteel Site Remediation Site Correspond2.tif
144	LP Radiation DEQ Draft Comments On Non-Radiological Decommissioning Plan For The Fansteel Site Remediation Site Corresponde.tif
145	LP Radiation Directions to Ramada Inn Remediation Site Correspondence FMRI_Fansteel 6_26_1998 (System Identifier_ 1228941).tif
146	LP Radiation Disposal of Contaminated Soils (TAC No. L31037) Remediation Site Correspondence FMRI_Fansteel 1_10_1998 (Syste.tif
147	LP Radiation Disposal of Contaminated Soils (TAC No. L31037) Remediation Site Correspondence FMRI_Fansteel 2_9_1998 (Syste2.tif
148	LP Radiation Disposal of Contaminated Soils (TAC No. L31037) Remediation Site Correspondence FMRI_Fansteel 2_9_1998 (System.tif
149	LP Radiation Disposal Of Contaminated Soils Remediation Site Correspondence FMRI_Fansteel 11_4_1997 (System Identifier_ 122.tif
150	LP Radiation Docket No. 40-7580 License SMB-911 Fansteel Inc. Muskogee, Oklahoma Site Remediation Site Correspondence FMRI2.tif
151	LP Radiation Docket No. 40-7580 license SMB-911 Fansteel Inc. Muskogee, Oklahoma Site Remediation Site Correspondence FMRI_.tif
152	LP Radiation Docket No. 40-7580 Remediation Site Correspondence FMRI_Fansteel 5_8_2003 (System Identifier_ 1228159).tif
153	LP Radiation Draft Charter and Operating Ground Rules Site-Specific Advisory Board Remediation Site Correspondence FMRI_Fa.tif
154	LP Radiation Draft Enviromental Assessment Of Proposed Decommissioning Activity At Fansteel Facility Remediation Site Corre.tif
155	LP Radiation Draft Environmental Assessment of Proposed Decommissioning Activity at Fansteel Facility July 1999 Remediation.tif
156	LP Radiation Draft Memo Remediation Site Correspondence FMRI_ Fansteel 6_12_2003 (System Identifier_ 1227500).tif
157	LP Radiation Earth Sciences Consultants, Inc. Facsimile Cover Sheet Remediation Site Correspondence FMRI_Fansteel 10_22_200.tif
158	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 9_2_1997 (System Identifier_ 1227748).tif
159	LP Radiation Email - Fansteel Permit - Radioactive Materials Clause Remediation Site Correspondence FMRI_Fansteel 12_8_1995.tif
160	LP Radiation Email - Nuclear Regulatory Commission Remediation Site Correspondence FMRI_Fansteel 8_19_1999 (System Identifi.tif
161	LP Radiation Email Fansteel Chemical Contamination Remediation Site Correspondence FMRI_ Fansteel 10_21_2003 (System Identi.tif
162	LP Radiation Email Remediation Site Correspondence FMRI_ Fansteel 12_5_2003 (System Identifier_ 1227504).tif
163	LP Radiation Email Remediation Site Correspondence FMRI_ Fansteel 12_8_2003 (System Identifier_ 1227502).tif
164	LP Radiation Email Remediation Site Correspondence FMRI_ Fansteel 12_8_2003 (System Identifier_ 1227503).tif
165	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 10_24_2002 (System Identifier_ 1228180).tif
166	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 2_13_2001 (System Identifier_ 1228196).tif
167	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 2_15_1995 (System Identifier_ 1228190).tif
168	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 3_10_1995 (System Identifier_ 1228186).tif
169	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 3_13_1995 (System Identifier_ 1228183).tif
170	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 3_24_1995 (System Identifier_ 1227695).tif
171	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 3_8_1995 (System Identifier_ 1227858).tif
172	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 3_8_1995 (System Identifier_ 1228187).tif
173	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 3_9_1995 (System Identifier_ 1227857).tif
174	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 4_4_1995 (System Identifier_ 1227599).tif

175	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 6_2_1995 (System Identifier_ 1228832).tif
176	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 6_9_1999 (System Identifier_ 1228765).tif
177	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 9_20_2002 (System Identifier_ 1227966).tif
178	LP Radiation Email Remediation Site Correspondence FMRI_Fansteel 9_22_2003 (System Identifier_ 1227967).tif
179	LP Radiation Email Subject_ Fansteel Decommission Plan Remediation Site Correspondence FMRI_Fansteel 3_22_1995 (System Iden.tif
180	LP Radiation Email Subject_ Fansteel Sampling Remediation Site Correspondence FMRI_Fansteel 3_22_1995 (System Identifier_ .tif
181	LP Radiation Email Subject_ Sampling Of Fansteel Remediation Site Correspondence FMRI_Fansteel 3_20_1995 (System Identifier.tif
182	LP Radiation Enclosed Documents Pertaining To The Decommissioning Of Fansteel, Inc. (Muskogee, Oklahoma Facility) Remediati.tif
183	LP Radiation Environmental Assessment for License SMB 911 Renewal, TAC NO. L30705 Remediation Site Correspondence FMRI_Fans.tif
184	LP Radiation Environmental Assessment License Amendment for Material License No SMB-911 Remediation Site Correspondence FMR.tif
185	LP Radiation EPA Memo of December 6, 1984 Remediation Site Correspondence FMRI_Fansteel 1_8_1985 (System Identifier_ 123017.tif
186	LP Radiation Executive Summary Remediation Site Correspondence FMRI_Fansteel 12_21_1992 (System Identifier_ 1230249).tif
187	LP Radiation Executive Summary Remediation Site Correspondence FMRI_Fansteel 12_28_1993 (System Identifier_ 1228769).tif
188	LP Radiation Facility Report - Status Remediation Site Correspondence FMRI_Fansteel 10_8_1993 (System Identifier_ 1230499).tif
189	LP Radiation Facility Report - Status Remediation Site Correspondence FMRI_Fansteel 12_13_1993 (System Identifier_ 1230498).tif
190	LP Radiation Facility Report - Status Remediation Site Correspondence FMRI_Fansteel 1_21_1993 (System Identifier_ 1230497).tif
191	LP Radiation Facility Report - Status Remediation Site Correspondence FMRI_Fansteel 3_25_1994 (System Identifier_ 1230496).tif
192	LP Radiation Facility Report - Status Remediation Site Correspondence FMRI_Fansteel 3_25_1994 (System Identifier_ 1230515).tif
193	LP Radiation Facility Report Remediation Site Correspondence FMRI_Fansteel 10_21_1992 (System Identifier_ 1230505).tif
194	LP Radiation Facility Report Remediation Site Correspondence FMRI_Fansteel 1_5_1992 (System Identifier_ 1230504).tif
195	LP Radiation Facility Report Remediation Site Correspondence FMRI_Fansteel 1_5_1992 (System Identifier_ 1230511).tif
196	LP Radiation Facility Report Remediation Site Correspondence FMRI_Fansteel 2_22_1992 (System Identifier_ 1230502).tif
197	LP Radiation Facility Report Remediation Site Correspondence FMRI_Fansteel 2_22_1992 (System Identifier_ 1230503).tif
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660	LP Radiation Response to Comments and License Amendment Application TAC No. L31039 Docket No. 40-7580 License No. SMB-911 R.tif
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662	LP Radiation Response To Comments NRC Letter of March 24, 1998. Decommissioning Plans Comments License No. SMB-911 Docket N.tif
663	LP Radiation Response To Fansteel Submittal Of June 26, 2003 Remediation Site Correspondence FMRI_Fansteel 7_8_2003 (System.tif
664	LP Radiation Response to Fansteel's Letter Dated May 3, 1999, and Agenda Remediation Site Correspondence FMRI_Fansteel 5_20.tif

665	LP Radiation Response To Fansteel's License Renewal Application And Letter Of June 25, 2002, Concerning Financial Assurance.tif
666	LP Radiation Response To Fansteel's License Renewal Application and Letter of June 25,2002, Concerning Fianacial Assurance .tif
667	LP Radiation Response to Letter of 3_31_99 regarding amendment to Materials License Decommissioning Plan (TAC NO. L31086) 2.tif
668	LP Radiation Response to Letter of 3_31_99 regarding amendment to Materials License Decommissioning Plan (TAC NO. L31086) R.tif
669	LP Radiation Response to Letter Regarding FMRI Facility Remediation Site Correspondence FMRI 7_5_2007 (System Identifier_ 1.tif
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671	LP Radiation Response to NRC Inspection Report 40-7580_00-01 and Notice of Violation Remediation Site Correspondence FMRI_F.tif
672	LP Radiation Response To NRC Inspection Report 40-7580_96_01 Remediation Site Correspondence FMRI_Fansteel 7_19_1996 (Syste.tif
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674	LP Radiation Response To NRC Inspection Report No. 40-7580_92-01 (Notice Of Violation) Remediation Site Correspondence FMRI.tif
675	LP Radiation Response To NRC Inspection Report No. 40-7580_93-01 Remediation Site Correspondence FMRI_Fansteel 10_4_1993 (S.tif
676	LP Radiation Response to TAC No. L31037 Remediation Site Correspondence FMRI_Fansteel 12_4_1998 (System Identifier_ 1228359.tif
677	LP Radiation Response to TAC No. L31037 Remediation Site Correspondence FMRI_Fansteel 12_4_1998 (System Identifier_ 1229799.tif
678	LP Radiation Results Of Preliminary Review Of Fansteel's Decommissioning Plan Dated January 2003 Remediation Site Correspo2.tif
679	LP Radiation Results Of Preliminary Review Of Fansteel's Decommissioning Plan Dated January 2003 Remediation Site Correspo3.tif
680	LP Radiation Results of Preliminary Review of Fansteel's Decommissioning Plan Dated January 2003 Remediation Site Correspo4.tif
681	LP Radiation Results Of Preliminary Review Of Fansteel's Decommissioning Plan Dated January 2003 Remediation Site Correspo5.tif
682	LP Radiation Results Of Preliminary Review Of Fansteel's Decommissioning Plan Dated January 2003 Remediation Site Correspon.tif
683	LP Radiation Results Of Preliminary Review Of Fansteel's Decommissoning Plan Dated January 2003 Remediation Site Correspond.tif
684	LP Radiation Return Letter_ EPA I.D. OKD007221831 Remediation Site Correspondence FMRI_Fansteel 7_14_1982 (System Identifi2.tif
685	LP Radiation Return Letter_ EPA I.D. OKD007221831 Remediation Site Correspondence FMRI_Fansteel 7_14_1982 (System Identifie.tif
686	LP Radiation Review of Decommissioning Cost Estimate Remediation Site Correspondence FMRI_Fansteel 4_9_1998 (System Identif.tif
687	LP Radiation Revised - Charter and Operating Ground Rules Site-Specific Advisory Board Fansteel, Inc. Muskogee, Oklahoma R.tif
688	LP Radiation Revised - Charter and Operating Ground Rules Site-Specific Advisory Board Fansteel, Inc. Muskogee, OK Remediat.tif
689	LP Radiation Revision of License Application to Incorporate Commitments Specified in Supplemental Correspondence (TAC No. L.tif
690	LP Radiation Rules and Regulations Remediation Site Correspondence FMRI_Fansteel 9_1_1989 (System Identifier_ 1228771).tif
691	LP Radiation Self-Monitoring Report 10_1_94 - 12_31_94 Remediation Site Correspondence FMRI_Fansteel 1_17_1995 (System Ide2.tif
692	LP Radiation Self-Monitoring Report 10_1_94 - 12_31_94 Remediation Site Correspondence FMRI_Fansteel 1_17_1995 (System Iden.tif
693	LP Radiation Sequoyah Fuels_Fansteel Status Report Remediation Site Correspondence FMRI_Fansteel 12_11_1991 (System Identif.tif
694	LP Radiation Status Report Remediation Site Correspondence FMRI_Fansteel 8_10_1992 (System Identifier_ 1227979).tif
695	LP Radiation Submittal Integrated Safety, Operations, Radiation Management, and Emergency Response Manual, Final Hazard Ana.tif
696	LP Radiation Summary of FMRI site visit on 2_13_07 to accompany NRC Remediation Site Correspondence FMRI 2_13_2007 (System .tif
697	LP Radiation Summary of License Commitments (TAC No. L31069) Remediation Site Correspondence FMRI_Fansteel 2_12_1999 (Syste.tif
698	LP Radiation Summary Report ALARA Analysis Residential and Industrial Scenarios - December 1998 Remediation Site Correspond.tif
699	LP Radiation Technical Information Transmittal Ohase 1 Remediation Project Remediation Site Correspondence FMRI 3_7_2007 (S.tif

700	LP Radiation Technical Information Transmittal Phase I Remediation Project Disc Fansteel_FMRI 3_7_2007 (System Identifier_ .zip
701	LP Radiation Technical Report Phase I Environmental Site Assessment Update Remediation Site Correspondence FMRI_Fansteel 5_.tif
702	LP Radiation Technical Report Remediation Assessment Volume 1 of 4 Remediation Site Correspondence FMRI_Fansteel 12_1_1993 .tif
703	LP Radiation Telefax Transmittal Remediation Site Correspondence FMRI_Fansteel 8_5_1994 (System Identifier_ 1229814).tif
704	LP Radiation Tornado and Thunderstorm Damage at Fansteel Site in Muskogee, OK Remediation Site Correspondence FMRI_Fansteel.tif
705	LP Radiation Transmittal Appendix F of Final Hazards Analysis Report License No. SMB-911 Fansteel, Inc. Muskogee, OK Remedi.tif
706	LP Radiation Transmittal December 16, 1999 SSAB Meeting Agenda Remediation Site Correspondence FMRI_Fansteel 12_2_1999 (Sy.tif
707	LP Radiation Transmittal Final Report Remedial Assessment, Fansteel, Muskogee, OK Remediation Site Correspondence FMRI_Fans.tif
708	LP Radiation Transmittal Integrated Safety, Operations, Radiation Management, and Emergency Response Manual and Final Hazar.tif
709	LP Radiation Transmittal Laboratory Analytical Results Deep Well Sampling from March 27, 1995 Remediation Site Corresponden.tif
710	LP Radiation Transmittal of Laboratory Report Reciprocity Correspondence FMRI_Fansteel 9_28_1981 (System Identifier_ 123020.tif
711	LP Radiation Transmittal Revised Decommissioning Plan and Response to the NRC's Request for Additional Information Dated 3-.tif
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713	LP Radiation Transmittal Revised Decommissioning Plan, Supporting Documents and Response to the NRC's Request for Additiona.tif
714	LP Radiation Transmittal Revised Figure 3 Decommissioning Plan Dated June 16, 1999 SDMP Action Plan Portion, Docket_ 40-758.tif
715	LP Radiation Treatability Study Report for Stabilization & Solidification of Above-Action-Level Soil Remediation Site Corre.tif
716	LP Radiation Treatability Study Report for Stabilization and Solidification of Above-Action-Level Soil Remediation Site Cor.tif
717	LP Radiation Trip Memo Fansteel CIW Compliance Inspection of May 5 1982 Remediation Site Correspondence FMRI_Fansteel 6_25_.tif
718	LP Radiation Trip Report - Visit Fansteel Metals, Muskogee, OK Remediation Site Correspondence FMRI_Fansteel 7_18_1994 (Sy.tif
719	LP Radiation Trip Report - Vistit to Fansteel Metals, Muskogee, OK Remediation Site Correspondence FMRI_Fansteel 7_18_1994 .tif
720	LP Radiation Trip Report Remediation Site Correspondence FMRI, Inc. 12_23_2009 (System Identifier_ 1409750).tif
721	LP Radiation Trip To Oklahoma Department Of Enviromental Quality And To Fansteel, Inc. , September 9 Through 10. 1997 Remed.tif
722	LP Radiation Trust Agreement Acceptable to NRC for Financial Assurance for Muskogee OK Facility LIC No SMB-911 Remediation .tif
723	LP Radiation U.S. Nuclear Regulatory Commission License No. SMB-911 Amendment Application Remediation Site Correspondence F.tif
724	LP Radiation U.S. Nuclear Regulatory Commission License No. SMB-911 Renewal Information Remediation Site Correspondence FMR.tif
725	LP Radiation Unresolved Items From NRC Inspection Report 040-07580_00-01 and the February 12, 2000, Hydrofluoric Acid Relea.tif
726	LP Radiation Update to Fansteel's Decommissioning Cost Estimate Remediation Site Correspondence FMRI_Fansteel 8_18_1999 (Sy.tif
727	LP Radiation VIA Facsimile 301-415-5370 and Regular Mail Remediation Site Correspondence FMRI_Fansteel 5_9_2000 (System Id2.tif
728	LP Radiation VIA Facsimile 301-415-5370 And Regular Mail Remediation Site Correspondence FMRI_Fansteel 5_9_2000 (System Ide.tif
729	LP Radiation Work Plan Remedial Assessment Fansteel Metals Remediation Site Correspondence FMRI_Fansteel 7_1_1992 (System I.tif
730	LP RCRA Notifications Fansteel Metals OKD007221831 Muskogee 8_5_1980 11_13_2013 11_09 AM (System Identifier_ 1166299).tif

#	File Name
1	airqlty.txt
2	AQ Compliance and Enforcement Enforcement Alternate Enforcement Document FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1.pdf
3	AQ Compliance and Enforcement Enforcement Alternate Enforcement Document FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 2.pdf
4	AQ Compliance and Enforcement Enforcement Alternate Enforcement Document FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 3.pdf
5	AQ Compliance and Enforcement Enforcement Alternate Enforcement Document FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 4.pdf
6	AQ Compliance and Enforcement Enforcement Alternate Enforcement Document FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 5.pdf
7	AQ Compliance and Enforcement Enforcement Alternate Enforcement Document FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 6.pdf
8	AQ Compliance and Enforcement Enforcement Alternate Enforcement Document FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 7.pdf
9	AQ Compliance and Enforcement Enforcement Alternate Enforcement Document FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 8.pdf
10	AQ Compliance and Enforcement Enforcement Alternate Enforcement Document FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 9.pdf
11	AQ Compliance and Enforcement Enforcement Alternate Enforcement Document FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_201410.pdf
12	AQ Compliance and Enforcement Enforcement Alternate Enforcement Document FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_201411.pdf
13	AQ Compliance and Enforcement Enforcement Compliance Plan FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 12_59 PM 9_18_20.pdf
14	AQ Compliance and Enforcement Enforcement Compliance Plan FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 PM 11_15_20.pdf
15	AQ Compliance and Enforcement Enforcement Compliance Plan FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 PM 11_22_20.pdf
16	AQ Compliance and Enforcement Enforcement Compliance Plan FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 PM 12_19_20.pdf
17	AQ Compliance and Enforcement Enforcement Compliance Plan FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 PM 12_2_200.pdf
18	AQ Compliance and Enforcement Enforcement Compliance Plan FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 PM 5_31_200.pdf
19	AQ Compliance and Enforcement Enforcement Compliance Plan FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 PM 5_9_2003.pdf
20	AQ Compliance and Enforcement Enforcement Compliance Plan FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 PM 7_29_200.pdf
21	AQ Compliance and Enforcement Enforcement Compliance Plan FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 PM 9_14_200.pdf
22	AQ Compliance and Enforcement Enforcement Consent Order FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 12_59 PM 9_16_2003.pdf
23	AQ Compliance and Enforcement Enforcement Notice of Violation FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 PM 4_18.pdf
24	AQ Compliance and Enforcement Enforcement Request for Information FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 12_59 PM.pdf
25	AQ Compliance and Enforcement Enforcement Request for Information FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 PM .pdf
26	AQ Compliance and Enforcement Enforcement Self Disclosures FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 PM 7_14_20.pdf
27	AQ Compliance and Enforcement General Correspondence Miscellaneous Correspondence FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_22.pdf
28	AQ Compliance and Enforcement General Correspondence Miscellaneous Correspondence FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27.pdf
29	AQ Compliance and Enforcement Inspections Full Compliance Evaluation FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_25_2015 3_17 P.pdf
30	AQ Compliance and Enforcement Inspections Full Compliance Evaluation FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 2.pdf
31	AQ Compliance and Enforcement Inspections Full Compliance Evaluation FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 3.pdf
32	AQ Compliance and Enforcement Inspections Full Compliance Evaluation FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 P.pdf
33	AQ Compliance and Enforcement Reports_Notifications Compliance Plan FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 PM.pdf
34	AQ Compliance and Enforcement Reports_Notifications MACT Notification FANSTEEL INC MUSKOGEE FURNACE FACLTY 2_27_2014 1_38 .pdf

#	File Name
1	1CONFIDENTIALITY NOTICE (2).docx
2	Legal Case Document FMRI INc 12-208 Water Quality Division Permit Violation(s) Permit Schedule Violation(s) I-51000040 Musk.tif
3	WQ Biomonitoring File 4 FMRI, INC. 51000040 Industrial Acute Toxicity Test Reports 12_10_2013 3_27_2014 4_51 PM (System Ide.tif
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17	WQ Wastewater Enforcement File 2 FMRI, INC. 51000040 Authorized Signature Statement 2 7_13_2000 3_24_2014 11_34 AM (System .tif
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Appendix C

Selected Historical Reports

Executive Summary

Executive Summary

This report documents the performance and results of the remediation assessment conducted at the Fansteel, Inc. (Fansteel) Muskogee, Oklahoma facility. This work was performed in accordance with Earth Sciences Consultants, Inc.'s work plan entitled Work Plan - Remedial Assessment, Fansteel Metals, Muskogee, Oklahoma (revised July 1992). This work was approved by the Nuclear Regulatory Commission (NRC) by incorporation into Fansteel's NRC License No. SMB-911, amendment date December 21, 1992.

The work performed as part of the remediation assessment included the installation of soil borings, monitoring wells, and test pits; the collection and analysis of soil, sediment, surface water, groundwater, air, and pond residue samples; and the performance of a radioactivity scoping survey.

The results of these activities indicate that chemical and radiological contamination is present in site soils and groundwater particularly in plant areas formerly utilized for the processing of tantalum and columbium bearing ores. Impacts are generally isolated to plant areas surrounding Ponds Nos. 2 and 3 and areas to the east of the Chemical "A" and Chemical "C" plant buildings. Soil and groundwater contamination was also detected to the east of the wastewater treatment ponds and Pond No. 5, however, at levels typically lower than that exhibited in the areas associated with manufacturing and ore processing.

Licensed residues contained within Ponds Nos. 2 and 3 exhibited characteristically hazardous concentrations of chromium. Wastewater treatment residues present in Ponds Nos. 5, 6, 7, 8, and 9 exhibited elevated levels of radioactivity. Slightly elevated levels of radioactivity and chemical contamination were detected in sediments, soils, surface water, and groundwater samples collected from the southwest portion of the site, in the area referred to as the borrow pit.

A buildings and equipment surface radioactivity scoping survey was performed in the eastern and southern areas of the site. Buildings and equipment associated with ore processing activities exhibited elevated surface radioactivity. The Chemical "C" Building is contaminated throughout by radioactive ore residues. Isolated areas of radioactive contamination were found

in the Chemical "A" and R&D buildings. Roof areas in the eastern plant appear to have been affected by radioactive fugitive dust. Paved ore storage and ore transportation areas west of the Chemical "A" Building also exhibited elevated levels of surface radioactivity.

Air monitoring activities conducted prior to and during the performance of the remediation assessment did not indicate the presence of elevated levels of suspended particulates or airborne radioactivity. Additionally, investigations of the shale bedrock aquifer indicate that this zone of saturation has not been affected by plant operations.

Respectfully submitted,

Paul N. Taylor
Project Manager

Joseph M. Harrick
Practice Area Manager,
Liability Management Programs

Marcel D. Tourdot
Executive Vice President, Regional Manager

PNT/JMH/MDT:ksm

Project No. 111
December 28, 1993

Technical Report
Remediation Assessment
Fansteel, Inc.
Muskogee, Oklahoma

1.0 Introduction

This report documents the remediation assessment performed by Earth Sciences Consultants, Inc. (Earth Sciences) at the Fansteel, Inc. (Fansteel) facility in Muskogee, Oklahoma. Earth Sciences was retained by Kirkpatrick & Lockhart on behalf of Fansteel to conduct the remediation assessment. The purposes of the remediation assessment were to characterize soil and groundwater quality and determine the magnitude and extent of potential contaminants of concern present on the subject site. Earth Sciences utilized technically appropriate investigative methods, in conjunction with available information regarding plant operations and site conditions, throughout the performance of the remediation assessment. The remediation assessment was performed in accordance with the approved Remedial Assessment Work Plan dated July 1992 (revised) prepared to facilitate its implementation.

1.1 Site Location and Setting

The Fansteel Muskogee plant occupies approximately 110 acres of land at a location 2.5 miles northeast of Muskogee, Oklahoma (Figure 1). The site lies along the western edge of the Arkansas River (Webber Falls Reservoir) and is bounded on the north by land owned by Muskogee Port Authority, on the south by U.S. Highway 62, and on the west by State Highway 165 and a service road. The facility was constructed in 1956 on alluvial soils and unconsolidated alluvium approximately 20 to 30 feet thick which are underlain by shale bedrock. Prior to the construction of the facility, the site was undeveloped. As expected in an area adjacent to a major river, the water table at the site is shallow. Groundwater flows largely toward the river with minor variations due to topographic influences and possibly site structures. Figure 2 presents a site plan of the Muskogee plant.

1.2 Facility Process Descriptions

Fansteel's Muskogee plant produced tantalum and columbium metals. Tantalum is used primarily in the electrical/electronics industry in the production of tantalum capacitors.

Columbium is marketed for use in heat-resistant alloys. The Fansteel processing facility had been in operation for approximately 33 years until operations ceased in 1990. The area had not been developed for any use prior to construction of the Fansteel facility and no previous structures existed.

The site has continued to be occupied by Fansteel since termination of processing in 1990. Chemical processing equipment used in the extraction of tantalum and columbium values from ores and slags was sold and removed from the site in 1990, 1991, and 1992. Site operations since 1990 have been limited to environmental monitoring; maintenance of buildings, grounds, and equipment remaining at the site; and cleanup of operating areas.

The Fansteel facility in Muskogee was constructed for the production of tantalum and columbium metal products. Raw materials utilized on site consisted of raw and beneficiated ores. Slag from tin extraction which contains commercially valuable concentrations of tantalum and columbium was also used as a raw material. The raw materials were ground and digested in hydrofluoric acid to extract the tantalum and columbium in the Chemical "C" Building (solid residues from the ore digestion process were stored in impoundments located in the east plant area). The digest was then treated by various liquid/liquid extraction processes to separate the dissolved tantalum and columbium which were then precipitated, purified, calcined, and refined to produce intermediate products (tantalum and columbium powders). These production processes occurred in the Chemical "A" Building, Chemical "C" Building, and the sodium reduction building and employed the following additional reagents: methyl isobutyl ketone (MIBK), sulfuric acid, potassium, fluoride, sodium metal, sodium chloride, nitric acid, sodium hydroxide, and ammonia. Liquid wastes were treated and discharged. Detailed process flow diagrams are presented in the July 1992 (revised) Remedial Assessment Work Plan.

The raw materials used for tantalum and columbium production contained uranium and thorium as naturally occurring trace constituents. These radioactive species were present in the process raw materials at an approximate concentration of 0.15 percent each of uranium oxide and thorium oxide. This concentration is sufficient to cause the ores and slags to be classified by the Nuclear Regulatory Commission (NRC) as source materials. Consequently, Fansteel operated under NRC License No. SMB-911 for the possession of source materials.

Uranium and thorium in the raw materials were not extracted from the ores by the digestion process. The radioactive species remained in the ore digestion residues which were retained in the east plant area, specifically Ponds Nos. 2 and 3. Therefore, the ore residues are classified as source material by the NRC.

The Northwest Property Area (Figure 2), during plant operations, was never utilized for the processing, generation, or disposal of licensed material. This portion of the site was involved with processing the intermediate products (tantalum and columbium powder) which were free of licensed material. The intermediate products were pressed and sintered into shapes in the Sintering Building. These sintered products were either sold as is or further refined prior to sale by electron beam melting in the Electron Beam Building. The Northwest Property Area has been assessed for both chemical and radiological parameters. Additionally, a radiation decommissioning survey was performed on this portion of the property. The results of these activities have been documented in the Radiation Survey and Remediation Assessment Northwest Property Area report dated July 1993. Fansteel has applied for release for unrestricted use for this portion of the property.

1.3 Project Background

The U.S. Atomic Energy Commission (precursor of NRC) granted Source Material License No. SMB-911 to Fansteel on January 27, 1967. Fansteel had been operating under this license as amended from that date. The NRC controls discharge of radionuclides to surface water and storage/management of radioactive materials on site. Discharge of other species is regulated by Oklahoma Water Resources Board (OWRB) under Waste Disposal Permit No. CW-69-020 and by U.S. Environmental Protection Agency (USEPA) under National Pollutant Discharge Elimination System (NPDES) Permit No. OK0001643. OWRB approved a monthly groundwater monitoring plan as part of the waste disposal permit. The Muskogee facility is exempt from regulation under the Resource Conservation and Recovery Act (RCRA) because it is an ore processing facility. However, it is subject to statutory requirements of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The Oklahoma State Department of Health (OSDH) and the Occupational Safety and Health Administration also have regulatory authority over certain aspects of facility operations. NRC has primacy over most facility operations; however, OWRB and USEPA may participate in the project if environmental conditions warrant remediation under CERCLA.

Pond No. 3, located in the northern portion of the plant site (Figure 2), had been in existence for approximately 10 years in 1989. The pond was designed and constructed as a total retention structure for ore/slag residues produced during the digestion and liquid/liquid exchange processes that occurred in Chemical "C" Building. Materials stored in the pond included digested ores and slags and fluid comprised of hydrofluoric and sulfuric acids and containing MIBK, heavy metals, and low-level radioactive species.

Pond No. 3 was constructed by excavating the alluvial soils to the top of the local shale bedrock. Because groundwater was encountered in this alluvium, a french drain network was installed around the structure to collect groundwater and route it to a wet well shown in Figure 2. Dikes were constructed above the former grade of the area to the configurations shown in Figure 2. A single synthetic liner was installed in the pond with the intent to retain all fluids and residues discharged to the structure.

The original design of the french drain collection system allowed groundwater to discharge to the small valley east of Outfall 003 (Figure 2). Some time after the pond was placed into service, the pH of the groundwater collected by the french drain decreased suggesting that the integrity of the liner may have been compromised. The wet well discharge to local surface watercourses was then ceased by plugging the outlet pipe; the collected fluids were then pumped from the wet well to Pond No. 3 or to the plant's wastewater treatment facility. The quantity of fluid pumped from the wet well fluctuated with weather conditions but typically had been approximately 10 gallons per minute.

On June 18, 1989, a large supernatant discharge from Pond No. 3 occurred from the wet well (collection sump) and french drain system adjacent to the subject pond and several seeps near the southwestern corner of Pond No. 3 (Figure 3) causing portions of the french drain system to collapse. The suspected cause of this release was a failure of the Pond No. 3 liner. The released fluid traveled along the natural drainage course around the western and northern sides of Pond No. 3 and discharged through storm water Outfall 003. Plant personnel immediately mobilized Fansteel employees and local contractors to contain the discharges.

Fluid discharge to the river was terminated by the construction of a temporary dike near Outfall 003 and a second dike near the northwestern corner of Pond No. 3. Fansteel's

personnel estimated that approximately 90,000 gallons of fluid was released into the Arkansas River before the discharge was arrested. Fansteel notified the National Response Center, State Response Commission, Muskogee Local Emergency Committee, and NRC immediately after the release was brought under control and again in writing on June 22, 1989 in accordance with PL99-499 (Superfund Amendments and Reauthorization Act Title III, Section 304) and related regulations. The fluids from the temporary ponds and Pond No. 3 were subsequently removed and routed to the plant's wastewater treatment system as directed by NRC. Pond No. 3 was approaching capacity when the release occurred.

A draft outline of a proposed remediation assessment work plan for the Pond No. 3 area entitled "Remediation Strategy, Pond No. 3" was submitted to NRC, USEPA, and OWRB in March 1990. Preliminary approval of this document was granted by the regulatory agencies with the stipulation that the entire site be included in the investigation rather than the Pond No. 3 area exclusively. On June 8, 1990, a draft remediation assessment work plan to assess conditions throughout the site was submitted to the NRC, OWRB, and OSDH for review and comment. The work plan underwent a series of agency reviews and revisions until it was eventually approved and incorporated into Fansteel's NRC license on December 21, 1992.

1.4 Purpose and Objectives

The remediation assessment was performed at the Muskogee facility to determine the potential impact of past site operations and existing site conditions on the surrounding environment. The results of this study will be utilized to ensure an efficient and environmentally sound closure of the site. Shallow soils, alluvium, bedrock, groundwater, surface water, and waste residues were characterized to determine if contaminants of environmental concern exist at the site. Studies were conducted to determine the hydraulic properties of the alluvial aquifer underlying the subject site and to determine the horizontal and vertical extent of contaminant plumes identified during the investigation. Additionally, air monitoring was conducted during the investigation to evaluate the potential for airborne transportation of contaminants. The goal of the investigation was to present sufficient data to develop technically feasible and cost-effective remedial alternatives to ensure that any risk to the environment from the identified contaminants of concern will be minimized.

1.5 Report Format

The following chapters of this report present and discuss the scope of work employed during the assessment and the results of the investigation. Chapter 2.0 presents the scope of work and field activities utilized during the performance of the remediation assessment. Chapter 3.0 discusses regional and site-specific geology and hydrogeology. Chapter 4.0 summarizes the results of the remediation assessment and Chapter 5.0 presents pertinent conclusions.

2.0 Scope of Work and Field Activities

The subsurface investigations conducted at the Fansteel facility included the installation and sampling of soil borings, groundwater monitoring wells, test pits, surface water, sediments, and ambient air. A combination of field instrumentation surveys, laboratory analyses, and hydrogeologic field testing procedures was utilized to determine physical, chemical, and radiological characteristics of soils and groundwater beneath the site. Specific details of investigation activities performed at this facility are discussed in detail below.

2.1 Drilling and Soil Sampling

A total of 96 borings (including 67 soil borings, 25 shallow monitoring wells, and 4 bedrock monitoring wells) were completed at the subject facility by A. W. Poole Drilling of Clinton, Oklahoma. Soil Borings B-1 through B-74 (Designations B-16, B-18, B-37, B-40, B-43, B-44, and B-45 were not utilized during boring numbering) were completed to characterize soil conditions only and, therefore, were advanced to the top of the uppermost zone of saturation. Boreholes for shallow Monitoring Wells MW-51S through MW-75S were advanced to the top of bedrock to characterize soil and shallow groundwater conditions. Boreholes for deep Monitoring Wells MW-151D, MW-161D, MW-167D, and MW-174D were advanced into bedrock to characterize groundwater conditions within the underlying shale. Boring logs containing detailed descriptions of subsurface materials encountered, field instrument readings, and all other pertinent drilling information are presented in Appendix A. In addition, all downhole drilling equipment was decontaminated before initial use and between borings using potable water passed through a high-pressure, high-temperature sprayer.

Boreholes for the soil borings and deep monitoring wells were advanced using 3-3/4-inch inside diameter continuous flight hollow-stem augers fitted with a 5-foot-long-by-3-inch-diameter continuous split-spoon sampler. Split-spoon samples were collected continuously throughout the depth of the boreholes. The sampling equipment was steam cleaned between uses to minimize the potential for cross contamination. Boreholes for the shallow monitoring wells were advanced through the unconsolidated materials using 6-1/4-inch inside diameter hollow-stem augers to facilitate their conversion into 4-inch monitoring wells. Continuous split-spoon samples were also collected at these locations.

Soil samples were screened in the field with a photoionization device (H-Nu) to detect any volatile organic constituents which might be present. Soil samples were also screened using a Bicron R meter and thin window beta/gamma detector for evidence of radioactive materials.

Three soil samples were selected for laboratory analysis for radiological and/or chemical analyses from each of the borings with the exception of MW-151D, MW-161D, MW-167D, and MW-179D. No soil samples were selected from deep monitoring well boreholes due to their proximity to MW-51S, MW-61S, MW-67S, and MW-74S respectively. However, continuous split-spoon samples were collected to obtain subsurface lithostratigraphic information from the deep monitoring well boreholes. For chemical analysis, samples were selected from the 0- to 6-inch interval, the depth interval immediately above the saturated zone, and an intermediate interval displaying the highest organic vapor reading or physical evidence of contamination. Similarly, samples for radiological analyses were secured from the depth interval of 0 to 6 inches, the interval immediately above the zone of saturation, and an intermediate interval displaying the highest beta/gamma reading. In some instances, the intermediate level for both chemical and radiological analyses coincided.

Soil samples designated for laboratory analysis were placed on ice and shipped to the appropriate receiving laboratory. Samples receiving radiological analyses were shipped to Accu-Labs Research, Inc. (Accu-Labs) in Golden, Colorado and samples receiving chemistry analyses were shipped to Antech Ltd. (Antech), an Earth Sciences Consultants, Inc. affiliated and OWRB-approved laboratory. Section 2.13 of this report represents specific analytical parameters. All standard protocols regarding chain of custody procedures were strictly adhered to. Soil samples not selected for laboratory analysis were archived on site for future reference, if needed.

Following completion, Borings B-1 trough B-74 were grouted to the ground surface with a cement/bentonite grout (6 to 1 mixture). Borings MW-51S through MW-75S were completed by converting them to monitoring wells. Borings MW-151D, MW-161D, MW-167D, and MW-174D were advanced through bedrock to their total depths using core drilling techniques. Coring was conducted at these locations to obtain an accurate lithologic profile of the first bedrock unit underlying the site.

Prior to coring activities at MW-151D, MW-161D, MW-167D, and MW-174D, the augers were advanced to a point of refusal generally 35 to 40 feet below ground surface. The boreholes were then increased in diameter by using recirculating water-rotary drilling techniques. A 7-7/8-inch-diameter pilot bit was initially advanced within the auger holes to depths corresponding to approximately 4 feet into bedrock. The boreholes were then reamed to the final 12-1/4-inch diameter to this same depth. After the rock cuttings and sediments were flushed from the boreholes, 8-inch inside diameter threaded steel casing with a steel and concrete drive shoe attached to the lowermost section of pipe was lowered to the bottom of the borings and extended approximately 6 inches above ground surface. The casings were subsequently pressure grouted in place by pumping a cement/bentonite slurry down the casing and injecting an 8-inch-diameter barbed rubber plug under pressure into the fitted drive shoe. This technique forced the grout to circulate between the borehole annulus and the casing. A sufficient volume of cement/bentonite grout was injected prior to pressurizing the plug to ensure recirculation to ground surface. After allowing a minimum of 48 hours for the grout to cure, the rubber plug and concrete base of the drive shoe were reamed out using the 7-7/8-inch tricone drill bit and water-rotary techniques. This procedure was followed to prevent any unconsolidated materials from collapsing into the borings during subsequent drilling activities and to prevent the potential for groundwater within the shallow water-bearing zone to migrate vertically into deeper zones of saturation.

Rock cores were obtained utilizing diamond-tipped core bits and collected in an HQ stainless steel core barrel (5-inch-diameter outer barrel). Steel rods were used to hoist the 10-foot-long core barrel to the surface. Once removed from the boreholes, cores were initially screened for the presence of organic vapors utilizing an H-Nu meter and for radiation using a beta/gamma meter. The cored rock sections were then logged for lithology, color, grain size, hardness, sedimentary structures, and fractures. Rock quality designation (RQD) was measured along with total core recovery. RQD is a cumulative measure of all portions of a core greater than 4 inches in length and provides a qualitative description of the competence and degree of fracturing in strata. Rock core samples were placed in core boxes, identified, and staged on site.

Core drilling was advanced into shale bedrock and was completed after identifying evidence of groundwater migration. The bottom of the core holes were sealed utilizing bentonite pellets

to ensure that the monitoring wells communicated with the fractured horizon detected. This installation procedure was conducted after discussions with and concurrence by the NRC's personnel. Following the completion of coring and with concurrence of NRC's personnel, the boring was reamed with a 7-7/8-inch-diameter tricone drill bit using water-rotary drilling techniques. All soil and rock cuttings produced during subsurface drilling activities were collected into Department of Transportation (DOT)-approved 55-gallon drums and stored on site for proper management by Fansteel. All recirculated fluids produced during drilling activities were pumped into a tanker for subsequent management by Fansteel.

2.2 Monitoring Well Installation and Development

A total of 29 monitoring wells (identified as MW-51S through MW-75S, and MW-151D, MW-161D, MW-167D, and MW-174D) were installed at the Fansteel site to determine the geochemical character of groundwater at this location. Monitoring Wells MW-51S through MW-75S were installed within the alluvium at the top of bedrock. Monitoring Wells MW-151D, MW-161D, MW-167D, and MW-174D were installed to communicate with fractures within the uppermost bedrock shale unit (McCurtain Shale). These series of wells provide for the evaluation of groundwater chemistry within the two uppermost continuous zones of saturation beneath the facility.

All monitoring wells were constructed of 4-inch-diameter, flush-joint, threaded polyvinyl-chloride (PVC) riser pipe and well screens. As proposed in the work plan, well screens were 15 feet in length in the shallow wells and 10 feet in length in the deeper bedrock well. The well screens were factory slotted 0.01 inch and fitted with a flush-joint threaded PVC bottom cap. All PVC riser pipe and screen were steam cleaned on site prior to installation.

Groundwater Monitoring Wells MW-51S through MW-75S were constructed by placing the screen fitted with an end cap through the hollow-stem augers. Sections of solid riser pipe were then added to the screen extending to the ground surface. As the augers were removed, the annular space surrounding the PVC was filled with chemically inert clean silica sand sized appropriately for the slot size (2040 grade sand) to approximately 2 feet above the top of the screen. An approximate 1- to 2-foot-thick fine silica sand filter pack followed by approximately 2 feet of bentonite pellets was placed sequentially above the coarse sand. The bentonite pellets

were then hydrated with 5 gallons of potable water and allowed time to expand forming a low-permeability clay seal. The annular space remaining above the bentonite seal was filled with a cement/bentonite (6 to 1 mixture) grout. A 6-inch-diameter steel well guard equipped with a locking cap was grouted in place at the surface of each well. Following the completion of each well, a lock was installed on each steel guard to ensure the integrity of the well.

Groundwater Monitoring Wells MW-151D, MW-161D, MW-167D, and MW-174D were constructed similar to the shallow wells. However, due to the placement of steel casing, augers were not required for installation. In addition, a slightly larger bentonite seal (4 feet thick) was installed to support a substantially larger overlying grout component. Well installation details for all wells are presented in Appendix A. Table 1 presents a monitoring well installation data summary.

The monitoring wells were developed using surge and bail methods to remove fine-grained sediments and any materials introduced during drilling and well installation. Development continued until turbidity of the discharge water was reduced to a level acceptable to the supervising geologist and field pH and specific conductance stabilized. pH and specific conductance readings were considered to have stabilized when readings from three consecutive bailers did not vary by more than 10 percent. Water collected as a result of monitoring well development was contained in double-lined DOT 55-gallon drums and contained on site for proper management by Fansteel. Wells were developed with a 3-1/2-inch PVC bailer which was decontaminated between wells using rinses of hexane, methanol, and 5 percent nitric acid solution followed by a thorough distilled water wash.

2.3 Groundwater Sampling

Groundwater samples were collected from Monitoring Wells MW-51S through MW-75S on February 24 through March 2, 1993. Monitoring Wells MW-151D, MW-161D, MW-167D, and MW-174D were sampled on March 3, 1993. Monitoring Well MW-151D was sampled again on April 30, 1993.

In order to ensure the collection of samples representative of formational water, each well was evacuated prior to sampling. Initially, static water elevations were obtained by measuring water depth with a Solinst Model 121 water level meter to the nearest 0.01 foot. After static

water levels were recorded, the standing water volume in each well was calculated and recorded on Earth Sciences' Well Evacuation/Sampling sheet. Calculations were performed using the following formula:

$$Volume\ (gallons) = \pi r^2 h\ x\ (7.48\ \frac{gal}{ft^3})$$

where

π = 3.14,
r = inside well casing radius in feet, and
h = height of the water column in the well.

Wells were purged by removing a minimum of three well volumes of water or until they were bailed dry, whichever came first. The following information was recorded in triplicate on a field sheet: pH, conductivity, and temperature. Each well was purged using dedicated 3-1/2-inch PVC bailers in conjunction with new clean nylon rope.

Prior to well evacuation, a calibration check was performed on each field instrument. Equipment requiring calibration included the pH meter and specific conductivity meter. The dissolved oxygen meter and Eh meter were calibrated prior to groundwater sampling activities. The pH meter was calibrated by placing the probe in standard solutions of 4.00, 7.00, and 10.00 pH units and adjusting the calibration control. For measurement of specific conductivity, the Micron Extraction Procedure meter was calibrated by zeroing the indicator dial with deionized water. The dissolved oxygen meter was field calibrated by adjusting the air temperature and mean sea level elevation dials to conform to field conditions. The Eh meter was calibrated by placing the probe in Zoebel solution which has a known stable redox potential. The instrument is then adjusted according to the known calibration solution and groundwater temperatures. A record of the calibration check was included on the well evacuation/water sampling sheets.

The wells were sampled within 24 hours following the time of well evacuation. Prior to sampling, the water level in the well was again obtained to ensure adequate recovery since

purging and recorded on the field sheets. The dissolved oxygen probe was lowered into the well and a measurement of dissolved oxygen was obtained and recorded. The water level meter and dissolved oxygen probe were decontaminated between sampling locations using rinses of hexane, methanol, and 5 percent nitric acid solution followed by a thorough distilled water wash.

Groundwater samples were obtained using dedicated 3-1/2-inch PVC bailers in conjunction with new clean nylon rope. After collecting the samples with minimal disturbance, the water samples were decanted directly from the bailer into the appropriate sample containers which contained the appropriate preservative. Volatile organic compounds (VOC) were collected first to minimize potential volatilization. Each 40-milliliter vial was filled such that no airspace was present. Following the collection of VOCs, other samples were collected in appropriate sample containers and properly preserved. Field measurements of pH, conductivity, and temperature were collected from a clean disposable plastic cup. In addition, general field observations including turbidity, odor, immiscible layers, and color were recorded for each groundwater sample. The redox potential was measured with an Eh meter at each well location on March 4, 1993 using a clean disposable plastic cup. Section 2.13 of this report presents specific analytical parameters. As with the soil samples, groundwater samples requiring radiological analyses were submitted to Accu-Labs. and those requiring chemical analyses were submitted to Antech. Proper chain of custody protocols were adhered to regarding sample handling and transportation.

2.4 Test Pit Excavation and Soil Sampling

A total of 13 test pits (TP-1 through TP-13) were excavated at the Fansteel site (Figure 2) to investigate the potential presence of buried drums in a central area of the site situated between the service building to the west, the Chemical "A" Building to the east, the R&D building to the north, and Pond No. 8 to the south. The test pits were excavated in this area even though a geophysical survey did not identify any unidentifiable magnetic anomalies in any area of the site.

All 13 test pits were excavated to a depth of approximately 5 feet below ground surface. The test pits were profiled for depth, subsurface horizons, color, structure, moisture, or groundwater presence, rock fragments, etc. All excavation activities were supervised and logged by

a qualified Earth Sciences geologist. Each test pit was screened with an H-Nu and a beta gamma meter to detect any volatile organic vapors or radioactive materials which may have been present. Test pit logs are presented in Appendix B. One soil sample was selected for laboratory analysis based upon visual observations and instrumentation responses. The soil samples were analyzed for a variety of radiological and chemical parameters which are presented in Section 2.13 of this report.

2.5 Pond Residue Sampling

Pond residues were sampled at 25 different locations within Ponds Nos. 2 (3 locations), 3 (5 locations), 5 (3 locations), 6 (2 locations), 7 (2 locations), 8 (5 locations), and 9 (5 locations). Pond sampling locations are identified in Figure 2. Because the residues contained within these ponds generally could not support a drill rig and standard split-spoon sampling techniques would not effectively sample the residues, an alternative method was used. Residue samples were collected at each location using a hollow-steel sampling barrel connected to an air compressor. The sampling barrel and air compressor were mounted on a pontoon barge which maneuvered from sampling location to sampling location by means of a steel cable and winch. Once at a sampling location, the sample barrel was inserted into the pond residues and a slight vacuum was created on the inside of the sample barrel. The barrel was then manually advanced through the pond residues until the bottom of the pond was encountered. The vacuum was maintained and the sample barrel was then slowly extracted from the residues. The residue samples were then extracted from the sample barrel by reversing the vacuum and exerting a small amount of pressure to the inside of the barrel.

Once extracted, the residue sample was divided into equal thirds, placed into stainless steel buckets, and homogenized. The homogenized samples were then placed into appropriate sample containers resulting in three samples per location. The sample barrel and stainless steel buckets were decontaminated between sample locations by swabbing the interior of the barrel and scrubbing the buckets with deionized water and soap followed by rinses of deionized water, a 5 percent nitric acid solution, methanol, and a final deionized water rinse. The barge and all sampling equipment were thoroughly steam cleaned between ponds and surveyed with beta/gamma meters to ensure that all residual radioactivity had been removed.

As stated earlier, three residue samples were collected from each sample location corresponding to the top third, middle third, and bottom third of residues present. The samples were analyzed for a variety of radiological and chemical parameters by Accu-Labs and Antech respectively. A specific list of analytical parameters is presented in Section 2.13 of this report.

2.6 Surface Water and Sediment Sampling

A total of seven surface water and six surface sediment samples were collected at the locations identified in Figure 2. In general, a sediment sample was collected at each surface water sampling location for comparative purposes. However, no sediment was available for sampling at Outfall 001 (SS-001). Surface water was collected directly into laboratory supplied sample containers. A new disposable sampling trowel was used at each location to sample sediments. The sediments and surface water samples were analyzed for a variety of radiological and chemical parameters as discussed in Section 2.13 of this report.

2.7 Seep Sampling

During the performance of the remediation assessment, the pool elevation of the Arkansas River prohibited access to the riverbank and an inspection for seeps could not be performed at that time. In early August 1993, after a period of significant rainfall, Earth Sciences' personnel returned to the site and completed the seep inspection. No seeps were identified which exhibited a sufficient enough flow to allow for sample collection and, as a result, no seep samples were collected.

2.8 Hydrogeological Testing

Hydrogeologic testing was conducted to determine representative hydraulic properties of both the shallow alluvial and shale bedrock aquifers beneath the Fansteel site. This information is valuable in defining possible contaminant pathways, determining the potential environmental risk associated with groundwater contamination, and developing technically feasible remedial alternatives for groundwater remediation. Methods which incorporate appropriate hydraulic testing without significant discharge of contaminated groundwater have been selected.

Hydraulic conductivity, storativity, specific yield, transmissivity, hydraulic gradients, and average linear flow velocity were calculated for both the alluvial and shale bedrock aquifers

beneath the site. Hydraulic conductivities will be calculated using aquifer type (confined or unconfined) and hydraulic test (slug or pump) specific models. Storativity, specific yield, and transmissivity for each aquifer will be calculated using standard formulas and aquifer characteristics determined during drilling activities. A potentiometric surface map will be generated for each aquifer from data collected during the remediation assessment. The hydraulic gradients will be determined using information provided on these potentiometric surface maps. To determine the rate of groundwater migration beneath the site, the average linear flow velocity in the downgradient direction will be calculated using the formula:

$$V = \frac{k*i}{n_e}$$

where

V = average linear flow velocity,
k = hydraulic conductivity,
i = groundwater flow gradient, and
n_e = effective porosity.

2.8.1 Slug Tests

Slug tests were performed on 19 of the newly installed monitoring wells at the site after development. Fifteen of the shallow wells and the 4 deep wells were slug tested to characterize the hydraulic properties of both the alluvial and shale bedrock aquifers. The tests were performed by placing a solid PVC pipe (slug) below the static water level and measuring the subsequent rate of fall of the water level in the well. In-Situ Hermit digital environmental data loggers interfaced with pressure transducers were used to record the rate of water level recovery in the monitoring wells during the testing periods. Recovery data generated during these tests will be reduced using the H. Bouwer and R. C. Rice method (1976, "A Slug Test for Determining the Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells," Water Resources Research, Vol. 12, No. 3) to determine the hydraulic conductivity (K) of the aquifers. Appropriate computer modeling software will be used to aid in these calculations.

2.8.2 Pumping Tests

A pump test was conducted at Monitoring Well MW-53S after Earth Sciences' personnel determined that this location was not impacted by site operations in either the alluvial or shale bedrock aquifers. The pump tests required the installation of three 2-inch-diameter PVC observation wells and one 4-inch-diameter PVC pumping well in the alluvial aquifer. Only an initial decontamination of drilling equipment and no soil sampling activities were necessary because the proposed pumping tests were conducted on wells at background locations. The pumping well was drilled and installed utilizing the standard procedures presented in Sections 2.1 and 2.2 of this report. All drilling and pumping activities were supervised by a qualified hydrogeologist.

After well development, an electric submersible pump was lowered into the well and a step test was conducted to determine maximum well yield. Upon completion of the step test, the water level in the pumping well was allowed to equilibrate and a steady rate nonequilibrium pumping test was performed in the shallow aquifer. Monitoring Well MW-53S was pumped for 3,900 minutes (65 hours). The total duration of the pump test including recovery was 72 hours. Based on step test data, it was determined that a pumping rate of 0.1 gallon per minute would be adequate to maintain well yield. Water level measurements from the pumping and observation wells were measured and recorded using In-Situ Hermit digital environmental data loggers interfaced with pressure transducers during the pumping test and throughout the water level recovery period following completion of the pumping test. Data were reduced using Jacob's Straight-Line Method and other appropriate methods to determine the hydraulic properties of each aquifer. Applicable computer modeling software was used to aid in these calculations.

2.9 Background Radiological Sampling

Background radiological conditions for the Fansteel facility were determined in order to establish baseline conditions against which radiological values measured on the site could be compared. The background was determined by obtaining instrument readings and soil samples from 30 off-site locations near the Fansteel facility. The background measurement locations are shown in Figure 3. The following measurements were performed at each background location:

- Gamma radiation in counts per minute at the ground surface utilizing a Ludlum Model 44-10 gamma scintillation probe and a Ludlum Model 2221 single channel analyzer operated in the scaler mode.

- Gamma radiation in counts per minute at an elevation of 1 meter above the ground surface utilizing a Ludlum Model 44-10 gamma scintillation probe and a Ludlum Model 2221 single channel analyzer operated in the scaler mode.

- Beta-gamma radioactivity in counts per minute at the ground surface utilizing a Ludlum Model 44-9 pancake type Geiger-Muller probe and a Ludlum Model 2221 single channel analyzer operated in the scaler mode.

- Gross alpha and gross beta radioactivity of the 6 inches of surface soil. Gross alpha and gross beta radioactivity were determined by laboratory analysis.

- Concentration of specific radionuclides in the top 6 inches of surface soil. Specific radionuclide concentrations were determined by laboratory analysis utilizing gamma spectroscopy and radiochemical analysis.

The results of the background investigation were utilized to calculate the average off-site gross alpha and gross beta radioactivity as well as the average concentration of uranium and thorium in the off-site soils.

2.10 Site Radiological and Geophysical Survey

Radiological and geophysical survey activities were conducted over the southern and eastern portion of the Fansteel facility. The following operations were performed:

- Instrumental survey of exterior grounds, paved areas, roads, concrete pads, etc.
- Instrumental survey of building exterior surfaces.
- Instrumental survey of building interior surfaces.
- Instrumental survey of equipment and facilities.
- Laboratory analysis of samples of soil, subsurface materials, sediments, surface water, groundwater, and pond residues for gross alpha and gross beta radioactivity as well as identification and quantitation of specific radionuclides.

Instrument surveys were conducted at defined locations. In the case of the instrumental surveys performed on the exterior grounds and exterior and interior building surfaces, the survey locations are described by the imposition of a regularly shaped geometric grid over the areas to be surveyed. The dimensions and spacing of these grids vary with the area being surveyed. It should be noted that the site radiological survey was performed to identify areas of potential concern and not intended as a comprehensive decommissioning survey.

2.10.1 Instrumental Survey of Exterior Grounds

2.10.1.1 Radiological Survey

External areas of the Fansteel property were subject to an instrumental survey to determine the presence of surficial contamination by radioactive materials and to indicate the possible presence of subsurface accumulations of radioactivity. Measurements of alpha, beta, and gamma radioactivity were obtained at the ground surface at designated points covering the entire area of land occupied by Fansteel. Additionally, gamma radioactivity measurements were obtained at an elevation of 1 meter at each of these points. The following instruments were used for performing these surveys:

- Ludlum Model 43-68 gas proportional probe attached to a Ludlum Model 2221 or Model 2200 single channel analyzer for alpha and beta activity measurements.
- Ludlum Model 43-10 or 43-5 alpha scintillation probe attached to a Ludlum Model 2221 or 2200 single channel analyzer for alpha activity measurements.
- Ludlum Model 44-10 gamma scintillation probe attached to a Ludlum Model 2221 or Model 2200 single channel analyzer for gamma radiation measurements.
- Ludlum Model 44-9 pancake type Geiger-Muller probe attached to a Ludlum Model 2221 or 2200 single channel analyzer or Ludlum Model 3 ratemeter for measurement of beta and/or gamma radioactivity.

A survey grid was established over the south and east plant area of the property for the location of sample points. Two different spacings of grid points were utilized. Surveys were performed within the boundaries of the areas utilized for manufacturing, processing, storage,

and waste management at a 10-meter interval. These areas were considered more likely to exhibit radioactivity than other areas on the Fansteel property. Outside the designated remediation assessment study areas, surveys were conducted at a 25-meter interval. The location of exterior grounds survey points is shown in Figure 4. Survey measurements were obtained at the numbered locations shown in the figure. Soil samples were collected at some of the survey grid points which exhibited elevated radioactivity with respect to background in the area. These samples were analyzed for gross alpha and gross beta.

2.10.1.2 Geophysical Survey

Each exterior survey point was also examined for the presence of subsurface metal objects which might indicate the presence of buried drums, tanks, or other containers. This investigation was conducted using electromagnetic metal detectors (Fisher Model "Pulse 8X").

2.10.2 Instrumental Survey of Building Exterior Surfaces

Radioactivity surveys were conducted over the exterior surfaces of the buildings located on the south and east plant portion of the Fansteel property. A 1-meter square grid was established to locate survey points on each building exterior wall. A portion of the grid squares were then surveyed for the presence of radioactivity. Building exterior and roof surfaces were surveyed at a density of at least 5 percent of the available grid square, i.e., one grid square in 25.

The same types of instruments were utilized for this survey as described in Section 2.10.1.1. The following measurements were obtained from each surveyed 1-meter square area:

- Three measurements of beta activity, consisting of one 1-minute count from the upper right-hand quadrant, the center, and the lower left-hand quadrant.
- One measurement of alpha activity consisting of one 1-minute count from the center of the square.
- One measurement of gamma activity consisting of one 1-minute count at the surface of the center of the square.
- One measurement of gamma activity consisting of one 1-minute count at a distance of 1 meter normal to the center of the square.

Building locations are shown in Figure 2.

2.10.3 Instrumental Survey of Building Interior Surfaces

Building interior surfaces were surveyed in the same manner as the building exterior surfaces. The same type of grid, instruments, and measurement techniques were used for the interior building surface surveys as for the building exterior surface surveys. Building interior surveys were conducted at a density of 11.1 percent of the available grid squares, i.e., one grid square in nine.

2.10.4 Instrumental Survey of Equipment and Facilities

Equipment and furnishings located inside the buildings were also surveyed. A regularly spaced grid cannot normally be established for items of equipment, furniture, etc., because of their small size and irregular shape. Consequently, survey point locations were arbitrarily assigned for these items. Survey points were selected such that each identified item of equipment or facility component was measured for surficial radioactivity. Items with an apparent surface area of 4 square meters or more had additional survey points located such that one set of measurements was obtained for every 4 square meters of surface area. The same types of instruments and measuring techniques were used for the survey of equipment and facilities as were utilized for the building surface surveys.

The radiological survey of the Fansteel property was conducted as two separate studies. The northwest portion of the property, consisting of approximately 35 acres of ground and 6 buildings, was treated as a separate parcel for purposes of the radiological survey. Results of the radiological survey for this portion of the property were reported in Radiation Survey and Remediation Assessment Northwest Property Area dated July 1993. The radiation survey addressed in this report concerns the remainder of the Fansteel property, consisting of approximately 75 acres and 11 buildings. The boundaries of the plant area and buildings subject to the radiation survey discussed herein are shown in Figure 2.

2.11 Air Monitoring

Air monitoring was conducted prior to and during the performance of remediation assessment field activities in order to determine if airborne particulate matter and/or radioactivity were being released from the site. Five air monitoring stations were established at the locations

50 picocuries per liter in a sample, individual radionuclide analyses were performed to determine the contributing species.

Soil and sediment samples collected for laboratory analysis at the site were analyzed for total metals (tantalum, columbium, tin, lead, nickel, antimony, arsenic, barium, cadmium, calcium, chromium, mercury, selenium, and silver), total fluoride, total ammonia, total sulfate, gross alpha, gross beta, and MIBK).

Generally, if gross alpha or gross beta was detected at levels significantly above background concentrations in site soil or sediment samples, individual radionuclide analyses were performed to determine the contributing species. The selection of soil or sediment samples chosen for individual radionuclide determinations was based on the number, location, distribution, and extent of apparent contamination of the samples.

Additionally, 20 percent of the soil samples were analyzed for the USEPA Toxicity Characteristic Leaching Procedure (TCLP) metals to determine the mobility of any contaminant detected. Soil samples were selected for TCLP metals analysis based on the highest total metals concentrations detected.

Waste samples collected from the facility's ponds (Ponds Nos. 3, 5, 6, 7, 8, 9, 1S, and 1N) were analyzed for total metals (antimony, arsenic, barium, beryllium, cadmium, chromium, columbium, lead, mercury, molybdenum, nickel, selenium, silver, tantalum, and tin) utilizing inductively coupled argon plasma procedures, TCLP metals, major anions and cations, total cyanide, VOCs, semivolatile organic compounds, uranium, $thorium_{230}$, $radium_{226}$, $radium_{228}$, gross alpha, and gross beta.

shown in Figure 2. Air samples were collected over 24-hour periods in accordance with the procedures outlined in the remediation assessment work plan. Samples were analyzed gravimetrically for total suspended particulates (TSP). Gross alpha and gross beta radioactivity were also measured on the particulate materials retained on the TSP filters.

2.12 Site Survey

All test borings and site monitoring wells were located according to a surveyed site grid system. Test borings were surveyed for ground surface elevations and monitoring wells were surveyed for ground surface, top of PVC, and top of steel casing elevations. All elevations are referenced to a U.S. Geological Survey datum and are accurate to 0.01 foot. All surveying was performed by Newell and Associates, a licensed Oklahoma surveyor.

2.13 Laboratory Analysis

Samples were collected and transported for analysis at the Muskogee facility following standard procedures outlined in the previous sections of this chapter. Contaminants of concern at the site were defined based on past site operations and historical groundwater, soil, and waste chemistry data. All samples collected for chemical analysis were analyzed by Earth Sciences' affiliated laboratory, Antech. All radiological parameters were analyzed by Accu-Labs.

Groundwater and surface water samples collected for laboratory analysis were analyzed for total metals (tantalum, columbium, tin, lead, nickel, antimony, arsenic, barium, cadmium, calcium, chromium, mercury, selenium, and silver), total fluoride, total ammonia, total sulfate, nitrate, gross alpha, gross beta, and MIBK. Dissolved metals analyses (same specific metals as above) were performed on 20 percent of the aqueous samples collected for comparative purposes. The selection of aqueous samples for dissolved metals analysis was based on elevated total metals analytical results. Additionally, groundwater samples collected from 13 of the site monitoring wells were analyzed for the USEPA Target Compound List (TCL) parameters to verify that the contaminants of concern list identified at the site is comprehensive. Included in this analysis are all monitoring wells downgradient of the facility (MW-60S, MW-61S, MW-151D, MW-161D, MW-62S, MW-66S, MW-67S, MW-167D, MW-73S, and MW-74S), one monitoring well directly downgradient of Pond No. 3 (MW-71S), and three upgradient wells to establish background conditions (MW-51S, MW-151D, and MW-52S). Generally, if gross alpha was detected in excess of 15 picocuries per liter or gross beta was detected in excess of

3.0 Geology and Hydrogeology

This chapter discusses the regional geology and hydrogeology as it pertains to the Fansteel facility located in Muskogee, Oklahoma. The site-specific geology and hydrogeology is also presented in this chapter and is based on specific information and data obtained during the performance of the remediation assessment. The regional geologic setting is discussed in Section 3.1 and the regional hydrogeology is presented in Section 3.2. Sections 3.3 and 3.4 discuss site-specific geology and hydrogeology.

3.1 Regional Geology

The city of Muskogee, Oklahoma is located in the unglaciated Osage Section of the Central Lowlands Physiographic Province. The eastern boundary of the section is delineated by the lapping of westward dipping Pennsylvanian rocks onto the western edge of the Ozark and the Ouachita uplifts. On the south, the Osage Section abuts the Arkansas Valley and Ouachita Mountains. Much of the Osage Section can be described as scarped plains. The topography ranges from nearly featureless plain and low escarpments to bold escarpments that rise as much as 600 feet above the adjacent plains. Lowlands or plains mark the weak rock belts and hills or escarpments the areas of resistant rock.

Bedrock in the southeastern portion of the Osage Section consists of mostly thin- to massive-bedded sandstone, shale, siltstone, and limestone of Pennsylvanian Age. The sandstone beds are hard and well cemented and the shales and siltstones are compact and dense. Units identified in the Muskogee area include the Hartshorne Sandstone, the McCurtain Shale, and the Warner Sandstone, in ascending order. Permeability in this type of bedrock is generally low and groundwater movement depends on secondary porosity (joints and fractures) rather than primary porosity (intergranular).

Although the subject site is physically located in the Osage Section, the regional structural geology is influenced by its proximity to the Boston Mountains Section of the Ozark Plateau Physiographic Province and the Arkansas Valley Section of the Ouachita Physiographic Province. The Boston Mountains form a fairly narrow east-west belt at the extreme southern margin of the Ozark Dome (uplift). Rocks of the Boston Mountains Section are early and middle Pennsylvanian in age and are predominantly sandstone and shale. Faulting is

conspicuous in the Boston Mountains, particularly in Cherokee and Adair counties of Oklahoma. However, the number and magnitude of these faults rapidly subsides until they are eventually unrecognizable west of the Arkansas River. On the southern margin of the Boston Mountains, near the subject site, bedrock dips steepen rapidly as the strata descend into the synclinorium in the Arkansas Valley to the south.

The Arkansas Valley Section is an east-west belt that extends from Oklahoma to the Coastal Plain in Arkansas. The Arkansas Valley is a trough both topographically and structurally. It is transitional between the essential homoclinal structure of the south flank of the Boston Mountains to the north and the complexly folded strata of the Ouachita Mountains to the south. Intensity of folding increases from the Ozark Uplift (north) to the Ouachita Mountains (south). Closed folding with an east-west trend characterizes the Arkansas Valley. The structures and associated ridges commonly overlap one another en echelon. Rocks in the Arkansas Valley, with the exception of a few igneous intrusions, are Carboniferous in age and belong mainly to the Atoka, Stanely, and Jackfork groups. The Atoka Group which consists mostly of shale and thin sandstone forms an erosional scarp located approximately 4 miles from the Arkansas River (and the subject site) and is the closest bedrock outcrop. The subject site is located on the northern flank of the Arkansas Valley. Bedrock dips typically are to the south toward the axis of the basin.

Bedrock in the area of the subject site is nearly entirely overlain by alluvial deposits. The general regional topography of the bedrock beneath the alluvial deposits is relatively uniform with minor variations due to differential erosion. Terrace deposits having upper surfaces ranging from 20 to 120 feet above the floodplain border the alluvial deposits in segments on both sides of the Arkansas River. These deposits are composed predominantly of silt, fine sand, coarse sand, and gravel near the base. The city of Muskogee is on a terrace segment that extends north and east of the city to the bank of the Arkansas River.

Alluvium is formed in lenticular segments along the Arkansas River from 1 to 3 miles wide and 3 to 11 miles long which roughly parallel the river flow direction. Deposits of alluvium underlying the floodplain consist of clay, silt, sand, and gravel in proportions that vary locally. A general feature of the alluvium is the gradation in grain size from gravel or coarse-grained

sand near the base of the deposit to silt and clay near the surface. Its total thickness averages 42 feet and its saturated thickness is approximately 25 feet.

3.2 Regional Hydrogeology

Shale bedrock permeability is generally low and, therefore, does not readily transmit groundwater in the Muskogee area as discussed previously in Section 3.1. However, a small amount of water is produced from bedrock aquifers throughout the area for domestic and stock use, presumably from fractures or joints within the bedrock. Depths to water measured in wells completed into the bedrock average approximately 30 feet below ground surface.

Alluvial deposits are the most important aquifer in the Muskogee area and along the Arkansas River in general. Precipitation is the primary recharge, averaging approximately 36 to 40 inches per year (Todd, 1983). Natural discharge is mainly by seepage into streams and evapotranspiration. Quantities of groundwater adequate for domestic or stock use are available almost everywhere on the alluvial floodplain. Wells completed into the alluvium have been recorded to yield between 300 and 5,000 gallons per minute (Todd, 1983).

Groundwater in the alluvium is predominantly a hard, calcium, magnesium bicarbonate type. The quality is affected by precipitation, geology, water movement, and hydraulics of the alluvium. The water is suitable for irrigation and for domestic, stock, and limited industrial purposes.

3.3 Site Geology and Hydrogeology

In February 1991 (revised July 1992), Earth Sciences submitted a Remedial Assessment Work Plan for the Fansteel facility in its entirety. Earth Sciences' personnel conducted a background literature search to obtain regional geologic and hydrogeologic information concerning rock units and unconsolidated deposits in the vicinity of the Fansteel facility. Information obtained during this search was used to postulate geologic and hydrogeologic conditions underlying the subject facility and develop a site-specific work plan to evaluate such conditions.

The Remedial Assessment Work Plan proposed to define geologic conditions of the subsurface through an extensive drilling program that included collection of continuous split-spoon samples of the unconsolidated materials and obtaining core samples of the underlying bedrock.

The hydrogeologic conditions in the Northwest Property Area were to be defined by observing water inflow zones during drilling, slug tests, and static water level measurements. The following sections present a detailed summary of site geologic and hydrogeologic conditions at the Fansteel property area based on these activities.

3.3.1 Site Geology

A total of 96 soil borings were advanced at the subject property as specified in the remediation assessment work plan. Twenty-five of these soil borings were converted into shallow groundwater monitoring wells (MW-51S through MW-75S) and four into deep monitoring wells (MW-151D, MW-161D, MW-167D, and MW-174D). In addition, three observation wells (OW-1, OW-2, and OW-3) were installed as part of the pumping tests performed at the subject site. The shallow monitoring wells were installed to the top of bedrock, fully penetrating the unconsolidated materials. The deep monitoring wells were installed into the McCurtain Shale which represents the first bedrock unit encountered beneath the site. The remaining soil borings not converted into monitoring wells were also drilled into unconsolidated materials to determine the depth to groundwater in these locations and to provide additional information regarding the chemical character of the sediments beneath the site. However, because these three borings were not fully advanced to bedrock, the thickness of the water-bearing zone at these locations was unquantifiable. The locations of the soil borings and monitoring wells are presented in Figure 2 included with this report.

As shown in geologic Cross Sections A-A,' B-B', and C-C' (Figure 5) and the boring logs contained in Appendix A, unconsolidated deposits underlying the Fansteel site range in thickness from approximately 8.75 feet (MW-75S) to approximately 34.5 feet (OW-1). These unconsolidated materials consist of natural soils and heterogeneous fill material. The fill is probably a heterogenous mixture of man-made materials and reworked natural soils used during the grading of the site. Fill material was not identified in most of the soil borings, however, where encountered, thicknesses ranging from 0.5 foot (MW-58) to 24 feet (OW-2) were observed.

The natural soils observed at the subject site are alluvial terrace deposits composed predominantly of silty and sandy clay, silt, fine sand, and coarse sand. It is typical of alluvial deposition for the more coarse-grained deposits to be found near the base of the materials.

Coarse-grained materials are heavier and will remain suspended in a medium- to high-energy environment for a shorter period of time than fine-grained sediments. This depositional environment is evident in the sequence of materials encountered beneath the Fansteel site.

The alluvial soil deposits observed beneath the subject property can be divided into two units. At the base of the unconsolidated deposits and overlying bedrock is a medium- to coarse-grained sand unit ranging in thickness from approximately 1.5 feet (MW-56S) to 17.5 feet (MW-54S). This sand unit is generally saturated throughout its entirety with few exceptions.

Additionally, at the base of the lower coarse-grained unit, a sand and gravel layer was observed in seven of the soil borings. This very coarse-grained layer, where observed, ranged in thickness from 0.5 foot (B-20) to 5.0 feet (B-64). Except for the occurrence in OW-2, the sand and gravel layer appears to be confined to the northeastern portion of the subject property.

Overlying the sand unit and comprising the major portion of the unconsolidated materials are a series of finer-grained deposits. These fine-grain materials range from 3 feet (MW-69S) to 27 feet (OW-1) in thickness and consist of predominantly silty and sandy clay at the top grading to clayey sand toward the bottom. As is evidenced at Well MW-51S, occasional coarse-grained lenses of materials may be found within the predominantly finer-grained matrix.

The bedrock encountered beneath the facility is the McCurtain Shale. Site monitoring wells MW-151D, MW-161D, MW-167D, and MW-174D were designed to monitor hydrogeologic conditions in the McCurtain Shale. As part of the monitoring well installation process, rock cores of the McCurtain Shale were retrieved and logged in detail. Monitoring Well MW-174D had the deepest penetration of the McCurtain Shale, 56.3 feet. Based on the boring logs contained in Appendix A for Monitoring Wells MW-151D, MW-161D, MW-167D, and MW-174D, the McCurtain Shale encountered at this location is predominantly medium to dark gray, siliceous, and moderately hard. Few relatively intense zones of horizontal fracturing were observed which included the presence of a few fractures on a 45-degree plane from horizontal. RQD values ranged from 0 to 100 percent. In general, the lower RQD values were recorded near the top of bedrock surface and typically increased with increasing depth corresponding to lessening degrees of weathering. Some of the fractures in the basal 30 feet of shale are clay filled indicating groundwater flow through fractures in this portion of the shale. Due to the

injection of water during coring activities, zones of saturation within the shale were detected using secondary identification indicators such as staining, contact features, and fracture/filling characteristics.

Although encountered at different portions of the facility during other remediation assessment activities, the strike and dip of the McCurtain Shale beneath the facility was not able to be calculated from drilling information because the unit was not fully penetrated and the uppermost surface represents an erosional surface. However, a strike and dip measurement from an outcrop of the McCurtain Shale on the west bank of the Arkansas River east of the Fansteel property boundary indicated the strike to be N20°W with a dip of 14 degrees to the southwest.

A top of bedrock map (Figure 6) was prepared for the Fansteel site using drill hole data collected during this assessment. As shown in Figure 6, the top of bedrock wholly consists of the McCurtain Shale with no detectable lithologic boundaries. The top of bedrock surface slopes from west to east over the majority of the Fansteel site. However, along the southern boundary of the subject site, the bedrock surface begins to rise slightly. Consequently, the overall morphology of the bedrock surface beneath the Fansteel site resembles an elongate swale with a north-south axis. Figure 6 depicts a depression on the bedrock surface in the northeast quadrant of the site roughly centered around Monitoring Well MW-72S. This depression in the bedrock surface most likely is a result of construction activity associated with the installation of the french drain circumventing Pond No. 3, rather than natural erosional or depositional processes.

3.4 Site Hydrogeology

Hydrogeologic conditions of the Fansteel property were determined using groundwater elevation data (Table 1), slug tests, data (Appendix C), and interpretation of geologic data discussed in preceding sections. Twenty-nine groundwater monitoring wells were installed to communicate with two distinct zones of saturation. Monitoring Wells MW-51S through MW-75S were installed to communicate with the unconsolidated zone of saturation and Monitoring Wells MW-151D, MW-161D, MW-167D, and MW-174D were installed to communicate with a water-bearing zone within the shale bedrock.

