

**FIRST FIVE-YEAR REVIEW REPORT FOR
ILLINOIS CENTRAL RAILROAD COMPANY'S JOHNSTON YARD SITE
SHELBY COUNTY, TENNESSEE**



JULY 2017

Prepared by

**U.S. Environmental Protection Agency
Region 4
Atlanta, Georgia**



**Franklin E. Hill, Director
Superfund Division**



Date



11067914

Table of Contents

LIST OF ABBREVIATIONS & ACRONYMS	iv
I. INTRODUCTION	1
Site Background.....	1
FIVE-YEAR REVIEW SUMMARY FORM.....	2
II. RESPONSE ACTION SUMMARY	3
Basis for Taking Action	3
Response Actions.....	3
Status of Implementation	4
Systems Operations/Operation & Maintenance.....	8
III. PROGRESS SINCE THE LAST REVIEW	8
IV. FIVE-YEAR REVIEW PROCESS	8
Community Notification, Involvement & Site Interviews.....	8
Data Review.....	9
Site Inspection.....	12
V. TECHNICAL ASSESSMENT	12
QUESTION A: Is the remedy functioning as intended by the decision documents?.....	12
QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of the remedy selection still valid?	13
QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?.....	14
VI. ISSUES/RECOMMENDATIONS	14
OTHER FINDINGS.....	15
VII. PROTECTIVENESS STATEMENT	15
VIII. NEXT REVIEW	15
APPENDIX A – REFERENCE LIST.....	A-1
APPENDIX B – CURRENT SITE STATUS	B-1
APPENDIX C – SITE CHRONOLOGY	C-1
APPENDIX D – SITE VICINITY MAP	D-1
APPENDIX E – SITE INSPECTION CHECKLIST.....	E-1
APPENDIX F – PRESS NOTICE	F-1
APPENDIX G – SITE INSPECTION PHOTOS.....	G-1
APPENDIX H – DETAILED ARARs REVIEW TABLES.....	H-1
APPENDIX I – PERFORMANCE MONITORING DATA	I-1
APPENDIX J – INTERVIEW FORMS	J-1

Tables

Table 1: Contaminants of Concern by Media.....	3
Table 2: Groundwater COC Cleanup Goals	4
Table 3: Summary of Implemented Institutional Controls (ICs).....	6
Table 4: O&M Costs Over the FYR Period.....	8
Table C-1: Site Chronology	C-1

Table H-1: Groundwater ARARs Review	H-1
Table I-1: Phase Separated Hydrocarbon (PSH; referred to as SPH in table) Thickness Measurements, 2008-2016	I-4
Table I-2: Groundwater Monitoring Data, 2012-2016	I-16

Figures

Figure 1: Institutional Control Map	7
Figure 2: Detailed Site Map	11
Figure D-1: Site Vicinity Map	D-1
Figure I-1: Total PSH Recovery and Total Fluids Recovery, 2008-2016	I-1
Figure I-2: Cumulative PSH (referred to as SPH in figure) Thickness Measurements for Wells MW-33, MW-35, MW-36 and MW-37 in the Fluvial Aquifer, 2008-2016.....	I-2
Figure I-3: Cumulative PSH (referred to as SPH in figure) Thickness Measurements for Wells MW-38, MW-40, MW-42, MW-43, MW-49, MW-54 and MW-55 in the Fluvial Aquifer, 2008-2016.....	I-3

LIST OF ABBREVIATIONS & ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	Contaminant of Concern
EPA	United States Environmental Protection Agency
FYR	Five-Year Review
HHRA	Human Health Risk Assessment
IC	Institutional Control
ICRR	Illinois Central Railroad Company
LNAPL	light non-aqueous phase liquid
MCL	Maximum Contaminant Level
MEME	Mobile-Enhanced Multi-Phase Extraction
mg/L	milligrams per liter
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
ORC	Oxygen Release Compound
OU	Operable Unit
PRP	Potentially Responsible Party
PSH	Phase Separated Hydrocarbons
RAO	Remedial Action Objective
ROD	Record of Decision
TDEC	Tennessee Department of Environment and Conservation
UU/UE	Unlimited Use and Unrestricted Exposure
VI	Vapor Intrusion
VOCs	Volatile Organic Compounds

This page is intentionally blank.

