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Curtis State Office Building
1000 SW Jackson, Suite 410
Topeka, Kansas 66612-1367

Kansas Department of Health and Environment

**Final
Corrective Action Decision**



**Missouri Pacific Railroad
Freight House Site
300 N. Seventh Street
Salina, Kansas**

June 2011

Bureau of Environmental Remediation

**KANSAS DEPARTMENT OF HEALTH AND ENVIRONMENT
FINAL CORRECTIVE DECISION
MISSOURI PACIFIC RAILROAD FREIGHT HOUSE SITE**

DECLARATION OF REMEDIAL ACTION SELECTION

SITE NAME AND LOCATION

**Missouri Pacific Railroad Freight House Site
Salina, Kansas**

STATEMENT OF BASIS AND PURPOSE

This final Corrective Action Decision (CAD) document presents the remedy selected to address contamination at the Missouri Pacific Railroad Freight House Site located at 300 N. Seventh Street, in Salina, Kansas. Contaminants of concern (COCs) for the Site are volatile organic compounds (VOCs), specifically, tetrachloroethene (PCE), trichloroethene (TCE) and cis-1,2-dichloroethene. The selected remedy was developed in accordance with guidelines of the State Cooperative Program of the Kansas Department of Health and Environment (KDHE). The Missouri Pacific Railroad Freight House Site is a State-lead site managed under State authority. The selection of the remedy was based on documents and information contained in the Administrative Record file for the Site. The Administrative Records file is available for public review at the KDHE central office in Topeka, Kansas.

DESCRIPTION OF THE SELECTED REMEDY

KDHE has determined the selected remedy, described and evaluated in the draft CAD, satisfies or meets the criteria established by both the State and Federal programs. The selected remedy will be protective of human health and the environment. The selected remedy for groundwater is Source Area Enhanced Reductive Dechlorination coupled with Monitored Natural Attenuation (MNA) to address downgradient impacts and establishing Environmental Use Controls (EUCs). The selected remedy is summarized below.

Source Area Enhanced Reductive Dechlorination and Downgradient MNA- A natural or synthetic compound would be injected into the subsurface to enhance bioremediation/reductive dechlorination while MNA would address downgradient groundwater impacts. An adequate number of injection points would be installed at the Site in order to achieve cleanup goals. A groundwater monitoring program would also be established and additional monitoring wells would be installed, as necessary, to determine the effectiveness of the remedy and to demonstrate compliance with the RAOs. The groundwater monitoring program will continue until conditions at the Site meet the requirements of KDHE BER's Reclassification Plan (Policy #BER-RS-024).

EUCs – The EUCs described below will be established through the EUC program administered by KDHE-BER.

- **Restricting future use of the Site to non-residential uses.**

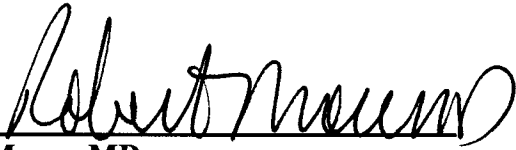
- Preventing the installation of a consumptive use water well(s) on-site.

DECLARATION:

The selected remedy will be protective of human health and the environment and attain State, Federal, and local requirements that are applicable or relevant and appropriate. The selected remedy also actively reduces the toxicity, mobility, and volume of contamination identified at the Site. In selecting and declaring this remedy, KDHE believes implementation of this remedy will have a beneficial effect by reducing the toxicity, mobility, and volume of contaminants.

6/23/2011

Date



Robert Moser, MD
Secretary of Kansas Department of Health and Environment

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1.0 PURPOSE OF THE CORRECTIVE ACTION DECISION

The primary purposes of the final Corrective Action Decision (CAD) are to: 1) summarize information from the key site documents including the Comprehensive Investigation (CI) and Corrective Action Study (CAS) reports; 2) briefly describe the alternatives for site remediation detailed in the CAS report; 3) identify and describe the Kansas Department of Health and Environment's (KDHE) selected remedy for the soil and groundwater contamination at the Missouri Pacific Railroad Freight House Site (Site); and, 4) document comments and KDHE's responses to the public comments received regarding the draft CAD. The public was encouraged to review and comment on the preferred remedy presented in the draft CAD during the public comment period held from April 19 to May 19, 2011.

Foth Infrastructure & Environment, LLC, (Foth) the consultant for the Union Pacific Railroad (UPRR), prepared the key documents for the Site. Work performed during the CI and CAS process followed the terms outlined in a July 18, 2006 Consent Agreement between UPRR and KDHE. The public was encouraged to review and comment on the technical information presented in the CI and CAS reports and other documents contained in the Administrative Record file. The Administrative Record file includes all pertinent documents and site information that form the basis and rationale for selecting the final remedy. The Administrative Record file, was made available for public review during normal business hours at the following location:

Kansas Department of Health and Environment
Bureau of Environmental Remediation
1000 SW Jackson St., Suite 410
Topeka, Kansas 66612-1367
CONTACT: Maggie Weiser, Environmental Scientist
Telephone Number: (785) 296-5555
E-mail: mweiser@kdheks.gov

For convenience to interested members of the public, copies of the CI and CAS reports, as well as the draft CAD, were also available for review during normal business hours at the following location:

Salina Public Library
301 W. Elm
Salina, Kansas 67401
CONTACT: Reference Desk
Telephone Number: (785) 825-4624

2.0 SITE BACKGROUND

2.1 Site Location

The former Missouri Pacific Railroad Freight House (railroad) facility is located at 353 N. Seventh Street, Salina, in the southeast quarter of Section 12, Township 14 South, Range 3 West, Saline County, Kansas. The general location of the Site and approximate property boundaries are illustrated on Figures 1 and 2. The former railroad property is zoned for light industrial use; however, surrounding properties are zoned for heavy industrial and central business district use. The nearest residential property is located approximately 750 feet to the southwest (sidegradient) and approximately 1,950 feet southeast (downgradient) of the Site.

2.2 Site History

UPRR and its predecessors, most recently Missouri Pacific, constructed the freight house in 1910 and operated the facility until 1995. The freight house was used to handle freight shipped in the Salina area via rail. A historical surface spill of tetrachloroethene (PCE) appears to have occurred at the facility although the exact source, time frame, and/or incident is unknown. In 1995, the former railroad property was purchased by the current owner and is used for storage. Prior to 1910, the property was a vacant lot.

In 1993, KDHE sampled the monitoring wells at the Long-McArthur underground storage tank (UST) Site, 330 N. Fifth Street, Salina, as part of the Preliminary Assessment (PA)/Site Inspection (SI) for the Salina PWS Well #11 Site. The laboratory results for the groundwater samples indicated the presence of chlorinated volatile organic compounds (VOCs), unrelated to the UST site. The chlorinated solvents detected in the groundwater included PCE, trichloroethene (TCE), carbon tetrachloride, chloroform, 1,2-dichloroethane (1,2-DCA), and 1,1,1-trichloroethane (1,1,1-TCA).

From 1994 to 1996, KDHE conducted a CI for the Salina North Site to identify the source(s) of the chlorinated VOCs in groundwater and determine if further investigation was necessary. The CI included sampling and analysis of soil gas, subsurface soil, and groundwater collected by direct-push methods and from existing and newly installed monitoring wells. The results of the Salina North Site CI identified on-site groundwater concentrations of PCE exceeding the maximum contaminant level (MCL) of 5 micrograms per liter ($\mu\text{g/L}$). The U. S. Environmental Protection Agency (EPA) has established MCLs for certain substances in drinking water supplies. The maximum concentrations detected and corresponding MCLs or Tier 2 Levels, as established in KDHE's *Risk-Based Standards for Kansas RSK Manual*, for the contaminants of concern (COCs) are shown in Table 1.