Groundwater within the unconsolidated deposits is located at the base of the sediments within the coarse-grained materials. The unconfined saturated sand unit overlying bedrock is laterally persistent across the subject area. The saturated thickness of this unit ranges from approximately 1.5 feet at Monitoring Well MW-56S to 17.5 feet at MW-54S. Perched zones of saturation were not encountered. In the instance where a coarse-grained lens of material was encountered overlying a finer-grained material, the lens was dry.

A groundwater contour map (Figure 7) was constructed based on groundwater elevation data for wells communicating with this unit across the entire facility. As indicated in Figure 7, a groundwater divide in the unconsolidated zone of saturation in the Northwest Property Area results in radial flow northeast, southeast, and southwest to other portions of the facility at hydraulic gradients of 0.0076, 0.003, and 0.0064 respectively. Hydraulic gradient calculations are presented in Appendix C.

3.4.1 Single Well Aquifer Characterization

Slug tests were conducted in each well to determine the hydraulic conductivity and transmissivity of the unconsolidated zone of saturation. The hydraulic conductivity of the northeast water-bearing zone ranged from 1.32×10^{-2} centimeter per second at Well MW-65S to 5.95×10^{-3} centimeter per second at Well MW-63S. The mean hydraulic conductivity for the northeast water-bearing zone was calculated as 5.43×10^{-3} centimeter per second. The hydraulic conductivity of the southwest water-bearing zone ranged from 5.15×10^{-3} centimeter per second at Well MW-56S to 3.12×10^{-3} centimeter per second at Well MW-54S. The mean hydraulic conductivity for the southwest water-bearing zone was calculated as 4.18×10^{-3} centimeter per second. The hydraulic conductivity of the southeast water-bearing zone ranged from 3.86×10^{-3} centimeter per second at Well MW-59S and 7.21×10^{-3} centimeter per second at Well MW-58S. The mean hydraulic conductivity for the southeast water-bearing zone was calculated as 5.56×10^{-3} centimeter per second.

Average linear groundwater velocity calculations were calculated for the shallow aquifer using effective porosity values of 15 and 20 percent for variations of sand, gravel, and some silty clay. The average linear velocity for the northeast and the southeast flow direction was consistent across the area ranging from 1.77×10^{-4} centimeter per second to 2.74×10^{-4} centimeter per second. However, average linear velocity for the southwest direction was slightly lower,

ranging from 6.27 x 10^{-5} centimeter pe ...d. Slug test and average linear groundwater veloc ...C.

The volume of groundwater flow thro ... the Fansteel site was calculated for the three flo ...nd northeast. Groundwater flow associated with th ...nd 0.52 gallon per minute respectively. Calculat ... presented in Appendix H.

Groundwater within the McCurta ...1D, MW-161D, MW-167D, and MW-174D in the Fansteel property ar... ...ring wells were installed to communicate with a zone of fractured shale which was determined to produce a measurable quantity of water. The rock core above and below this fractured sequence was determined to be dry based on core inspection. Groundwater in this zone of saturation was encountered under confined conditions and is separated from the overlying unconsolidated zone of saturation by approximately 30 feet of shale bedrock. The significant difference in static groundwater elevation observed between nested Monitoring Wells MW-51S, MW-61S, MW-67S, and MW-74S (designed to communicate with the overlying unconsolidated material) and Monitoring Wells MW-151D, MW-161D, MW167D, and MW-174D (designed to communicate with the shale bedrock) indicates that these pairs of monitoring wells communicate with two distinct zones of saturation.

A potentiometric surface map (Figure 8) was constructed based on groundwater elevations obtained from all site monitoring wells communicating with the McCurtain Shale. As shown in Figure 8, groundwater in the shale bedrock unit beneath the Fansteel property area has a bidirectional flow direction; one component of flow is to the west-northwest and the second to the east. The flow to the northwest has a hydraulic gradient of 0.017. The hydraulic gradient of the easterly flow is 0.00565. Hydraulic gradient calculations are presented in Appendix H.

3.4.2 Single Well Aquifer Characterization Tests

Slug tests were performed at Monitoring Wells MW-151D, MW-161D, MW-167D, and MW-174D to determine the hydraulic conductivity and transmissivity of the shale bedrock zone of saturation at this location (Table 7). The hydraulic conductivities of bedrock Monitoring

Wells MW-151D, MW-161D, MW-167D, and MW-174D were 3.82×10^{-6}, 1.54×10^{-5}, 1.08×10^{-3}, and 9.72×10^{-6} centimeter per second respectively. However, it should be noted that the saturated zone in MW-167 was 17 feet compared to 5.5, 6.0, and 7.25 feet in the other three bedrock monitoring wells. This may account for the anomolously high hydraulic conductivity at this location. Based on these hydraulic conductivities, mean conductivities were calculated for the two bedrock flow directions. The mean conductivity for the westerly flow is 8.30×10^{-6} centimeter per second. The mean conductivity for the easterly flow (includes MW-167D) is 5.45×10^{-5} centimeter per second.

An average linear groundwater velocity was calculated using effective porosities of 5 and 10 percent. Five percent was assumed to account for little fracturing within the saturated zone and 10 percent was assumed to account for moderate fracturing within the saturated zone. Based on an effective porosity of 5 percent, the average linear groundwater velocity was calculated to be 9.38×10^{-7} and 1.85×10^{-5} centimeter per second for the westerly and easterly flow directions respectively. Based on an effective porosity of 10 percent, the average linear groundwater velocity was calculated to be 4.69×10^{-7} and 9.27×10^{6} centimeter per second for the westerly and easterly flow directions respectively.

The volume of groundwater flow through the McCurtain Shale zone of saturation in the eastern portion of the Fansteel property area was determined to be 5.18×10^{-5} gallon per minute. The volume of groundwater flow through the shale in the western portion of the subject property is 8.30×10^{-6} gallon per minute. Slug test and average linear groundwater velocity calculations are presented in Appendix C.

3.4.3 Multiwell Aquifer Characterization Test

A 65-hour pumping test was conducted in the southwestern quadrant of the Fansteel property to further characterize the unconsolidated aquifer. Because no impacts were observed to the McCurtain Shale, a pumping test was not required for this aquifer. Monitoring Well MW-53S was utilized as the pumping well for the unconsolidated aquifer while Monitoring Wells MW-52S, MW-54S, MW-61S, MW-63S, and MW-68S, and Observation Wells OW-1, OW-2, and OW-3 were used as observation points.

A step test performed on the pumping well indicated that the well could not sustain pumping rates more than 1.0 gallon per minute. A rate of 0.5 gallon per minute produced a slight decrease in hydraulic head over time. Consequently, a rate of 0.1 gallon per minute was determined to be the highest rate at which the pumping well could be pumped in order to retain its yield for the duration of the pump test. Based on water level measurements made at the designated observation points, it does not appear that the pumping test produced a measurable response in the unconsolidated aquifer. Although, Observation Points OW-1 and OW-2 were located only 40 and 35 feet respectively from the pumping well, no effects of the pumping were observed. Consequently, the zone of influence produced by the pumping appears to be confined to a radius of less than 35 feet.

4.0 Remediation Assessment Results

4.1 Chemical Characteristics

The chemical characteristics of soil, groundwater, and pond residues were determined using the methodologies and analytical parameters presented in Chapter 3.0 of this report. The following sections present a summary of the results of the chemical analysis performed on various media present on site.

4.1.1 Site Soils

Soil samples were collected and analyzed from all of the soil borings, shallow monitoring well boreholes, and test pits installed at the site. Generally, three soil samples for chemical analysis were selected from each soil boring and shallow monitoring well borehole based on the criteria described in Chapter 3.0 of this report. One soil sample was selected for chemical analysis from each of the test pits. All soil samples were analyzed for the following parameters:

- Total metals (antimony, arsenic, barium, cadmium, calcium, chromium, columbium, lead, mercury, nickel, silver, selenium, tantalum, and tin)
- Ammonia
- Fluoride
- Sulfate
- pH
- MIBK (4-methyl-2-pentanone)

Additionally, 20 percent of all soil samples selected for analysis was also analyzed for TCLP metals to determine the mobility of certain constituents. Soil samples were selected for TCLP metals analysis based on the highest total metals concentration detected. Results of the soil sample analyses were compared to typical concentration ranges or proposed RCRA corrective action levels, if available, to identify potential areas which may be of concern. These concentration ranges and proposed corrective action levels are summarized in Table 2. Analytical results for soils analyses are presented in Table 3 for soil borings and shallow monitoring well boreholes and Table 4 for test pits.

With the exception of antimony, mercury, selenium, and silver, the metals analyzed were detected in the majority of site soil samples at various concentrations. Antimony, generally not

identified in site soil samples, was present at concentrations up to 56 milligrams per kilogram (mg/kg) in Boring B-64, 9.5 - 12.5 feet) when identified. Arsenic ranged from not detected to a concentration of 33 mg/kg (B39, 12.0 feet to 13.0 feet). Barium was detected in the great majority of samples collected at the site and ranged in concentrations from 10 mg/kg (B-33, 0 - 0.5 feet) to 3,100 mg/kg (B-56, 4.5 - 7.0 feet). Cadmium ranged from not detected to a concentration of 36 mg/kg (B-50, 0 - 0.5 feet). Calcium was widely distributed throughout site soils at a concentration up to 220,000 mg/kg (B-55, 1.0 feet to 2.0 feet). Chromium was identified in site soils up to a concentration of 240 mg/kg (B-61, 0 feet to 0.5 feet). Columbium detected in all but a few soil samples ranged in concentrations from 1.2 mg/kg (B-5, 0 feet to 0.5 feet; B-20, 2.5 feet to 4.0 feet; B-47, 0 feet to 0.5 feet; MW-65S, 23.5 feet to 26.2 feet; and TP-6, 0.8 foot) to 2,100 mg/kg (MW-66S, 0 feet to 2 feet). Lead, another metal detected in the vast majority of site soil samples, ranged in concentrations from 0.58 mg/kg (B-42, 0.5 foot to 2.0 feet) to 91 mg/kg (B-25, 23.5 feet to 26.8 feet). Mercury was detected in only a small number of site soil samples with the highest concentration identified being 1.4 mg/kg (B-61, 0 foot to 0.5 feet). Nickel ranged from not detected to 79 mg/kg (B-1, 19.5 feet to 22 feet). Silver was identified in only one sample collected at the site (MW-55S, 14.5 feet to 17.0 feet) at a concentration of 2.5 mg/kg. Selenium was not detected in many site soil samples but, when identified, ranged in concentrations from 0.26 mg/kg (MW-65S, 0 feet to 0.5 feet) to 0.50 mg/kg (B-68, 7.5 feet to 10.0 feet). Tantalum was present in the majority of soil samples at concentrations ranging from 1.2 mg/kg (B-36, 23.0 feet to 24.5 feet) to 1,500 mg/kg (MW-66S, 0 feet to 2 feet). Tin ranged from not detected up to a concentration of 2,200 mg/kg (B-64, 9.5 feet to 12.5 feet).

Total concentrations of the following metals were present in site soils either within typical concentration ranges and/or below proposed RCRA corrective action levels: arsenic, barium, cadmium, calcium, chromium, lead, mercury, nickel, selenium, and silver. Total concentrations of antimony exceeded the proposed RCRA corrective action level of 30 mg/kg in only two site soil samples: B-64 (9.5 feet to 12.5 feet), 56 mg/kg and B-72 (15 feet to 16 feet), 40 mg/kg.

Tin which currently does not have a proposed corrective action level was present in the majority of site soil samples at concentrations outside its typical range of less than 0.1 to 7.4 mg/kg. The highest concentrations of tin detected in site soils were present in the following samples: B-1 (12 feet to 14.5 feet), 1,800 mg/kg; B-35 (11 feet to 12 feet), 440 mg/kg;

B-36 (11 feet to 13 feet), 480 mg/kg; B-47 (15 feet to 17.5), 710 mg/kg; B-64 (9.5 feet to 12.5 feet), 220 mg/kg; and B-72 (15 feet to 16 feet), 630 mg/kg.

Columbium and tantalum currently do not have established typical concentration ranges or proposed RCRA corrective action levels. The highest concentrations of columbium detected in site soils were present in the following samples: B-1 (12 feet to 14.5), 730 mg/kg; B-2 (9.5 feet to 12 feet), 510 mg/kg; B-4 (2 feet to 4.5 feet), 320 mg/kg; B-49 (0 feet to 0.5 feet), 330 mg/kg; B-64 (9.5 feet to 12.5 feet), 400 mg/kg; MW-66S (0 feet to 2 feet), 2,100 mg/kg; and MW-67S (0 feet to 2), 740 mg/kg. The highest concentrations of tantalum were observed in B-4 (2 feet to 4.5 feet), MW-66S (0 feet to 2 feet), and MW-67S (0 feet to 2 feet) at 330, 1,500 and 130 mg/kg respectively.

As stated earlier, 20 percent of the soil samples collected throughout the site were analyzed for TCLP metals. Only one of the samples analyzed for TCLP metals exhibited a leachable metal concentration of concern. This sample was collected from B-56 (4.5 feet to 7.0 feet) and exhibited a leachable concentration of barium of 200 mg/l.

Fluoride was detected in all site soil samples submitted for analyses up to a concentration of 66,000 mg/kg in B-1 (12 feet to 14.5 feet). No RCRA corrective action level has been proposed for fluoride at this time. The typical range of fluoride concentrations in soil is less than 10 mg/kg to 1,900 mg/kg. This concentration range was exceeded by a number of site soil samples, most notably: B-1 (12 feet to 10.5 feet, 17 feet to 19.5 feet, and 19.5 feet to 22 feet), 66,000, 13,000, and 10,000 mg/kg respectively; B-2 (9.5 feet to 12 feet, 24.5 feet to 27 feet, and 27 feet to 31 feet), 60,000, 24,000, and 23,000 mg/kg respectively; B-15 (9.2 feet to 10 feet), 9,100 mg/kg; B-22 (0 feet to 0.5 foot), 5,600 mg/kg; B-29 (0 feet to 0.5 foot, 0.5 foot to 2.5 feet, and 23 feet to 24.5 feet), 6,400, 43,000, and 6,500 mg/kg respectively; B-35 (10 feet to 11 feet and 11 feet to 12 feet), 17,000 and 53,000 mg/kg; B-36 (11 feet to 13 feet), 13,000 mg/kg; B-49 (0 feet to 0.5 foot), 7,900 mg/kg; B-51 (24 feet to 26 feet), 5,400 mg/kg; B-52 (0.5 foot to 2.5 feet), 5,600 mg/kg; B-54 (0.5 foot to 2.0 feet), 31,000 mg/kg; B-55 (1 foot to 2 feet and 7 feet to 9.5 feet), 6,800 and 5,800 mg/kg; B-59 (12.5 feet to 15 feet), 8,800 mg/kg; B-61 (0 feet to 0.5 foot), 13,000 mg/kg; B-62 (15 feet to 17 feet), 5,200 mg/kg; B-64 (18 feet to 20 feet), 14,000 mg/kg; B-70 (12.5 feet to 14.0 feet), 5,200 mg/kg; B-72 (12.5 feet to 15 feet and 15 feet to 16 feet), 6,800 and 12,000 mg/kg; MW-66S (0 feet to 2 feet and 14.5 feet to 17 feet), 8,900 and 6,100

mg/kg; MW-67S (12.0 feet to 14.5 feet and 19.5 feet to 22.0 feet) 12,000 and 5,100 mg/kg; MW-71S (2 feet to 4.5 feet), 6,000 mg/kg; and TP-6 (0.8 foot), 6,200 mg/kg.

Ammonia was also identified in site soil samples at concentrations up to 1,780 mg/kg in MW-67S (19.5 feet to 22 feet). No typical concentration ranges for ammonia in soil have been established and no RCRA corrective action levels have been proposed at this time. The highest concentrations of ammonia detected in site soils were exhibited by the following samples: B-1 (17 feet to 19.5 feet), 780 mg/kg; B-35 (10 feet to 11 feet), 480 mg/kg; B-58 (9.5 feet to 12 feet), 1,100 mg/kg; B-61 (15 feet to 17 feet), 560 mg/kg; B-62 (15 feet to 17 feet), 540 mg/kg; B-63 (15 feet to 17.5 feet), 520 mg/kg; and MW-67S (12 feet to 14.5 feet, 19.5 feet to 22 feet, and 22 feet to 24.5 feet), 1,580, 1,780, and 1,300 mg/kg respectively.

Sulfate was detected in site soils at concentrations up to 10,000 mg/kg in B-9 (12 feet to 15 feet). No typical concentration ranges or proposed RCRA corrective action levels have been established for sulfate. The highest concentrations of sulfate were detected in the following site soil samples: B-9 (12 feet to 15 feet and 15 feet to 17 feet), 10,000 and 4,200 mg/kg; B-12 (17.5 feet to 19 feet), 600 mg/kg; B-19 (0 feet to 0.5 foot), 1,420 mg/kg; B-35 (11 feet to 12 feet), 640 mg/kg; B-36 (11 to 13 feet), 700 mg/kg; B-48 (24.5 feet to 26 feet), 540 mg/kg; B-53 (23 feet to 24.9 feet), 740 mg/kg; B-58 (9.5 feet to 12 feet), 860 mg/kg; B-63 (15 feet to 17.5 feet), 660 mg/kg; MW-59S (9.5 feet to 12 feet), 780 mg/kg; MW-64S (0 feet to 0.5 foot), 680 mg/kg; MW-67S (19.5 feet to 22 feet and 22 feet to 24.5 feet), 1,120 and 960 mg/kg; MW-71S (19.5 feet to 22 feet), 1,500 mg/kg; and MW-73S (13.02 feet to 14.2 feet), 520 mg/kg.

MIBK was also identified in several site soil samples. A proposed RCRA corrective action level has been established for MIBK. This level is 4,000 micrograms per kilogram (µg/kg). The following site soil samples exhibited concentrations of MIBK in excess of the proposed RCRA corrective action level: B-1 (12 feet to 14.5 feet, 17 feet to 19.5 feet, and 19.5 feet to 22 feet), 75,000, 65,000, and 64 µg/kg respectively; B-2 (9.5 feet to 12 feet, 24.5 feet to 27 feet, and 27 feet to 31 feet), 14,000, 25,000, and 5,700 µg/kg respectively; B-35 (10 feet to 11 feet and 11 feet to 12 feet), 23,000 and 91,000 µg/kg; B-36 (11 feet to 13 feet), 6,900 µg/kg; B-47 (15 feet to 17 feet and 24.5 feet to 26 feet), 190,000 and 20,000 µg/kg; B-59 (12.5 feet to 15 feet), 22,000 µg/kg; B-64 (9.5 feet to 12.5 feet and 18 feet to 20 feet), 30,000 and 33,000 µg/kg; B-72 (15 feet to 16 feet), 7,600 µg/kg; MW-73S (13 feet to 14.2 feet and 14.7 feet to 15 feet), 45,000 and

10,000 µg/kg; and MW-64S (14.5 feet to 17 feet and 19.5 feet to 22 feet), 19,000 and 83,000 µg/kg.

4.1.1.1 Distribution of Contaminants of Concern in Site Soils

Figure 9 illustrates the location of the parameters of concern identified in excess of typical soil concentration ranges or proposed corrective action levels. As stated earlier, ammonia does not have a typical soil concentration range or proposed corrective action level. Figure 9 identifies the location of ammonia concentrations generally detected in excess of 10 mg/kg. As this figure illustrates, the vast majority of soil contamination is confined to the eastern area of the site, downgradient or in the immediately vicinity of the Chemical "A" Building, Chemical "C" Building, Pond No. 2, and Pond No. 3. The most pervasive constituents identified in this portion of the site (MIBK, ammonia, fluoride, tin, and columbium) are consistent with plant operations and activities historically conducted in this area.

The presence of these constituents appears to be well distributed throughout the soil column in this area with the exception of MIBK and ammonia. MIBK and ammonia, almost without exception, were present at depths greater than 5 feet in the borings in this area and do not appear to present a surficial concern. Antimony was identified in only two borings in this area at concentrations only slightly in excess of typical ranges and, therefore, does not appear to present significant concern.

Barium which is not widely distributed in site soils at significant levels was identified at one specific location (B-56) at a concentration that presents some concern. Leachable concentrations of barium were present in soils from B-56 at levels sufficient to classify these materials as characteristically hazardous. Barium was not identified in soil borings immediately surrounding this location at significant concentrations. Therefore, the presence of the elevated concentration of barium within B-56 appears to be a discrete and isolated occurrence. Columbium, fluoride, and ammonia were also identified at relatively elevated concentrations in soils to the east of Ponds Nos. 5, 6, 7, 8, and 9. However, the concentrations of these constituents were typically less than that exhibited in soils to the east of the Chemical "A" Building and in the area of Ponds Nos. 2 and 3.

4.1.2 Pond Residues

Residue samples were collected from each of the ponds located on the Fansteel site including Ponds Nos. 2, 3, 5, 6, 7, 8, and 9. The residue samples were collected in accordance with the sampling methodologies outlined in Chapter 3.0 of this report. Each residue sample was analyzed for the following parameters:

- Total metals: antimony, arsenic, barium, beryllium, cadmium, chromium, columbium, lead, mercury, molybdenum, nickel, selenium, silver, tin, and tantalum.
- TCLP metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, silver, and nickel).
- Ammonia, chloride, fluoride, nitrate, sulfate, and cyanide.
- Aluminum, calcium, iron, potassium, magnesium, manganese, and sodium.
- Alkalinity, pH, and specific conductance.
- VOCs.
- Semivolatile organic compounds.

These parameters were utilized to define the characteristics of the pond residues. The following sections discuss the analytical results for the residue samples on a pond-by-pond basis.

4.1.2.1 Pond No. 2

A total of nine residue samples were collected from three sampling locations within Pond No. 2 (Figure 2). Silver was present in Pond No. 2 residue at concentrations ranging from 10 to 52.7 mg/kg. Arsenic was detected in only three residue samples at concentrations up to 74.3 mg/kg. Barium ranged in concentrations from 284 to 2,180 mg/kg. Beryllium was detected at concentrations ranging from 10.3 to 33.1 mg/kg. Cadmium was not detected in any of the Pond No. 2 residue samples. Chromium ranged in concentrations from 153 to 740 mg/kg. Mercury was identified at concentrations ranging from 0.260 to 2.74 mg/kg. Molybdenum ranged in concentrations from 21 to 40 mg/kg. Nickel ranged from nondetected to 103 mg/kg. Lead ranged from nondetected to 167 mg/kg. Antimony was detected at concentrations ranging from 61.9 to 576 mg/kg. Selenium was not detected in any Pond No. 2 residue samples. Tin ranged in concentrations from 830 to 6,000 mg/kg. Columbium ranged in concentrations from 1,200 to 11,000 mg/kg and tantalum ranged from 970 to 7,100 mg/kg. Cyanide ranged from not detected to 11 mg/kg.

Analysis of the nine residue samples for TCLP metals indicated that all residue samples exhibited leachable concentrations of chromium. Five of the residue samples contained leachable concentrations of chromium in excess of 5.0 milligrams per liter (mg/l), the maximum contaminant level (MCL). The concentrations of leachable chromium in the five samples ranged from 5.0 to 20.0 mg/l.

Ammonia was present in Pond No. 2 residues at concentrations ranging from 1.3 to 8.9 mg/l. Chloride ranged from nondetected to 5.7 mg/l. Fluoride was detected from 110 to 650 mg/l. Nitrate ranged in concentrations from 0.12 to 0.46 mg/l. Sulfate was detected at concentrations from 2.6 to 510 mg/l. Aluminum ranged from nondetected to 270 mg/l. Calcium was present at concentrations ranging from 13 to 300 mg/l. Iron ranged from 110 to 640 mg/l. Potassium was identified at concentrations ranging from 15 to 170 mg/l. Magnesium ranged from 16 to 50 mg/l. Manganese was present at concentrations ranging from 27 to 150 mg/l. Sodium ranged from not detected to 58 mg/l.

The alkalinity of all Pond No. 2 residue samples was below 2.0 mg/l calcium carbonate. Specific conductance ranged from 845 to 5,660 micromhos per centimeter. The pH of Pond No. 2 residues ranged from 2.33 to 3.38 standard units. The only VOC detected in Pond No. 2 residue samples was MIBK, identified in each of the nine residue samples at concentrations ranging from 43,000 to 730,000 micrograms per liter (µg/l).

No semivolatile organic compounds were detected in Pond No. 2 residue samples with the exception of di-N-butyl phthalate. However, this constituent was also detected in quality assurance/quality control (QA/QC) samples associated with the residue samples and may be associated with plastic sample collection equipment. It is not believed that di-N-butyl phthalate is actually present in Pond No. 2 residues. The results for the analysis of Pond No. 2 residues are summarized in Table 5. Figure 10 illustrates the location of various parameters of concern identified in Pond No. 2 residues.

4.1.2.2 Pond No. 3

A total of 15 residue samples were collected at 5 separate locations within Pond No. 3 in accordance with the methodologies presented in Chapter 3.0 of this report. Silver concentrations within Pond No. 3 residues ranged from 9.6 to 37 mg/kg. Arsenic ranged from

not detected to 109 mg/kg. Barium was detected at concentrations from 288 to 1,720 mg/kg. Beryllium ranged from 8.5 to 39.8 mg/kg. Cadmium was identified in only one Pond No. 3 residue sample at a concentration of 5.9 mg/kg. Chromium concentrations ranged from 1,540 to 1,970 mg/kg. Mercury ranged from not detected to 3.5 mg/kg. Molybdenum, nickel, lead, and antimony were detected at concentrations up to 49, 56.4, 137, and 241 mg/kg respectively. Selenium was not detected in any of the 15 Pond No. 3 residue samples. Tin was identified at concentrations ranging from 210 to 3,900 mg/kg. Columbium ranged from 720 to 4,400 mg/kg and tantalum ranged from 260 to 2,200 mg/kg. Cyanide ranged from not detected to concentrations up to 160 mg/kg.

TCLP metal analysis of Pond No. 3 residue samples indicated that leachable concentrations of chromium were present at levels above the MCL for this metal, 5.0 mg/l. Thirteen of the 15 residue samples collected from this pond exhibited leachable concentrations of chromium ranging from 6.7 to 36 mg/l.

Ammonia was detected in Pond No. 3 residues at concentrations ranging from 2.9 to 7.5 mg/l. Chloride ranged from not detected to 48 mg/l. Fluoride was identified at concentrations ranging from 32 to 670 mg/l. Nitrates ranged from not detected to 2.6 mg/l. Sulfates ranged from 2.6 to 540 mg/l. Aluminum ranged from not detected to 100 mg/l. Calcium was present at concentrations ranging from 20 to 270 mg/l. Iron, potassium, magnesium, manganese, and sodium were identified at concentrations up to 380, 170, 55, 140, and 37 mg/l respectively.

Alkalinity was detected in only one Pond No. 3 residue sample at 3.0 mg/l calcium carbonate. Specific conductance ranged from 714 to 6,220 microhms per centimeter. The pH of Pond No. 3 residue samples ranged from 2.10 to 5.56 standard units.

The only VOC detected in Pond No. 3 residues was MIBK. MIBK was identified in each of the 15 Pond No. 3 residue samples at concentrations ranging from 34,000 to 1,300,000 µg/kg.

No semivolatile organic compounds were detected in Pond No. 3 residues with the exception of di-N-butyl phthalate which is believed to be associated with plastic samples collection equipment. Analytical results for Pond No. 3 residue samples are summarized in Table 6.

Figure 10 identifies the location of various parameters of concern present in Pond No. 3 residues.

4.1.2.3 Pond No. 5

A total of five residue samples were collected from Pond No. 5 at three separate sampling locations in accordance with the methodologies presented in Chapter 3.0 of this report. No silver, arsenic, cadmium, cyanide, or selenium was detected in Pond No. 5 residue samples. Barium was identified at concentrations ranging from 28.1 to 119 mg/kg. Beryllium ranged from 3.2 to 15.6 mg/kg. Chromium was detected in Pond No. 5 residues at concentrations ranging from 45.8 to 164 mg/kg. Mercury was present at levels up to 0.410 mg/kg and molybdenum at concentrations up to 21 mg/kg. Nickel ranged in concentrations from 17.5 to 143 mg/kg. Lead was detected at concentrations up to 89.8 mg/kg. Antimony ranged form 140 to 4,200 mg/kg. Columbium and tantalum were detected in each residue sample form Pond No. 5. Columbium ranged from 870 to 8,100 mg/kg and tantalum ranged from 270 to 5,200 mg/kg.

TCLP metals analysis of the Pond No. 5 residue samples did not identify the presence of metals above established MCLs. Leachable concentrations of nickel were detected in one Pond No. 5 residue sample at a concentration of 1.3 mg/l. No MCL has been established for nickel.

Ammonia was detected in four of the five Pond No. 5 residue samples at concentrations up to 16 mg/l. Chloride was identified in only two samples at concentrations of 6 and 19 mg/l. Fluoride was detected in each sample at concentrations ranging from 3.8 to 9.6 mg/l. Nitrate and sulfate were detected in each Pond No. 5 residue sample at concentrations up to 7.6 and 900 mg/l respectively.

Aluminum and iron were not detected in any of the pond No. 5 residue samples. Calcium ranged from 57 to 610 mg/l. Potassium, magnesium, manganese, and sodium were present at trace levels up to 38, 19, 13, and 39 mg/l respectively.

The alkalinity of Pond No. 5 residues ranged from 21 to 60 mg/l calcium carbonate. Specific conductances ranged from 384 to 2,500 micromhos per centimeter. The pH of Pond No. 5 residues ranged from 7.93 to 10.31 standard units.

No VOCs or semivolatile organic compounds were detected within the Pond No. 5 residue samples with the exception of bis(2-ethylhexyl) phthalate and di-N-butyl phthalate. The presence of these phthalates are believed to be associated with plastic sample collection equipment used to handle the residue samples. The results for the analysis of Pond No. 5 residue samples are summarized in Table 7. Figure 10 identifies the location of various parameters of concern identified in Pond No. 5 residues.

4.1.2.4 Pond No. 6

Two residue samples were collected from the bottom sediments of Pond No. 6 in accordance with the sampling methodologies outlined in Chapter 3.0 of this report. No silver, arsenic, cyanide, molybdenum, lead, or selenium were detected in sediment samples from Pond No. 6. Barium was detected at 74.2 and 195 mg/kg in the two residue samples. Beryllium, cadmium, chromium, and mercury were identified at 9 and 10.9 mg/kg, not detected and 11 mg/kg, 183 and 249 mg/kg, and 0.221 and 0.414 mg/kg respectively in the two sediment samples. Antimony was present in both samples at 126 and 134 mg/kg. Tin was detected at 1,100 and 1,400 mg/kg. Columbium and tantalum were detected at 260 and 2,700 mg/kg (columbium) and 310 and 960 mg/kg (tantalum).

No TCLP metals were detected in Pond No. 6 sediment samples. Ammonia was present at 0.51 and 0.84 mg/l; chloride at 2.2 and 3.9 mg/l, and fluoride at 4.6 and 11 mg/l. Nitrate was detected in only one sediment sample at 0.14 mg/l. Sulfates were present at 73 and 1,200 mg/l.

Aluminum, iron, magnesium, manganese, and sodium were not detected in Pond No. 6 sediments. Calcium was detected at 41 and 520 mg/l and potassium was present at 15 and 17 mg/l.

The alkalinity of the two Pond No. 6 sediment samples was 8 and 18 mg/l calcium carbonate. Specific conductance was measured at 283 and 2,093 micromhos per centimeter. The pH of the two sediment samples was 7.93 and 8.08 standard units.

No VOCs or semivolatile organic compounds were detected within the two Pond No. 6 samples. Analytical results for Pond No. 6 are summarized in Table 8. Figure 10 identifies the location of various parameters of concern detected in Pond No. 6.

4.1.2.5 Pond No. 7

A total of two sediment samples from Pond No. 7 were collected for analysis in accordance with the sampling protocols outlined in Chapter 3.0 of this report. No silver, arsenic, cyanide, cadmium, molybdenum, or selenium were detected in these two sediment samples. The following metals were detected in the two sediment samples at the concentrations identified: barium (79.7 and 91.7 mg/kg), beryllium (21.4 and 22.5 mg/kg), chromium (358 and 406 mg/kg), mercury (1.72 and 2.98 mg/kg), nickel (61.1 and 95 mg/kg), lead (98.4 and 102 mg/kg), antimony (366 and 623 mg/kg), tin (3,000 and 3,400 mg/kg), columbium (5,700 and 7,600 mg/kg), and tantalum (1,600 and 1,900 mg/kg). No TCLP metals were detected in the two sediment samples.

Ammonia was detected at 3.3 and 7.8 mg/l. Chloride was present at 8.9 and 22 mg/l and fluoride was identified at 5.4 and 9.9 mg/l. No nitrate was detected in the two Pond No. 7 sediment samples. Sulfates were detected at 140 and 720 mg/l in the two samples.

No aluminum, iron, magnesium, or manganese was detected in Pond No. 7 samples. Calcium was identified at 64 and 240 mg/l, potassium at 30 and 39 mg/l, and sodium at 40 and 53 mg/l.

The alkalinity of the two sediment samples was determined to be 14 and 20 mg/l calcium carbonate. The specific conductance of the two samples was measured at 735 and 1,530 micromhos per centimeter. The pH of Pond No. 7 sediments was 8.02 and 9.57 standard units.

No VOCs or semivolatile organic compounds were detected in Pond No. 7 sediments. Analytical results for Pond No. 7 are summarized in Table 9. Figure 10 illustrates the location of various parameters of concern identified in Pond No. 7 residues.

4.1.2.6 Pond No. 8

A total of 15 residue samples were collected from 5 separate locations within Pond No. 8 in accordance with the sampling protocols outlined in Chapter 3.0 of this report. No silver, cadmium, lead, selenium, or cyanide were detected in any of the Pond No. 8 residue samples. The following metals were detected at the indicated concentration ranges: arsenic (not detected to 91.1 mg/kg), barium (24.2 to 105 mg/kg) beryllium (8.4 to 27.3 mg/kg), chromium

(74.7 to 992 mg/kg), mercury (0.197 to 1.24 mg/kg), molybdenum (not detected to 38 mg/kg), nickel (27.4 to 159 mg/kg), antimony (106 to 513 mg/kg), tin (360 to 1,800 mg/kg), columbium (1,500 to 5,500 mg/kg), and tantalum (650 to 3,700 mg/kg).

No TCLP metals were detected in the Pond No. 8 residue samples above established MCLs. Nickel which does not have an established MCL associated with TCLP analysis was detected in one sample at 1.3 mg/l.

Ammonia was identified in Pond No. 8 residues at concentrations ranging from 7.3 to 19 mg/l. Chloride was detected at concentrations from 21 to 47 mg/l. Fluoride ranged from 2.4 to 9.0 mg/l. Nitrate, when detected, was present at concentrations up to 0.43 mg/l. Sulfate ranged from 190 to 1,200 mg/l.

No aluminum, iron, magnesium, or manganese was detected in Pond No. 8 residues. Calcium, potassium, and sodium were present at concentrations up to 1,300, 74, and 98 mg/l respectively.

The alkalinity of Pond No. 8 residues ranged from 16 to 2,080 mg/l calcium carbonate. The specific conductance of the residue samples was measured at 1,050 to 8,350 micromhos per centimeter. The pH of the residues in Pond No. 8 ranged from 7.84 to 12.67 standard units. All pond residue samples with the exception of P8-2C (14 feet to 20 feet) exhibited pH near 11.0 standard units or less. Residue Sample P8-2C exhibited a pH of 12.67 standard units. This pH does not appear to be representative of residues contained within Pond No. 8.

MIBK was detected in each of the 15 Pond No. 8 residue samples at concentrations ranging from 4,800 to 190,000 µg/kg. Acetone was also detected in one residue sample at 3,000 µg/kg. No semivolatile organic compounds were identified in Pond No. 8 residues with the exception of di-N-butyl phthalate. Di-N-butyl phthalate was also detected in QA/QC samples associated with Pond No. 8 residues and is believed to be associated with the use of plastic sample collection trowels. The analytical results for Pond No. 8 are summarized in Table 10. Figure 10 illustrates the location of various parameters of concern detected in Pond No. 8.

4.1.2.7 Pond No. 9

A total of 15 residue samples were collected from 5 separate locations within Pond No. 9 in accordance with the methodologies outlined in Chapter 3.0 of this report. No silver, cadmium, molybdenum, lead, or selenium were detected in Pond No. 9 residue samples. Cyanide, arsenic, barium, mercury, and antimony when detected were present at concentrations up to 460, 74.5, 37.2, 1.73, and 362 mg/kg respectively. Beryllium was detected at concentrations ranging from 11.5 to 17.0 mg/kg, chromium ranged from 189 to 816 mg/kg, and nickel ranged from 37.2 to 88.3 mg/kg. Tin ranged from 580 to 1,500 mg/kg, columbium ranged from 2,100 to 5,500 mg/kg, and tantalum ranged from 640 to 1,300 mg/kg. TCLP metals analysis did not identify the presence of leachable concentrations of metals above established MCLs.

Ammonia was detected in Pond No. 9 residues at concentrations ranging from 2.0 to 18 mg/kg. Chloride and fluoride were identified at the following concentration ranges: 18 to 68 mg/l and 3.9 to 13 mg/l. Nitrate, when detected, was present at concentrations up to 0.32 mg/l. Sulfates ranged from 140 to 1,600 mg/l.

No aluminum, iron, magnesium, or manganese were detected in Pond No. 9 residue samples. Calcium was detected at concentrations ranging from 61 to 520 mg/l. Potassium concentrations ranged from 24 to 65 mg/l and sodium was present from 35 to 100 mg/l in Pond No. 9 residue samples.

The alkalinity on Pond No. 9 residue samples ranged from not detected up to 111 mg/l calcium carbonate. Specific conductances ranged from 952 to 2,400 micromhos per centimeter. The pH of Pond No. 9 residues was measured at 8.44 to 10.93 standard units.

MIBK was detected in all but one of the Pond No. 9 residue samples at concentrations ranging from 6,000 to 190,000 µg/kg. 1,1,1-Trichloroethane was identified in one Pond No. 9 residue sample at 4,700 µg/kg. No other VOCs were detected in the residue sample. No semivolatile organic compounds were detected in Pond No. 9 residues with the exception of bis(2-ethyl-hexyl) phthalate and di-N-butyl phthalate. The presence of the phthalates is believed to be associated with the use of plastic sample collection equipment. The results of Pond No. 9 residue analyses are summarized in Table 11. Figure 10 illustrates the location of various parameters of concern detected in Pond No. 9.

4.1.2.8 Distribution of Contaminants of Concern in Pond Residues

The residues present in each of the ponds located on site appear to be fairly well homogenized. Although the chemistry of the residues may differ from pond to pond, each individual pond residues chemistry is fairly consistent from sample location to sample location and from depth to depth. No significant trends could be identified in any of the ponds which would indicate the presence of particularly contaminated or relatively clean "layers" or locations.

A variety of metals is present in the residues contained in each of the ponds, the most notable being chromium which was identified in Ponds Nos. 2 and 3 at levels considered characteristically hazardous. MIBK was detected at relatively significant concentrations in Ponds Nos. 2, 3, 8, and 9 residues. No MIBK was detected in residues contained in Ponds Nos. 5, 6, or 7. As might be expected, fluoride concentrations were present at the highest concentrations in Ponds Nos. 2 and 3. Ammonia concentrations were similar from pond to pond. Ponds Nos. 2 and 3 exhibit acidic pH. Ponds Nos. 5, 6, 7, 8, and 9 exhibit slightly basic pH.

4.1.3 Surface Water and Sediments

A total of 6 sediment and 7 surface water samples were collected at locations identified in Figure 2. The following sections discuss the results of the analysis of these samples.

4.1.3.1 Sediments

Sediment samples were analyzed for the following chemical parameters:

- Total metals (antimony, arsenic, barium, calcium, cadmium, chromium, fluoride, lead, nickel, mercury, selenium, silver, tin, columbium, and tantalum).
- Ammonia, sulfate, and pH.
- MIBK.

No silver, mercury, antimony, or selenium were detected in the sediment samples. Arsenic, barium, calcium, cadmium, chromium, nickel, lead, and columbium were detected in one or more of the sediment samples, however, the concentrations exhibited by these metals were within typical soil concentrations ranges and, where applicable, were below proposed RCRA corrective action levels.

Tin was detected in SS-002 (22 mg/kg), SS-003 and SS-005 (17 mg/kg), and SS-1 (28 mg/kg) at concentrations slightly above the typical soil concentration range for this metal (less than 0.1 to 7.4 mg/kg). Fluoride was identified in sediment Samples SS-002 (3,700 mg/kg) and SS-003 (2,100 mg/kg) at concentrations outside the typical soil concentration range for this parameter (less than 10 to 1,900 mg/kg). Tantalum does not currently have a typical soil concentration range or proposed RCRA corrective action level. Tantalum was detected in the sediment samples at concentrations ranging from 5.6 mg/kg (SS-005 and SS-2) to 13 mg/kg (SS-003 and SS-1).

Ammonia was detected only in sediment sample SS-002 at a concentration of 26 mg/kg. Sulfate was present in all sediment samples at concentrations ranging from 44 to 66 mg/kg. The pH of the sediment sample ranged from a low of 6.26 standard units in SS-3 to a high of 7.18 standard units in SS-003. No MIBK was detected in any of the six sediment samples. The analytical results of the sediment samples are summarized in Table 12. Figure 9 illustrates the location of the various parameters identified in sediment samples at concentrations in excess of typical ranges or proposed action levels.

4.1.3.2 Surface Water

A total of seven surface water samples were collected and analyzed for the following parameters:

- Total metals (silver, arsenic, barium, calcium, cadmium, chromium, mercury, nickel, lead, antimony, selenium, tin, columbium, and tantalum).
- Fluoride, ammonia, nitrate, and sulfate.
- MIBK.

The surface water analytical results were compared to established USEPA Drinking Water Standard MCLs, Table 13 where applicable, to identify potential areas of concern.

No silver, mercury, or selenium were detected in any of the surface water samples. Arsenic was detected in all seven surface water samples; however, only one exhibited concentrations of this metal above its established MCL of 50 µg/l. This sample was SS-001 which contained 188 µg/l of arsenic. Barium was detected in all surface water samples with the exception of SS-001.

All detected concentrations of barium were below its established MCL. Calcium which does not have an established MCL ranged in concentrations from 11,600 µg/l in SS-003 to 111,000 µg/l in SS-001. Cadmium was detected in all surface water samples with the exception of SS-002 and was present at concentrations above its MCL of 5 µg/l in the following samples: SS-001 (6.48 µg/l), SS-003 (5.11 µg/l), SS-005 (12.2 µg/l), SS-1 (20.8 µg/l), SS-2 (15.2 µg/l), and SS-3 (5.51 µg/l). Chromium was detected in all surface water samples except SS-3 and was present above its MCL of 100 µg/l in only one sample, SS-1 (110 µg/l). Nickel which does not have an MCL was detected in only two surface water samples, SS-002 (28.4 µg/l) and SS-1 (103 µg/l). Lead was detected in all surface water samples at concentrations ranging rom 1.74 to 276 µg/l. No MCL is currently in effect for lead; however, an action level of 15 µg/l has been imposed at the tap of drinking water supplies. Antimony was detected in only one sample, SS-002, at a concentration of 85.1 µg/l. No MCL has been established for antimony. Tin which also does not have an MCL was detected in two surface water samples, SS-001 (72 µg/l) and SS-1 (120 µg/l). Columbium and tantalum were only detected in SS-1 both at 300 µg/l. No MCL has been established for either of these metals.

Fluoride which has an MCL of 4.0 mg/l was detected in each of the seven surface water samples. Fluoride was present at concentrations above its MCL in SS-001 (9.4 mg/l) and SS-002 (12 mg/l). Ammonia was identified only in SS-001 (6.7 mg/l), SS-002 (8.4 mg/l), and SS-3 (0.12 mg/l). Ammonia currently does not have an established MCL. Nitrate were detected in all but one surface water sample, SS-003. An MCL for nitrate has been established of 10 mg/l and was equaled or exceeded in SS-001 (10 mg/l) and SS-002 (15 mg/l). The MCL for sulfate is 250 mg/l and was exceeded in only one surface water sample, SS-001 (390 mg/l).

MIBK was detected only in surface water Sample SS-001 at a concentration of 500 µg/l. An MCL of 2,000 µg/l has been established by the state of Oklahoma for MIBK. The analytical results of surface water samples are summarized in Table 14. Figure 11 illustrates the locations where parameters of concern were identified in excess of established MCLs.

4.1.4 Groundwater

All 29 monitoring wells installed at the site were sampled and analyzed for the following parameters:

- Total metals (antimony, arsenic, barium, cadmium, calcium, chromium, lead, mercury, nickel, selenium, silver, tin, tantalum, and columbium).
- Total fluoride, total ammonia, total nitrate, and total sulfate.
- MIBK.
- Dissolved metals (same specific metals as total analyses) analysis was performed on groundwater samples from MW-55S, MW-62S, MW-63S, MW-65S, MW-66S, MW-67S, MW-73S, and MW-74S for comparative purposes.
- TCL parameters were analyzed for in the following wells: MW-51S, MW-52S, MW-60S, MW-61S, MW-62S, MW-66S, MW-67S, MW-71S, and MW-74S.

The following sections discuss the results of the chemical analysis of site groundwater samples. As with the surface water samples, analytical results for groundwater were compared to established MCLs (Table 13) to identify potential areas of concern.

4.1.4.1 Unconsolidated Zone of Saturation (Shallow Monitoring Wells)

A total of 24 monitoring wells were installed to communicate with the unconsolidated zone of saturation present on site (MW-51S through MW-75S). The only total metals detected in groundwater samples from shallow monitoring wells in excess of established MCLs or action levels were aluminum, arsenic, cadmium, chromium, manganese, and lead. The MCL for aluminum is 200 µg/l. This level was exceeded in samples collected from the following wells: MW-51S (1,090 µg/l), MW-52S (5,620 µg/l), MW-60S (5,240 µg/l), MW-61S (6,040 µg/l), MW-62S (1,980 µg/l), MW-66S (13,200 µg/l), MW-67S (37,900 µg/l), MW-71S (26,700 µg/l), and MW-74S (394,000 µg/l). The drinking water MCL for arsenic is 50 µg/l. This level was exceeded in groundwater samples collected from the following wells: MW-57S (70.2 µg/l), MW-58S (330 µg/l), MW-59S (126 µg/l), MW-60S (391 µg/l), MW-61 (405 µg/l), MW-62S (538 µg/l), MW-63S (1,100 µg/l), MW-64S (177 µg/l), MW-65S (403 µg/l), MW-66S (205 µg/l), MW-67S (2,830 µg/l), MW-70S (126 µg/l), MW-71S (494 µg/l), MW-73S (116 µg/l), and MW-74S (149 µg/l).

The drinking water MCL for cadmium in 5 µg/l. The following monitoring wells exhibited concentrations of cadmium in excess of 5 µg/l: MW-51S (18.1 µg/l), MW-52S (10.1 µg/l), MW-53S (7.17 µg/l), MW-55S (28.5 µg/l), MW-57S (8.45 µg/l), MW-58S (5.18 µg/l), MW-59S (5.86

µg/l), MW-60S (7.2 µg/l), MW-61S (6.38 µg/l), MW-62S (5.39 µg/l), MW-63S (5.55 µg/l), MW-64S (6.39 µg/l), MW-65S (10.1 µg/l), MW-66S (6.03 µg/l), MW-67S (6.69 µg/l), MW-68S (11 µg/l), MW-69S (10.2 µg/l), MW-70S (5.32 µg/l), MW-71S (12.8 µg/l), MW-72S (9.12 µg/l), MW-73S (79 µg/l), MW-74S (119 µg/l), and MW-75S (5.65 µg/l).

Chromium was detected in only two shallow groundwater monitoring wells at concentrations in excess of its drinking water MCL of 100 µg/l. These wells included MW-73S (126 µg/l) and MW-74S (1,500 µg/l). Manganese was identified in nine wells in excess of its drinking water MCL of 50 µg/l. These wells included MW-51S (207 µg/l), MW-52S (619 µg/l), MW-60S (6,290 µg/l), MW-61S (1,370 µg/l), MW-62S (718 µg/l), MW-66S (17,200 µg/l), MW-67S (321 µg/l), MW-71S (20,000 µg/l), and MW-74S (266,000 µg/l).

Lead currently does not have a drinking water MCL; however, the USEPA has imposed an action level of 15 µg/l at the tap for drinking water suppliers. Six shallow monitoring wells exhibited concentrations of lead in excess of 15 µg/l. These wells included MW-54S (34.6 µg/l), MW-55S (16.7 µg/l), MW-56S (55.3 µg/l), MW-57S (15.8 µg/l), MW-69S (110 µg/l), and MW-73S (110 µg/l).

Total silver, barium, copper, mercury, and selenium were either not detected in the groundwater samples collected from the shallow monitoring wells or present at concentrations below established MCLs.

Beryllium, calcium, cobalt, iron, potassium, magnesium, sodium, nickel, antimony, tin, thallium, vanadium, zinc, columbium, and tantalum do not have established MCLs. These metals were detected in one or more of the shallow monitoring wells with the exception of thallium. Thallium was not detected in any of the 25 shallow wells. The remainder of these metals were detected at the following total concentration ranges: beryllium from 1.19 µg/l (MW-51S) to 253 µg/l (MW-74S); calcium from 1,070 µg/l (MW-67S) to 500,000 µg/l (MW-56S); cobalt from not detected (MW-51S, 62S, and 67S) to 290 µg/l (MW-74S); iron from 926 µg/l (MW-51S) to 832,000 µg/l (MW-74S); potassium from 1,850 µg/l (MW-51S) to 235,000 µg/l (MW-60S); magnesium from 638 µg/l (MW-67S) to 48,000 µg/l (MW-62S); sodium from 32,400 µg/l (MW-52S) to 696,000 µg/l (MW-60S); nickel from not detected (MW-51S, MW-52S, MW-53S, MW-62S, and MW-70S) to 2,380 µg/l (MW-74S); antimony from not detected (MW-51S,

MW-52S, MW-53S, MW-54S, MW-58S, MW-59S, MW-60S, MW-61S, MW-62S, MW-64S, MW-66S, MW-68S, MW-70S, MW-71S, MW-74S, and MW-75S) to 284 µg/l (MW-74S); tin from not detected (MW-51S, MW-52S, MW-57S, MW-58S, MW-60S, MW-61S, MW-62S, MW-63S, MW-64S, MW-66S, MW-68S, MW-69S, MW-70S, and MW-75S) to 160,000 µg/l (MW-56S); vanadium from not detected (MW-51S) to 2,640 µg/l (MW-74S); zinc from 18.3 µg/l (MW-61S) to 1,480 µg/l (MW-74S); columbium from not detected (MW-51S, MW-52S, MW-53S, MW-59S, MW-61S, MW-62S, MW-63S, MW-64S, MW-65S, MW-66S, MW-67S, MW-68S, MW-70, and MW-75S) to 1,900 µg/l (MW-74S); and tantalum from not detected (MW-53S, MW-63S, MW-64S, MW-65S, MW-66S, MW-67S, MW-68S, MW-70S, and MW-71S) to 600 µg/l (MW-74S).

Dissolved metals analysis was performed on groundwater samples collected from MW-55S, MW-62S, MW-63S, MW-65S, MW-66S, MW-67S, MW-73S, and MW-74S. The dissolved metals analysis was performed for comparative purposes with total metal concentrations. Dissolved concentrations of silver were only detected in MW-73S (60 µg/l) and MW-74S (27 µg/l). The concentrations of dissolved silver present in these well samples were below the established MCL for this metal (100 µg/l). Dissolved arsenic concentrations exceeded the MCL for this metal (50 µg/l) in the following wells: MW-62S (550 µg/l), MW-63S (650 µg/l), MW-65S (300 µg/l), MW-66S (430 µg/l), MW-67S (4,000 µg/l), MW-73S (180 µg/l), and MW-74S (910 µg/l). Dissolved concentrations of barium were not exhibited by any of the wells sampled at concentrations in excess of this metal's MCL. Dissolved concentrations of cadmium were identified above its established MCL (5 µg/l) in the following wells: MW-55S (5.5 µg/l), MW-63S (5.1 µg/l), MW-66S (10 µg/l), MW-73S (190 µg/l), and MW-74S (110 µg/l). Dissolved concentrations of chromium were only detected in MW-73S (1,400 µg/l) and MW-75S (1,500 µg/l). The concentrations of chromium detected in both of these wells exceed this metals established MCL of 100 µg/l. Mercury was not detected in any of the eight wells at concentrations in excess of its MCL. Dissolved concentrations of selenium were not identified in any of the eight wells sampled. Dissolved lead was detected in the following wells at trace concentrations: MW-55S (1.6 µg/l), MW-67S (3.6 µg/l), MW-73S (2.0 µg/l), and MW-74S (5.2 µg/l).

Calcium, nickel, antimony, tin, columbium, and tantalum do not have established MCLs. These metals were detected at the following dissolved concentrations in the wells identified below: calcium was detected in MW-55S (13,000 µg/l), MW-62S (180,000 µg/l), MW-63S (280,000 µg/l),

MW-65S (53,000 µg/l), MW-66S (67,000 µg/l), MW-67S (1,000 µg/l), MW-73S (8,000 µg/l), and MW-74S (9,900 µg/l); nickel was detected in MW-55S (68 µg/l), MW-63S (53 µg/l), MW-65S (54 µg/l), MW-66S (120 µg/l), MW-73S (2,300 µg/l), and MW-74 (2,300 µg/l); antimony was detected in MW-55S (6.0 µg/l), MW-63S (4.2 µg/l), MW-65S (7.2 µg/l), MW-66S (4.3 µg/l), MW-67S (12 µg/l), and MW-74S (4.0 µg/l); tin was identified in MW-62S (53 µg/l), MW-63S (61 µg/l), MW-67S (110 µg/l), MW-73S (1,300 µg/l), MW-73S (1,400 µg/l), and MW-74S (1,500 µg/l); and tantalum was detected in MW-62S (100 µg/l), MW-63S (200 µg/l), MW-67S (100 µg/l), MW-73S (900 µg/l), and MW-74S (800 µg/l).

Total concentrations of fluoride were detected in excess of its established MCL (4 mg/l) in the following wells: MW-55S (52 mg/l)), MW-57S (19 mg/l), MW-60S (7.4 mg/l), MW-61S (25 mg/l), MW-62S (10 mg/l), MW-63S (20 mg/l), MW-64S (39 mg/l), MW-65S (42 mg/l), MW-66S (51 mg/l), MW-67S (3,600 mg/l), MW-68S (5.0 mg/l), MW-69S (21 mg/l), MW-70S (16 mg/l), MW-71S (54 mg/l), MW-72S (50 mg/l), MW-73S (12 mg/l), MW-74S (8.5 mg/l), and MW-75S (38 mg/l).

Ammonia which does not have an established MCL was detected in 17 of the 25 shallow monitoring wells at concentrations ranging from 0.39 mg/l (MW-73S) to 3,500 mg/l (MW-67S). Total nitrate was detected above its MCL (10 mg/l) in the following wells: MW-52S (41 mg/l), MW-57S (30 mg/l), MW-61S (29 mg/l), MW-62S (160 mg/l), MW-66S (59 mg/l), and MW-67S (69 mg/l). Sulfate was detected in 16 of 25 shallow monitoring wells at concentrations in excess of its MCL of 250 mg/l. These wells included MW-52S (2,000 mg/l), MW-56S (2,000 mg/l), MW-57S (270 mg/l), MW-58S (800 mg/l), MW-59S (1,600 mg/l), MW-60S (780 mg/l), MW-62S (1,000 mg/l), MW-63S (1,900 mg/l), MW-64S (740 mg/l), MW-65S (420 mg/l), MW-66S (880 mg/l), MW-67S (2,900 mg/l), MW-71S (590 mg/l), MW-72S (1,200 mg/l), MW-73S (800 mg/l), and MW-74S (1,600 mg/l).

MIBK was detected in MW-64S (430 µg/l), MW-67S (820 µg/l), MW-71S (37 µg/l), MW-73S (120,000 µg/l), and MW-74S (83,000 µg/l). The state of Oklahoma has established an MCL for MIBK of 2,000 µg/l. The only other VOCs detected in site wells were methyl ethyl ketone (MEK), 1,2-dichloroethene, and 2-hexanone. These constituents were only detected in MW-74S at 21, 64, and 33 µg/l respectively. None of these three VOCs have established MCLs. No semivolatile organic compounds were detected in the monitoring wells with the exception of di-N-butyl phthalate which was identified in MW-67S (14 µg/l) and MW-74S (36 µg/l). Table 15

summarizes the results of groundwater samples collected from the shallow monitoring wells. Figure 11 illustrates the location of various parameters of concern detected above established MCLs.

4.1.4.1.1 Distribution of Contaminants of Concern in the Unconsolidated Zone of Saturation

Figure 11 illustrates the location of various contaminants of concern in shallow monitoring wells. As with site soils, groundwater is most significantly impacted in the areas of the site downgradient of the Chemical "A" Building and in the immediate vicinity of Ponds Nos. 2 and 3. Groundwater in this area of the site exhibits elevated concentrations of ammonia, fluoride, and MIBK. Concentrations of metals are also generally higher in the monitoring wells in this portion of the site than in other facility areas.

Groundwater samples collected from wells in the vicinity of the wastewater treatment ponds also exhibit some impacts associated with fluoride and ammonia. No MIBK was identified in groundwater in this portion of the site.

4.1.4.2 Shale Bedrock Zone of Saturation

A total of four groundwater monitoring wells were installed at the Fansteel facility to communicate with the shale bedrock zone of saturation (MW-151D, MW-161D, MW-167D, and MW-174D). Groundwater samples collected from these wells were analyzed for the list of parameters identified in Section 4.1.4 of this report.

Silver, barium, chromium, mercury, nickel, selenium, tin, columbium, and tantalum were either not detected or present at concentrations below established MCLs within samples collected from the four bedrock monitoring wells. Arsenic was detected in each bedrock monitoring well (MW-151D, 120 µg/l; MW-161D, 4.6 µg/l; MW-167D, 3.88 µg/l; and MW-174D, 11.3 µg/l). The drinking water MCL for arsenic is 50 µg/l. Calcium was detected in each of the four wells at concentrations ranging from 20,100 µg/l (MW-151D) to 83,600 µg/l (MW-167D). Cadmium was identified only in MW-151D (6.3 µg/l). The MCL for cadmium is 5.0 µg/l. Lead was detected in each bedrock monitoring well at concentrations ranging from 8.71 µg/l (MW-167D) to 122 µg/l (MW-161D). Antimony was detected only in MW-151D (38.2 µg/l) and MW-174D (30.8 µg/l).

Fluoride was detected in each well at concentrations below 4 mg/l, the MCL for this constituent. Ammonia was detected in MW-161D (0.33 mg/l), MW-167D (0.22 mg/l), and MW-174D (0.44 mg/l). Nitrate was detected in each of the four wells at concentrations ranging from 0.31 mg/l (MW-161D) to 10 mg/l (MW-151D).

MIBK was detected only in MW-174D at a trace concentration of 13 µg/l. The method detection limit for MIBK is 10 µg/l. However, this well was sampled again on April 30, 1993 and MIBK was not detected at this time. The presence of MIBK in the initial sample collected from this well immediately after installation is believed to be associated with residual contamination resulting from well installation that was not completely removed during initial well development. The analytical results for the analysis of groundwater from the bedrock wells are summarized in Table 16. Figure 11 illustrates the location of various parameters detected above established MCLs.

4.1.4.2.1 Distribution of Contaminants of Concern in the Shale Bedrock Zone of Saturation

Figure 11 also summarizes the occurrence of specific chemical contaminants of concern in the bedrock zone of saturation. Generally, the bedrock zone of saturation does not exhibit concentrations of the various constituents of concern at levels which pose a significant concern. Fluoride is not present in any of the bedrock monitoring wells at concentrations above MCLs. Ammonia was detected in the three downgradient bedrock monitoring wells; however, the concentrations are orders of magnitude less than those associated with the unconsolidated zone of saturation. Results of the most recent sampling activities indicate that MIBK is not present in the bedrock zone. The analytical results demonstrate that groundwater impacts of concern are confined to the shallow zone of saturation. The bedrock zone of saturation does not appear to have been adversely impacted by site operations.

4.2 Radiological Characteristics

Based on the field activities described in Sections 3.9 and 3.10 of this report, the following determinations were obtained relating to the presence of radioactive materials on the south and east plant area of the Fansteel property.

4.2.1 Soils

4.2.1.1 Background Soils

Radiochemical analysis of the soils obtained from 30 background locations was utilized to establish a baseline for comparison of site soils. The background soil samples were assumed to be unaffected by Fansteel's manufacturing operations. The background soil samples were also assumed to be representative of the total content and distribution of radionuclides which would be present on the Fansteel property without regard to any manufacturing activity. Figure 3 presents the location of the 30 background soil samples and Table 17 summarizes the results of their analyses.

Average values of gross alpha and gross beta activity were calculated from the background soil analytical results. The average gross alpha activity measured in the background soils was found to be 15.6 picocuries per gram (pCi/g). Results were distributed normally around this value, i.e., the calculated sample standard deviation was 4.5 pCi/g. No background sample results exceeded two standard deviations from the mean value of alpha activity. One sample (Sample No. 9) showed alpha activity less than the mean value by more than two standard deviations but less than three. The average gross beta activity measured in the background samples was found to be 20.5 pCi/g. Results were distributed normally around the mean, i.e., the calculated sample standard deviation was 4.6 pCi/g. No background sample exceeded two standard deviations from the mean value of beta activity. One sample (Sample No. 3), showed beta activity less than the mean value by more than two standard deviations but less than three. Based on the normal distribution of gross activity results, the average values for gross alpha and gross beta radioactivity can be confidently applied to the results of similar analyses at the Fansteel site as a background correction for purposes of detecting impacts to the site by radioactive materials managed at the facility.

One reservation must be enunciated regarding the background radiochemistry values for gross alpha activity. The results of the background radiochemistry survey exhibited a higher level of alpha activity than might have been expected. These slightly elevated results are most probably due to fallout from the nearby Oklahoma Gas and Electric (OG&E) coal-fired electricity generation plant. Both uranium and thorium are emitted from coal-burning facilities. The OG&E plant has been in operation in excess of 20 years and so may have

contributed measurable amounts of these long-lived radionuclides to the surface soil on the land surfaces surrounding the generation plant. The Fansteel facility would be expected to have received approximately the same addition as the areas sampled for the determination of the radiochemical background.

Background soil samples were also analyzed for specific radionuclides of concern, specifically uranium and thorium. The concentration of uranium (including U-238, U-235, and U-234) averaged 1.08 pCi/g with a sample standard deviation of 0.62 pCi/g. The concentration of thorium (including Th-232, Th-230, and Th-228) averaged 3.33 pCi/g with a sample standard deviation of 0.92 pCi/g. These results indicate a normal distribution of radionuclide concentrations in the background soil. These average concentrations will be used to provide a background radionuclide concentration for interpreting the results of soil samples obtained from the Fansteel site.

Examination of the background soils for Radium-226 (a Uranium-238 decay product) and Radium-228 (a Thorium-232 decay product) indicates that the parent radionuclides are in a condition of approximate equilibrium with their decay products. Results of the background soil sample radiochemical analysis are also presented in Table 18.

4.2.1.2 Site Soils

Site soils were investigated for radioactive materials using both an instrument survey of the ground surface and by laboratory analysis of soils obtained from borings, test pits, and monitoring well installations. These investigations indicate the presence of radioactive materials in site soils at various locations on the east plant area of the Fansteel property.

4.2.1.2.1 Instrument Survey Results

The results of the instrument survey of site soils are presented in Table 17. The location of the soil instrument survey points is shown in Figure 4. The instrument survey of the exterior grounds was able to yield relatively little additional information on the concentration of radionuclides in the soil. Surveys of surface alpha and beta activity are only marginally useful because of the short range of alpha and beta particles through soil. Gamma radiation surveys are generally capable of detecting the presence of concentrations of radionuclides in soils. However, the presence of large quantities of radioactive materials in Pond No. 2, Pond No. 3,

and, to a lesser extent, Pond No. 5 contributed a sufficiently high and variable background to preclude meaningful interpretation of the results of the surface gamma radiation survey.

The results of the surface alpha radioactivity survey generally support the findings of the subsurface radiochemical analysis. Elevated surface alpha radioactivity was observed in the immediate surroundings of the residue impoundments, Pond No. 2 and Pond No. 3. Additional elevated surface alpha particle activity was detected in the area east of the Chemical "A" Building and along the railroad spur terminus northwest of the Chemical "C" Building.

Surface alpha particle surveys are more useful on finished surfaces. The paved ore storage pad located west of the Chemical "A" Building showed widespread areas of elevated alpha particle activity on the surface. Areas used for traffic carrying ores or residues between the storage pad and the materials entrance for the Chemical "A" Building similarly showed elevated surface activity, probably due to fugitive ore material or processing residues. These areas will be remediated with regard to radioactive materials as part of site decommissioning activities.

4.2.1.2.2 Soil Analysis Results

Results of the soil radiochemical analyses performed on samples recovered from soil borings, monitoring wells, test pits, and surface sediments are presented in Tables 3, 4, and 12. Locations of soil samples for radiochemical analysis are shown in Figure 2. Gross alpha and gross beta analysis was performed by counting 100 milligrams of dried soil using a gas flow proportional counter. Specific radionuclides were determined by gamma spectrometry and radiochemical analysis.

The following criteria were used to identify soil areas that may have been affected by radioactive materials used at the Fansteel site:

- Gross alpha radioactivity in excess of 20 pCi/g. This level of radioactivity represents one standard deviation above the local background alpha activity of 15 pCi/g.
- Total uranium (U-238, U-235, and U-234) in excess of 6.1 pCi/g. This concentration of uranium represents 5 pCi/g above the local background concentration of uranium in soil.

- Total thorium (Th-232 and Th-230) in excess of 8.3 pCi/g. This concentration of thorium represents 5 pCi/g above the local background concentration of thorium in soil.

Soils meeting one or more of these criteria for consideration as potentially affected by radioactive materials from the Fansteel manufacturing operations are found throughout the site, as shown in Figure 12. Potentially affected soils are found in various locations from the surface to depths in excess of 20 feet below the surface. Most of the contaminated soils and the soils with the highest levels of contamination are located along the eastern edge of the property, east of the manufacturing, processing, and waste management areas of the facility. The location, concentration, and extent of contamination in each area is discussed in further detail in the following sections.

4.2.1.2.2.1 Borrow Pit Area

The borrow pit is located in the southwest corner of the plant property. The original surface soils in the borrow pit have been partially removed for use in constructing berms, impoundments, improving drainage, and other uses at the site. Three samples of surface soil were obtained and six soil borings were evaluated as part of the soils investigation. Two of the soil borings were developed as shallow monitoring wells. Two of the soil borings, B-10 and MW-56S, exhibited elevated gross alpha activity.

Soil Boring B-10 exhibited gross alpha activity of 42 pCi/g in the sample obtained between 2.0 and 4.5 feet below the surface. Radiochemical analysis of this sample showed both uranium and thorium in the soil at levels above the local background but below the threshold criteria cited previously. Other decay products of uranium and thorium are also present in a condition of equilibrium. Other sampled intervals did not exhibit elevated radioactivity.

The boring for MW-56S exhibited gross alpha radioactivity of 23 pCi/g in the top 6 inches of soils sampled. Radiochemical analysis of this sample showed uranium and thorium concentrations approximately equal to the local background average. Other decay products of uranium and thorium are present in a condition of equilibrium. Other sampled intervals did not exhibit elevated radioactivity.

Based on the results of the soil sampling alone, the radioactivity detected in this area might be attributed to a random accumulation of fugitive material or to a naturally occurring concentration of uranium or thorium-bearing minerals. However, as discussed in Sections 4.2.3.1 and 4.2.4.1 following, groundwater and surface water in this area of the property also indicate elevated concentrations of radioactivity. This combination of indicators suggests that radioactive materials may have impacted this area at some time in the past.

4.2.1.2.2.2 Wastewater Treatment Ponds (Ponds Nos. 6, 7, 8, and 9)

The wastewater treatment ponds are located in the southeast corner of the Fansteel property. These ponds are currently used to store sludges, principally calcium carbonate and calcium fluoride, generated during the treatment of plant wastewater. Additionally, the location designated as Pond No. 5 has in the past been used for the storage of radioactive material containing residues from the processing of ores at this facility. Fifteen soil borings were advanced in this area. Seven of these borings were developed as monitoring wells. One sediment sample from a surface water outfall was also sampled. One of the soil borings, B-17, exhibited elevated gross alpha radioactivity and elevated concentrations of thorium.

Boring B-17 exhibited gross alpha radioactivity of 27 pCi/g and thorium at a concentration of 13.6 pCi/g at a depth of 0.5 to 2.5 feet below the ground surface. The principal contributor to the total thorium is Thorium-230 which was reported present at 11 pCi/g. Radiochemical analysis of other members of the Uranium-238 decay series shows these elements to be present but at concentrations less than would be required for equilibrium, i.e., in the range of 1 to 3 pCi/g. The result reported for B-17 appears to be a local anomaly since no other soil borings in this area of the property indicate elevated radioactivity, nor was elevated radioactivity detected in any of the other samples obtained from this borehole.

4.2.1.2.2.3 Eastern Outslope

The eastern outslope comprises the area lying south of the closed impoundment designated Pond No. 2, north of the wastewater treatment ponds, and east of the main chemical processing building referred to as the Chemical "A" Building or Building No. 16. Twenty-seven boreholes were sampled in this area, 4 of which were developed as monitoring wells. Sediment from 2 runoff or treated water outfalls were also sampled. All but 6 of the boreholes show elevated radioactivity levels. Sediment from Outfall 002 also exhibited elevated radioactivity.

Elevated gross alpha radioactivity was identified in the following boreholes: B-32, B-33, B-74, B-50, B-66, B-49, B-63, MW-65S, B-48, B-47, B-58, B51, B-52, B-64, B-65, B-54, B-55, B-56, B-61, B-73, and B-62. Elevated uranium was found in B-74, B-33, B-50, B-49, MW-65S, B-47, B-64, B-65, B-54, B-55, B-56, B-61, B-73, and B-62. Elevated thorium was found in B-47, B-51, B-52, B-54, B-55, B-56, B-61, and B-73. Elevated gross alpha was detected in the sediments associated with Outfall 002. Radioactivity in the boreholes was detected at depths from the surface material to 20 feet below the surface. The majority of the contamination is found within the top 2.5 feet of soil in this area. Levels of radioactivity range from near the criterion concentration to more than 100 pCi/g. This entire area appears to be affected by radioactive materials which may have resulted from plant operations.

4.2.1.2.2.4 Residue Pond Area

This area comprises the boundaries of the embankments of Pond No. 2, Pond No. 3, the Chemical "C" Building (also referred to as Building No. 13) and the area of land lying east of these ponds to the Arkansas River. These impoundments are used for the storage of ore processing residues from the production of tantalum and columbium. A total of 24 boreholes were developed in this area, 9 of which were developed as monitoring wells. Sediment associated with 1 surface water outfall was also sampled. Eleven of the boreholes and the sediment sample exhibited elevated radioactivity.

Elevated alpha radioactivity was detected in the following boreholes: B-15, B-29, B-36, MW-71S, B-60, B-59, B-38, B-72, B-39, MW-75S, and B-22. Elevated uranium was detected in B-29, B-36, MW-71S, B-59, B-72, MW-75S, and B-22. Elevated thorium was detected in MW-75S. Elevated gross alpha radioactivity and elevated uranium were found in the sediment obtained from Outfall 003. Radioactivity in this area was distributed from the surface to depths in excess of 20 feet. However, as with the eastern slope area, most of the radioactivity was found in the upper 2.5 feet of soil. The contamination found at depth, i.e., from soils recovered from MW-71S, B-59, and B-72, was almost exclusively due to uranium. Radioactive decay products were found in these locations at concentrations much lower than the parent uranium. This indicates that the contamination may be associated with uranium mobilized by infiltrating groundwater through Pond No. 2 or Pond No. 3 rather than from ore or slag residues present in the soils at these locations. This entire area appears to have been affected by radioactive materials derived from plant operations.

4.2.1.2.2.5 Central Area

The central area comprises the balance of the property. Soil samples were obtained from 12 test pits and 14 soil borings. Three of the soil borings were also developed as monitoring wells. Radioactive contamination is essentially absent from the central plant area. Gross alpha radioactivity in excess of the criterion was detected from two of the test pits (TP-5 and TP-10) and one borehole, B-28. Results from these locations are from the surface soil and are either at the criterion value of 20 pCi/g (TP-5) or slightly above it. Gross alpha radioactivity at TP-10 was 21 pCi/g. Gross alpha radioactivity at B-28 was 22 pCi/g. These values may be attributed to fugitive emissions of ore or residue, and do not indicate significant contamination of soils in this area of the site.

4.2.2 Pond Residues

Samples were obtained from each of the ponds on the site as identified in Figure 2. These consisted of the two ore processing residue impoundments (Pond No. 2 and Pond No. 3), an empty basin (Pond No. 5) formerly used for residue storage, and four basins (Pond No. 6, Pond No. 7, Pond No. 8, and Pond No. 9) used for treatment of wastewaters and storage of water treatment residues, principally calcium carbonate and calcium fluoride.

4.2.2.1 Pond No. 2 and Pond No. 3

Pond No. 2 and Pond No. 3 were sampled at the locations shown in Figure 2. At each location, a sample of the entire column of process residue was obtained. The sample was divided into thirds by vertical interval. The uppermost aliquot was identified as the "A" sample, the middle aliquot as "B", and the bottom aliquot as "C." The samples were analyzed for gross alpha, gross beta, and specific radionuclides by gamma ray spectroscopy. Analytical results are presented in Tables 5 and 6.

The ore processing residues retain the radioactive species that were present in the ores processed at the facility. All samples exhibited significant radioactivity, with gross alpha values in the thousands of picocuries per gram range. Uranium and thorium were present in all samples at hundreds of picocuries per gram. Evaluation of the decay product activities shows that the residues are in a condition of approximate equilibrium. Figure 13 illustrates the location of pond sampling points exhibiting elevated levels of radioactivity.

4.2.2.2 Wastewater Treatment Residue Impoundments

Ponds Nos. 6, 7, 8, and 9 were sampled at the locations shown in Figure 2. Ponds No. 6 and 7 are is the final polishing basins where treated wastewater is retained prior to discharge. Only a small amount of residue is present in each of these ponds. Consequently, only one sample increment was obtained from sample location associated with Ponds Nos. 6 and 7. Ponds Nos. 8 and 9 are essentially full of wastewater treatment residue. This residue is composed primarily of calcium carbonate and calcium fluoride derived from treatment of process water and other wastewaters generated at the facility. Each sample from Ponds Nos. 8 and 9 was divided into three aliquots in the same manner as the samples from the ore processing residue impoundments. Each sample was analyzed for gross alpha and gross beta radioactivity and for specific radionuclides. Analytical results are presented in Tables 8, 9, 10, and 11.

All of the wastewater treatment residue samples contain radioactivity in excess of the criterion value of 20 pCi/g. All of the wastewater treatment residue samples contain uranium and thorium in excess of the criterion value of 5 pCi/g. Examination of the activity of the radioactive decay products in the wastewater treatment residues indicates that equilibrium activities exist through radium. Activities of elements below radium in the decay sequence are present in less than equilibrium activities. The activity of these species will therefore tend to increase over time as equilibrium is re-established. Figure 13 illustrates the location of pond sampling points exhibiting elevated levels of radioactivity.

4.2.2.3 Pond No. 5

Pond No. 5 is a dry basin that has been used both for storage of ore processing residues and for wastewater treatment. The ore processing residues have been substantially removed. An accumulation of wastewater treatment residues remain in the basin. The material remaining in Pond No. 5 was sampled at the locations shown in Figure 2. Each sample was divided into three aliquots in the same manner as the samples from the active wastewater treatment residue impoundments. Each sample aliquot was analyzed for gross alpha and gross beta radioactivity and for specific radionuclides. Results of these analyses are presented in Table 7.