I. INTRODUCTION

The purpose of a five-year review (FYR) is to evaluate the implementation and performance of a remedy to determine if the remedy is and will continue to be protective of human health and the environment. The methods, findings and conclusions of reviews are documented in FYR reports such as this one. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) is preparing this FYR pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121, consistent with the National Contingency Plan (NCP) (40) Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), and considering EPA policy.

This is the first FYR for the Illinois Central Railroad Company's Johnston Yard Superfund Alternative Approach site (the Site). The triggering action for this statutory review is the on-site construction start date of the sitewide remedial action. The FYR has been prepared due to the fact that hazardous substances, pollutants or contaminants remain at the Site above levels that allow for unlimited use and unrestricted exposure (UU/UE).

The Site consists of one operable unit (OU), which will be addressed in this FYR. This OU addresses the groundwater remedy.

The relevant entities, including the potentially responsible party (PRP), were notified of the initiation of the five-year review. The EPA led the FYR. Participants included EPA Remedial Project Manager Randy Bryant; EPA Community Involvement Coordinator Kyle Bryant; Tennessee Department of Environment and Conservation (TDEC) representative Alison Campany; Joe Phelps, Devin Sprinkle and Gary Schwartz, with Canadian National (current site owner which acquired the PRP, Illinois Central Railroad); Chelsea Wenhardt, with TRC Environmental Corporation (the PRP's remedial contractor); and EPA contractor support staff Johnny Zimmerman-Ward and Sabrina Foster from Skeo. The review began on 10/17/2016.

Site Background

The 288-acre Site is two miles in length and located at 2921 Horn Lake Road in Memphis, Shelby County, Tennessee (see Appendix D for Site location). The Site is owned by Canadian National, which purchased Illinois Central Railroad (ICRR) in 1998, and has operated as a railroad classification yard, locomotive fueling and servicing center and car repair facility since the turn of the 20th century. The Site also included an intermodal terminus which operated until around 2006 when it was relocated several miles west of the facility. The Site is bordered to the south by a residential neighborhood, to the east and northwest by light industry, and to the west and north by undeveloped parcels of land. Nonconnah Creek is about 300 yards north of center of the northern boundary of the Site. There are no known private water supply wells within one mile downgradient of the Site, but there are five private wells that are about one mile upgradient of the Site.

In the western and central portions of the Site, the railyard is situated upon reworked silty clay that has been graded to accommodate the layout of the railyard. However, in the area roughly east and north of the former round house (see Figure 2), Site operators have raised the natural ground surface several feet with fill material resulting in the formation of a Shallow Perched Zone (SPZ) of groundwater between

the current ground surface and the underlying natural ground surface. Groundwater in the SPZ flows to the east-northeast under unconfined conditions and is directly influenced by the topography upon which the fill material was placed. Beneath the fill material, silty clay forms the upper aquitard of the “Fluvial Aquifer” which is composed of sand, gravel, silt and clay. Infiltration of precipitation provides the primary recharge to the Fluvial Aquifer and is temporal. Groundwater in the Fluvial Aquifer flows to the north-northwest towards Nonconnah Creek and Lake McKellar under confined conditions.

Refer to Appendix A for additional resources, Appendix B for Current Site Status and Appendix C for the Site’s chronology.

FIVE-YEAR REVIEW SUMMARY FORM

SITE IDENTIFICATION		
Site Name: Illinois Central Railroad Company’s Johnston Yard		
EPA ID: TND073540783		
Region: 4	State: Tennessee	City/County: Memphis/Shelby
SITE STATUS		
NPL Status: Non-NPL		
Multiple OUs? No	Has the site achieved construction completion? No	
REVIEW STATUS		
Lead agency: EPA		
Author name: Randy Bryant (EPA), Johnny Zimmerman-Ward and Sabrina Foster (Skeo)		
Author affiliation: EPA and Skeo		
Review period: 10/17/2016 - 5/19/2017		
Date of site inspection: 10/19/2016		
Type of review: Statutory		
Review number: 1		
Triggering action date: 5/21/2012		
Due date (five years after triggering action date): 5/21/2017		