Results from an Expanded Site Investigation (ESI) of the Salina PWS Well #11 Site, conducted by KDHE in early 2001, further identified PCE and TCE in on-site groundwater at concentrations of 230 $\mu\text{g/L}$ and 49.3 $\mu\text{g/L}$, respectively. The ESI confirmed the chlorinated VOC contaminant plume associated with the former railroad facility and identified several additional groundwater contaminant plumes from other unrelated sources.

In 2005, Foth conducted a Preliminary Site Investigation (PSI) on behalf of UPRR to confirm KDHE's conclusions drawn from previous investigations and to further define the horizontal and

vertical extent of impacts to the soil and groundwater. Results of the PSI identified the presence of PCE in the soil but at concentrations below the KDHE Tier 2 soil levels. Concentrations of PCE and TCE previously observed in the groundwater exceeding the MCLs were confirmed during the PSI field activities.

Based on the contamination detected during the Salina North Site CI, Salina PWS #11 PA/SI and ESI, and the PSI conducted by Foth, KDHE requested UPRR perform a CI/CAS at the Site. A Consent Agreement (Case No. 06-E-0051) was executed between UPRR and KDHE on July 18, 2006, setting the requirements for the investigation and evaluation of cleanup alternatives as part of the CI/CAS process.

Additional information concerning the site background is described in the January 2008 *Comprehensive Investigation Report, Missouri Pacific Railroad Depot Salina, Kansas*.

3.0 COMPREHENSIVE INVESTIGATION

UPRR contracted Foth to perform the CI/CAS at the Site. A CI Work Plan was approved by KDHE in November 2006. The objectives of the CI process include:

- identification and characterization of all potential source areas, including identification of COCs, the mechanisms of release, estimating the quantities of release, and determining whether these releases are ongoing or inactive;
- delineation of the extent of contamination for each of the impacted environmental media at the site;
- characterization of the environmental setting, including regional and local geology, hydrogeology, and hydrology;
- characterization of the physical and chemical properties for each COC, their mobility and persistence in the environment, and their important fate and transport mechanisms;
- identification of potential human and environmental targets that may be threatened or affected by the site;
- perform bench or pilot treatability tests as necessary to support the development of potential corrective action alternatives; and,
- develop a preliminary list of remedial objectives and corresponding potential corrective action alternatives.

3.1 Results of the Comprehensive Investigation

The CI included an evaluation of the geology and hydrogeology for assessing pathways of contaminant migration. The observed lithology in the area of the Site consists of 35 feet of silty clay intermittent sand underlain by fine- to coarse-grained sand ranging from approximately 35 to 70 feet below ground surface. The underlying bedrock consists of the Wellington Shale. A single unconfined aquifer is present at the Site, with a water table approximately 30 to 35 feet below ground surface. The groundwater flow in the area is generally to the southeast (Figure 3). It is worthy to note that several of the City of Salina's public water supply (PWS) wells are located southeast of the Site and the pumping influences in the area may slightly alter the regional groundwater flow direction.

3.1.1 Soil Contamination

Previous investigations conducted by KDHE indicated a source of VOC contamination in groundwater was present in the area of the former railroad facility. As part of the preliminary investigation activities conducted by Foth in 2005, several soil samples were collected across the former railroad property and submitted to the laboratory for analysis. The laboratory results indicated PCE was present in the soil at concentrations ranging from less than 8.4 to 43.8 micrograms per kilogram ($\mu\text{g}/\text{kg}$), below the KDHE Tier 2 Level of 121 $\mu\text{g}/\text{kg}$. Figure 4 shows the sample locations and Table 2 summarizes the highest concentration of contaminants detected in soil during the preliminary investigation.

3.1.2 Groundwater Contamination

Groundwater samples obtained during the CI activities were collected using direct-push technology and from newly installed monitoring wells to delineate the vertical and horizontal extent of groundwater contamination. Groundwater samples collected in the shallow portion of the aquifer contained PCE and TCE at concentrations above the MCL of 5 $\mu\text{g}/\text{L}$. Additional groundwater sampling downgradient of the source area determined that the contaminant plume extending from the railroad property is limited to the area bounded by West Pine and West Elm Streets, to the north and south, respectively, and North 8th Street and North Santa Fe Avenue, to the west and east, respectively and remained within the upper, shallow portion of the aquifer (Figure 5). Subsequent quarterly groundwater sampling events conducted in 2007 and 2008 (Table 1) indicated the concentrations of VOCs across the plume, including the source area, were stable. Table 1 summarizes the highest concentration of COCs detected in groundwater during the CI investigation and the corresponding MCLs and Tier 2 Levels for each contaminant.

Subsequent to the CI, groundwater monitoring events have continued on a quarterly basis. Results from the most recent sampling event conducted in January 2011 indicate PCE, TCE, and cis-1,2-dichloroethene (1,2-DCE) remain present in the groundwater at concentrations above the MCL and/or KDHE Tier 2 Level (Figure 6).

For more information on the results of the CI, refer to the January 2008 *Comprehensive Investigation Report, Missouri Pacific Railroad Depot Site, Salina Kansas*.

3.2 Pilot Study Results

A pilot test for enhanced reductive dechlorination was conducted at the Site from September 2008 through July 2009, utilizing Adventus' EHC[®] (EHC[®]) technology. EHC[®] is a combination of controlled-release carbon and zero valent iron (ZVI) particles used for stimulating *in-situ* chemical reduction (ISCR) of groundwater impacted by persistent organic compounds. The purpose of the pilot test was to evaluate the efficacy of a remedial alternative by injecting Adventus EHC[®] product into the subsurface. Per the KDHE-approved *Corrective Action Study Pilot Test Work Plan* dated August 14, 2008, EHC[®] was injected as aqueous slurry into 30 injection points from September 15 to 19, 2008, to create a 150 foot long permeable reactive barrier. Performance monitoring was conducted quarterly between September 2008 and July 2009 and consisted of collecting groundwater samples that were analyzed for chlorinated VOCs and various geochemical parameters which are considered indicators of reductive dechlorination.

Results of the pilot test indicated that sustainable conditions conducive to reductive dechlorination of chlorinated VOCs were established in the aquifer in and near the injection zone. For more information on the results of the pilot test, refer to the *In-situ Bioremediation Pilot Test Summary*, dated December 11, 2009, provided as Appendix C in the November 2010 *Corrective Action Study, Missouri Pacific Railroad Depot Site, Salina, Kansas*.

Results of all the investigations conducted at the Site were used to identify the preferred remedy, which will be described in Section 7.0.

4.0 SITE RISKS

The primary route of exposure to contaminants at the Site is through use of groundwater contaminated with VOCs. The properties in the vicinity of the Site are connected to the public water supply system to reduce the potential for exposure to contaminated groundwater. Although two of the City's PWS wells are located more than a quarter mile downgradient of the contaminant plume, results of continued monitoring indicate neither well has historically been or is currently impacted by the COCs associated with the Site. The site-related contaminant plume does not extend off-site to any residential properties and no potential targets for the vapor intrusion pathway have been identified.

5.0 REMEDIAL ACTION OBJECTIVES

Based on the information collected during the CI, the following remedial action objectives (RAOs) were developed:

- Reduce mass of PCE in the source area to the extent practicable;
- Reduce concentrations of chemicals of interest in groundwater in order to restore the aquifer to its most beneficial use; and
- Prevent exposure to contaminated groundwater.

5.1 Cleanup Levels

For groundwater remediation being conducted at sites with drinking water aquifers, federally promulgated MCLs are used as the default cleanup levels. If no MCL is established for a particular contaminant, comparison is made to the KDHE Tier 2 Levels.