All of the sample locations have radioactivity in excess of the criterion value of 20 pCi/g gross alpha radioactivity except for the "C" aliquot of Samples P5-1 and P5-3. All of the sample

locations have uranium and thorium concentrations in excess of the criterion of 5 pCi/g except the "C" aliquot of Samples P5-1 and P5-3. Radioactivity levels in the Pond No. 5 materials are slightly higher than the levels found in the other wastewater treatment ponds. Figure 13 illustrates the location of pond sampling points exhibiting elevated levels of radioactivity.

4.2.3 Surface Water and Sediments

Surface water and sediments were sampled at the locations shown in Figure 2. The samples were analyzed for gross alpha and gross beta radioactivity and for specific radionuclides. The results of these analyses are presented in Tables 12 and 14. For purposes of evaluating surface water for the presence of radioactive contamination, the OWRB values of 15 picocuries per liter (pCi/l) for alpha radioactivity and 50 pCi/l for beta radioactivity were utilized. Water containing radioactivity in excess of these values is presumed to have been affected by plant operations, except as noted.

4.2.3.1 Surface Water

Two of the surface water sources, S-1 and S-002, contained gross alpha and gross beta radioactivity in excess of criterion. Sample S-1 consisted of runoff from the borrow pit area located in the southwest corner of the Fansteel property. This sample exhibited elevated alpha and beta radioactivity 110 pCi/l and 150 pCi/l respectively. Specific radionuclide analysis identified elevated concentrations of uranium, thorium, and radium. These results may indicate that surface waters in this area have been affected by radioactive materials.

S-002 is a permitted discharge point for runoff from the east side of the plant property. Runoff discharging through this point flows through the east outslope area discussed in Section 4.2.1.2.3. Soils in this area appear to have been impacted with radioactive residues. These residues are located primarily in the near surface soils and so would be subject to transport in any surface runoff. The water sampled at S-002 contained elevated gross alpha and gross beta radioactivity as well as uranium and radium. Figure 14 identifies the surface water locations exhibiting elevated levels of radioactivity.

4.2.3.2 Sediment

Sediment samples were obtained from each surface water sample location. Sediments from discharge Points S-002 and S-003 exhibited elevated levels of radioactivity.

S-002 is the permitted discharge point for runoff from the east side of the plant and was discussed previously in Section 4.2.3.1. Sediment associated with the discharge point exhibited slightly elevated gross alpha radioactivity, i.e., 28 pCi/g.

S-003 is the permitted discharge point for the french drain system used for controlling groundwater in the vicinity of Pond No. 3. The sediment associated with the discharge point contained slightly elevated gross alpha radioactivity, 24 pCi/g, and elevated uranium, 12.4 pCi/g. Figure 12 identifies surface sediment sampling locations exhibiting elevated levels of radioactivity.

4.2.4 Groundwater

Twenty-five monitoring wells were developed in the unconsolidated zone of saturation on the south and east portion of the Fansteel property. Four monitoring wells were developed in the bedrock zone of saturation. The location of these wells is shown in Figure 2. Water from these wells was sampled and analyzed for gross alpha and gross beta radioactivity as well as for specific radionuclides. Results of these analyses are presented in Table 15 for the shallow groundwater zone and Table 16 for the deep groundwater zone.

4.2.4.1 Unconsolidated Zone of Saturation (Shallow Wells)

Groundwater in the unconsolidated zone of saturation is generally contaminated with radioactivity over the south and east portion of the site. All but three of the monitoring wells installed to communicate with the unconsolidated zone of saturation exhibit some degree of radiological contamination. However, some of this contamination may be from sources other than manufacturing and processing operations conducted at Fansteel. Figure 14 identifies groundwater monitoring wells exhibiting elevated levels of radioactivity.

MW-52S and MW-56S are located in the borrow pit area, i.e., the southwest corner of the property. Both of these wells exhibited elevated gross alpha radioactivity. MW-52S contained 79 pCi/l and 160 pCi/l respectively of gross alpha and gross beta radioactivity. MW-56S contained 76 pCi/l and 34 pCi/l of gross alpha and gross beta radioactivity. Additionally, MW-56S contains 68 pCi/l of uranium. MW-52S contains elevated concentrations of radium and thorium. The groundwater in the borrow pit area appears to have been affected by radioactive materials.

MW-59S, MW-60S, MW61S, MW-57S, and MW-62S are located along the eastern (downgradient) side of the wastewater treatment residue impoundments. MW-59S, MW-60S, and MW-57S exhibited elevated gross alpha and gross beta radioactivity. MW-61S and MW-62S show elevated gross beta radioactivity only. The elevated gross beta in these wells appears to be associated with elevated levels of naturally occurring Potassium-40 rather than contamination with exogenous radionuclides.

MW-59S exhibited elevated gross alpha and gross beta radioactivity at 19 pCi/l and 110 pCi/l respectively. MW-60S exhibited gross alpha and gross beta radioactivity of 24 pCi/l and 240 pCi/l respectively. MW-57S exhibited 23 pCi/l and 120 pCi/l of gross alpha and gross beta radioactivity. Radium was the only specific radionuclide detected in these wells at significant concentrations.

The source of this groundwater contamination may be associated with the radioactive materials contained in the wastewater treatment residues. The presence of radium in the groundwater samples together with the relative absence of uranium and thorium (which would be immobilized in the wastewater treatment residues) supports this identification of the impoundments as the source of the groundwater contamination in this area of the plant.

MW-65S, MW-66S, and MW-67S are located in the east outslope area, directly east of the main process area of the plant. All three of these wells exhibited elevated gross alpha and gross beta radioactivity. Of these wells, MW-65 shows the least contamination with 19 pCi/l gross alpha and 100 pCi/l gross beta activity. This well is located most upgradient of the three wells in this area and is removed from the majority of the contaminated soils previously identified. MW-66S contains 140 pCi/l of gross alpha activity and 120 pCi/l of gross beta radioactivity. MW-67S is the most contaminated well in the area with 1,300 pCi/l gross alpha and 440 pCi/l gross beta radioactivity. The concentration of uranium in MW-67S is also substantial.

MW-68S, MW-70S, MW-71S, MW-73S, MW-74S, MW-72S, MW-75S, and MW-69S surround the ore processing residue impoundments, Pond No. 2 and Pond No. 3. MW-72S and MW-75S, located north and east of Pond No. 3, do not exhibit contamination by radioactive materials. MW-70S shows only gross beta radioactivity above the water quality criteria. Elevated gross beta in the absence of elevated gross alpha may indicate elevated concentrations of naturally

occurring Potassium-40. Pending additional information, groundwater containing only beta activity in excess of the water quality criteria will not be considered affected by manufacturing or processing activities.

Pond No. 2 is an unlined ore processing residue impoundment. Consequently, the wells associated with this impoundment are strongly affected. MW-73S contains 830 pCi/l of gross alpha radioactivity and 1,300 pCi/l of gross beta. MW-74S, located downgradient and immediately adjacent to Pond No. 2, contains 2,600 pCi/l of gross alpha radioactivity and 930 pCi/l of gross beta. MW-71 which is located on the upgradient side of Pond No. 2 contains only 29 pCi/l of gross alpha and 140 pCi/l gross beta radioactivity.

MW-68S located on the west side of Pond No. 3 and MW-69S located on the north side of Pond No. 3 also exhibited some contamination. MW-68S contains 52 pCi/l of gross alpha radioactivity and 59 pCi/l of gross beta. MW-69S contains 30 pCi/l of gross alpha activity. Gross beta radioactivity in this well is less than the criterion concentration of 50 pCi/l. Both MW-68S and MW-69S are located in areas that were potentially affected by the lining failure in Pond No. 3. As such, the presence of contaminants may be associated with this single event. If this is the case, contamination concentrations in these wells may be expected to decrease over time. The absence of radioactive contamination in MW-72S which is located downgradient of Pond No. 3 indicates that the liner of Pond No. 3 is generally intact and not leaking.

Monitoring Wells MW-63S, MW-64S, and MW-55S are located in the central area immediately west of the main processing area. This was an area in which soil analysis showed little if any radioactive contamination present. Groundwater obtained from MW-63S and MW-64S exhibited elevated gross beta radioactivity, but not elevated gross alpha. Pending further investigation, these wells will not be considered to have been affected by plant operations. MW-55S does exhibit elevated gross alpha radioactivity, 40 pCi/l. Gross beta radioactivity in this well is below the criterion concentration. MW-55S is in an area that was potentially affected by the release of materials from Pond No. 3. As with MW-68S and MW-69S, contaminant concentrations for this well may be expected to diminish over time.

4.2.4.2 Bedrock Zone of Saturation

Four monitoring wells were developed in the bedrock zone of concentration: MW-151D, MW-161D, MW-167D, and MW-174D. The locations of these wells is presented in Figure 2. Water from these wells was analyzed for gross alpha and gross beta radioactivity. MW-151D initially exhibited gross alpha and gross beta radioactivity in excess of the water quality criteria cited in Section 4.2.3. Subsequent sampling and analysis of water from this well exhibited gross alpha and gross beta activity at levels below these criteria. The initial concentrations are therefore believed to be due to laboratory error or to trace contaminants introduced during well installation or development. Radionuclide concentrations in the other bedrock monitoring wells were below the cited water quality criteria. Based on these results, radioactive contaminated groundwater appear to be confined to the unconsolidated zone of saturation.

4.2.5 Buildings and Equipment

A preliminary scoping survey was performed on the buildings and equipment in the east plant area. This survey was performed to identify buildings, portions of buildings, and equipment that will require decontamination or other measures during NRC license decommissioning activities. Locations of the buildings surveyed during this activity are identified in figures contained in Appendix D. The results of the radiation survey are summarized in Appendix E.

Building No. 13, also referred to as the Chemical "C" Building, was formerly used for the ore digestion process. This building is contaminated with radioactive material throughout.

Individual areas of walls and floors and individual items of equipment in Building No. 16, also referred to as the Chemical "A" Building, are contaminated with radioactivity in excess of the applicable standard for release for unrestricted use. These areas and items will be delineated in the decommissioning plan which will be prepared for the site. Additionally, much of the roof surface shows elevated radioactivity, probably caused by fugitive dust from ore crushing or processing operations.

The other buildings on the east plant area appear to be uncontaminated. Roof areas on these structures do exhibit some elevated radioactivity from fugitive dust emissions and/or windblown material.

4.3 Air Monitoring Results

The results for TSP and radioactivity measurements were compared against background values for the site determined during the third quarter of 1992. The results of the air quality monitoring are included in this report as Appendix F. Data for the air quality evaluation were supplied by Fansteel.

Background air quality results were evaluated with regard to concentrations of TSP and radionuclides. The background average upwind concentration of TSP was 55.8 micrograms per cubic meter ($\mu g/m^3$) with a standard deviation of 33.2 $\mu g/m^3$. The 90 percent confidence interval for the concentration of TSP includes the range from 1.4 to 110.2 $\mu g/m^3$.

The concentrations of gross alpha and gross beta activity in the air samples, as determined by measuring the activity of the air sample filters, were too variable to calculate meaningful statistics. Because of this, the most restrictive airborne radionuclide effluent limit applicable to the Fansteel facility, i.e., Thorium-230, was used as a standard for comparison. All background upwind air samples had an activity of less than 3×10^{-14} microcurie per milliliter ($\mu Ci/ml$) of air, the effluent limitation for airborne Thorium-230 as established by the NRC in 10 Code of Federal Regulations (CFR) 20, Appendix B, Table 2. The upwind background concentrations of airborne radionuclides varied from not detectable to 3.16×10^{-15} $\mu Ci/ml$.

The same air quality parameters were measured during the performance of remediation assessment field activities during February of 1993. The concentration of airborne TSP during the remediation assessment field activities averaged 49.9 $\mu g/m^3$ with a standard deviation of 18.6 $\mu g/m^3$. None of the air quality samples obtained during the remediation assessment field activities fell outside the 90 percent confidence interval for upwind background TSP concentrations.

Concentrations of alpha emitting radionuclides exhibited the same behavior during the performance of remediation assessment field activities as was observed during the period in which background values were measured. The concentration of alpha particle activity was too variable for the development of meaningful statistics. All the measured concentrations were well below the most restrictive applicable airborne radioactivity effluent limitation of 3.0×10^{-14} $\mu Ci/ml$ of air. The maximum observed airborne radioactivity was 1.09×10^{-15} $\mu Ci/ml$ of air.

Based on these measurements, no measurable increase in TSP or radioactive constituents left the site as airborne material during the performance of the remediation assessment. Concentrations of TSP and radioactivity were below applicable standards at all times during the remediation assessment field activities.

4.4 QA/QC

The QA/QC procedures utilized during the performance of the remedial assessment at the Fansteel site are summarized in the QA Project Plan (QAPP) which was prepared for this project. The QAPP can be found in Appendix A of the Remedial Assessment Work Plan (July 1993 revised) prepared for the implementation of this work scope.

Analytical QA/QC documentation for the work performed on this project is contained within Appendix G of this report. This information includes matrix spike, matrix spike duplicate, field blank, equipment blank, trip blanks, and method blank results for each matrix sampled on site. Soil and sediments QA/QC data are summarized on Table G-1. Groundwater QA/QC data are summarized in Table G-2 and pond residue QA/QC data are summarized on Table G-3.

All method blank and trip blanks associated with samples collected from the facility were free of the contaminants of concern analyzed for in site samples. All equipment blank samples associated with site soil samples exhibited trace concentrations of sulfates. Low concentrations of fluoride were also present in three of the equipment blanks. Ammonia was detected near the method detection limit of 0.10 mg/l in one equipment blank. Additionally, trace concentrations of lead, arsenic, chromium, and tin were identified in several equipment blanks. No MIBK was detected in any of the equipment blanks associated with soil samples collected from the site. Barium and di-N-butyl phthalate were detected in the equipment blanks associated with the pond residues samples.

Trace concentrations of fluoride, sulfate, aluminum, calcium, copper, manganese, lead, zinc, and tantalum were identified in field blanks associated with the groundwater samples collected from the site. Several of these constituents are most likely associated with the water used to prepare the blank samples. The concentrations of these constituents exhibited by the field blanks are low compared to actual site samples, and their occurrence in the field blanks does not invalidate associated site sample data.

Fourteen groundwater samples were analyzed for TCL parameters using Contract Laboratory Program (CLP) protocols to verify that the list of specific parameters used to characterize site conditions was comprehensive. The results of these analyses are discussed in Section 4.1.4 of this report. The CLP data packages associated with the analysis of these 14 samples are contained in Appendix G. The data packages have been determined to be in compliance with the terms and conditions of the contract, both technically and for completeness.

5.0 Summary of Results

Based upon the results of this remedial assessment, Earth Sciences presents the following summary:

- The most pervasive chemical contaminants of concern identified in site soils included MIBK, ammonia, columbium, fluoride, and tin. The vast majority of these constituents was located in plant areas surrounding Pond No. 3 and to the east of Ponds Nos. 2 and 3, the Chemical "A" Building, and the Chemical "C" Building. These constituents are well distributed throughout the soil column in this area with the exception of MIBK and ammonia. MIBK and ammonia, almost without exception, were present at depths greater than 5 feet and do not appear to present a surficial concern. Columbium, fluoride, and tin were also identified at relatively elevated concentrations in soils to the east of Ponds Nos. 5, 6, 7, 8, and 9. A leachable concentration of barium was identified in one soil boring (B-56) located to the east of the Chemical "A" Building near Pond No. 2 which was in excess of 100 mg/l. Based upon surrounding data points, this concentration of barium appears to be an isolated occurrence.

- Radioactivity in site soils was detected in the manufacturing and processing area of the facility. Radioactivity was most prevalent in the soils located in the immediate vicinity of the ore processing residue ponds and the area lying east of these ponds and the Chemical "A" and Chemical "C" buildings. Soil radioactivity was concentrated in the top 2.5 feet of soil, although some locations did exhibit radioactivity to depths greater than 15 feet below the surface. These locations are consistent with historical manufacturing practices. Radioactivity was also detected in the southwest area of the plant in sufficient extent to require further investigation since this area is not known to have been used for manufacturing and processing activities.

- Similar to site soils, the shallow groundwater zone is most significantly impacted in the area of the site to the east of Ponds Nos. 2 and 3, the Chemical "A" Building, and the Chemical "C" Building. Groundwater in this area of the site exhibits elevated concentrations of ammonia, fluoride, and MIBK. Concentrations of a variety of metals (including columbium, tantalum, tin, arsenic, and chromium) are also generally higher in the monitoring wells in this portion of site than in other facility areas. Groundwater samples collected from wells in the vicinity of the wastewater treatment ponds (Nos. 6, 7, 8, and 9) and Pond No. 5 also exhibit some impact associated with fluoride and ammonia; however, no MIBK was detected in these wells.

- Groundwater throughout the south and east area of the property exhibited elevated radioactivity. Radioactivity was most prevalent in the areas adjacent to the ore processing residue ponds and the area lying east of these ponds and the Chemical "A" and Chemical "C" buildings. Elevated radioactivity was also detected in the groundwater downgradient (east) of the

wastewater treatment impoundments. The groundwater underlying the southwest plant area exhibits elevated radioactivity as well.

- The shale bedrock groundwater-bearing zone does not appear to be impacted by either chemical or radiological constituents of concern associated with plant operations.

- Surface water present in the southwest borrow pit area exhibits concentrations of barium, cadmium, lead, columbium, and tantalum. Ammonia was detected in one surface water sample from this area at low concentrations. Surface water discharge samples contained relatively low concentrations of ammonia, fluoride, and cadmium, MIBK was also identified in one surface water discharge sample (SS-001).

- Surface water was affected by radioactivity in two locations. NPDES Outfall 002 which discharges storm water runoff from the surface area east of the Chemical "A" Building exhibited elevated radioactivity. Water from surface water Source S-1 located in the southwest plant area also contains elevated radioactivity.

- The chemistry of the pond residues differs from pond to pond, as expected. However, the residues contained in each of the ponds appear to be fairly well homogenized. A variety of metals is present in each of the ponds on site, the most notable being chromium. Leachable concentrations of chromium in excess of 5.0 mg/l were identified in residue samples collected from Ponds Nos. 2 and 3. MIBK was identified within Ponds Nos. 2, 3, 8, and 9 residues. Fluoride was detected in all pond residues with the highest concentrations being identified in Ponds Nos. 2 and 3. Ammonia was present in each of the ponds at similar concentrations.

- The ore processing residues stored in Ponds Nos. 2 and 3 retain most of the radioactivity originally contained in the ores. The ore processing residues are licensed by the NRC as source materials. Radioactivity is also present throughout the wastewater treatment residue impoundments, Ponds Nos. 5, 7, 8, and 9.

- Surface contamination with radioactive materials is limited to roof surfaces subject to deposition of fugitive dust and areas formerly utilized for the management or processing of ores and ore residues. These areas include the entire Chemical "C" Building and specific locations in the Chemical "A" Building and R&D Building. Paved areas used for ore storage and transportation located west of the Chemical "A" Building also exhibit surface contamination with radioactive materials.

- Based upon the results of air monitoring activities, airborne concentrations of TSP and radioactivity were below applicable standards at all times prior to and during the performance of the remedial assessment.

- A groundwater divide in the unconsolidated zone of saturation is present on site which isolated the northwestern portion of the site from the remainder of the facility. This divide results in radial groundwater flow directions from

the northwestern plant area to the northeast, southeast, and southwest. Single well aquifer characterization tests indicated the hydraulic conductivities and average linear groundwater velocities associated with the three different flow directions were relatively low. The pumping test conducted on the shallow groundwater-bearing zone indicated that one groundwater well completed in this zone would not sustain pumping rates of much more than 0.1 gallon per minute for an extended period of time. Pumping of the well at this rate exhibited no effect on observation wells located no more than 35 feet away.

Targeted Brownfield Assessment
Port of Muskogee Expansion
Southern Portion of FMRI (aka Fansteel Metals) Northwest Property
Area Retained by FMRI
Muskogee, Oklahoma

ASTM E 1527-05
Phase I Environmental Site Assessment
All Appropriate Inquiry

March, 2007

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"I declare that, to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in § 312.10 of this part."

"I have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. I have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312."

Rita R. Kottke, Ph.D.
Environmental Programs Manager

Background and Disclaimer: The purpose of an environmental site assessment is to identify actual or potential "recognized environmental conditions" that may result in liability or land use restrictions. The ASTM Phase I Environmental Site Assessment E 1527 – 05 is the minimum standard for environmental due diligence in the commercial real estate industry and meets the standard for All Appropriate Inquiry under the Small Business Liability Relief and Brownfields Revitalization Act of 2002. A diligent effort in accordance with generally accepted good commercial and customary standards and practices was undertaken to identify the "recognized environmental conditions" that might affect the redevelopment project. However, the identification of old hazardous waste sites is an evolving process; therefore, DEQ cannot state with absolute certainty that no other potential hazardous waste sites are located in the area. In no event shall the DEQ or its employees be liable for any damages, injury, loss, cost or expense whatsoever arising in connection with the use or reliance on the information contained in this report, except as otherwise provided by law.

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APPENDICES

1.0 EXECUTIVE SUMMARY

This report summarizes a Targeted Brownfield Assessment of a portion of the Northwest Property Area, located in the NE/4 of the SE/4 and the SE/4 of the SE/4 the NE/4, both in Section 17, Township 15 North, Range 19 East of the Indian Base and Meridian, Muskogee County, Oklahoma. This assessment included review of available records of the Department of Environmental Quality, the Nuclear Regulatory Commission, and the County Clerk's Office of the County of Muskogee, interviews with key personnel, and a site visit in September 2005.

The purpose of this assessment was to look at the environmental conditions within the target area and provide this information to the Muskogee City/County Port Authority to assist in its redevelopment planning as well as help meet the All Appropriate Inquiry requirement of the Bona Fide Prospective Purchaser protection against liability under the Comprehensive Environmental Response, Compensation and Liability Act. Sampling and analysis of soil and groundwater were not performed for this assessment.

The assessment assumed, among other things, that the records reviewed were complete and the information provided in the interviews was complete and accurate.

Owing to the era in which the businesses and industries at the property were developed, lead-based paint, asbestos-containing materials, and light fixtures containing polychlorinated biphenyls (PCB) may be present in the building materials. Determination and characterization of these materials was beyond the scope of this assessment.

Recognized Environmental Conditions (REC) found in the assessment include:

- Groundwater contamination on the adjoining property to the north with trichloroethene, 1,1,1-trichloroethane and 1,1-dichloroethene is considered a REC. The extent of affected groundwater has not been determined.
- Groundwater contamination with total arsenic, cadmium and lead, and total alpha activity and total Radium 226 plus Radium 228 activity is considered a REC.

Data gaps exist in the assessment. These gaps could be filled by additional research or by limited Phase II environmental assessments of the specific properties where RECs were identified. Any demolition and environmental assessment and cleanup in this area should be coordinated with the DEQ due to previous decommissioning activities by Fansteel and FMRI.

2.0 INTRODUCTION

The State of Oklahoma Department of Environmental Quality (DEQ) under a Brownfield Assistance Agreement (No. VC98677601) (EPA, 2001) with the U.S. Environmental Protection Agency (EPA) conducted a Targeted Brownfield Assessment (TBA) of the Southern Parcel of the Northwest Area of the FMRI (formerly Fansteel Metals) facility in Muskogee, Oklahoma at the request of the Muskogee City-County Port Authority (Muskogee City/County Port Authority, 2003).

Fansteel Metals operated the property under Nuclear Regulatory Commission (NRC) License No. SMB-911 for the possession of source materials, because uranium and thorium compounds contained in the ore materials and slag (from tin extraction) Fansteel used as feedstock accumulated in the residues left behind after Fansteel extracted the extraction of tantalum and columbium (a/k/a niobium) metal, resulting in over 10,000 tons of low-level radioactive material. License Condition 9 of the NRC License released the Northwest Area of the property for unrestricted use. The Port Authority has already acquired the Northern Parcel of the Northwest Area, and has the right of first refusal on the remainder of the Northwest Property Area and the East Plant Area.

This TBA concerns the Southern Parcel of the Northwest Area. The Port Authority has expressed interest in acquiring this parcel, and has also expressed interest in acquiring some or all of the East Plant Area, possibly subdivided into four or more additional parcels when they are released from the NRC License and become available.

2.1 Purpose

The purpose of this assessment is to look at the environmental conditions within the target area and provide this information to the Muskogee City/County Port Authority ("the Port Authority") to help meet the All Appropriate Inquiry requirement of the Bona Fide Prospective Purchaser protection against liability under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA, better known as Superfund – U.S. Congress, Public Law 96-510, 1980), as amended by the Small Business Relief and Brownfields Revitalization Act of 2002 (U.S. Congress, Public Law 107-118, 2002). The purpose of a Phase I Environmental Site Assessment is to identify, to the extent feasible, recognized environmental conditions in connection with the target property through a systematic review of readily available information sources and a site reconnaissance.

The Port of Muskogee lies immediately north of the FMRI site. Constrained to the east and north by the Arkansas River, and to the west by State Highway 165 (Muskogee Turnpike) the Port Authority has demonstrated interest in expanding to the south, onto the FMRI property as it becomes available. The DEQ is providing technical assistance by evaluating the environmental condition of the property prior to the Port purchasing the necessary properties. Funding for this assessment has been provided by the U.S. Environmental Protection Agency (EPA).

2.2 Detailed Scope-of-Services

The DEQ examined the current use of the property, and then identified the historical uses to determine if recognized environmental conditions exist. The DEQ examined historical documents, governmental databases, deed records, aerial photographs, DEQ environmental files, and Sanborn Fire Insurance Maps, conducted interviews with owner and operator representatives, and conducted a site reconnaissance of the area. A good faith effort was made to identify possible environmental conditions that might affect the development of the property.

2.3 Significant Assumptions

The Property is located in unincorporated Muskogee County, and city zoning therefore does not apply. A review of county land records turned up no zoning instruments.

The Northern Parcel of the Northwest Area is not included in this assessment because it has already been transferred to the Port Authority. The portion of the FMRI property still subject to the NRC License is not included in this assessment because it is unlikely to become available for sale and redevelopment for several years, and would require separate assessment within the six to twelve months prior to sale.

Due to the age of the buildings, they may contain asbestos, lead and/or mercury paint, mercury thermostats, mercury vapor lights, and PCB containing fluorescent light ballast but analysis for these constituents is outside the scope of this assessment.

A radiation survey has been performed on the buildings and grounds of the Northwest Area (Earth Sciences, 1993 and Earth Sciences, 1995), and approved by the NRC. The survey report noted the survey of the grounds was "seriously complicated by the presence of large quantities of radioactive ore processing residues in the nearby Pond No. 3 in the East Plant Area." The gamma ray "shine effect from Pond No. 3" is likely to persist until the ore residues are removed as part of the Decommissioning Plan for the East Plant Area. Currently, most of the residues from Pond No. 3 have been dried, placed in Super Sacks and removed to staging areas in the East Plant Area. FMRI began shipping the first Super Sacks of dried residues to International Uranium Corporation in November 2006, and has stated shipments will be complete by approximately July 2007 (NRC, 2006).

The railroad spur which serves the FMRI facility is not included in the Property for the purposes of this assessment.

2.4 Limitations and Exceptions

The purpose of an environmental site assessment is to identify actual or potential "recognized environmental conditions" that may result in liability, land use restrictions, or cause delays in redevelopment. The ASTM Phase I Environmental Site Assessment E 1527 – 05 (ASTM, 2005) is the minimum standard for environmental due diligence in the commercial real estate industry and is the standard for All Appropriate Inquiry under the Small Business Liability Relief and Brownfields Revitalization Act of 2002. A diligent effort in accordance with generally accepted good commercial and customary standards and practices was undertaken to identify the "recognized environmental conditions" that might affect the redevelopment project. However, the identification of old hazardous waste sites is an evolving process; therefore, DEQ cannot state with absolute certainty that no other potential hazardous waste sites are located in the area. This assessment was conducted under constraints of time, cost, and scope and reflects a limited investigation and evaluation. It reflects the normal degree of care and skill that is ordinarily exercised by environmental professionals conducting business in this or similar localities. In no event shall the DEQ or its employees be liable for any damages, injury, loss, cost or expense whatsoever arising in connection with the use or reliance on the information contained in this report, except as otherwise provided by law.

The information in this report is based on a review of governmental records, interviews with knowledgeable residents in the community, information provided by FMRI and the Muskogee City/County Port Authority and observations of the area and specific sites. The result of this assessment, as written in this report, is valid as of the date of report. The assessment does not include sampling of soil, rock, groundwater, surface water, or air.

Determination and characterization of the presence of hazardous building materials once commonly used is beyond the scope of this assessment.

2.5 Special Terms and Conditions

This assessment report has been prepared for the Muskogee City/County Port Authority by the DEQ using U.S. Environmental Protection Agency (EPA) funding. A copy of this report will be provided to the EPA for its files. This report and the working file are public record and subject to the Oklahoma Open Records Act and the federal Freedom of Information Act.

3.0 *SITE DESCRIPTION*

3.1 Location and Legal Description

The Property is a portion of the Northwest Property Area of the FMRI Site, retained by FMRI, which lies south of the parcel conveyed in 1999 to the Muskogee City/County Port Authority (North Parcel). The property is located in the NE/4 of the SE/4 and the SE/4 of the SE/4 the NE/4, both in Section 17, Township 15 North, Range 19 East of the Indian Base and Meridian, Muskogee County, Oklahoma.

Approximate property lines, showing generally how the two parcels fit together, are sketched in Figures 1 and 2 in Appendix A.

A full legal description of the property is not available, but a map and legal description for the Northwest Property Area of the FMRI Site (Figure 2, Dwg. No. 0111210 from Earth Sciences Consultants, 1995) and a copy of the deed for the parcel already conveyed (the North Parcel) to the Muskogee City/County Port Authority are provided in Appendix E. The North Parcel excludes the easement for the railroad right-of-way and a 45-foot wide strip along the easternmost edge of the Northwest Property Area.

3.2 Site and Vicinity General Characteristics

Environmental Setting

The FMRI site is immediately south of the Port of Muskogee, in the northeastern part of Oklahoma. It is located on the west bank of the Webbers Fall Reservoir on the Arkansas River, at approximately Navigation Mile 395, approximately a mile downstream of the mouth of the Neosho River, two miles downstream of the mouth of the Verdigris River, and approximately 26 miles upstream of the Webbers Falls Lock and Dam. The general topography of the area, based on topographic maps by the U.S. Geological Survey (USGS) is shown in Figure 1 (USGS, 1974).

Hydrogeology

The Northwest Property sits on the Quaternary alluvium associated with the Arkansas River. According to Marcher (1969) bedrock below the alluvium is Pennsylvanian Boggy Formation, which generally consists of shale, sandstone, and coal. Logs of borings and monitor wells installed by Fansteel, Inc. (Earth Science Consultants, 1995) show the alluvium in the Southern Parcel of the Northwest Area to consist predominantly of silty or sandy clays, with occasional beds or lenses of sand, mostly just above the top of bedrock, identified as the McCurtain Shale. Borings at the site showed bedrock to be predominantly light gray to dark gray shale and silty shale, with occasional zones of sandy shale, and thin layers of coal.

Groundwater flow in the alluvium is typically through sandy layers at the base, and is generally eastward toward the Arkansas River, although a gradient of 0.002 ft/ft to the southwest across the southern parcel of the Northwest Property Area was noted in a Shallow Groundwater Contour Map prepared in October 2002 (Earth Sciences Consultants, Figure 3-7, 2003).

In the McCurtain Shale, permeability is generally low and groundwater movement depends on secondary (joints and fractures) porosity rather than primary (intergranular) porosity (Earth Sciences, 1993). A potentiometric surface map prepared for the bedrock (Earth Sciences Consultants, Figure 3-8, 2003) shows a gradient of 0.0045 ft/ft to the northwest. Following approval of a request to the Oklahoma Department of Health by Fansteel in 1994, for DEQ concurrence with Fansteel's request for permission from the NRC to remove the bedrock wells, they are now plugged and abandoned.

On the eastern side of the NRC-licensed area east of the Northwest Property Area, an interceptor trench was installed between 2002 and 2003 to capture groundwater affected by operation of the various ponds and settling basins before it can reach the Arkansas River. Recent unpublished potentiometric surface maps, prepared by the DEQ from water levels provided in Self-Monitoring Reports submitted to the DEQ Water Quality Division, show eastward gradients in the alluvium in the Northwest Property Area of approximately 0.004 ft/ft, toward the interceptor trench.

Water Wells

A search of Oklahoma Water Resources Board (OWRB) database of Multi-Purpose Well Completion & Plugging Reports filed since 1988 (monitor wells) or 1982 (other wells) showed seventeen registered wells within a mile of the Northwest Property area, including:

- in the NW/4 of the NE/4 of the SE/4 of Section 17, East of Highway 165, two groundwater test holes (92215 and 92254) installed for Zapata Industries, Inc.,
- in the SE/4 of the SW/4 of the SW/4 of Section 16, one monitoring well (74117) installed in 2002 for Fansteel , Inc.,
- in the NE/4 of the SW/4 of the SW/4 of Section 16, one monitoring well (74116) installed in 2002 for Fansteel , Inc.,
- in the NW/4 of the NE/4 of the SE/4 of Section 17, West of Highway 165, two groundwater test holes (92216 and 92217) and one monitoring well (92226)) installed for Zapata Industries, Inc.,
- in the SE/4 of the NE/4 of the SW/4 of Section 17, four monitoring wells (94602, 94603, 97682, and 97683) for Indian Capital Technology Center,
- across the Arkansas River, in the SE/4 of the NE/4 of the NW/4 of Section 21, one domestic well 92281) belonging to the Port of Muskogee, and
- across the Arkansas River, in the SE/4 of the NW/4 of Section 21, one industrial well (41363) belonging to Oklahoma Gas & Electric Company

(OG&E). OG&E owns additional wells nearby, but these are more than one mile from the Property.

The approximate locations of the OWRB-registered wells near the property are shown in Appendix A, Figure 4. Note that the listed location of a well is generally the center of the 10-acre quarter-quarter-quarter section listed in the Multi-Purpose Well Completion Report filed by the driller. For registered wells within one mile of the Northwest Property Area, the approximate yield was noted in only one, specifically well #26956, which is located across the Arkansas River from the site, and is owned by Oklahoma Gas and Electric Company. Water rights allocations for two OWRB permitted groundwater supply wells (Permit numbers 19550715, for 50 acre-feet per year and 19490129 for 10 acre-feet per year) are shown within 1 mile of the FMRI property. Both allocations are owned by OG&E, and both are on the east side of the Arkansas River (OWRB, 2006). Both are listed as Active, Industrial water right allocations.

Additional monitoring and observation wells are present on the Northwest Property Area (MW-51S, MW-53S, MW-54S, OW-1 and OW-2) and on the remainder of the FMRI property, as shown in Appendix A, Figure 3 (From Figure 4-1 in Earth Sciences Consultants, 2003). Available logs for the borings and monitor wells installed in the Northwest Property Area and Multi-Purpose Well Completion Reports for wells within one mile of the property are provided in Appendix G.

In addition, seven temporary monitoring wells, now plugged and abandoned, were installed in the northern parcel of the Northwest Property Area in September and December 2006 for the Port of Muskogee.

Floodplains

According to Federal Emergency Management Administration (FEMA) flood rate insurance maps for Muskogee County, Oklahoma and Incorporated Areas (FEMA, 1991) the Northwest Property Area is outside the 500-year flood plain of the Arkansas River, as is most of the FMRI property. The base flood elevation in the Arkansas River is between 515 and 516 feet above Mean Sea Level (MSL) (FEMA, 1991). In contrast, USGS Topographic maps show the elevation east (and downhill) of the area to be above 530 feet MSL, that is, above the base flood elevation.

Soils

Soil profiles in the Northwest Property Area were determined from county soil survey maps (Townsend, Long, and Gilbertson, 1988) and those applicable to the Property are listed in Table 1 below. Extracts from the Natural Resource Conservation Service website, including a map showing the distribution of the soil profiles over the Property, are given in Appendix E.

Table 1: Soil Profiles applicable to the Property

Map Unit	Unit Name	Description
9	Choteau Loam, 1 to 3 percent Slopes	Typically very dark grayish brown loam to about 10 inches; grayish brown loam subsurface layer to about 24 inches; yellowish brown silty clay loam to about 36 inches; mottled gray, yellowish brown, yellowish red and grayish brown clay loam to about 62 inches; coarsely mottled yellowish brown, gray, yellowish red and grayish brown clay loam below.
24	Kamie fine sandy loam, 1 to 3 percent slopes	Typically dark brown fine sandy loam to about 7 inches; brown fine sandy loam subsurface layer to about 12 inches; sandy clay loam subsoil to 66 inches (red 12-48 inches, light red 48-66 inches).
25	Kamie fine sandy loam, 3 to 5 percent slopes	Typically brown fine sandy loam to about 7 inches; brown fine sandy loam subsurface layer to 11 inches; red sandy clay loam and clay loam subsoil to about 50 inches, and red fine sandy loam below that.
67	Stigler silt loam, 0 to 1 percent slopes	Typically grayish brown silt loam about 15 inches thick; light brownish gray silt loam subsurface layer to about 26 inches; brown silty clay subsoil to about 40 inches and coarsely mottled strong brown, pale brown and grayish brown clay to about 64 inches; gray clay strongly mottled with brown below that.
74	Urban land	No description provided.

Vegetation

Vegetation in the area is mostly grass with scattered trees, except a 600-foot by 800-foot triangular area in the southwest corner, where vegetation is mostly mixed shrubs and trees, some of which are overgrown with vines. No noticeable area of stressed vegetation was observed.

Surface Water

There are no ponds or other small surface water features within the Northwest Property Area, although water may collect in low-lying areas (e.g. just north of the gate to the NRC-licensed area, and near the south fence). The NRC-licensed area includes several water treatment ponds and four outfalls regulated under Oklahoma Pollutant Discharge Elimination System (OPDES) Permit Number OK0001643, ID Number I-51000040.

Aerial photographs from June 1958 to April 1972 show a pond approximately 400 feet north of the Property, approximately north-northwest of the northwest corner

of the main parking lot. Subsequent aerial photographs show only a brush-filled gap in the tree cover, and during the October 2006 site visit the pond was a brush-filled depression with no standing water.

Drainage Paths and Erosion

The topography of the site is shown in the form of two-foot contours are in the site plans provided by FMRI, for example Appendix A, Figures 2 and 3 (Earth Science, 2003). Topographic contours in Appendix A, Figure 3, suggest one drainage path is a drainage swale constructed along the east side of the Northwest Property Area north side of the entrance road, generally draining to a low-lying area approximately 800 feet to 900 feet north of the driveway, and spills across the fence into the NRC-licensed area north of Pond 3. The map shows a shallow depression in the swale, approximately 100 feet to 300 feet long, just north of the facility driveway. Another drainage path drains south across the south fence of the Northwest Property Area, west of the Electron Beam Building. Neither area showed signs of erosion.

Railroad Spurs

A railroad spur extends south from just east of the northeast corner of the Northwest Property Area, and terminates at a loading bay on the east end of the Service Building, with a branch curving to the east to end just south of FMRI's Pond Number 3. The Decommissioning Plan submitted to NRC by FMRI includes loading low-level radioactive process residue (known as Work-in-Progress material or WIP) onto railcars parked on these spurs for transport to an off-site location. As of August 10, 2006, FMRI has a contract with International Uranium Corporation in Utah to accept the WIP, and is in the process of arranging transportation (Burgess, 2006). The railroad spurs are not included in the Property for the purposes of this assessment.

Utilities

- Sewer: According to the Facility Layout, Boring and Well Location Plan provided in Appendix A, Figure 3 (Earth Sciences Consultants, 2003) a sewer main extends from the southeast corner of the Service Building, south-southeast towards a main sewer line running north-south just east of the property line. This figure shows another sewer main line extends southeast from a point in the field approximately 100 feet north of the Service Building, southeast approximately 200 feet to the same north-south sewer line. Neither line has been field-verified. If sewer lines exist to the Sintering Building and Electron Beam Building, they are not shown. According to Burgess (2006) sewage treatment is by the City of Muskogee system.

- Water: The location of water lines is not shown. Water is provided by the City of Muskogee (Burgess, 2006).

- Gas: The Site Layout Plan shown in Figure 3 (Earth Sciences Corporation, Figure 4-1, 2003) shows the approximate location of a gas transmission line near the south property line of the NRC-licensed area, but outside the Northwest Property Area. If gas lines exist to the Service Building, Electron Beam Building or Sintering Building, they are not shown. A search of Muskogee County land records revealed two right-of-way grants to Oklahoma Natural Gas Company, dated March 13, 1968, (Book 1269 Page 668) and July 3, 1968 (Book 1274 Page 084). A buried gas line serving the Port of Muskogee runs along the western edge of the Property (Robinson, 2006). An enclosure with visible valves is present at the southeast corner of Tantalum Drive and N 43rd Street, and may be the connection to the Property.

- Electric Power: Service is from Oklahoma Gas & Electric Company (OG&E). An electrical substation is located in a fenced enclosure between the Electron Beam Building and the Service Building. This is fed from a 69 kilovolt electrical distribution lines along the south end of the Northwest Property Area and served the entire facility. A separate OG&E 128 kilovolt power line crosses the south end of the Northwest Property and the FMRI facility.

Underground features

Review of Oklahoma Corporation Commission records and interviews with FMRI personnel indicate Underground Storage Tanks (UST) are not present on the Property, but are present on the adjacent property to the west of State Highway 165, and a nearly-adjacent property north of the FMRI facility and northeast of the Property. Details concerning the UST are provided in Section 5.0.

An underground vault for access to buried electrical power lines to the FMRI facility is on the south side of the electrical substation. (Burgess, 2006)

Former cooling water reservoirs are present under the west side of the Electron Beam Building and under the Sintering Building. According to Burgess (2006) the cooling water reservoirs were cleaned out in 1989, and the sludge was filtered out and recycled in the Fansteel facility to recover the tantalum and columbium content.

An underground storm drain was observed east of the Electron Beam Building, which apparently receives water via downspouts from the roof of the Electron Beam Building and possibly the Sintering Building. A rectangular grate and what may be a cleanout are visible east of the southeast corner and northeast corner, respectively, of the Electron Beam Building.

Structures

The structures on the South Parcel of the Northwest Area are the Service Building (also known as Building 1 and the Warehouse Building), the Sintering Building

(a/k/a Building 2) , the Electron Beam Building (a/k/a Building 3 and the EB Building), a guardhouse (a/k/a Building 4) located approximately 100 feet north of the Service Building and east of the entry gate to the FMRI facility, and Building 6, a small metal storage building near the southeast corner of the Service Building. None of the buildings is residential. The report "Additional Radiation Survey Activities" (Earth Science Consultants, 1995) also lists a Building 5, a metal storage building once used to store laboratory glassware supplies, which was located south of the Service Building and west of Building 6. Building 5 is no longer present at the site.

General characteristics of the various buildings are summarized below. Historical operations are described in Section 3.3, current property use is described in Section 3.4, and observations of grounds and buildings are described in Sections 6.2 and 6.3, respectively.

- **Service Building**: This is a brick building, approximately 270 feet by 120 feet, with loading docks for trucks on the east end of the north side and for railcars on the north end of the east side. It consists of office areas, a warehouse, a machine shop, and former chemical and metallurgical laboratories. Part of the building is currently leased to AI International, a custom manufacturer of metal frame parts (Grindstaff, 2006). The fabricated parts are not painted onsite, but are sent to a powder-coating contractor in Broken Arrow.

  "Licensed material", for example, feedstock material such as ore and slag from tin extraction operations overseas, was occasionally managed in the building when the Fansteel facility was still operating. However, this building passed a room-by-room, surface-by-surface radiation survey and, along with the rest of the Northwest Property Area, was released from the NRC license (i.e. released for unrestricted use) per License SMB-911 Amendment No. 6, Condition No. 9, August 20, 1999 (Decommissioning Plan, Earth Sciences Consultants, 2003).

- **Sintering Building**: This is a brick building, approximately 240 feet x 90 feet, in which powders composed of tantalum metal, tantalum hydride or columbium, were milled and classified, then shaped by hydraulic presses into bars rods or other shapes, then fused under vacuum (sintered) to add strength, and then cooled. In addition, a machine shop in the northwest corner of the building was used to machine these shapes under an inert atmosphere or under vacuum. No information was available on additives to the cooling water system or on the possibility of PCBs being present in the hydraulic fluid.

  Cooling pumps were observed during the site visit; vacuum pumps were not. According to Burgess (2006) the cooling water reservoirs were drained and cleaned out in 1989 and refilled with city water. The material

removed was run through filter presses, and the solids recycled to recover their tantalum content.

The presence of the cooling water reservoirs and the absence of information concerning additives to the water or releases from the reservoir, are considered data gaps. The lack of information concerning the PCB content of hydraulic fluids used in the hydraulic presses is considered a data gap.

The Sintering Building is now leased by AI International, a metal parts fabricator.

- **Electron Beam Building**: This is a metal building approximately 150 feet x 210 feet. In the Electron Beam Building, large rods of sintered tantalum metal were heated in a vacuum with electron beams, and the melted metal then cooled as ingots. The electrodes were water-cooled, with a reservoir of cooling water in an underground tank under the west side of the building, under removable floor plates. According to the Remediation Assessment Report (1993) no licensed materials were handled in the building. No information was available concerning the use of anti-fouling additives in the cooling water system. According to Burgess (2006) the cooling water reservoirs were drained and cleaned out in 1989 and refilled with city water, and the sludge was recycled through Fansteel's process to recover the tantalum and columbium content.

  The presence of the cooling water reservoirs and the absence of information concerning additives to the water or releases from the reservoir, are considered data gaps.

  According to the FMRI Operations Manager, the Electron Beam Building is now leased by Global Machine Company, a company that performs Precision Product Machining and Metal Fabrication. The operations at Global Machine Company in the Electron Beam Building were inspected on October 27, 2006.

- **Building 6**: A small metal building (approximately 15 feet by 15 feet according to Earth Sciences, 2003) south of the Service Building is currently leased to AI International. This building was once used for electrical equipment, then as storage for a tractor and mowing equipment.

- **Guard House**: A small (less than 15 feet by 20 feet) brick building north of the facility driveway, opposite the Service Building, is used as the guard house for the FMRI facility.

- **Electrical Power Substation**: An electrical power substation is present in a fenced enclosure (approximately 200 feet x 75 feet) between the

Electron Beam Building and the Service Building. Determination of the PCB status of transformers is beyond the scope of this assessment, and no plates or markings indicating PCB status or age of the equipment were seen from outside the fence.

Above-Ground Storage Tanks

Two skid-mounted boilers, which might be considered above-ground storage tanks (AST) were observed, inside the Sintering Building, where they were being stored prior to sale. These are not considered to be Recognized Environmental Concerns (REC). No other AST were observed on the subject property.

Offsite, at least four AST were observed within the NRC-licensed property, east (and downhill) of the Chem-A and Chem-C Building, and therefore at least 800 feet east of the Northwest Property Area. One was identified as containing anhydrous ammonia; other chemicals used by Fansteel, and therefore possibly stored in tanks in the past, were Methyl isobutyl Ketone (4-methyl-2-pentanone, or MIBK), aqueous hydrofluoric acid, nitric acid, and sulphuric acid. According to Burgess (2006) these chemicals are no longer stored at the FMRI facility or on the Property. Additional AST were observed just west of the Chem A Building, and at least 600 feet east of the Northwest Property.

North of the FMRI property, and at least 500 feet east of the Northwest Property Area, at least eight AST are visible on property listed by the Port Authority as Koch Pavement Solutions.

All these AST are hydraulically downgradient of the site, and are not considered to be REC.

Landfills, Dumping, Disturbed Soil

Based on site visits, examination of historical aerial photographs and interviews, landfills were not noted in the site. Aerial photos indicate disturbed ground just south of the driveway intersection south of the west end of the Service Building and in the field north of the east end of the Service Building in 1958; possible bushes or piles of material were visible south of the driveway south of the southwest corner of the Service Building in 1964 and 1979. A possible disturbed area in the center of the field north of the Service Building was visible in1981, appeared smaller in 1984, and appeared still smaller in 1991.

Approximately 200 feet south of the site, the Borrow Pit Area west of Pond 9 was first visible in the 1979 aerial photographs, with signs of possible activity visible through to the 1991 photographs. This area is within the NRC-licensed facility and was addressed in the 1993 Remediation Assessment Report, which determined:

> *"Based on the results of the soil sampling alone, the radioactivity detected in this area might be attributed to a random accumulation of fugitive material or to a naturally occurring concentration of uranium or thorium*

bearing minerals. However, as discussed in Sections 4.2.3.1 and 4.2.4.1 following, groundwater and surface water in this area of the property also indicate elevated concentrations of radioactivity. This combination of indicators suggests that radioactive materials may have impacted this area at some time in the past."

This area is topographically and hydraulically downgradient from the subject Property, and therefore is not considered a Recognized Environmental Condition.

Impoundments

Except for the ponds visible in the facility to the east, no impoundments were observed on the site.

East of the site is Pond 3, which contains the sludge residue, left over from the extraction of columbium and tantalum compounds from the ore and slag feedstock by Fansteel. According to the Decommissioning Plan, on a dry weight basis the sludge typically contains approximately 0.3% uranium and 0.6% thorium (Earth Sciences Consultants, 2003) and the resulting gamma ray "shine" from the pond contents was sufficient that special survey techniques were employed in a 1995 survey to differentiate gamma ray "shine" intensity from any gamma ray intensity from the soil from the eastern 75 feet of the field north of the Service Building and driveway. Until the contents of this pond are properly removed or the pond is properly closed in accordance with a NRC-approved Decommissioning Plan, the presence of this pond is considered a Recognized Environmental Condition. According to Burgess (2006) FMRI has a new or renewed contract for offsite recycling of the WIP at a facility in Utah, and is currently making arrangements to have it transported there. Much of the sludge has been excavated and dried, and has been stockpiled south of Pond 3 in preparation for shipment.

Southeast of the site, former Pond 5 and Ponds 6 though 9 are used to treat process wastewater for disposal through an OPDES-permitted outfall.

Air Emissions, Wastewater Discharge

No strong odors indicating air emissions were noted during site visits, and no wastewater discharges were observed. FMRI operates air sampling stations to monitor airborne radionuclides from decommissioning activities.

The five outfalls operated by the FMRI facility to the east, in accordance with OPDES Permit No OK0001643 in support of decommissioning activities, are listed below.

Table 2: OPDES-Permitted Outfalls

Permit Number	Facility	Location	Facility Latitude	Facility Longitude	Facility Legal
OK0001643	Fansteel, Inc / FMRI	Outfall 001	N35°46'24"	W95°18'06"	SE-NW-SW Sec 16 T15N R19EIM

Permit Number	Facility	Location	Facility Latitude	Facility Longitude	Facility Legal
OK0001643	Fansteel, Inc / FMRI	Outfall 002	N35°46'27"	W95°18'06"	SE-NW-SW Sec 16 T15N R19EIM
OK0001643	Fansteel, Inc / FMRI	Outfall 003	N35°46'36"	W95°18'09"	NE-NW-SW Sec 16 T15N R19EIM
OK0001643	Fansteel, Inc / FMRI	Outfall 004	N35°46'24"	W95°18'06"	SE-NW-SW Sec 16 T15N R19EIM
OK0001643	Fansteel, Inc / FMRI	Outfall 005	N35°46'15"	W95°18'15"	SE-SW-SW Sec 16 T15N R19EIM

Industrial Activities

The 1993 Remediation Assessment Report states:

> "The Northwest Property Area ... during plant operations, was never utilized for the processing, generation, or disposal of licensed material. This portion of the site was involved with processing the intermediate products (tantalum and columbium powder) which were free of licensed material. The intermediate products were pressed end sintered into shapes in the Sintering Building. These sintered products were either sold as is or further refined prior to sale by electron beam melting in the Electron Beam Building. The Northwest Property Area has been assessed for both chemical and radiological parameters. Additionally, a radiation decommissioning survey was performed on this portion of the property. The results of these activities have been documented in the Radiation Survey and Remediation Assessment Northwest Property Area report dated July 1993."

Currently part of the Service Building and Sintering Building are leased by AI International for metal fabrication. According to the president of the company, cleaning and painting/coating of the fabricated parts is done offsite. The operations at the Service Building were observed, but during the September 2005 visit the Sintering Building was used by FMRI to store equipment and chemicals for use or sale in support of remediation activities by FMRI, and any removal of stored chemicals and any subsequent operations there had not yet occurred.

At the time of the September 2005 site visit, the Electron Beam Building was not leased, but was used to store equipment and furniture, and was mostly empty. Currently the Electron Beam Building is leased by Global Machine Company, which performs precision product machining and metal fabrication in steel, stainless steel and aluminum.

Monitoring Wells

Three monitoring wells, MW-51S, MW-52S and MW-53S and two observation wells, MW-OW1 and MW-OW2 near MW-52S are present on the site, based on site maps on file with the Nuclear Regulatory Commission. A fourth monitoring well, MW-151D, has been plugged and abandoned. All are owned by FMRI.

Monitoring Wells in Neighboring Areas: Numerous monitoring wells are present on the FMRI facility, and were installed in support of the 1993 remedial assessment performed to meet NRC requirements. Locations of the wells and soil borings are shown in Figure 3.

Outside the FMRI facility and Northwest Property Area, the 17 wells registered with OWRB within a mile of the site are listed below; four are described as monitoring wells. Approximate locations of these wells are shown in Figure 4.

In addition, seven temporary monitoring wells were installed in September and December 2006 in the parcel of the Northwest Property Area already transferred to the Port Authority. These have subsequently been plugged and abandoned. Groundwater contamination with trichloroethene was observed in five of these wells is discussed later and is summarized in Table 5.

Table 3: OWRB-Registered Wells

OWNER NAME	QTRS	SEC TWP RGE	DPC NO	USE	WELL TYPE	Address/City/State OR Finding Location (from OWRB, 2005)
Zapata Industries	NW-NE-SE	17-15N-19EI	92215	Water Location	Groundwater Test Hole	4400 Don Cayo Dr., Muskogee
Zapata Industries	NW-NE-SE	17-15N-19EI	92216	Water Location	Groundwater Test Hole	4400 Don Cayo Dr., Muskogee
Zapata Industries	NW-NE-SE	17-15N-19EI	92217	Water Location	Groundwater Test Hole	4400 Don Cayo Dr., Muskogee
Zapata Industries	NW-NE-SE	17-15N-19EI	92226	Water Location	Groundwater Test Hole (Plugged)	4400 Don Cayo Dr., Muskogee
Zapata Industries	NW-NE-SE	17-15N-19EI	92254	Water Location	Groundwater Test Hole	4400 Don Cayo Dr., Muskogee
Tim King	NE-SW-SW	8-15N-19EI	99530	Heat Exchange	Geothermal or Heat pump well	3704 N Country Club Road, Muskogee
Oklahoma Gas & Electric Co.	SW-SE-NE	21-15N-19EI	26956	Industrial	Groundwater Well	4 miles east of Muskogee
Oklahoma Gas & Electric Co.	SE-NE-SE	08-15N-19EI	64767	Soil Evaluation	Geotechnical Boring	[None given]
Oklahoma Gas & Electric Co.	SE-NW	21-15N-19EI	41363	Industrial	Groundwater Well	4 miles east of Muskogee
Economy Plumbing Heating & Air	SE-SE-NW	17-15N-19EI	96510	Domestic	Groundwater Well	3816 Putter Place, Muskogee
Indian Capital Technology Center	SE-NE-SW	17-15N-19EI	94602	Site Assessment	Monitoring Well	2403 North 41st East, Muskogee
Indian Capital Technology Center	SE-NE-SW	17-15N-19EI	94603	Site Assessment	Monitoring Well	2403 North 41st East, Muskogee
Indian Capital Technology Center	SE-NE-SW	17-15N-19EI	97682	Site Assessment	Monitoring Well	2403 North 41st East, Muskogee

OWNER NAME	QTRS	SEC TWP RGE	DPC NO	USE	WELL TYPE	Address/City/State OR Finding Location (from OWRB, 2005)
Indian Capital Technology Center	SE-NE-SW	17-15N-19EI	97683	Site Assessment	Monitoring Well	2403 North 41st East, Muskogee
Port of Muskogee, c/o Geo Enter	SE-NE-NW	21-15N-19EI	92281	Domestic	Groundwater Well	S of Hwy 63, E of Arkansas River, E side of visitors center parking lot
Muskogee City County	NE-NE-SE	17-15N-19EI	101607	Site Assessment	Monitoring Well (Plugged)	North of Highway 62 on Highway 165 - 1/4 mile on East side of Highway 165
Muskogee City County	NE-NE-SE	17-15N-19EI	101608	Site Assessment	Monitoring Well (Plugged)	North of Highway 62 on Highway 165 - 1/4 mile on East side of Highway 165
Muskogee City County	NE-NE-SE	17-15N-19EI	101609	Site Assessment	Monitoring Well (Plugged)	North of Highway 62 on Highway 165 - 1/4 mile on East side of Highway 165

Stained Soils

No stained soils were observed.

Seeps

No seeps were observed during the site visits, and would not be expected within the Northwest Property Area, based on comparison between surface topography and potentiometric surface maps.

Chemical Spills

During the September 2005 site visit, dry chemicals were observed spilled from sacks and drums stored in the Sintering Building, where an ammonia-like odor was observed, and smears of dark gray dust, described as tantalum metal dust, which appeared to have been trapped between furniture and interior walls before the furniture was moved. At the time of the October 27, 2006 site visit, the spilled dry chemicals appeared to have been cleaned up, and all the metal dust smears less than approximately seven feet above the floor had been cleaned up.

The historical presence of spilled dry chemicals is considered a Historical Recognized Environmental Condition (HREC).

Oil and Gas Exploration

A certification filed in 1960 in Muskogee County Land Records by the Oklahoma Corporation Commission stated there was no oil or gas development in Section 17, T15N R19E. The Oklahoma Corporation Commission has records of three wells in the section, approximately one-half mile north of the Property. None is on the Property. Available information from the Corporation Commission,

together with a sketch map showing approximate locations, is shown in Appendix E.

Known Groundwater or Surface Water Contamination

1993-2005: Contamination of groundwater has been reported from the FMRI facility east of the site, and shallow monitoring wells (screened in the alluvium) and deep monitoring wells (screened in bedrock below the alluvium) were installed in 1993 (except as noted) and sampled. Of these, three shallow monitoring wells and one deep monitoring well were installed in the Northwest Property Area. The locations of MW-51S (installed in 1991), MW-151D, MW-53S, and MW-54S, and offsite wells MW-52S (south of the site), and MW-68S (between the site and Pond No. 3 to the east) are shown in Appendix A, Figure 3. Monitoring well MW-151D was subsequently plugged and abandoned.

Groundwater analyses reported in the 1993 Remediation Assessment report included analyses for groundwater from MW-51S, MW-54S and MW-68S, and the deep well MW-151D, in or near the Northwest Property Area. In this series of groundwater samples, most of the wells on or near the Property were analyzed for water-quality parameters and total metals; one well on the Property (MW-51S) was also analyzed for Volatile Organic Compounds (VOC) and Semi-volatile Organic Compounds (SVOC), and one well just off the Property (MW-52S) was also analyzed for isotopes of uranium, radium, potassium and thorium.
In addition, FMRI has sampled and analyzed selected wells for a limited suite of parameters on a quarterly or semi-annual basis from 1996 through 2006, and submitted these to the DEQ in the form of Self-Monitoring Reports. For the wells MW-51S, MW-53S, and MW-54S, besides depth to groundwater the reported analyses were limited to ammonia (as N), fluoride, pH, Total Dissolved Solids. For MW-68, results were reported for depth to groundwater, fluoride, total arsenic, total cadmium, total chromium, total lead, pH and total dissolved solids (TDS).

For each parameter, the maximum value reported among the wells on or near the Property has been tabulated and compared to applicable Drinking Water Standards (MCL), Medium-Specific Screening Levels (MSSL) issued by EPA Region 6, or Secondary Drinking Water Standards (SMCL) in Table 4. All radiological results were included regardless of whether a screening level exists.

Table 4: Groundwater Screening Levels Exceeded by Sample Concentration or Laboratory Detection Limit in Fansteel or FMRI Samples, 1993-2006

Parameter	Units	Max Value	Location of Max [1]	Screening Level	Type of Screening Level [3]	Detection Limit	Event Year [2]
Total Analyses:							
Nitrate-Nitrite	(mg/l NO3-N)	***41***	***MW-52S***	10	MCL		1993
Sulfate	mg/l	***2000***	***MW-52S***	250	SMCL		1993

Parameter	Units	Max Value	Location of Max [1]	Screening Level	Type of Screening Level [3]	Detection Limit	Event Year [2]
Gross Alpha	pCi/l	***79***	***MW-52S***	15	MCL		1993
Gross Beta	pCi/l	160	MW-52S		Rad		1993
Isotopes:							
Uranium-233	pCi/l	0.7			Rad		1993
Uranium-238	pCi/l	0.9			Rad		1993
Radium 226	pCi/l	***4.1***	***MW-52S***	5	MCL		1993
Radium 228	pCi/l	***5.9***	***MW-52S***	5	MCL		1993
Potassium.40	pCi/l	2			Rad		1993
Thorium-228	pCi/l	6.4			Rad		1993
Thorium-230	pCi/l	4			Rad		1993
Thorium-232	pCi/l	5.6			Rad		1993
Total Metals:							
Aluminum, Total	ug/l	***5650***	***MW-52S***	200	SMCL		1993
Arsenic, Total	ug/l	***120***	***MW-68S***	20	MCL		2003
Cadmium, Total	ug/l	***18.1***	***MW-51S***	5	MCL		1993
Iron, Total	ug/l	***9180***	***MW-52S***	300	SMCL		1993
Manganese, Total	ug/l	***619***	***MW-52S***	50	SMCL		1993
Lead, Total	ug/l	***140***	***MW-68S***	15	MCL		2005
Antimony, Total	ug/l		***MW-53S***	6	MCL	***29.7***	1993
Thallium, Total	ug/l		***MW-51S***	2	MCL	***4***	1993
Volatile Organics:							
Benzene	ug/l		***MW-51S***	5	MCL	***10***	1993
Bromodichloromethane	ug/l		***MW-51S***	1.8E-1	MSSL	***10***	1993
Bromoform	ug/l		***MW-51S***	8.5E+0	MSSL	***10***	1993
Bromomethane	ug/l		***MW-51S***	8.7E+0	MSSL	***10***	1993
Carbon Tetrachloride	ug/l		***MW-51S***	5	MCL	***10***	1993
Dibromochloromethane	ug/l		***MW-51S***	1.3E-1	MSSL	***10***	1993
Chloroethane	ug/l		***MW-51S***	3.9E+0	MSSL	***10***	1993
Chloromethane	ug/l		***MW-51S***	2.1E+0	MSSL	***10***	1993
Chloroform	ug/l		***MW-51S***	1.7E-1	MSSL	***10***	1993
1,2-Dichloroethane	ug/l		***MW-51S***	5	MCL	***10***	1993
1,1-Dichloroethene	ug/l		***MW-51S***	7	MCL	***10***	1993
1,2-Dichloropropane	ug/l		***MW-51S***	5	MCL	***10***	1993
Cis-1,3-Dichloropropene	ug/l		***MW-51S***	4.0E-1	MSSL	***10***	1993
Trans-1,3-Dichloropropene	ug/l		***MW-51S***	4.0E-1	MSSL	***10***	1993
Methylene Chloride	ug/l		***MW-51S***	4.3E+0	MSSL	***10***	1993
1,1,2,2-Tetrachloroethane	ug/l		***MW-51S***	5.5E-2	MSSL	***10***	1993
Tetrachloroethene	ug/l		***MW-51S***	5	MCL	***10***	1993
1,1,2-Trichloroethane	ug/l		***MW-51S***	5	MCL	***10***	1993
Trichloroethene	ug/l		***MW-51S***	5	MCL	***10***	1993
Vinyl Chloride	ug/l		***MW-51S***	2	MCL	***10***	1993
Semivolatile Organics:							
Bis(2-chloroethyl)ether	ug/l		***MW-51S***	9.8E-3	MSSL	***10***	1993
Bis(2-chloroisopropyl)ether	ug/l		***MW-51S***	2.7E-1	MSSL	***10***	1993
Bis(2-ethylhexyl)phthalate	ug/l		***MW-51S***	6	MCL	***10***	1993

Parameter	Units	Max Value	Location of Max [1]	Screening Level	Type of Screening Level [3]	Detection Limit	Event Year [2]
Benzo(a)pyrene	ug/l		***MW-51S***	0.2	MCL	***10***	1993
Benzo(a)anthracene	ug/l		***MW-51S***	9.2E-2	MSSL	***10***	1993
Benzo(b)fluoranthene	ug/l		***MW-51S***	9.2E-2	MSSL	***10***	1993
Benzo(k)fluoranthene	ug/l		***MW-51S***	9.2E-1	MSSL	***10***	1993
Carbazole	ug/l		***MW-51S***	3.4E+0	MSSL	***10***	1993
Chrysene	ug/l		***MW-51S***	9.2E+0	MSSL	***10***	1993
Dibenzo(a,h)anthracene	ug/l		***MW-51S***	9.2E-3	MSSL	***10***	1993
3,3-Dichlorobenzidine	ug/l		***MW-51S***	***1.5E-1***	MSSL	***10***	1993
Hexachlorobenzene	ug/l		***MW-51S***	1	MCL	***10***	1993
Hexachlorobutadiene	ug/l		***MW-51S***	8.6E-1	MSSL	***10***	1993
Hexachloroethane	ug/l		***MW-51S***	4.8E+0	MSSL	***10***	1993
Indeno(1,2,3-c,d)pyrene	ug/l		***MW-51S***	9.2E-2	MSSL	***10***	1993
N-Nitrosodi-n-propylamine	ug/l		***MW-51S***	9.6E-3	MSSL	***10***	1993
Naphthalene	ug/l		***MW-51S***	6.2E+0	MSSL	***10***	1993
Nitrobenzene	ug/l		***MW-51S***	3.4E+0	MSSL	***10***	1993
Pentachlorophenol	ug/l		***MW-51S***	1	MCL	***50***	1993
2,4,6-Trichlorophenol	ug/l		***MW-51S***	6.1E+0	MSSL	***10***	1993

While VOC and SVOC screening levels were not exceeded, the detection limit for some compounds exceeded the screening level. Metals present in excess of the MCLs included Arsenic, Cadmium, and Lead, and metals for which the detection limit exceeded the MCLs included Antimony and Thallium. Inorganic species present in excess of the MCLs include Nitrate-Nitrite (assuming the less toxic species, nitrate, was not present), Gross Alpha activity and Total Radium-226 plus Radium 228 activity.

Groundwater contamination with total arsenic, cadmium and lead, and total alpha activity and total Radium 226 plus Radium 228 activity is considered a Recognized Environmental Condition (REC).

2006: In the course of a Phase II Environmental Site Assessment of the Northern Parcel of the Northwest Property Area, performed for the Port Authority, the DEQ installed three temporary monitor wells in September 2006. Organic compounds were observed in one of the temporary monitoring wells, MPA-2, located approximately 100 feet north of the Property, and approximately 400 feet west of the railroad spur. Four additional temporary monitoring wells were installed and sampled in December 2006, and organic compounds were observed in all four groundwater samples. The compounds detected are listed in Table 5. The locations of the temporary wells are shown in Figure 6.

Soil collected from the boring for MPA-2 (at 30.5 ft. bgs) contained Trichloroethene (aka Trichloroethylene or TCE) at a concentration of 3000

microgram/kilogram (µg/kg) also referred to as parts per billion (ppb). A soil sample collected at 27 ft bgs in the same well showed Trichlorethene at a concentration of 48 µg/kg. Table 5 lists the concentrations of contaminants in a groundwater sample collected from this well.

Table 5: Groundwater Screening Levels Exceeded by Sample Concentration in Temporary Monitor Wells, September 7, 2006 and December 12, 2006

Parameter	Units	Location	Value	Screening Level	Type of Screening Level
1,1-Dichloroethene	µg/L	MPA-2	1500	7.0	MCL
Cis-1,2-Dichloroethene	µg/L	MPA-2	93	70	MCL
1,1,1-Trichloroethane	µg/L	MPA-2	320	200	MCL
Tetrachloroethene	µg/L	MPA-2	69	5.0	MCL
Trichloroethene	µg/L	MPA-2	37,000	5.0	MCL
Arsenic	µg/L	MPA-1	74	10	MCL
Arsenic	µg/L	MPA-2	154	10	MCL
Arsenic	µg/L	MPA-3	68	10	MCL
Barium	µg/L	MPA-3	2510	2000	MCL
Beryllium	µg/L	MPA-1	15	4	MCL
Beryllium	µg/L	MPA-2	15	4	MCL
Beryllium	µg/L	MPA-3	17	4	MCL
Chromium	µg/L	MPA-1	686	100	MCL
Chromium	µg/L	MPA-2	422	100	MCL
Chromium	µg/L	MPA-1	685	100	MCL
Lead	µg/L	MPA-1	176	15	Action Level
Lead	µg/L	MPA-2	142	15	Action Level
Lead	µg/L	MPA-3	311	15	Action Level
Antimony	µg/L	MPA-1	142	6	MCL
Antimony	µg/L	MPA-1	140	6	MCL
Antimony	µg/L	MPA-1	103	6	MCL
Thallium	µg/L	MPA-1	75	2	MCL
Trichloroethene	µg/L	MPA-2N	12,000	5.0	MCL
1,1-Dichloroethene	µg/L	MPA-2NA	250	7.0	MCL
1,1,1-Trichloroethane	µg/L	MPA-2NA	62	200	MCL
Trichloroethene	µg/L	MPA-2NA	6500	5.0	MCL
1,1-Dichloroethene	µg/L	MPA-4N*	290	7.0	MCL
1,1,1-Trichloroethane	µg/L	MPA-4N*	71	200	MCL
Trichloroethene	µg/L	MPA-4N*	6900	5.0	MCL
Trichloroethene	µg/L	MPA-2E	610	5.0	MCL
Trichloroethene	µg/L	MPA-2W	83	5.0	MCL

Parameter	Units	Location	Value	Screening Level	Type of Screening Level
* MPA-4N is a duplicate of MPA-2NA					

The extent of the affected groundwater has not yet been delineated. Groundwater flow in the area is believed to be eastward, towards a French drain and an interceptor trench operated by FMRI. The presence of the affected groundwater and soil adjacent to the Property is a Recognized Environmental Condition (REC).

Farm Wastes

The land use prior to purchase by the Muskogee Industrial Foundation in 1956-57 is not known, but is assumed to be agricultural. No information concerning farm wastes was found.

Known Pesticide Misapplication

No information was found regarding misapplication of pesticides in this area.

Discharges and Runoff from Adjacent Property Affecting the Site

The property is down slope from the embankment to State Highway 165 to the west, and a tract already owned by the Muskogee City-County Port Authority on the north. The presence of contaminated groundwater on the adjacent property to the north, based on groundwater samples collected from a temporary monitor well in September 2006, has already been discussed. The properties to the south and east are down slope.

East of the site, a surface release of the supernatant from Pond 3 occurred in June 1989, resulting in released fluid traveling along the natural drainage along the west and north sides of Pond 3. This drainage was eventually contained using dikes, and removed for treatment in the plant's wastewater system (Earth Sciences Consultants, 1993). The drainage north of Pond 3 is down-slope and approximately 10 feet lower than the eastern edge of the site. This is not considered an REC.

Other Known or Suspected Environmental Concerns on the Site

The presence or absence of radioactive materials on the grounds north of the Service Building and Sintering Building has been determined by historical information, limited soil analyses and a limited radiological survey complicated by the gamma ray "shine" emanating from the contents of Pond 3 to the east. This work satisfied the criteria set by the Nuclear Regulatory Commission to release the Northwest Property for unrestricted use.

If small quantities of radioactive material were present on the site, they could have gone undetected, however. A radiological survey of the Northwest Property Area, performed after FMRI removes the contents of Pond 3 and ships them off-site, could confirm the presence or absence of radioactive materials on the property. This is considered a data gap.

Historical Recognized Environmental Conditions on the Site

- Buildings: Licensed material was stored or used in specific rooms (114, 115, 120, and 123) of the Service Building. Following room-by-room gridding and scanning for radioactivity, vigorous cleaning of areas identified as impacted was performed. The building was resurveyed, and none of the survey locations exhibited radioactivity in excess of the criteria for release for unrestricted use for affected areas (Earth Sciences, 1995).

  Similarly, the other rooms, the exterior walls, and the roof of the Service Building, and the rooms, exterior walls and roof of each of the other buildings in the Northwest Property Area, were gridded, scanned for radioactivity, and identified as not impacted.

  The historical presence of licensed material in specific rooms in the Service Building is considered an HREC.

- Release from Pond 3 in June 1989: The release of supernatant from Pond 3 to the ground surface to the west and north is considered an HREC. Immediate cleanup activity and subsequent characterization revealed no radiological impact, and groundwater samples from Monitoring Well MW-68S nearby are collected and analyzed periodically.

- Tornado Damage: The release during a tornado in 1999, of moist low-level radioactive material excavated from Pond 5 in 1993 and stored in fabric Super Sacks in the Sodium Reduction Building, is considered an HREC. According to the Decommissioning Report (Earth Sciences Consultants, 2003) the material contained an average of 21 pCi/g uranium-235 and 6 pCi/g thorium-232. Approximately 500 pounds of the material were released to the ground surface within a 10-foot diameter area before being recovered and bagged.

- Spilled chemicals including ammonium bifluoride, observed in September 2005 in the Sintering Building, appear to have been cleaned up to prepare the building for use by AI International, and were gone at the time of the October 2006 site visit.

Pipelines

The Site Plan in Appendix A, Figure 3 shows a gas pipeline (Oklahoma Natural Gas Co.) running along the south property line of the FMRI facility offsite. The Site Plan does not show the western edge of the Northwest Property Area. However, a small fenced area containing what appear to be gas valves and lines was observed at the southeast corner of Tantalum Place and N 43rd Street East during the September 2005 site visit. According to Robinson (2006) a gas line running along N 43rd Street serves FMRI, the Property and the Port of Muskogee. The lack of maps showing the pipeline in this area is considered a data gap.

The Site Plan also shows city sewer mains serving the Service Building and a location near the Guardhouse, but does not show lines serving the Electron Beam Building or Sintering Building.

A storm drain, which conducts water southwards from the roofs of the Electron Beam Building and possibly the Sintering Building and Service Building, was observed during the October 2006 site visit. This is not considered an REC.

Transformers/PCB Equipment

Transformers and other equipment are present in the electrical substation located between the Service Building and the Electron Beam Building. Determination of the PCB status of the transformers is beyond the scope of this assessment. No plates or markings indicating PCB status or age of the equipment were seen from outside the fence enclosing the substation. This is considered a data gap.

3.3 Operational History

According to Earth Sciences Consultants (1993) the Fansteel (now FMRI) facility was constructed in 1956 on alluvial soils and unconsolidated alluvium approximately 20 to 30 feet thick which are underlain by shale bedrock. Prior to the construction of the facility, the site was undeveloped. Fansteel's Muskogee plant produced tantalum and columbium metals. Extraction of raw tantalum and columbium occurred on the portion of the facility east of the Property; further purification of the tantalum and columbium was done in the Sintering Building and later in the Electron Beam Building on the Property. Tantalum is used primarily in the electrical/electronics industry in the production of tantalum capacitors. Columbium is marketed for use in heat-resistant alloys. The Fansteel processing facility had been in operation for approximately 33 years until operations ceased in 1990. The area had not been developed for any use prior to construction of the Fansteel facility and no previous structures existed.