II. RESPONSE ACTION SUMMARY

Basis for Taking Action

For more than a century, the Site has operated as a railyard, including a fueling and servicing center, which stored diesel fuel oil and lubricating oil (both clean and used) on-site. Prior to 1993 diesel fuel oil was delivered by a pipeline that ran both above and below ground. Presumed leaks and spills led to groundwater contamination with diesel fuel oil, as free product or phase separated hydrocarbons (PSH), as well as diesel-related contaminants such as benzo(a)pyrene, lead and arsenic (Table 1).

Table 1: Contaminants of Concern by Media

Contaminant of Concern	Media
Arsenic	Groundwater
Lead	Groundwater
Benzo(a)pyrene	Groundwater
Phase separated hydrocarbons (PSH)	Groundwater

The 2007 human health risk assessment (HHRA) evaluated potential exposure of industrial workers, construction workers and trespassers to soil, surface water, sediment and groundwater. None of these exposure scenarios generated unacceptable risk to human health or the environment. Another way to establish the potential for unacceptable risk is to consider when groundwater contaminants are present above primary federal Maximum Contaminant Levels (MCLs) or the State of Tennessee's requirements. Groundwater contaminants of concern (COCs) are present at concentrations exceeding primary federal MCLs and Tennessee General Water Quality Criteria.

The groundwater in the Fluvial Aquifer at the Site is classified as "GA," a potential source of drinking water. The EPA determined a response action is warranted because chemical specific standards that define acceptable risk levels are exceeded and exposure to contaminants above these acceptable levels is possible. In addition, the presence of PSH necessitates the removal of free product to the maximum extent practicable.

The CERCLA petroleum exclusion, which excludes CERCLA response authority for petroleum, does not apply at this Site due to the presence of lead in the diesel samples. The EPA has previously determined that the petroleum exclusion does not apply in situations where hazardous substances not normally found in petroleum are present. This previous determination is discussed in an EPA Office of Solid Waste and Emergency Response memo dated July 31, 1987. The Site is considered a Superfund Alternative Approach Site and is not listed on the National Priorities List.

Response Actions

The PRP has continued Site use as an active railyard and implemented remedial measures in compliance with the September 2003 Administrative Order by Consent (No. CER-04-2003-3525) between the PRP (Illinois Central Railroad Company) and EPA Region 4.

While drafting the Remedial Investigation Report in the mid-2000s, the PRP notified the EPA and Tennessee Department of Environment and Conservation (TDEC) about major capital improvement plans for the railyard operations on the Site, including demolition of some Site buildings and infrastructure and the filling, regrading, and realignment of tracks on-site. The PRP implemented these plans with approval from the EPA and TDEC. These actions also included a voluntary removal of lead contaminated soil from the area of the former car shop. Approximately 5,087 tons of lead impacted soil were removed and disposed at a permitted off-site landfill.

The EPA signed the Record of Decision (ROD) Summary of Remedial Alternative Selection, finalizing the Site’s remedy, in September 2010. The Remedial Action Objectives (RAOs) for the Site include:

- Remove the diesel present as free product in the subsurface to the extent practicable
- Stabilize the light non-aqueous phase liquid (LNAPL) plume (i.e. free product or PSH) in groundwater to prevent its potential off-site migration
- Address the potential dissolved phase plume in groundwater to comply with applicable or relevant and appropriate requirement (ARARs)

The major components (and estimated timeframes for the components) of the selected remedy include:

- Mobile-Enhanced Multi-Phase Extraction (MEME) to extract and recover PSH from groundwater wells located within the contaminant plumes – 12 events to be completed over two years.
- Enhanced bioremediation as necessary after the PSH recovery to address residual groundwater contamination – 10 years.
- Performance monitoring – 12 years (two years of semi-annual sampling and 10 years of annual sampling). The first two years of monitoring will coincide with MEME, while the remaining 10 years will coincide with enhanced bioremediation, if necessary.
- Institutional controls on the property to limit future use of the Site to industrial/commercial uses and to prohibit potential future consumption of groundwater of the Site until cleanup levels and RAOs have been met.
- Additional groundwater monitoring as necessary until groundwater standards (Table 2) have been met.