The results of the CI indicate that soil contaminated with VOCs does not exceed KDHE's Tier 2 Level for the soil pathway nor the soil to groundwater pathway, and, therefore, does not present a direct contact or indirect contact human health risk. KDHE has calculated risk-based Tier 2 Levels for soil and soil-to-groundwater pathway for the protection of human health. The risk-based Tier 2 Levels and methods of calculation are identified in KDHE's *Risk-Based Standards for Kansas, RSK Manual*.

The conclusions of the CI, the formulation of RAOs, and the determination of MCLs as the cleanup levels for groundwater and Tier 2 Levels as the cleanup levels for soil provide the basis for selecting a preferred remedial alternative. The MCLs and Tier 2 Levels for contaminants in soil and groundwater are provided in Tables 1 and 2. The selected remedy for groundwater is expected to eventually lead to unrestricted use of the aquifer.

6.0 SUMMARY OF REMEDIAL ALTERNATIVES EVALUATED

In accordance with KDHE's CI/CAS Scope of Work, several remedial action alternatives were assembled and evaluated in detail. Each remedial alternative was evaluated using the following criteria: 1) overall protection of human health and the environment; 2) compliance with Federal and State applicable or relevant and appropriate requirements (ARARs); 3) long-term effectiveness and permanence; 4) overall reduction of toxicity, mobility and volume through treatment; 5) short-term effectiveness; 6) implementability, 7) cost; and 8) community acceptance. A detailed description of each remedial alternative is presented in the CAS Report.

6.1 Soil Remedial Alternatives

Results of the CI indicate that soil contaminated with VOCs does not exceed KDHE's Tier 2 Level for the soil pathway nor the soil-to-groundwater pathway, and, therefore, soil remedial alternatives were not evaluated as part of the CAS for the Site.

6.2 Groundwater Remedial Alternatives

The five remedial alternatives for groundwater that were evaluated in the CAS Report are summarized below.

Remedial Alternative 0 – No Action

The No Action alternative provides a baseline for evaluating all other remedial alternatives. Since no action is taken, risks to human health and environment may not be addressed.

Remedial Alternative 1 –Source Area Accelerated Remediation Technologies System and Downgradient Monitored Natural Attenuation

Alternative 1 consists of installation of Accelerated Remediation Technologies, LLC (ART) wells and equipment to address source area impacts along with monitored natural attenuation (MNA) to address downgradient groundwater impacts. This alternative would include the use of in-well stripping which uses a combination of air stripping, air sparging and vapor extraction technologies to remove contaminants from the groundwater and subsurface. Wells are drilled and constructed in the area of contaminated groundwater. A submersible pump is placed at the bottom of the well to re-circulate water to the top of the well for downward discharge through a spray head. The contaminants in the groundwater are volatilized by the spraying action. Simultaneously, air sparging occurs by injecting air into the water at the bottom of the well. The air bubbling up through the water column in the well causes the contaminants in groundwater to volatilize. Finally, the contaminants that have volatilized into the air within the well by air stripping and air sparging technologies are removed by applying a vacuum pressure (i.e., vacuum extraction) to extract the contaminants from the well and transport them to the surface where they are released to the atmosphere. Three ART wells would be installed in the highest impacted area in order to remove contaminants from the saturated zone and prevent further downgradient migration. Groundwater monitoring would be conducted to determine the effectiveness of the remedy and to demonstrate compliance with the RAOs. Environmental use controls (EUCs) would be established to reduce the risk of exposure to impacted groundwater and would

minimally include: restricting future use of the property to non-residential uses and preventing the installation of a consumptive use water well(s) on-site. Implementation of this alternative would require obtaining an underground injection control (UIC) permit and air emissions permit or waiver along with following the City's building codes for construction of the treatment buildings that are part of the ART system.

Remedial Alternative 2 – Source Area Chemical Oxidation and Downgradient Monitored Natural Attenuation

This alternative would consist of in-situ chemical oxidation to address source area impacts along with MNA to address downgradient groundwater impacts. In-situ chemical oxidation destroys contaminants in the subsurface without having to pump the contaminated groundwater out of the ground for treatment. Temporary wells or probes are used to inject the oxidant into the subsurface. The oxidant mixes with the harmful chemicals and causes them to break down. When the process is complete, only water and other harmless chemicals are left behind. The chemical oxidant would be delivered to the subsurface via several injection points in the area of highest impacts by either using direct-push technology or by installing semi-permanent injection wells. As discussed above in Alternative 1, groundwater monitoring would be conducted to determine the effectiveness of the remedy and EUCs would be established to reduce the risk of exposure to impacted groundwater. Prior to implementation, a pilot study would need to be performed in order to determine the proper oxidant dosage and a UIC permit would need to be obtained.

Remedial Alternative 3 – Source Area Enhanced Reductive Dechlorination and Downgradient Monitored Natural Attenuation

Alternative 3 consists of enhanced reductive dechlorination to address source area impacts and MNA to address downgradient impacts. Enhanced bioremediation utilizes the injection of a natural or synthetic compound to enhance *in-situ* biodegradation rates of contaminants located in the subsurface. As previously discussed above in Section 3.2, a successful pilot test for enhanced reductive dechlorination was conducted at the Site from September 2008 to July 2009. During the pilot study, a combination of controlled-release carbon and ZVI particles were injected into the subsurface to create conditions where the harmful chemicals would more readily break down into other harmless chemicals. Full scale implementation of enhanced reductive dechlorination would be performed using either direct-push injection or semi-permanent injection wells. An adequate number of injection points would be installed at the Site in order to achieve cleanup goals. A groundwater monitoring program and EUCs would also be a part of this remedial alternative. Implementation of this alternative would require obtaining a UIC permit.

Remedial Alternative 4 – Source Area Pump and Treat and Downgradient Monitored Natural Attenuation

This alternative would consist of installation of extraction wells, pumping contaminated groundwater from the subsurface, and treatment of the water above ground by air stripping or granular activated carbon. The pump-and-treat technology would address source area impacts while MNA would address downgradient groundwater impacts. Specific design parameters for the hydraulic containment system would be determined from an aquifer pumping test which would be performed prior to implementation, but, it is anticipated that the pump-and-treat system would consist of three extraction wells. As with the previous three alternatives, groundwater

monitoring and establishment of EUCs would also be a part of the remedy. Implementation of this alternative would require obtaining a term permit for extracting groundwater, and either a National Pollutant Elimination Discharge System (NPDES) permit for surface discharge of the treated water or an agreement with the City to dispose of treated water at a publicly owned treatment works (POTW) along with following the City's building codes for construction of the treatment buildings.

7.0 DESCRIPTION OF THE SELECTED REMEDY

KDHE has determined the selected remedy for the Site, outlined below, satisfies or meets the criteria established by both State and Federal programs and will be protective of human health and the environment.

The remedial alternatives were evaluated based on the eight criteria discussed in Section 6.0. KDHE has identified **Groundwater Remedial Alternative 3** as the selected remedy for addressing the groundwater contamination at and downgradient of the Site.

7.1 Selected Remedy for Groundwater

Remedial Alternative 3, Source Area Enhanced Reductive Dechlorination and Downgradient Monitored Natural Attenuation – The selected remedy for groundwater consists of injecting a natural or synthetic compound into the subsurface to enhance bioremediation/reductive dechlorination coupled with MNA to address downgradient groundwater impacts. An adequate number of injection points would be installed at the Site in order to achieve cleanup goals. A groundwater monitoring program would be established and additional monitoring wells would be installed, as necessary, to determine the effectiveness of the remedy and to demonstrate compliance with the RAOs. Environmental use controls would be formally established through the EUC Program administered by the KDHE-Bureau of Environmental Remediation (BER) as described below.