Operations on the Property:

The Northwest Property Area which includes the Property and a parcel to the north previously conveyed to the Port Authority (Appendix A, Figure 2) was

never utilized for the processing, generation, or disposal of licensed (that is, radioactive) material during plant operations. This portion of the site was involved with processing the intermediate products (tantalum and columbium powder) which were free of licensed material. The intermediate products were pressed and sintered into shapes in the Sintering Building. These sintered products were either sold as is or further refined prior to sale by electron beam melting in the Electron Beam Building. The Northwest Property Area has been assessed for both chemical and radiological parameters. Additionally, a radiation decommissioning survey was performed on this portion of the property. The results of these activities were documented in the Radiation Survey and Remediation Assessment Northwest Property Area report dated July 1993 (Earth Sciences Consultants, 1993).

Additional decommissioning and radiation survey activities were performed in 1995 (Earth Sciences Consultants, 1995) in support of an application to have the Northwest Property Area released from the NRC License. The Northwest Property Area was released from the NRC license (i.e. released for unrestricted use) per License SMB-911 Amendment No. 6, Condition No. 9, August 20, 1999 (Decommissioning Plan, Earth Sciences Consultants, 2003).

The northern portion of the Northwest Property Area was conveyed in June 1999 to the Muskogee City-County Port Authority; the remainder was retained by Fansteel, Inc., and the Service Building, Electron Beam Building and Sintering Building were largely unused.

Service Building: This building consists of office areas, a warehouse, a machine shop, and chemical and metallurgical laboratories. A laboratory for measuring environmental radioactivity consisting of alpha and beta counting equipment was formerly located in this structure. Building No. 1 is part of the original plant construction.

In 2005, AI International leased the Service Building for a metal fabrication shop specializing in steel and aluminum frames for industrial purposes, and custom motorcycle frames. In addition to design activities, operations include welding and computer numerically-controlled (CNC) machining. The fabricated parts are not painted onsite, but are powder-coated offsite. (Grindstaff, 2005, Appendix F).

Sintering Building (Building No. 2): This building formerly contained sintering furnaces, storage areas, offices, and support equipment as well as a machine shop. This building received purified tantalum or columbium powder. Neither powder was radioactive. Processes which occurred in this building involved pressing the powders into shapes specified by Fansteel's customers and sintering the powdered shapes into metal. The sintering furnaces have been sold and removed from the site. Building No. 2 is part of the original plant construction.

At the time of the September 2005 site visit, the Sintering Building was being used to store dry and liquid chemicals, of which some had salvaged for sale and others were intended for use in the decommissioning process. Evidence of spills of dry chemicals was observed during the site visit. Photographs from the site visit are presented in Appendix C.

In 2006, the Sintering Building was leased by AI International for fabrication and storage of steel parts, for example motorcycle frames, frames for construction equipment and conveyors. At the time of the October 2006 site visit, the stored chemicals were no longer present except for some super sacks of spent alumina and Floricel 828. Operations included welding, grinding and parts storage.

Electron Beam Building: This building was constructed 1989, just prior to the termination of plant manufacturing operations, to house an Electron Beam (EB) furnace for the production of high-purity tantalum. Building No. 3 also contained a vacuum arc furnace (VAF) which was used for tantalum refining. These furnaces would receive relatively pure metals and remelt and reshape the material to achieve a higher degree of purity. Raw materials utilized and final products generated in this building were not radioactive.

Guardhouse: A guardhouse lies north of the Service Building and is used by security personnel. No processing activity occurred in this building. (Earth Sciences Consultants, Inc., 2003)

Metal Building (Building 6): South of the Service Building, this metal building was used for electrical equipment, then for storage of a tractor and lawn maintenance equipment. It was leased to AI International in 2005, and houses two air compressors.

Operations on the Fansteel/FMRI Facility east of the Property:

The Fansteel/FMRI Facility, east of the Property, is where tantalum and columbium were extracted from the ore and slag feedstock. Detailed descriptions of the process are available online in Earth Sciences Consultants (1999), and a brief summary is provided here.

Raw materials utilized in the facility east of the Property consisted of raw and beneficiated ores. Slag from tin extraction overseas which contains commercially valuable concentrations of tantalum and columbium was also used as a raw material. Aqueous hydrofluoric acid was used to digest the raw material, and extraction of the tantalum and columbium employed the reagents: methyl isobutyl ketone (MIBK), sulfuric acid, potassium, fluoride, sodium metal, sodium

chloride, nitric acid, sodium hydroxide, and ammonia (Earth Sciences Consultants, 1993).

The raw materials used for tantalum and columbium production contained uranium and thorium as naturally occurring trace constituents. These radioactive species were present in the process raw materials at an approximate concentration of 0.15 percent each of uranium oxide and thorium oxide. This concentration is sufficient to cause the ore and slag materials to be classified by the Nuclear Regulatory Commission (NRC) as source materials. Consequently, Fansteel operated under NRC License No. SMB-911 for the possession of source materials (Earth Sciences Consultants, 1993).

Uranium and thorium in the raw materials were not extracted from the ores by the digestion process. The radioactive species remained in the ore digestion residues which were retained in the east plant area, specifically Ponds Nos. 2 and 3. Therefore, the ore residues are classified as source material by the NRC (Earth Sciences Consultants, 1993). East of the Property, facility operations since 1990 have been limited to environmental monitoring; maintenance of buildings, grounds, and equipment remaining at the site; and cleanup of operating areas (Earth Sciences Consultants, 1993).

The facility east of the Property continued to be occupied by Fansteel since termination of processing in 1990. Chemical processing equipment used in the extraction of tantalum and columbium values from ore and slag materials was sold and removed from the site in 1990, 1991, and 1992.

On January 15, 2002, Fansteel Inc. filed a petition for bankruptcy pursuant to Chapter 11 of Title 11 (Bankruptcy) of the United States Code in the Federal Bankruptcy Court for the District of Delaware (Tessitore, 2002). As a result of the reorganization of Fansteel, FMRI was formed, with the sole purpose of maintaining and eventually decommissioning the Muskogee facility.

3.4 Current Use of the Property

Currently the Sintering Building and part of the Service Building are leased by AI International for metal fabrication, and the Electron Beam Building is leased by Global Machine Company, which performs precision product machining and metal fabrication.

Descriptions of Structures, Roads, Other Improvements on the Site

Roads: Access to the Property and to the FMRI facility east of the Property is via the asphalt-paved entrance driveway, from North 43rd Street East, through remote-

controlled gate serving both the buildings in the Property and the FMRI facility. There is a paved parking lot north of the Sintering Building, another on the north side of the Service Building, and paved access to the south side of the Service Building.

Service Building: This is a brick building, approximately 270 feet by 120 feet, with loading docks for trucks on the east end of the north side and for railcars on the north end of the east side. The building contains former environmental and metallurgical laboratory facilities, restrooms, conference rooms, and warehouse space which is currently leased to AI International, for metal fabrication.

Sintering Building: This is a brick building, approximately 240 feet by 90 feet. Currently the Sintering Building is leased by AI International. The building has chillers on the roof, and lieu of a basement, the building has a cooling water reservoir, both associated with Fansteel's operations from the 1950s through 1990.

At the time of the October 2006 site visit, the cooling water pumps, some of the machine shop equipment in the northwest corner, and the drums of liquid chemicals and most of the super sacks of dry chemicals had been removed, except for some sacks of spent alumina and Floricel 828, in a doorway at the west side of the open area in the northeast corner of the building. The open area was being used for storage of manufactured metal parts, and welding operations were going on in the southern part of the building.

When Fansteel was still operating, the building housed hydraulic presses to shape and compress metal powder, machine tools, and furnaces to sinter the shaped powder. At the time of the 2005 site visit, the Sintering Building contained a machine shop in the northwest corner including facilities to do machining under vacuum, and components of a cooling water system including a cooling tower on the roof, cooling water pumps at ground level, and cooling water reservoir capacity underground. Much of the east half of the building is open, and appears to be forklift-accessible. At the time of the September 2005 inspection it was used to store numerous sacks and super-sacks of dry chemicals and drums of liquid chemicals, either salvaged from facility operations or intended for use in facility decommissioning activities.

One floor drain was visible, which may have been covered at the time of the September 2005 site visit. The presence in 2005 of the stored chemicals in the area and the possibility of spills is considered an HREC.

The former machine shop in the northwest corner of the building was being used for custom fabrication of motorcycle frames. While the area was inactive during the visit, and photography in that room was restricted, it appeared that the main activity in the room was assembly and welding of steel parts.

A central room contains insulated pipes, electrical cables and the like. Due to the age of the building, the insulation may contain asbestos, but analysis for this is outside the scope of this assessment.

A reservoir formerly used for cooling water related to the sintering operation underlies much of the building. An access hatch near the center of the building opens to the reservoir. At least six rungs of an access ladder were visible under the water surface during the October 2006 visit, suggesting a water depth of at least six feet. A slight sheen was visible on the water surface, but is not considered an environmental concern. According to Burgess (2005) the cooling water was disposed through Fansteel's wastewater system and replaced with city water; the sludge from the reservoir was processed by Fansteel to recover any residual tantalum and columbium. A chiller unit was visible on the roof of the building but was not inspected during the site visit.

Electron Beam Building: This is a metal building, approximately 150 feet by 210 feet, mainly open and with an overhead bridge type crane running the length of the building. When Fansteel was still in operation, the building housed electron beam furnaces to purify sintered metal bars. The building still has cooling water reservoirs under the floor and what may be a transformer or similar in a room on the east side of the building. No marking indicating age or PCB status was observed.

Currently the Electron Beam Building is leased by Global Machine Company, which performs precision product machining and metal fabrication of steel, stainless steel and aluminum parts. Current operations include precision machining, cutting and welding, and occasional painting using epoxy paints or spray paint.

At the time of the September 2005 site inspection the building was used to store furniture and some equipment.

Guard House: This is a small brick building used by security personnel for the facility. It is located beside the entrance gate, east of the Sintering Building and north of the Service Building.

Metal Building (Building 6): At the time of the September 2005 site visit, a small metal building was located south of the Service Building. This building was originally used for electrical equipment, and later as storage for tractors and mowing equipment. The building currently houses two compressors supplying compressed air for operations at AI International.

3.5 Adjacent Properties

West of the property is North 43rd Street East, State Highway 165, North 41st Street East, and the Indian Capital Technology Center. North of that is Conners State College.

North of the property is the portion of the Northwest Property Area already conveyed to the Muskogee City-County Port Authority.

East and northeast of the property is the NRC-licensed portion of FMRI's property, which is currently in the process of being decommissioned. Beyond that is the Arkansas River.

To the south, between the Property and the interchange between US Highway 62 and State Highway 165, is the Borrow Pit Area of the former Fansteel Metallurgical Plant, a roughly triangular area approximately 1,000 feet by 400 feet. Soil from the Borrow Pit Area was partially removed for use in constructing berms, impoundments, improving drainage, and other uses at the Fansteel site. Surface water samples were collected from the Borrow Pit Area as part of the 1993 Remedial Assessment. Standing water was not visible in the historical aerial photographs or from the Property during the site visit. The land south of Highway 165 contains some residences but appears to be largely undeveloped.

Southwest of the interchange is a construction center for Morton Buildings, a manufacturer of metal-clad wooden buildings.

3.6 Site Inspection

Site reconnaissance was performed on the following dates: May 4, 2005, September 27, 2005, April 10-11, 2006, by J. Paul Davis, Environmental Programs Specialist with the DEQ, and John Flynn, Environmental Engineer with the DEQ, and on October 27, 2006, by J. Paul Davis. Reports from the September 2005 and October 2006 site visits are provided in Appendix F.

4.0 USER PROVIDED INFORMATION

4.1 Title and Judicial Records

Muskogee County Land Records Department maintains records of land transactions in the area since before statehood. These consist of:

- ledger indexes of transactions by township, range, section, and quarter-quarter-quarter section,
- microfilm copies of deeds and other instruments, and of the older ledgers,
- ledger indexes of transactions by subdivision, block and lot,
- scanned images of recent instruments, and
- database indexes of recent transactions.

In the site area, none of the land is subdivided. From the land records indexed as lying within the southeast quarter of Section 17, Township 15 North, Range 19 East, the DEQ looked at each available deed and lease document, dated from 1905 through 2006, indicated by the respective ledger to be located within the northeast quarter of the southeast quarter or the southeast quarter of the northeast quarter of Section 17. A brief summary of the findings follows; more detailed information obtained about prior ownership is tabulated in Appendix B. The land still subject to the NRC license, and therefore not part of the Property, was not included in the search.

- Between 1905 and 1956, the property was mostly divided into small parcels, each owned by a sequence of individual owners. A list of the parcels, owners and instruments conveying the parcels between them beginning in 1905 is tabulated in Appendix B. Land use during this period could not be readily ascertained from the instruments.
- The Muskogee Industrial Foundation accumulated portions of the western property area between 1956 and 1957 from individual owners.
- The Muskogee Industrial Foundation conveyed much of the western part of the property (Ne/4-SE/4 & Se/4-SE/4 of Sec. 17) to Tantalum Defense Corporation in May 1956 (1060/587); Tantalum Defense Corporation conveyed the same to Fansteel Metallurgical Corporation in September 1958 (1104/019).
- The Muskogee Industrial Foundation conveyed the northern portion of the Northwest Property Area (e/2-Se-NE & e/2-sw-Ne-NE) to Fansteel Metallurgical Corporation in July 1961 (1153/520).
- Following release of the Northwest Property Area from Fansteel Inc's NRC License, Fansteel, Inc. conveyed the northern portion of the Northwest Property Area to Muskogee City-County Port Authority in June 1999 (2645/140).

- FMRI, created as part of the reorganization of Fansteel Inc., currently owns the southern portion ("the property") of the Northwest Property Area.

4.2 Environmental Liens or Activity and Use Limitations

The Northwest Property Area has been released for unrestricted use by the Nuclear Regulatory Commission, License SMB-911. Use of the area east and south of the Property is still restricted by the license.

4.3 Specialized Knowledge and Experience of the User

Mr. Scott Robinson, director of the Muskogee City/County Port Authority, served on a Site Specific Advisory Board convened by the Nuclear Regulatory Commission from 1997 through 1999, and he has been inside the buildings on the Property (Robinson, 2006). In addition, he has been advised of the preliminary findings of a Phase II Environmental Site Assessment of the adjacent property to the north, the Northern Parcel of the Northwest Property Area.

4.4 Valuation Reduction for Environmental Issues

This is outside the scope of this report. Please not that the All Appropriate Inquiry Regulation requires a determination of whether the purchase price and Fair Market Value have been affected by contamination on the property. The DEQ is not an authority on the value of the property, and therefore recommends that the Port obtain additional information on the Fair Market Value of the property.

4.5 Owner, Property Manager, and Occupant Information

James Burgess, Operations Manager with FMRI, was interviewed as Property manager. Mark Grindstaff, President of AI International, was interviewed as a tenant. Mr. Ryan Bennett and Mr. Justin Cooper of Global Machine Company were interviewed as employees of a tenant.

Interviews with landowners, tenants or property managers are documented in Appendix F.

4.6 Reason for Performing Phase I

The Muskogee City-County Port Authority has requested this Phase I assessment as part of the Bona Fide Prospective Purchaser protection from Superfund liability. The Port of Muskogee lies immediately to the north of the FMRI facility

and the Northwest Property Area, and the Port Authority wishes to make the property available for industrial development.

5.0 RECORDS REVIEW

5.1 Standard Environmental Record Sources

Federal National Priorities List (NPL) Sites Within One Mile

No NPL sites or delisted NPL sites are located within one mile of the property.

Federal Institutional Control / Engineering Control Registries

The only federal institutional control found was the NRC license for the FMRI Facility, from which the Northwest Property Area (which includes the Property) was released by the NRC.

Active Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) Sites Within one-half mile

The CERCLIS database provided by EPA lists no sites lies within one-half mile of the site, but three sites in and around Muskogee. **One (Pure Oil Company) is listed as having a Site Inspection completed November 14, 2006. The DEQ has recommended to EPA that any additional work at the Pure Oil Company site be conducted in accordance with the Brownfields Program.**

Archived CERCLIS Sites (on site and adjacent properties)

The CERCLIS list of archived sites includes no sites within ½ mile of the site, but does include four in Muskogee.

Table 6: Archived CERCLIS Sites in Muskogee

EPA ID	Site Name	Address	City	NPL
OK0001408228	CALLERY ROCKET FUEL	RIVERSIDE ROAD	MUSKOGEE	Not NPL
OK0001408236	HUB WASTE OIL	725 S. CHEROKEE	MUSKOGEE	Not NPL. Removal Action Planned
OK0002024594	THE PURE OIL COMPANY	2ND STREET/KALAMAZOO AVENUE	MUSKOGEE	Not NPL
OKN000606583	YAFFE IRON & METAL EXPLOSION	1100 SOUTH G STREET	MUSKOGEE	Not NPL

Federal Resource Conservation and Recovery Act (RCRA) CORRACTS Facility List within One Mile

One RCRA site, Zapata Industries Inc (ID: OKD990751059) is currently under corrective action. The site, located at 4400 Don Cayo Drive, lies within one mile of the property. According to the EPA website, the site was evaluated April 29, 1988 to determine if there may have been past or ongoing releases of hazardous waste posing risks to human health and the environment that would require corrective action. However, the site was not identified for corrective action.

Federal RCRA non-CORRACTS TSD Facilities List within one-half mile

The FMRI/Fansteel site is listed by the Resource Conservation and Recovery Act (RCRAInfo) website. It is listed in the Oklahoma Department of Environmental Quality RCRA Notifiers Listing as having state generator code 6 ("No Longer Generating, Still in Business") and is not listed as a Treatment, Storage or Disposal Site. However, as stated elsewhere in this report, the site is instead

subject to regulation by the Nuclear Regulatory Commission through Special Materials License SMB-911.

State RCRA Generators List (on site and adjacent properties)

No tribal RCRA Generators are listed in the area. State RCRA generators are listed in Table 7.

Table 7: State RCRA Generators List

Inside or Adjacent?	EPA-ID	Facility Name	Location Address	EPA Class
Adjacent	OKD007221831	FANSTEEL METALS	10 TANTALUM PL	No Longer Generating
Adjacent	OKD981595143	INDIAN CAPITOL VOTECH	NW 45TH & 2 BLKS N ON HW	Conditionally-Exempt Small Quantity Generator (CESQG)

Federal Emergency Response Notification System (ERNS) List (site only)

Table 8: Federal ERNS Incidents List

NRC Report #	Incident Date	Street	Location County	City	State	ZIP	Suspected Responsible Company	Type Of Incident	Medium Affected	Material Name
No ERNS incidents were found for the Fansteel site, from 1982 through 2006.										

State and Tribal Lists of Hazardous Waste Sites within one mile

No tribal hazardous sites are listed within one mile. State hazardous waste sites are listed in Table 9. .

Table 9: State Hazardous Waste Sites

Inside or Adjacent?	EPA-ID	Facility Name	Location Address	State Class
Adjacent	OKD007221831	FANSTEEL METALS	10 TANTALUM PL	No Longer Generating
Adjacent	OKD981595143	INDIAN CAPITOL VOTECH	NW 45TH & 2 BLKS N ON HW	Conditionally-Exempt Small Quantity Generator (CESQG)
1 mile	OKD990751059	ZAPATA INDUSTRIES INC	4400 DON CAYO DRIVE	No Longer Generating, Out of Business
Less than 1 mile	OKR000002139	SEM MATERIALS MUSKOGEE PLANT	2501 PORT PLACE	CESQG

State and Tribal Landfills or Solid Waste Disposal Sites within one-half mile

No operating landfills are within one-half mile of the site, except for the closed pond under NRC administration noted above.

State and Tribal Underground Storage Tank List (property and adjoining properties)

No records of Underground Storage Tanks (UST) for the area were found in the tribal list. From an extract from the UST Notification Database maintained by Oklahoma Corporation Commission, no UST were registered to FMRI or present on the Property, but one facility for which geographic coordinates were given plots adjacent to the Property. Specifically, this is Indian Capital AVTS, 2403 N 41st St. E., N35° 46' 28.15", W95° 18'50.19". This has two active tanks: one 10,000-gallon steel tank containing gasoline, one 6,000-gallon steel tank containing diesel. It also has one 1,000-gallon tank, composition and contents unknown, permanently out of use.

Another facility is nearly adjacent to the property, ELF Asphalt, Inc., Don Cayo St., Port of Muskogee, (may now be owned by Koch Materials, Inc.), N35°46'47.15", W95°18'12.22". This has no active tanks, but one1000-gallon concrete and steel tank. The state registry lists the contents as "Mixture", permanently out of use.

State and Tribal Leaking Underground Storage Tank (LUST) Cases

Oklahoma Corporation Commission records showed no Leaking Underground Storage Tank (LUST) cases within one-half mile of the Redevelopment Area. No tribal record of LUST cases within one-half mile was found.

One facility, Former 7-11 Store #39, may have been located approximately 0.55 miles southwest of the Property, based on the street address given. The latitude and longitude information given, are not consistent with the street address. According to Earth Sciences Consultants (1999):

> "The Former 7-11 facility was identified in the UST and LUST databases and is located at 3600 E. Shawnee Road, over one-quarter mile south of the subject property. Based on the site reconnaissance of the subject site and the surrounding area, the Former 7-11 facility is located approximately less than one-quarter mile south of the subject property. The Oklahoma Corporation Commission (OC) requires that all facilities that maintain USTs register those tanks. According to the UST database, the Former 7-11 facility currently owns one 4,030-gallon gasoline UST and one 10,152-gallon gasoline UST, which are permanently out of use. No information was available on any spill prevention or leak detection equipment utilized for the operation of these USTs.
>
> "The OCC maintains lists of USTs that have experienced leaks or spills related to their operation. According to the LUST database, the Former 7-11 facility experienced a release from a regulated UST. The status of this release has been closed as of November 1993.
>
> "The former 7-11 facility is located hydrogeologically downgradient from the subject property. Any releases from these USTs would have very minimal, if any, environmental impact on the soils and groundwater beneath the subject property. "

State and Tribal Voluntary Cleanup and Brownfield Sites (one-half mile)
DEQ records show no Voluntary Cleanup sites and no Brownfield sites within ½ mile of the Property. However, the Port of Muskogee has approached the DEQ about applying for the Brownfield Program for the portion of the Northwest Property Area it has already acquired from FMRI. No tribal record of Voluntary Cleanup or Brownfields sites within one-half mile was found.

5.2 Additional Environmental Record Sources

The document database Agencywide Document Access and Management System (ADAMS) provided by the Nuclear Regulatory Commission for correspondence concerning NRC-licensed sites was consulted, specifically for information regarding the FMRI property and release of the Northwest Property Area from the license.

City of Muskogee records were not consulted because the property is in unincorporated Muskogee County.

5.3 Historical Use Information on the Property

Sanborn Fire Insurance Maps for Muskogee were consulted, but did not cover the Property. Historical use information on the property includes statements in the Remediation Assessment report and other submittals to the NRC, land records on file with Muskogee County, interviews with facility managers and tenants, aerial photographs and submittals to the DEQ.

5.4 Historical Use Information on Adjoining Properties

Aerial Photo Review

Available airphotos, with stereo coverage except as noted, were:

1958 CUE-4V-151, 152, (nominal scale1:20,000)
1964 CUE-1FF-134, 135, (nominal scale1:20,000)
1972 40101-272-39, 40, (nominal scale1:40,000)
1979 40101-179-149, 150, (nominal scale1:48,000)
1980 HAP80-415-140, 141, (nominal scale1:60,000)
1984 HARP-2884-123, 124, (nominal scale1:60,000)
1991 40000-4890-168, 169, (nominal scale1:40,000)
1995 Digital mosaic imagery (not stereo coverage) at 1-meter resolution.
2003 NAIP03-08156-135, 136, (1-meter resolution, printed at nominal scale1:60,000)

The portion of each aerial photograph showing the project area was digitized, enlarged to a scale of approximately 1:2400, and each was then superimposed

approximately on a map generated from the ArcView® database. Approximate property lines were added based on legal descriptions from the application to NRC for release of the Northwest Property Area from License SMB-911 and from the deed conveying the northern portion of the Northwest Property Area to the Muskogee Port Authority. Together with the corresponding descriptions, these are presented in Appendix D. As the original scale of the photographs ranged from 1:20,000 (photographed from lower-altitude flights) to 1:60,000 (photographed from high altitude), the level of detail available after enlargement to 1:2400 was fair to poor.

The aerial photographs show the Service Building, Sintering Building and electrical substation and present in 1958, and the Electron Beam Building added between July 1984 and April 1991. They show possible disturbed ground south and north of the Service Building in 1958, a slight depression north of the Service Building in 1964, possible bushes or piles of material southwest of the Service Building 1972 through 1981, and a possible disturbed area in the field north of the Service Building 1981 through 1984.

Zoning Review

The Property lies in Unincorporated Muskogee County, and is therefore not zoned by the City of Muskogee.

Land Use Records

Land ownership records were described previously, as were descriptions of land use provided by Earth Sciences Consultants (1993). Other land use records were not found.

Property Tax Files

Property tax files were not reviewed.

Building Department Records

Because the Property is in unincorporated Muskogee County, city building department records were not reviewed.

Fire Insurance Maps

Sanborn Fire Insurance Maps were not available for the site.

City Directories

City directories were not examined.

Interviews

The following individuals were interviewed:

Individual(s) Interviewed	Position	Affiliation
James Burgess	Operations Manager	FMRI
Mark Grindstaff	President	AI International

Individual(s) Interviewed	Position	Affiliation
Ryan Bennett	Manager	Global Machine Company
Keyton Payne	Radiation Safety Officer	FMRI
Justin Cooper	Foreman	Global Machine Company

6.0 SITE RECONNAISSANCE

6.1 Methodology and Limiting Conditions

Site reconnaissance consisted of walking the exterior and most but not all the interior portions of the site in September 2005, recording radiation levels and photographing the site. Photography was not permitted within the buildings leased at the time to AI International. The interior of the metal building south of the Service Building was not inspected. Records of the interviews are presented in Appendix F.

The assessment also utilized limited interior and exterior observations.

6.2 Exterior Observations

Exterior observations are noted in the report of the September 27, 2005 site visit and interview, presented in Appendix F. Photos are shown in Appendix C. No signs of environmental distress or unusual odors were observed in the Northwest Property Area, and measured radiation levels were consistently around 0.03 millirems per hour. The area south of the Service Building contained apparent overspray of blue paint. This is not considered a REC.

One PVC standpipe was observed and photographed standing at an angle on the ground. Its nature is not known. This is considered a data gap.

The electrical substation between the Service Building and the Electron Beam Building did not show signs of leakage, but determination of the PCB status of transformers and similar equipment is beyond the scope of this assessment. No plates or markings indicating PCB status or age of the equipment were seen from outside the fence enclosing the substation. This is considered a data gap.

6.3 Interior Observations

Interior observations are noted in the reports of the site visits on September 27, 2005 and October 27, 2006 and interviews on September 17, 2006, July 25, 2006, August 10, 2006 and September 27, 2006, presented in Appendix F. Photographs are shown in Appendix C. Observations are summarized below.

Service Building: In a September 2005 site visit, no evidence was found of storage of solvents or chemicals, and in a December 2005 interview Mr. Mark Grindstaff, president of AI International stated he knew of no chemicals in containers larger than 5 gallons or in aggregate more than 50 gallons stored on the property, and knew of no releases of chemicals.

The laboratory portion still contained some equipment including ventilation hoods, not in use. Exterior photographs and photographs of the laboratory section are shown in Appendix C. Ceramic tiles in the rest room and shower facilities showed the highest radiation readings (10 millirems per hour) seen in the

building. Low levels of radioactivity are associated with the pigments in the tile, and are not uncommon. This is not considered an REC.

No solvents or solvent odors were observed in the building during the walk-through surveys on September 27, 2005 and October 27, 2006. Similarly, radiation measurements performed during the 2005 walk-through survey showed no readings above background (0.03 millirems/hr) except readings of 10 millirems/hr from the ceramic tiles in the restrooms.

The warehouse portion is being used by AI International for metal fabrication. No drums or containers of chemicals, no indications of a release and no unusual odors were observed.
AI International does Computer Numerical Controlled (CNC) and manual machining, and laser cutting.

Electron Beam Building: The building appears in good repair, and at the time of the site visit was used to store small quantities of furniture and equipment. Metal covers in the floor were observed over what Mr. Burgess said were reservoirs for cooling water. Mr. Burgess stated these had been cleaned out in 1989 and filled with city water, and had not used since then. He was not able to provide information concerning additives to the cooling water, but did say piezometers had been installed in the late 1980s to check for leaks. He did not know the results. This is considered a data gap.

During the 1995 site visit, the Electron Beam Building was unused except for storage of furniture and miscellaneous equipment. Photographs are presented in Appendix C. In 2006, subsequent to the site visit, the building was leased to Global Machine Company for precision machining and welding of steel, stainless steel and aluminum parts (Bennett, 2006). At the time of the October 2006 site visit, operations included construction of a field service trailer and turning on a lathe of a heavy-duty steel perforated pipe 6 to 10 inches in diameter and 15 to 20 feet long.

Solvents observed included a 55-gallon drum of Sherwin-Williams® Reducer 54, used one time to attempt to thin epoxy paint for spray application and not used since then (Justin Cooper, 2006), and a drum (16 or 30 gallon) of Crystal Clean® solvent. According to a Sherwin-Williams Material Safety Data Sheet, Reducer 54 is a mixture of methyl isobutyl ketone (MIBK), ethanol, xylene and ethylbenzene. According to a Crystal Clean representative on site during the visit, the solvent is naphtha. Other liquids observed on site were diesel fuel, Weld-Kleen Anti-Splatter, cutting oil, spray paint, and epoxy paint components, all in containers of 5 gallons size or smaller.

There was what appeared to be a transformer, possibly associated with Fansteel's electron beam process, in a room on the east side of the building. Determining the presence or absence of PCB-containing oils in this equipment is beyond the

scope of this assessment. No unusual odors, beyond odors associated with welding, were observed.

During the September 2005 site visit, the Electron Beam Building was mostly empty, although empty drums, some furniture, some salvaged equipment and a few appliances were stored near the north end. The building has an overhead bridge-type crane running on rails mounted high on the walls. No unusual odors were observed in the building. Photographs are presented in Appendix C.

Sintering Building: At the time of the September 2005 site visit, this brick building was in good repair, but contained stored liquid and granular chemicals including flocculants in drums and ammonium bifluoride in super sacks, and some spilled granular chemicals were observed. An ammonia-like odor was observed even after the building was allowed to air out for an hour or so. Because they were subsequently removed, the spilled chemicals are considered an HREC, not an REC.

During the September 2005 site visit, dark gray smears identified as powdered metal (Burgess, 2005) were observed on the walls in one room. According to Sax (1984) niobium dust forms a moderate fire and explosion hazard when exposed to flame, and dry powdered tantalum ignites spontaneously in air. According to Burgess (2006) the powdered metal can be heated with a torch and merely glows, but had been removed except for a small amount remaining as a stain on the paint. These smears are not considered a REC, as they no longer present a hazard. During the October 2006 site visit, the smears lower than approximately seven feet above the floor had been removed.

Until after the September 2005 site visit, the building was used to store super sacks and drums of various materials, including alumina powder, granular ammonium bifluoride, sodium hydroxide, quicklime and others. Several Super Sacks showed signs of spillage, and the building had an ammonia-like odor. Some of these materials were intended for use in decommissioning activities, while others were unused process materials being stored for sale. During the October 2006 visit, a floor drain was observed near the middle of the area where the materials had been stored.

During the October 2006 site visit, only a few super sacks of spent alumina and Floricel 828 remained. Therefore the past presence of stored chemicals and the fact that some were spilled is considered a Historical Recognized Environmental Condition (HREC).

A ventilation fan and vent stacks were observed outside the Sintering Building. No deposits were observed near the vent stacks. According to Burgess (2006) the vents were for the exhaust from vacuum pumps, and any residues collecting in the

vents were processed for tantalum and columbium content. Photographs are presented in Appendix C.

Cooling water pumps were observed inside the Sintering Building, and a cooling tower was observed on the roof. The lack of information concerning additives to the cooling water is considered a data gap.

Vacuum pumps and hydraulic presses were used inside the building. Determining the PCB status of these is beyond the scope of this assessment.

Guardhouse: During the October 2006 site visit, there were no signs of stored chemicals, spilled materials or unusual odors in the guardhouse.

Metal Building (Building 6): At the time of the October 2006 site visit, the building contained two operating air compressors. Spilled oil and absorbent to pick up the oil were seen on the concrete floor. No unusual odors were observed.

7.0 INTERVIEWS

7.1 Interviews with Past and Present Owners of the Property

The owner is a corporate entity. The site manager was interviewed instead. As Fansteel or FMRI have owned the property for nearly fifty years, past owners were not interviewed.

7.2 Interviews with Key Site Managers

The owner's representative and site manager interviewed was Mr. James Burgess, manager of plant operations and a long-time employee of Fansteel and FMRI. The records of the interviews are given in Appendix F.

7.3 Interviews with Operators and Occupants of the Property

The tenant in the Service Building and the Sintering Building (since 2006) is AI International. Mr. Mark Grindstaff, president of AI International, was interviewed. There was no tenant in the Electron Beam Building until 2006, when Global Machine Company leased the building. Interviews with Mr. Grindstaff and Mr. Bennett are given in Appendix F.

7.4 *Interviews with Neighbors and Others*

Neighbors were not interviewed.

7.5 Interviews with State and/or Local Government Officials

Various DEQ staff members were interviewed concerning the site but interview notes were not recorded. Instead, DEQ and NRC files were reviewed. Representatives of the Cherokee Nation were also interviewed but said the Property was not on tribal land.

8.0 FINDINGS

The following REC were noted.

Groundwater contamination with total arsenic, cadmium and lead, and total alpha activity and total Radium 226 plus Radium 228 activity is considered a REC.

Groundwater contamination with Trichloroethene, 1,1,1-trichloroethane and 1,1-dichloroethene observed in 2006 north of the Property is considered a REC.

The historical presence of licensed material in specific rooms in the Service Building is considered an HREC.

The presence of stored chemicals including ammonium bifluoride in the Sintering Building, and the fact that some were spilled is considered an Historical Recognized Environmental Condition (HREC).

Powdered tantalum metal observed in the Sintering Building in September 2005 was subsequently removed except for stains left in the paint above approximately seven feet from the floor. While the metal dust would be considered a moderate fire hazard (Sax, 1984) the stains are not, and the powdered metal is therefore considered an HREC.

The release of supernatant from Pond 3 to the ground surface to the west and north is considered an HREC.

The release during tornado in 1999, of moist low-level radioactive material excavated from Pond 5 in 1993 and stored in bags in the Sodium Reduction Building, is considered an HREC.

The presence of the cooling water reservoirs in the Sintering Building and Electron Beam Building and the absence of information concerning additives to the water or releases from the reservoir, are considered data gaps.

The results of an assessment in the late 1980s of possible leakage of cooling water were not available. This is considered a data gap.

Historic information is not available indicating the management of radioactive material in the field in the northeast corner of the Property. However, if small quantities of radioactive material were present on the site, they could have gone undetected. A radiological survey of the northeast corner of the Property, performed after FMRI removes the contents of Pond 3 and ships them off-site, could confirm the presence or absence of radioactive materials on the property. Because the area was surveyed in 1995 but the current standard for radiological surveys, Multi-Agency Radiation Survey and Site Investigation Manual

(MARSSIM) was only in draft form in 1997, it is not clear whether the surveys would meet the current standard. This is considered a data gap.

The lack of maps showing a natural gas pipeline in the western portion of the property is considered a data gap.

The PCB status of the transformers in the electrical substation west of the Service Building could not be determined. This is considered a data gap.

The nature of a PVC standpipe was observed and photographed standing at an angle on the ground east of the Electron Beam Building is not known. This is considered a data gap.

9.0 OPINION

The respective impacts of the RECs found are discussed below.

Recognized Environmental Condition	Anticipated Impact on the Properties
Groundwater contamination associated with Fansteel/FMRI operations has been documented.	This includes radioactive uranium, dissolved metals and MIBK. Screening levels for Gross Alpha radiation, aluminum, total Arsenic Total Cadmium and Total Lead have been exceeded in groundwater samples collected from wells in or adjacent to the property. In addition, only two groundwater analyses for VOC and SVOC have been reported for wells on or near the Property. The risk to human health and the environment arising from this groundwater contamination should be assessed, and additional groundwater analyses may be required.
Groundwater contamination north of the Property with TCE, 1,1-DCE and 1,1,1-TCA was observed in 2006	The extent of the contaminated groundwater has not been delineated, and could extend onto the Property. FMRI's interceptor trench and wastewater treatment is expected to intercept the groundwater plume before reaching the Arkansas River, but the effects of soil vapor intrusion should be considered when building on the Property.
Spilled granular chemicals were observed in the Sintering Building, but have subsequently been removed.	A list of chemicals stored was not provided, but several super sacks labeled "Ammonium Bifluoride" were observed. Ammonium Bifluoride is potentially corrosive, toxic and reactive. Since the building is currently leased for a metal fabrication operation, the spilled material has removed. It is therefore considered an HREC
Pond 3 contents	Until the contents of this pond are properly removed or the pond is properly closed in accordance with a NRC-approved Decommissioning Plan, the presence of this pond on the neighboring property is considered a Recognized Environmental Condition. As Pond 3 is downhill from the Property, and FMRI is making arrangements to send the contents off-site, additional assessment may not be required.

10.0 DATA GAPS

The absence of information concerning additives to the cooling water reservoirs and any releases from the reservoirs is considered a data gap. If additives such as chromium compounds had been used, the groundwater could be affected in the event of a release. The data gap could be satisfied by additional review of Fansteel records, if still extant, concerning additive purchases or by obtaining a copy of the report, if it still exists, of the assessment performed in the late 1980s in association with the piezometer installation mentioned by Burgess (2006).

The lack of information concerning the PCB content of fluids used in the hydraulic presses and vacuum pumps in the Sintering Building is considered a data gap. This data gap could be satisfied by determination of the former location of this equipment together with analysis for PCB of wipe samples from the floor in the area.

AI International's operations in the Sintering Building have not been inspected, and the requests for follow-up interviews concerning operations there have not been responded to; this is considered a data gap. This data gap could be satisfied by a follow-up inspection and interview.

The operations at Global Machine Company in the Electron Beam Building have not been inspected, and are considered a data gap. This data gap could be satisfied by a follow-up inspection and interview.

The radioactivity survey of the fields in the northeast corner of the Property, opposite Pond 3, used to justify release of the area from the NRC license, was performed to a different standard than MARSSIM, the current standard. Whether the survey performed in 1995 satisfies the current MARSSIM standard, which was only in draft form in 1997, is not known and is considered a data gap. This data gap could be resolved by comparison of the methods used to the current standard.

The lack of maps showing a natural gas pipeline in the western portion of the property is considered a data gap. This data gap could be satisfied by review of maps by ONG showing the location of the lines.

The PCB status of the transformers in the electrical substation west of the Service Building could not be determined. This is considered a data gap. This data gap could be satisfied by review of FMRI or OG&E records or by inspection and sampling of the equipment for PCB.

The nature of a PVC standpipe was observed and photographed standing at an angle on the ground east of the Electron Beam Building is not known. This is considered a data gap. This data gap could be satisfied by probing and possibly sampling the standpipe.

11.0 CONCLUSIONS

The DEQ has performed a *Phase I Environmental Site Assessment* in conformance with the scope and limitations of ASTM Practice E-1527-05 of the portion of the Northwest Property Area retained by FMRI, located 10 Tantalum Place, Muskogee, Muskogee County, Oklahoma, the *property*. Any exceptions to, or deletions from, this practice are described in Section 12.0 of this report.

This assessment has revealed the following recognized environmental conditions in connection with the property:

- Groundwater contamination associated with FMRI operations is considered a Recognized Environmental Condition (REC).
- Groundwater contamination with TCE, 1,1,1-TCA and 1,1-DCE observed in 2006 in groundwater north of the Property is considered a Recognized Environmental Condition (REC).
- Powdered tantalum or Columbium metal identified by Burgess (2005) during the September 2005 site visit in the Sintering Building is considered moderate fire hazard (Sax, 1984) but has been reported to have been removed except for stains in the paint (Burgess, 2006). As the stains are not dust, the presence of the powdered metal is considered only a Historic Recognized Environmental Condition (HREC).
- The presence of stored chemicals including ammonium bifluoride in the Sintering Building, and the fact that some were spilled is considered an Historical Recognized Environmental Condition (HREC).
- The presence of WIP in Pond 3, east of the Property, is considered an REC. As FMRI is making arrangements to ship this material off-site, this may soon become an HREC.

These RECs represent possible risks, either from the standpoint of exposure to workers or the public, or from inadvertent generation of hazardous waste, especially during demolition and excavation. To quantify the risks posed by an REC will require limited Phase II sampling and analysis appropriate to the REC, and comparison of the concentrations of suspected hazardous substances or petroleum products to risk-based screening levels or other regulatory levels. Any demolition and environmental assessment and cleanup in this area should be coordinated with the DEQ.

Owing to the era in which the buildings in *the property* were built, lead-based paint, asbestos-containing materials, and light fixtures containing polychlorinated biphenyls (PCB) could be present. Determination and characterization of these materials was beyond the scope of this assessment.

12.0 DEVIATIONS

- At the request of FMRI, no sampling has been performed on the Property as part of this Targeted Brownfield Assessment.
- If the purchase of the Property by Muskogee City/County Port Authority occurs more than 6 months after the date of this TBA report, additional follow-up work will be required to preserve the Bona-Fide Prospective Purchaser Defense to Superfund Liability.

City directories and city zoning were not examined because the Property is in Unincorporated Muskogee County. This is not considered a data gap.

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APPENDICES

Appendix A - Site Maps

Appendix B –Property Ownership History

Appendix C - Site Photographs

Appendix D - Historical Research Documentation
- Aerial Photographs
- Fire Insurance Maps
- Topographical Maps

Appendix E - Regulatory Records Documentation

Appendix F - Interview Documentation

Appendix G – Qualifications of Environmental Professionals

SITE CHARACTERIZATION REPORT ADDENDUM

Targeted Brownfield Assessment

Muskogee Port Authority
Muskogee County, Oklahoma

May 03, 2011

Prepared by:

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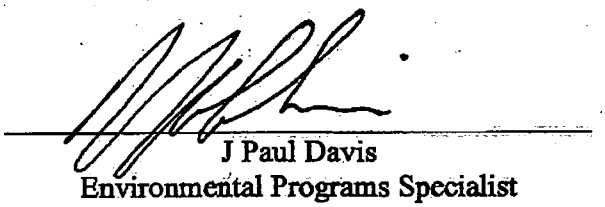
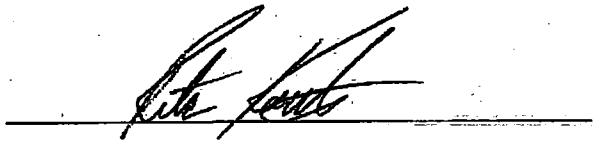
Environmental Professional in charge of the project:

I declare that to the best of my professional knowledge and belief, I meet the definition of Environmental Professional as defined in Section 312.10 of this part. I have specific qualifications based on education, training, and experience to assess a property of the nature, history and setting of the subject property. I have developed and performed the all appropriate inquiry in conformance with the standards and practices set forth in 40 CFR Part 312.



J Paul Davis
Environmental Programs Specialist



Rita R. Kottke, Ph.D.
Brownfields Program Manager

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Section

1. Introduction

The Site Characterization Report dated February 1, 2007 identified Trichloroethene (TCE) in ground water at concentrations up to 37,000 micrograms per liter (µg/L). While this concentration far exceeds the drinking water standard of 5 µg/L, exposure via the pathway of direct ingestion can be prevented by institutional controls prohibiting the installation of water wells on the property and preventing occupants from drinking the water.

Of greater concern is that these concentrations of TCE also exceed the Target Groundwater Concentration screening level of 5 µg/L.[1] In any area where this screening level is exceeded, mitigation of soil vapor intrusion should be considered in occupied buildings, whether the use of the buildings is residential or industrial. Commonly, the technology used is very similar to that used to mitigate radon intrusion, and for new construction is available at a modest increase in construction and operating cost. If the groundwater is later remediated, it may be possible to stop the vapor mitigation system and its associated operating cost.

The purpose of this Addendum to the Phase II Assessment was to better characterize the extent of the plume of trichloroethene exceeding drinking water standards and target groundwater concentrations in the groundwater, and the gradients driving groundwater movement under the property.

This information is intended to better delineate areas of concern that might need additional investigation, vapor mitigation and/or remediation prior to a new tenant building on the site.

The DEQ is providing technical assistance to the project by evaluating the environmental condition of the property. Funding for this assessment has been provided by the U.S. Environmental Protection Agency (EPA).

1.1 Location and Legal description

The approximate center of the proposed redevelopment site has the coordinates of 35° 46' 29" north latitude and 95° 18' 29" west longitude, and is located in the floodplain of the Arkansas River (Webber Falls Reservoir), a meander of which loops from a point approximately 1.3 miles to the north, to a point 1500 feet to the east. The property is bounded on the south and east by the FMRI, Inc. (formerly Fansteel, Inc.) property, on the west by the 46th Street and by another parcel owned by the Port, and on the north by Don Cayo Boulevard. A topographic vicinity map is presented in Figure 1.

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[1] This screening level represents the groundwater concentration which results in a lifetime risk of cancer of 10^{-5} (one in one hundred thousand) from being exposed by inhalation of the associated soil vapor intruding into a residence under default exposure conditions, as described in EPA's draft Subsurface Vapor Intrusion Guidance (EPA, 2002). A screening level based on industrial exposure criteria might be double the Target Groundwater Concentration, but would still clearly be much lower than the TCE concentrations measured. Exposure criteria are described in EPA's interim final Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A) (EPA, 1989).

1.2 Previous Work

For background information on the property the DEQ relied on the 1999 Earth Sciences Phase I Environmental Assessment Report (Ref. 2) and the DEQ's 2007 Phase I Targeted Brownfield Assessment (Ref. 3) of the property directly to the south of the property in question. The DEQ mobilized to the site to collect samples on two occasions, September 6-7 and December 12-13, 2006. During the first sampling event, the DEQ collected composite surface soil samples, subsurface soil samples, and groundwater samples. During the second sampling event, only groundwater samples were collected. The State Environmental Laboratory analyzed the samples and validated the data. The sampling results, analytical data, and description of future actions to be taken by the DEQ were summarized in the Site Characterization Report, dated February 1, 2007. Figure 2 shows the sample locations from work in 2006 and 2010-2011.

Because the temporary wells were removed within days of their installation and were not surveyed, ground-water gradient directions could not be measured, and had to be assumed based on the site's proximity to the Arkansas River to the east, and on hydraulic gradient information submitted to the Nuclear Regulatory Commission as a license condition for the FMRI facility to the east.

2. Sampling Activities

Five additional temporary shallow monitoring wells, MW-01 through MW-05, were installed on December 6 and December 7, 2010. The locations of these temporary wells and the previous soil borings are shown in Figure 2. Soil head-space readings were performed on core samples collected during drilling, and soil from the interval with the highest reading was submitted to the State Environmental Laboratory for analysis for VOC using EPA Method 8260.

The temporary wells were completed with 2-inch Schedule 40 PVC risers and 0.010-inch factory-slotted PVC screens, lockable protective covers and concrete pads in accordance with Oklahoma Water Resource Board regulations, so they could be left in place long enough for water levels to equilibrate. Table 1 lists the approximate locations and justification of the 2006/2007 and 2010 sample locations.

Table 1: Sample Locations

Sample Number	Location	Matrix	Justification
GW01 (MPA-1) 9/7/06	Northeast corner of site,	Aqueous (Grab)	Indicator of hazardous substances in ground water on site
GW02 (MPA-2) 9/7/06	Southeast corner of site	Aqueous (Grab)	Indicator of hazardous substances in ground water on site
GW03 (MPA-3) 9/7/06	Southwest part of site	Aqueous (Grab)	Indicator of hazardous substances in ground water on site

Sample Number	Location	Matrix	Justification
GW04 (MPA-1) 9/7/06	Duplicate water sample of GW01	Aqueous (Grab)	Indicator of hazardous substances in ground water on site / QA sample
SS01 9/6/06	Soils from monitoring well #1	Soil/Sediment (Grab)	Screening for hazardous substances in soil
SS02 9/6/06	Soils from monitoring well #2	Soil/Sediment (Grab)	Screening for hazardous substances in soil
SS03 9/6/06	Soils from monitoring well #3	Soil/Sediment (Grab)	Screening for hazardous substances in soil
SS04 9/6/06	Duplicate soil sample at monitoring well #1	Soil/Sediment (Grab)	Screening for hazardous substances in soil / QA sample
SS05 9/6/06	Northeast part of site 0-6" below surface	Soil (Five Point Composite)	Screening for hazardous substances in soil
SS06 9/6/06	Southeast part of site 0-6" below surface	Soil (Five Point Composite)	Screening for hazardous substances in soil
SS07 9/6/06	Southwest part of site 0-6" below surface	Soil (Five Point Composite)	Screening for hazardous substances in soil
SS08 9/6/06	Central part of site in area of old pond 0-6" below surface	Soil (Five Point Composite)	Screening for hazardous substances in soil
SS09 9/6/06	Northwest part of site 0-6" below surface	Soil (Five Point Composite)	Screening for hazardous substances in soil
SS10 9/6/06	Duplicate soil sample SS05	Soil (Five Point Composite)	Screening for hazardous substances in soil/QA sample
MPA-2W 12/12/06	~ 250 ft. west of impacted well MPA-2	Aqueous (Grab)	Indication of extent of chlorinated solvent plume
MPA-2N 12/12/06	~ 250 ft. north of impacted well MPA-2	Aqueous (Grab)	Indication of extent of chlorinated solvent plume
MPA-2E 12/13/06	~ 250 ft. east of impacted well MPA-2	Aqueous (Grab)	Indication of extent of chlorinated solvent plume
MPA-2NA 12/13/06	~ 500 ft. north of impacted well MPA-2	Aqueous (Grab)	Indication of extent of chlorinated solvent plume
MPA-4N 12/13/06	~ 500 ft. north of impacted well MPA-2	Aqueous (Grab)	Indication of extent of chlorinated solvent plume
MW-01 12/06/10 (Soil) 12/14/10 (GW)	~ 420 ft NW of MPA-2W	Soil and Aqueous (Grab)	Indication of hydraulic gradient and extent of chlorinated solvent plume
MW-02 12/06/10 (Soil) 12/14/10 (GW)	~ 100 ft N of MPA-2N-A	Soil and Aqueous (Grab)	Indication of hydraulic gradient and extent of chlorinated solvent plume
MW-03 12/06/10 (Soil) 12/14/10 (GW)	~ 100 ft N of MPA-2	Soil and Aqueous (Grab)	Indication of hydraulic gradient and extent of chlorinated solvent plume
MW-04 12/07/10 (Soil) 12/14/10 (GW)	~ 200 ft W of MPA-2W	Soil and Aqueous (Grab)	Indication of hydraulic gradient and extent of chlorinated solvent plume
MW-05 12/07/10 (Soil) 12/14/10 (GW)	~ 70 ft SW of MPA-2E	Soil and Aqueous (Grab)	Indication of hydraulic gradient and extent of chlorinated solvent plume

Drill cuttings and purge water were drummed and left on site. DEQ will arrange for a state contractor to remove and properly dispose of the drums. There was a deviation from the Quality

Assurance Project Plan during this project. Quality Control rinsate samples were not collected after the decontamination of the drilling equipment, between samples. It is not expected that this has any affect on the data since the levels of contamination are very high.

The elevations of tops-of-casing, ground levels and top-of concrete pads (relative to an arbitrary datum, not to Mean Sea Level) were surveyed by DEQ personnel the following week. Relative elevations are known to within 0.02 feet, based on the closure error of the survey. Water levels were measured on December 14, 2010 (a week after installation) and again on January 28, 2011. The wells were not checked for the presence of dense, non-aqueous phase liquid (DNAPL).

3. Findings

Analytical results are summarized in Table 2 and 3; the laboratory analytical reports are in Appendix A.

Surface Soil
No surface soils were tested in 2010.

Previously, however, the surface soils were tested in 2006 for metals contamination due to the former operations of Fansteel, Inc. The Phase I ESA and DEQ's institutional knowledge of the area showed no reason to suspect organic contaminants in the surface soil of this property. However, because fugitive metal dust from Fansteel/FMRI could have impacted this property, samples for metals analyses were collected in 2006. As reported in the 2007 report, the laboratory analyses did not detect metal contamination in the surface soil above EPA Region 6's screening levels for outdoor industrial workers.

Subsurface Soil
During the December 2010 sampling event, subsurface soil samples were collected from MW-01, MW-02, MW-03, MW-04 and MW-05, and were analyzed for Volatile Organic Compounds (VOC) using EPA Method 8260. Only trichloroethene (TCE) was detected, and that was in a duplicate sample, collected to assess sampling uncertainty, for MW-03 (480 micrograms per kilogram or µg/kg , estimated value) at a depth of 24.0 to 24.5 feet. The actual sample for the same interval, and all the other soil samples collected in the December 2010 sampling event, had TCE concentrations below the detection limit of 15 µg/kg , which was well below the EPA Regional Screening Level[2] (RSL) of 0.014 µg/kg for industrial soil for TCE. The RSL replaces the EPA Region 6 screening level. However, this TCE detection limit was over the "Protection of ground water" RSL of 1.8 µg/kg , which indicates the risk should be considered that this compound could leach from the soil into groundwater at concentrations greater than drinking water standards. The December 2010 soil samples were not analyzed for semivolatile compounds or metals.

[2] Published RSL values for soil are expressed in milligrams per kilogram (mg/kg), but have been converted to micrograms per kilogram (ug/kg) for comparison purposes in this report.

As noted in the 2007 report, during the September 2006 sampling event, subsurface soils samples were collected in MPA-1, MPA-2, and MPA -3. Only MPA-2 showed elevated levels of trichloroethene (aka trichloroethylene and TCE). This sample location had 3000 micrograms per kilogram (µg/kg) of TCE at a depth of 30.5 feet below ground surface (bgs) and 12,000 µg/kg arsenic at 27 feet bgs. The EPA Region 6 industrial outdoor worker screening level for TCE is 100 (µg/kg) and for arsenic it is 1800 µg/kg.

Ground water

Because the focus of the Addendum Site Characterization work was on determining the extent of potential soil vapor intrusion issues and on determining hydraulic gradients, during the 2010 sampling event, ground water samples were analyzed only for VOC.

Water level elevations measured on December 14, 2010 and January 28, 2011, and the resulting potentiometric surface contours are shown in Figures 3 and 4, respectively. The December 2010 potentiometric surface shows a hydraulic gradient to the north between MW-03, MW-04 and MW-05, near the south property line with FMRI, and to the west between MW-01, MW-03 and MW-05 near the east property line with FMRI, and converging to a northwesterly direction near MW-02. The January 2011 potentiometric surface is similar, but does not show the westerly gradient between MW-01, MW-03 and MW-05. For both events, the potentiometric surface gradients differ from the easterly gradient previously assumed, based on gradients reported by FMRI, and the implications of this new gradient information are discussed in the section "Fate and Transport" below.

The ground water analytical results are summarized in Table 2, and are plotted against well location in Figure 5.

As tabulated in Table 2, the highest TCE concentrations in ground water were in MW-03 (25,000 µg/L), MW-01 (490 µg/L) and MW-04 (420 µg/L). This distribution is consistent with the 2006 results. The laboratory detection limits for the sample from MW-03 were too high to determine whether Tetrachloroethene (PCE), 1,1,1-Trichloroethane (1,1,1-TCA) and 1,1-Dichloroethene (1,1-DCE) were present in concentrations consistent with those found in GW-02 (aka MPA-2) and MPA-2N in 2006. The highest concentrations appear to lie within a south-to-north trending band or "plume" between the south property line, MW-03 and MW-01, and including the locations of the abandoned wells GW-02 and MPA-2-N and MPA-2N-A.

Figure 5 shows the distribution of these compounds based on the combined 2006 and 2010 sampling events. The combined results suggest that the concentration of TCE in the ground water is high enough that measures to mitigate soil vapor intrusion should be considered in any occupied buildings on the property east of MW-04 and south of MW-01.

Fate and Transport

Based on the hydraulic gradients and contaminant distributions, we suspect the plume may have originated as a small spill of organic solvent or solvents, consisting mainly of TCE, somewhere

to the south. Such solvents, if released to the environment, can form a "dense, non-aqueous phase liquid" (DNAPL).

DNAPL was not observed at the site; the TCE and other compounds we observed at the site were dissolved in water. At other sites, however, concentrations as high as those observed in MW-03 have been associated with the presence of DNAPL nearby. When released to the environment, DNAPL can sink through the soil and substrate until it encounters low-permeability material such as bedrock. The DNAPL would then follow the contour of the bedrock.

Whether present in dissolved form or as DNAPL, as these compounds migrate, they degrade. Under anaerobic conditions, as are normally present deep in the subsurface, tetrachloroethene will naturally degrade into trichloroethene, which will in turn degrade into its "daughter" or degradation products; 1,1-dichloroethene, cis-1,2-dichloroethene, and trans-1,2-dichloroethene. These daughter products are present in the samples but in low concentrations. Ultimately these chemicals degrade to vinyl chloride, which was not detected during this sampling event. Vinyl chloride is more resistant to anaerobic degradation, but will degrade to ethane under aerobic conditions (Center for Public Environmental Oversight, 1998).

The source and ultimate fate of the plume are still not known. More information is needed before DEQ can determine what necessary actions need to be taken to manage the risk.

Due to the potential impact this plume might have on FMRI's waste water discharge permit, DEQ's Water Quality Division is reevaluating FMRI's Oklahoma Pollution Discharge Elimination System (OPDES) permit. DEQ's requests to sample FMRI's potentially affected monitoring wells for volatile organic compounds have so far been denied, but discussions are ongoing. The information gained from this sampling event could give some detail about the southern and eastern extent of the plume. It may not provide enough detail to determine the origination of the plume.

Quality Assurance/Quality Control

The EPA Approved Quality Assurance Project Plan for Targeted Brownfield Assessments was followed during this assessment. There was one deviation; rinsate samples were not collected after the decontamination of the drilling equipment, between borings.

Duplicate samples were collected at selected locations to evaluate the accuracy of the laboratory. They were not collected for comparison to screening levels

Water samples were not filtered in the field. The metal contamination may be representative of suspended sediment and not dissolved metals in the groundwater.

Table 2: Summary of the VOC Analytical Results for Ground Water Samples [micrograms per liter (µg/L)]

Chemical Name	MCL (µg/L)	GW01 MPA – 1 30 ft 9/7/06	GW02 MPA-2 35 ft 9/7/06	GW03 MPA-3 37.5 ft 9/7/06	GW04 MPA-1 30 ft Dup. of GW01 9/7/06	MPA-2W 35 ft 12/12/06	MPA-2E 30 ft 12/13/06	MPA-2N 24 ft 12/12/06	MPA-2NA 24 ft 12/13/06	MPA-4N 24 ft Dup. of MPA-2NA 12/13/06
Tetrachloroethene	5	*< 10*	*69 J*	*< 10*	*< 10*	*< 10*	*< 10*	*< 100*	*< 10*	*< 100*
1,1-Dichloroethene	7	*< 10*	1500	*< 10*	*< 10*	*< 10*	*< 10*	*< 100*	250	290
1,1,1-Trichloroethane	200	< 10	320	< 10	< 10	< 10	< 10	< 100	62	71
Trichloroethene	5	*< 10*	37000	*< 10*	*< 10*	83	610	12000	6500	6900
Cis-1,2-Dichlorethene	70	----	*93 J*	----	----	----	80	----	----	----

Chemical Name	MCL (µg/L)	MW-01 14.5-24.5 ft 12/14/10	MW-02 24.5-34.5 ft 12/14/10	MW-03 21.0-31.0 ft 12/14/10	MW-04 27.3-37.3 ft 12/14/10	MW-05 19.5-29.5 ft 12/14/10
Tetrachloroethene	5	*< 50*	*< 10*	*< 2000*	*< 10*	*< 50*
1,1-Dichloroethene	7	*< 50*	*< 10*	*< 2000*	*< 10*	*< 50*
1,1,1-Trichloroethane	200	< 50	< 10	*< 2000*	< 10	< 50
Trichloroethene	5	490	*< 10*	25000	*< 10*	420
Cis-1,2-Dichlorethene	70		< 10	*< 2000*	< 10	59

---- Analyzed for but not detected
< Analyzed for but not detected (detection limit stated)
xxx Not analyzed for
J Estimated value
JB Also found in blanks, estimated value
Exceeds EPA's Maximum Contaminant Level for Groundwater
Estimated Value ("J" or "JB") exceeds MCL
Detection Limit exceeds MCL

Table 3: Summary of the VOC Analytical Results for Soil Samples [micrograms per kilograms (µg/kg)]

Chemical Name	Industrial Outdoor Screening Levels (µg/kg)	SS-01 MPA – 1 22 ft 09/06/06	SS-02 MPA-2 30.5 ft 09/06/06	SS-03 MPA-3 31 ft 09/06/06	SS-04 MPA-1 Duplicate of SS03 09/06/06	SS-11 MPA-2 27 ft 09/06/06
Tetrachloroethene		< 12	< 120	< 12	< 10	< 12
1,1-Dichloroethene	1,100,000	< 12	44 J	< 12	< 10	< 12
1,1,1-Trichloroethane	38,000,000	< 12	25 J	< 12	< 10	< 12
Trichloroethene	14,000	< 12	3000	< 12	< 10	48

Chemical Name	Industrial Outdoor Screening Levels (µg/kg)	MW-01 17.0-17.5 ft 12/06/10	MW-02 1.5-1.6 ft 12/06/10	MW-03 14.5-14.6 ft 12/06/10	MW-03 24.0-24.5 ft 12/06/10	MW-03 24.0-24.5 ft DUP 12/06/10	MW-04 29.5-29.6 ft 12/07/10	MW-05 24.5-24.6 ft 12/07/10
Tetrachloroethene		< 15	< 15	< 15	< 15	< 16	< 15	< 15
1,1-Dichloroethene	1,100,000	< 15	< 15	< 15	< 15	< 16	< 15	< 15
1,1,1-Trichloroethane	38,000,000	< 15	< 15	< 15	< 15	< 16	< 15	< 15
Trichloroethene	14,000	< 15	< 15	< 15	< 15	480 J	< 15	< 15

---- Analyzed for but not detected
xxx Not analyzed for
J Estimated value
JB Also found in blanks, estimated value
Above **industrial outdoor worker screening levels**

4. Conclusions

The analyses of the samples collected from the Port of Muskogee's property indicate high levels of chlorinated solvents and metals in the groundwater. The metals are discussed in the 2007 report.

The extent of dissolved TCE in the ground water is now thought to include much of the easternmost 400 feet of the property, and the potential for soil vapor intrusion should be considered over the easternmost 600 feet of the property. TCE was detected at a very high concentration in MW-03 (slightly lower than the concentration in MPA-2 in 2006), and with concentrations that are somewhat smaller, but still well above Target Groundwater Levels[3] in wells MW-05 and MW-01. The plume appears to have spread to the north, based on concentration gradients and groundwater gradients. TCE is a volatile organic compound and whether present as a dense non-aqueous liquid or a dissolved at low concentrations in ground water, it volatilizes. The gaseous TCE can move considerable distances vertically and horizontally through the soils, and can accumulate within surface structures. The 2007 report noted headspace readings using a Photoionization Detector (PID) of organic vapor, at a depth of three feet in GW-01, near the north end of the property, although the composition of the organic vapor was not determined.

Volatile organic vapors from the soil have the potential to enter and concentrate inside buildings. These vapors move depending on pressure gradients – from high pressure to low pressure (DEQ, 2007). Disturbing the subsurface changes the pressure gradient – this is especially true when installing subgrade structures such as sewers. The packing around the sewer lines is less compacted than the soils around it and vapors can migrate into buildings through this media. Engineering controls such as vapor barriers can help prevent the vapors from entering the buildings because they effectively seal the foundation and around utility corridors.

The temporary monitoring wells MW-01 through MW-05 have been left in place pending a decision from the Muskogee Port Authority whether to pursue source identification, plume tracking, or cost recovery.

Any new development of the surface should take into consideration the environmental issues in the subsurface. The design and construction engineers for new development on the property should be made aware of the groundwater plume and the potential for soil vapor intrusion into occupied structures.

5. Environmental Professional's Opinion

There is a known ground water plume under the easternmost 600 feet of the site. The extent and source of the plume has not been determined. The plume should be investigated further. The ground water under the site should not be used. Care should be taken during construction to ensure that vapors from the plume do not have a conduit into structures.

[3] Target Groundwater Levels are screening levels above which the risk of soil vapor intrusion should not be ignored.

The DEQ has repeatedly been denied access from FMRI to investigate the ground water under FMRI's property since the contaminants may also be reaching FMRI's ground water treatment system. This investigation would provide some information about the extent of the plume.

6. Recommendations

The DEQ will continue to inform the Port of any additional information/data it finds during its investigations. As the Port and its tenants proceed with their development plans, they should consider vapor intrusion mitigation in the design of any occupied structures in the eastern portion of the subject property. If anything unusual is found during construction, the Port should notify the DEQ of the discovery. The DEQ will work with the Port to resolve the environmental issues that have been discovered. The DEQ stands ready to remove the wells, should the Port Authority decide not to pursue source identification, plume tracking or cost recovery associated with the plume of dissolved TCE.

7. References

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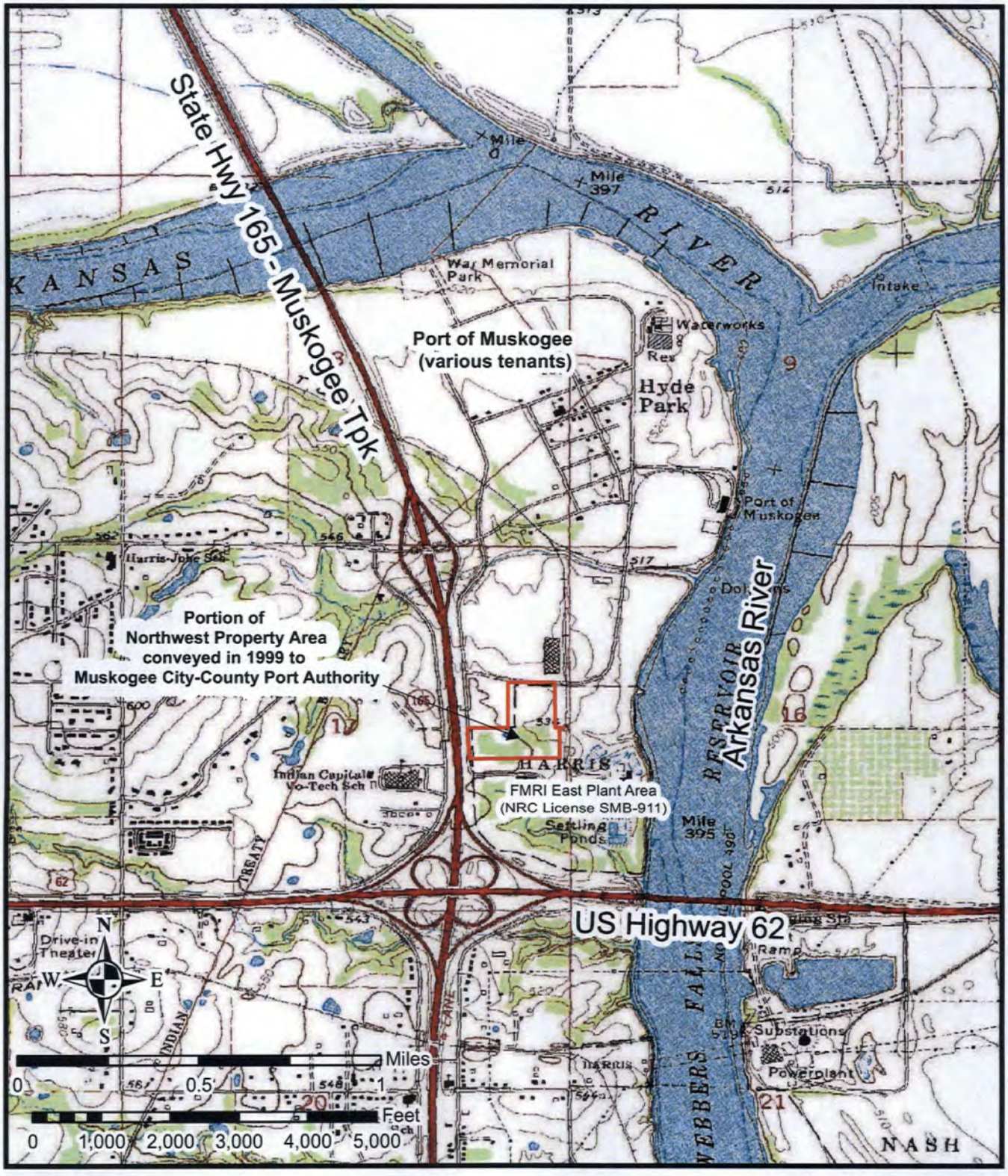
Figures

Figure 1: Topographic Location Map
Muskogee Port Authority / FMRI Site
Muskogee, OK



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on 03/14/2011.

We make every effort to provide and maintain accurate, complete, usable, and timely information. However, some data and information on this map may be preliminary or out of date and is provided with the understanding that it is not guaranteed to be correct or complete. Conclusions drawn from, or actions undertaken on the basis of, such data and information are the sole responsibility of the user.

Figure 2: Well and Sampling Point Locations
Muskogee Port Authority / FMRI Site
Muskogee, OK

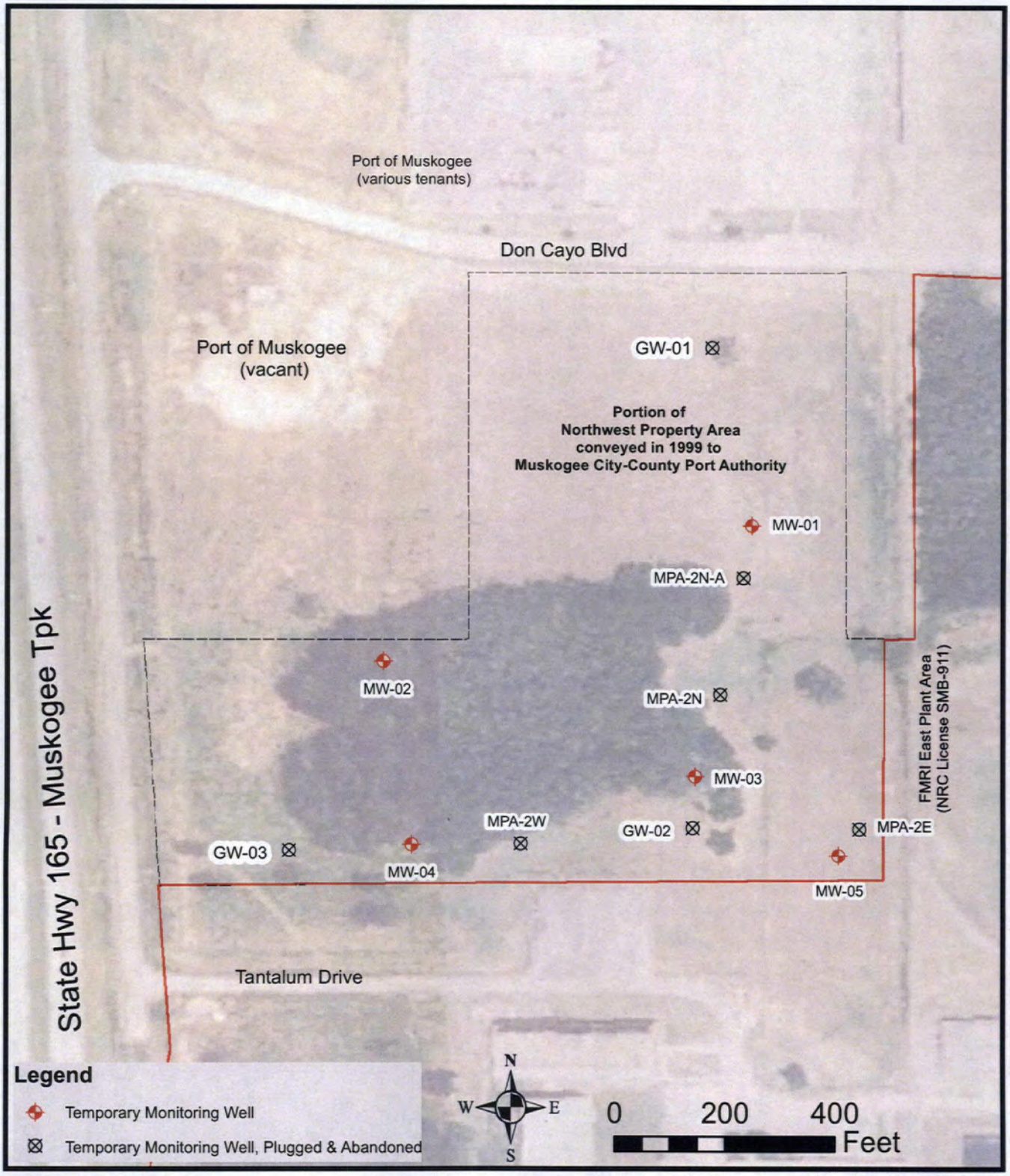

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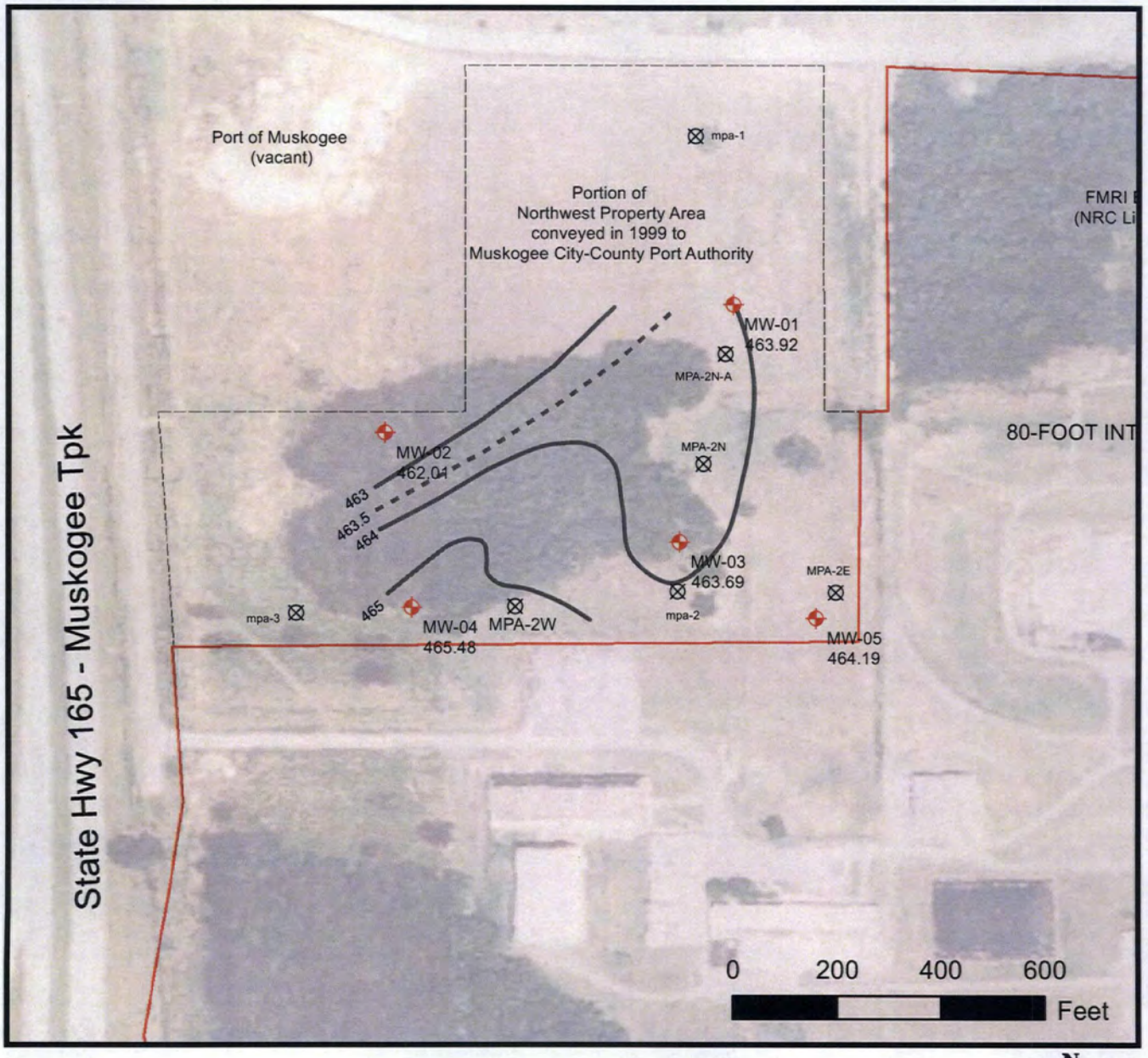
Figure 3: Relative Water Level Elevations (12/07/10)
Muskogee Port Authority / FMRI Site
Muskogee, OK



Legend

- Temporary Monitoring Wells with Water Level Elevations from 12/07/10
- Temporary Monitoring Well, Plugged & Abandoned

N
W E
S

Map created by Savannah Richards
on 03/25/2011.