Table 2: Groundwater COC Cleanup Goals

Groundwater COC	Record of Decision Cleanup Goal (milligrams per liter; mg/L)
Arsenic	0.01
Lead	0.005
Benzo(a)pyrene	0.0002
PSH	Attempt removal if PSH thickness exceeds 0.01 feet in a well.

Status of Implementation

The PRP began remedial construction in April 2012. The original frequency for MEME events was every 2-3 months for five days at a time. In 2015, the frequency changed to every 1-2 months for three days at a time. In 2016, the frequency changed again to a monthly basis for three days at a time. Implementation of MEME has exceeded the original estimated duration of two years because it continues to remove free product from several wells where PSH thicknesses exceed the cleanup goal; however, MEME has reduced overall free product and PSH continues to decline in individual wells. The changes to frequency and durations of MEME events are intended to optimize free product extraction, and MEME will continue to operate until the EPA determines that it is no longer effective or that the PSH cleanup goal has been achieved. Once the EPA determines that MEME is no longer effective in recovering PSH from the subsurface, the remedy will transition to enhanced bioremediation to address residual groundwater contamination.

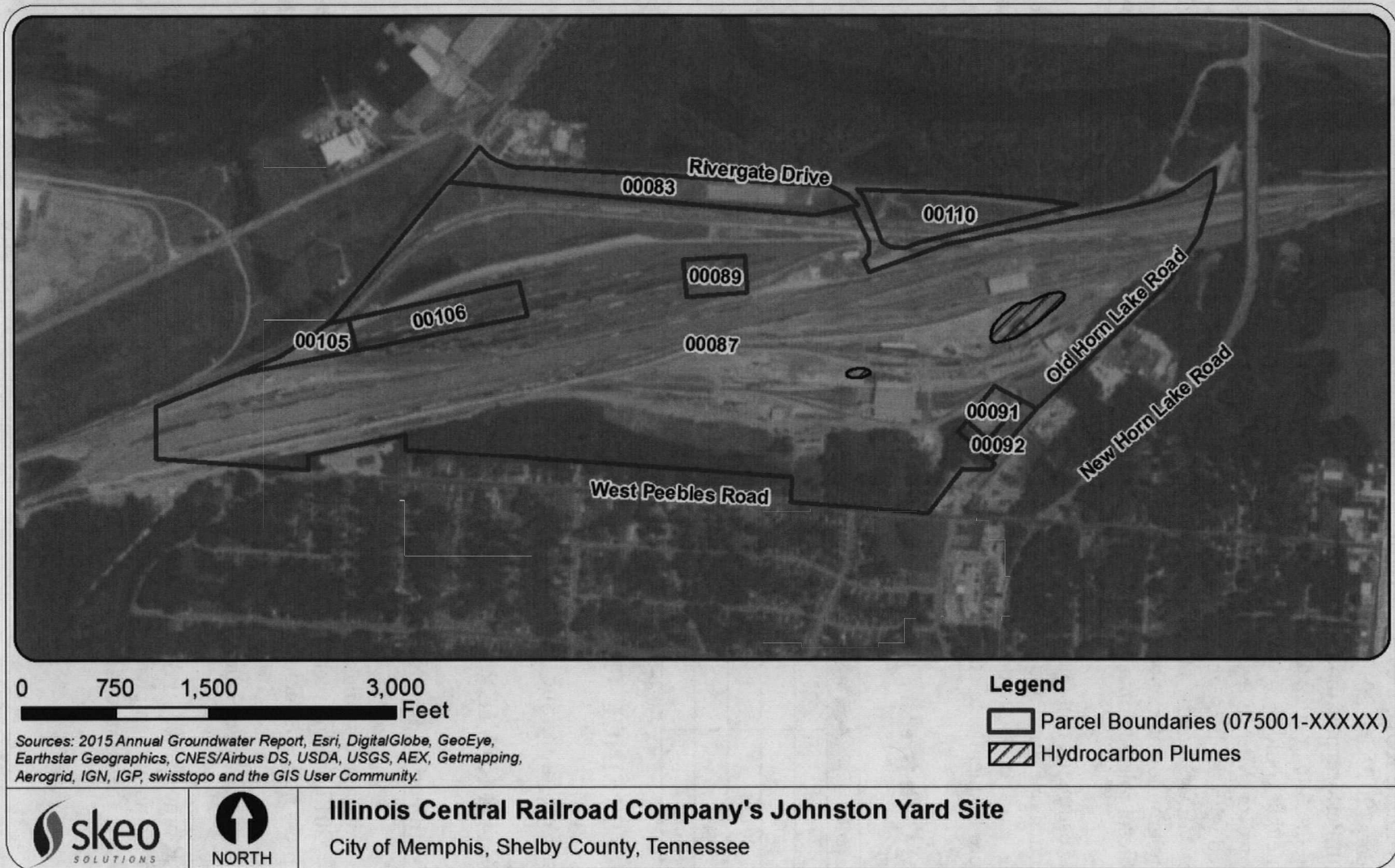
For each water bearing zone (the Shallow Perched Zone and the Fluvial Aquifer), the PRP annually monitors two sets of groundwater monitoring wells. The first set is associated with determining plume stability and the second set is for monitored natural attenuation (MNA). As specified in the ROD, the PRP performed semi-annual monitoring of the plume stability wells for the first two years and annually thereafter. Since PSH recovery is ongoing, enhanced bioremediation of residual groundwater contamination has not yet started. The PRP samples the MNA wells annually to monitor contaminant levels while MEME events continue. As of October 2016, remedial efforts had recovered over 430,000 gallons of water and almost 10,500 gallons of free product.