- Restricting future use of the Site to non-residential uses.
- Preventing the installation of a consumptive use water well(s) on-site.

The groundwater monitoring program would continue until conditions at the Site meet the requirements of KDHE BER's Reclassification Plan (Policy #BER-RS-024). The cost of implementing the source area Enhanced Reductive Dechlorination and downgradient MNA alternative as described in the CAS is approximately \$345,000.

Evaluation of the performance of the remedial action for groundwater would be based on analytical results. KDHE may re-evaluate the remedial options, specifically if analytical data demonstrate the persistence or increasing concentrations of contaminants in groundwater.

8.0 COMMUNITY INVOLVEMENT

A Public Information Plan for the Site was developed by KDHE. Public input and comment has been encouraged by KDHE throughout the process. On April 19, 2011, KDHE issued a news release announcing the availability of the draft CAD and the public comment period offered from April 19 to May 19, 2011. Public notice of the availability of the draft CAD, the Administrative

Record file, and the public comment period was published in the *Salina Journal* on April 19, 2011.

9.0 DOCUMENTATION OF SIGNIFICANT CHANGES

No written or verbal comments on the draft CAD were submitted to KDHE during the public comment period. No significant changes have been made to the final CAD

10.0 RESPONSIVENESS SUMMARY

The purpose of the Responsiveness Summary is to summarize the comments made by private citizens and other interested parties during the public comment period for the draft CAD. A public comment period was offered from April 19 to May 19, 2011. No comments were received by KDHE during the public comment period.

Table 1
 Site-Related Contaminants of Concern in Groundwater
 Former Missouri Pacific Railroad Freight House Site
 micrograms per liter (µg/L)

MCL and/or KDHE Tier 2 Levels	Tetrachloroethene (PCE) 5		Trichloroethene (TCE) 5		cis-1,2-dichloroethene (cis-1,2-DCE) 70													
July 2005																		
	FG-1 (37')	FG-1 (40')	FG-2 (37')	FG-3 (37')	FG-4 (37')	FG-6 (37')	FG-7 (37')	FG-8 (37')	FG-9 (37')	FG-10 (37')	FG-11 (37')	FG-12 (37')	FG-13 (37')	FG-14 (40')	FG-19 (37')	FG-20 (37')	FG-21 (37')	
PCE	5.4	7.3	12.8	50.5	19.4	152	1312	175	133	86.5	50.7	117	260	20.8	58.8	276	65.7	
TCE	39.2	31.1	119	52	14.7	2.4	8.4	11.6	14.2	<4	4.4	26.2	2	<6	<6	11.7	<6	
cis-1,2-DCE	<4	<2	<2	14.3	59.7	60.6	3	<8	<4	25.4	<4	<4	82.6	41	<6	<6	<6	
November 2006 and March 2007																		
	FG-01 (32')	FG-01 (44')	FG-02 (36')	FG-12 (35')	FG-13 (35')	FG-14 (35')	FG-32 (67')	FG-33 (46')	FG-34 (34')	FG-35 (36')	FG-36 (34')	FG-38 (39')	FG-38 (40')	FG-39 (37')	FG-45 (34')			
PCE	76	3.27	<1	3.03	<1	<1	2.92	7.66	2.74	29.1	<1	<1	1.53	<1	<1			
TCE	24.9	<1	<1	<1	<1	<1	<1	<1	1.49	1.19	<1	<1	<1	<1	<1			
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
July 2007 through January 2011																		
MW-FG-01S																		
	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/26/2010	4/28/2010	7/29/2010	10/26/2010	1/18/2011			
PCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
MW-FG-01D																		
	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/26/2010	4/28/2010	7/29/2010	10/26/2010	1/18/2011			
PCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
MW-FG-02S																		
	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/14/2009	4/24/2009	7/9/2009	10/14/2009	1/28/2010	4/28/2010	7/29/2010	10/26/2010	1/19/2011			
PCE	189	256	315	308	244	237	184	202	183	22.4	200	198	21.7	<1	4.4			
TCE	48.4	55.1	53	49	89.4	63.6	57.4	35.7	40.5	17.3	40.6	57.4	11.2	<1	2.16			
cis-1,2-DCE	8.6	16.1	12.4	9.65	19.5	11.2	11.2	7.42	63	259	193	78.5	127	200	269			
MW-FG-02D																		
	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/28/2010	4/28/2010	7/29/2010	10/26/2010	1/19/2011			
PCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
MW-FG-03S																		
	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/27/2010	4/28/2010	7/29/2010	10/26/2010	1/18/2011			
PCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
MW-FG-03D																		
	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/27/2010	4/28/2010	7/29/2010	10/26/2010	1/18/2011			
PCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			

Table 1
 Site-Related Contaminants of Concern in Groundwater
 Former Missouri Pacific Railroad Freight House Site
 micrograms per liter (µg/L)

MCL and/or KDHE Tier 2 Levels	Tetrachloroethene (PCE) 5	Trichloroethene (TCE) 5	cis-1,2-dichloroethene (cis-1,2-DCE) 70													
MW-FG-04S																
PCE	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/27/2010	4/28/2010	7/29/2010	10/26/2010	1/18/2011	
TCE	<1	1.42	<1	<1	<1	<1	<1	1.21	<1	1.06	<1	<1	<1	<1	<1	
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
MW-FG-04D																
PCE	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/27/2010	4/28/2010	7/29/2010	10/26/2010	1/18/2011	
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
MW-FG-05S																
PCE	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/26/2010	4/28/2010	7/29/2010	10/26/2010	1/19/2011	
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
MW-FG-05D																
PCE	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/26/2010	4/28/2010	7/29/2010	10/26/2010	1/19/2011	
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
MW-FG-06S																
PCE	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/27/2010	4/28/2010	7/29/2010	10/26/2010	1/19/2011	
TCE	40.9	8.92	7.34	1.81	10.2	8.79	12.4	6.37	4.41	2.36	35.5	15.3	3.63	11.1	6.05	
cis-1,2-DCE	9.91	2.1	1.54	<1	6.92	1.31	1.16	<1	2.13	3.33	50.8	22.3	31.8	6.01	<1	
	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	2.49	<1	<1	
MW-FG-06D																
PCE	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/27/2010	4/28/2010	7/29/2010	10/26/2010	1/19/2011	
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
MW-FG-07S																
PCE	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/28/2010	4/28/2010	7/29/2010	10/26/2010	1/19/2011	
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
MW-FG-07D																
PCE	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/28/2010	4/28/2010	7/29/2010	10/26/2010	1/19/2011	
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
MW-FG-08S																
PCE	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/27/2010	4/28/2010	7/29/2010	10/26/2010	1/19/2011	
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
MW-FG-08D																
PCE	7/31/2007	10/17/2007	1/17/2008	4/14/2008	7/30/2008	11/3/2008	1/15/2009	4/24/2009	7/9/2009	10/14/2009	1/27/2010	4/28/2010	7/29/2010	10/26/2010	1/19/2011	
TCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	
cis-1,2-DCE	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	