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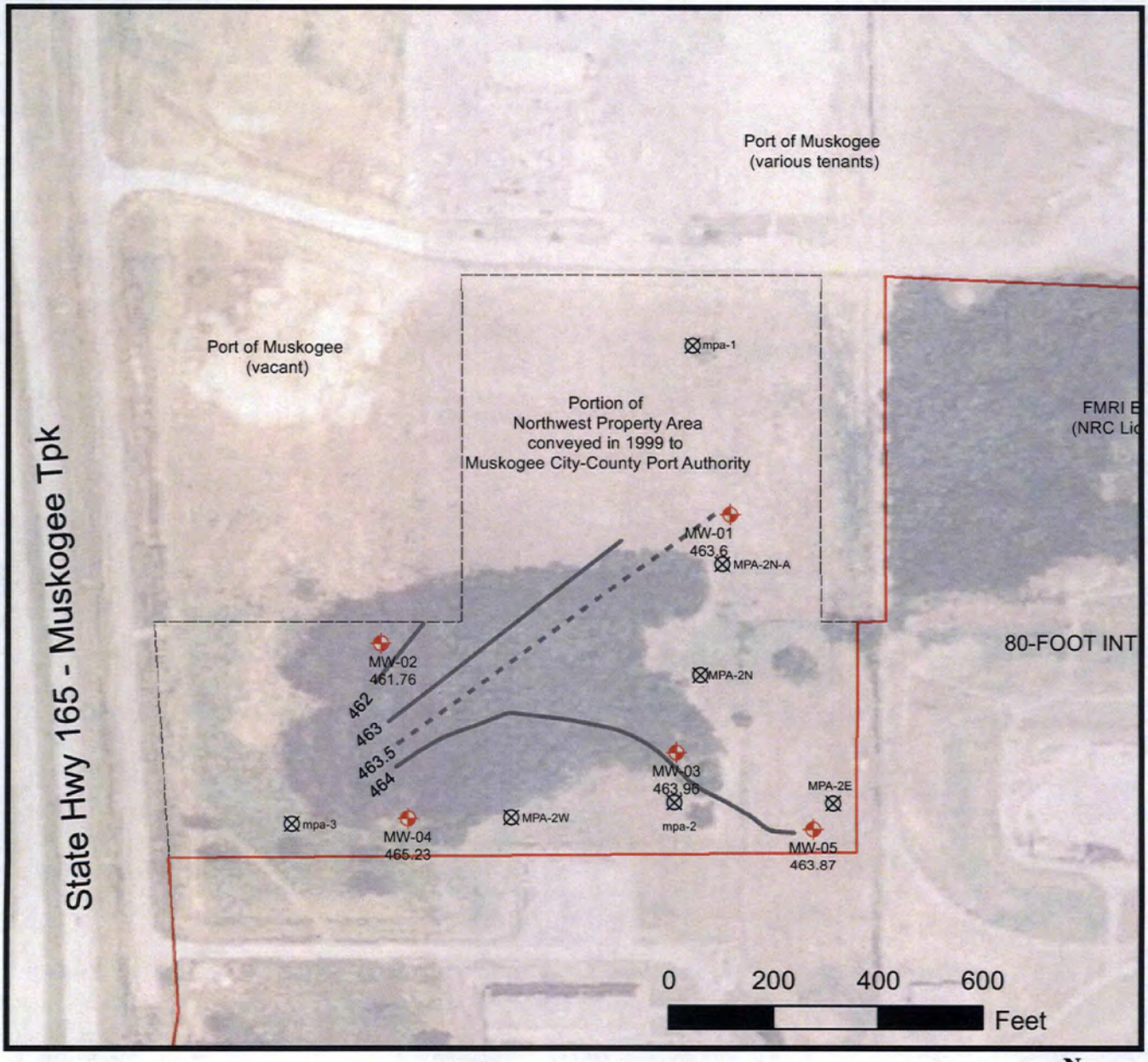
Figure 4: Relative Water Level Elevations (01/28/11)
Muskogee Port Authority / FMRI Site
Muskogee, OK



Legend

- January 2011Temporary Monitoring Wells with Water Level Elevations from 01/28/11
- Temporary Monitoring Well, Plugged & Abandoned

N
W E
S

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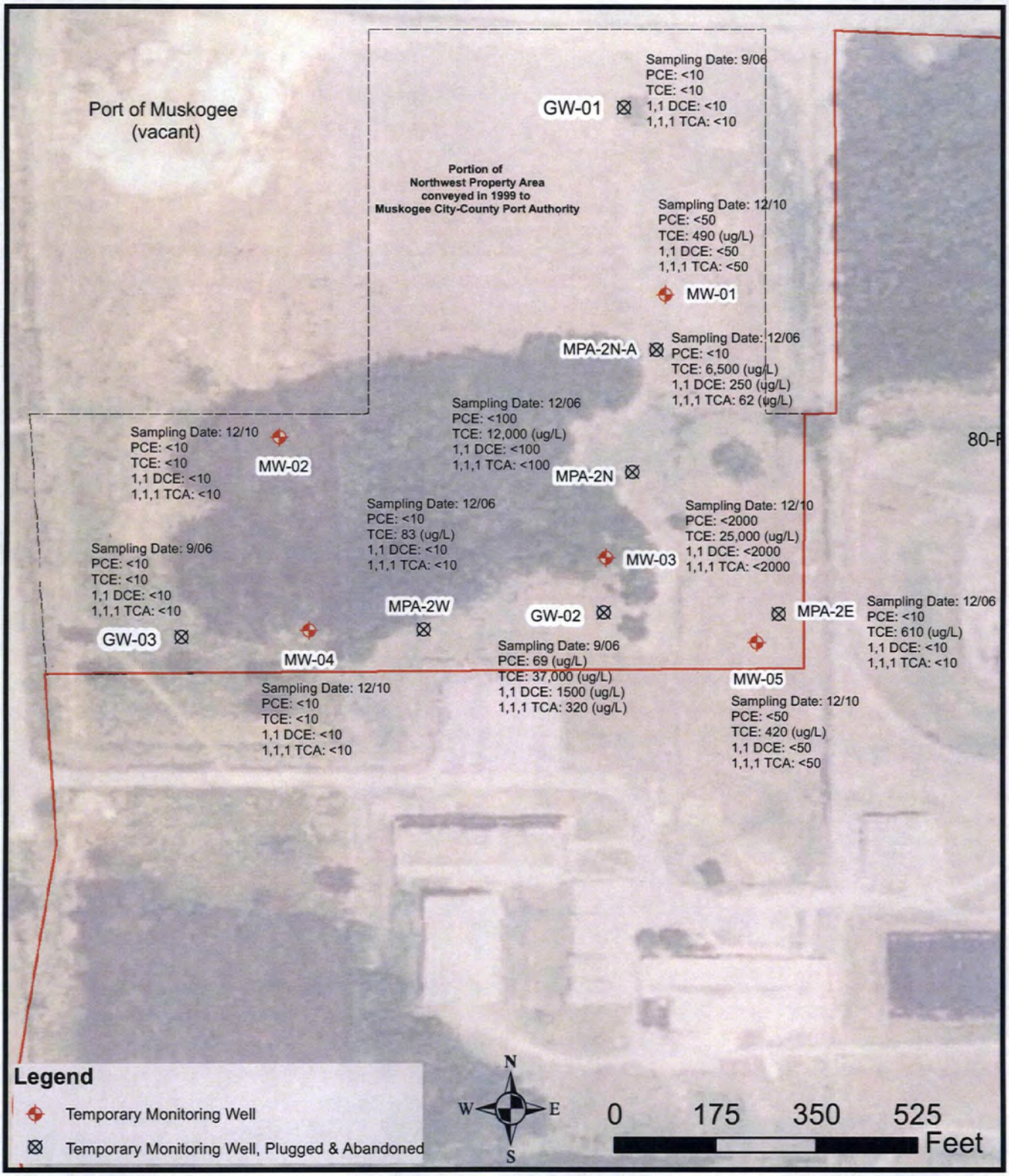
Figure 5: Historic Volatile Organic Compounds in Ground Water
Muskogee Port Authority / FMRI Site
Muskogee, OK



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Map created by Savannah Richards
on 03/14/2011.

Appendix A:

Boring Logs

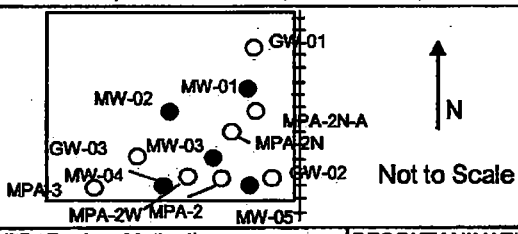
DRILLING/SAMPLING ACTIVITY RECORD

SITE: Muskogee City-County Port Authority, FMRI NW Property	PROJECT CODE: 292054509	SAMPLING PERSONNEL: J Paul Davis, Travis Estes, Hal Cantwell	Date: 12/6/2010
	SAMPLING STATION: MW-01	COORDINATES: 35.780358 N, 95.308187 W	SHEET NO.: 1
	HOLE SIZE: 2 Inch well	DRILLING CONTRACTOR/DRILLER'S NAME: Davis Drilling / Roland Davis	
DRILLING METHOD/EQUIPMENT: Hollow Stem Auger			

CHRONOLOGICAL RECORD

TIME	ACTIVITY
14:00	Start drilling
15:40	Well complete

SKETCH (LOCATION, ORIENTATION, FACILITIES, OTHER NOTES)



GROUND EL.	T/CASING EL.	DEPT H H2O	TIME/ DATE	GROUTING (Mix Design, Method)	DECONTAMINATION (Method)
				Temporary well - Screen 14.5'-24.5', Sand pack 13'-27', bentonite chips 2'-13', concrete 0'-2' with lockable above-grade cover.	High pressure water spray

BORING LOG

DEPTH BELOW SURFACE	GRAPHIC LOG	SOIL CLASSIFICATION	DESCRIPTION / CLASSIFICATION	% CORE RECOV.	SAMPLE LOG	TIME OF SAMPLE RECOVERY	FIELD VAPOR TEST READINGS	WELL CONSTRUCTION
0'		ML	Moist, dark brown 7.5YR3/4 slightly clayey silt TOPSOIL with roots, 0' - 1.5'					
1'							0.0	
2'		MH	Slightly moist to dry, hard, grayish brown 10YR5/2 clayey silt with occasional roots or root traces, 1.5'-13'	100%				
3'								
4'								
5'								
6'								
7'				100%				
8'							0.0	
9'								
10'			Becomes reddish yellow 5YR6/8 mottled with light gray below 10'.					
11'								
12'				100%				
13'		ML	Slightly moist reddish brown, slightly clayey sandy silt 13' - 15'				0.6	
14'					14-14.5	15:30		
15'								
16'		MH	Slightly moist strong brown mottled with reddish brown clayey silt with root traces, 15' - 17'	100%			4.4	
17'		MH	Slightly moist, stiff yellowish red 5YR5/6 clayey silt, 17'-19.5'		17-17.5	15:30		
18'								
19'							2.0	
20'		SM	Moist reddish yellow 7.5YR6/6 silty fine sand, 19.5' - 20'					
		SM	Moist yellowish brown 10YR5/4 fine silty sand 20' - 25'					

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SIGNATURE OF SAMPLE TEAM LEADER

FIGURE NO.

DRILLING/SAMPLING ACTIVITY RECORD	PROJECT CODE	SAMPLING PERSONNEL	Date
	292054509	J Paul Davis, Travis Estes, Hal Cantwell	12/6/2010
SITE: Muskogee City-County Port Authority, FMRI NW Property	SAMPLING STATION: MW-01	COORDINATES: 35.780358 N, 95.308187 W	SHEET NO.: 2

BORING LOG

DEPTH BELOW SURFACE	GRAPHIC LOG	SOIL CLASSIFICATION	DESCRIPTION / CLASSIFICATION	% CORE RECOV.	SAMPLE LOG	TIME OF SAMPLE RECOVERY	FIELD VAPOR TEST READINGS	WELL CONSTRUCTION
21'		SM						
22'			Becomes strong brown 22'-23'	60%				
23'								
24'							1.5	
25'		SH	Dark gray shale, friable, 25.0' - 27.0' TD. Breaks into irregular, sharp 1- to 5-mm thick flakes				0.0	
26'				100%				
27'								
28'								
29'								
30'								
31'								
32'								
33'								
34'								
35'								
36'								
37'								
38'								
39'								
40'								
41'								
42'								
43'								
44'								
45'								
46'								
47'								
48'								
49'								
50'								

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SIGNATURE OF SAMPLE TEAM LEADER

FIGURE NO.

DRILLING/SAMPLING ACTIVITY RECORD

PROJECT CODE	SAMPLING PERSONNEL		Date
292054509	J Paul Davis, Travis Estes, Hal Cantwell		12/6/2010
SAMPLING STATION		COORDINATES	SHEET NO.
MW-02		35.780581 N, 95.310726 W	1

SITE: Muskogee City-County Port Authority, FMRI NW Property

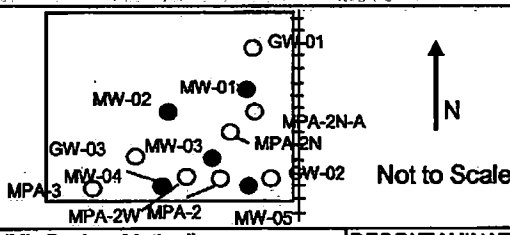
HOLE SIZE	DRILLING CONTRACTOR/DRILLER'S NAME
2 inch well	Davis Drilling / Roland Davis

DRILLING METHOD/EQUIPMENT: Hollow Stem Auger

CHRONOLOGICAL RECORD

TIME	ACTIVITY
11:00	Start drilling
13:30	Well complete

SKETCH (LOCATION, ORIENTATION, FACILITIES, OTHER NOTES)



GROUND EL.	T/CASING EL.	DEPT H H2O	TIME/ DATE

GROUTING (Mix Design, Method): Temporary well - Screen 24.5'-34.5', Sand pack 22.75'-35", bentonite chips 2'-22.75', concrete 0'-2' with lockable above-grade cover.

DECONTAMINATION (Method): High pressure water spray

BORING LOG

DEPTH BELOW SURFACE	GRAPHIC LOG	SOIL CLASSIFICATION	DESCRIPTION / CLASSIFICATION	% CORE RECOV.	SAMPLE LOG	TIME OF SAMPLE RECOVERY	FIELD VAPOR TEST READINGS	WELL CONSTRUCTION
0'		ML	Dry to sl. moist, brown 7.5YR5/4 silt topsoil with root hairs, 0' - 1.5'					
1'							0.0	
2'		CL	Dry to slightly moist, hard, dark brown 10YR4/3 speckled with yellowish red silty clay 1.5'-12'	100%				
3'								
4'								
5'			Root traces visible to 6'					
6'			Becomes mottled with gray and reddish brown (5YR4/6)					
7'				100%			0.0	
8'								
9'			Becomes dark reddish brown 5YR3/4					
10'								
11'								
12'		ML	Dry, pale brown 10&R6/3 sandy silt 12'-13'	100%			0.0	
13'		MH	Dry to sl. Moist grayish brown 10YR5/2 clayey silt, 13'- 14'					
14'		CL	Grades to silty clay, 14' - 16'					
15'								
16'		ML	Grades to slightly clayey silt, 16' - 19.5'	100%				
17'							0.0	
18'								
19'		MH	Dry to sl. Moist, hard gray clayey silt 19.5' -23.5'					
20'			Becomes light brownish gray mottled with yellowish red.					

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SIGNATURE OF SAMPLE TEAM LEADER

FIGURE NO.

DRILLING/SAMPLING ACTIVITY RECORD

PROJECT CODE	SAMPLING PERSONNEL	Date
292054509	J Paul Davis, Travis Estes, Hal Cantwell	12/6/2010

SITE	SAMPLING STATION	COORDINATES	SHEET NO.
Muskogee City-County Port Authority, FMRI NW Property	MW-02	35.780581 N, 95.310726 W	2

BORING LOG

DEPTH BELOW SURFACE	GRAPHIC LOG	SOIL CLASSIFICATION	DESCRIPTION / CLASSIFICATION	% CORE RECOV.	SAMPLE LOG	TIME OF SAMPLE RECOVERY	FIELD VAPOR TEST READINGS	WELL CONSTRUCTION
21'		MH	Dry to sl. Moist, hard light brownish gray 10YR6/2 mottled w/ yellowish red clayey silt 19.5' -23.5' (cont)					
22'				100%				
23'		ML	Gray sandy silt layer					
24'							0.0	
25'		MH	Dry to slightly moist hard brownish gray clayey silt 24.5' - 26.0'					
26'		ML - SW	Moist reddish brown to yellowish red, fine sandy silt to silty sand 26' - 30'	100%				
27'								
28'							0.0	
29'								
30'		SM	Wet, yellowish red 5YR4/6 fine silty sand with occasional lenses (0' to 0.2' thick) of sandy clay 30' - 33'					
31'								
32'								
33'			Wet strong brown 7.5YR5/6 fine to medium sand 33' to 34.95'					
34'					34-34.5	13:20	0.0	
35'			Dark Gray hard shale in tip of split spoon at TD, 35.0'					
36'								
37'								
38'								
39'								
40'								
41'								
42'								
43'								
44'								
45'								
46'								
47'								
48'								
49'								
50'								

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FIGURE NO.

DRILLING/SAMPLING ACTIVITY RECORD

PROJECT CODE	SAMPLING PERSONNEL		Date
292054509	J Paul Davis, Travis Estes, Hal Cantwell		12/6/2010
SAMPLING STATION		COORDINATES	SHEET NO.
MW-03		35.779792 N, 95.308577 W	1

SITE: Muskogee City-County Port Authority, FMRI NW Property

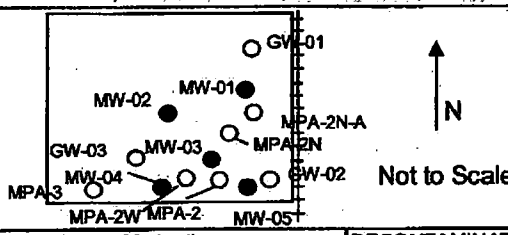
HOLE SIZE	DRILLING CONTRACTOR/DRILLER'S NAME
2 inch well	Davis Drilling / Roland Davis

DRILLING METHOD/EQUIPMENT: Hollow Stem Auger

CHRONOLOGICAL RECORD

TIME	ACTIVITY
16:00	Start drilling
18:00	Well complete

SKETCH (LOCATION, ORIENTATION, FACILITIES, OTHER NOTES)



GROUND EL.	T/CASING EL.	DEPT H H2O	TIME/ DATE

GROUTING (Mix Design, Method): Temporary well - Screen 21.0' - 31.0', Sand pack 18.0' - 31.5', bentonite chips 2'-18.0', concrete 0'-2' with lockable above-grade cover.

DECONTAMINATION (Method): High pressure water spray

BORING LOG

DEPTH BELOW SURFACE	GRAPHIC LOG	SOIL CLASSIFICATION	DESCRIPTION / CLASSIFICATION	% CORE RECOV.	SAMPLE LOG	TIME OF SAMPLE RECOVERY	FIELD VAPOR TEST READINGS	WELL CONSTRUCTION
0'		ML	Moist, reddish brown 5YR5/3 silt, Topsoil with roots. 0' - 1.5'					
1'		ML	Dry to slightly moist light yellowish brown 10YR6/4 silt. 1.5' - 2.5'				0.6	
2'		MH	Dry to slightly moist, stiff, dark yellowish brown, 10YR4/4 speckled with reddish brown clayey silt 2.5' - 5.0'	100%				
3'							0.4	
4'								
5'		MH	Dry to slightly moist, stiff, light brownish gray 10YR6/2 clayey silt with occasional root tracks filled with strong brown clayey silt, 5.0'-15.0'				3.6	
6'				100%			8.1	
7'							5.4	
8'							8.3	
9'								
10'			Becomes slightly moist				3.0	
11'				100%			29.0	
12'								
13'							36.4	
14'					14.5-14.6	17:45		
15'		MH	Slightly moist, stiff, light brownish gray mottled with brown to reddish yellow, clayey silt. 15.0' - 25.0'				41.4	
16'							23.4	
17'				100%			67.5	
18'								
19'			Root traces visible down to 20'				42.3	
20'				100%			240.0	

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SIGNATURE OF SAMPLE TEAM LEADER

FIGURE NO.

DRILLING/SAMPLING ACTIVITY RECORD	PROJECT CODE	SAMPLING PERSONNEL	Date
	292054509	J Paul Davis, Travis Estes, Hal Cantwell	12/6/2010
SITE: Muskogee City-County Port Authority, FMRI NW Property	SAMPLING STATION: MW-03	COORDINATES: 35.779792 N, 95.308577 W	SHEET NO.: 2

BORING LOG

DEPTH BELOW SURFACE	GRAPHIC LOG	SOIL CLASSIFICATION	DESCRIPTION / CLASSIFICATION	% CORE RECOV.	SAMPLE LOG	TIME OF SAMPLE RECOVERY	FIELD VAPOR TEST READINGS	WELL CONSTRUCTION
21'		MH	Slightly moist, stiff, light brownish gray mottled with brown to reddish yellow, clayey silt, continued.					
22'				100%			67.2	
23'								
24'					24.0-24.5	17:45		
							93.0	
25'		MH	Sl. moist stiff light brownish gray clayey silt 25.0' - 28.0'					
							23.1	
26'								
27'				90%				
28'		SW	Lt gray fine silty sand with black laminae on base, 28'-29'					
							245.4	
29'		SW	Wet brown silty fine to medium sand, 30.5–31.4'					
							191.6	
30'				80%				
31'		SH	Dark gray friable shale, 31.4'-31.5' TD					
32'								
33'								
34'			Note: Field PID readings were measured directly in fresh core, still warm from the core barrel, by splitting core and inserting probe tip.					
35'			Tests done in samples kept in ziplock bags and allowed to sit cooled down to near freezing, had readings 60% lower in corresponding interval.					
36'								
37'								
38'								
39'								
40'								
41'								
42'								
43'								
44'								
45'								
46'								
47'								
48'								
49'								
50'								

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SIGNATURE OF SAMPLE TEAM LEADER

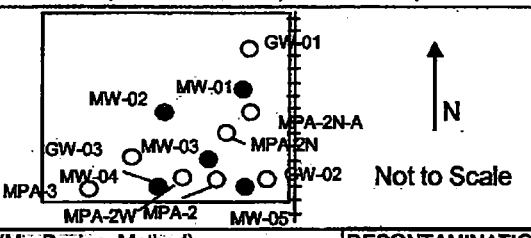
FIGURE NO.

DRILLING/SAMPLING ACTIVITY RECORD

PROJECT CODE	SAMPLING PERSONNEL		Date
292054509	J Paul Davis, Travis Estes, Hal Cantwell		12/7/2010
SAMPLING STATION		COORDINATES	SHEET NO.
MW-04		35.781625 N, 95.310530 W	1
SITE: Muskogee City-County Port Authority, FMRI NW Property	HOLE SIZE	DRILLING CONTRACTOR/DRILLER'S NAME	
DRILLING METHOD/EQUIPMENT	2 inch well	Davis Drilling / Roland Davis	
Hollow Stem Auger	SKETCH (LOCATION, ORIENTATION, FACILITIES, OTHER NOTES)		

CHRONOLOGICAL RECORD

TIME	ACTIVITY
8:30	Start drilling
10:00	Well complete



GROUND EL.	T/CASING EL.	DEPT H H2O	TIME/ DATE	GROUTING (Mix Design, Method)	DECONTAMINATION (Method)
				Temporary well - Screen 27.3' - 37.3', Sand pack 25.0' - 38.0', bentonite chips 2'-25.0', concrete 0'-2' with lockable above-grade cover.	High pressure water spray

BORING LOG

DEPTH BELOW SURFACE	GRAPHIC LOG	SOIL CLASSIFICATION	DESCRIPTION / CLASSIFICATION	% CORE RECOV.	SAMPLE LOG	TIME OF SAMPLE RECOVERY	FIELD VAPOR TEST READINGS	WELL CONSTRUCTION
0'		ML	Moist dark brown 10YR3/4 med. Dense silt. 0.0'-1.5' Topsoil with roots					
1'								
2'		CL	Moist dark brown 10YR3/3 stiff silty clay 1.5' - 3.0'				0.0	
3'		MH	Slightly moist, stiff, dark yellowish brown speckled with reddish yellow clayey silt 3.0' - 10.0'	100%				
4'							0.0	
5'								
6'							0.0	
7'				100%				
8'							0.0	
9'								
10'		CL	Slightly moist, stiff to very stiff, yellowish red 5YR5/6 silty clay speckled with gray, 10.0' - 17.0'					
11'							0.3	
12'								
13'			Becomes mostly gray speckled with grayish brown below 13'	100%			0.0	
14'							0.0	
15'								
16'							0.0	
17'		MH	Slightly moist, stiff light yellowish brown 10YR6/4 clayey silt, from 17.0' to 20.0'					
18'							0.3	
19'				100%				
20'		MH	Slightly moist, stiff, light yellowish brown 2.5Y6/4 clayey silt, from 20.0' to 24.0'				0.9	

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SIGNATURE OF SAMPLE TEAM LEADER

FIGURE NO.

DRILLING/SAMPLING ACTIVITY RECORD	PROJECT CODE	SAMPLING PERSONNEL	Date
	292054509	J Paul Davis, Travis Estes, Hal Cantwell	12/7/2010
SITE: Muskogee City-County Port Authority, FMRI NW Property	SAMPLING STATION: MW-04	COORDINATES: 35.781625 N, 95.310530 W	SHEET NO.: 2

BORING LOG

DEPTH BELOW SURFACE	GRAPHIC LOG	SOIL CLASSIFICATION	DESCRIPTION / CLASSIFICATION	% CORE RECOV.	SAMPLE LOG	TIME OF SAMPLE RECOVERY	FIELD VAPOR TEST READINGS	WELL CONSTRUCTION
21'		MH	Slightly moist, stiff, light yellowish brown 2.5Y6/4 clayey silt, from 20.0' to 24.0', continued				0.1	
22'				100%				
23'								
24'		ML	Slightly moist, dense, light yellowish brown 2.5Y6/4 mottled with yellowish red 5YR4/6, slightly clayey silt, from 24.0' - 29.5'. Becomes yellowish red below 26'				0.1	
25'								
26'				100%				
27'								
28'								
29'		MH	Moist, stiff, brown 7.5YR5/4 clayey silt 29.5' - 31.5'		29.5-29.6	10:15	0.4	
30'								
31'		CL	Thin layer moist soft yellowish red silty clay, 31.5'-31.55'					
32'		SW	Wet, loose, light yellowish brown 2.5YR6/4 fine to medium sand, 31.55' - 35.0'. Poor recovery.	80%				
33'								
34'								
35'		SP	Wet, loose light brownish gray 2.5YR6/2 medium sand from 35.0' - 37.0'.					
36'				80%			0.0	
37'		SW	2 layers silty fine gray sand / yellowish red med. sand					
		SH	Dark gray shale, dry, 37.5'-38.0' TD				0.2	
38'								
39'								
40'								
41'								
42'								
43'								
44'								
45'								
46'								
47'								
48'								
49'								
50'								

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SIGNATURE OF SAMPLE TEAM LEADER

FIGURE NO.

DRILLING/SAMPLING ACTIVITY RECORD

PROJECT CODE	SAMPLING PERSONNEL		Date
292054509	J Paul Davis, Travis Estes, Hal Cantwell		12/7/2010
SAMPLING STATION		COORDINATES	SHEET NO.
MW-05		35.779240 N, 95.307584 W	1

SITE: Muskogee City-County Port Authority, FMRI NW Property

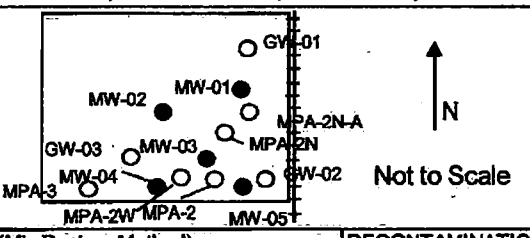
HOLE SIZE	DRILLING CONTRACTOR/DRILLER'S NAME
2 inch well	Davis Drilling / Roland Davis

DRILLING METHOD/EQUIPMENT: Hollow Stem Auger

CHRONOLOGICAL RECORD

TIME	ACTIVITY
10:30	Start drilling
12:50	Well complete

SKETCH (LOCATION, ORIENTATION, FACILITIES, OTHER NOTES)



GROUND EL.	T/CASING EL.	DEPTH H2O	TIME/ DATE

GROUTING (Mix Design, Method): Temporary well - Screen 19.5'-29.5', Sand pack 25.0'-13.5', bentonite chips 2'-13.5', concrete 0'-2' with lockable above-grade cover.

DECONTAMINATION (Method): High pressure water spray

BORING LOG

DEPTH BELOW SURFACE	GRAPHIC LOG	SOIL CLASSIFICATION	DESCRIPTION / CLASSIFICATION	% CORE RECOV.	SAMPLE LOG	TIME OF SAMPLE RECOVERY	FIELD VAPOR TEST READINGS	WELL CONSTRUCTION
0'		ML	Moist brown 7.5YR4/4 sandy clayey silt w/ roots. 0.0' - 0.5'					
		MH	Dry stiff, strong brown 7.5YR5/6 clayey silt with root traces				0.0	
1'			from 0.5' - 3.5'	100%				
2'							0.0	
3'		MH	Dry, stiff, gray 7.5YR5/1 speckled strong brown, clayey silt					
4'			with dark brown root traces. 3.5' - 10.0'				0.0	
5'							0.7	
6'				100%				
7'							0.3	
8'								
9'							0.2	
10'		ML	Dry, stiff, gray 7.5YR5/1 speckled strong brown, slightly				0.1	
11'			clayey silt with dark brown root traces. 10.0' - 13.5'	100%				
12'							0.1	
13'		ML	Slightly moist dense reddish yellow 5YR6/8 slightly clayey					
14'			silt with root traces. 13.5' - 15.0'				0.2	
15'		ML	Slighly moist to moist, dense, reddish brown silt with trace				0.0	
16'			of clay, mottled with light brownish gray. Occasional root traces. 15.0' - 19.0'	100%				
17'					17-17.5	12:00	0.1	
18'								
19'		ML	As above but with abundant root traces. 19.0' - 20.0'				0.0	
20'		ML	Moist, weak, brown 2.5YR5/4 slightly clayey silt. 20.0' - 24.5' Root traces visible 20' to 22'.				0.3	

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FIGURE NO.

DRILLING/SAMPLING ACTIVITY RECORD

PROJECT CODE	SAMPLING PERSONNEL	Date
292054509	J Paul Davis, Travis Estes, Hal Cantwell	12/7/2010

SITE	SAMPLING STATION	COORDINATES	SHEET NO.
Muskogee City-County Port Authority, FMRI NW Property	MW-05	35.779240 N, 95.307584 W	2

BORING LOG

DEPTH BELOW SURFACE	GRAPHIC LOG	SOIL CLASSIFICATION	DESCRIPTION / CLASSIFICATION	% CORE RECOV.	SAMPLE LOG	TIME OF SAMPLE RECOVERY	FIELD VAPOR TEST READINGS	WELL CONSTRUCTION
21'		ML	Moist, weak, brown 2.5YR5/4 slightly clayey silt continued Root traces visible 20' to 22'.					
22'				100%				
23'							0.6	
24'		ML	Moist yellowish brown 10YR5/8 fine sandy silt 24.5-26.0		24.5-24.6	12:00	4.3	
25'								
26'		SW	Wet, strong brown 7.5YR5/8 fine to medium sand 26.0' - 28.5'. Thin layer of yellowish red mediuim sand at base.	90%			0.6	
27'								
28'		SH	Soft dark gray to black shale. 28.5' - 30.0' TD				0.2	
29'								
30'								
31'								
32'								
33'								
34'								
35'								
36'								
37'								
38'								
39'								
40'								
41'								
42'								
43'								
44'								
45'								
46'								
47'								
48'								
49'								
50'								

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SIGNATURE OF SAMPLE TEAM LEADER

FIGURE NO.

Appendix B:

Analytical Reports

Limited Site Investigation and Sub-Slab Vapor Investigation

FMRI Facility
10 Tantalum Place
Muskogee, OK

April 23, 2015
Terracon Project No. 04157022

Prepared for:
Muskogee City-County Port Authority
Muskogee, OK

Prepared by:
Terracon Consultants, Inc.
Tulsa, OK

April 23, 2015

Terracon

Muskogee City-County Port Authority
P.O. Box 2819
Muskogee, OK 74402

Attn: Scott Robinson, Port Director
P: (918) 682-7886
E: scott@muskogeeport.com

Re: Limited Site Investigation and Sub-Slab Vapor Investigation
FMRI Facility
10 Tantalum Place
Muskogee, OK
Terracon Project No. 04157022

Dear Mr. Robinson:

Terracon Consultants, Inc. (Terracon) is pleased to submit our report of the Limited Site Investigation and Sub-Slab Vapor Investigation activities completed at the site referenced above. The report presents data from field activities that included the completion of soil borings, installation of temporary monitoring wells, and the collection of soil, water, and sub-slab vapor samples for chemical analysis. The activities were completed to evaluate impacts to soil and groundwater on the site and to evaluate whether the facility is at risk of intrusion of chlorinated vapors.

Should you have any questions or require additional information, please do not hesitate to contact our office.

Sincerely,
Terracon Consultants, Inc.

for Andrew F. Cowan
Staff Scientist

Tom Knudson
Senior Project Manager

TABLE OF CONTENTS

LIMITED SITE INVESTIGATION AND
SUB-SLAB VAPOR INVESTIGATION
FMRI FACILITY
10 TANTALUM PLACE
MUSKOGEE, OKLAHOMA

Terracon Project No. 04157022
April 23, 2015

1.0 BACKGROUND

The site is located at 10 Tantalum Place, Muskogee, Oklahoma. The property that is the subject of this investigation was formerly owned by Fansteel, Inc. (Fansteel), an exotic metals processing facility. Fansteel is in bankruptcy and FMRI, Inc. (FMRI) was created to decommission the facility. The site is developed with the former Fansteel Sintering Building, Electron Beam Building, Service Building, and electrical substation (hereinafter, the site).

The objective of this project is to assist the Muskogee City-County Port Authority with site characterization of the southern portion of the FMRI facility in order to fulfill the requirements of the Brownfield Voluntary Redevelopment Program (Brownfield Program). The Oklahoma Department of Environmental Quality (ODEQ) previously installed soil borings and temporary monitoring wells on the adjacent FMRI property to the north. The ODEQ site investigation identified groundwater concentrations of chlorinated solvents including trichloroethene (TCE), tetrachloroethene (PCE) and associated degradation by-products in groundwater samples that exceed EPA Primary Drinking Water Standard Maximum Contaminant Levels (MCLs). The ODEQ investigation also identified elevated concentrations of antimony, arsenic, barium, beryllium, chromium, lead, and thallium that exceeded their respective MCLs. However, the groundwater samples were not filtered and there is potential that these concentrations resulted from suspended sediment and are not representative of dissolved metals in the groundwater.

Two electrical transformers are located within the fenced substation compound. The status of the dielectric fluids in the transformers is unknown. Some transformer fluids contain polychlorinated bi-phenyls (PCBs). Due to the age of the transformers, there is potential that a release of PCB-impacted fluids has occurred.

A Topographic Location Map depicting the site location is included as Exhibit A-1 and a Site Diagram illustrating the locations of the soil borings, hand auger samples, soil vapor samples, and monitor wells in relation to the surrounding buildings and properties is included as Exhibit A-2 in Appendix A.

2.0 SCOPE OF SERVICES

The objectives of the site investigation were to:

- Further define the local groundwater flow direction and hydraulic gradient from installation of groundwater monitor wells;
- Collect soil and groundwater samples that will better define the horizontal extent and concentration levels of identified chemicals of concern (COCs) including: PCE, TCE, 1,1-dichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene and other volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), antimony, arsenic, barium, beryllium, chromium, lead, and thallium;
- Collect soil samples to evaluate if there has been a release of PCBs to site soils in the vicinity of the electrical substation transformers; and,
- Collect sub-slab soil vapor samples from vapor pin sampling ports located inside the Sintering Building, Electron Bean Building, and Service Building to evaluate the potential for encroachment of VOC vapors into these buildings.

Site investigation activities were conducted in conformance with the ODEQ-approved Sampling and Analysis Plan (SAP) and Quality Assurance Protection Plan (QUAPP) dated March 18, 2015.

3.0 FIELD INVESTIGATION

3.1 Soil Borings and Monitor Wells

A total of nine soil borings were advanced at the site on March 19, 20, and 24, 2015. The soil borings were advanced using a Geoprobe® direct-push drilling rig equipped with hollow stem augers (HSAs). Drilling services were conducted under the supervision of a licensed monitoring well driller.

Soil boring SMW-2 was advanced at a location approximately 110 feet south-southwest of ODEQ boring GW-02 in which high concentrations of TCE were detected in the groundwater. Soil boring SMW-3 was advanced at a location approximately 20 feet north of the Sintering Building. These two boring locations were selected to better define the horizontal extent and concentration levels of identified VOCs, SVOCs, antimony, arsenic, barium, beryllium, chromium, lead, and thallium in site groundwater. Soil borings SMW-2 and SMW-3 were advanced to refusal of the Geoprobe® on bedrock at depths of approximately 32 and 34 feet below grade surface (bgs), respectively.

Seven soil borings were advanced in the vicinity of the Sintering Building, Electron Beam Building, and Service Building. The locations of the shallow soil borings were as follows:

- Boring SS-1 is located on the north side of the Sintering Building;
- Boring SS-2 is located between the Sintering Building and the Electron Beam Building;
- Boring SS-3 is located on the east side of the Sintering Building;
- Boring SS-4 is located on the west side of the Electron Beam Building;
- Boring SS-5 is located on the east side of the Electron Beam Building;
- Boring SS-6 is located near the southwest corner of the Service Building; and,
- Boring SS-7 is located approximately 55 feet southeast of the Electron Beam Building.

Soil borings SS-1 through SS-7 were advanced to depths of approximately 10 feet bgs.

Soil samples were collected continuously using disposable thin-walled tube (acetate) samplers to document lithology, color, and relative moisture content. In addition, the soil samples were field screened using sensory methods and a photoionization detector (PID) to detect the presence of VOCs. Non-dedicated sampling equipment was cleaned using an Alconox® detergent wash and potable water rinse prior to commencement of the project and between collection of each sample.

After collection of soil samples, soil borings SMW-2 and SMW23 were over-drilled using the Geoprobe HSA and completed as temporary groundwater monitoring wells as follows:

- Installation of 20 feet of 1-inch diameter, 0.010-inch machine slotted polyvinyl chloride (PVC) well screen with a threaded bottom cap;
- Installation of 1-inch diameter, threaded, flush-joint PVC riser pipe to a point approximately 2 to 3.5 feet above grade surface;
- Addition of pre-sieved 10/20 grade silica sand for annular sand pack around the well screen from the bottom of the boring to a point approximately 4 feet (SMW-2) and 9 feet (SMW-3) above the top of the well screen; and,
- Placement of hydrated bentonite pellets from the top of the annular sand pack to grade surface.

Monitoring well construction details are presented on the soil boring/well logs in Appendix C.

3.2 Soil, Groundwater, and Soil Vapor Sampling

Soil Sample Collection for VOC, SVOC and Metals Analyses

Two soil samples were collected for analysis from each of the soil borings. (Note: Soil samples were also collected from borings SMW-2 and SMW-3, although soil sampling of these borings was not included in the SAP.) One near-surface soil sample was collected from each of the nine borings from the approximate 0.5 ft to 1.0 ft bgs interval. The shallow soil samples were analyzed only for metal COCs. A second soil sample was collected from each boring based on

field-screening observations. Selection of the deeper soil samples collected from SMW-2, SMW-3, and SS-1 was based on intervals with high PID readings. In the absence of elevated PID readings in borings SS-2 through SS-7, the deeper soil samples were collected from the clay interval above the weathered shale bedrock. The deeper soil samples were analyzed for VOCs and SVOCS.

Groundwater Sample Collection for VOC, SVOC and Metals Analyses

Groundwater samples were collected from temporary monitoring wells SMW-2 and SMW-3, and permanent monitoring wells W51S, W53S, and W54S. Prior to groundwater sample collection, each well was purged with low-flow sampling and dedicated tubing equipment until consistent values (i.e., less than 10% variance between consecutive readings) were obtained for pH, temperature and conductivity. Subsequent to sufficient recharge, one groundwater sample was collected from each monitoring well on March 26, 2015 utilizing low-flow sampling equipment and disposable tubing. The groundwater samples were analyzed for VOCs, SVOCs, and metals. The groundwater samples collected for metals analysis were filtered in the field prior to submittal to the lab.

Electrical Substation Assessment for PCBs

Four soil samples (Sub1-1, Sub2-1, Sub3-1, and Sub4-1) were collected within the electrical substation compound in the vicinity of the two electrical transformers. Approximately 12 inches of coarse gravel were removed at each sample location. One soil sample was collected from the upper six inches of the soil beneath the gravel layer using a hand auger. The soil samples were analyzed for PCBs.

The soil and groundwater samples retained for analysis were placed in laboratory prepared glassware, placed on ice in a cooler sealed with custody tape, and were relinquished to Test America Laboratories, Inc. of Nashville, Tennessee with a completed chain-of-custody form.

Sub-Slab Vapor Sampling

Six sub-slab vapor samples were collected from vapor pin sampling ports located inside the Sintering Building, Electron Bean Building, and Service Building on March 19, 2015. Two vapor pin sampling ports were installed in each of the three buildings. For each sampling port, a ¾-inch hole was drilled through the interior concrete foundation/slab using a hammer drill. A brass vapor pin, manufactured by Cox-Colvin, was inserted into the drill hole. Polyethylene tubing was attached to the vapor pin fitting. The tubing was connected to a one-liter Summa canister and the system was leak tested. Following successful leak testing soil vapor samples were collected from each of the six vapor pin ports using evacuated Summa canisters obtained from the analytical laboratory. The samples were collected in conformance with Terracon's Soil Gas Investigation Guidance Document, Version 1.0, dated August 7, 2013. One background sample of ambient air was collected from the Sintering Building for Quality Assurance/Quality Control

(QA/QC) purposes. The Summa canisters containing the soil vapor samples were packaged and shipped using chain-of-custody (COC) procedures to ESC Lab Sciences of Mt. Juliet, Tennessee for analysis of VOCs per EPA Method Modified TO-15.

Subsequent to collection of the sub-slab vapor samples, the vapor pins were removed from the drill holes, and the holes were filled with Portland cement grout.

3.3 Quality Control (QC) Sampling

During the course of the field investigations, QC samples were collected to ensure that cross-contamination of samples did not occur from improperly cleaned equipment or to ensure reproducible data. Two trip blank samples were shipped, one with the soil samples and one with the groundwater samples. The trip blanks were transported to the site with the sample containers, handled like a sample, and returned to the laboratory for analysis of VOCs using SW-846 Method 8260B. The trip blanks were not opened in the field. The purpose of the trip blanks was to determine if contaminants are introduced into samples, primarily through airborne routes, during sample handling or transport.

One equipment rinsate blank (R-031915) was collected on March 19, 2015. The equipment rinsate blank was prepared by pouring distilled water through the Geoprobe® continuous sampler and cutting shoe. The rinsate blank was analyzed for the same constituents as the collected soil samples. The purpose of the rinsate blank was to ensure that cross-contamination of samples does not occur through improperly cleaned equipment. Equipment rinsate samples were not collected during groundwater sampling because new, dedicated tubing was used to purge and collect groundwater samples using low-flow sampling equipment.

One soil sample duplicate (S-032015) was collected on March 20, 2015. The duplicate soil sample was collected from the same interval as the environmental sample. The environmental and duplicate soil samples were analyzed for the same parameters. The field duplicate was collected to ensure that the analytical laboratory can provide reproducible analytical results. Based on discussions with the field sampling personnel, the soil environmental and duplicate sample for VOC analysis was collected using Method 5035 and the environmental and duplicate samples were collected from the same interval. However to obtain sufficient sample volume (4-oz glass container) for the SVOC analysis, the environmental and duplicate samples were collected within the same 6-inch interval but the two samples were not split vertically. The inhomogeneity of the soil core across the 6-inch interval may account for the discrepancy in the analytical results of sample SS-6-8 and duplicate sample S-032015 as discussed in Sections 5.4 and 5.8.

One groundwater sample duplicate (GW-032615) was collected on March 26, 2015. The field duplicate was collected to ensure that the analytical laboratory can provide reproducible

analytical results. The groundwater duplicate sample was collected by pumping water from the low-flow sampler into two identical sample containers. The environmental and duplicate groundwater samples were analyzed for the same parameters.

3.4 Laboratory Analytical Methods

The nine shallow soil samples collected from borings SMW-2, SMW-3, and borings SS-1 through SS-7 were analyzed for arsenic, barium, beryllium, chromium, thallium, and antimony using EPA SW-846 Method 6010A. The nine deeper samples collected from the these same borings were analyzed for VOCs using EPA SW-846 Method 8260B, and SVOCs using EPA SW-846 Method 8270D.

The five groundwater samples collected from the monitoring wells were analyzed for VOCs using EPA SW-846 Method 8260B, SVOCs using EPA SW-846 Method 8270D, and arsenic, barium, beryllium, chromium, thallium, and antimony using EPA SW-846 Method 6010A.

The four soil samples collected in the electrical substation compound were analyzed for PCBs using EPA SW-846 Method 8082.

3.5 Monitor Well Gauging and Surveying

The depth to the top of groundwater below the top of the well casing was gauged in monitoring wells SMW-2, SMW-3, W51S, W53S, and W54S using an interface probe on March 26, 2015. The gauging and survey data are summarized in Table 1 in Appendix B. The elevations used in Table 1 are based on a 2009 survey from Heartland Surveying and surveying done by Terracon on March 26, 2015 using well W54S as a benchmark. The data from Table 1 were used to construct a Groundwater Potentiometric Surface Map illustrating the direction of groundwater flow (Exhibit A-3, Appendix A). The map illustrates the interpreted direction of groundwater flow based on the gauging and survey data collected March 26, 2015. The direction of groundwater flow appears to be generally eastward toward the Arkansas River which is located approximately 1,000 feet east of the site.

The interpreted eastward groundwater flow direction appears to generally correspond to a groundwater flow map prepared in 2006 based on gauging data measured September 7, 2006 (MCCPA Phase II). The September 7, 2006 gauging data indicated groundwater elevations of W54S and W53S were within 0.18 feet and the groundwater elevation of W51S was approximately 2.5 feet higher. The March 26, 2015 gauging data indicated an anomalously high groundwater elevation at monitor well W54S and the groundwater elevation data for this well was not used to construct the Groundwater Potentiometric Surface Map.

4.0 RESULTS OF THE FIELD INVESTIGATION

4.1 Geology/Hydrogeology

The boring logs in Appendix C detail the observed soil stratigraphy. Clay, sandy clay, clayey sand, and sand were observed in borings SMW-2 and SMW-3 from grade surface to the top of the shale bedrock at depths of approximately 34.5 ft and 31 feet bgs, respectively. During advancement of the borings, groundwater was observed at depths of approximately 30 ft and 28 ft bgs, respectively.

4.2 Field Screening

The field screening results are summarized on the boring logs in Appendix C. PID readings ranged from background levels (<1 part per million [ppm]) in the upper four to nine feet of borings SMW-2 and SMW-3. PID readings ranging from 1 ppm to 72 ppm were recorded in SMW-2 with the maximum reading of 72 ppm in the 31-32 ft bgs interval. PID readings ranging from 1 ppm to 517 ppm were recorded in SMW-3 with the maximum reading of 517 ppm in the 29-30 ft bgs interval. PID readings ranging from <1 ppm to 12 ppm were recorded in SS-1 with the maximum reading of 12 ppm in the 6-7 ft bgs interval. No elevated PID readings were observed in the soil samples collected from borings SS-2 through SS-7.

5.0 ANALYTICAL RESULTS

The laboratory analytical report and chain-of-custody record are attached in Appendix D. The following sections describe the results of the testing.

5.1 QC Samples

Eighteen soil samples, five groundwater samples, and six soil vapor samples were collected between March 19, 2015 and March 26, 2015. Six QC samples were also collected: one groundwater duplicate, one soil duplicate, one equipment rinsate blank, two trip blanks, and one air background sample. The soil and water samples were submitted to Test America located in Nashville, Tennessee. The air sample was sent to ESC Lab Sciences of Mt. Juliet, Tennessee.

Test America completed validation and verification, with comparison of laboratory process and data to project requirements of the Quality Assurance Protection Plan (QAPP). Test America delivered Level II data packages with the laboratory report. ESC Lab Sciences delivered a Level I data package with the laboratory report.

Results of the QC samples and comparison with their associated sample results are summarized in Tables 5 through Table 8 (Appendix B).

5.2 Sample Collection, Preservation, and Holding Times

Observation: All samples were received and analyzed with correct preservation, within method holding times, and with proper COC forms with the following exception: the VOC containers for the soil samples SMW2-31 and SMW3-30 were not preserved because the preserved vials were broken during shipment from TestAmerica to Terracon.

Evaluation: No significant effect on data quality, the VOC results for these to samples may be considered bias low.

5.3 Blanks

Observation: All constituents tested in field and laboratory blanks were detected below the laboratory reporting limit for that constituent.

Evaluation: No effect on data quality.

5.4 Duplicates

Observation: The Relative Percent Difference (RPD) of the concentrations reported for the groundwater duplicate samples were within acceptable limits (below 30). The RPD of the concentrations for the soil duplicate samples were within acceptable limits (below 50) with the following exceptions:

- The RPD for the concentrations of Trichloroethene (TCE) in the soil duplicate pair was 70.
- Fourteen polycyclic aromatic hydrocarbons (PAHs) were detected in Duplicate sample S-032015 (Duplicate of SS-6-8), seven of which exceed the MCL-Based SSL or the Risk-Based SSL for protection of groundwater. The RPDs for these fourteen PAHs range between 69 and 197.

Evaluation: The RPD of 70 for TCE was determined to have no significant effect on data quality. High RPDs for soil samples are common and the higher TCE result was reported in the soil sample summary table.

The detection of PAHs with concentrations that exceed regulatory screening levels was determined to have a significant effect on data quality. The initial analysis of the soil sample duplicate S-032015 indicated concentrations of ten PAHs that were not detected in the environmental sample. Due to the PAH concentrations detected in the duplicate soil sample, the

duplicate sample was re-analyzed by Test America even though it was outside of hold time. The analytical results identified four additional PAHs and the detected concentrations of all of the detected PAHs were higher than reported in the initial analysis. The lab has reviewed and is confident of the data. The lab explained the difference in the analytical results between the environmental sample and the two soil duplicate samples as a result of inhomogeneity of the sample.

The laboratory report includes the results of the initial analysis of duplicate sample S-032015 and the re-extraction and second analysis of the sample. Since S-032015 is a duplicate of SS-6-8, the PAHs detected in duplicate sample S-032015 are listed in Table 2A as the concentrations detected in SS-6-8.

5.5 Laboratory Control Spikes(s) / Laboratory Control Spike Duplicate(s) (LCS/LCSD)

Observation: All percent recoveries and RPDs were within control limits.

Evaluation: No effect on data quality.

5.6 Matrix Spike(s) / Matrix Spike Duplicate(s) (MS/MSD)

Observation: All RPDs were within control limits. All recoveries were within or exceeded control limits. The control limit exceedances were due to a relatively high concentration of target analytes in the native sample.

Evaluation: No effect on data quality.

5.7 Surrogate Recoveries

Observation: All surrogate recoveries were within acceptance criteria.

Evaluation: No effect on data quality.

5.8 Soil Sample Results

Concentrations of VOCs, SVOCs, and metals detected in the soil samples were compared to EPA Region 6 Regional Screening Levels (RSLs) for residential and commercial/industrial sites and to Soil Screening Levels (SSLs) for protection of groundwater (January 2015, Target Hazard Quotient [THQ] = 1.0, Dilution Attenuation Factor [DAF] = 1). If listed, the SSL based on the EPA Primary Drinking Water Standard Maximum Contaminant Levels (MCLs) was used. If

the MCL-based SSL was not listed, the Risk-based SSL was used for comparison. A summary of soil analytical results is included as Table 2 in Appendix B.

Concentrations of the following constituents exceeded regulatory screening levels:

- SMW2-31 reported 1,1-Dichloroethene at 0.0259 milligrams per kilogram (mg/kg) which exceeds the MCL-Based SSL of 0.00025 mg/kg.
- SMW2-31 reported TCE at 2.04 mg/kg which exceeds the MCL-Based SSL of 0.0018 mg/kg.
- SMW3-30 reported 1,1,1-Trichloroethane at 0.0713 mg/kg which exceeds the MCL-Based SSL of 0.007 mg/kg.
- SMW3-30 reported 1,1-Dichloroethane at 0.00395 mg/kg which exceeds the Risk-Based SSL of 0.00078 mg/kg.
- SMW3-30 reported 1,1-Dichloroethene at 0.262 mg/kg which exceeds the MCL-Based SSL of 0.0025 mg/kg.
- SMW3-30 reported cis-1,1-Dichloroethene at 0.0671 mg/kg which exceeds the MCL-Based SSL of 0.021 mg/kg.
- SMW3-30 reported PCE at 0.0258 mg/kg which exceeds the MCL-Based SSL of 0.0023 mg/kg.
- SMW3-30 reported TCE at 2.46 mg/kg which exceeds the MCL-Based SSL of 0.0018 mg/kg.
- SS-1-6 reported PCE at 0.00644 mg/kg which exceeds the MCL-Based SSL of 0.0023 mg/kg.
- SS-1-6 reported TCE at 4.44 mg/kg which exceeds the MCL-Based SSL of 0.0018 mg/kg.
- SS-6-8 reported TCE at 0.00999 mg/kg which exceeds the MCL-Based SSL of 0.0018 mg/kg.
- Duplicate sample S-032015 (Duplicate of SS-6-8) reported Benzo(a)anthracene at 0.3.44 mg/kg which exceeds the Risk-Based SSL of 0.012 mg/kg.
- Duplicate sample S-032015 (Duplicate of SS-6-8) reported Benzo(a)pyrene at 2.99 mg/kg which exceeds the MCL-Based SSL of 0.24 mg/kg.
- Duplicate sample S-032015 (Duplicate of SS-6-8) reported Benzo(b)fluoranthene at 4.60 mg/kg which exceeds the Risk-Based SSL of 0.041 mg/kg.
- Duplicate sample S-032015 (Duplicate of SS-6-8) reported Benzo(k)fluoranthene at 1.80 mg/kg which exceeds the Risk-Based SSL of 0.4 mg/kg.
- Duplicate sample S-032015 (Duplicate of SS-6-8) reported Chrysene at 4.10 mg/kg which exceeds the Risk-Based SSL of 1.2 mg/kg.
- Duplicate sample S-032015 (Duplicate of SS-6-8) reported Dibenz(a,h)anthracene at 0.59 mg/kg which exceeds the Risk-Based SSL of 0.013 mg/kg.
- Duplicate sample S-032015 (Duplicate of SS-6-8) reported Indeno(1,2,3-cd)pyrene at 1.93 mg/kg which exceeds the Risk-Based SSL of 0.24 mg/kg.

- The detected concentrations of arsenic ranging from 3.28 mg/kg to 6.45 mg/kg in eight of the near-surface soil samples exceed the RSL of 3.0 mg/kg.

Fourteen PAHs were detected in Duplicate sample S-032015 (Duplicate of SS-6-8), seven of which exceed the MCL-Based SSL or the Risk-Based SSL for protection of groundwater. The laboratory re-extracted the sample and analyzed it for VOCs, SVOCs, and metals a second time. The analysis of the re-extracted sample resulted in the detections listed above. No PAHs were detected in sample SS-6-8. The laboratory report includes the results of the initial analysis of duplicate sample S-032015 and the re-extraction and second analysis of the sample. Since S-032015 is a duplicate of SS-6-8, the PAHs detected in duplicate sample S-032015 are listed in Table 2A as the concentrations detected in SS-6-8.

Concentrations of other VOCs detected in the samples did not exceed regulatory screening levels or did not exceed laboratory reporting limits. Concentrations of SVOCs did not exceed laboratory reporting limits.

Although the detected concentration of PCB-1242 in Sub3-1 of 0.0604 mg/kg exceeds the Risk-Based SSL of 0.0061 mg/kg, the detected concentration does not exceed the RSL of 1.0 mg/kg. Since this sample was collected at a depth of approximately 1 ft bgs and the top of the groundwater occurs at a depth of approximately 18 to 28 ft bgs, the Risk-Based SSL for protection of groundwater may not be the most appropriate regulatory screening level to apply to this sample result. Concentrations of other PCBs in Sub3-1 and of PCBs in Sub-1-1, Sub2-2 and Sub4-1 did not exceed laboratory reporting limits. Although the laboratory reporting limits exceed the MCL-based SSLs, SSLs for groundwater protection may not be applicable due to the depth at which groundwater occurs.

Concentrations of arsenic, barium and/or chromium were detected in the shallow soil samples collected from each of the nine borings. The detected concentrations of arsenic range between 3.28 mg/kg to 6.45 mg/kg. The U.S. Geological Survey website (http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm) reports average background concentrations of arsenic in Muskogee County as 6 mg/kg. In addition, the EPA RSLs use a cancer risk factor of 1E+06 whereas ODEQ policy uses a cancer risk factor of 1E+05, thereby increasing the ODEQ screening level for arsenic to 30 mg/kg. The detected concentrations of barium do not exceed the RSL. The EPA does not list an RSL for total chromium, although the RSL for Chromium III is 1,800,000 mg/kg and the RSL for Chromium VI is 6.3 mg/kg. The detected concentrations of arsenic do not exceed the MCL-Based SSL for Total Chromium of 180,000 mg/kg.

5.9 Groundwater Sample Results

Concentrations of VOCs and Metals detected in the groundwater samples were compared to the EPA MCLs. A summary of groundwater analytical results is included as Table 3 in Appendix B. Concentrations of the following constituents exceeded MCLs:

- SMW2 reported 1,1,1-Trichloroethane at 284 µg/L which exceeds the MCL of 200 µg/L
- SMW2 reported 1,1-Dichloroethene at 802 µg/L which exceeds the MCL of 7 µg/L
- SMW2 reported cis 1,2-Dichloroethene at 82.2 ug/L which exceeds the MCL of 70 µg/L
- SMW2 reported PCE at 53.2 µg/L which exceeds the MCL of 5 µg/L
- SMW2 reported TCE at 34,700 µg/L which exceeds the MCL of 5 µg/L
- SMW2 reported Thallium at 0.0131 mg/L which exceeds the MCL of 0.002 mg/L
- SMW3 reported 1,1,1-Trichloroethane at 867 µg/L which exceeds the MCL of 200 µg/L
- SMW3 reported 1,1-Dichloroethene at 824 µg/L which exceeds the MCL of 7 µg/L
- SMW3 reported cis 1,2-Dichloroethene at 486 µg/L which exceeds the MCL of 70 µg/L
- SMW3 reported PCE at 246 µg/L which exceeds the MCL of 5 µg/L
- SMW3 reported TCE at 63,200 µg/L which exceeds the MCL of 5 µg/L
- SMW3 reported Vinyl chloride at 3.26 µg/L which exceeds the MCL of 2 µg/L
- W53S reported TCE at 313 µg/L which exceeds the MCL of 5 µg/L

Concentrations of other VOCs and metals detected in the samples did not exceed regulatory screening levels or did not exceed laboratory reporting limits. Concentrations of SVOCs did not exceed laboratory reporting limits.

The TCE in Groundwater Isoconcentration Map (Exhibit A-4 in Appendix A) illustrates the interpreted extent of TCE that exceeds the MCL. It should be noted that the extent of the groundwater TCE plume has been estimated using data from previous investigations of the property north of the site. Based on the TCE concentration data, the direction of migration of the groundwater TCE plume appears to be northeastward.

5.10 Sub-Slab Vapor Sample Results

Concentrations of VOCs detected in the sub-slab vapor samples were compared to the three screening levels listed below:

- EPA Region 6 RSLs (January 2015, Target Hazard Quotient [THQ] = 1.0) for commercial/industrial sites. The EPA Region 6 RSL table provides a conservative value based on a cancer risk of 1E+06.
- Office of Solid Waste and Emergency Response (OSWER) Vapor Intrusion Screening Level (VISL) Calculator Version 3.3.1, May 2014 RSLs. The VISL Calculator values

incorporate an attenuation factor of approximately 0.1 and are less conservative than the RSL values.

- ODEQ Preliminary Screening Level (ODEQ-RSLs) based on an attenuation factor of 0.03 (EPA RSLs divided by 0.03). Based on discussions with Ray Roberts with the ODEQ on April 17, 2015, the attenuation factor can generally be applied to sites at which sub-slab vapor samples are collected beneath the concrete foundation of the building, or soil vapor samples collected from shallow vapor sampling points adjacent to buildings. The attenuation factor may vary based on soil conditions or other site-specific factors.

A summary of sub-slab vapor analytical results is included as Table 4 in Appendix B. Sub-slab vapor samples V-1 and V-2 were collected from the west and east interior portions of the interior of the Sintering Building. Sub-slab vapor samples V-3 and V-4 were collected from the east and west portions of the interior of the Service Building. Sub-slab vapor samples V-5 and V-6 were collected from the south and north portions of the interior of the Electron Beam Building. The reported concentrations of the following samples/analytes exceeded the ODEQ-RSLs, which are the highest values of the three screening levels:

- V-1 reported Chloroform at 370 micrograms per cubic meter ($\mu g/m^3$) which exceeds the ODEQ-RSL of 18 $\mu g/m^3$
- V-1 reported Ethylbenzene at 480 $\mu g/m^3$ which exceeds the ODEQ-RSL of 163 $\mu g/m^3$
- V-1 reported Tetrachloroethylene at 1,6000 $\mu g/m^3$ which exceeds the ODEQ-RSL of 1,567 $\mu g/m^3$
- V-1 reported Trichloroethene at 70,000 $\mu g/m^3$ which exceeds the ODEQ-RSL of 100 $\mu g/m^3$
- V-2 reported Chloroform at 63 $\mu g/m^3$ exceeds the ODEQ-RSL of 18 $\mu g/m^3$
- V-2 reported Ethylbenzene at 390 $\mu g/m^3$ which exceeds the ODEQ-RSL of 163 $\mu g/m^3$
- V-2 reported Trichloroethene at 59,000 $\mu g/m^3$ which exceeds the ODEQ-RSL of 100 $\mu g/m^3$
- V-3 reported Ethylbenzene at 330 $\mu g/m^3$ which exceeds the ODEQ-RSL of 163 $\mu g/m^3$
- V-3 reported Trichloroethene at 19,000 $\mu g/m^3$ which exceeds the ODEQ-RSL of 100 $\mu g/m^3$
- V-4 reported Ethylbenzene at 220 $\mu g/m^3$ which exceeds the ODEQ-RSL of 163 $\mu g/m^3$
- V-4 reported Trichloroethene at 3,900 $\mu g/m^3$ which exceeds the ODEQ-RSL of 100 $\mu g/m^3$
- V-5 reported Trichloroethene at 1,400 $\mu g/m^3$ which exceeds the ODEQ-RSL of 100 $\mu g/m^3$
- V-6 reported Ethylbenzene at 240 $\mu g/m^3$ which exceeds the ODEQ-RSL of 163 $\mu g/m^3$
- V-6 reported Trichloroethene at 1,700 $\mu g/m^3$ which exceeds the ODEQ-RSL of 100 $\mu g/m^3$

Concentrations of other VOCs detected in the vapor samples did not exceed regulatory screening levels or did not exceed laboratory reporting limits.

6.0 CONCLUSION

Based on the results of the current site investigation and review of data from investigations conducted on the north adjoining property, Terracon concludes the following:

- Site soils in the vicinity of SMW-2, SMW-3, SS-1, and SS-6 have been impacted by concentrations of PCE, TCE, cis-1,2-Dichloroethene, 1,1-Dichloroethene, 1,1-Dichloroethane, and/or 1,1,1-Trichloroethane that exceed MCL-Based SSLs or Risk-Based SSLs for protection of groundwater. Concentrations of seven PAHs detected in Duplicate sample S-032015 (Duplicate of SS-6-8) exceed the MCL-Based SSL or the Risk-Based SSL for protection of groundwater.
- Site groundwater in the vicinity of SMW-2 and SMW-3 has been impacted by concentrations of TCE, PCE, cis-1,2-Dichloroethene, 1,1-Dichloroethene, and 1,1,1-Trichloroethane that exceed MCLs. Site groundwater in the vicinity of SMW-3 has been impacted by a concentration of Vinyl Chloride that exceeds the MCL. Site groundwater in the vicinity of W53S has been impacted by a concentration of TCE that exceeds the MCL. Site groundwater in the vicinity of SMW-2 has been impacted by a concentration of Thallium that exceeds the MCL.
- Concentrations of sub-slab vapors beneath the Sintering Building in the vicinity of V-1 and V-2 exceed ODEQ-RSLs for Chloroform, Ethylbenzene, PCE, and/or TCE. Concentrations of sub-slab vapors beneath the Service Building in the vicinity of V-3 and V-4 exceed ODEQ-RSLs for Ethylbenzene and TCE. Concentrations of sub-slab vapors beneath the Electron Beam Building in the vicinity of V-5 and V-6 exceed ODEQ-RSLs for Ethylbenzene and TCE.
- No evidence of PCB contamination was found in the soil samples collected in the vicinity of the electrical transformers located within the electrical substation compound.
- Based on the March 26, 2015 gauging data, the interpreted direction of groundwater flow is generally eastward.
- The core of the TCE groundwater plume is interpreted to extend from SMW-3 in a northeasterly direction toward SMW-2, continuing northeastward onto the north portion of the FMRI property toward GW-02, MW-03, MPA-2N, and MPN-2N-A.
- Based on the interpreted direction of migration of the TCE groundwater plume with the highest TCE concentration in SMW-3 and TCE concentrations apparently decreasing in monitor wells located to the northeast, and the high concentrations of TCE detected in the sub-slab vapor samples collected beneath the Sintering Building, the source of the TCE appears to be located near the

Sintering Building. However, multiple TCE sources may be present based on the TCE detected in W53S located on the south side of the Service Building.

- Further assessment would be required to define the source and extent of TCE, PCE and associated chlorinated VOCs as well as other VOC constituents and Thallium identified in site groundwater.