The PRP implemented institutional controls required as part of the ROD. The institutional controls are recorded for all ICRR property parcels (see parcels in Figure 1) with a Notice of Land Use Restrictions, recorded with the Shelby County Register of Deeds (Instrument # 12049772). Restrictions are explained in Table 3, below.

Table 3: Summary of Implemented Institutional Controls (ICs)

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Soil	Yes	Yes	075001 00087; 075001 00110; 075001 00083; 075001 00089; 075001 00106; 075001 00105; 075001 00091; and 075001 00092	1) The property shall not be used in any manner that would interfere with the performance of the remedy called for in the ROD. 2) The property shall only be used for industrial/commercial purposes. 3) Before any land disturbing activity occurs on the Site property, the grantor (currently the PRP, Illinois Central Railroad) must demonstrate, to the satisfaction of TDEC that such activity will not pose a danger to public health, safety or the environment.	Notice of Land Use Restrictions, December 2011
Groundwater	Yes	Yes	075001 00087; 075001 00110; 075001 00083; 075001 00089; 075001 00106; 075001 00105; 075001 00091; and 075001 00092	Prohibits potable use of groundwater under the Site property.	Notice of Land Use Restrictions, December 2011

Figure 1: Institutional Control Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

Systems Operations/Operation & Maintenance

In accordance with the ROD, the PRP performed semi-annual groundwater performance monitoring for the first two years (2012 and 2013) and performance monitoring has been performed annually from 2014 to present. Performance monitoring tracks both plume stability and progress of MNA. MEME events began at the Site in 2012 and continue in 2017. The 2010 ROD noted the uncertainty regarding the PSH volume that could be recovered, but assumed two years of MEME to address free product in the subsurface. However, MEME events continue as the PSH cleanup goal has not yet been achieved. The PRP has worked with the EPA and TDEC to optimize extraction of free product by varying frequency and duration of MEME events. The selected remedy calls for enhanced bioremediation of residual diesel contaminants in groundwater once MEME events have been completed. Long term monitoring continues for diesel related contaminants and the inorganic contaminants, arsenic and lead.

The 2010 ROD estimated that operations and maintenance activities would cost \$560,905 over a period of 12 years. Actual operation and maintenance (O&M) annual costs for the past five years are included in Table 4. The actual costs are on pace to be higher than the originally estimated costs in part due to performing more frequent extraction events over a greater number of years.