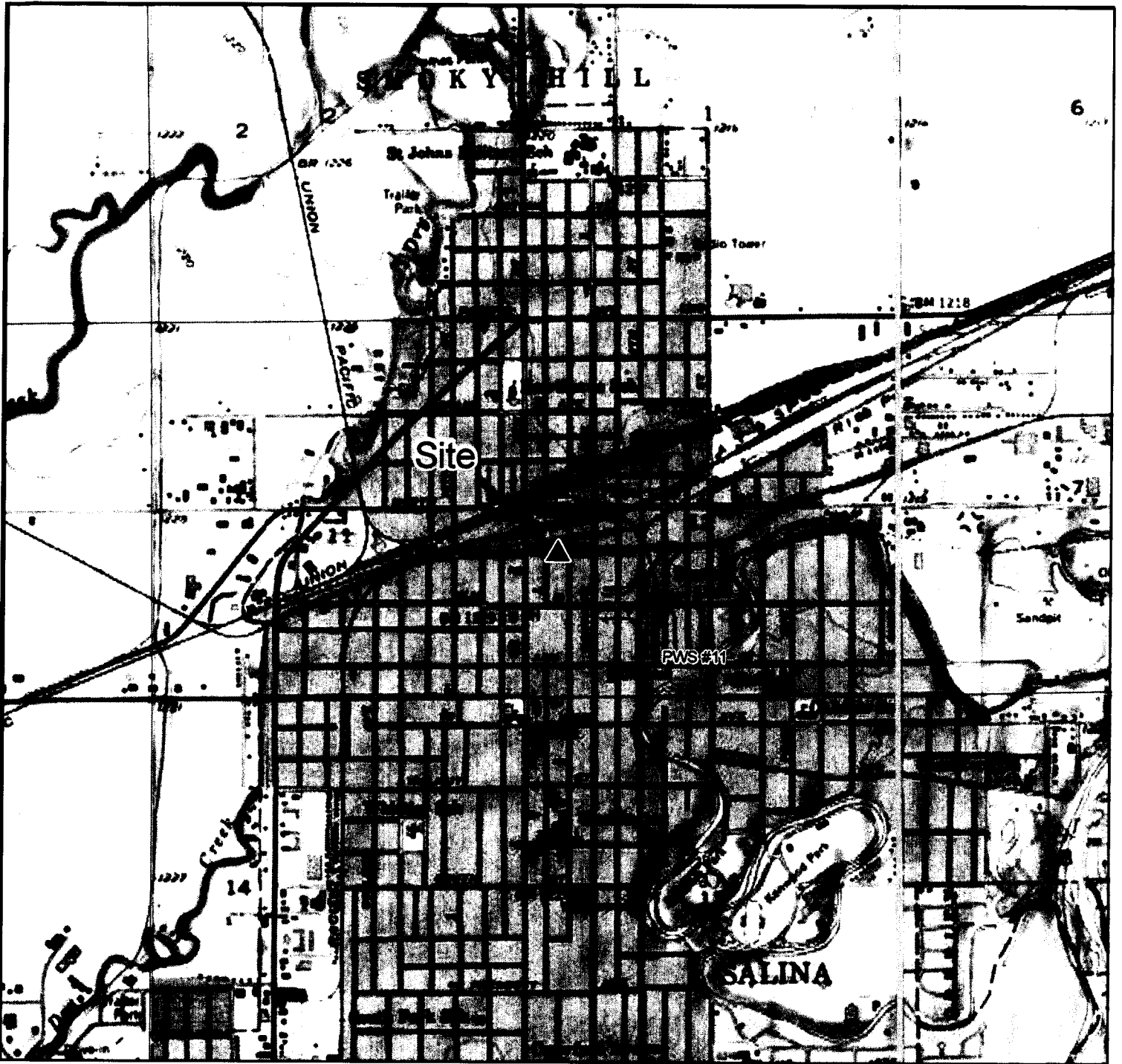
Table 1
 Site-Related Contaminants of Concern in Groundwater
 Former Missouri Pacific Railroad Freight House Site
 micrograms per liter (µg/L)

MCL and/or KDHE Tier 2 Levels	Tetrachloroethene (PCE) 5		Trichloroethene (TCE) 5		cis-1,2-dichloroethene (cis-1,2-DCE) 70																			
* MW-FG-09S																								
	9/26/2008	1/14/2009	4/24/2009	7/9/2009	10/14/2009	1/28/2010	4/28/2010	7/29/2010	10/26/2010	1/19/2011														
PCE	5.98	34.8	3.42	<i>1.21</i>	45.6	5.76	<i>2.02</i>	6.8	<i>4.74</i>	<i>3.54</i>														
TCE	<i>1.89</i>	<i>3.61</i>	<1	<i>1.71</i>	81.1	7.33	<i>1.43</i>	8.7	<i>4.69</i>	<i>1.96</i>														
cis-1,2-DCE	<1	<1	<1	<i>1.26</i>	<i>4.77</i>	<i>16.8</i>	<i>2.6</i>	<i>33.4</i>	94.7	49.8														
* MW-FG-10S																								
	9/26/2008	1/14/2009	4/24/2009	7/9/2009	10/14/2009	1/28/2010	4/28/2010	7/29/2010	10/26/2010	1/19/2011														
PCE	25.1	690	779	1000	87.9	514	1030	439	303	814														
TCE	<i>3.19</i>	38.5	48.2	54.1	27.4	102	253	130	140	194														
cis-1,2-DCE	<1	<1	<i>2.97</i>	<i>5.32</i>	<i>7.94</i>	<i>4.38</i>	<i>34.2</i>	73.3	177	133														
Notes:																								
MCL - Maximum contaminant level																								
Detections italicized																								
Exceedences above the MCL and/or KDHE Tier 2 Level in bold																								
< not detected above reporting limit shown																								
* - Monitoring wells MW-FG-09S & 10S were installed in September 2008																								
Data obtained from the <i>Comprehensive Investigation Report; Former Missouri Pacific Railroad Depot</i> dated January 2008 and the <i>Quarterly Progress Report January 1 to March 31, 2011; Former Missouri Pacific Railroad Depot</i> dated April 2011																								

Table 2
 Site-Related Contaminants of Concern in Soil
 Former Missouri Pacific Railroad Freight House Site
 micrograms per kilogram (µg/kg)

Sample ID	Sample Date	Sample Depth (ft)	Laboratory Analytical Results			
			Tetrachloroethene (PCE)		Trichloroethene (TCE)	
			Soil	Soil to GW	Soil	Soil to GW
<i>KDHE Tier 2 Residential Levels</i>			7540	121	41,000	84.2
<i>KDHE Tier 2 Non-Residential Levels</i>			16,500	121	69,800	84.2
FG-2	7/12/2005	8	2.2		<8.4	
FG-5	7/12/2005	7	<8.4		<8.4	
FG-7	7/13/2005	8	<8.4		<8.4	
FG-17	7/14/2005	7	12.9		<8.4	
FG-18	7/14/2005	6	<8.4		<8.4	
FG-18	7/14/2005	11	<8.4		<8.4	
FG-18	7/14/2005	15	<8.4		<8.4	
FG-19	7/14/2005	5	6.4		<8.4	
FG-19	7/14/2005	8	<8.4		<8.4	
FG-20	7/14/2005	6	43.8		<8.4	
FG-21	7/14/2005	8	31.4		<8.4	
FG-22	7/14/2005	8	5.5		<8.4	
FG-23	7/14/2005	8	<8.4		<8.4	
FG-24	7/14/2005	8	<8.4		<8.4	
FG-25	7/15/2005	28	37		<8.4	
FG-26	7/15/2005	7	<8.4		<8.4	
FG-27	7/15/2005	5	<8.4		<8.4	

Notes:
 GW - groundwater
 Detections in bold
 < not detected above reporting limit shown
 Data obtained from the *Comprehensive Investigation Report; Missouri Pacific Railroad Depot*
 dated January 2008