APPENDIX A – EXHIBITS

Exhibit A-1 - Topographic Location Map

Exhibit A-2 - Site Diagram

Exhibit A-3 - Groundwater Potentiometric Surface Map

Exhibit A-4 - Trichloroethene (TCE) in Groundwater Isoconcentration Map

APPENDIX B –TABLES

Table 1 - Summary of Groundwater Gauging and Elevation Data

Table 2 - Summary of Soil Analytical Results

Table 2A – Summary of Soil Analytical Results (SVOC data)

Table 3 - Summary of Groundwater Analytical Results

Table 4 – Summary of Sub-Slab Vapor Analytical Results

Table 5 - Soil Duplicate Sample Analytical Results

Table 6 - Groundwater Duplicate Sample Analytical Results

Table 7 - Summary of Soil QA/QC Sample Analytical Results

Table 8 - Summary of water QA/QC Sample Analytical Results

APPENDIX C – SOIL BORING LOGS

APPENDIX D – ANALYTICAL REPORT AND CHAIN OF CUSTODY

APPENDIX A – EXHIBITS

Exhibit A-1 - Topographic Location Map

Exhibit A-2 - Site Diagram

Exhibit A-3 - Groundwater Potentiometric Surface Map

Exhibit A-4 - Trichloroethene (TCE) in Groundwater Isoconcentration Map

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0.5 0 1 KILOMETER

CONTOUR INTERVAL 10 FEET

USGS 7.5 MINUTE SERIES TOPOGRAPHIC MAP

STATE OF OKLAHOMA QUADRANGLES

NORTHEAST MUSKOGEE, 1975

N

Mngr:	TDK
Drawn By:	JM
Checked By:	TDK
Approved By:	TDK
Project No.	04157022
Scale:	SEE BAR SCALE
File No.	04157022
Date:	APRIL 2015

Terracon
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9522 E. 47TH PLACE, UNIT D TULSA, OKLAHOMA 74145
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TOPOGRAPHIC MAP

LIMITED SITE INVESTIGATION

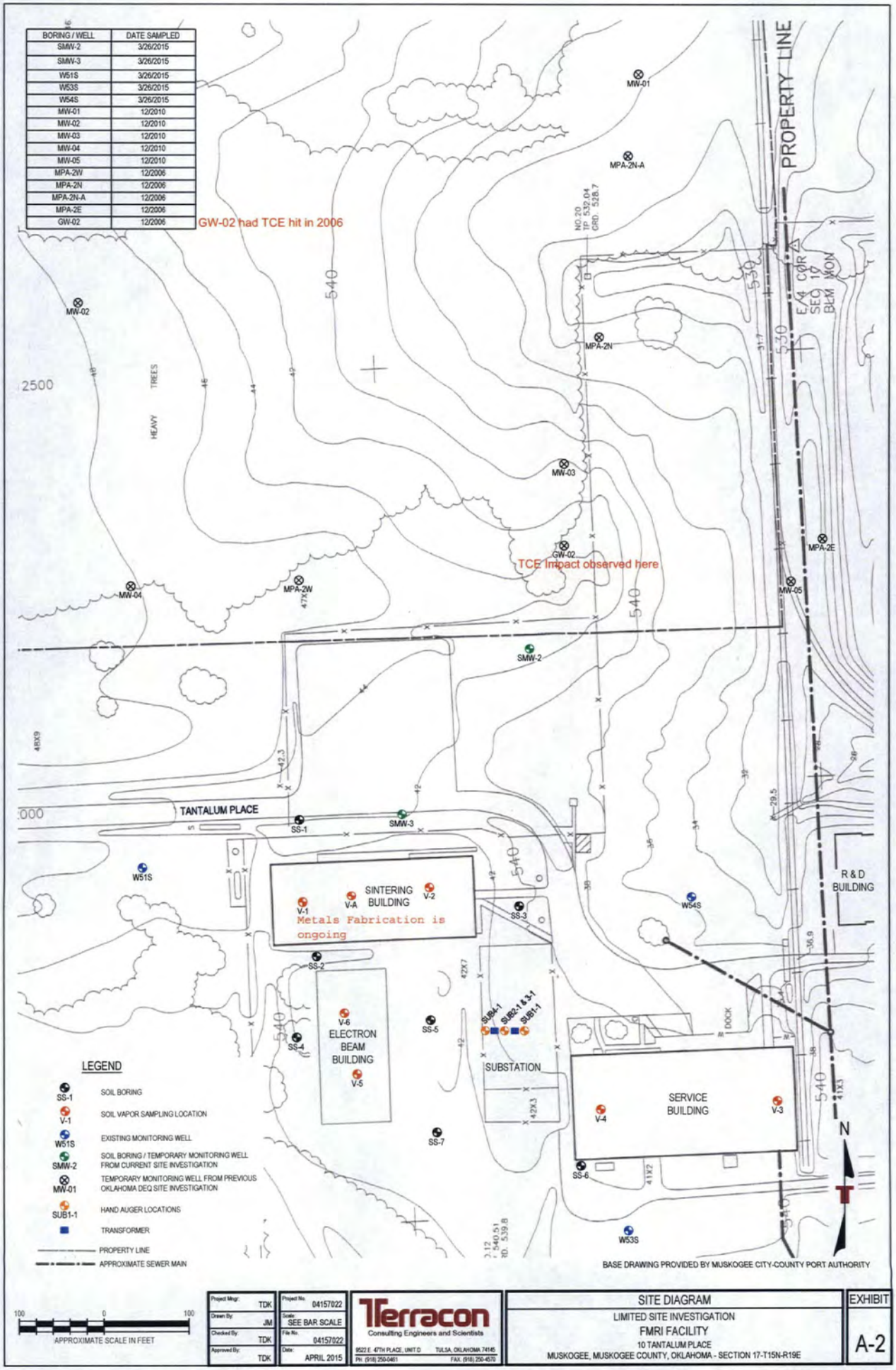
FMRI FACILITY

10 TANTALUM PLACE

MUSKOGEE, MUSKOGEE COUNTY, OKLAHOMA - SECTION 17-T15N-R19E

EXHIBIT

A-1



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Drawn By:	JM
Checked By:	TDK
Approved By:	TDK
Project No.	04157022
Scale:	SEE BAR SCALE
File No.	04157022
Date:	APRIL 2015

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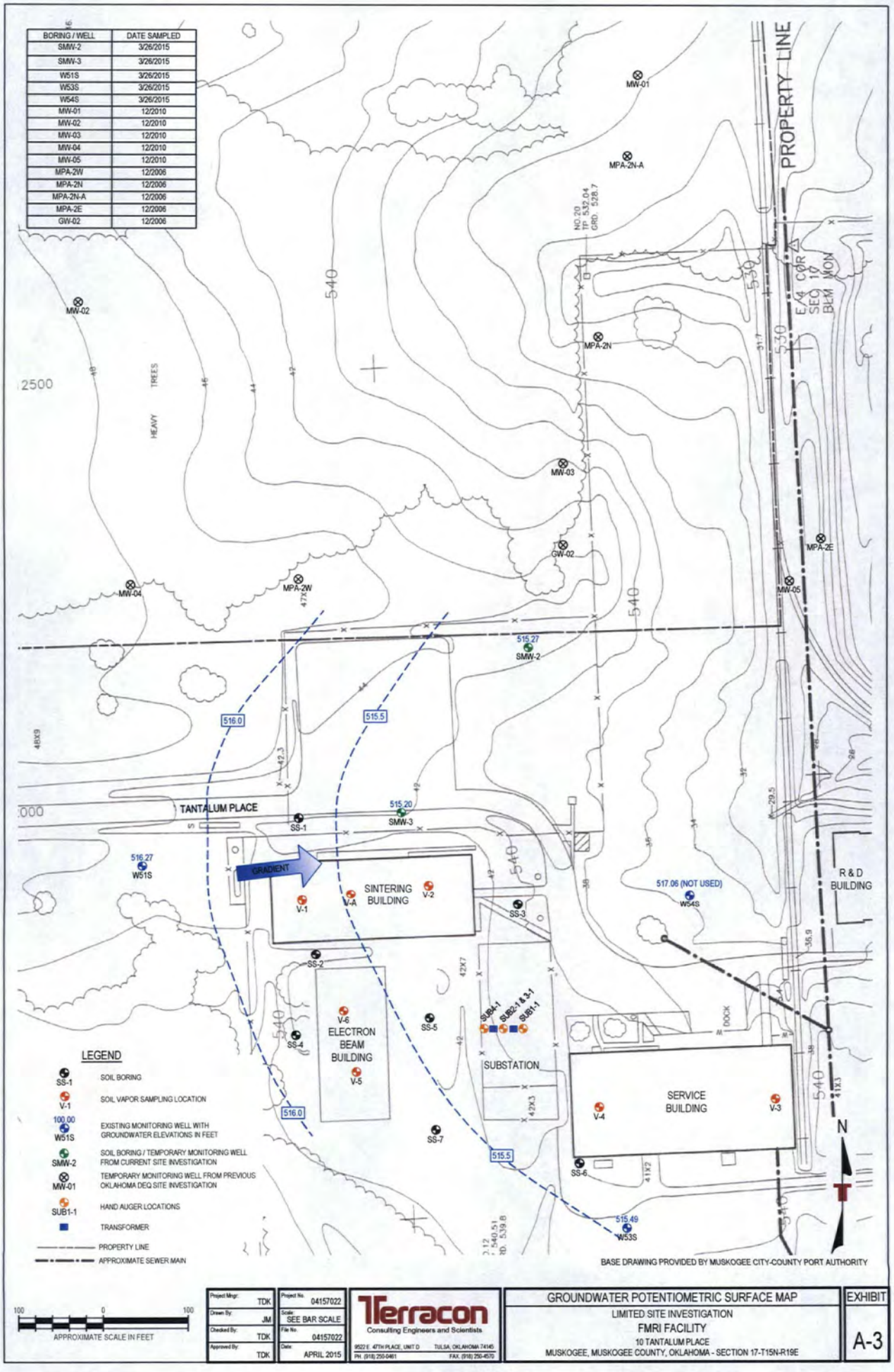
SITE DIAGRAM
LIMITED SITE INVESTIGATION
FMRI FACILITY
10 TANTALUM PLACE
MUSKOGEE, MUSKOGEE COUNTY, OKLAHOMA - SECTION 17-T15N-R19E

EXHIBIT
A-2



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Drawn By:	JM
Checked By:	TDK
Approved By:	TDK
Project No.	04157022
Scale:	SEE BAR SCALE
File No.	04157022
Date:	APRIL 2015

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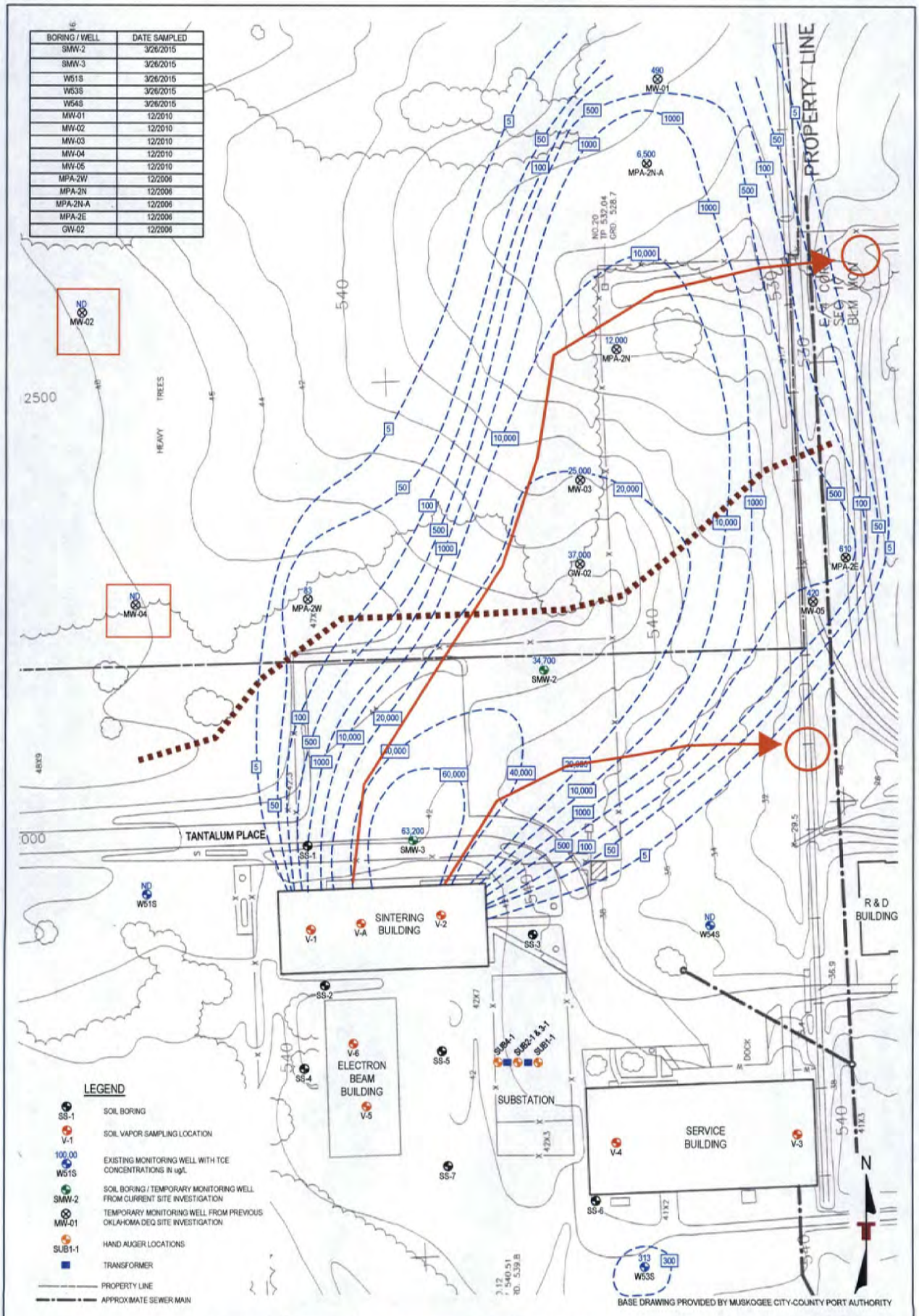
GROUNDWATER POTENTIOMETRIC SURFACE MAP

LIMITED SITE INVESTIGATION
FMRI FACILITY
10 TANTALUM PLACE
MUSKOGEE, MUSKOGEE COUNTY, OKLAHOMA - SECTION 17-T15N-R19E

EXHIBIT
A-3



Project Mngr:	TDK
Drawn By:	JM
Checked By:	TDK
Approved By:	TDK
Project No.	04157022
Scale:	SEE BAR SCALE
File No.	04157022
Date:	APRIL 2015

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TRICHLOROETHENE (TCE) IN GROUNDWATER ISOCONCENTRATION MAP
LIMITED SITE INVESTIGATION
FMRI FACILITY
10 TANTALUM PLACE
MUSKOGEE, MUSKOGEE COUNTY, OKLAHOMA - SECTION 17-T15N-R19E

EXHIBIT
A-4

APPENDIX B –TABLES

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Table 6 - Groundwater Duplicate Sample Analytical Results

Table 7 - Summary of Soil QA/QC Sample Analytical Results

Table 8 - Summary of water QA/QC Sample Analytical Results

TABLE 1
Summary of Groundwater Gauging and Elevation Data
FMRI Facility
10 Tantalum Place
Muskogee, Oklahoma
Terracon Project 04157022

Well	Date	Well Depth (Ft)	TOC Elev	Surface Grade Elev	GW Depth (Ft BTC)	GW Elev (Ft)	GW Depth (Ft bgs)
SMW2	3/26/2015	35.6	543.95	541.89	28.68	515.27	26.62
SMW3	3/26/2015	34.4	543.32	539.67	28.12	515.20	24.47
W51S	3/26/2015	36.4	546.34	544.35	30.07	516.27	28.08
W53S	3/26/2015	35.5	543.18	541.32	27.69	515.49	25.83
W54S	3/26/2015	32.2	537.24	535.47	20.18	517.06	18.41

GW Depth (Ft BTC)- depth of groundwater in feet below top of casing
GW Elev - Elevation of groundwater
TOC Elev - Top of Casing Elevation
Well Depth - Depth of the bottom of the casing below top of casing
GW Depth (Ft BGS)- depth of groundwater in feet below grade surface

Note: elevations based on 6-23-09 survey by Heartland Surveying

TABLE 2
Summary of Soil Analytical Results
FMRI Facility
10 Tantalum Place
Muskogee, Oklahoma
Terracon Project No. 04157022

Sample I.D.	Date Collected	Sample Depth (ft)	1,1,1-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Trichloroethene	SVOCs - 8270D - mg/kg	PCB-1242	Antimony	Arsenic	Barium	Beryllium	Chromium	Thallium
			VOCs - 8260B - mg/kg							(See Table 2A)	PCBs - 8082A - mg/kg	Metals - 6010C - mg/kg					
SMW2-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA		NA	<9.73	4.44	35.8	<0.973	24.3	<1.95
SMW2-31	3/20/2015	31	0.0145	< 0.00165	0.0259	< 0.00165	0.00216	0.00166	2.04		NA	NA	NA	NA	NA	NA	NA
SMW3-0.5	3/19/2015	0.5	NA	NA	NA	NA	NA	NA	NA		NA	<9.77	6.45	84.7	<0.977	324	<1.95
SMW3-30	3/19/2015	30	0.0713	0.00395	0.262	< 0.00158	0.0671	0.0258	2.46		NA	NA	NA	NA	NA	NA	NA
SS-1-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA		NA	<9.78	3.74	107	<0.978	16.6	<1.96
SS-1-6	3/20/2015	6.0	< 0.00150	< 0.00150	< 0.00150	0.00180	0.00266	0.00644	4.44		NA	NA	NA	NA	NA	NA	NA
SS-2-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA		NA	<9.73	4.66	322	<0.973	13.6	<1.95
SS-2-8	3/20/2015	8.0	< 0.00141	< 0.00141	< 0.00141	< 0.00141	< 0.00141	< 0.00141	< 0.00140		NA	NA	NA	NA	NA	NA	NA
SS-3-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA		NA	<9.80	< 1.96	40.4	<0.980	5.43	<1.96
SS-3-8	3/20/2015	8.0	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148		NA	NA	NA	NA	NA	NA	NA
SS-4-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA		NA	<9.52	3.77	182	<0.952	11.2	<1.90
SS-4-8	3/20/2015	8.0	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148	< 0.00148		NA	NA	NA	NA	NA	NA	NA
SS-5-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA		NA	<9.84	4.06	193	<0.984	14.6	<1.97
SS-5-8	3/20/2015	8.0	< 0.00164	< 0.00164	< 0.00164	< 0.00164	< 0.00164	< 0.00164	< 0.00164		NA	NA	NA	NA	NA	NA	NA
SS-6-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA		NA	<10.0	3.28	98.0	<1.0	13.6	<2.0
SS-6-8	3/20/2015	8.0	< 0.00158	< 0.00158	< 0.00158	< 0.00158	< 0.00158	< 0.00158	0.00999		NA	NA	NA	NA	NA	NA	NA
SS-7-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA		NA	<10.1	4.69	201	<1.01	14.5	<2.02
SS-7-8	3/20/2015	8.0	< 0.00141	< 0.00141	< 0.00141	< 0.00141	< 0.00141	< 0.00141	< 0.00141		NA	NA	NA	NA	NA	NA	NA
Sub1-1	3/20/2015	1.0	NA	NA	NA	NA	NA	NA	NA		< 0.0326	NA	NA	NA	NA	NA	NA
Sub2-1	3/20/2015	1.0	NA	NA	NA	NA	NA	NA	NA		< 0.0324	NA	NA	NA	NA	NA	NA
Sub3-1	3/20/2015	1.0	NA	NA	NA	NA	NA	NA	NA		0.0604	NA	NA	NA	NA	NA	NA
Sub4-1	3/20/2015	1.0	NA	NA	NA	NA	NA	NA	NA		< 0.0331	NA	NA	NA	NA	NA	NA
MCL-SSL			0.07	0.00078*	0.0025	0.022	0.021	0.0023	0.0018		0.0061*	0.27	0.29	82	3.2	180,000	0.14
RSL ind			36,000	16	1,000	1.4	2,300	100	6		1.0	470	3	220,000	2,300	NL	12

NA - Not analyzed
NL - Not listed
mg/kg - milligrams per kilogram
VOCs - Volatile Organic Compounds
SVOCs - Semivolatile Organic Compounds
PCB - Polychlorinated Biphenyl
MCL-SSL - Groundwater protection Soil Screening Levels (SSLs) based on EPA Primary Drinking Water Standard Maximum Contaminant Level (MCL)
(January 2015, Target Hazard Quotient=1.0, Dilution Attenuation Factor [DAF] = 1)
* If the EPA does not list an MCL-Based SSL, the Risk-Based SSL was included
RSL ind - EPA Region 6 Regional Screening Level for Commercial/Industrial Sites (January 2015, Target Hazard Quotient=1.0)
Muskogee County background concentrations of Arsenic average about 6 mg/kg (from USGS website http://mrdata.usgs.gov/geochem/doc/averages/countydata.htm)
Concentrations in cells highlighted in yellow exceed regulatory screening levels - Note: RSL ind screening levels applied to shallow soil samples (0.5-1.0 ft bgs)

TABLE 2A
Sumamry of Soil Analytical Results (SVOC Data)
FMRI Facility
10 Tantalum Place
Muskogee, Oklahoma
Terracon Project No. 04157022

Sample I.D.	Date Collected	Sample Depth (ft)	Acenaphthalene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Carbazole	Chrysene	Dibenz(a,h)anthracene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene
			SVOCs - 8270D - mg/kg													
SMW2-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SMW2-31	3/20/2015	31	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SMW3-0.5	3/19/2015	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SMW3-30	3/19/2015	30	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-1-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SS-1-6	3/20/2015	6.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-2-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SS-2-8	3/20/2015	8.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-3-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SS-3-8	3/20/2015	8.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-4-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SS-4-8	3/20/2015	8.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-5-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SS-5-8	3/20/2015	8.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
SS-6-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SS-6-8**	3/20/2015	8.0	0.133	0.674	3.44	2.99	4.60	2.09	1.80	0.815	4.10	0.59	9.44	1.93	5.04	7.47
SS-7-0.5	3/20/2015	0.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SS-7-8	3/20/2015	8.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sub1-1	3/20/2015	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sub2-1	3/20/2015	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sub3-1	3/20/2015	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sub4-1	3/20/2015	1.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MCL-SSL			5.5*	58*	0.012*	0.24	0.041*	NL	0.4*	NL	1.2*	0.013*	89*	0.24*	NL	13*
RSL ind			45,000	230,000	2.9	0.29	2.9	NL	29	NL	290	0.29	30,000	2.9	NL	23,000

NA - Not analyzed
NL - Not listed
ND - Not Detected above laboratory reporting limits
mg/kg - milligrams per kilogram
SVOCs - Semivolatile Organic Compounds
MCL-SSL - Groundwater protection Soil Screening Levels (SSLs) based on EPA Primary Drinking Water Standard Maximum Contaminant Level (MCL) (January 2015, Target Hazard Quotient=1.0, Dilution Attenuation Factor [DAF] = 1)
* If the EPA does not list an MCL-Based SSL, the Risk-Based SSL was included
RSL ind - EPA Region 6 Regional Screening Level for Commercial/Industrial Sites (January 2015, Target Hazard Quotient=1.0)
**SVOC concentrations reported for SS-6-8 are the higher values reported for duplicate sample S-032015 which is the duplicate of SS-6-8
Concentrations in cells highlighted in yellow exceed regulatory screening level

TABLE 3
Summary of Groundwater Analytical Results
FMRI Facility
10 Tantalum Place
Muskogee, Oklahoma
Terracon Project No. 04157022

Sample I.D.	Date Collected	1,1,1-Trichloroethane	1,1,2-Trichloroethane	1,1-Dichloroethane	1,1-Dichloroethene	1,2-Dichloroethane	Carbon tetrachloride	Chloroform	cis-1,2-Dichloroethene	Tetrachloroethene	Toluene	trans-1,2-Dichloroethene	Trichloroethene	Vinyl chloride	SVOCs	Antimony	Arsenic	Barium	Beryllium	Chromium	Thallium
		VOCs - 8260B - ug/L													SVOCs - 8270D - mg/L	Metals - 6010C - mg/L					
SMW2	3/26/2015	284	2.36	29.0	802	1.49	3.23	4.52	82.2	53.2	< 1.00	2.48	34,700	< 1.00	ND	<0.0100	<0.0100	0.0530	<0.00400	<0.00500	0.0131
SMW3	3/26/2015	867	2.85	137	824	< 1.00	< 1.00	8.05	486	246	1.47	6.66	63,200	3.26	ND	<0.0100	<0.0100	0.0712	<0.00400	<0.00500	< 0.0100
W51S	3/26/2015	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	ND	<0.0100	<0.0100	0.0660	<0.00400	<0.00500	< 0.0100
W53S	3/26/2015	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	1.54	12.2	< 1.00	< 1.00	< 1.00	313	< 1.00	ND	<0.0100	<0.0100	0.0364	<0.00400	<0.00500	< 0.0100
W54S	3/26/2015	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	< 1.00	ND	<0.0100	<0.0100	0.163	<0.00400	<0.00500	< 0.0100
MCL		200	5	NL	7	5	5	NL	70	5	1000	100	5	2		0.006	0.01	2.0	0.004	0.100	0.002

NL - Not listed
NA - Not analyzed
ND - Not Detected above laboratory reporting limits
ug/L - micrograms per liter
mg/L - milligrams per liter
VOCs - Volatile Organic Compounds
SVOCs - Semi-Volatile Organic Compounds
MCL - EPA Primary Drinking Water Standard Maximum Contaminant Level
Concentrations in cells highlighted in yellow exceed the MCL

TABLE 4
Summary of Sub-Slab Vapor Sample Results
FMRI Facility
10 Tantalum Place
Muskogee, Oklahoma
Terracon Project No. 04157022

Sample	V-A*	V-1	V-2	V-3	V-4	V-5	V-6	RSL	ODEQ-RSL	VISL-RSL
Date Collected	3/19/2015	3/19/2015	3/19/2015	3/19/2015	3/19/2015	3/19/2015	3/19/2015	~		~
VOCs by TO-15 -µg/m3										
Acetone	20	230	86	97	120	1,200	1,600	14,000	466,667	1,400,000
Benzene	<1.3	<13	5.4	<2.6	1.5	2.7	3.8	1.6	53	16
carbon disulfide	<1.2	<12	<5.0	<2.5	<1.2	<1.2	4.4	3,100	103,333	31,000
Chloroform	<1.9	370	63	11	6.3	2.3	1.9	0.53	18	5.3
Chloromethane	0.95	<8.3	<3.3	<1.7	<0.83	<0.83	<0.83	390	13,000	3,900
Cyclohexane	<1.4	20	<5.5	<2.8	<1.4	3.4	3.4	26,000	866,667	260,000
1,1-Dichloroethane	<1.6	64	<6.4	<3.2	<1.6	<1.6	<1.6	7.7	257	77
1,1-Dichloroethene	<1.6	25,000	3,500	380	150	67	39	880	29,333	8,800
cis-1,2-Dichloroethene	<1.6	71	9.5	<3.2	<1.6	<1.6	<1.6	NL	NL	NL
1,4-Dioxane	<1.4	43	<5.8	<2.9	2.3	7.6	3.4	2.5	83	NL
Ethanol	14	34	13	5.7	43	28	40	NL	NL	NL
Ethylbenzene	2.9	480	390	330	220	140	240	4.9	163	49
4-Ethyltoluene	<2.0	<20	<7.9	<3.9	5.4	6.9	7.9	NL	NL	NL
Dichlorodiflouromethane	<2.0	<20	<7.9	<4.0	2.3	2.0	2.5	440	14,667	4,400
Heptane	<1.6	<16	<6.5	<3.3	<1.6	2.9	3.8	NL	NL	NL
n-Hexane	3.0	14	6.0	3.0	1.7	4.6	7.8	3,100	103,333	31,000
Isopropylbenzene	<2.0	<20	<7.9	<3.9	2.7	3.3	3.6	NL	NL	NL
Methylene Chloride	300	59	14	7.6	4.5	2.5	4.2	1,200	40,000	12,000
2-Butanone (MEK)	110	<74	<29	<15	530	350	440	22,000	733,333	NL
2-Propanol	<6.1	290	<25	<12	<6.1	<6.1	<6.1	NL	NL	NL
Propene	19	120	26	17	13	16	9.3	NL	NL	NL
Styrene	<1.7	<17	<6.8	<3.4	<1.7	<1.7	9.4	4,400	146,667	44,000
Tetrachloroethylene	<2.7	1,600	600	390	210	140	95	47	1,567	470
Tetrahydrofuran	<1.2	20	<4.7	<2.4	<1.2	38	<1.2	NL	NL	NL
Toluene	2.0	19	7.9	5.7	6.0	6.8	9.0	22,000	733,333	220,000
1,1,1-Trichloroethane	<2.2	600	33	12	4.2	3.0	<2.2	22,000	733,333	220,000
Trichloroethylene	2.3	70,000	59,000	19,000	3,900	1,400	1,700	3	100	30
1,2,4-Trimethylbenzene	<2.3	<20	<7.9	<3.9	24	28	25	15	500	310
1,3,5-Trimethylbenzene	<2.0	<20	<7.9	<3.9	9.3	12	11	120	4,000	NL
m&p-Xylene	12	1,200	780	820	610	420	690	440	14,667	4,400
o-Xylene	3.9	160	100	130	150	160	200	440	14,667	4,400

NL - Not listed
NA - Not analyzed
µg/m3 - micrograms per cubic meter
RSL - EPA Region 6 Regional Screening Level for Commercial/Industrial Sites (January 2015, Target Hazard Quotient=1.0)
ODEQ-RSL - Oklahoma Department of Environmental Quality Preliminary Screening Level = RSL divided by 0.03
VISL-RSL - OSWER Vapor Intrusion Screening Level Calculator Version 3.3.1, May 2014 RSLs
*Sample V-A is a background sample of air collected in the Sintering Building
Concentrations in cells highlighted in yellow exceed the ODEQ-RSLs, which are the highest of the three RSL columns

TABLE 5
Summary of Soil Duplicate Sample Results
FMRI Facility
10 Tantalum Place
Muskogee, Oklahoma
Terracon Project No. 04157022

Sample	SS-6-8	S-032015*	RPD
Date	3/20/2015	3/20/2015	~
Sample Depth (ft)	8	8	~
VOCs - 8260B - mg/kg			
1,1,1-Trichloroethane	< 0.00148	< 0.00158	~
1,1-Dichloroethane	< 0.00148	< 0.00158	~
1,1-Dichloroethene	< 0.00148	< 0.00158	~
Chloroform	< 0.00148	< 0.00158	~
cis-1,2-Dichloroethene	< 0.00148	< 0.00158	~
Tetrachloroethene	< 0.00148	< 0.00158	~
Trichloroethene	0.00999	0.00481	70
SVOCs - 8270D - mg/kg			
Acenaphthalene	< 0.0651	0.133	69
Anthracene	< 0.0651	0.674	165
Benzo(a)anthracene	< 0.0651	3.44	193
Benzo(a)pyrene	< 0.0651	2.99	191
Benzo(b)fluoranthene	< 0.0651	4.60	194
Benzo(g,h,i)perylene	< 0.0651	2.09	188
Benzo(k)fluoranthene	< 0.0651	1.80	188
Carbazole	< 0.324	0.815	86
Chrysene	< 0.0651	4.10	194
Dibenz(a,h)anthracene	< 0.0651	0.59	160
Fluoranthene	< 0.0651	9.44	197
Indeno(1,2,3-cd)pyrene	< 0.0651	1.93	187
Phenanthrene	< 0.0651	5.04	195
Pyrene	< 0.0651	7.47	197

NL - Not listed

NA - Not analyzed

mg/kg - milligrams per kilogram

VOCs - Volatile Organic Compounds

RPD - Relative Percent Difference (difference divided by average times 100)

*Sample SS-6-8 and S-032015 are field duplicates

TABLE 6
Summary of Groundwater Duplicate Sample Results
FMRI Facility
10 Tantalum Place
Muskogee, Oklahoma
Terracon Project No. 04157022

Sample	W51S	W-032615*	RPD
Date	3/26/2015	3/26/2015	~
VOCs - Method 8260B - ug/L			
1,1,1-Trichloroethane	< 1.00	< 1.00	~
1,1,2-Trichloroethane	< 1.00	< 1.00	~
1,1-Dichloroethane	< 1.00	< 1.00	~
1,1-Dichloroethene	< 1.00	< 1.00	~
1,2-Dichloroethane	< 1.00	< 1.00	~
Carbon tetrachloride	< 1.00	< 1.00	~
Chloroform	< 1.00	< 1.00	~
cis-1,2-Dichloroethene	< 1.00	< 1.00	~
Tetrachloroethene	< 1.00	< 1.00	~
Toluene	< 1.00	< 1.00	~
trans-1,2-Dichloroethene	< 1.00	< 1.00	~
Trichloroethene	< 1.00	< 1.00	~
Vinyl chloride	< 1.00	< 1.00	~
Metals - 6010C - mg/L			
Barium	0.0660	0.0664	1
Thallium	< 0.0100	< 0.0100	~

ug/L - micrograms per liter
mg/L - milligrams per liter
VOCs - Volatile Organic Compounds
RPD - Relative Percent Difference (difference divided by average times 100)
*Sample W51S and G-032615 are field duplicates

TABLE 7
Summary of Soil QA/QC Sample Results
FMRI Facility
10 Tantalum Place
Muskogee, Oklahoma
Terracon Project No. 04157022

Sample	RB-031915	Trip Blank
Date	3/19/2015	3/20/2015
VOCs - 8260B	ug/L	mg/kg
1,1,1-Trichloroethane	<1.00	<0.00200
1,1-Dichloroethane	<1.00	<0.00200
1,1-Dichloroethene	<1.00	<0.00200
Chloroform	<1.00	<0.00200
cis-1,2-Dichloroethene	<1.00	<0.00200
Tetrachloroethene	<1.00	<0.00200
Trichloroethene	<1.00	<0.00200
Metals - 6010C - mg/L		
Arsenic	<0.0100	NA
Barium	<0.0100	NA
Chromium	<0.00500	NA

NA - Not analyzed
ug/L - micrograms per liter
mg/L - milligrams per liter
mg/kg - milligrams per kilogram
VOCs - Volatile Organic Compounds
Note: sample RB-031915 is a rinsate blank and was analyzed for Semivolatile Organic Compounds by 8270D (all results were less than the laboratory reporting limit)

TABLE 8
Summary of Water QA/QC Sample Results
FMRI Facility
10 Tantalum Place
Muskogee, Oklahoma
Terracon Project No. 04157022

Sample	Trip Blank
Date	3/26/2015
VOCs - 8260B	ug/L
1,1,1-Trichloroethane	<1.00
1,1,2-Trichloroethane	<1.00
1,1-Dichloroethane	<1.00
1,1-Dichloroethene	<1.00
1,2-Dichloroethane	<1.00
Carbon tetrachloride	<1.00
Chloroform	<1.00
cis-1,2-Dichloroethene	<1.00
Tetrachloroethene	<1.00
Toluene	<1.00
trans-1,2-Dichloroethene	<1.00
Trichloroethene	<1.00
Vinyl chloride	<1.00

ug/L - micrograms per liter
VOCs - Volatile Organic Compounds

APPENDIX C – SOIL BORING LOGS

WELL LOG NO. SMW2

PROJECT: FMRI Facility - LSI/Soil Vapor Investigation

CLIENT: Muskogee City-County Port Authority

SITE: 10 Tantalum Place
Muskogee, Oklahoma

DEPTH	LOCATION:	INSTALLATION DETAILS	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	PID (ppm)	Soil Sample Collected
1.0	**CLAY**, dark brown, medium plasticity, soft, moist	Bentonite				SMW2	<1	X
	CLAY, brown, high plasticity, firm, moist						<1	
							<1	
5.0							<1	
	CLAY, reddish-brown, high plasticity, hard, moist		5				2	
							1	
8.0							3	
	SHALEY CLAY, gray and reddish-brown, medium plasticity, firm, dry						4	
10.0							4	
	CLAY, gray, low plasticity hard, dry, with dark brown seams		10				4	
		Sand 10/20 Silica					5	
		Riser 1" PVC					4	
							7	
15.0							9	
	CLAY, gray, low plasticty, hard, moist		15				10	
							8	
							14	
							6	
20.0							7	
	SANDY CLAY, gray and reddish-brown, medium plasticty, firm, moist		20				9	
							5	
		Screen 1" PVC 0.01 Slot					5	
	- reddish-brown below 23 feet						7	
							6	
26.0			25				17	
	CLAYEY SAND, reddish-brown, firm, moist						33	
							6	
29.0							4	
30.0	**SAND**, brown, soft, wet						54	
	SAND, light brown, soft, saturated		30	▽			68	
						SMW2	72	X
							45	
							23	
34.5		Well Cap					16	
	Refusal on Shale at 34.5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method: Direct Push

Abandonment Method:

Notes:
Boring was drilled and backfilled on 3/20/15; redrilled and well installed on 3/24/15

WATER LEVEL OBSERVATIONS

▽ *30 ft While Drilling*

Terracon
9522 East 47th Place, Unit D
Tulsa, Oklahoma

Well Started: 3/20/2015	Well Completed: 3/24/2015
Drill Rig: Geoprobe	Driller: Terracon
Project No.: 04157022	

WELL LOG NO. SMW3

PROJECT: FMRI Facility - LSI/Soil Vapor Investigation

CLIENT: Muskogee City-County Port Authority

SITE: 10 Tantalum Place
Muskogee, Oklahoma

LOCATION: / DEPTH	INSTALLATION DETAILS	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	PID (ppm)	Soil Sample Collected
1.0 **CLAY**, brown, medium plasticity, soft, moist	Bentonite				SMW3		X
CLAY, light brown, high plasticity, firm, moist						<1	
						<1	
						<1	
- reddish-brown below 4 feet						<1	
		5				<1	
	Sand 10/20 Silica					<1	
						<1	
						<1	
	Riser 1" PVC					<1	
		10				2	
- gray below 10 feet						3	
						4	
						30	
						42	
		15				15	
- gray and reddish-brown below 15 feet						108	
						83	
						28	
						233	
		20				249	
- gray below 20 feet						357	
22.0 **SANDY CLAY**, reddish-brown, medium plasticity, firm, moist	Screen 1" PVC 0.01 Slot					38	
						90	
25.0 **SAND**, gray, firm, wet						21	
		25				117	
						263	
						469	
- saturated below 28 feet			▽			303	
						517	
31.0		30					
32.0 **SHALE**, black, hard	Well Cap				SMW3	360	X
Refusal at 32 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method: Direct Push

Abandonment Method:

Notes:

WATER LEVEL OBSERVATIONS

▽ *28 ft While Drilling*

Terracon
9522 East 47th Place, Unit D
Tulsa, Oklahoma

Well Started: 3/19/2015 | Well Completed: 3/19/2015

Drill Rig: Geoprobe | Driller: Terracon

Project No.: 04157022

BORING LOG NO. SS-1

PROJECT: FMRI Facility - LSI/Soil Vapor Investigation

CLIENT: Muskogee City-County Port Authority

SITE: 10 Tantalum Place
Muskogee, Oklahoma

GRAPHIC LOG	LOCATION: / DEPTH	INSTALLATION DETAILS	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	PID (ppm)	Soil Sample Collected
	2" Topsoil **CLAY**, olive-brown, high plasticity, firm, moist					SS-1	<1 <1 <1 2 6	X
	5.0 **CLAY**, olive-brown and reddish-brown, high plasticty, firm, moist		5			SS-1	12 8 5 3	X
	10.0 ***Boring Terminated at 10 Feet***		10					

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method: Direct Push

Abandonment Method:

Notes:

WATER LEVEL OBSERVATIONS

Terracon
9522 East 47th Place, Unit D
Tulsa, Oklahoma

Boring Started: 3/20/2015 | Boring Completed: 3/20/2015

Drill Rig: Geoprobe | Driller: Terracon

Project No.: 04157022

BORING LOG NO. SS-2

PROJECT: FMRI Facility - LSI/Soil Vapor Investigation

CLIENT: Muskogee City-County Port Authority

SITE: 10 Tantalum Place
Muskogee, Oklahoma

GRAPHIC LOG	LOCATION: / DEPTH	INSTALLATION DETAILS	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	PID (ppm)	Soil Sample Collected
	1.0 3" Topsoil **CLAY**, brown, low plasticity, soft, dry					SS-2	<1	X
	CLAY, brown and reddish-brown, medium plasticity, firm, moist						<1 <1 <1 <1	
	5.0 **CLAY**, reddish-brown and gray, high plasticty, firm, moist		5				<1 <1 <1	
						SS-2	<1 <1	X
	10.0 ***Boring Terminated at 10 Feet***		10					

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Direct Push

Abandonment Method:

Notes:

WATER LEVEL OBSERVATIONS

Terracon
9522 East 47th Place, Unit D
Tulsa, Oklahoma

Boring Started: 3/20/2015 | Boring Completed: 3/20/2015

Drill Rig: Geoprobe | Driller: Terracon

Project No.: 04157022

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL 04157022.GPJ

BORING LOG NO. SS-3

PROJECT: FMRI Facility - LSI/Soil Vapor Investigation

CLIENT: Muskogee City-County Port Authority

SITE: 10 Tantalum Place
Muskogee, Oklahoma

GRAPHIC LOG	LOCATION: / DEPTH	INSTALLATION DETAILS	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	PID (ppm)	Soil Sample Collected
	6" Topsoil **CLAY**, reddish-brown, high plasticity, firm, moist							
	5.0 **CLAY**, olive-brown and reddish-brown, high plasticity, firm, moist		5			SS-3	<1 <1 <1 <1 <1 <1 <1	X
	10.0 ***Boring Terminated at 10 Feet***		10			SS-3	<1 <1	X

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Direct Push

Abandonment Method:

Notes:

WATER LEVEL OBSERVATIONS

Terracon
9522 East 47th Place, Unit D
Tulsa, Oklahoma

Boring Started: 3/20/2015 | Boring Completed: 3/20/2015

Drill Rig: Geoprobe | Driller: Terracon

Project No.: 04157022

BORING LOG NO. SS-4

PROJECT: FMRI Facility - LSI/Soil Vapor Investigation

CLIENT: Muskogee City-County Port Authority

SITE: 10 Tantalum Place
Muskogee, Oklahoma

GRAPHIC LOG	LOCATION: DEPTH	INSTALLATION DETAILS	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	PID (ppm)	Soil Sample Collected
	3" Topsoil							
	CLAY, brown and reddish-brown, medium plasticity, firm, moist							
	2.0 - dark brown below 1 foot							
	3.0 **SANDY CLAY**, brown, low plasticity, soft, wet							
	CLAY, reddish-brown, high plasticity, firm, moist							
	- reddish-brown below 5 feet		5					
						SS-4	<1	X
							<1	
							<1	
							<1	
							<1	
							<1	
							<1	
						SS-4	<1	X
	10.0		10				<1	
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method:
Direct Push

Abandonment Method:

Notes:

WATER LEVEL OBSERVATIONS

Terracon
9522 East 47th Place, Unit D
Tulsa, Oklahoma

Boring Started: 3/20/2015 | Boring Completed: 3/20/2015

Drill Rig: Geoprobe | Driller: Terracon

Project No.: 04157022

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL 04157022.GPJ

BORING LOG NO. SS-5

PROJECT: FMRI Facility - LSI/Soil Vapor Investigation

CLIENT: Muskogee City-County Port Authority

SITE: 10 Tantalum Place
Muskogee, Oklahoma

GRAPHIC LOG	LOCATION: / DEPTH	INSTALLATION DETAILS	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	PID (ppm)	Soil Sample Collected
	1.0 2" Topsoil **CLAY**, dark brown, medium plasticity, firm, moist No recovery					SS-5	<1 <1 <1 <1 <1 <1 <1	X
	5.0 **CLAY**, reddish-brown and gray, high plasticity, firm, moist		5			SS-5	<1 <1	X
	10.0 ***Boring Terminated at 10 Feet***		10					

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method: Direct Push

Abandonment Method:

Notes:

WATER LEVEL OBSERVATIONS

Terracon
9522 East 47th Place, Unit D
Tulsa, Oklahoma

Boring Started: 3/20/2015 | Boring Completed: 3/20/2015

Drill Rig: Geoprobe | Driller: Terracon

Project No.: 04157022

THIS BORING LOG IS NOT VALID IF SEPARATED FROM ORIGINAL REPORT. GEO SMART LOG-WELL 04157022.GPJ

BORING LOG NO. SS-6

PROJECT: FMRI Facility - LSI/Soil Vapor Investigation

CLIENT: Muskogee City-County Port Authority

SITE: 10 Tantalum Place
Muskogee, Oklahoma

GRAPHIC LOG	LOCATION: DEPTH	INSTALLATION DETAILS	DEPTH (FL)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	PID (ppm)	Soil Sample Collected
	1.0 2" Gravel **CLAY**, reddish-brown and gray, high plasticity, firm, moist No Recovery					SS-6	<1 <1 <1 <1	X
	5.0 **CLAY**, reddish-brown and gray, high plasticity, firm, moist		5				<1 <1 <1	
	10.0 ***Boring Terminated at 10 Feet***		10			SS-6	<1 <1	X

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method: Direct Push

Abandonment Method:

Notes:

WATER LEVEL OBSERVATIONS

Terracon
9522 East 47th Place, Unit D
Tulsa, Oklahoma

Boring Started: 3/20/2015 | Boring Completed: 3/20/2015

Drill Rig: Geoprobe | Driller: Terracon

Project No.: 04157022

BORING LOG NO. SS-7

PROJECT: FMRI Facility - LSI/Soil Vapor Investigation

CLIENT: Muskogee City-County Port Authority

SITE: 10 Tantalum Place
Muskogee, Oklahoma

GRAPHIC LOG	LOCATION: / DEPTH	INSTALLATION DETAILS	DEPTH (FL.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	PID (ppm)	Soil Sample Collected
	2" Topsoil **SHALEY CLAY**, brown and dark brown, medium plasticity, soft, dry					SS-7	<1	X
	3.0 **SANDY CLAY**, brown, medium plasticity, soft, moist						<1	
	5.0 **LEAN CLAY**, reddish-brown and gray, high plasticity, firm, moist		5				<1	
							<1	
							<1	
						SS-7	<1	X
	10.0		10				<1	
	Boring Terminated at 10 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Advancement Method: Direct Push

Abandonment Method:

Notes:

WATER LEVEL OBSERVATIONS

Terracon
9522 East 47th Place, Unit D
Tulsa, Oklahoma

Boring Started: 3/20/2015 | Boring Completed: 3/20/2015

Drill Rig: Geoprobe | Driller: Terracon

Project No.: 04157022

Appendix D

Environmental Data Resources Material

Former Fansteel Site
10 Tantalum Place
Muskogee, OK 74403

Inquiry Number: 4556333.3
March 07, 2016

Certified Sanborn® Map Report

6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

3/07/16

Site Name:
Former Fansteel Site
10 Tantalum Place
Muskogee, OK 74403

Client Name:
Enercon Services, Inc.
1601 NW Expressway
Oklahoma City, OK 73118

EDR Inquiry # 4556333.3

Contact: Jamie Persico

The Sanborn Library has been searched by EDR and maps covering the target property location as provided by Enercon Services, Inc. were identified for the years listed below. The Sanborn Library is the largest, most complete collection of fire insurance maps. The collection includes maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow, and others. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by the Sanborn Library LLC, the copyright holder for the collection. Results can be authenticated by visiting www.edrnet.com/sanborn.

The Sanborn Library is continually enhanced with newly identified map archives. This report accesses all maps in the collection as of the day this report was generated.

Certified Sanborn Results:

Site Name: Former Fansteel Site
Address: 10 Tantalum Place
City, State, Zip: Muskogee, OK 74403
Cross Street:
P.O. # NA
Project: GEO260
Certification # 8473-414E-AC9B

Sanborn® Library search results
Certification # 8473-414E-AC9B

UNMAPPED PROPERTY

This report certifies that the complete holdings of the Sanborn Library, LLC collection have been searched based on client supplied target property information, and fire insurance maps covering the target property were not found.

The Sanborn Library includes more than 1.2 million fire insurance maps from Sanborn, Bromley, Perris & Browne, Hopkins, Barlow and others which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ☑ Library of Congress
- ☑ University Publications of America
- ☑ EDR Private Collection

The Sanborn Library LLC Since 1866™

Limited Permission To Make Copies

Enercon Services, Inc. (the client) is permitted to make up to FIVE photocopies of this Sanborn Map transmittal and each fire insurance map accompanying this report solely for the limited use of its customer. No one other than the client is authorized to make copies. Upon request made directly to an EDR Account Executive, the client may be permitted to make a limited number of additional photocopies. This permission is conditioned upon compliance by the client, its customer and their agents with EDR's copyright policy; a copy of which is available upon request.

Former Fansteel Site
10 Tantalum Place
Muskogee, OK 74403

Inquiry Number: 4556333.9
March 07, 2016

The EDR Aerial Photo Decade Package

6 Armstrong Road, 4th Floor
Shelton, Connecticut 06484
Toll Free: 800.352.0050
www.edrnet.com

EDR Aerial Photo Decade Package

Environmental Data Resources, Inc. (EDR) Aerial Photo Decade Package is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's professional researchers provide digitally reproduced historical aerial photographs, and when available, provide one photo per decade.

When delivered electronically by EDR, the aerial photo images included with this report are for ONE TIME USE ONLY. Further reproduction of these aerial photo images is prohibited without permission from EDR. For more information contact your EDR Account Executive.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Date EDR Searched Historical Sources:
Aerial Photography March 07, 2016

Target Property:
10 Tantalum Place
Muskogee, OK 74403

Year	Scale	Details	Source
1971	Aerial Photograph. Scale: 1"=1000'	Flight Date: March 08, 1971	EDR
1973	Aerial Photograph. Scale: 1"=500'	Flight Date: February 03, 1973	EDR
1981	Aerial Photograph. Scale: 1"=1000'	Flight Date: March 16, 1981	EDR
1984	Aerial Photograph. Scale: 1"=1000'	Flight Date: July 20, 1984	EDR
1995	Aerial Photograph. Scale: 1"=500'	DOQQ - acquisition dates: March 09, 1995	USGS/DOQQ
2005	Aerial Photograph. Scale: 1"=500'	Flight Year: 2005	USDA/NAIP
2006	Aerial Photograph. Scale: 1"=500'	Flight Year: 2006	USDA/NAIP
2008	Aerial Photograph. Scale: 1"=500'	Flight Year: 2008	USDA/NAIP
2010	Aerial Photograph. Scale: 1"=500'	Flight Year: 2010	USDA/NAIP


INQUIRY #: 4556333.9
YEAR: 1971
= 1000'
N
EDR

INQUIRY #: 4556333.9

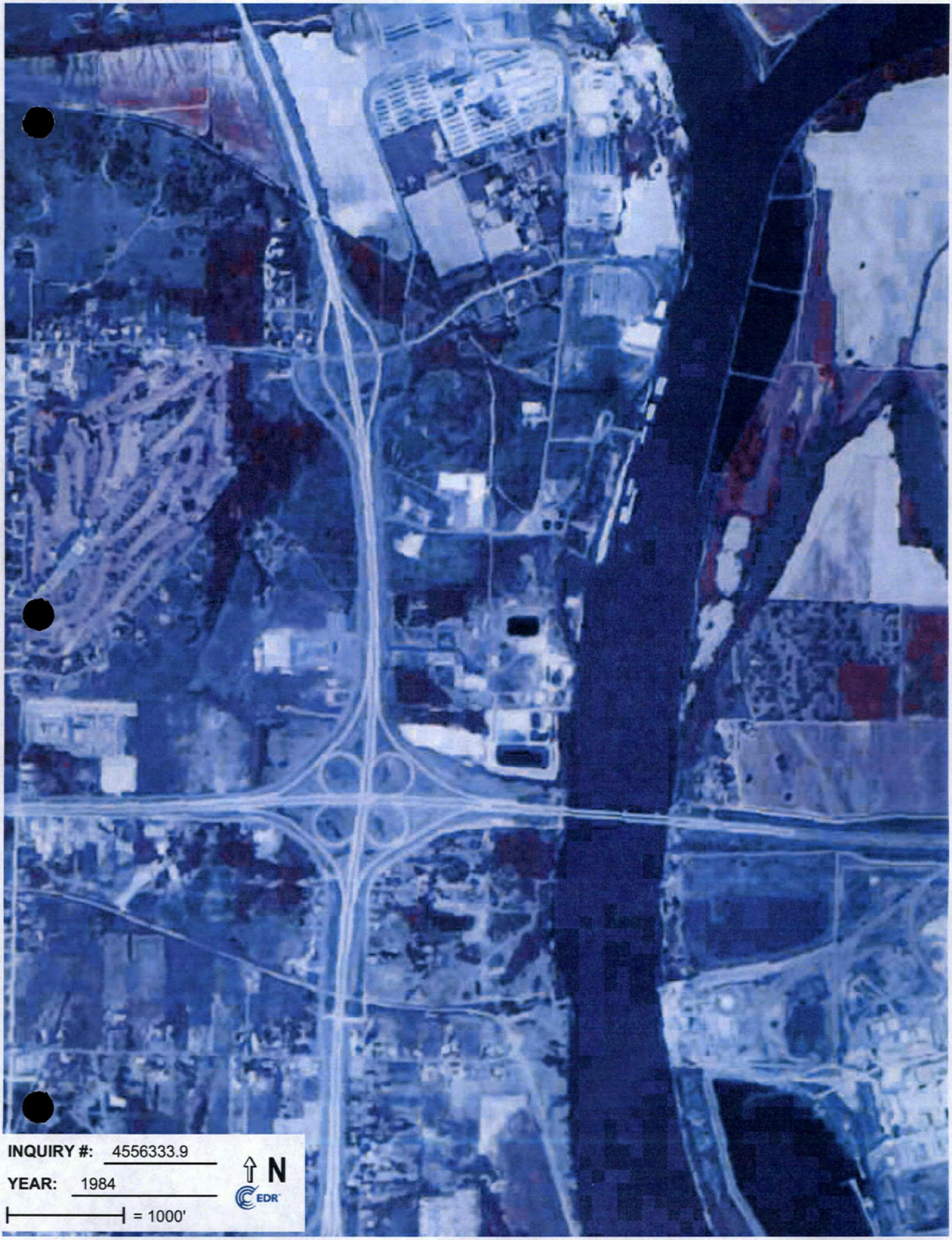
YEAR: 1973

= 500'

N

EDR


INQUIRY #: 4556333.9
YEAR: 1981
= 1000'
N
EDR


INQUIRY #: 4556333.9
YEAR: 1984
= 1000'
N
EDR

INQUIRY #: 4556333.9

YEAR: 1995

= 500'

N

EDR


INQUIRY #: 4556333.9
YEAR: 2005
= 500'
N
EDR


INQUIRY #: 4556333.9
YEAR: 2006
= 500'
N
EDR


INQUIRY #: 4556333.9
YEAR: 2008
= 500'
N
EDR


INQUIRY #: 4556333.9
YEAR: 2010
= 500'
N
EDR

Former Fansteel Site
10 Tantalum Place
Muskogee, OK 74403

Inquiry Number: 4556333.2s
March 07, 2016

The EDR Radius Map™ Report with GeoCheck®

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

10 TANTALUM PLACE
MUSKOGEE, OK 74403

COORDINATES

Latitude (North):	35.7736070 - 35° 46' 24.98"
Longitude (West):	95.3049330 - 95° 18' 17.75"
Universal Tranverse Mercator:	Zone 15
UTM X (Meters):	291646.9
UTM Y (Meters):	3961089.5
Elevation:	541 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	5926522 NORTHEAST MUSKOGEE, OK
Version Date:	2012

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20100810
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
10 TANTALUM PLACE
MUSKOGEE, OK 74403

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION
A1	FMRI, INC.	NUMBER 10 TANTALUM P	TIER 2		TP
A2	FANSTEEL METALS	10 TANTALUM PL	CERCLIS-NFRAP, RCRA NonGen / NLR, ICIS		TP
A3	FMRI, INC.	NUMBER 10 TANTALUM P	TIER 2		TP
A4	FANSTEEL INC	10 TANTALUM PL	FINDS, ECHO		TP
A5	FMRI, INC.	NUMBER 10 TANTALUM P	TIER 2		TP
6	ERGON ASPHALT & EMUL	2501 PORT PLACE	RCRA-CESQG, US AIRS, FINDS, ECHO	Lower	752, 0.142, North
7	INDIAN CAPITAL AVTS	2403 N 41ST ST E	UST, HIST UST	Higher	967, 0.183, NW
8	ZAPATA INDUSTRIES IN	4400 DON CAYO DR.	CORRACTS, RCRA NonGen / NLR, FINDS, ECHO	Lower	1206, 0.228, NNW
9	QUALITY LIQUID FEEDS	2530 PORT PLACE	AST, TIER 2	Lower	1251, 0.237, NNE

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was identified in the following records. For more information on this property see page 8 of the attached EDR Radius Map report:

Site	Database(s)	EPA ID
FMRI, INC. NUMBER 10 TANTALUM P MUSKOGEE, OK 74403	TIER 2 Facility Id: FATR2011237KSP0026QL	N/A
FANSTEEL METALS 10 TANTALUM PL MUSKOGEE, OK 74401	CERCLIS-NFRAP Site ID: 0601045 EPA Id: OKD007221831 RCRA NonGen / NLR EPA ID:: OKD007221831 ICIS FRS ID:: 110001632378	OKD007221831
FMRI, INC. NUMBER 10 TANTALUM P MUSKOGEE, OK 74446	TIER 2 Facility Id: FATR2009237KSP0026QL	N/A
FANSTEEL INC 10 TANTALUM PL MUSKOGEE, OK 74403	FINDS Registry ID:: 110001632378 ECHO	N/A
FMRI, INC. NUMBER 10 TANTALUM P MUSKOGEE, OK 74403	TIER 2 Facility Id: FATR2010237KSP0026QL	N/A

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ..... National Priority List

Proposed NPL..... Proposed National Priority List Sites
NPL LIENS..... Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL..... National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY..... Federal Facility Site Information listing
CERCLIS..... Comprehensive Environmental Response, Compensation, and Liability Information System

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF..... RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG..... RCRA - Large Quantity Generators
RCRA-SQG..... RCRA - Small Quantity Generators

Federal Institutional controls / engineering controls registries

LUCIS..... Land Use Control Information System
US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROL..... Sites with Institutional Controls

Federal ERNS list

ERNS..... Emergency Response Notification System

State- and tribal - equivalent CERCLIS

SHWS..... The Land Report

State and tribal landfill and/or solid waste disposal site lists

SWF/LF..... Permitted Solid Waste Disposal & Processing Facilities

State and tribal leaking storage tank lists

LUST..... Leaking Underground Storage Tank List
LAST..... Leaking Aboveground Storage Tanks List
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land

State and tribal registered storage tank lists

FEMA UST..... Underground Storage Tank Listing
INDIAN UST..... Underground Storage Tanks on Indian Land

State and tribal institutional control / engineering control registries

INST CONTROL..... Institutional Control Sites

State and tribal voluntary cleanup sites

VCP..... Voluntary Cleanup Site Inventory

INDIAN VCP..... Voluntary Cleanup Priority Listing

State and tribal Brownfields sites

BROWNFIELDS..... Brownfield Sites

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY..... Recycling Facilities
INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands
DEBRIS REGION 9..... Torres Martinez Reservation Illegal Dump Site Locations
ODI..... Open Dump Inventory

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL..... National Clandestine Laboratory Register
US CDL..... Clandestine Drug Labs

Local Land Records

LIENS 2..... CERCLA Lien Information

Records of Emergency Release Reports

HMIRS..... Hazardous Materials Information Reporting System
OK COMPLAINT..... Oklahoma Complaint System Database

Other Ascertainable Records

FUDS..... Formerly Used Defense Sites
DOD..... Department of Defense Sites
SCRD DRYCLEANERS..... State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR..... Financial Assurance Information
EPA WATCH LIST..... EPA WATCH LIST
2020 COR ACTION..... 2020 Corrective Action Program List
TSCA..... Toxic Substances Control Act
TRIS..... Toxic Chemical Release Inventory System
SSTS..... Section 7 Tracking Systems
ROD..... Records Of Decision
RMP..... Risk Management Plans
RAATS..... RCRA Administrative Action Tracking System
PRP..... Potentially Responsible Parties
PADS..... PCB Activity Database System
FTTS..... FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS..... Material Licensing Tracking System
COAL ASH DOE..... Steam-Electric Plant Operation Data
COAL ASH EPA..... Coal Combustion Residues Surface Impoundments List

PCB TRANSFORMER..... PCB Transformer Registration Database
RADINFO..... Radiation Information Database
HIST FTTS..... FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS..... Incident and Accident Data
CONSENT..... Superfund (CERCLA) Consent Decrees
INDIAN RESERV..... Indian Reservations
FUSRAP..... Formerly Utilized Sites Remedial Action Program
UMTRA..... Uranium Mill Tailings Sites
LEAD SMELTERS..... Lead Smelter Sites
US AIRS..... Aerometric Information Retrieval System Facility Subsystem
US MINES..... Mines Master Index File
AIRS..... Permitted AIRS Facility Listing
DRYCLEANERS..... Drycleaner Facility Listing
Financial Assurance..... Financial Assurance Information Listing
UIC..... Underground Injection Wells Database Listing
FUELS PROGRAM..... EPA Fuels Program Registered Listing

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP..... EDR Proprietary Manufactured Gas Plants
EDR Hist Auto..... EDR Exclusive Historic Gas Stations
EDR Hist Cleaner..... EDR Exclusive Historic Dry Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS..... Recovered Government Archive State Hazardous Waste Facilities List
RGA LF..... Recovered Government Archive Solid Waste Facilities List
RGA LUST..... Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were identified in the following databases.

Elevations have been determined from the USGS Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified. Sites with an elevation equal to or higher than the target property have been differentiated below from sites with an elevation lower than the target property.
Page numbers and map identification numbers refer to the EDR Radius Map report where detailed data on individual sites can be reviewed.

Sites listed in ***bold italics*** are in multiple databases.

Unmappable (orphan) sites are not considered in the foregoing analysis.

STANDARD ENVIRONMENTAL RECORDS

Federal RCRA CORRACTS facilities list

CORRACTS: CORRACTS is a list of handlers with RCRA Corrective Action Activity. This report shows which nationally-defined corrective action core events have occurred for every handler that has had corrective action activity.

A review of the CORRACTS list, as provided by EDR, and dated 06/09/2015 has revealed that there is 1 CORRACTS site within approximately 1 mile of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
ZAPATA INDUSTRIES IN	*4400 DON CAYO DR.*	*NNW 1/8 - 1/4 (0.228 mi.)*	*8*	*40*

Federal RCRA generators list

RCRA-CESQG: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

A review of the RCRA-CESQG list, as provided by EDR, and dated 06/09/2015 has revealed that there is 1 RCRA-CESQG site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
ERGON ASPHALT & EMUL	*2501 PORT PLACE*	*N 1/8 - 1/4 (0.142 mi.)*	*6*	*30*

State and tribal registered storage tank lists

UST: The Underground Storage Tank database contains registered USTs. USTs are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA). The data come from the Oklahoma Corporation Commission's State UST List, List II Version.

A review of the UST list, as provided by EDR, and dated 10/27/2015 has revealed that there is 1 UST site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
INDIAN CAPITAL AVTS Facility Id: 5113287 TankStatus: CIU TankStatus: POU	*2403 N 41ST ST E*	*NW 1/8 - 1/4 (0.183 mi.)*	*7*	*39*

AST: The Aboveground Storage Tank database contains registered ASTs. The data come from the Oklahoma Corporation Commission's State AST List, List II Version.

A review of the AST list, as provided by EDR, and dated 10/27/2015 has revealed that there is 1 AST site within approximately 0.25 miles of the target property.

Lower Elevation	Address	Direction / Distance	Map ID	Page
QUALITY LIQUID FEEDS	*2530 PORT PLACE*	*NNE 1/8 - 1/4 (0.237 mi.)*	*9*	*60*

Facility Id: 5121636
Tank Status: CIU
Tank Status: POU

ADDITIONAL ENVIRONMENTAL RECORDS

Local Lists of Registered Storage Tanks

HIST UST: This underground storage tank listing includes tank information through March 2003. This listing is no longer updated by the Oklahoma Corporation Commission.

A review of the HIST UST list, as provided by EDR, and dated 03/21/2003 has revealed that there is 1 HIST UST site within approximately 0.25 miles of the target property.

Equal/Higher Elevation	Address	Direction / Distance	Map ID	Page
INDIAN CAPITAL AVTS	***2403 N 41ST ST E***	***NW 1/8 - 1/4 (0.183 mi.)***	***7***	***39***
Facility Id: 5113287				
Tank Status: Currently in Use				
Tank Status: Permanently Out of Use				
Tank Status: Currently In Use				

Other Ascertainable Records

RCRA NonGen / NLR: RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

A review of the RCRA NonGen / NLR list, as provided by EDR, and dated 06/09/2015 has revealed that there is 1 RCRA NonGen / NLR site within approximately 0.25 miles of the target property.

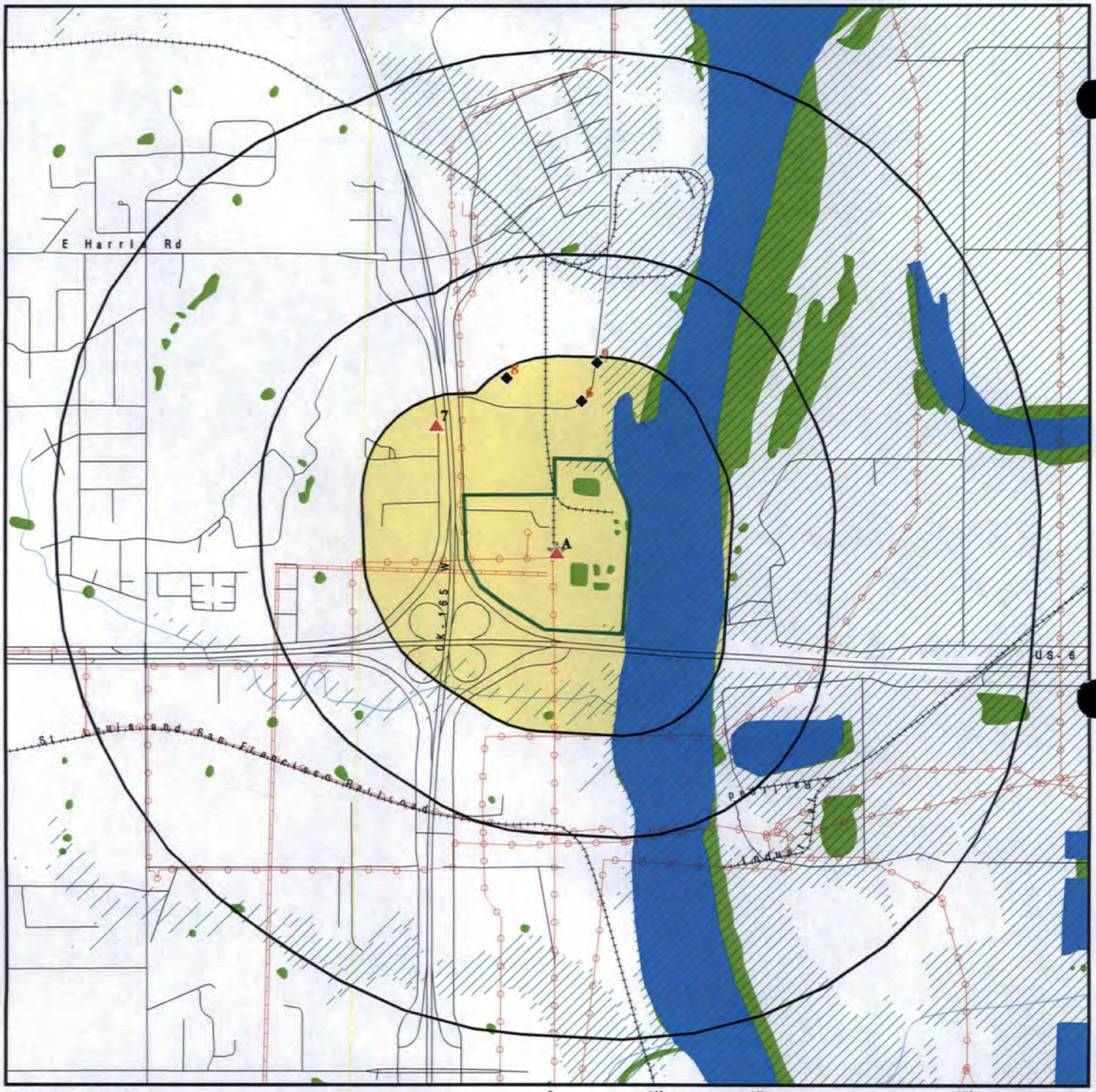
Lower Elevation	Address	Direction / Distance	Map ID	Page
ZAPATA INDUSTRIES IN	***4400 DON CAYO DR.***	***NNW 1/8 - 1/4 (0.228 mi.)***	***8***	***40***

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 1 records.

Site Name	Database(s)
GREEN COUNTRY CASTINGS CORPORATION	SWF/LF

OVERVIEW MAP - 4556333.2S



0 1/4 1/2 1 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory

This report includes Interactive Map La... display and/or hide map information. Th... legend includes only those icons for the default map view.

SITE NAME: Former Fansteel Site ADDRESS: 10 Tantalum Place Muskogee OK 74403 LAT/LONG: 35.773607 / 95.304933	CLIENT: Enercon Services, Inc. CONTACT: Jamie Persico INQUIRY #: 4556333.2s DATE: March 07, 2016 9:31 am

DETAIL MAP - 4556333.2S

0 1/8 1/4 1/2 Miles

- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites
- Indian Reservations BIA
- Power transmission lines
- Pipelines
- 100-year flood zone
- 500-year flood zone
- National Wetland Inventory

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	Former Fansteel Site	CLIENT:	Enercon Services, Inc.
ADDRESS:	10 Tantalum Place Muskogee OK 74403	CONTACT:	Jamie Persico
		INQUIRY #:	4556333.2s
LAT/LONG:	35.773607 / 95.304933	DATE:	March 07, 2016 9:32 am

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	TP		NR	NR	NR	NR	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
CERCLIS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site List								
CERCLIS-NFRAP	0.500	1	0	0	0	NR	NR	1
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	1	0	0	NR	1
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-CESQG	0.250		0	1	NR	NR	NR	1
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROL	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	TP		NR	NR	NR	NR	NR	0
State- and tribal - equivalent CERCLIS								
SHWS	1.000		0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	0	NR	NR	0
LAST	0.500		0	0	0	NR	NR	0
INDIAN LUST	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
UST	0.250		0	1	NR	NR	NR	1
AST	0.250		0	1	NR	NR	NR	1
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal institutional control / engineering control registries								
INST CONTROL	0.500		0	0	0	NR	NR	0
State and tribal voluntary cleanup sites								
VCP	0.500		0	0	0	NR	NR	0
INDIAN VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
SWRCY	0.500		0	0	0	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	TP		NR	NR	NR	NR	NR	0
US CDL	TP		NR	NR	NR	NR	NR	0
Local Lists of Registered Storage Tanks								
HIST UST	0.250		0	1	NR	NR	NR	1
Local Land Records								
LIENS 2	TP		NR	NR	NR	NR	NR	0
Records of Emergency Release Reports								
HMIRS	TP		NR	NR	NR	NR	NR	0
OK COMPLAINT	TP		NR	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250	1	0	1	NR	NR	NR	2
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	TP		NR	NR	NR	NR	NR	0
EPA WATCH LIST	TP		NR	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
TSCA	TP		NR	NR	NR	NR	NR	0
TRIS	TP		NR	NR	NR	NR	NR	0
SSTS	TP		NR	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	TP		NR	NR	NR	NR	NR	0
RAATS	TP		NR	NR	NR	NR	NR	0
PRP	TP		NR	NR	NR	NR	NR	0
PADS	TP		NR	NR	NR	NR	NR	0
ICIS	TP	1	NR	NR	NR	NR	NR	1
FTTS	TP		NR	NR	NR	NR	NR	0
MLTS	TP		NR	NR	NR	NR	NR	0
COAL ASH DOE	TP		NR	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	TP		NR	NR	NR	NR	NR	0
RADINFO	TP		NR	NR	NR	NR	NR	0
HIST FTTS	TP		NR	NR	NR	NR	NR	0
DOT OPS	TP		NR	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	TP		NR	NR	NR	NR	NR	0
US AIRS	TP		NR	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
FINDS	TP	1	NR	NR	NR	NR	NR	1
AIRS	TP		NR	NR	NR	NR	NR	0
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
Financial Assurance	TP		NR	NR	NR	NR	NR	0
TIER 2	TP	3	NR	NR	NR	NR	NR	3
UIC	TP		NR	NR	NR	NR	NR	0
ECHO	TP	1	NR	NR	NR	NR	NR	1
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA HWS	TP		NR	NR	NR	NR	NR	0
RGA LF	TP		NR	NR	NR	NR	NR	0
RGA LUST	TP		NR	NR	NR	NR	NR	0
- Totals –		8	0	6	0	0	0	14

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

A1
Target Property

FMRI, INC.
NUMBER 10 TANTALUM PLACE
MUSKOGEE, OK 74403

TIER 2 **S112012678**
N/A

Site 1 of 5 in cluster A

Actual:
541 ft.

OK TIER 2:

Facility ID:	FATR2011237KSP0026QL
Facilty Country:	USA
All Chems. Same as Last Year:	T
Date Tier 2 Signed:	2/29/2012
Dike/Other Safeguards Employed:	Not reported
Facility Department:	Not reported
Facility Date Modified:	6/20/2012
State Fees Total:	Not reported
Facility Fire District:	Not reported
Mailing Address:	Not reported
Mailing City,St,Zip:	Not reported
Mailing Country:	Not reported
Latitude:	35.775556
Longitude:	-95.308889
Lat/Long Location Description:	PG - Plant Entrance (General)
Lat/Long Method:	I4 - Interpolation (Digital Map - TIGER)
Number of Employees on Site:	7
Notes:	Not reported
Validation Report:	Not reported
Reporting Year:	2011
Site Coordinate Abbrvtions Submitted:	Not reported
State 1Require Contact:	Not reported
ID:	3339
Facility Type:	SIC
Facility Desctription:	Not reported
Facility Last Modified:	1/6/2003
ID:	00-722-1831
Facility Type:	Dun & Bradstreet
Facility Desctription:	Not reported
Facility Last Modified:	1/6/2003
ID:	56291
Facility Type:	NAICS
Facility Desctription:	Not reported
Facility Last Modified:	2/24/2010
Contact Record ID:	CTTR20115N8BP400304F
Contact Name:	POM James Burgess
Contact Email:	burgessj@emptychair.net
Contact Mail Address:	#10 Tantalum Place
Contact Mail City,St,Zip:	Muskogee, OK 74403
Contact Mail Country:	USA
Contact Type:	Emergency Contact
Contact Modified Date:	3/20/2012
Contact Record ID:	CTTR20115N8BS2007J8A
Contact Name:	RSO Rob Miller
Contact Email:	fmri@emptychair.net
Contact Mail Address:	#10 Tantalum Place
Contact Mail City,St,Zip:	Muskogee, OK 74403
Contact Mail Country:	USA
Contact Type:	Emergency Contact
Contact Modified Date:	3/20/2012
Contact Record ID:	CTTR20117RK02H008GJ2
Contact Name:	President Bob Compernolle

FMRI, INC. (Continued) **S112012678**

Contact Email:	Not reported
Contact Mail Address:	#10 Tantalum Place
Contact Mail City,St,Zip:	Muskogee, OK 74403
Contact Mail Country:	USA
Contact Type:	Owner / Operator
Contact Modified Date:	3/20/2012
Acute Health Risks:	Not reported
Average Daily Amount:	Not reported
Average Daily Amount Code:	Not reported
Chemical Inventory Record ID:	Not reported
Chemical Same As Last Year:	Not reported
Chronic Heath Risks:	Not reported
CAS Number:	Not reported
EHS Substance:	Not reported
Last Modified:	Not reported
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	Not reported
Chemical Name:	Not reported
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	Not reported
Max Daily Amount:	Not reported
Max Daily Amount Code:	Not reported
Max Amount in Largest Container:	Not reported
Mixture Form:	Not reported
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	Not reported
Reactive Hazard:	Not reported
Solid:	Not reported
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	Not reported
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported

A2 Target Property | **FANSTEEL METALS**
10 TANTALUM PL
MUSKOGEE, OK 74401

Database(s): **CERCLIS-NFRAP, RCRA NonGen / NLR, ICIS**
EDR ID Number: **1000388376**
EPA ID Number: **OKD007221831**

Site 2 of 5 in cluster A

Actual: 541 ft.

CERCLIS-NFRAP:
Site ID: 0601045
Federal Facility: Not a Federal Facility
NPL Status: Not on the NPL
Non NPL Status: NFRAP-Site does not qualify for the NPL based on existing information

CERCLIS-NFRAP Site Contact Details:
Contact Sequence ID: 6424148.00000
Person ID: 6270175.00000

CERCLIS-NFRAP Site Alias Name(s):
Alias Name: FANSTEEL METALS
Alias Address: Not reported
MUSKOGEE, OK

CERCLIS-NFRAP Assessment History:
Action: PRELIMINARY ASSESSMENT
Date Started: 07/01/80
Date Completed: 07/01/80
Priority Level: Higher priority for further assessment

Action: SITE INSPECTION
Date Started: 06/01/81
Date Completed: 06/01/81
Priority Level: NFRAP-Site does not qualify for the NPL based on existing information

Action: DISCOVERY
Date Started: / /
Date Completed: 09/01/80
Priority Level: Not reported

Action: NON-NATIONAL PRIORITIES LIST POTENTIALLY RESPONSIBLE PARTY SEARCH
Date Started: 12/04/01
Date Completed: 12/06/01
Priority Level: Search Complete, Viable PRPs

Action: ARCHIVE SITE
Date Started: / /
Date Completed: 10/25/90
Priority Level: Not reported

RCRA NonGen / NLR:
Date form received by agency: 08/05/1980
Facility name: FANSTEEL METALS
Facility address: 10 TANTALUM PL
MUSKOGEE, OK 74401
EPA ID: OKD007221831
Mailing address: TANTALUM PLACE
MUSKOGEE, OK 74401
Contact: JAMES-A PIERRET
Contact address: 10 TANTALUM PLACE

FANSTEEL METALS (Continued) **1000388376**

MUSKOGEE, OK 74401
Contact country: US
Contact telephone: (918) 687-6303
Contact email: Not reported
EPA Region: 06
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

Owner/Operator Summary:
Owner/operator name: FANSTEEL INC
Owner/operator address: 1 TANTALUM PLACE
NORTH CHICAGO, IL 60064
Owner/operator country: Not reported
Owner/operator telephone: (312) 689-4900
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Owner/operator name: FANSTEEL INC
Owner/operator address: 1 TANTALUM PLACE
UNKNOWN, IL 00000
Owner/operator country: Not reported
Owner/operator telephone: (312) 689-4900
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: Not reported
Owner/Op end date: Not reported

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: D002
. Waste name: CORROSIVE WASTE

. Waste code: U134
. Waste name: HYDROFLUORIC ACID (C,T) (OR) HYDROGEN FLUORIDE (C,T)

. Waste code: U161
. Waste name: 4-METHYL-2-PENTANONE (I) (OR) METHYL ISOBUTYL KETONE (I) (OR) PENTANOL, 4-METHYL-

FANSTEEL METALS (Continued) **1000388376**

Violation Status: No violations found

ICIS:

Enforcement Action ID: 06-1987-0202
FRS ID: 110001632378
Program ID: FRS 110001632378
Action Name: FANSTEEL, INC.
Full Address: 10 TANTALUM PLACE MUSKOGEE OK 74403-9297
State: Oklahoma
Facility Name: FANSTEEL INC
Facility Address: 10 TANTALUM PLACE
MUSKOGEE, OK 74403-9297
Enforcement Action Type: Civil Judicial Action
Facility County: MUSKOGEE
EPA Region #: 6

Enforcement Action ID: 06-1987-0202
FRS ID: 110001632378
Program ID: TRIS 74401FNSTLNUMBE
Action Name: FANSTEEL, INC.
Full Address: 10 TANTALUM PLACE MUSKOGEE OK 74403-9297
State: Oklahoma
Facility Name: FANSTEEL INC
Facility Address: 10 TANTALUM PLACE
MUSKOGEE, OK 74403-9297
Enforcement Action Type: Civil Judicial Action
Facility County: MUSKOGEE
EPA Region #: 6

Enforcement Action ID: 06-1987-0202
FRS ID: 110001632378
Program ID: RCRAINFO OKD007221831
Action Name: FANSTEEL, INC.
Full Address: 10 TANTALUM PLACE MUSKOGEE OK 74403-9297
State: Oklahoma
Facility Name: FANSTEEL INC
Facility Address: 10 TANTALUM PLACE
MUSKOGEE, OK 74403-9297
Enforcement Action Type: Civil Judicial Action
Facility County: MUSKOGEE
EPA Region #: 6

Enforcement Action ID: 06-1987-0202
FRS ID: 110001632378
Program ID: NEI NEIOKT$11107
Action Name: FANSTEEL, INC.
Full Address: 10 TANTALUM PLACE MUSKOGEE OK 74403-9297
State: Oklahoma
Facility Name: FANSTEEL INC
Facility Address: 10 TANTALUM PLACE
MUSKOGEE, OK 74403-9297
Enforcement Action Type: Civil Judicial Action
Facility County: MUSKOGEE
EPA Region #: 6

Program ID: FRS 110001632378
Facility Name: FANSTEEL INC

FANSTEEL METALS (Continued) **1000388376**

Address:	10 TANTALUM PLACE
Tribal Indicator:	N
Fed Facility:	No
NAIC Code:	Not reported
SIC Code:	3339
Program ID:	NEI NEIOKT$11107
Facility Name:	FANSTEEL INC
Address:	10 TANTALUM PLACE
Tribal Indicator:	N
Fed Facility:	No
NAIC Code:	Not reported
SIC Code:	3339
Program ID:	RCRAINFO OKD007221831
Facility Name:	FANSTEEL INC
Address:	10 TANTALUM PLACE
Tribal Indicator:	N
Fed Facility:	No
NAIC Code:	Not reported
SIC Code:	3339
Program ID:	TRIS 74401FNSTLNUMBE
Facility Name:	FANSTEEL INC
Address:	10 TANTALUM PLACE
Tribal Indicator:	N
Fed Facility:	No
NAIC Code:	Not reported
SIC Code:	3339

A3 Target Property **FMRI, INC.** **TIER 2** **S107827404**
NUMBER 10 TANTALUM PLACE **N/A**
MUSKOGEE, OK 74446

Site 3 of 5 in cluster A

Actual: 541 ft.