Table 4: O&M Costs Over the FYR Period

Date Range	Total Cost (rounded to the nearest \$1,000)
2012	\$70,000
2013	\$60,000
2014	\$70,000
2015	\$100,000
2016	\$130,000

III. PROGRESS SINCE THE LAST REVIEW

This is the first FYR for the Site.

IV. FIVE-YEAR REVIEW PROCESS

Community Notification, Involvement & Site Interviews

A public notice was made available by a newspaper posting in the Memphis Daily News on March 10th and March 17th, 2017, stating that there was a FYR and inviting the public to submit any comments to the EPA. The press notice is included in Appendix F. The results of the review and the report will be made available at the Site's information repository, located at the Memphis Shelby County Public Library (Levi Branch), 3676 South Third Street, Memphis, TN 38109.

During the FYR process, the EPA conducted interviews to document any perceived problems or successes with the remedy implemented to date. The results of these interviews are summarized below and are included in their entirety in Appendix J.

The PRP indicated that the remedy has been progressing as expected and that it is pleased with the results. MEME appears to be effectively recovering free product PSH from the subsurface and the recovery phase is nearing completion. Meanwhile the contaminated groundwater plume has remained stable. The PRP is not aware of any effects on the surrounding community or of any inquiries or concerns from the community about the Site in the last five years. It has had an open and effective dialogue with the EPA and feel well-informed about remedial activities and progress.

The PRP's contractor also believes that MEME may have reached its technical endpoint and that transitioning to bioremediation seems like the best next step for the remedy. It noted that the property is well-maintained and railyard Site use will continue for the foreseeable future. The PRP's contractor indicated that monitoring data show the dissolved phase plume associated with the free product is stable and limited to an area just beyond the edge of the free product plume. Arsenic and lead are the only COCs that exceed their cleanup goals in groundwater and only in select wells. The contractor is on-site for MEME events, annual groundwater monitoring events, and periodic monitoring well network inspections.

TDEC believes that the selected remedy remains protective for continued Site uses and that appropriate institutional controls are in place. However, it is concerned that the PSH cleanup is taking longer than anticipated, especially for wells in the Fluvial Aquifer. TDEC also notes that if the enhanced bioremediation phase of cleanup does not begin during the next FYR period, that more aggressive measures to remove remaining free product may be appropriate. TDEC is not aware of any community concerns regarding the Site, nor of any changes to state laws or projected land uses that may impact the Site remedy.

Data Review

Groundwater cleanup at the Site is being implemented in two phases. The first phase involves MEME events to reduce free product PSH in the soil and groundwater. The EPA and the PRP have recently agreed to begin the use of oxygen release compound (ORC) to enhance bioremediation of diesel compounds while continuing the periodic MEME events. The PRP continues to implement annual groundwater monitoring to track plume stability and to track contaminant concentrations.

Free Product Recovery

The ROD estimated a total volume of PSH of approximately 14,000 gallons. The ROD also noted the uncertainty associated with the total volume that could be recovered and used an estimate of 50% recovery (7,000 gallons) of PSH as a basis for the active alternatives. The selected remedy assumed that 7,200 gallons of PSH could be recovered in two years. In practice, the PRP has recovered PSH through the periodic MEME events since 2008 and have recovered a total of 10,475 gallons.

As seen in Figure I-1 (Appendix I), pilot testing of the MEME technology at the Site in 2008-2012 yielded much higher average free product recovery rates than following implementation of MEME as part of the selected remedy, beginning in April 2012. The early implementation of MEME likely reduced the total mass of free product, leading to the lower recovery rates in subsequent MEME events. However, this chart also shows that the continued application of MEME has reduced overall PSH thicknesses over time. The volume of PSH recovered per event has varied since 2008, but indicates a generally declining trend between 2008 to 2016 (see Figure I-1).