03W 02W

0 1,250 2,500 Feet



Scale of 1:24,000
when printed at 8.5 x 11



Saline County

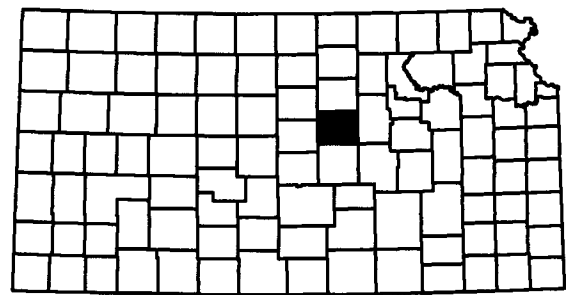
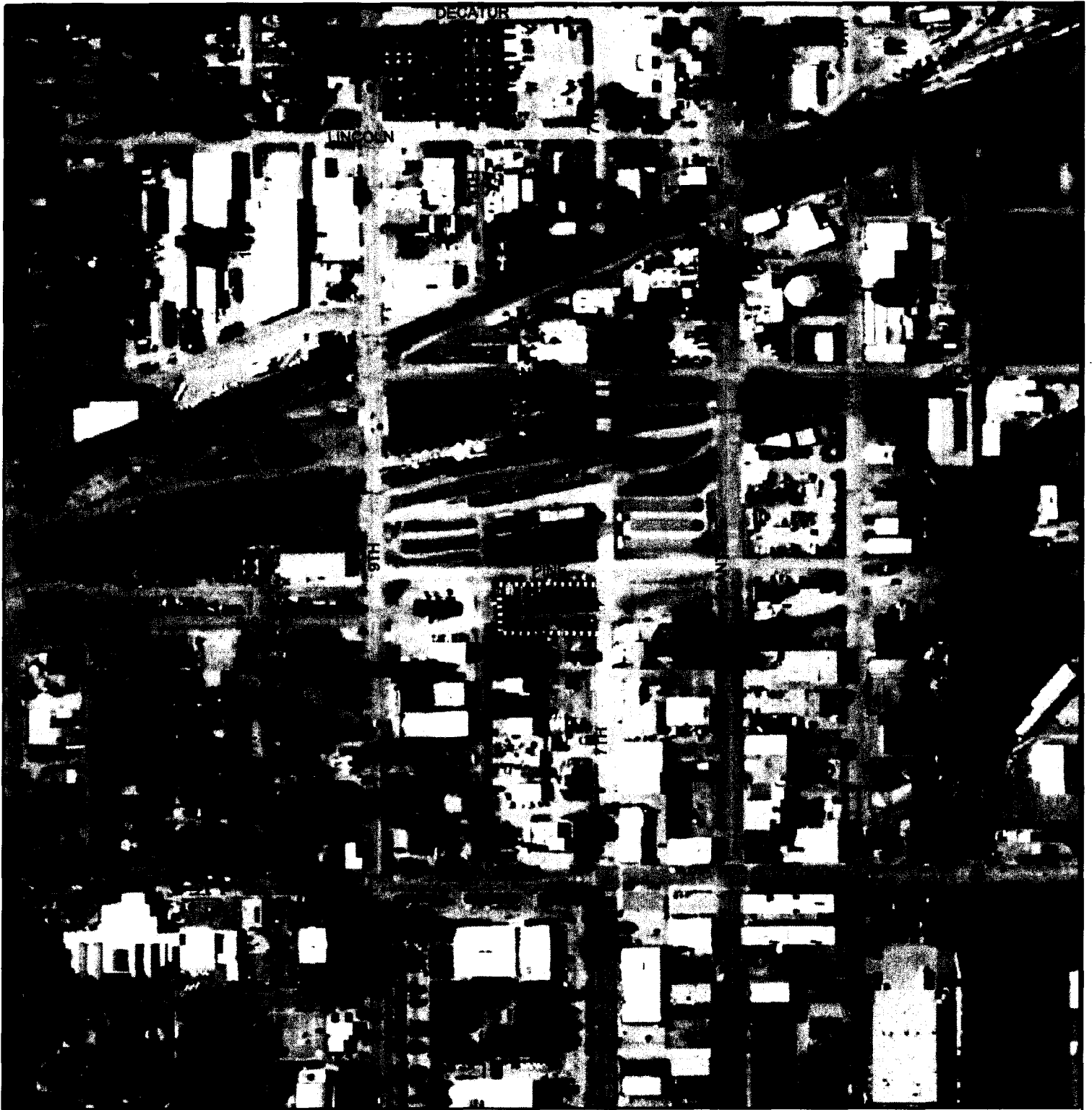


Figure 1
Site Locations
Former Missouri Pacific
Railroad Freight House Site
Salina, KS