OK TIER 2:

Facility ID:	Not reported
Facilty Country:	Not reported
All Chems. Same as Last Year:	Not reported
Date Tier 2 Signed:	Not reported
Dike/Other Safeguards Employed:	Not reported
Facility Department:	Not reported
Facility Date Modified:	9/13/2013
State Fees Total:	Not reported
Facility Fire District:	Not reported
Mailing Address:	Not reported
Mailing City,St,Zip:	Not reported
Mailing Country:	Not reported
Latitude:	35.775556
Longitude:	-95.308889
Lat/Long Location Description:	Not reported
Lat/Long Method:	Not reported
Number of Employees on Site:	Not reported
Notes:	Not reported
Validation Report:	Not reported
Reporting Year:	2012
Site Coordinate Abbrvtions Submitted:	Not reported

FMRI, INC. (Continued) **S107827404**

State 1Require Contact:		Not reported
ID:		Not reported
Facility Type:		Not reported
Facility Desctription:		Not reported
Facility Last Modified:		Not reported
Contact Record ID:	Not reported	
Contact Name:	Not reported	
Contact Email:	Not reported	
Contact Mail Address:	Not reported	
Contact Mail City,St,Zip:	Not reported	
Contact Mail Country:	Not reported	
Contact Type:	Not reported	
Contact Modified Date:	Not reported	
Acute Health Risks:		Not reported
Average Daily Amount:		Not reported
Average Daily Amount Code:		Not reported
Chemical Inventory Record ID:		Not reported
Chemical Same As Last Year:		Not reported
Chronic Heath Risks:		Not reported
CAS Number:		Not reported
EHS Substance:		Not reported
Last Modified:		Not reported
State Max Daily Amt Required:		Not reported
State Unit Required:		Not reported
Days on Site:		Not reported
Chemical Name:		Not reported
Fire Hazard:		Not reported
Gas:		Not reported
Liquid:		Not reported
Max Daily Amount:		Not reported
Max Daily Amount Code:		Not reported
Max Amount in Largest Container:		Not reported
Mixture Form:		Not reported
"Sudden Release of Preasue" Hazard:		Not reported
Pure Form:		Not reported
Reactive Hazard:		Not reported
Solid:		Not reported
State Contact Field:		Not reported
State Contact Comment:		Not reported
State EHS Comment:		Not reported
State Label Code:		Not reported
Max Daily Amount Required:		Not reported
State Mac Per Container Required:		Not reported
State Req Heading:		Not reported
Trade Secret:		Not reported
Mixture Chemical:		Not reported
Mixture Percentage:		Not reported
Mixture CAS:		Not reported
Mixture EHS:		Not reported
Mixture Last Modified:		Not reported
Amount of Substnce:		Not reported
Amount Units:		Not reported
Type of Storage:		Not reported
Number Code for Storage Pressure:		Not reported
Number Code for Storage Temperature:		Not reported
Last Modified:		Not reported
Location:		Not reported

FMRI, INC. (Continued) **S107827404**

Facility ID:	Not reported
Facilty Country:.	USA
All Chems. Same as Last Year:	Not reported
Date Tier 2 Signed:	3/2/2015
Dike/Other Safeguards Employed:	Not reported
Facility Department:	Not reported
Facility Date Modified:	Not reported
State Fees Total:	Not reported
Facility Fire District:	Not reported
Mailing Address:	Not reported
Mailing City,St,Zip:	Not reported
Mailing Country:	Not reported
Latitude:	35.775556
Longitude:	-95.308889
Lat/Long Location Description:	Not reported
Lat/Long Method:	Not reported
Number of Employees on Site:	Not reported
Notes:	Not reported
Validation Report:	Not reported
Reporting Year:	2014
Site Coordinate Abbrvtions Submitted:	Not reported
State 1Require Contact:	Not reported
ID:	Not reported
Facility Type:	Not reported
Facility Desctription:	Not reported
Facility Last Modified:	Not reported
Contact Record ID: Not reported	
Contact Name: Not reported	
Contact Email: Not reported	
Contact Mail Address: Not reported	
Contact Mail City,St,Zip: Not reported	
Contact Mail Country: Not reported	
Contact Type: Not reported	
Contact Modified Date: Not reported	
Acute Health Risks:	Not reported
Average Daily Amount:	Not reported
Average Daily Amount Code:	Not reported
Chemical Inventory Record ID:	Not reported
Chemical Same As Last Year:	Not reported
Chronic Heath Risks:	Not reported
CAS Number:	Not reported
EHS Substance:	Not reported
Last Modified:	Not reported
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	Not reported
Chemical Name:	Not reported
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	Not reported
Max Daily Amount:	Not reported
Max Daily Amount Code:	Not reported
Max Amount in Largest Container:	Not reported
Mixture Form:	Not reported
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	Not reported
Reactive Hazard:	Not reported

FMRI, INC. (Continued) **S107827404**

Solid:	Not reported
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	Not reported
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported
Facility ID:	Not reported
Facilty Country:	USA
All Chems. Same as Last Year:	Not reported
Date Tier 2 Signed:	2/28/2014
Dike/Other Safeguards Employed:	Not reported
Facility Department:	Not reported
Facility Date Modified:	Not reported
State Fees Total:	Not reported
Facility Fire District:	Not reported
Mailing Address:	Not reported
Mailing City,St,Zip:	Not reported
Mailing Country:	Not reported
Latitude:	35.775556
Longitude:	-95.308889
Lat/Long Location Description:	Not reported
Lat/Long Method:	Not reported
Number of Employees on Site:	Not reported
Notes:	Not reported
Validation Report:	Not reported
Reporting Year:	2013
Site Coordinate Abbrvtions Submitted:	Not reported
State 1Require Contact:	Not reported
ID:	Not reported
Facility Type:	Not reported
Facility Desctription:	Not reported
Facility Last Modified:	Not reported
Contact Record ID: Not reported	
Contact Name: Not reported	
Contact Email: Not reported	
Contact Mail Address: Not reported	
Contact Mail City,St,Zip: Not reported	
Contact Mail Country: Not reported	
Contact Type: Not reported	
Contact Modified Date: Not reported	
Acute Health Risks:	Not reported

FMRI, INC. (Continued) **S107827404**

Average Daily Amount:	Not reported
Average Daily Amount Code:	Not reported
Chemical Inventory Record ID:	Not reported
Chemical Same As Last Year:	Not reported
Chronic Heath Risks:	Not reported
CAS Number:	Not reported
EHS Substance:	Not reported
Last Modified:	Not reported
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	Not reported
Chemical Name:	Not reported
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	Not reported
Max Daily Amount:	Not reported
Max Daily Amount Code:	Not reported
Max Amount in Largest Container:	Not reported
Mixture Form:	Not reported
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	Not reported
Reactive Hazard:	Not reported
Solid:	Not reported
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	Not reported
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported

Facility ID:	FATR2009237KSP0026QL
Facilty Country:	USA
All Chems. Same as Last Year:	T
Date Tier 2 Signed:	2/24/2010
Dike/Other Safeguards Employed:	Not reported
Facility Department:	Not reported
Facility Date Modified:	4/19/2010
State Fees Total:	Not reported
Facility Fire District:	Not reported
Mailing Address:	Not reported
Mailing City,St,Zip:	Not reported
Mailing Country:	Not reported
Latitude:	35.775556

FMRI, INC. (Continued) **S107827404**

Longitude:	-95.308889
Lat/Long Location Description:	PG - Plant Entrance (General)
Lat/Long Method:	I4 - Interpolation (Digital Map - TIGER)
Number of Employees on Site:	7
Notes:	Not reported
Validation Report:	This facility passed all validation checks.
Reporting Year:	2009
Site Coordinate Abbrvtions Submitted:	Not reported
State 1Require Contact:	Not reported
ID:	3339
Facility Type:	SIC
Facility Desctription:	Not reported
Facility Last Modified:	1/6/2003
ID:	00-722-1831
Facility Type:	Dun & Bradstreet
Facility Desctription:	Not reported
Facility Last Modified:	1/6/2003
ID:	56291
Facility Type:	NAICS
Facility Desctription:	Not reported
Facility Last Modified:	2/24/2010
Contact Record ID:	CTTR20093JQZVE005VES
Contact Name:	PRESIDENT, FMRI, INC. Jon Jackson
Contact Email:	jjackson@fansteel.com
Contact Mail Address:	10 TANTALUM PLACE
Contact Mail City,St,Zip:	MUSKOGEE, OK 74403
Contact Mail Country:	USA
Contact Type:	Owner / Operator
Contact Modified Date:	3/25/2010
Contact Record ID:	CTTR20095N8BS2007J8A
Contact Name:	RSO Rob Miller
Contact Email:	fmri@emptychair.net
Contact Mail Address:	#10 Tantalum Place
Contact Mail City,St,Zip:	Muskogee, OK 74403
Contact Mail Country:	USA
Contact Type:	Emergency Contact
Contact Modified Date:	3/25/2010
Contact Record ID:	CTTR20095N8BP400304F
Contact Name:	POM James Burgess
Contact Email:	burgessj@emptychair.net
Contact Mail Address:	#10 Tantalum Place
Contact Mail City,St,Zip:	Muskogee, OK 74403
Contact Mail Country:	USA
Contact Type:	Emergency Contact
Contact Modified Date:	3/25/2010
Acute Health Risks:	True
Average Daily Amount:	Not reported
Average Daily Amount Code:	5
Chemical Inventory Record ID:	CVTR2009237LZF00MGGR
Chemical Same As Last Year:	True
Chronic Heath Risks:	True
CAS Number:	1344-28-1
EHS Substance:	Not reported
Last Modified:	3/25/2010
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	365

FMRI, INC. (Continued) **S107827404**

Chemical Name:	ALUMINUM OXIDE
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	Not reported
Max Daily Amount:	Not reported
Max Daily Amount Code:	5
Max Amount in Largest Container:	Not reported
Mixture Form:	Not reported
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	True
Reactive Hazard:	Not reported
Solid:	True
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	OK2009
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported
Acute Health Risks:	True
Average Daily Amount:	Not reported
Average Daily Amount Code:	4
Chemical Inventory Record ID:	CVTR2009237MLX00U1KH
Chemical Same As Last Year:	True
Chronic Heath Risks:	Not reported
CAS Number:	1336-21-6
EHS Substance:	Not reported
Last Modified:	3/25/2010
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	365
Chemical Name:	AMMONIUM HYDROXIDE (19% AQUEOUS)
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	True
Max Daily Amount:	Not reported
Max Daily Amount Code:	4
Max Amount in Largest Container:	Not reported
Mixture Form:	True
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	Not reported
Reactive Hazard:	Not reported
Solid:	Not reported
State Contact Field:	Not reported

FMRI, INC. (Continued) **S107827404**

State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	OK2009
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported
Acute Health Risks:	True
Average Daily Amount:	Not reported
Average Daily Amount Code:	5
Chemical Inventory Record ID:	CVTR2009239BD6001XVD
Chemical Same As Last Year:	True
Chronic Heath Risks:	True
CAS Number:	7789-75-5
EHS Substance:	Not reported
Last Modified:	3/25/2010
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	365
Chemical Name:	CALCIUM FLUORIDE SLUDGE (80%)
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	Not reported
Max Daily Amount:	Not reported
Max Daily Amount Code:	9
Max Amount in Largest Container:	Not reported
Mixture Form:	True
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	Not reported
Reactive Hazard:	Not reported
Solid:	True
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	OK2009
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported

FMRI, INC. (Continued) **S107827404**

Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported
Acute Health Risks:	True
Average Daily Amount:	Not reported
Average Daily Amount Code:	4
Chemical Inventory Record ID:	CVTR2009237MQJ00W62U
Chemical Same As Last Year:	True
Chronic Heath Risks:	True
CAS Number:	1305-78-8
EHS Substance:	Not reported
Last Modified:	3/25/2010
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	365
Chemical Name:	CALCIUM OXIDE
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	Not reported
Max Daily Amount:	Not reported
Max Daily Amount Code:	4
Max Amount in Largest Container:	Not reported
Mixture Form:	Not reported
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	True
Reactive Hazard:	True
Solid:	True
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	OK2009
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported
Acute Health Risks:	True
Average Daily Amount:	Not reported
Average Daily Amount Code:	7
Chemical Inventory Record ID:	CVTR2009239BQQ003X5V
Chemical Same As Last Year:	True
Chronic Heath Risks:	True
CAS Number:	7440-25-7

FMRI, INC. (Continued) **S107827404**

EHS Substance:	Not reported
Last Modified:	3/25/2010
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	365
Chemical Name:	WORK IN PROCESS POND RESIDUES (TANTALUM PRODUCT)
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	Not reported
Max Daily Amount:	Not reported
Max Daily Amount Code:	7
Max Amount in Largest Container:	Not reported
Mixture Form:	True
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	Not reported
Reactive Hazard:	Not reported
Solid:	True
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	OK2009
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported

A4 Target Property **FANSTEEL INC**
10 TANTALUM PL
MUSKOGEE, OK 74403

FINDS 1016074530
ECHO N/A

Site 4 of 5 in cluster A

Actual: 541 ft.

FINDS:

Registry ID: 110001632378

Environmental Interest/Information System

US EPA TRIS (Toxics Release Inventory System) contains information from facilities on the amounts of over 300 listed toxic chemicals that these facilities release directly to air, water, land, or that are transported off-site.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA

FANSTEEL INC (Continued) **1016074530**

program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

ICIS (Integrated Compliance Information System) is the Integrated Compliance Information System and provides a database that, when complete, will contain integrated Enforcement and Compliance information across most of EPA's programs. The vision for ICIS is to replace EPA's independent databases that contain Enforcement data with a single repository for that information. Currently, ICIS contains all Federal Administrative and Judicial enforcement actions. This information is maintained in ICIS by EPA in the Regional offices and it Headquarters. A future release of ICIS will replace the Permit Compliance System (PCS) which supports the NPDES and will integrate that information with Federal actions already in the system. ICIS also has the capability to track other activities occurring in the Region that support Compliance and Enforcement programs. These include; Incident Tracking, Compliance Assistance, and Compliance Monitoring.

ECHO:

Envid:	1016074530
Registry ID:	110001632378
FIPS Code:	40101
EPA Region:	06
Indian Country Flag:	Y
Federal Flag:	N
US Mexico Border Flag:	Not reported
Chesapeake Bay Flag:	Not reported
NAA Flag:	Not reported
Latitude:	35.77508
Longitude:	-95.308772
Map Icon:	RCRA-IC-MN-N.png
Collection Method:	ADDRESS MATCHING-HOUSE NUMBER
Reference Point:	ENTRANCE POINT OF A FACILITY OR STATION
Accuracy Meters:	50
Derived Tribes:	Cherokee Nation - 0 mile(s), The Muscogee (Creek) Nation - 0 mile(s)
Derived Huc:	11110102
Derived WBD:	Not reported
Derived STCT FPS:	40101
Derived Zip:	74403
Derived CD113:	02
Derived CB2010:	401010004001020
Percent Minority:	Not reported
Pop Den:	Not reported
Major Flag:	Not reported
Active Flag:	Not reported
MYRTK Universe:	NNN
Inspection Count:	0
Date Last Inspection:	Not reported
Days Last Inspection:	Not reported
Informal Count:	0
Date Last Informal Action:	Not reported
Formal Action Count:	0
Date Last Formal Action:	08/17/1988
Total Penalties:	0
Penalty Count:	0
Date Last Penalty:	08/17/1988

FANSTEEL INC (Continued) **1016074530**

Last Penalty Amount:	99000
QTRS in NC:	0
Programs in SNC:	0
Curr Compliance Status:	No Violation
Curr SNC Flag:	N
3yr Compliance Status:	
AFS Flag:	N
NPDES Flag:	N
SDWIS Flag:	N
RCRA Flag:	Y
TRI Flag:	N
GHG Flag:	N
AFS IDS:	Not reported
CAA Permit Types:	Not reported
CAA NAICS:	Not reported
CAA SICS:	Not reported
CAA Evaluation Count:	Not reported
CAA Days Last Evaluation:	Not reported
CAA Informal Count:	Not reported
CAA Formal Action Count:	Not reported
CAA Date Last Formal Action:	Not reported
CAA Penalties:	Not reported
CAA Last Penality Date:	Not reported
CAA Last Penality Amount:	Not reported
CAA Qtrs in NC:	Not reported
CAA Curr Compliance Status:	Not reported
CAA Curr HPV Flag:	N
CAA 3yr Compl Qtrs Status:	Not reported
NPDES IDS:	Not reported
CWA Permit Types:	Not reported
CWA Compliance Tracking:	Not reported
CWA NAICS:	Not reported
CWA SICS:	Not reported
CWA Inspection Count:	Not reported
CWA Days Last Inspection:	Not reported
CWA Informal Count:	Not reported
CWA Formal Action Count:	Not reported
CWA Date Last Formal Action:	Not reported
CWA Penalties:	Not reported
CWA Last Penality Date:	Not reported
CWA Last Penality Amount:	Not reported
CWA Qtrs in NC:	Not reported
CWA Curr Compliance Status:	Not reported
CWA Curr SNC Flag:	N
CWA 13QTRS Compl Status:	Not reported
CWA 13QTRS EFFLNT Exceedances:	Not reported
CWA 3tr QNCR Codes:	Not reported
RCRA IDS:	OKD007221831
RCRA Permit Types:	Other
RCRA NAICS:	331419
RCRA Inspection Count:	Not reported
RCRA Days Last Evaluation:	Not reported
RCRA Informal Count:	Not reported
RCRA Formal Action Count:	Not reported
RCRA Date Last Formal Action:	Not reported
RCRA Penalties:	Not reported
RCRA Last Penality Date:	Not reported

FANSTEEL INC (Continued) **1016074530**

RCRA Last Penality Amount:	Not reported
RCRA QTRS in NC:	0
RCRA Curr Compliance Status:	No Violation
RCRA Curr SNC Flag:	N
RCRA 3yr Compl Qtrs Status:	
SDWA IDS:	Not reported
SDWA System Types:	Not reported
SDWA Informal Count:	Not reported
SDWA Formal Action Count:	Not reported
SDWA Curr Compliance Status:	Not reported
SDWA Curr SNC Flag:	N
TRI IDS:	74401FNSTLNUMBE
TRI Releases Transfers:	Not reported
TRI on Site Releases:	Not reported
Tri off Site Transfers:	Not reported
TRI Reporter in Past:	Y
FEC Case IDS:	06-1987-0202 OK-51000040-08-1 OK-51000040-10-1 OK-51000040-12-208
FEC Number of Cases:	Not reported
FEC Last Case Date:	08/17/1988
FEC Total Penalties:	Not reported
GHG IDS:	Not reported
GHG CO2 Release:	Not reported
DFR URL:	http://echo.epa.gov/detailed_facility_report?fid=110001632378
Facility SIC Codes:	3339 2819
Facility NAICS Codes:	331419
Facility Date Last Inspection EPA:	Not reported
Facility Date Last Inspection State:	Not reported
Facility Date Last Formal ACT EPA:	08/17/1988
Facility Date Last Formal ACT ST:	Not reported
Facility Date Last Inforamal ACT EPA:	Not reported
Facility Date Last Informal ACT ST:	Not reported
Facility Federal Agency:	Not reported
TRI Reporter:	Not reported
Facility IMP Water Flag:	Not reported

A5
Target Property

FMRI, INC.
NUMBER 10 TANTALUM PLACE
MUSKOGEE, OK 74403

TIER 2 **S111162924**
N/A

Site 5 of 5 in cluster A

Actual:
541 ft.

OK TIER 2:

Facility ID:	FATR2010237KSP0026QL
Facilty Country:	USA
All Chems. Same as Last Year:	T
Date Tier 2 Signed:	02/28/2011
Dike/Other Safeguards Employed:	Not reported
Facility Department:	Not reported
Facility Date Modified:	3/23/2011
State Fees Total:	Not reported
Facility Fire District:	Not reported
Mailing Address:	Not reported
Mailing City,St,Zip:	Not reported
Mailing Country:	Not reported
Latitude:	35.775556
Longitude:	-95.308889
Lat/Long Location Description:	PG - Plant Entrance (General)
Lat/Long Method:	I4 - Interpolation (Digital Map - TIGER)

FMRI, INC. (Continued) **S111162924**

Number of Employees on Site:	7
Notes:	Not reported
Validation Report:	Not reported
Reporting Year:	2010
Site Coordinate Abbrvtions Submitted:	Not reported
State 1Require Contact:	Not reported
ID:	3339
Facility Type:	SIC
Facility Desctription:	Not reported
Facility Last Modified:	1/6/2003
ID:	00-722-1831
Facility Type:	Dun & Bradstreet
Facility Desctription:	Not reported
Facility Last Modified:	1/6/2003
ID:	56291
Facility Type:	NAICS
Facility Desctription:	Not reported
Facility Last Modified:	2/24/2010
Contact Record ID:	CTTR20105N8BP400304F
Contact Name:	POM James Burgess
Contact Email:	burgessj@emptychair.net
Contact Mail Address:	#10 Tantalum Place
Contact Mail City,St,Zip:	Muskogee, OK 74403
Contact Mail Country:	USA
Contact Type:	Emergency Contact
Contact Modified Date:	3/21/2011
Contact Record ID:	CTTR20105N8BS2007J8A
Contact Name:	RSO Rob Miller
Contact Email:	fmri@emptychair.net
Contact Mail Address:	#10 Tantalum Place
Contact Mail City,St,Zip:	Muskogee, OK 74403
Contact Mail Country:	USA
Contact Type:	Emergency Contact
Contact Modified Date:	3/21/2011
Contact Record ID:	CTTR20107RK02H008GJ2
Contact Name:	President Bob Compernolle
Contact Email:	Not reported
Contact Mail Address:	#10 Tantalum Place
Contact Mail City,St,Zip:	Muskogee, OK 74403
Contact Mail Country:	USA
Contact Type:	Owner / Operator
Contact Modified Date:	3/21/2011
Acute Health Risks:	True
Average Daily Amount:	Not reported
Average Daily Amount Code:	5
Chemical Inventory Record ID:	CVTR2010237LZF00MGGR
Chemical Same As Last Year:	True
Chronic Heath Risks:	True
CAS Number:	1344-28-1
EHS Substance:	Not reported
Last Modified:	3/21/2011
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	365
Chemical Name:	ALUMINUM OXIDE
Fire Hazard:	Not reported
Gas:	Not reported

FMRI, INC. (Continued) **S111162924**

Liquid:	Not reported
Max Daily Amount:	Not reported
Max Daily Amount Code:	5
Max Amount in Largest Container:	Not reported
Mixture Form:	Not reported
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	True
Reactive Hazard:	Not reported
Solid:	True
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	Not reported
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported
Acute Health Risks:	True
Average Daily Amount:	Not reported
Average Daily Amount Code:	4
Chemical Inventory Record ID:	CVTR2010237MLX00U1KH
Chemical Same As Last Year:	True
Chronic Heath Risks:	Not reported
CAS Number:	1336-21-6
EHS Substance:	Not reported
Last Modified:	3/21/2011
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	365
Chemical Name:	AMMONIUM HYDROXIDE (19% AQUEOUS)
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	True
Max Daily Amount:	Not reported
Max Daily Amount Code:	4
Max Amount in Largest Container:	Not reported
Mixture Form:	True
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	Not reported
Reactive Hazard:	Not reported
Solid:	Not reported
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	Not reported

FMRI, INC. (Continued) **S111162924**

Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported
Acute Health Risks:	True
Average Daily Amount:	Not reported
Average Daily Amount Code:	5
Chemical Inventory Record ID:	CVTR2010239BD6001XVD
Chemical Same As Last Year:	True
Chronic Heath Risks:	True
CAS Number:	7789-75-5
EHS Substance:	Not reported
Last Modified:	3/21/2011
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	365
Chemical Name:	CALCIUM FLUORIDE SLUDGE (80%)
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	Not reported
Max Daily Amount:	Not reported
Max Daily Amount Code:	9
Max Amount in Largest Container:	Not reported
Mixture Form:	True
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	Not reported
Reactive Hazard:	Not reported
Solid:	True
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	Not reported
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported

FMRI, INC. (Continued) **S111162924**

Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported
Acute Health Risks:	True
Average Daily Amount:	Not reported
Average Daily Amount Code:	4
Chemical Inventory Record ID:	CVTR2010237MQJ00W62U
Chemical Same As Last Year:	True
Chronic Heath Risks:	True
CAS Number:	1305-78-8
EHS Substance:	Not reported
Last Modified:	3/21/2011
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	365
Chemical Name:	CALCIUM OXIDE
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	Not reported
Max Daily Amount:	Not reported
Max Daily Amount Code:	4
Max Amount in Largest Container:	Not reported
Mixture Form:	Not reported
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	True
Reactive Hazard:	True
Solid:	True
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	Not reported
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported
Acute Health Risks:	True
Average Daily Amount:	Not reported
Average Daily Amount Code:	7
Chemical Inventory Record ID:	CVTR2010239BQQ003X5V
Chemical Same As Last Year:	True
Chronic Heath Risks:	True
CAS Number:	7440-25-7
EHS Substance:	Not reported
Last Modified:	3/21/2011
State Max Daily Amt Required:	Not reported

FMRI, INC. (Continued) **S111162924**

State Unit Required:	Not reported
Days on Site:	365
Chemical Name:	WORK IN PROCESS POND RESIDUES (TANTALUM PRODUCT)
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	Not reported
Max Daily Amount:	Not reported
Max Daily Amount Code:	7
Max Amount in Largest Container:	Not reported
Mixture Form:	True
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	Not reported
Reactive Hazard:	Not reported
Solid:	True
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	Not reported
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported

6
North
1/8-1/4
0.142 mi.
752 ft.

ERGON ASPHALT & EMULSIONS INC
2501 PORT PLACE
MUSKOGEE, OK 74401

RCRA-CESQG **1001120050**
US AIRS **OKR000002139**
FINDS
ECHO

Relative:
Lower

Actual:
527 ft.

RCRA-CESQG:

Date form received by agency:	06/01/2009
Facility name:	ERGON ASPHALT & EMULSIONS INC
Facility address:	2501 PORT PLACE MUSKOGEE, OK 744012501
EPA ID:	OKR000002139
Mailing address:	PO BOX 1639 JACKSON, MS 39215
Contact:	STEVE CLARK
Contact address:	PO BOX 1639 JACKSON, MS 39215
Contact country:	US
Contact telephone:	(601) 933-1022
Contact email:	STEVE.CLARK@ERGON.COM
EPA Region:	06
Land type:	Private
Classification:	Conditionally Exempt Small Quantity Generator

ERGON ASPHALT & EMULSIONS INC (Continued) **1001120050**

Description: Handler: generates 100 kg or less of hazardous waste per calendar month, and accumulates 1000 kg or less of hazardous waste at any time; or generates 1 kg or less of acutely hazardous waste per calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste; or generates 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste during any calendar month, and accumulates at any time: 1 kg or less of acutely hazardous waste; or 100 kg or less of any residue or contaminated soil, waste or other debris resulting from the cleanup of a spill, into or on any land or water, of acutely hazardous waste

Owner/Operator Summary:

Owner/operator name: KOCH MATERIALS COMPANY
Owner/operator address: PO BOX 2338
WICHITA, KS 67201
Owner/operator country: US
Owner/operator telephone: (316) 828-4671
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 02/01/2002
Owner/Op end date: 05/31/2005

Owner/operator name: ERGON ASPHALT & EMULSIONS INC
Owner/operator address: Not reported
Not reported
Owner/operator country: Not reported
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 05/15/2009
Owner/Op end date: Not reported

Owner/operator name: SEM MATERIALS LP
Owner/operator address: S YALE AVE SUITE 700
TULSA, OK 74136
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Operator
Owner/Op start date: 05/31/2005
Owner/Op end date: Not reported

Owner/operator name: SEM MATERIALS LP
Owner/operator address: S YALE AVE SUITE 700
TULSA, OK 74136
Owner/operator country: US
Owner/operator telephone: Not reported
Legal status: Private
Owner/Operator Type: Owner
Owner/Op start date: 05/31/2005
Owner/Op end date: Not reported

ERGON ASPHALT & EMULSIONS INC (Continued) **1001120050**

Handler Activities Summary:
U.S. importer of hazardous waste: No
Mixed waste (haz. and radioactive): No
Recycler of hazardous waste: No
Transporter of hazardous waste: No
Treater, storer or disposer of HW: No
Underground injection activity: No
On-site burner exemption: No
Furnace exemption: No
Used oil fuel burner: No
Used oil processor: No
User oil refiner: No
Used oil fuel marketer to burner: No
Used oil Specification marketer: No
Used oil transfer facility: No
Used oil transporter: No

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D018
. Waste name: BENZENE

. Waste code: D039
. Waste name: TETRACHLOROETHYLENE

. Waste code: D040
. Waste name: TRICHLORETHYLENE

Historical Generators:
Date form received by agency: 03/08/2006
Site name: SEM MATERIALS MUSKOGEE PLANT
Classification: Conditionally Exempt Small Quantity Generator

Date form received by agency: 02/01/2002
Site name: KOCH MATERIALS COMPANY
Classification: Small Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: D018
. Waste name: BENZENE

. Waste code: D039
. Waste name: TETRACHLOROETHYLENE

. Waste code: D040
. Waste name: TRICHLORETHYLENE

Date form received by agency: 03/13/2000
Site name: KOCH MATERIALS COMPANY
Classification: Small Quantity Generator

Violation Status: No violations found

ERGON ASPHALT & EMULSIONS INC (Continued) **1001120050**

Evaluation Action Summary:
- Evaluation date: 09/27/2002
- Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
- Area of violation: Not reported
- Date achieved compliance: Not reported
- Evaluation lead agency: State

US AIRS (AFS):
- Envid: 1001120050
- Region Code: 06
- County Code: OK101
- Programmatic ID: AIR OK0000004010100026
- Facility Registry ID: 110001645783
- D and B Number: Not reported
- Facility Site Name: ERGON ASPHALT AND EMULSIONS INC / MUSKOGEE OK FACLTY
- Primary SIC Code: 2951
- NAICS Code: 324121
- Default Air Classification Code: SMI
- Facility Type of Ownership Code: POF
- Air CMS Category Code: SMI
- HPV Status: Not reported

US AIRS (AFS):
- Region Code: 06
- Programmatic ID: AIR OK0000004010100026
- Facility Registry ID: 110001645783
- Air Operating Status Code: OPR
- Default Air Classification Code: SMI
- Air Program: New Source Performance Standards
- Activity Date: 2001-07-17 00:00:00
- Activity Status Date: Not reported
- Activity Group: Compliance Monitoring
- Activity Type: Inspection/Evaluation
- Activity Status: Not reported

- Region Code: 06
- Programmatic ID: AIR OK0000004010100026
- Facility Registry ID: 110001645783
- Air Operating Status Code: OPR
- Default Air Classification Code: SMI
- Air Program: New Source Performance Standards
- Activity Date: 2003-10-10 00:00:00
- Activity Status Date: Not reported
- Activity Group: Compliance Monitoring
- Activity Type: Inspection/Evaluation
- Activity Status: Not reported

- Region Code: 06
- Programmatic ID: AIR OK0000004010100026
- Facility Registry ID: 110001645783
- Air Operating Status Code: OPR
- Default Air Classification Code: SMI
- Air Program: New Source Performance Standards
- Activity Date: 2003-10-24 00:00:00
- Activity Status Date: Not reported
- Activity Group: Compliance Monitoring
- Activity Type: Inspection/Evaluation
- Activity Status: Not reported

ERGON ASPHALT & EMULSIONS INC (Continued) **1001120050**

Region Code:	06
Programmatic ID:	AIR OK0000004010100026
Facility Registry ID:	110001645783
Air Operating Status Code:	OPR
Default Air Classification Code:	SMI
Air Program:	New Source Performance Standards
Activity Date:	2005-12-13 00:00:00
Activity Status Date:	Not reported
Activity Group:	Compliance Monitoring
Activity Type:	Inspection/Evaluation
Activity Status:	Not reported

Region Code:	06
Programmatic ID:	AIR OK0000004010100026
Facility Registry ID:	110001645783
Air Operating Status Code:	OPR
Default Air Classification Code:	SMI
Air Program:	New Source Performance Standards
Activity Date:	2009-11-18 00:00:00
Activity Status Date:	Not reported
Activity Group:	Compliance Monitoring
Activity Type:	Inspection/Evaluation
Activity Status:	Not reported

Region Code:	06
Programmatic ID:	AIR OK0000004010100026
Facility Registry ID:	110001645783
Air Operating Status Code:	OPR
Default Air Classification Code:	SMI
Air Program:	New Source Performance Standards
Activity Date:	2014-06-12 00:00:00
Activity Status Date:	Not reported
Activity Group:	Compliance Monitoring
Activity Type:	Inspection/Evaluation
Activity Status:	Not reported

Region Code:	06
Programmatic ID:	AIR OK0000004010100026
Facility Registry ID:	110001645783
Air Operating Status Code:	OPR
Default Air Classification Code:	SMI
Air Program:	State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date:	1996-06-10 00:00:00
Activity Status Date:	Not reported
Activity Group:	Compliance Monitoring
Activity Type:	Inspection/Evaluation
Activity Status:	Not reported

Region Code:	06
Programmatic ID:	AIR OK0000004010100026
Facility Registry ID:	110001645783
Air Operating Status Code:	OPR
Default Air Classification Code:	SMI
Air Program:	State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date:	2001-07-17 00:00:00
Activity Status Date:	Not reported
Activity Group:	Compliance Monitoring

ERGON ASPHALT & EMULSIONS INC (Continued) **1001120050**

Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 06
Programmatic ID: AIR OK0000004010100026
Facility Registry ID: 110001645783
Air Operating Status Code: OPR
Default Air Classification Code: SMI
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2003-10-10 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 06
Programmatic ID: AIR OK0000004010100026
Facility Registry ID: 110001645783
Air Operating Status Code: OPR
Default Air Classification Code: SMI
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2003-10-24 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 06
Programmatic ID: AIR OK0000004010100026
Facility Registry ID: 110001645783
Air Operating Status Code: OPR
Default Air Classification Code: SMI
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2005-12-13 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 06
Programmatic ID: AIR OK0000004010100026
Facility Registry ID: 110001645783
Air Operating Status Code: OPR
Default Air Classification Code: SMI
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards
Activity Date: 2009-11-18 00:00:00
Activity Status Date: Not reported
Activity Group: Compliance Monitoring
Activity Type: Inspection/Evaluation
Activity Status: Not reported

Region Code: 06
Programmatic ID: AIR OK0000004010100026
Facility Registry ID: 110001645783
Air Operating Status Code: OPR
Default Air Classification Code: SMI
Air Program: State Implementation Plan for National Primary and Secondary Ambient Air Quality Standards

ERGON ASPHALT & EMULSIONS INC (Continued) **1001120050**

Activity Date:	2014-06-12 00:00:00
Activity Status Date:	Not reported
Activity Group:	Compliance Monitoring
Activity Type:	Inspection/Evaluation
Activity Status:	Not reported

FINDS:

Registry ID: 110001645783

Environmental Interest/Information System

AFS (Aerometric Information Retrieval System (AIRS) Facility Subsystem) replaces the former Compliance Data System (CDS), the National Emission Data System (NEDS), and the Storage and Retrieval of Aerometric Data (SAROAD). AIRS is the national repository for information concerning airborne pollution in the United States. AFS is used to track emissions and compliance data from industrial plants. AFS data are utilized by states to prepare State Implementation Plans to comply with regulatory programs and by EPA as an input for the estimation of total national emissions. AFS is undergoing a major redesign to support facility operating permits required under Title V of the Clean Air Act.

AIR SYNTHETIC MINOR

US EPA TRIS (Toxics Release Inventory System) contains information from facilities on the amounts of over 300 listed toxic chemicals that these facilities release directly to air, water, land, or that are transported off-site.

US National Pollutant Discharge Elimination System (NPDES) module of the Compliance Information System (ICIS) tracks surface water permits issued under the Clean Water Act. Under NPDES, all facilities that discharge pollutants from any point source into waters of the United States are required to obtain a permit. The permit will likely contain limits on what can be discharged, impose monitoring and reporting requirements, and include other provisions to ensure that the discharge does not adversely affect water quality.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

ECHO:

Envid:	1001120050
Registry ID:	110001645783
FIPS Code:	40101
EPA Region:	06
Indian Country Flag:	N
Federal Flag:	N
US Mexico Border Flag:	Not reported

ERGON ASPHALT & EMULSIONS INC (Continued) **1001120050**

Chesapeake Bay Flag:	Not reported
NAA Flag:	Not reported
Latitude:	35.78588
Longitude:	-95.30257
Map Icon:	MULT-IC-MN-2.png
Collection Method:	ADDRESS MATCHING-HOUSE NUMBER
Reference Point:	ENTRANCE POINT OF A FACILITY OR STATION
Accuracy Meters:	50
Derived Tribes:	Cherokee Nation - 0 mile(s), The Muscogee (Creek) Nation - .3 mile(s)
Derived Huc:	11110102
Derived WBD:	111101020307
Derived STCT FPS:	40101
Derived Zip:	74403
Derived CD113:	02
Derived CB2010:	401010004001013
Percent Minority:	Not reported
Pop Den:	Not reported
Major Flag:	Not reported
Active Flag:	Y
MYRTK Universe:	NNN
Inspection Count:	1
Date Last Inspection:	06/12/2014
Days Last Inspection:	465
Informal Count:	0
Date Last Informal Action:	Not reported
Formal Action Count:	0
Date Last Formal Action:	Not reported
Total Penalties:	0
Penalty Count:	0
Date Last Penalty:	Not reported
Last Penalty Amount:	Not reported
QTRS in NC:	1
Programs in SNC:	0
Curr Compliance Status:	No Violation
Curr SNC Flag:	N
3yr Compliance Status:	_____V____
AFS Flag:	Y
NPDES Flag:	Y
SDWIS Flag:	N
RCRA Flag:	Y
TRI Flag:	Y
GHG Flag:	N
AFS IDS:	OK0000004010100026
CAA Permit Types:	Synthetic Minor Emissions
CAA NAICS:	324121
CAA SICS:	2951
CAA Evaluation Count:	1
CAA Days Last Evaluation:	465
CAA Informal Count:	Not reported
CAA Formal Action Count:	Not reported
CAA Date Last Formal Action:	Not reported
CAA Penalties:	Not reported
CAA Last Penality Date:	Not reported
CAA Last Penality Amount:	Not reported
CAA Qtrs in NC:	0
CAA Curr Compliance Status:	No Violation
CAA Curr HPV Flag:	N

ERGON ASPHALT & EMULSIONS INC (Continued) **1001120050**

CAA 3yr Compl Qtrs Status:	
NPDES IDS:	OKG270039
CWA Permit Types:	Minor
CWA Compliance Tracking:	On
CWA NAICS:	Not reported
CWA SICS:	2951
CWA Inspection Count:	Not reported
CWA Days Last Inspection:	Not reported
CWA Informal Count:	Not reported
CWA Formal Action Count:	Not reported
CWA Date Last Formal Action:	Not reported
CWA Penalties:	Not reported
CWA Last Penality Date:	Not reported
CWA Last Penality Amount:	Not reported
CWA Qtrs in NC:	1
CWA Curr Compliance Status:	No Violation
CWA Curr SNC Flag:	N
CWA 13QTRS Compl Status:	V
CWA 13QTRS EFFLNT Exceedances:	Not reported
CWA 3tr QNCR Codes:	Not reported
RCRA IDS:	OKR000002139
RCRA Permit Types:	CESQG
RCRA NAICS:	324121
RCRA Inspection Count:	Not reported
RCRA Days Last Evaluation:	4741
RCRA Informal Count:	Not reported
RCRA Formal Action Count:	Not reported
RCRA Date Last Formal Action:	Not reported
RCRA Penalties:	Not reported
RCRA Last Penality Date:	Not reported
RCRA Last Penality Amount:	Not reported
RCRA QTRS in NC:	0
RCRA Curr Compliance Status:	No Violation
RCRA Curr SNC Flag:	N
RCRA 3yr Compl Qtrs Status:	
SDWA IDS:	Not reported
SDWA System Types:	Not reported
SDWA Informal Count:	Not reported
SDWA Formal Action Count:	Not reported
SDWA Curr Compliance Status:	Not reported
SDWA Curr SNC Flag:	N
TRI IDS:	74401KCHMT2501P
TRI Releases Transfers:	0
TRI on Site Releases:	0
Tri off Site Transfers:	0
TRI Reporter in Past:	Y
FEC Case IDS:	Not reported
FEC Number of Cases:	Not reported
FEC Last Case Date:	Not reported
FEC Total Penalties:	Not reported
GHG IDS:	Not reported
GHG CO2 Release:	Not reported
DFR URL:	http://echo.epa.gov/detailed_facility_report?fid=110001645783
Facility SIC Codes:	2951 5171
Facility NAICS Codes:	324121
Facility Date Last Inspection EPA:	Not reported
Facility Date Last Inspection State:	06/12/2014

ERGON ASPHALT & EMULSIONS INC (Continued) **1001120050**

Facility Date Last Formal ACT EPA:	Not reported
Facility Date Last Formal ACT ST:	Not reported
Facility Date Last Inforamal ACT EPA:	Not reported
Facility Date Last Informal ACT ST:	Not reported
Facility Federal Agency:	Not reported
TRI Reporter:	Y
Facility IMP Water Flag:	Not reported

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7 **INDIAN CAPITAL AVTS** **UST U001884132**
NW **2403 N 41ST ST E** **HIST UST N/A**
1/8-1/4 **MUSKOGEE, OK 74403**
0.183 mi.
967 ft.

Relative:
Higher

Actual:
541 ft.

UST:

Facility ID:	5113287
Contact Name:	Indian Capital Avts
Contact Address:	2403 N 41ST STR E
Contact Telephone:	9186876383
Contact City,St,Zip:	Muskogee, OK 74403
Lat/Long:	35.7745000 / -95.313900

Tank ID:	1
Tank Status:	Currently In Use
Total Capacity:	10000
Substance:	Diesel
Date Installed:	07/01/1993
Tank Type:	UST
Closed Date:	Not reported
Closed Status:	Not reported
Tank Material:	Steel
Tank Construction:	Single Walled
Pipe Material:	Fiberglass

Tank ID:	2
Tank Status:	Permanently Out Of Use
Total Capacity:	1000
Substance:	Not Listed
Date Installed:	Not reported
Tank Type:	UST
Closed Date:	07/17/1996
Closed Status:	Tank Removed From Ground

Tank ID:	3
Tank Status:	Currently In Use
Total Capacity:	4000
Substance:	Gasoline
Date Installed:	08/01/1996
Tank Type:	UST
Closed Date:	Not reported
Closed Status:	Not reported
Tank Material:	Steel
Tank Construction:	Single Walled
Pipe Material:	Steel

HIST UST:

INDIAN CAPITAL AVTS (Continued) **U001884132**

Facility ID: 5113287
Owner Name: INDIAN CAPITAL AVTS
Owner Address: 2403 N 41ST STR E
Owner City,St,Zip: Muskogee, OK 74403
Tank ID: 1
Tank Status: Currently in Use
Installed Date: 7/1/1993 0:00:00
Tank Capacity: 10000
Product: Gasoline

Facility ID: 5113287
Owner Name: INDIAN CAPITAL AVTS
Owner Address: 2403 N 41ST STR E
Owner City,St,Zip: Muskogee, OK 74403
Tank ID: 2
Tank Status: Permanently Out of Use
Installed Date: Not reported
Tank Capacity: 1000
Product: Not Listed

Facility ID: 5113287
Owner Name: INDIAN CAPITAL AVTS
Owner Address: 2403 N 41ST STR E
Owner City,St,Zip: Muskogee, OK 74403
Tank ID: 3
Tank Status: Currently In Use
Installed Date: 8/1/1996 0:00:00
Tank Capacity: 6000
Product: Diesel

8
NNW
1/8-1/4
0.228 mi.
1206 ft.

ZAPATA INDUSTRIES INC
4400 DON CAYO DR.
MUSKOGEE, OK 74403

CORRACTS **1000882645**
RCRA NonGen / NLR **OKD990751059**
FINDS
ECHO

Relative:
Lower

Actual:
528 ft.

CORRACTS:

EPA ID: OKD990751059
EPA Region: 6
Area Name: ENTIRE FACILITY
Actual Date: 19920224
Action: CA075ME - CA Prioritization, Facility or area was assigned a medium corrective action priority
NAICS Code(s): Not reported
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: OKD990751059
EPA Region: 6
Area Name: ENTIRE FACILITY
Actual Date: 19921125
Action: CA070NO - RFA Determination Of Need For An RFI, RFI is Not Necessary
NAICS Code(s): Not reported
Original schedule date: Not reported
Schedule end date: Not reported

ZAPATA INDUSTRIES INC (Continued) **1000882645**

EPA ID: OKD990751059
EPA Region: 6
Area Name: ENTIRE FACILITY
Actual Date: 19921125
Action: CA999NF - Corrective Action Process Terminated, No Further Action
NAICS Code(s): Not reported
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: OKD990751059
EPA Region: 6
Area Name: ENTIRE FACILITY
Actual Date: 19921125
Action: CA725YE - Current Human Exposures Under Control, Yes, Current Human Exposures Under Control has been verified
NAICS Code(s): Not reported
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: OKD990751059
EPA Region: 6
Area Name: ENTIRE FACILITY
Actual Date: 19921125
Action: CA750YE - Migration of Contaminated Groundwater under Control, Yes, Migration of Contaminated Groundwater Under Control has been verified
NAICS Code(s): Not reported
Original schedule date: Not reported
Schedule end date: Not reported

EPA ID: OKD990751059
EPA Region: 6
Area Name: ENTIRE FACILITY
Actual Date: 19880429
Action: CA050 - RFA Completed
NAICS Code(s): Not reported
Original schedule date: Not reported
Schedule end date: Not reported

RCRA NonGen / NLR:
Date form received by agency: 06/09/2014
Facility name: PROFORM INDUSTRIES
Facility address: 4400 DON CAYO DR
MUSKOGEE, OK 74403
EPA ID: OKD990751059
Mailing address: DON CAYO DR
MUSKOGEE, OK 74403
Contact: HARRY O MELLON
Contact address: DON CAYO DR
MUSKOGEE, OK 74403
Contact country: US
Contact telephone: (918) 683-4577
Telephone ext.: 149
Contact email: Not reported
EPA Region: 06
Land type: Private
Classification: Non-Generator
Description: Handler: Non-Generators do not presently generate hazardous waste

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Handler Activities Summary:

U.S. importer of hazardous waste:	No
Mixed waste (haz. and radioactive):	No
Recycler of hazardous waste:	No
Transporter of hazardous waste:	No
Treater, storer or disposer of HW:	No
Underground injection activity:	No
On-site burner exemption:	No
Furnace exemption:	No
Used oil fuel burner:	No
Used oil processor:	No
User oil refiner:	No
Used oil fuel marketer to burner:	No
Used oil Specification marketer:	No
Used oil transfer facility:	No
Used oil transporter:	No

Historical Generators:

Date form received by agency: 04/07/2010
Site name: FORMER ZAPATA INDUSTRIES INC
Classification: Not a generator, verified

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 02/25/2005
Site name: ZAPATA INDUSTRIES INC
Classification: Not a generator, verified

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Date form received by agency: 10/05/2004
Site name: ZAPATA INDUSTRIES INC
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 02/23/2004
Site name: ZAPATA INDUSTRIES INC.
Classification: Not a generator, verified

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 02/11/2002
Site name: ZAPATA INDUSTRIES INC.
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Date form received by agency: 12/22/2000
Site name: ZAPATA INDUSTRIES INC
Classification: Large Quantity Generator

. Waste code: D001
. Waste name: IGNITABLE WASTE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 11/02/2000
Site name: ZAPATA INDUSTRIES
Classification: Large Quantity Generator

Date form received by agency: 03/23/1998
Site name: ZAPATA INDUSTRIES, INC.
Classification: Large Quantity Generator

Date form received by agency: 02/19/1996
Site name: ZAPATA INDUSTRIES, INC.
Classification: Large Quantity Generator

Date form received by agency: 02/24/1994
Site name: ZAPATA INDUSTRIES, INC.
Classification: Large Quantity Generator

Date form received by agency: 02/25/1992
Site name: ZAPATA INDUSTRIES, INC.
Classification: Large Quantity Generator

Date form received by agency: 03/01/1990
Site name: ZAPATA INDUSTRIES INC.
Classification: Large Quantity Generator

Date form received by agency: 11/19/1980
Site name: ZAPATA INDUSTRIES INC
Classification: Not a generator, verified

. Waste code: D001

ZAPATA INDUSTRIES INC (Continued) **1000882645**

. Waste name: IGNITABLE WASTE

. Waste code: F003
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: XYLENE, ACETONE, ETHYL ACETATE, ETHYL BENZENE, ETHYL ETHER, METHYL ISOBUTYL KETONE, N-BUTYL ALCOHOL, CYCLOHEXANONE, AND METHANOL; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONLY THE ABOVE SPENT NONHALOGENATED SOLVENTS; AND ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS, AND A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THOSE SOLVENTS LISTED IN F001, F002, F004, AND F005; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

. Waste code: F005
. Waste name: THE FOLLOWING SPENT NONHALOGENATED SOLVENTS: TOLUENE, METHYL ETHYL KETONE, CARBON DISULFIDE, ISOBUTANOL, PYRIDINE, BENZENE, 2-ETHOXYETHANOL, AND 2-NITROPROPANE; ALL SPENT SOLVENT MIXTURES/BLENDS CONTAINING, BEFORE USE, A TOTAL OF TEN PERCENT OR MORE (BY VOLUME) OF ONE OR MORE OF THE ABOVE NONHALOGENATED SOLVENTS OR THOSE SOLVENTS LISTED IN F001, F002, OR F004; AND STILL BOTTOMS FROM THE RECOVERY OF THESE SPENT SOLVENTS AND SPENT SOLVENT MIXTURES.

Date form received by agency: 08/18/1980
Site name: ZAPATA INDUSTRIES INC
Classification: Large Quantity Generator

Date form received by agency: 08/18/1980
Site name: ZAPATA INDUSTRIES INC
Classification: Large Quantity Generator

Corrective Action Summary:

Event date: 04/29/1988
Event: RFA Completed

Event date: 02/24/1992
Event: CA Prioritization, Facility or area was assigned a medium corrective action priority.

Event date: 11/25/1992
Event: Corrective Action Process Terminated, No Further Action

Event date: 11/25/1992
Event: Current Human Exposures under Control, Yes, Current Human Exposures Under Control has been verified. Based on a review of information contained in the EI determination, current human exposures are expected to be under control at the facility under current and reasonably expected conditions. This determination will be re-evaluated when the Agency/State becomes aware of significant changes at the facility.

Event date: 11/25/1992
Event: Igration of Contaminated Groundwater under Control, Yes, Migration of Contaminated Groundwater Under Control has been verified. Based on a review of information contained in the EI determination, it has been determined that migration of contaminated groundwater is under control at the facility. Specifically, this determination indicates that the

ZAPATA INDUSTRIES INC (Continued) **1000882645**

migration of contaminated groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the existing area of contaminated groundwater. This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

Event date: 11/25/1992
Event: RFA Determination Of Need For An RFI, RFI is Not Necessary;

Facility Has Received Notices of Violations:
Regulation violated: Not reported
Area of violation: TSD IS-Container Use and Management
Date violation determined: 06/05/2014
Date achieved compliance: 10/03/2014
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 07/08/2014
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD - Preparedness and Prevention
Date violation determined: 06/05/2014
Date achieved compliance: 10/03/2014
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 07/08/2014
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD IS-Preparedness and Prevention
Date violation determined: 06/05/2014
Date achieved compliance: 10/03/2014
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 07/08/2014
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Generators - Records/Reporting
Date violation determined: 06/05/2014
Date achieved compliance: 09/08/2014
Violation lead agency: State

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Enforcement action: Not reported
Enforcement action date: 07/08/2014
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD IS-General Facility Standards
Date violation determined: 06/05/2014
Date achieved compliance: 10/03/2014
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 07/08/2014
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Generators - Pre-transport
Date violation determined: 06/05/2014
Date achieved compliance: 08/08/2014
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 07/08/2014
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: TSD IS-Contingency Plan and Emergency Procedures
Date violation determined: 06/05/2014
Date achieved compliance: 10/03/2014
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 07/08/2014
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Used Oil - Generators
Date violation determined: 06/05/2014
Date achieved compliance: 08/08/2014
Violation lead agency: State
Enforcement action: Not reported

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Enforcement action date: 07/08/2014
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Generators - General
Date violation determined: 06/05/2014
Date achieved compliance: 08/22/2014
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 07/08/2014
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: Generators - General
Date violation determined: 06/05/2014
Date achieved compliance: 09/08/2014
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 07/08/2014
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: LDR - General
Date violation determined: 06/05/2014
Date achieved compliance: 08/22/2014
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 07/08/2014
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: Not reported
Area of violation: State Statute or Regulation
Date violation determined: 06/05/2014
Date achieved compliance: 09/08/2014
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 07/08/2014

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - local hospitals
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 10/17/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - training on UW
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 10/17/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - job title and name of employee
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 11/25/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - training by qualified person
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 10/17/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported
Regulation violated:	FR - open containers
Area of violation:	Generators - General
Date violation determined:	09/11/2002
Date achieved compliance:	10/17/2002
Violation lead agency:	State
Enforcement action:	Not reported
Enforcement action date:	09/11/2002
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported
Regulation violated:	FR - contingency. plan
Area of violation:	Generators - General
Date violation determined:	09/11/2002
Date achieved compliance:	10/17/2002
Violation lead agency:	State
Enforcement action:	Not reported
Enforcement action date:	09/11/2002
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported
Regulation violated:	FR - training records
Area of violation:	Generators - General
Date violation determined:	09/11/2002
Date achieved compliance:	11/25/2002
Violation lead agency:	State
Enforcement action:	Not reported
Enforcement action date:	09/11/2002
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported
Regulation violated:	FR - Haz Waste on Containers
Area of violation:	Generators - General
Date violation determined:	09/11/2002
Date achieved compliance:	10/17/2002
Violation lead agency:	State
Enforcement action:	Not reported
Enforcement action date:	09/11/2002
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - Arrangements w local auth.
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 10/17/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - annual review of training
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 11/25/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - spill control equip.
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 10/17/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - list of person emer coord.
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 11/25/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - training program
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 11/25/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - actions taken in CP
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 10/17/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - job description in record
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 11/25/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - doc of training rec'd
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 11/25/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: SR - DP # on manifest
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 11/25/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - local authorities
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 10/17/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - descr of training for each pos
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 11/25/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - evac plan
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 10/17/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Paid penalty amount: Not reported

Regulation violated: FR - copy of CP
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 10/17/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - training shutdown of oper.
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 10/17/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - training on comm and alarms
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 11/25/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

Regulation violated: FR - training response to fires
Area of violation: Generators - General
Date violation determined: 09/11/2002
Date achieved compliance: 11/25/2002
Violation lead agency: State
Enforcement action: Not reported
Enforcement action date: 09/11/2002
Enf. disposition status: Not reported
Enf. disp. status date: Not reported
Enforcement lead agency: State
Proposed penalty amount: Not reported
Final penalty amount: Not reported
Paid penalty amount: Not reported

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Regulation violated:	FR - emer. response teams
Area of violation:	Generators - General
Date violation determined:	09/11/2002
Date achieved compliance:	10/17/2002
Violation lead agency:	State
Enforcement action:	Not reported
Enforcement action date:	09/11/2002
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	Not reported
Area of violation:	Generators - General
Date violation determined:	09/12/1991
Date achieved compliance:	10/14/1991
Violation lead agency:	State
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	09/24/1991
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	Not reported
Area of violation:	TSD - General
Date violation determined:	08/09/1989
Date achieved compliance:	09/20/1989
Violation lead agency:	State
Enforcement action:	Not reported
Enforcement action date:	Not reported
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	Not reported
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

Regulation violated:	Not reported
Area of violation:	TSD - General
Date violation determined:	02/18/1988
Date achieved compliance:	05/04/1988
Violation lead agency:	State
Enforcement action:	WRITTEN INFORMAL
Enforcement action date:	03/03/1988
Enf. disposition status:	Not reported
Enf. disp. status date:	Not reported
Enforcement lead agency:	State
Proposed penalty amount:	Not reported
Final penalty amount:	Not reported
Paid penalty amount:	Not reported

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Evaluation Action Summary:

Evaluation date:	06/05/2014
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD IS-Container Use and Management
Date achieved compliance:	10/03/2014
Evaluation lead agency:	State
Evaluation date:	06/05/2014
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Generators - Pre-transport
Date achieved compliance:	08/08/2014
Evaluation lead agency:	State
Evaluation date:	06/05/2014
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD IS-Preparedness and Prevention
Date achieved compliance:	10/03/2014
Evaluation lead agency:	State
Evaluation date:	06/05/2014
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Generators - General
Date achieved compliance:	09/08/2014
Evaluation lead agency:	State
Evaluation date:	06/05/2014
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Used Oil - Generators
Date achieved compliance:	08/08/2014
Evaluation lead agency:	State
Evaluation date:	06/05/2014
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	Generators - General
Date achieved compliance:	08/22/2014
Evaluation lead agency:	State
Evaluation date:	06/05/2014
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD - Preparedness and Prevention
Date achieved compliance:	10/03/2014
Evaluation lead agency:	State
Evaluation date:	06/05/2014
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	TSD IS-General Facility Standards
Date achieved compliance:	10/03/2014
Evaluation lead agency:	State
Evaluation date:	06/05/2014
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation:	State Statute or Regulation
Date achieved compliance:	09/08/2014
Evaluation lead agency:	State
Evaluation date:	06/05/2014
Evaluation:	COMPLIANCE EVALUATION INSPECTION ON-SITE

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Area of violation: TSD IS-Contingency Plan and Emergency Procedures
Date achieved compliance: 10/03/2014
Evaluation lead agency: State

Evaluation date: 06/05/2014
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: LDR - General
Date achieved compliance: 08/22/2014
Evaluation lead agency: State

Evaluation date: 06/05/2014
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - Records/Reporting
Date achieved compliance: 09/08/2014
Evaluation lead agency: State

Evaluation date: 09/11/2002
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 11/25/2002
Evaluation lead agency: State

Evaluation date: 09/11/2002
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 10/17/2002
Evaluation lead agency: State

Evaluation date: 06/24/1992
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 09/12/1991
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Generators - General
Date achieved compliance: 10/14/1991
Evaluation lead agency: State

Evaluation date: 09/10/1990
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: State

Evaluation date: 08/09/1989
Evaluation: NON-FINANCIAL RECORD REVIEW
Area of violation: Not reported
Date achieved compliance: Not reported
Evaluation lead agency: EPA

Evaluation date: 08/09/1989
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 09/20/1989
Evaluation lead agency: State

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Evaluation date: 02/18/1988
Evaluation: COMPLIANCE EVALUATION INSPECTION ON-SITE
Area of violation: TSD - General
Date achieved compliance: 05/04/1988
Evaluation lead agency: State

FINDS:

Registry ID: 110000455597

Environmental Interest/Information System
AIR EMISSIONS CLASSIFICATION UNKNOWN

US EPA TRIS (Toxics Release Inventory System) contains information from facilities on the amounts of over 300 listed toxic chemicals that these facilities release directly to air, water, land, or that are transported off-site.

RCRAInfo is a national information system that supports the Resource Conservation and Recovery Act (RCRA) program through the tracking of events and activities related to facilities that generate, transport, and treat, store, or dispose of hazardous waste. RCRAInfo allows RCRA program staff to track the notification, permit, compliance, and corrective action activities required under RCRA.

HAZARDOUS WASTE BIENNIAL REPORTER

ECHO:

Envid:	1000882645
Registry ID:	110000455597
FIPS Code:	40101
EPA Region:	06
Indian Country Flag:	N
Federal Flag:	Not reported
US Mexico Border Flag:	Not reported
Chesapeake Bay Flag:	Not reported
NAA Flag:	Not reported
Latitude:	35.77981
Longitude:	-95.30708
Map Icon:	RCRA-IC-MN-2.png
Collection Method:	ADDRESS MATCHING-HOUSE NUMBER
Reference Point:	CENTER OF A FACILITY OR STATION
Accuracy Meters:	30
Derived Tribes:	Cherokee Nation - 0 mile(s), The Muscogee (Creek) Nation - .1 mile(s)
Derived Huc:	11110102
Derived WBD:	Not reported
Derived STCT FPS:	40101
Derived Zip:	74403
Derived CD113:	02
Derived CB2010:	401010004001029
Percent Minority:	Not reported
Pop Den:	Not reported
Major Flag:	Not reported
Active Flag:	Not reported
MYRTK Universe:	NNN
Inspection Count:	1

ZAPATA INDUSTRIES INC (Continued) **1000882645**

Date Last Inspection:	06/05/2014
Days Last Inspection:	472
Informal Count:	1
Date Last Informal Action:	07/08/2014
Formal Action Count:	0
Date Last Formal Action:	Not reported
Total Penalties:	0
Penalty Count:	0
Date Last Penalty:	Not reported
Last Penalty Amount:	Not reported
QTRS in NC:	3
Programs in SNC:	0
Curr Compliance Status:	No Violation
Curr SNC Flag:	N
3yr Compliance Status:	_____VVV___
AFS Flag:	N
NPDES Flag:	N
SDWIS Flag:	N
RCRA Flag:	Y
TRI Flag:	N
GHG Flag:	N
AFS IDS:	Not reported
CAA Permit Types:	Not reported
CAA NAICS:	Not reported
CAA SICS:	Not reported
CAA Evaluation Count:	Not reported
CAA Days Last Evaluation:	Not reported
CAA Informal Count:	Not reported
CAA Formal Action Count:	Not reported
CAA Date Last Formal Action:	Not reported
CAA Penalties:	Not reported
CAA Last Penality Date:	Not reported
CAA Last Penality Amount:	Not reported
CAA Qtrs in NC:	Not reported
CAA Curr Compliance Status:	Not reported
CAA Curr HPV Flag:	N
CAA 3yr Compl Qtrs Status:	Not reported
NPDES IDS:	Not reported
CWA Permit Types:	Not reported
CWA Compliance Tracking:	Not reported
CWA NAICS:	Not reported
CWA SICS:	Not reported
CWA Inspection Count:	Not reported
CWA Days Last Inspection:	Not reported
CWA Informal Count:	Not reported
CWA Formal Action Count:	Not reported
CWA Date Last Formal Action:	Not reported
CWA Penalties:	Not reported
CWA Last Penality Date:	Not reported
CWA Last Penality Amount:	Not reported
CWA Qtrs in NC:	Not reported
CWA Curr Compliance Status:	Not reported
CWA Curr SNC Flag:	N
CWA 13QTRS Compl Status:	Not reported
CWA 13QTRS EFFLNT Exceedances:	Not reported
CWA 3tr QNCR Codes:	Not reported
RCRA IDS:	OKD990751059

ZAPATA INDUSTRIES INC (Continued) **1000882645**

RCRA Permit Types:	Other
RCRA NAICS:	Not reported
RCRA Inspection Count:	1
RCRA Days Last Evaluation:	472
RCRA Informal Count:	Not reported
RCRA Formal Action Count:	1
RCRA Date Last Formal Action:	Not reported
RCRA Penalties:	Not reported
RCRA Last Penality Date:	Not reported
RCRA Last Penality Amount:	Not reported
RCRA QTRS in NC:	3
RCRA Curr Compliance Status:	No Violation
RCRA Curr SNC Flag:	N
RCRA 3yr Compl Qtrs Status:	VVV
SDWA IDS:	Not reported
SDWA System Types:	Not reported
SDWA Informal Count:	Not reported
SDWA Formal Action Count:	Not reported
SDWA Curr Compliance Status:	Not reported
SDWA Curr SNC Flag:	N
TRI IDS:	74401ZPTNDRR6BO
TRI Releases Transfers:	Not reported
TRI on Site Releases:	Not reported
Tri off Site Transfers:	Not reported
TRI Reporter in Past:	Y
FEC Case IDS:	Not reported
FEC Number of Cases:	Not reported
FEC Last Case Date:	Not reported
FEC Total Penalties:	Not reported
GHG IDS:	Not reported
GHG CO2 Release:	Not reported
DFR URL:	http://echo.epa.gov/detailed_facility_report?fid=110000455597
Facility SIC Codes:	3466
Facility NAICS Codes:	332119 332115
Facility Date Last Inspection EPA:	Not reported
Facility Date Last Inspection State:	06/05/2014
Facility Date Last Formal ACT EPA:	Not reported
Facility Date Last Formal ACT ST:	Not reported
Facility Date Last Inforamal ACT EPA:	Not reported
Facility Date Last Informal ACT ST:	07/08/2014
Facility Federal Agency:	Not reported
TRI Reporter:	Not reported
Facility IMP Water Flag:	Not reported

9
NNE
1/8-1/4
0.237 mi.
1251 ft.

QUALITY LIQUID FEEDS **AST** **S107836894**
2530 PORT PLACE **TIER 2** **N/A**
MUSKOGEE, OK 74403

Relative:
Lower

Actual:
520 ft.

AST:

Facility ID:	5121636
Contact Name:	QLF Transportation Inc
Contact Address:	3586 Hwy 23 North
Contact Telephone:	6089350915
Contact City,St,Zip:	Dodgeville, WI 53533
Lat/Long:	35.7815999 / -95.302999

QUALITY LIQUID FEEDS (Continued) **S107836894**

Tank ID:	2
Tank Status:	Currently In Use
Total Capacity:	12000
Substance:	Diesel
Install Date:	08/01/2010
Tank Type:	AST
Closed Date:	Not reported
Closed Status:	Not reported
Tank Material:	Steel
Tank Construction:	Double Walled
Pipe Material:	Steel

Tank ID:	1
Tank Status:	Permanently Out of Use
Total Capacity:	10000
Substance:	Diesel
Install Date:	12/01/2006
Tank Type:	AST
Closed Date:	09/16/2010
Closed Status:	Tank Removed From Ground
Tank Material:	Steel
Tank Construction:	Double Walled
Pipe Material:	Steel

OK TIER 2:

Facility ID:	FATR20093W2J1C1BKQ41
Facilty Country:	USA
All Chems. Same as Last Year:	Not reported
Date Tier 2 Signed:	2/26/2010
Dike/Other Safeguards Employed:	Not reported
Facility Department:	Muskogee Fire Department
Facility Date Modified:	4/16/2010
State Fees Total:	Not reported
Facility Fire District:	Mskogee
Mailing Address:	Not reported
Mailing City,St,Zip:	Not reported
Mailing Country:	Not reported
Latitude:	35.780833
Longitude:	-95.30255
Lat/Long Location Description:	CE - Center of Facility
Lat/Long Method:	A4 - Address Matching (Nearest Intersection)
Number of Employees on Site:	4
Notes:	Not reported
Validation Report:	This facility passed all validation checks.
Reporting Year:	2009
Site Coordinate Abbrvtions Submitted:	Not reported
State 1Require Contact:	Not reported
ID:	2048
Facility Type:	SIC
Facility Desctription:	PREP FEEDS & INGRED FOR ANIMA
Facility Last Modified:	2/24/2010
ID:	03-888-6593
Facility Type:	Dun & Bradstreet
Facility Desctription:	Not reported
Facility Last Modified:	8/4/2005
ID:	311119

QUALITY LIQUID FEEDS (Continued) **S107836894**

Facility Type:		NAICS
Facility Desctription:		Other Animal Food Manufacturing
Facility Last Modified:		2/26/2010
Contact Record ID:	CTTR20093W2J6H1BX52U	
Contact Name:	VP/Manufacturing Merlyn Kruger	
Contact Email:	merlyn@qlf.com	
Contact Mail Address:	3586 State Raod 23 N	
Contact Mail City,St,Zip:	Dodgeville, WI 53533	
Contact Mail Country:	USA	
Contact Type:	Owner / Operator	
Contact Type:	Regulatory Point of Contact	
Contact Type:	Regulatory Point of Contact	
Contact Type:	Emergency Contact	
Contact Modified Date:	3/25/2010	
Acute Health Risks:		True
Average Daily Amount:		2230
Average Daily Amount Code:		03
Chemical Inventory Record ID:		CVTR20093W2J8E1C2TN3
Chemical Same As Last Year:		Not reported
Chronic Heath Risks:		Not reported
CAS Number:		7664-38-2
EHS Substance:		T
Last Modified:		3/25/2010
State Max Daily Amt Required:		Not reported
State Unit Required:		Not reported
Days on Site:		365
Chemical Name:		PHOSPHORIC ACID
Fire Hazard:		Not reported
Gas:		Not reported
Liquid:		True
Max Daily Amount:		588000
Max Daily Amount Code:		05
Max Amount in Largest Container:		294000
Mixture Form:		True
"Sudden Release of Preasue" Hazard:		Not reported
Pure Form:		Not reported
Reactive Hazard:		True
Solid:		Not reported
State Contact Field:		Not reported
State Contact Comment:		Not reported
State EHS Comment:		Not reported
State Label Code:		OK2009
Max Daily Amount Required:		Not reported
State Mac Per Container Required:		Not reported
State Req Heading:		Not reported
Trade Secret:		Not reported
Mixture Chemical:		Not reported
Mixture Percentage:		Not reported
Mixture CAS:		Not reported
Mixture EHS:		Not reported
Mixture Last Modified:		Not reported
Amount of Substnce:		Not reported
Amount Units:		Not reported
Type of Storage:		Not reported
Number Code for Storage Pressure:		Not reported
Number Code for Storage Temperature:		Not reported
Last Modified:		Not reported

QUALITY LIQUID FEEDS (Continued) **S107836894**

Location:	Not reported
Acute Health Risks:	True
Average Daily Amount:	1825
Average Daily Amount Code:	03
Chemical Inventory Record ID:	CVTR20093W2J9R1C4YRL
Chemical Same As Last Year:	Not reported
Chronic Heath Risks:	Not reported
CAS Number:	7664-93-9
EHS Substance:	T
Last Modified:	3/25/2010
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	365
Chemical Name:	SULFURIC ACID
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	True
Max Daily Amount:	102510
Max Daily Amount Code:	05
Max Amount in Largest Container:	102510
Mixture Form:	True
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	Not reported
Reactive Hazard:	True
Solid:	Not reported
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	OK2009
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported
Acute Health Risks:	True
Average Daily Amount:	1175
Average Daily Amount Code:	03
Chemical Inventory Record ID:	CVTR20095N1SMT0072PA
Chemical Same As Last Year:	Not reported
Chronic Heath Risks:	Not reported
CAS Number:	79-09-4
EHS Substance:	Not reported
Last Modified:	3/25/2010
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	365

QUALITY LIQUID FEEDS (Continued) **S107836894**

Chemical Name:	PROPIONIC ACID
Fire Hazard:	Not reported
Gas:	Not reported
Liquid:	True
Max Daily Amount:	162000
Max Daily Amount Code:	05
Max Amount in Largest Container:	81000
Mixture Form:	True
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	Not reported
Reactive Hazard:	True
Solid:	Not reported
State Contact Field:	Not reported
State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	OK2009
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported
Acute Health Risks:	True
Average Daily Amount:	2520
Average Daily Amount Code:	03
Chemical Inventory Record ID:	CVTR200971PTKF001HDR
Chemical Same As Last Year:	Not reported
Chronic Heath Risks:	True
CAS Number:	68476-34-6
EHS Substance:	Not reported
Last Modified:	3/25/2010
State Max Daily Amt Required:	Not reported
State Unit Required:	Not reported
Days on Site:	365
Chemical Name:	DIESEL FUEL NO. 2
Fire Hazard:	True
Gas:	Not reported
Liquid:	True
Max Daily Amount:	73,000
Max Daily Amount Code:	04
Max Amount in Largest Container:	73000
Mixture Form:	Not reported
"Sudden Release of Preasue" Hazard:	Not reported
Pure Form:	True
Reactive Hazard:	Not reported
Solid:	Not reported
State Contact Field:	Not reported

QUALITY LIQUID FEEDS (Continued) **S107836894**

State Contact Comment:	Not reported
State EHS Comment:	Not reported
State Label Code:	OK2009
Max Daily Amount Required:	Not reported
State Mac Per Container Required:	Not reported
State Req Heading:	Not reported
Trade Secret:	Not reported
Mixture Chemical:	Not reported
Mixture Percentage:	Not reported
Mixture CAS:	Not reported
Mixture EHS:	Not reported
Mixture Last Modified:	Not reported
Amount of Substnce:	Not reported
Amount Units:	Not reported
Type of Storage:	Not reported
Number Code for Storage Pressure:	Not reported
Number Code for Storage Temperature:	Not reported
Last Modified:	Not reported
Location:	Not reported

Count: 1 records.

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
MUSKOGEE COUNTY	S106496763	GREEN COUNTRY CASTINGS CORPORATION	NW/4 SW/4 OF S33 T15N R19E (LO		SWF/LF

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 10/30/2015
Date Data Arrived at EDR: 11/07/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 58

Source: EPA
Telephone: N/A
Last EDR Contact: 01/26/2016
Next Scheduled EDR Contact: 04/18/2016
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 6
Telephone: 214-655-6659

EPA Region 3
Telephone 215-814-5418

EPA Region 7
Telephone: 913-551-7247

EPA Region 4
Telephone 404-562-8033

EPA Region 8
Telephone: 303-312-6774

EPA Region 5
Telephone 312-886-6686

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 10/30/2015
Date Data Arrived at EDR: 11/07/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 58

Source: EPA
Telephone: N/A
Last EDR Contact: 01/26/2016
Next Scheduled EDR Contact: 04/18/2016
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 10/30/2015
Date Data Arrived at EDR: 11/07/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 58

Source: EPA
Telephone: N/A
Last EDR Contact: 01/26/2016
Next Scheduled EDR Contact: 04/18/2016
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 03/26/2015
Date Data Arrived at EDR: 04/08/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 01/06/2016
Next Scheduled EDR Contact: 04/18/2016
Data Release Frequency: Varies

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System

CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 02/19/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site List

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned

Archived sites are sites that have been removed and archived from the inventory of CERCLIS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list this site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. This decision does not necessarily mean that there is no hazard associated with a given site; it only means that, based upon available information, the location is not judged to be a potential NPL site.

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 11/11/2013
Date Made Active in Reports: 02/13/2014
Number of Days to Update: 94

Source: EPA
Telephone: 703-412-9810
Last EDR Contact: 02/19/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 06/09/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 82

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 12/18/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 06/09/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 214-665-6444
Last EDR Contact: 12/18/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/09/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 214-665-6444
Last EDR Contact: 12/18/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 06/09/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 214-665-6444
Last EDR Contact: 12/18/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Quarterly

RCRA-CESQG: RCRA - Conditionally Exempt Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Conditionally exempt small quantity generators (CESQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 06/09/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 214-665-6444
Last EDR Contact: 12/18/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Federal Institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 05/28/2015
Date Data Arrived at EDR: 05/29/2015
Date Made Active in Reports: 06/11/2015
Number of Days to Update: 13

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 02/16/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 09/10/2015
Date Data Arrived at EDR: 09/11/2015
Date Made Active in Reports: 11/03/2015
Number of Days to Update: 53

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/29/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Varies

US INST CONTROL: Sites with Institutional Controls

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 09/10/2015
Date Data Arrived at EDR: 09/11/2015
Date Made Active in Reports: 11/03/2015
Number of Days to Update: 53

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 02/29/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/22/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 82

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 12/29/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Annually

State- and tribal - equivalent CERCLIS

SHWS: Voluntary Cleanup & Superfund Site Status Report

Land restoration projects carried out in several DEQ programs.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 05/28/2010
Date Made Active in Reports: 07/13/2010
Number of Days to Update: 46

Source: Department of Environmental Quality
Telephone: 405-702-5100
Last EDR Contact: 02/19/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: Varies

State and tribal landfill and/or solid waste disposal site lists

SWF/LF: Permitted Solid Waste Disposal & Processing Facilities
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 09/18/2014
Date Data Arrived at EDR: 11/05/2014
Date Made Active in Reports: 01/05/2015
Number of Days to Update: 61

Source: Department of Environmental Quality
Telephone: 405-702-5184
Last EDR Contact: 02/01/2016
Next Scheduled EDR Contact: 05/16/2016
Data Release Frequency: Semi-Annually

State and tribal leaking storage tank lists

LUST: Leaking Underground Storage Tank List
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 10/09/2015
Date Data Arrived at EDR: 10/15/2015
Date Made Active in Reports: 12/09/2015
Number of Days to Update: 55

Source: Oklahoma Corporation Commission
Telephone: 405-521-3107
Last EDR Contact: 02/24/2016
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Varies

LAST: Leaking Aboveground Storage Tanks List
Leaking aboveground storage tank site locations.

Date of Government Version: 10/09/2015
Date Data Arrived at EDR: 10/15/2015
Date Made Active in Reports: 12/09/2015
Number of Days to Update: 55

Source: Oklahoma Corporation Commission
Telephone: 405-522-4640
Last EDR Contact: 02/24/2016
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 11/04/2015
Date Data Arrived at EDR: 11/13/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 52

Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 01/07/2016
Date Data Arrived at EDR: 01/08/2016
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 41

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Quarterly

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 01/08/2015
Date Data Arrived at EDR: 01/08/2015
Date Made Active in Reports: 02/09/2015
Number of Days to Update: 32

Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 01/27/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Quarterly

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 10/13/2015
Date Data Arrived at EDR: 10/23/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 118
Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Quarterly

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 03/30/2015
Date Data Arrived at EDR: 04/28/2015
Date Made Active in Reports: 06/22/2015
Number of Days to Update: 55
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Varies

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 08/20/2015
Date Data Arrived at EDR: 10/30/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 111
Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 10/27/2015
Date Data Arrived at EDR: 10/29/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 67
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 02/22/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 11/24/2015
Date Data Arrived at EDR: 12/01/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 34
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Semi-Annually

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/01/2010
Date Data Arrived at EDR: 02/16/2010
Date Made Active in Reports: 04/12/2010
Number of Days to Update: 55
Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 01/08/2016
Next Scheduled EDR Contact: 04/25/2016
Data Release Frequency: Varies

UST: Underground Storage Tank Listing
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 10/27/2015
Date Data Arrived at EDR: 10/28/2015
Date Made Active in Reports: 12/09/2015
Number of Days to Update: 42

Source: Oklahoma Corporation Commission
Telephone: 405-521-3107
Last EDR Contact: 02/24/2016
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Varies

AST: Aboveground Storage Tanks
Registered Aboveground Storage Tanks.