While MEME treatments are effective in recovering PSH from the impacted monitoring wells, there continues to be rebound in some wells between MEME events where PSH thicknesses rise until treated again (see Figures I-2 and I-3 in Appendix I). This is also evident in the cumulative data tracking PSH thickness in wells from 2008 to 2016 (Table I-1 in Appendix I). PSH levels decline quickly in a given well over the course of a 3-day MEME event. For example, in July 2016, the PSH levels declined from 12.9 feet to 0.44 feet within the 3-day event. While the EPA intends to achieve the PSH cleanup goal in all wells, the cleanup efforts closely monitor wells MW-33, MW-35 and MW-55, which continue to exhibit the greatest consistent PSH thicknesses. Average highs for PSH thickness in MW-35 appear to have increased from the pilot testing MEME period to present (Figure I-2).

In December 2016, the PRP requested to transition from active (MEME) remediation to the passive enhanced bioremediation stage of the remedy. The EPA and TDEC responded to the PRP that it was too soon to entirely stop the MEME events given that several feet of PSH eventually accumulates in at least two on-site monitoring wells. However, it would be acceptable to reduce the frequency of the MEME events to a quarterly basis and to begin the deployment of the ORC socks, particularly in monitoring wells with lower PSH thicknesses (generally less than 0.5 foot). The ORC is designed to help enhance aerobic biodegradation of dissolved-phase petroleum hydrocarbons.

Groundwater Contaminant Monitoring

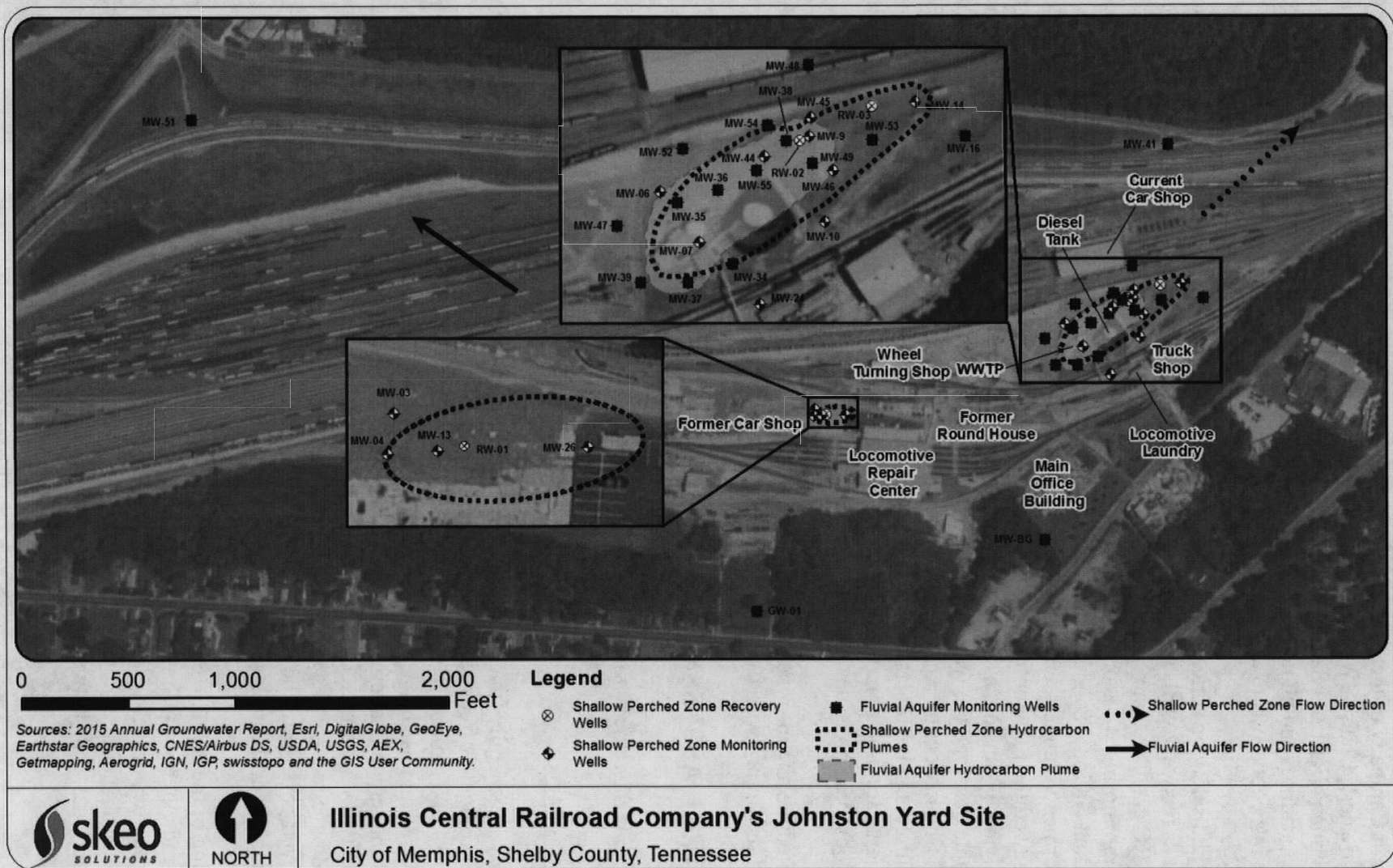
Routine performance monitoring ensures that the groundwater contamination is not migrating off-site and to track groundwater contaminant concentrations.