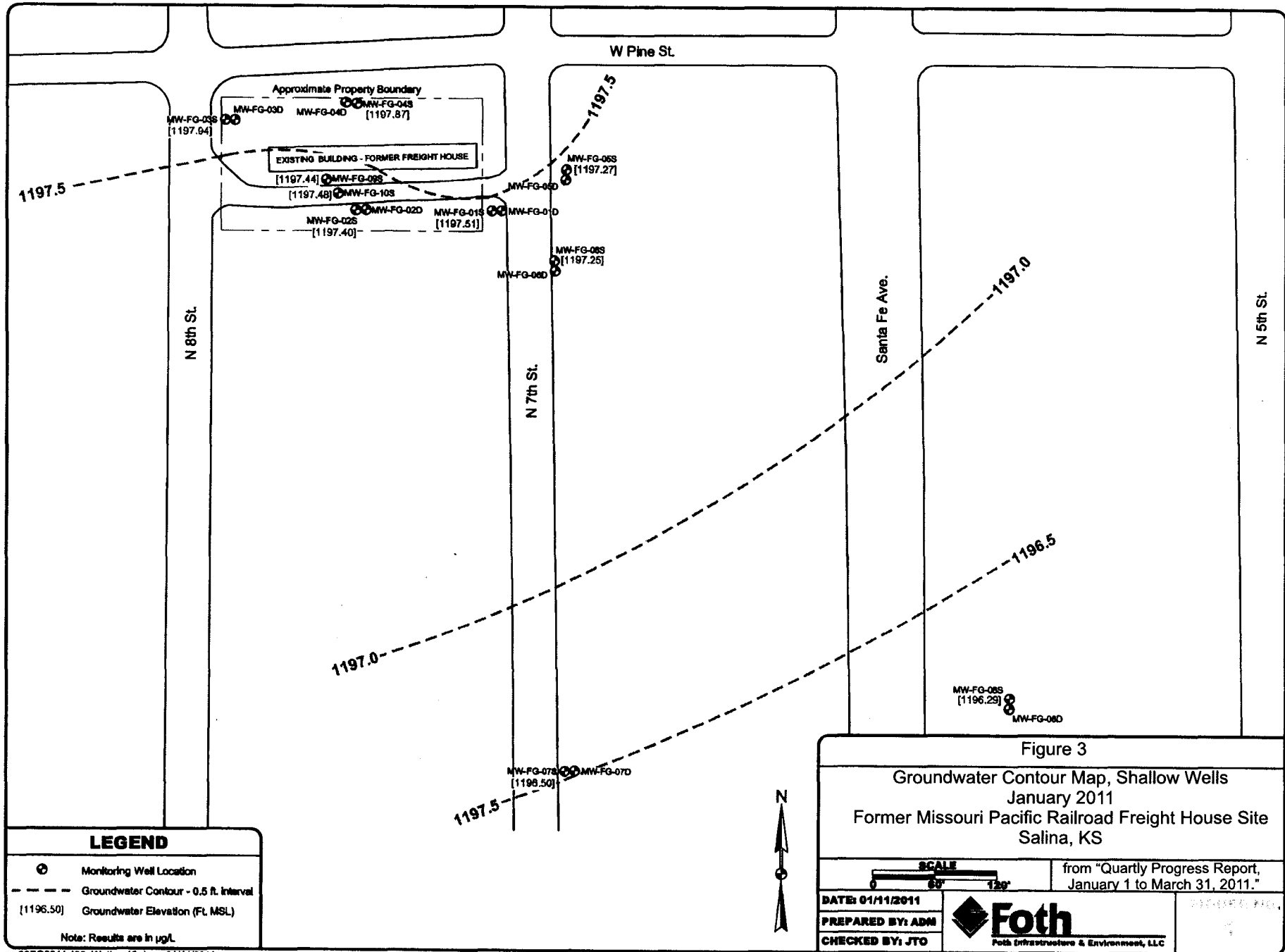
0 250 500 Feet

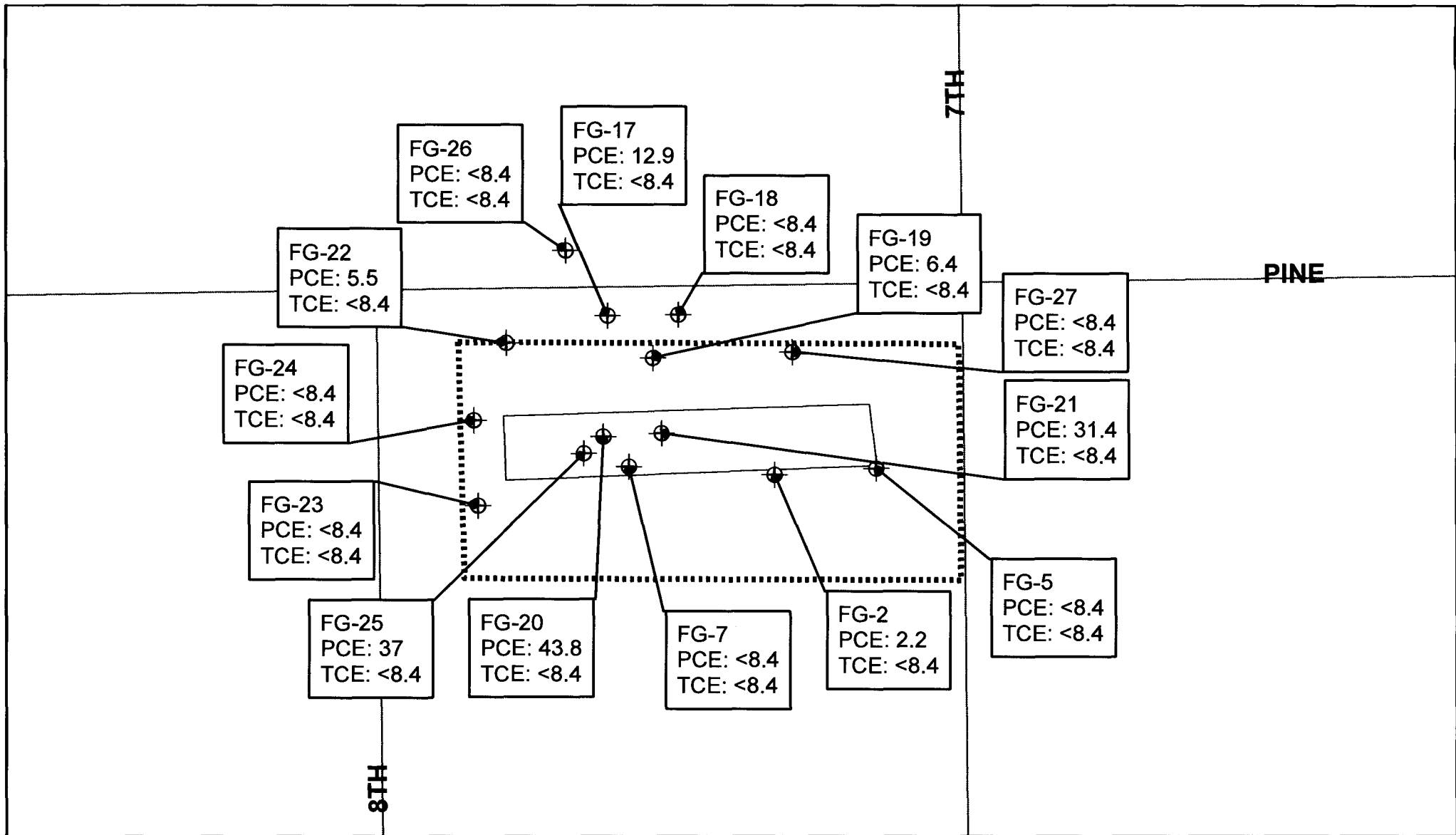


Approximate Property Boundary
2010 Imagery

Figure 2

Former Property Boundary
Former Missouri Pacific
Railroad Freight House Site
Salina, KS