Date of Government Version: 10/27/2015
Date Data Arrived at EDR: 10/28/2015
Date Made Active in Reports: 12/09/2015
Number of Days to Update: 42

Source: Oklahoma Corporation Commission
Telephone: 405-521-3107
Last EDR Contact: 02/24/2016
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 08/20/2015
Date Data Arrived at EDR: 10/30/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 111

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Semi-Annually

INDIAN UST R9: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 12/14/2014
Date Data Arrived at EDR: 02/13/2015
Date Made Active in Reports: 03/13/2015
Number of Days to Update: 28

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 01/27/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Quarterly

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 11/24/2015
Date Data Arrived at EDR: 12/01/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 34

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Semi-Annually

INDIAN UST R1: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/29/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 67

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 02/22/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 09/23/2014
Date Data Arrived at EDR: 11/25/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 65

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 10/13/2015
Date Data Arrived at EDR: 10/23/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 118

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Quarterly

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 01/07/2016
Date Data Arrived at EDR: 01/08/2016
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 41

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Quarterly

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 11/05/2015
Date Data Arrived at EDR: 11/13/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 52

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Varies

State and tribal institutional control / engineering control registries

INST CONTROL: Institutional Control Sites

Sites with institutional controls in place.

Date of Government Version: 11/04/2015
Date Data Arrived at EDR: 11/19/2015
Date Made Active in Reports: 01/05/2016
Number of Days to Update: 47

Source: Department of Environmental Quality
Telephone: 405-702-5100
Last EDR Contact: 02/18/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

VCP: Voluntary Cleanup Site Inventory

Investigations and cleanups by groups or individuals participating in the Voluntary Cleanup Program (VCP).

Date of Government Version: 11/04/2015
Date Data Arrived at EDR: 11/19/2015
Date Made Active in Reports: 01/05/2016
Number of Days to Update: 47

Source: Department of Environmental Quality
Telephone: 405-702-5100
Last EDR Contact: 02/18/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: Varies

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 12/28/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng
A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 04/20/2009
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Brownfield Sites
Brownfields are defined by Oklahoma law as abandoned, idled or under used industrial or commercial facilities or other real property at which expansion or redevelopment of the real property is complicated by environmental contamination caused by regulated substances. This program provides a means for private parties and government entities to voluntarily investigate and if warranted, clean up properties that may be contaminated with hazardous wastes. The formal Brownfields Program provides specific state liability relief and protects the property from federal Superfund actions.

Date of Government Version: 09/07/2012
Date Data Arrived at EDR: 09/07/2012
Date Made Active in Reports: 10/10/2012
Number of Days to Update: 33

Source: Department of Environmental Quality
Telephone: 405-702-5100
Last EDR Contact: 02/15/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: No Update Planned

BROWNFIELDS 2: Brownfields Public Record Listing
The Brownfields program provides a means for private parties and government entities to voluntarily investigate and if warranted, clean up properties that may be contaminated with hazardous wastes. The formal Brownfields Program provides specific state liability relief and protects the property from federal Superfund actions.

Date of Government Version: 07/28/2015
Date Data Arrived at EDR: 08/21/2015
Date Made Active in Reports: 09/15/2015
Number of Days to Update: 25

Source: Department of Environmental Quality
Telephone: 405-702-5100
Last EDR Contact: 02/17/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: Varies

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites
Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 12/22/2015
Date Data Arrived at EDR: 12/23/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 57

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 12/21/2015
Next Scheduled EDR Contact: 04/04/2016
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

SWRCY: Recycling Facilities
A listing of recycling facility locations.

Date of Government Version: 01/14/2016
Date Data Arrived at EDR: 01/26/2016
Date Made Active in Reports: 03/02/2016
Number of Days to Update: 36

Source: Department of Environmental Quality
Telephone: 405-702-5100
Last EDR Contact: 01/20/2016
Next Scheduled EDR Contact: 05/02/2016
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands
Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 02/01/2016
Next Scheduled EDR Contact: 05/16/2016
Data Release Frequency: Varies

ODI: Open Dump Inventory
An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations
A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: No Update Planned

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/17/2015
Date Data Arrived at EDR: 12/04/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 76

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/01/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: No Update Planned

US CDL: Clandestine Drug Labs
A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 09/17/2015
Date Data Arrived at EDR: 12/04/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 76

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 03/01/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Quarterly

Local Lists of Registered Storage Tanks

HIST UST: Underground Storage Tank List, List II Version
This underground storage tank listing includes tank information through March 2003. This listing is no longer updated by the Oklahoma Corporation Commission.

Date of Government Version: 03/21/2003
Date Data Arrived at EDR: 04/28/2003
Date Made Active in Reports: 05/27/2003
Number of Days to Update: 29

Source: Oklahoma Corporation Commission
Telephone: 405-521-3107
Last EDR Contact: 01/19/2009
Next Scheduled EDR Contact: 04/19/2009
Data Release Frequency: No Update Planned

Local Land Records

LIENS 2: CERCLA Lien Information
A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 02/18/2014
Date Data Arrived at EDR: 03/18/2014
Date Made Active in Reports: 04/24/2014
Number of Days to Update: 37

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Varies

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 06/24/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/02/2015
Number of Days to Update: 68

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 12/30/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Annually

OK COMPLAINT: Oklahoma Complaint System Database
Environmental complaints reported to the Oklahoma Corporation Commission.

Date of Government Version: 09/30/2014
Date Data Arrived at EDR: 06/02/2015
Date Made Active in Reports: 06/04/2015
Number of Days to Update: 2

Source: Oklahoma Corporation Commission
Telephone: 405-521-2384
Last EDR Contact: 02/29/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: Varies

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated
RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 06/09/2015
Date Data Arrived at EDR: 06/26/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 214-665-6444
Last EDR Contact: 12/18/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Varies

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 01/31/2015
Date Data Arrived at EDR: 07/08/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 97

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 12/11/2015
Next Scheduled EDR Contact: 03/21/2016
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 01/15/2016
Next Scheduled EDR Contact: 04/25/2016
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 02/06/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 339

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 01/15/2016
Next Scheduled EDR Contact: 04/25/2016
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 03/07/2011
Date Data Arrived at EDR: 03/09/2011
Date Made Active in Reports: 05/02/2011
Number of Days to Update: 54

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 02/19/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 09/01/2015
Date Data Arrived at EDR: 09/03/2015
Date Made Active in Reports: 11/03/2015
Number of Days to Update: 61

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 02/16/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 02/09/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 04/22/2013
Date Data Arrived at EDR: 03/03/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 6

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 02/12/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2012
Date Data Arrived at EDR: 01/15/2015
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 14

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 12/23/2015
Next Scheduled EDR Contact: 04/04/2016
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/12/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 110

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 02/24/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 12/31/2009
Date Data Arrived at EDR: 12/10/2010
Date Made Active in Reports: 02/25/2011
Number of Days to Update: 77

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Annually

ROD: Records Of Decision
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 11/25/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 02/24/2014
Number of Days to Update: 74
Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 12/11/2015
Next Scheduled EDR Contact: 03/21/2016
Data Release Frequency: Annually

RMP: Risk Management Plans
When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 08/01/2015
Date Data Arrived at EDR: 08/26/2015
Date Made Active in Reports: 11/03/2015
Number of Days to Update: 69
Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 01/25/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35
Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 10/25/2013
Date Data Arrived at EDR: 10/17/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 3
Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 02/12/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 10/15/2014
Date Made Active in Reports: 11/17/2014
Number of Days to Update: 33
Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 01/12/2016
Next Scheduled EDR Contact: 04/25/2016
Data Release Frequency: Annually

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 01/23/2015
Date Data Arrived at EDR: 02/06/2015
Date Made Active in Reports: 03/09/2015
Number of Days to Update: 31

Source: Environmental Protection Agency
Telephone: 202-564-5088
Last EDR Contact: 01/08/2016
Next Scheduled EDR Contact: 04/25/2016
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 02/22/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Quarterly

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25

Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 02/22/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Quarterly

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 06/26/2015
Date Data Arrived at EDR: 07/10/2015
Date Made Active in Reports: 10/13/2015
Number of Days to Update: 95

Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 02/08/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Quarterly

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 08/07/2009
Date Made Active in Reports: 10/22/2009
Number of Days to Update: 76

Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 01/13/2016
Next Scheduled EDR Contact: 04/25/2016
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 07/01/2014
Date Data Arrived at EDR: 09/10/2014
Date Made Active in Reports: 10/20/2014
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 12/11/2015
Next Scheduled EDR Contact: 03/21/2016
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 02/01/2011
Date Data Arrived at EDR: 10/19/2011
Date Made Active in Reports: 01/10/2012
Number of Days to Update: 83

Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 01/29/2016
Next Scheduled EDR Contact: 05/09/2016
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/07/2015
Date Data Arrived at EDR: 07/09/2015
Date Made Active in Reports: 09/16/2015
Number of Days to Update: 69

Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 01/07/2016
Next Scheduled EDR Contact: 04/18/2016
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data
Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 07/31/2012
Date Data Arrived at EDR: 08/07/2012
Date Made Active in Reports: 09/18/2012
Number of Days to Update: 42

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 02/03/2016
Next Scheduled EDR Contact: 05/16/2016
Data Release Frequency: Varies

CONSENT: Superfund (CERCLA) Consent Decrees
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 04/17/2015
Date Made Active in Reports: 06/02/2015
Number of Days to Update: 46

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 12/23/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2013
Date Data Arrived at EDR: 02/24/2015
Date Made Active in Reports: 09/30/2015
Number of Days to Update: 218

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 02/26/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 12/08/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 34

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 01/15/2016
Next Scheduled EDR Contact: 04/25/2016
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 11/23/2015
Date Data Arrived at EDR: 11/24/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 86

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 02/08/2016
Next Scheduled EDR Contact: 05/23/2016
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 09/14/2010
Date Data Arrived at EDR: 10/07/2011
Date Made Active in Reports: 03/01/2012
Number of Days to Update: 146

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 02/22/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 11/25/2014
Date Data Arrived at EDR: 11/26/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 64

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 01/26/2016
Next Scheduled EDR Contact: 04/18/2016
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/27/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 69

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 12/22/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data
A listing of minor source facilities.

Date of Government Version: 10/20/2015
Date Data Arrived at EDR: 10/27/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 69

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 12/22/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Annually

US MINES: Mines Master Index File
Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 08/18/2015
Date Data Arrived at EDR: 09/01/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 125

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 03/02/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing
This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 12/05/2005
Date Data Arrived at EDR: 02/29/2008
Date Made Active in Reports: 04/18/2008
Number of Days to Update: 49

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 03/04/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing
Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 03/04/2016
Next Scheduled EDR Contact: 06/13/2016
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 07/20/2015
Date Data Arrived at EDR: 09/09/2015
Date Made Active in Reports: 11/03/2015
Number of Days to Update: 55

Source: EPA
Telephone: (214) 665-2200
Last EDR Contact: 12/10/2015
Next Scheduled EDR Contact: 03/21/2016
Data Release Frequency: Quarterly

AIRS: Permitted AIRS Facility Listing

A listing of permitted AIRS facility locations.

Date of Government Version: 12/22/2015
Date Data Arrived at EDR: 12/28/2015
Date Made Active in Reports: 03/02/2016
Number of Days to Update: 65

Source: Department of Environmental Quality
Telephone: 405-702-4100
Last EDR Contact: 12/22/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Varies

DRYCLEANERS: Drycleaner Facilities

A listing of drycleaner facility locations.

Date of Government Version: 12/22/2015
Date Data Arrived at EDR: 12/28/2015
Date Made Active in Reports: 03/02/2016
Number of Days to Update: 65

Source: Department of Environmental Quality
Telephone: 405-702-9100
Last EDR Contact: 12/22/2015
Next Scheduled EDR Contact: 04/11/2016
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing

Financial Assurance information.

Date of Government Version: 07/25/2014
Date Data Arrived at EDR: 11/06/2014
Date Made Active in Reports: 01/13/2015
Number of Days to Update: 68

Source: Department of Environmental Quality
Telephone: 405-702-5105
Last EDR Contact: 02/29/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing

Financial Assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 12/10/2013
Date Data Arrived at EDR: 12/12/2013
Date Made Active in Reports: 01/24/2014
Number of Days to Update: 43

Source: Department of Environmental Quality
Telephone: 405-702-5100
Last EDR Contact: 02/29/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: Varies

TIER 2: Tier 2 Data Listing

A listing of facilities which store or manufacture hazardous materials and submit a chemical inventory report.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 09/25/2015
Date Made Active in Reports: 12/10/2015
Number of Days to Update: 76

Source: Department of Environmental Quality
Telephone: 405-702-1000
Last EDR Contact: 12/09/2015
Next Scheduled EDR Contact: 03/28/2016
Data Release Frequency: Varies

UIC: Underground Injection Wells Database Listing
Class I injection wells. CLASS I wells are used to inject liquid hazardous and non-hazardous wastes beneath the lower most Underground Sources of Drinking Water (USDW).

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 06/12/2015
Date Made Active in Reports: 08/04/2015
Number of Days to Update: 53

Source: Department of Environmental Quality
Telephone: 405-702-5188
Last EDR Contact: 11/07/2016
Next Scheduled EDR Contact: 02/01/2016
Data Release Frequency: Varies

ECHO: Enforcement & Compliance History Information
ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 09/20/2015
Date Data Arrived at EDR: 09/23/2015
Date Made Active in Reports: 01/04/2016
Number of Days to Update: 103

Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 12/21/2015
Next Scheduled EDR Contact: 04/04/2016
Data Release Frequency: Quarterly

FUELS PROGRAM: EPA Fuels Program Registered Listing
This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 11/23/2015
Date Data Arrived at EDR: 11/24/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 86

Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 02/24/2016
Next Scheduled EDR Contact: 06/06/2016
Data Release Frequency: Quarterly

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historic Gas Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historic Dry Cleaners

EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA HWS: Recovered Government Archive State Hazardous Waste Facilities List

The EDR Recovered Government Archive State Hazardous Waste database provides a list of SHWS incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environmental Quality in Oklahoma.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/03/2014
Number of Days to Update: 186

Source: Department of Environmental Quality
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Environmental Quality in Oklahoma.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/20/2014
Number of Days to Update: 203

Source: Department of Environmental Quality
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Oklahoma Corporation Commission in Oklahoma.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/27/2013
Number of Days to Update: 179

Source: Oklahoma Corporation Commission
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/30/2013
Date Data Arrived at EDR: 08/19/2013
Date Made Active in Reports: 10/03/2013
Number of Days to Update: 45

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 02/18/2016
Next Scheduled EDR Contact: 05/30/2016
Data Release Frequency: No Update Planned

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 11/02/2015
Date Data Arrived at EDR: 11/08/2015
Date Made Active in Reports: 12/09/2015
Number of Days to Update: 31

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 02/03/2016
Next Scheduled EDR Contact: 05/16/2016
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 03/19/2015
Date Made Active in Reports: 04/07/2015
Number of Days to Update: 19

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 12/09/2015
Next Scheduled EDR Contact: 03/28/2016
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: PennWell Corporation
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Electric Power Transmission Line Data
Source: PennWell Corporation
This map includes information copyrighted by PennWell Corporation. This information is provided on a best effort basis and PennWell Corporation does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of PennWell.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.
Daycare Centers: Day Care Centers
Source: Department of Human Services
Telephone: 405-521-3561

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

GEOCHECK®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

FORMER FANSTEEL SITE
10 TANTALUM PLACE
MUSKOGEE, OK 74403

TARGET PROPERTY COORDINATES

Latitude (North):	35.773607 - 35° 46' 24.99"
Longitude (West):	95.304933 - 95° 18' 17.76"
Universal Tranverse Mercator:	Zone 15
UTM X (Meters):	291646.9
UTM Y (Meters):	3961089.5
Elevation:	541 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	5926522 NORTHEAST MUSKOGEE, OK
Version Date:	2012

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principal investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

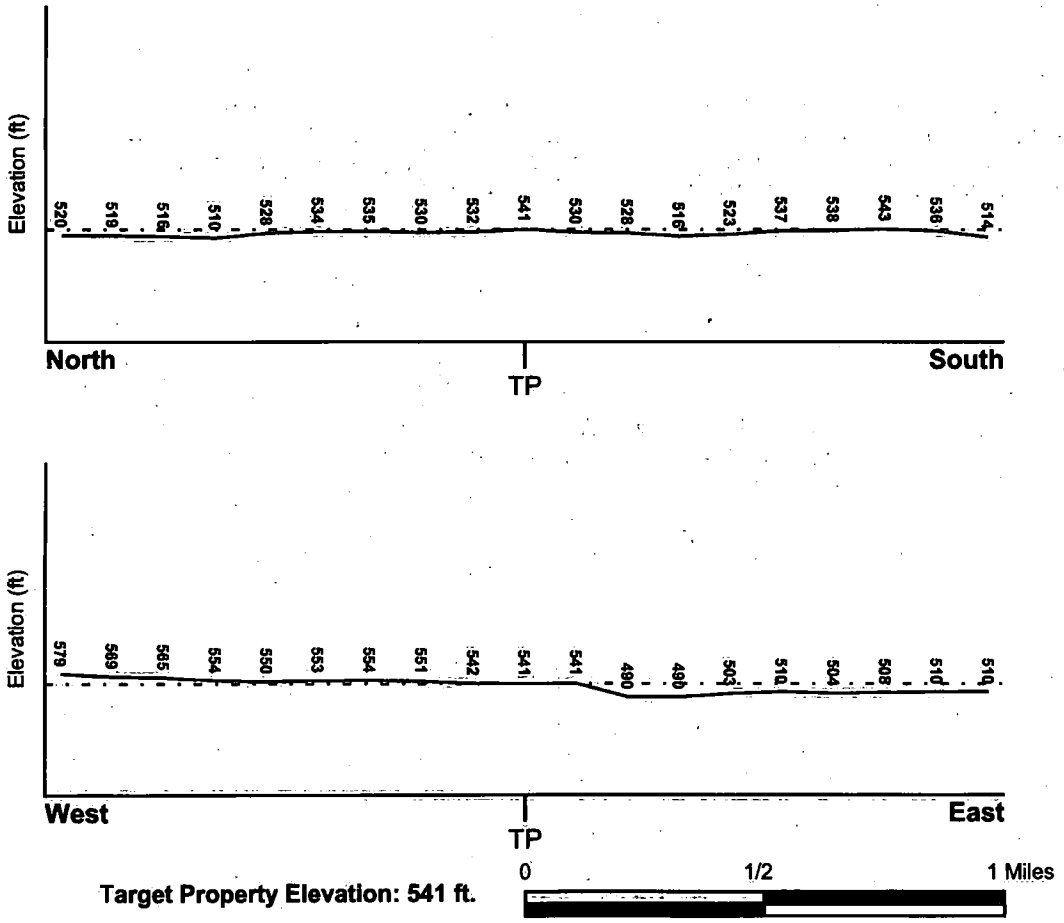
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General East

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Target Property County	FEMA Flood Electronic Data
MUSKOGEE, OK	YES - refer to the Overview Map and Detail Map

Flood Plain Panel at Target Property: 40101C - FEMA DFIRM Flood data

Additional Panels in search area: Not Reported

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
NOT AVAILABLE	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT **GEOLOGIC AGE IDENTIFICATION**

Era:	Paleozoic	Category:	Stratifed Sequence
System:	Pennsylvanian		
Series:	Atokan and Morrowan Series		
Code:	PP1 *(decoded above as Era, System & Series)*		

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps. The following information is based on Soil Conservation Service STATSGO data.

Soil Component Name:	CHOSKA
Soil Surface Texture:	very fine sandy loam
Hydrologic Group:	Class B - Moderate infiltration rates. Deep and moderately deep, moderately well and well drained soils with moderately coarse textures.
Soil Drainage Class:	Well drained. Soils have intermediate water holding capacity. Depth to water table is more than 6 feet.

Hydric Status: Soil does not meet the requirements for a hydric soil.

Corrosion Potential - Uncoated Steel: LOW

Depth to Bedrock Min: > 60 inches

Depth to Bedrock Max: > 60 inches

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Soil Layer Information							
	Boundary			Classification			
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil	Permeability Rate (in/hr)	Soil Reaction (pH)
1	0 inches	14 inches	very fine sandy loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 2.00 Min: 0.60	Max: 7.80 Min: 6.10
2	14 inches	48 inches	silt loam	Silt-Clay Materials (more than 35 pct. passing No. 200), Silty Soils.	FINE-GRAINED SOILS, Silts and Clays (liquid limit less than 50%), Lean Clay	Max: 2.00 Min: 0.60	Max: 8.40 Min: 6.60
3	48 inches	66 inches	loamy fine sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 6.00 Min: 2.00	Max: 8.40 Min: 6.60

OTHER SOIL TYPES IN AREA

Based on Soil Conservation Service STATSGO data, the following additional subordinant soil types may appear within the general area of target property.

Soil Surface Textures: silt loam
loamy fine sand
silty clay loam
clay
fine sandy loam
silty clay

Surficial Soil Types: silt loam
loamy fine sand
silty clay loam
clay
fine sandy loam
silty clay

Shallow Soil Types: No Other Soil Types

Deeper Soil Types: stratified
silt loam
clay
silty clay loam
loam
sandy clay loam
silty clay

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No Wells Found		

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A1	OK5000000104887	1/8 - 1/4 Mile North
B2	OK5000000104885	1/8 - 1/4 Mile NW
C3	OK5000000156899	1/8 - 1/4 Mile WNW
C4	OK5000000137158	1/8 - 1/4 Mile WNW
C5	OK5000000158732	1/8 - 1/4 Mile WNW
C6	OK5000000158734	1/8 - 1/4 Mile WNW
C7	OK5000000158733	1/8 - 1/4 Mile WNW
A8	OK5000000104886	1/8 - 1/4 Mile NNW
B9	OK5000000092007	1/8 - 1/4 Mile NW
B10	OK5000000092006	1/8 - 1/4 Mile NW
B11	OK5000000092008	1/8 - 1/4 Mile NW
B12	OK5000000092459	1/8 - 1/4 Mile NW
B13	OK5000000092014	1/8 - 1/4 Mile NW
14	OK5000000072119	1/8 - 1/4 Mile NE
15	OK5000000072120	1/4 - 1/2 Mile SE
16	OK5000000135361	1/4 - 1/2 Mile West
17	OK5000000137503	1/4 - 1/2 Mile WNW
D18	OK5000000146128	1/4 - 1/2 Mile WNW
D19	OK5000000141123	1/4 - 1/2 Mile WNW
20	OK5000000124905	1/4 - 1/2 Mile NNE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

STATE DATABASE WELL INFORMATION

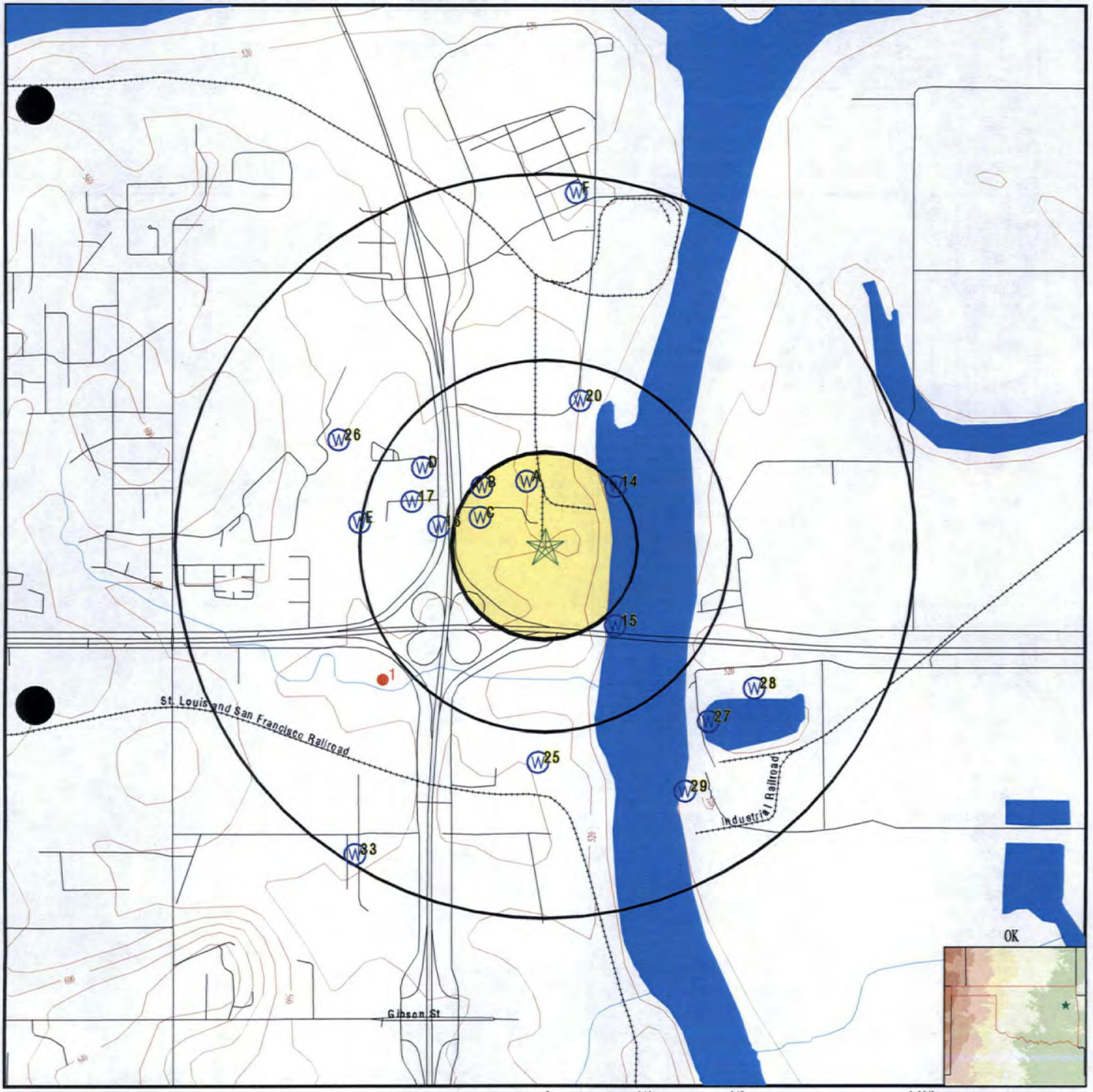
MAP ID	WELL ID	LOCATION FROM TP
E21	OK5000000093516	1/4 - 1/2 Mile West
E22	OK5000000096073	1/2 - 1 Mile West
E23	OK5000000096074	1/2 - 1 Mile West
E24	OK5000000093515	1/2 - 1 Mile West
25	OK5000000141046	1/2 - 1 Mile South
26	OK5000000097390	1/2 - 1 Mile WNW
27	OK5000000092581	1/2 - 1 Mile SE
28	OK5000000151553	1/2 - 1 Mile SE
29	OK5000000038513	1/2 - 1 Mile SSE
F30	OK5000000127947	1/2 - 1 Mile North
F31	OK5000000160989	1/2 - 1 Mile North
F32	OK5000000128732	1/2 - 1 Mile North
33	OK5000000132124	1/2 - 1 Mile SSW

OTHER STATE DATABASE INFORMATION

STATE OIL/GAS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	OKOG20000219584	1/2 - 1 Mile SW

PHYSICAL SETTING SOURCE MAP - 4556333.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons

- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- Oil, gas or related wells

SITE NAME: Former Fansteel Site ADDRESS: 10 Tantalum Place Muskogee OK 74403 LAT/LONG: 35.773607 / 95.304933	CLIENT: Enercon Services, Inc. CONTACT: Jamie Persico INQUIRY #: 4556333.2s DATE: March 07, 2016 9:32 am

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation

	Database	EDR ID Number
A1 **North** **1/8 - 1/4 Mile** **Lower**	**OK WELLS**	**OK5000000104887**

Latitude:	35.7759		
Longitude:	-95.3054		
Elevation:	0	El method:	Not Reported
Well id:	106109	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	Muskogee City County	Quarter1:	NE
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	30	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	12-DEC-06	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=106109		
Site id:	OK5000000104887		

	Database	EDR ID Number
B2 **NW** **1/8 - 1/4 Mile** **Higher**	**OK WELLS**	**OK5000000104885**

Latitude:	35.7758167		
Longitude:	-95.307		
Elevation:	0	El method:	Not Reported
Well id:	106107	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	Muskogee City County	Quarter1:	NE
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	35	First wtr:	26
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	12-DEC-06	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=106107		
Site id:	OK5000000104885		

	Database	EDR ID Number
C3 **WNW** **1/8 - 1/4 Mile** **Higher**	**OK WELLS**	**OK5000000156899**

Latitude:	35.774722		
Longitude:	-95.308056		
Elevation:	0	El method:	Not Reported
Well id:	133548	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	PORT OF MUSKOGEE-ODEQ	Quarter1:	SW
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	38	First wtr:	0

Approx yld:	0	LI method:	Mathematical conversion program
Const date:	07-DEC-10	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=133548		
Site id:	OK5000000156899		

C4
WNW
1/8 - 1/4 Mile
Higher

OK WELLS **OK5000000137158**

Latitude:	35.774722		
Longitude:	-95.308056		
Elevation:	0	EI method:	Not Reported
Well id:	133549	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	PORT OF MUSKOGEE-ODEQ	Quarter1:	SW
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	30	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	07-DEC-10	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=133549		
Site id:	OK5000000137158		

C5
WNW
1/8 - 1/4 Mile
Higher

OK WELLS **OK5000000158732**

Latitude:	35.774722		
Longitude:	-95.308056		
Elevation:	0	EI method:	Not Reported
Well id:	133545	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	PORT OF MUSKOGEE-ODEQ	Quarter1:	SW
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	35	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	06-DEC-10	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=133545		
Site id:	OK5000000158732		

C6
WNW
1/8 - 1/4 Mile
Higher

OK WELLS **OK5000000158734**

Latitude:	35.774722		
Longitude:	-95.308056		
Elevation:	0	El method:	Not Reported
Well id:	133547	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	PORT OF MUSKOGEE-ODEQ	Quarter1:	SW
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	31.5	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	06-DEC-10	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=133547		
Site id:	OK5000000158734		

C7
WNW **OK WELLS** **OK5000000158733**
1/8 - 1/4 Mile
Higher

Latitude:	35.774722		
Longitude:	-95.308056		
Elevation:	0	El method:	Not Reported
Well id:	133546	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	PORT OF MUSKOGEE-ODEQ	Quarter1:	SW
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	27	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	06-DEC-10	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=133546		
Site id:	OK5000000158733		

A8
NNW **OK WELLS** **OK5000000104886**
1/8 - 1/4 Mile
Lower

Latitude:	35.7763667		
Longitude:	-95.30625		
Elevation:	0	El method:	Not Reported
Well id:	106108	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	Muskogee City County	Quarter1:	NE
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	24	First wtr:	19

Approx yld:	0	LI method:	Mathematical conversion program
Const date:	12-DEC-06	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=106108		
Site id:	OK5000000104886		

B9
NW
1/8 - 1/4 Mile
Higher

OK WELLS **OK5000000092007**

Latitude:	35.775931		
Longitude:	-95.308175		
Elevation:	0	EI method:	Not Reported
Well id:	92216	County:	Muskogee
Work type:	Groundwater Test Hole	Permit:	Not Reported
Owner name:	Zapata Industries, Inc.	Quarter1:	NW
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Water Location
Total dpth:	0	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	30-DEC-99	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=92216		
Site id:	OK5000000092007		

B10
NW
1/8 - 1/4 Mile
Higher

OK WELLS **OK5000000092006**

Latitude:	35.775931		
Longitude:	-95.308175		
Elevation:	0	EI method:	Not Reported
Well id:	92215	County:	Muskogee
Work type:	Groundwater Test Hole	Permit:	Not Reported
Owner name:	Zapata Industries, Inc.	Quarter1:	NW
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Water Location
Total dpth:	0	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	30-DEC-99	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=92215		
Site id:	OK5000000092006		

B11
NW
1/8 - 1/4 Mile
Higher

OK WELLS **OK5000000092008**

Latitude:	35.775931		
Longitude:	-95.308175		
Elevation:	0	El method:	Not Reported
Well id:	92217	County:	Muskogee
Work type:	Groundwater Test Hole	Permit:	Not Reported
Owner name:	Zapata Industries, Inc.	Quarter1:	NW
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Water Location
Total dpth:	0	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	28-APR-04	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=92217		
Site id:	OK5000000092008		

B12
NW
1/8 - 1/4 Mile
Higher

OK WELLS **OK5000000092459**

Latitude:	35.775931		
Longitude:	-95.308175		
Elevation:	0	El method:	Not Reported
Well id:	92254	County:	Muskogee
Work type:	Groundwater Test Hole	Permit:	Not Reported
Owner name:	Zapata Industries, Inc.	Quarter1:	NW
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Water Location
Total dpth:	0	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	30-DEC-99	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=92254		
Site id:	OK5000000092459		

B13
NW
1/8 - 1/4 Mile
Higher

OK WELLS **OK5000000092014**

Latitude:	35.775931		
Longitude:	-95.308175		
Elevation:	0	El method:	Not Reported
Well id:	92226	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	Zapata Industries, Inc.	Quarter1:	NW
Quarter2:	NE	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Water Quality
Total dpth:	0	First wtr:	0

Approx yld:	0	LI method:	Mathematical conversion program
Const date:	30-DEC-99	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=92226		
Site id:	OK5000000092014		

14
NE
1/8 - 1/4 Mile
Lower

OK WELLS **OK5000000072119**

Latitude:	35.775931		
Longitude:	-95.301556		
Elevation:	0	El method:	Not Reported
Well id:	74116	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	Fansteel, Inc.	Quarter1:	NE
Quarter2:	NW	Quarter3:	SW
Section:	16	Township:	15N
Range:	19EI	Use class:	Water Quality
Total dpth:	17	First wtr:	0
Approx yld:	0	LI method:	Interpolation from PLSS
Const date:	24-SEP-02	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=74116		
Site id:	OK5000000072119		

15
SE
1/4 - 1/2 Mile
Lower

OK WELLS **OK5000000072120**

Latitude:	35.770509		
Longitude:	-95.301556		
Elevation:	0	El method:	Not Reported
Well id:	74117	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	Fan Steel, Inc.	Quarter1:	SE
Quarter2:	SW	Quarter3:	SW
Section:	16	Township:	15N
Range:	19EI	Use class:	Water Quality
Total dpth:	27	First wtr:	0
Approx yld:	0	LI method:	Interpolation from PLSS
Const date:	24-SEP-02	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=74117		
Site id:	OK5000000072120		

16
West
1/4 - 1/2 Mile
Higher

OK WELLS **OK5000000135361**

Latitude:	35.77436		
Longitude:	-95.31004		
Elevation:	0	El method:	Not Reported
Well id:	147729	County:	Muskogee
Work type:	Geothermal or Heat Pump Well	Permit:	Not Reported
Owner name:	Indian Capital Tech Center	Quarter1:	SE
Quarter2:	NW	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Heat Exchange
Total dpth:	400	First wtr:	0
Approx yld:	0	LI method:	Not Reported
Const date:	24-NOV-12	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=147729		
Site id:	OK5000000135361		

17
WNW
1/4 - 1/2 Mile
Higher

OK WELLS **OK5000000137503**

Latitude:	35.775333		
Longitude:	-95.311333		
Elevation:	0	El method:	Not Reported
Well id:	135828	County:	Muskogee
Work type:	Geothermal or Heat Pump Well	Permit:	Not Reported
Owner name:	ICTC	Quarter1:	NE
Quarter2:	NW	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Heat Exchange
Total dpth:	200	First wtr:	0
Approx yld:	0	LI method:	Not Reported
Const date:	21-APR-11	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=135828		
Site id:	OK5000000137503		

D18
WNW
1/4 - 1/2 Mile
Higher

OK WELLS **OK5000000146128**

Latitude:	35.776518		
Longitude:	-95.310795		
Elevation:	0	El method:	Not Reported
Well id:	160383	County:	Muskogee
Work type:	Geothermal or Heat Pump Well	Permit:	Not Reported
Owner name:	Muskogee Indian Tech Center	Quarter1:	NE
Quarter2:	NW	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Heat Exchange
Total dpth:	400	First wtr:	0

Approx yld:	0	LI method:	Not Reported
Const date:	28-MAY-14	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=160383		
Site id:	OK5000000146128		

D19
WNW
1/4 - 1/2 Mile
Higher

OK WELLS **OK5000000141123**

Latitude:	35.776813		
Longitude:	-95.310859		
Elevation:	0	El method:	Not Reported
Well id:	154382	County:	Muskogee
Work type:	Geothermal or Heat Pump Well	Permit:	Not Reported
Owner name:	Indian Capital Tech Center	Quarter1:	NE
Quarter2:	NW	Quarter3:	SE
Section:	17	Township:	15N
Range:	19EI	Use class:	Heat Exchange
Total dpth:	400	First wtr:	0
Approx yld:	0	LI method:	Not Reported
Const date:	27-AUG-13	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=154382		
Site id:	OK5000000141123		

20
NNE
1/4 - 1/2 Mile
Lower

OK WELLS **OK5000000124905**

Latitude:	35.779275		
Longitude:	-95.3032583		
Elevation:	0	El method:	Not Reported
Well id:	126362	County:	Muskogee
Work type:	Groundwater Test Hole	Permit:	Not Reported
Owner name:	Ergon	Quarter1:	NW
Quarter2:	SW	Quarter3:	NW
Section:	16	Township:	15N
Range:	19EI	Use class:	Water Location
Total dpth:	11	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	27-AUG-09	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=126362		
Site id:	OK5000000124905		

E21
West
1/4 - 1/2 Mile
Higher

OK WELLS **OK5000000093516**

Latitude:	35.7743333		
Longitude:	-95.3137833		
Elevation:	0	El method:	Not Reported
Well id:	94603	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	Indian Capital Technology Cent	Quarter1:	SE
Quarter2:	NE	Quarter3:	SW
Section:	17	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	12.5	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	13-JUN-05	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=94603		
Site id:	OK5000000093516		

E22
West
1/2 - 1 Mile
Higher

OK WELLS **OK5000000096073**

Latitude:	35.7744		
Longitude:	-95.3137833		
Elevation:	0	El method:	Not Reported
Well id:	97682	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	Indian Capital Technology Ctr	Quarter1:	SE
Quarter2:	NE	Quarter3:	SW
Section:	17	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	14	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	10-NOV-05	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=97682		
Site id:	OK5000000096073		

E23
West
1/2 - 1 Mile
Higher

OK WELLS **OK5000000096074**

Latitude:	35.7747		
Longitude:	-95.3139		
Elevation:	0	El method:	Not Reported
Well id:	97683	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	Indian Capital Technology Ctr	Quarter1:	SE
Quarter2:	NE	Quarter3:	SW
Section:	17	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	14	First wtr:	0

Approx yld:	0	LI method:	Mathematical conversion program
Const date:	10-NOV-05	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=97683		
Site id:	OK5000000096074		

E24
West
1/2 - 1 Mile
Higher

OK WELLS **OK5000000093515**

Latitude:	35.7746333		
Longitude:	-95.3139167		
Elevation:	0	El method:	Not Reported
Well id:	94602	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	Indian Capital Technology Cent	Quarter1:	SE
Quarter2:	NE	Quarter3:	SW
Section:	17	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	14	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	13-JUN-05	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=94602		
Site id:	OK5000000093515		

25
South
1/2 - 1 Mile
Higher

OK WELLS **OK5000000141046**

Latitude:	35.76518		
Longitude:	-95.30527		
Elevation:	0	El method:	Not Reported
Well id:	146318	County:	Muskogee
Work type:	Geotechnical Boring	Permit:	Not Reported
Owner name:	Muskogee Port Authority	Quarter1:	NE
Quarter2:	SE	Quarter3:	NE
Section:	20	Township:	15N
Range:	19EI	Use class:	Soil Evaluation
Total dpth:	15	First wtr:	0
Approx yld:	0	LI method:	GPS-corrected data (WASS)
Const date:	11-OCT-12	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=146318		
Site id:	OK5000000141046		

26
WNW
1/2 - 1 Mile
Lower

OK WELLS **OK5000000097390**

Latitude:	35.777739		
Longitude:	-95.314857		
Elevation:	0	El method:	Not Reported
Well id:	96510	County:	Muskogee
Work type:	Groundwater Well	Permit:	Not Reported
Owner name:	Economy Plumbing Heating & Air	Quarter1:	SE
Quarter2:	SE	Quarter3:	NW
Section:	17	Township:	15N
Range:	19EI	Use class:	Domestic
Total dpth:	280	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	09-JUL-05	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=96510		
Site id:	OK5000000097390		

27
SE
1/2 - 1 Mile
Lower

OK WELLS **OK5000000092581**

Latitude:	35.766776		
Longitude:	-95.297084		
Elevation:	0	El method:	Not Reported
Well id:	92281	County:	Muskogee
Work type:	Groundwater Well	Permit:	Not Reported
Owner name:	Port of Muskogee c/o Geo Enter	Quarter1:	SE
Quarter2:	NE	Quarter3:	NW
Section:	21	Township:	15N
Range:	19EI	Use class:	Domestic
Total dpth:	302	First wtr:	20
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	14-FEB-05	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=92281		
Site id:	OK5000000092581		

28
SE
1/2 - 1 Mile
Lower

OK WELLS **OK5000000151553**

Latitude:	35.76807		
Longitude:	-95.29489		
Elevation:	0	El method:	Not Reported
Well id:	152270	County:	Muskogee
Work type:	Groundwater Well	Permit:	Not Reported
Owner name:	Three Forks Harbor	Quarter1:	NW
Quarter2:	NW	Quarter3:	NE
Section:	21	Township:	15N
Range:	19EI	Use class:	Irrigation
Total dpth:	65	First wtr:	0

Approx yld:	300	LI method:	GPS-corrected data (WASS)
Const date:	29-APR-13	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=152270		
Site id:	OK5000000151553		

29
SSE
1/2 - 1 Mile
Lower

OK WELLS **OK5000000038513**

Latitude:	35.764066		
Longitude:	-95.298197		
Elevation:	0	El method:	Not Reported
Well id:	41363	County:	Muskogee
Work type:	Groundwater Well	Permit:	Not Reported
Owner name:	Okla Gas & Elec Co	Quarter1:	Not Reported
Quarter2:	SE	Quarter3:	NW
Section:	21	Township:	15N
Range:	19EI	Use class:	Industrial
Total dpth:	48	First wtr:	24
Approx yld:	0	LI method:	Interpolation from PLSS
Const date:	21-JUN-37	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=41363		
Site id:	OK5000000038513		

F30
North
1/2 - 1 Mile
Lower

OK WELLS **OK5000000127947**

Latitude:	35.7872		
Longitude:	-95.3033583		
Elevation:	0	El method:	Not Reported
Well id:	128750	County:	Muskogee
Work type:	Geotechnical Boring	Permit:	Not Reported
Owner name:	PORT AUTHORITY	Quarter1:	NW
Quarter2:	SW	Quarter3:	SW
Section:	09	Township:	15N
Range:	19EI	Use class:	Soil Evaluation
Total dpth:	20	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	10-MAR-10	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=128750		
Site id:	OK5000000127947		

F31
North
1/2 - 1 Mile
Lower

OK WELLS **OK5000000160989**

Latitude:	35.7874		
Longitude:	-95.3034639		
Elevation:	0	El method:	Not Reported
Well id:	140602	County:	Muskogee
Work type:	Geotechnical Boring	Permit:	Not Reported
Owner name:	MUSKOGEE PORT AUTHORITY	Quarter1:	NW
Quarter2:	SW	Quarter3:	SW
Section:	09	Township:	15N
Range:	19EI	Use class:	Soil Evaluation
Total dpth:	20	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	10-MAR-10	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=140602		
Site id:	OK5000000160989		

F32
North
1/2 - 1 Mile
Lower

OK WELLS **OK5000000128732**

Latitude:	35.787497		
Longitude:	-95.303564		
Elevation:	0	El method:	Not Reported
Well id:	130207	County:	Muskogee
Work type:	Monitoring Well	Permit:	Not Reported
Owner name:	MUSKOGEE CITY-COUNTY PORT AUTH	Quarter1:	NW
Quarter2:	SW	Quarter3:	SW
Section:	09	Township:	15N
Range:	19EI	Use class:	Site Assessment
Total dpth:	20	First wtr:	0
Approx yld:	0	LI method:	Mathematical conversion program
Const date:	10-MAR-10	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=130207		
Site id:	OK5000000128732		

33
SSW
1/2 - 1 Mile
Higher

OK WELLS **OK5000000132124**

Latitude:	35.7616		
Longitude:	-95.31405		
Elevation:	0	El method:	Not Reported
Well id:	132503	County:	Muskogee
Work type:	Groundwater Well	Permit:	Not Reported
Owner name:	Marie Gassaway	Quarter1:	NE
Quarter2:	NE	Quarter3:	SW
Section:	20	Township:	15N
Range:	19EI	Use class:	Domestic
Total dpth:	125	First wtr:	0

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Approx yld:	6	LI method:	Not Reported
Const date:	04-OCT-10	Aquifer co:	Not Reported
Basin code:	Not Reported		
Url:	http://www.owrb.ok.gov/wd/reporting/printreport.php?siteid=132503		
Site id:	OK5000000132124		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance

Database | EDR ID Number

1
SW
1/2 - 1 Mile

OIL_GAS | **OKOG20000219584**

Fid:	219583	Api county:	101
Api number:	04830	Well name:	FIANERS
Well no:	2		
Oper name:	OTC/OCC NOT ASSIGNED		
Oper no:	9998	Status :	AC
Well class:	Not Reported		
Operstatus:	Not Reported	Countycode:	101
Meridan:	IM	Section:	20
Township:	15N		
Range :	19E		
Quarter1:	Not Reported	Quarter2:	NW
Quarter3:	NW	Quarter4:	NE
Feet ns:	0	Direct ns:	Not Reported
Feet ew:	0	Direct ew:	Not Reported
Latitude:	35.7683	Longitude:	-95.31247
G elevatio:	0	D el:	0
Completion:	1930-08-02	Dept:	0
Site id:	OKOG20000219584		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: OK Radon

Radon Test Results

Zipcode	Num Tests	# > 4 pCi/L	Maximum	Average
74403	27	0	2.6	0.828

Federal EPA Radon Zone for MUSKOGEE County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for Zip Code: 74403

Number of sites tested: 15

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.360 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	Not Reported	Not Reported	Not Reported	Not Reported

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 2003 & 2011 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

STATE RECORDS

Reported Well Locations in Oklahoma
Source: Oklahoma Water Resources Board
Telephone: 405-530-8800

OTHER STATE DATABASE INFORMATION

Oil and Gas Well Listing
Source: Oklahoma Corporation Commission
Telephone: 405-521-3636
Oil and gas well locations in the state.

Oil and Gas Well Listing
Source: Osage Nation Environmental and Natural Resources
Telephone: 918-287-5333
Oil and gas well locations.

RADON

State Database: OK Radon
Source: Department of Environmental Quality
Telephone: 405-702-5100
Radon Information

Area Radon Information
Source: USGS
Telephone: 703-356-4020
The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones
Source: EPA
Telephone: 703-356-4020
Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

OTHER

Airport Landing Facilities: Private and public use landing facilities
Source: Federal Aviation Administration, 800-457-6656

Epicenters: World earthquake epicenters, Richter 5 or greater
Source: Department of Commerce, National Oceanic and Atmospheric Administration

Earthquake Fault Lines: The fault lines displayed on EDR's Topographic map are digitized quaternary faultlines, prepared in 1975 by the United State Geological Survey

STREET AND ADDRESS INFORMATION

FORMER FANSTEEL SITE
10 Tantalum Place
Muskogee, OK 74403

Inquiry Number: 4556333.8s
March 7, 2016

EDR-Industrial Site Package™

Air, Water, OSHA Report

EDR® Environmental Data Resources Inc

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

The EDR Industrial Site Addendum is a comprehensive presentation of government filings on a facility. The report is divided into three sections:

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

SECTION 1: FACILITY SUMMARY

Due to inconsistent name and/or locational information, records on the same facility may be listed in separate facility columns.

	RECORD 1 FORMER FANSTEEL SITE MUSKOGEE, OK	RECORD 2 THERMAL SPECIALTIES, INC. 10 TANTALUM PL. 1 MUSKOGEE, OK 74401 EDR ID #O-107505307	RECORD 3 US NUCLEAR REGULATORY COMMISSI 10 TANTALUM PLACE MUSKOGEE, OK 74403 EDR ID #O-302389945
AIR EMISSIONS Permitted air emissions (AIRS)	NO	NO	NO
Reported emergency releases to air (ERNS/A)	NO	NO	NO
Compliance data (AIRS/COM)	NO	NO	NO
WATER DISCHARGES Permitted waste water discharges (NPDES/PCS)	NO	NO	NO
Reported emergency releases to water (ERNS/W)	NO	NO	NO
Enforcement actions (NPDES/PCS-ENF)	NO	NO	NO
Inactive waste water discharges (NPDES-PCS INACT)	NO	NO	NO
Stormwater permit (STORMWATER)	NO	NO	NO
HEALTH AND SAFETY Inspected by the Occupational Safety and Health Administration (OSHA)	NO	YES - p7	YES - p9
Violations under OSHA (OSHA/VIOL)	NO	NO	YES - p10
Facility has had accidents according to the Occupational Safety and Health Administration (OSHA/ACC)	NO	NO	NO
TOTAL (YES)	0	1	2

- A "NO" indicates that no findings were identified based on an exact name, address and/or EPA facility identification number search. Facility information may be available under an alternate name, address and/or EPA identification number.
- NR = Not Requested

SECTION 1: FACILITY SUMMARY

...Continued...

	RECORD 4 US NUCLEAR REGULATORY COMMISSI 10 TANTALUM PLACE MUSKOGEE, OK 74403 EDR ID #O-302383690	RECORD 5 US NUCLEAR REGULATORY COMMISSI 10 TANTALUM PLACE MUSKOGEE, OK 74403 EDR ID #O-302388541	TOTAL (YES)
AIR EMISSIONS Permitted air emissions (AIRS)	NO	NO	0
Reported emergency releases to air (ERNS/A)	NO	NO	0
Compliance data (AIRS/COM)	NO	NO	0
WATER DISCHARGES Permitted waste water discharges (NPDES/PCS)	NO	NO	0
Reported emergency releases to water (ERNS/W)	NO	NO	0
Enforcement actions (NPDES/PCS-ENF)	NO	NO	0
Inactive waste water discharges (NPDES-PCS INACT)	NO	NO	0
Stormwater permit (STORMWATER)	NO	NO	0
HEALTH AND SAFETY Inspected by the Occupational Safety and Health Administration (OSHA)	YES - p12	YES - p15	4
Violations under OSHA (OSHA/VIOL)	YES - p13	YES - p16	3
Facility has had accidents according to the Occupational Safety and Health Administration (OSHA/ACC)	NO	NO	0
TOTAL (YES)	2	2	7

- A "NO" indicates that no findings were identified based on an exact name, address and/or EPA facility identification number search. Facility information may be available under an alternate name, address and/or EPA identification number.
- NR = Not Requested

SECTION 2: FACILITY DETAIL REPORTS

Record 1: **FORMER FANSTEEL SITE**
MUSKOGEE, OK (EDR ID#)

AIR EMISSIONS

Facility has permitted air emissions	NO
Facility has reported emergency releases to air	NO
Facility has compliance data	NO

WATER DISCHARGES

Facility has permitted waste water discharges	NO
Facility has reported emergency releases to water	NO
Facility has enforcement actions	NO
Facility has an inactive waste water permit	NO
Facility has stormwater discharges	NO

HEALTH AND SAFETY

Facility has been inspected by the Occupational Safety and Health Administration	NO
Facility has violations cited by the Occupational Safety and Health Administration	NO
Facility has had accidents according to the Occupational Safety and Health Administration	NO
TOTALS (YES)	**0**

SECTION 2: FACILITY DETAIL REPORTS

...Continued...

Record 2: THERMAL SPECIALTIES, INC.
MUSKOGEE, OK 74401 (EDR ID# O-107505307)

AIR EMISSIONS

Facility has permitted air emissions ..... NO

Facility has reported emergency releases to air ..... NO

Facility has compliance data ..... NO

WATER DISCHARGES

Facility has permitted waste water discharges ..... NO

Facility has reported emergency releases to water ..... NO

Facility has enforcement actions ..... NO

Facility has an inactive waste water permit ..... NO

Facility has stormwater discharges ..... NO

HEALTH AND SAFETY

Facility has been inspected by the Occupational Safety and Health Administration ..... YES

Facility has violations cited by the Occupational Safety and Health Administration ..... NO

Facility has had accidents according to the Occupational Safety and Health Administration ..... NO

TOTALS (YES) 1

HEALTH AND SAFETY

Facility has been inspected by the Occupational Safety and Health Administration

DATABASE: Occupational Safety and Health Administration (OSHA)

THERMAL SPECIALTIES, INC.
10 TANTALUM PL. 1
MUSKOGEE, OK 74401
EDR ID #O-107505307

OSHA INSPECTIONS:

OSHA Inspection Activity Number 107505307
Establishment: THERMAL SPECIALTIES, INC.
10 TANTALUM PL.
MUSKOGEE, OK 74401
MUSKOGEE County

Primary SIC: 1742
Secondary SIC: Not reported
Employees at Site: Not reported
Total Employees: Not reported

Inspection Report ID: 0627700
Inspector Title: Safety Officer
Total Inspection Time: Not Reported

Lost Workday Injury Rate: Not reported
Case Completed Date: 1/09/91
Unionized: NONUNION

SECTION 2: FACILITY DETAIL REPORTS

...Continued...

Record 3: US NUCLEAR REGULATORY COMMISSI
MUSKOGEE, OK 74403 (EDR ID# O-302389945)

AIR EMISSIONS

Facility has permitted air emissions ..... NO

Facility has reported emergency releases to air ..... NO

Facility has compliance data ..... NO

WATER DISCHARGES

Facility has permitted waste water discharges ..... NO

Facility has reported emergency releases to water ..... NO

Facility has enforcement actions ..... NO

Facility has an inactive waste water permit ..... NO

Facility has stormwater discharges ..... NO

HEALTH AND SAFETY

Facility has been inspected by the Occupational Safety and Health Administration ..... YES

Facility has violations cited by the Occupational Safety and Health Administration ..... YES

Facility has had accidents according to the Occupational Safety and Health Administration ..... NO

TOTALS (YES) 2

HEALTH AND SAFETY

Facility has been inspected by the Occupational Safety and Health Administration

DATABASE: Occupational Safety and Health Administration (OSHA)

US NUCLEAR REGULATORY COMMISSI
10 TANTALUM PLACE
MUSKOGEE, OK 74403
EDR ID #O-302389945

OSHA INSPECTIONS:

OSHA Inspection Activity Number 302389945

Establishment:	US NUCLEAR REGULATORY COMMISSI 10 TANTALUM PLACE MUSKOGEE, OK 74403 MUSKOGEE County
Primary SIC:	9631
Secondary SIC:	Not reported
Employees at Site:	Not reported
Total Employees:	Not reported

Inspection Report ID:	0627700	Lost Workday Injury Rate:	Not reported
Inspector Title:	Health Officer	Case Completed Date:	6/08/00
Total Inspection Time:	34.5 hours	Unionized:	NONUNION

HEALTH AND SAFETY

Facility has had violations cited by the Occupational Safety and Health Administration

DATABASE: Occupational Safety and Health Administration (OSHA)

US NUCLEAR REGULATORY COMMISSI
10 TANTALUM PLACE
MUSKOGEE, OK 74403
EDR ID #O-302389945

OSHA VIOLATIONS:

Standard Violated: N-04 ATAR
Event: Not reported
Citation Type: Not reported
Citation ID: Not reported
Issue Date: Not reported
Original Penalty: Not reported
Actual Penalty: Not reported
Penalty Contested: No
Hazardous Substance Involved: Not reported

Disposition: Not reported
Abatement Status: Not reported
Abatement Date: Not reported
Original Failure-to-Abate Penalty: Not reported
Actual Failure-to-Abate Penalty: Not reported

Record 4: **US NUCLEAR REGULATORY COMMISSI**
MUSKOGEE, OK 74403 (EDR ID# O-302383690)

AIR EMISSIONS

Facility has permitted air emissions	NO
Facility has reported emergency releases to air	NO
Facility has compliance data	NO

WATER DISCHARGES

Facility has permitted waste water discharges	NO
Facility has reported emergency releases to water	NO
Facility has enforcement actions	NO
Facility has an inactive waste water permit	NO
Facility has stormwater discharges	NO

HEALTH AND SAFETY

Facility has been inspected by the Occupational Safety and Health Administration	YES
Facility has violations cited by the Occupational Safety and Health Administration	YES
Facility has had accidents according to the Occupational Safety and Health Administration	NO
TOTALS (YES)	**2**

HEALTH AND SAFETY

Facility has been inspected by the Occupational Safety and Health Administration

DATABASE: Occupational Safety and Health Administration (OSHA)

US NUCLEAR REGULATORY COMMISSI
10 TANTALUM PLACE
MUSKOGEE, OK 74403
EDR ID #O-302383690

OSHA INSPECTIONS:

OSHA Inspection Activity Number 302383690

Establishment:	US NUCLEAR REGULATORY COMMISSI 10 TANTALUM PLACE MUSKOGEE, OK 74403 MUSKOGEE County
Primary SIC:	9631
Secondary SIC:	Not reported
Employees at Site:	Not reported
Total Employees:	Not reported
Inspection Report ID:	0627700
Inspector Title:	Safety Officer
Total Inspection Time:	66.5 hours
Lost Workday Injury Rate:	Not reported
Case Completed Date:	8/09/99
Unionized:	NONUNION

HEALTH AND SAFETY

Facility has had violations cited by the Occupational Safety and Health Administration

DATABASE: Occupational Safety and Health Administration (OSHA)

US NUCLEAR REGULATORY COMMISSI
10 TANTALUM PLACE
MUSKOGEE, OK 74403
EDR ID #O-302383690

OSHA VIOLATIONS:

Standard Violated:	N-04 ATAR		
Event:	Not reported		
Citation Type:	Not reported	Disposition:	Not reported
Citation ID:	Not reported	Abatement Status:	Not reported
Issue Date:	Not reported	Abatement Date:	Not reported
Original Penalty:	Not reported	Original Failure-to-Abate Penalty:	Not reported
Actual Penalty:	Not reported	Actual Failure-to-Abate Penalty:	Not reported
Penalty Contested:	No		
Hazardous Substance Involved:	Not reported		

Record 5: US NUCLEAR REGULATORY COMMISSI
MUSKOGEE, OK 74403 (EDR ID# O-302388541)

AIR EMISSIONS

Facility has permitted air emissions	NO
Facility has reported emergency releases to air	NO
Facility has compliance data	NO

WATER DISCHARGES

Facility has permitted waste water discharges	NO
Facility has reported emergency releases to water	NO
Facility has enforcement actions	NO
Facility has an inactive waste water permit	NO
Facility has stormwater discharges	NO

HEALTH AND SAFETY

Facility has been inspected by the Occupational Safety and Health Administration	YES
Facility has violations cited by the Occupational Safety and Health Administration	YES
Facility has had accidents according to the Occupational Safety and Health Administration	NO
TOTALS (YES)	**2**

HEALTH AND SAFETY

Facility has been inspected by the Occupational Safety and Health Administration

DATABASE: Occupational Safety and Health Administration (OSHA)

US NUCLEAR REGULATORY COMMISSI
10 TANTALUM PLACE
MUSKOGEE, OK 74403
EDR ID #O-302388541

OSHA INSPECTIONS:

OSHA Inspection Activity Number 302388541

Establishment:	US NUCLEAR REGULATORY COMMISSI 10 TANTALUM PLACE MUSKOGEE, OK 74403 MUSKOGEE County
Primary SIC:	9631
Secondary SIC:	Not reported
Employees at Site:	Not reported
Total Employees:	Not reported

Inspection Report ID:	0627700	Lost Workday Injury Rate:	Not reported
Inspector Title:	Safety Officer	Case Completed Date:	3/23/00
Total Inspection Time:	67.0 hours	Unionized:	NONUNION

HEALTH AND SAFETY

Facility has had violations cited by the Occupational Safety and Health Administration

DATABASE: Occupational Safety and Health Administration (OSHA)

US NUCLEAR REGULATORY COMMISSI
10 TANTALUM PLACE
MUSKOGEE, OK 74403
EDR ID #O-302388541

OSHA VIOLATIONS:

Standard Violated: N-04 ATAR
Event: Not reported
Citation Type: Not reported
Citation ID: Not reported
Issue Date: Not reported
Original Penalty: Not reported
Actual Penalty: Not reported
Penalty Contested: No
Hazardous Substance Involved: Not reported

Disposition: Not reported
Abatement Status: Not reported
Abatement Date: Not reported
Original Failure-to-Abate Penalty: Not reported
Actual Failure-to-Abate Penalty: Not reported

SECTION 3: DATABASES SEARCHED AND UPDATE DATES

To maintain currency of the following federal, state and local databases, EDR contacts the appropriate government agency on a monthly or quarterly basis as required.

Elapsed ASTM days: Provides confirmation that this report meets or exceeds the 90-day updating requirement of the ASTM standard.

FACILITY RELATED DATABASES

AIR EMISSIONS

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)
Source: EPA
Telephone: 202-564-2496
The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/20/2015
Database Release Frequency: Annually
Date of Last EDR Contact: 12/22/2015
Date of Next Scheduled Update: 04/11/2016

ERNS: Emergency Response Notification System
Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/22/2015
Database Release Frequency: Annually
Date of Last EDR Contact: 12/29/2015
Date of Next Scheduled Update: 04/11/2016

WATER DISCHARGES

PCS: Permit Compliance System
Source: EPA, Office of Water
Telephone: 202-564-2496
PCS is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Date of Government Version: 07/14/2011
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 12/09/2015
Date of Next Scheduled Update: 03/28/2016

PCS: Permit Compliance System
Source: EPA, Office of Water
Telephone: 202-564-2496
PCS is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Date of Government Version: 07/14/2011
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 12/09/2015
Date of Next Scheduled Update: 03/28/2016

PCS INACTIVE: Listing of Inactive PCS Permits
Source: EPA
Telephone: 202-564-2496
An inactive permit is a facility that has shut down or is no longer discharging.

Date of Government Version: 11/05/2014
Database Release Frequency: Semi-Annually
Date of Last EDR Contact: 01/08/2016
Date of Next Scheduled Update: 04/25/2016

SECTION 3: DATABASES SEARCHED AND UPDATE DATES

...Continued...

ERNS: Emergency Response Notification System
Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/22/2015
Database Release Frequency: Annually

Date of Last EDR Contact: 12/29/2015
Date of Next Scheduled Update: 04/11/2016

STORMWATER: Storm Water General Permits
Source: Environmental Protection Agency
Telephone: 202-564-0746
A listing of all facilities with Storm Water General Permits.

Date of Government Version: 06/02/2005
Database Release Frequency: Quarterly

Date of Last EDR Contact: 02/29/2016
Date of Next Scheduled Update: 06/13/2016

HEALTH AND SAFETY

OSHA: Occupational Safety and Health Administration
Source: DOL, OSHA, Office of Mgmt Data
Telephone: 202-693-1700
Specific inspection, violation and fatality/catastrophe information regarding inspections of interest.

Date of Government Version: 12/31/2013
Database Release Frequency: Annually

Date of Last EDR Contact: 12/18/2015
Date of Next Scheduled Update: 04/04/2016

Former Fansteel Site
10 Tantalum Place
Muskogee, OK 74403

Inquiry Number: 4556333.5
March 08, 2016

The EDR-City Directory Image Report

EDR® Environmental Data Resources Inc

6 Armstrong Road
Shelton, CT 06484
800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EXECUTIVE SUMMARY

DESCRIPTION

Environmental Data Resources, Inc.'s (EDR) City Directory Report is a screening tool designed to assist environmental professionals in evaluating potential liability on a target property resulting from past activities. EDR's City Directory Report includes a search of available city directory data at 5 year intervals.

RESEARCH SUMMARY

The following research sources were consulted in the preparation of this report. A check mark indicates where information was identified in the source and provided in this report.

Year	Target Street	Cross Street	Source
2013	☑	☑	Cole Information Services
2008	☑	☑	Cole Information Services
2003	☑	☑	Cole Information Services
1999	☑	☑	Cole Information Services
1995	☑	☑	Cole Information Services
1992	☑	☐	Cole Information Services
1987	☑	☐	Polk's City Directory
1982	☐	☐	Polk's City Directory
1977	☐	☐	Polk's City Directory
1973	☐	☐	Polk's City Directory
1969	☐	☐	Polk's City Directory
1965	☐	☐	Polk's City Directory

RECORD SOURCES

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FINDINGS

TARGET PROPERTY STREET

10 Tantalum Place
Muskogee, OK 74403

Year	CD Image	Source	
TANTALUM PL			
2013	pg A2	Cole Information Services	
2008	pg A4	Cole Information Services	
2003	pg A7	Cole Information Services	
1999	pg A9	Cole Information Services	
1995	pg A11	Cole Information Services	
1992	pg A12	Cole Information Services	
1987	pg A13	Polk's City Directory	
1982	-	Polk's City Directory	Street not listed in Source
1977	-	Polk's City Directory	Street not listed in Source
1973	-	Polk's City Directory	Street not listed in Source
1969	-	Polk's City Directory	Street not listed in Source
1965	-	Polk's City Directory	Street not listed in Source

FINDINGS

CROSS STREETS

Year	CD Image	Source	
N 43RD ST E			
2013	pg. A1	Cole Information Services	
2008	pg. A3	Cole Information Services	
2003	pg. A5	Cole Information Services	
1999	pg. A8	Cole Information Services	
1995	pg. A10	Cole Information Services	
1992	-	Cole Information Services	Target and Adjoining not listed in Source
1987	-	Polk's City Directory	Street not listed in Source
1982	-	Polk's City Directory	Street not listed in Source
1977	-	Polk's City Directory	Street not listed in Source
1973	-	Polk's City Directory	Street not listed in Source
1969	-	Polk's City Directory	Street not listed in Source
1965	-	Polk's City Directory	Street not listed in Source

City Directory Images

N 43RD ST E 2013

300	STEVEN CUNNINGHAM
400	SOONER STEEL 20944
540	GRISSOMS LLC
651	HIGHWAY PATROL
	OKLA LAKE PATROL MAINTENANCE SHOP
	STATE OF OKLAHOMA
800	CULLUM GREG CONSTRUCTION SERVICES
900	RIVERSIDE PIPE CO
910	KNIGHTS INN MUSKOGEE
920	WW TRANSPORT LLC
924	GRAHAM PACKAGING COMPANY
1200	FURMANITE
1240	MARTY BARMETT
1320	RHONDA GOINS
1330	JERRY CLARK
1336	OCCUPANT UNKNOWN
1350	BRIAN WELLS
1352	OCCUPANT UNKNOWN
1354	OCCUPANT UNKNOWN
1356	PATSY POWELL
1358	OCCUPANT UNKNOWN
1360	ADDN HUNTER
1400	GORDON ESTES
1401	SAMMIE MCMAHAN
1410	DAVID RUSSELL
1411	KAREN LEE
1420	GARY DAVIDSON
1421	OCCUPANT UNKNOWN
1430	MYRIAH LOWREY
1440	HORACE BURNS
1451	SAM CARTER
1461	ARCHIE HUNTER
1501	NEW HOPE BAPTIST CHURCH
1520	OCCUPANT UNKNOWN
1530	COLLIN HENSLEY
1540	ALAN PERRY
1790	BERNICE MCCABE
1810	TED BATTENFIELD
1820	OCCUPANT UNKNOWN
1830	MARVIN BLOSS
1840	BILL CROWLE
1850	OCCUPANT UNKNOWN
1860	JON DAVIS
1870	BOBBY HOOVER
1880	SHANE LEONARD
1890	OCCUPANT UNKNOWN
1950	MARK WINTERS
2800	METALS USAMUSKOGEE

TANTALUM PL 2013

10 ADVANTAGE WELD SHOP
FANSTEEL METALS

N 43RD ST E 2008

300	GALE CUNNINGHAM
540	UNITED ENGINES MUSKOGEE
600	MID CONTINENT CONCRETE CO INC
651	HIGHWAY PATROL HEADQUARTERS
900	RIVERSIDE PIPE CO
910	THREE RIVERS INN
1120	HARRY TRACY
1200	FLOWSERVE FSD
	FURMANITE AMERICA INC
	PLANT MAINTENANCE
1210	COREY MESECHER
1240	MARTY BARMETT
1320	GOINS PAINTING
	JAMES GOINS
1330	JERRY CLARK
1336	OCCUPANT UNKNOWN
1350	BRIAN WELLS
1351	TOM WINKLER
1352	MANUEL MARES
1356	PATSY POWELL
1358	DALE HUNTER
1361	OCCUPANT UNKNOWN
1400	GORDON ESTES
1401	EDWARD FAVORS
1404	BILLIE OWENS
1410	LINCOLN ANDERSON
1411	STEVE BUSH
1420	GARY DAVIDSON
1421	TROY BOLING
1430	GREG HAWS
1440	ANITA BURRIS
1450	OCCUPANT UNKNOWN
1451	PEGGY CARTER
1461	ARCHIE HUNTER
1501	NEW HOPE BAPTIST CHURCH
1520	LINDA DRY
1530	PERRY OWEN
1540	M BURNETT
1790	BERNICE MCCABE
1820	OCCUPANT UNKNOWN
1830	MARVIN BLOSS
1840	BILL CROWLE
1850	OCCUPANT UNKNOWN
1860	JOY ROGERS
1870	CRAIG CONAWAY
1880	TOBBY JACKSON
1890	RUBYE LAWSON
1950	OCCUPANT UNKNOWN
2800	METALS U S A PLATES & SHAPES INC

TANTALUM PL 2008

10 FANSTEEL

N 43RD ST E 2003

300	GALE CUNNINGHAM
601	MI RANCHITO DISTRIBUTORS
651	OKLAHOMA HIGHWAY PATROL
900	RIVERSIDE PIPE CO
910	PARESH PATEL
	THREE RIVERS INN
1120	HARRY TRACY
1200	PLANT MAINTENANCE INC
	PRODUCTION MACHINES INC
1210	OCCUPANT UNKNOWN
1240	OCCUPANT UNKNOWN
1320	VICTOR PYLAND
1330	JERRY CLARK
1336	OCCUPANT UNKNOWN
1340	ROSSON WHEEL SERVICE
1350	LISA TONEY
1351	TOM WINKLER
1352	OCCUPANT UNKNOWN
1354	OCCUPANT UNKNOWN
1356	LOUIE POWELL
1358	DALE HUNTER
1360	MARION HUNTER
1361	OCCUPANT UNKNOWN
1392	MID AIR CONSTRUCTION CO
1400	GORDON ESTES
1401	EDWARD FAVORS
1404	OCCUPANT UNKNOWN
1410	LINCOLN ANDERSON
1411	STEVE BUSH
1420	GARY DAVIDSON
1421	TROY BOLING
1430	OCCUPANT UNKNOWN
1440	HORACE BURRIS
1450	PARK ROZELLE
1451	PEGGY CARTER
1461	NORA HUNTER
1501	NEW HOPE BAPTIST CHURCH
1530	PERRY OWEN
1540	VERLON BURNETT
1810	TIMOTHY GRAY
1820	DELBERT CARTER
1830	MARVIN BLOSS
1840	BILL CROWLE
1844	STORAGE USA
1850	DOROTHY WINGET
1860	JOY ROGERS
1870	HOOVER ENTERPRISES INC
	KARLA SMITH
1880	TOBBY JACKSON
1890	RUBYE LAWSON

N 43RD ST E 2003 (Cont'd)

1950 BRIAN KIRKHART
2800 UNI STEEL

TANTALUM PL 2003

10 FANSTEEL INC

N 43RD ST E 1999

300	GALE CUNNINGHAM
900	RIVERSIDE MOBILE HOME PARK INCORPORATED
910	THREE RIVERS INN
1120	HARRY TRACY
1200	PLANT MAINTENANCE INCORPORATED
	PRODUCTION MACHINES INCORPORATED
1320	VICTOR PYLAND
1330	JERRY CLARK
1336	MUSKOGEE SIDING
	RON SMITH
1350	LISA TONEY
1351	TOMMY WINKLER
1352	OCCUPANT UNKNOWN
1354	OCCUPANT UNKNOWN
1356	DAVID KUMMERS
1358	DALE HUNTER
1360	MARION HUNTER
1361	BLANCHE CLAUSEN
1400	OCCUPANT UNKNOWN
1404	BILLIE OWENS
1410	ATHEN RECTOR
1411	OCCUPANT UNKNOWN
1420	GARY DAVIDSON
1421	TROY BOLING
1430	C SPENCER
1440	HORACE BURRIS
1450	CLASSIC AUTO SALES & PARTS
	PARK ROZELLE
	ROZELLE PARK L
1451	SAM CARTER
1461	NORA HUNTER
1501	NEW HOPE BAPTIST CHURCH
1530	PERRY OWEN
1540	VERLON BURNETT
1790	BERNICE MCCABE
1800	OCCUPANT UNKNOWN
1810	OCCUPANT UNKNOWN
1820	DELBERT CARTER
1830	MARVIN BLOSS
1840	BARBARA CLIFTON
1850	DOROTHY WINGET
1860	JOY ROGERS
1870	CRAIG CONAWAY
1880	TOBBY JACKSON
1890	ROY LAWSON

TANTALUM PL 1999

10 FANSTEEL METALS

N 43RD ST E 1995

300	CUNNINGHAM, GALE
640	MID CONTINENT CONCRETE CO
651	HIGHWAY PATROL HEADQUARTERS
	LAKE PATROL MAINTENANCE SHOP
	SIZE & WEIGHT PERMITS
1120	WADDLE, BILL
1200	PLANT MAINTENANCE INC
	PRDCTN MCHNS INC
1320	OCCUPANT UNKNOWNN
1330	CLARK, JERRY M
1350	HARRIS, EDNA
1351	OCCUPANT UNKNOWNN
1352	NOE, HAROLD
1358	HUNTER, DALE
1360	HUNTER, MARION
1361	CRAWFORD, TRENT
1401	FAVORS, EDWARD
1410	RECTOR, ATHEN
1411	CAMPBELL, VERNON D
1420	OCCUPANT UNKNOWNN
1421	WILSON, WOODROW
1440	OCCUPANT UNKNOWNN
1450	ROZELLE, PARK L
1451	CARTER, SAM
1461	HUNTER, NORA
1501	NEW HOPE BAPTIST CHURCH
1530	OWEN, PERRY D
1540	BURNETT, VERLON
1790	MCCABE, THOMAS B
1800	YATES, MIKE
1810	WILLIAMS, DESSIE G
1820	CARTER, DELBERT
	HOMESLEY, RALPH
1830	BLOSS, MARVIN L
1850	WINGET, HENRY
1860	ROGERS, JOY
1880	JACKSON, TOBBY
1890	LAWSON, ROY

TANTALUM PL 1995

10 FANSTEEL METALS

TANTALUM PL 1992

10 FANSTEEL METALS
FANSTEEL MTLS TTIC

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TANTALUM PL —FROM E SHAWNEE AV NORTH EAST OF MUSKOGEE TURNPIKE

ZIP CODE 74403

10 Fansteel Metals 687-6303

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