0 50 100 Feet



⊕ Sampling Location

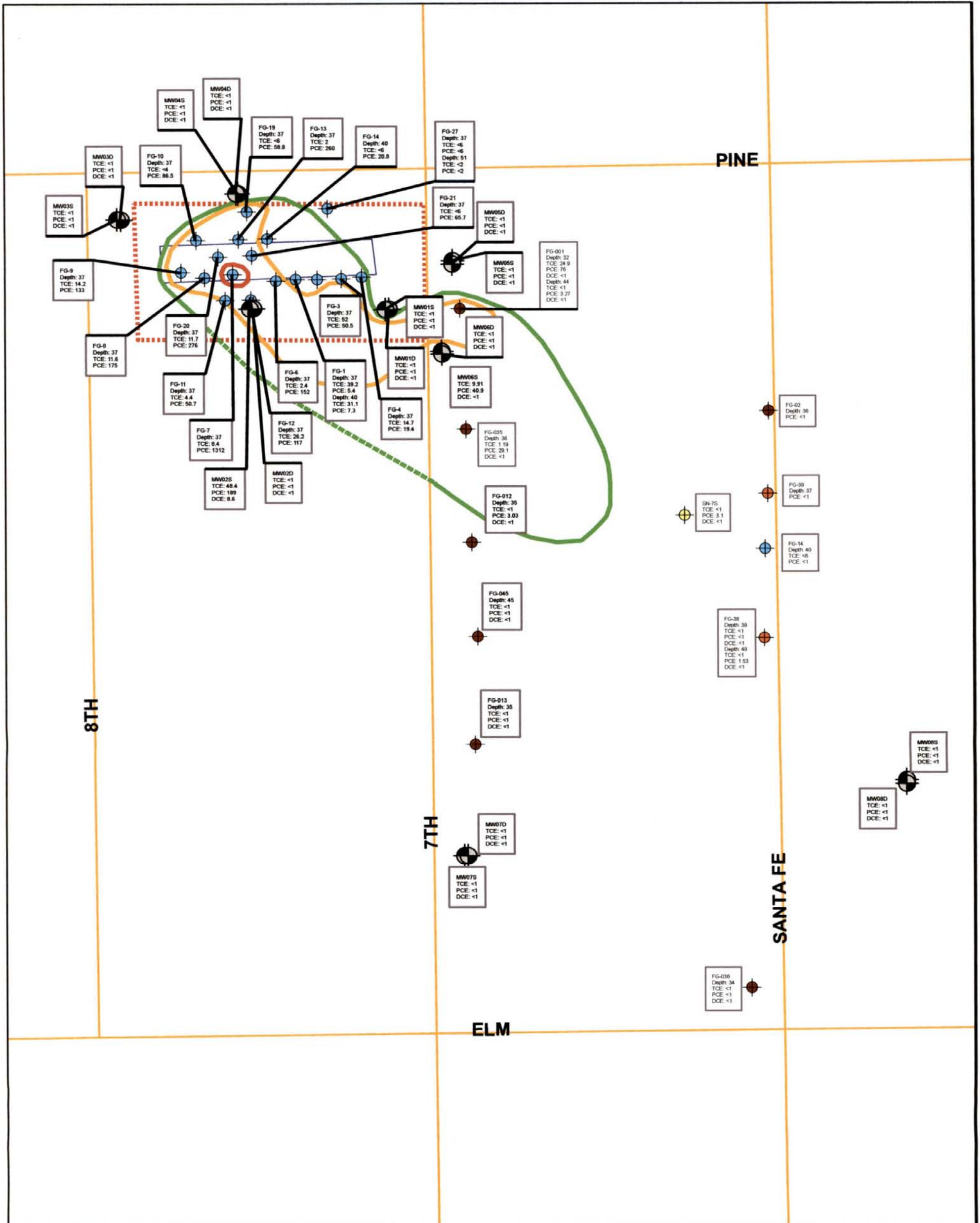
— Local Roads

▭ Former Freight House Building

⋯ Property Boundary

All Locations are Approximate
Units are in µg/kg

Figure 4
Contaminants of Concern in Soil
Former Missouri Pacific
Railroad Freight House Site
Salina, KS



0 75 150 Feet



Sampling Locations

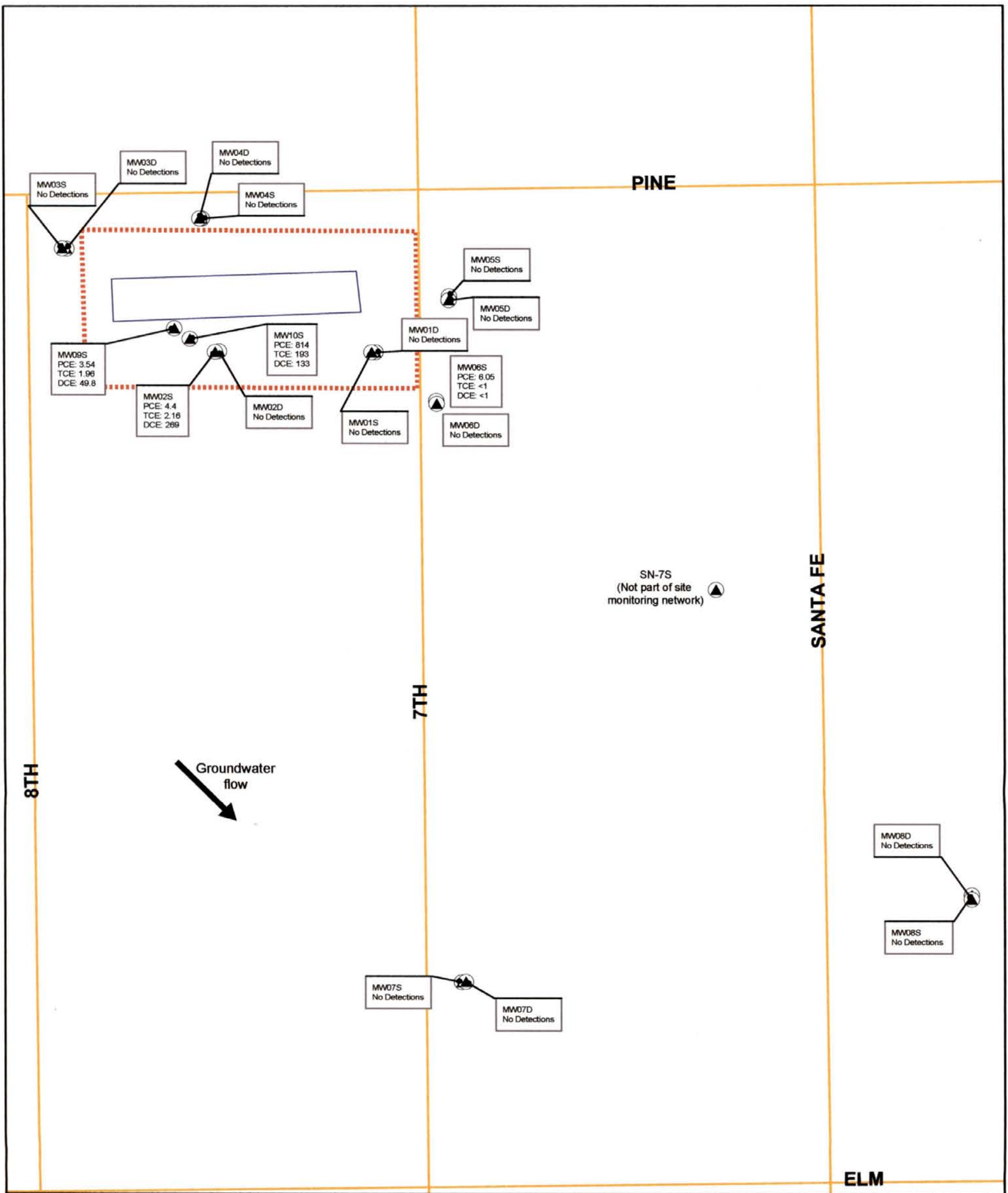
- Sample Type (Date)**
- Probe Location (November 2006)
 - Probe Location (March 2007)
 - Probe Location (July 2005)
 - Probe Location (July 2007)
 - Monitoring Well (July 2007)
 - Local Roads
 - ▭ Former Freight House Building
 - - - Property Boundary

PCE Plume

- Concentration**
- 5
 - - - 5 (Undefined line)
 - 50
 - 500
- | Maximum Contaminant Levels | |
|----------------------------|----|
| TCE: | 5 |
| PCE: | 5 |
| DCE: | 70 |

All Locations are approximate
Depths are in feet
Concentrations are in µg/L

Figure 5
Contaminants of Concern in Groundwater
Former Missouri Pacific
Railroad Freight House Site
Salina, KS



0 75 150 Feet



- Monitoring Wells
- Local Roads
- Former Freight House Building
- Property Boundary

Detection limit of <1 for all non-detects
Analytical results in µg/L
All Locations are Approximate

Figure 6

Groundwater Monitoring Results
January 2011
Former Missouri Pacific
Railroad Freight House Site
Salina, KS

CONCURRENCE SHEET

BUREAU OF ENVIRONMENTAL REMEDIATION

June 13, 2011

This concurrence form is for your review and comments on the enclosed document; please be advised that this is the ORIGINAL INSTRUMENT.

**IN THE MATTER OF: Missouri Pacific Railroad Freight House Site (Case No. 06-E-0051)
 Salina, Kansas
 Corrective Action Decision**

	Name	Date	Comments
Project Manager (M. Weiser)	<i>Margaret F. Weiser</i>	6/13/11	
Unit Chief (E.J. Underwood)	<i>E. J. Underwood</i>	6/13/11	
Section Chief (R. Bean)	<i>R. Bean</i>	6/14/11	
Bureau Manager (G. Blackburn)	<i>Gary Blackburn</i>	6/15/11	
Legal Office— Environmental Group Lead Attorney (S. Feist Albrecht)	<i>Shari Feist Albrecht</i>	6/21/11	
Director of Environment (J. Mitchell)	<i>John W. Mitchell</i>	6/22/11	
Deputy Chief Counsel (T. Keck)	<i>T. Keck</i>	6/23/11	
Secretary (R. Moser, M.D.)	<i>R. Moser</i>	6/23/2011	

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Received

JUN 22 2011

DIRECTOR OF ENVIRONMENT
 DEPT. OF HEALTH & ENVIRONMENT