The September 2016 annual groundwater monitoring event sampled nine Shallow Perched Zone wells and nine Fluvial Aquifer wells. Sampling detected arsenic exceedances in two of the nine Shallow Perched Zone wells and three of the nine Fluvial Aquifer wells. Arsenic concentrations ranged from 0.0153 mg/l to 0.167 mg/l, with the highest concentration found in a Shallow Perched Zone well. Sampling showed lead exceedances in three of the nine Shallow Perched Zone wells and four of the nine Fluvial Aquifer wells. Lead concentrations ranged from 0.0075 mg/l to 0.0416 mg/l, with the highest concentration found in a Shallow Perched Zone well. The monitoring event did not detect any exceedances of the benzo(a)pyrene cleanup goal. Groundwater in one monitoring well and two recovery wells in the Shallow Perched Zone, as well as in five Fluvial Aquifer wells, were not sampled due to the presence of LNAPL (i.e. free product) on the water surface.

MW-10, a monitoring well in the Shallow Perched Zone, is located near the on-site diesel tank and is therefore downgradient of former car shop. This well saw an order of magnitude increase in both arsenic and lead concentrations from 2014 to 2015. Given the downgradient groundwater flow, it is possible that metals in groundwater could approach MW-10. However, the 2016 groundwater monitoring data did not confirm this theory as it showed an order of magnitude decrease in lead (it still exceeds cleanup goal at 0.0416 mg/L), and arsenic is now no longer detected.

A table containing a summary of groundwater analytical data from 2012 to 2016 is included in Table I-2 in Appendix I.

Figure 2: Detailed Site Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

Site Inspection

The Site inspection took place on 10/19/2016. In attendance were Randy Bryant, EPA Remedial Project Manager; Alison Campany of the TDEC; Joe Phelps, Devin Sprinkle and Gary Schwartz, of Canadian National (Site owner); Chelsea Wenhardt of TRC Environmental Corporation (PRP contractor); and Johnny Zimmerman-Ward and Sarah Alfano of Skeo. The completed site inspection checklist is available in Appendix E and photos taken during the site inspection are available in Appendix G. The purpose of the inspection was to assess the protectiveness of the remedy.

After a health and safety briefing, participants observed the area of the remaining larger free product plume, as well as recovery wells and monitoring wells in the diesel fueling and former wastewater lagoon area. TRC and Canadian National described how the MEME mobile unit extracts free product from existing monitoring wells on an approximately monthly basis. Extracted free product is disposed of off-site. Canadian National conducted a railyard expansion in the late 2000s in coordination with the EPA and performed voluntary removal actions when soil excavations revealed contaminated soil. Participants viewed the Locomotive Repair Center, the new building that Canadian National constructed during this railyard expansion, as well as the humpyard area where voluntary removals had taken place. Then participants observed the wells and area of the smaller free product plume near the Locomotive Repair Center. Site inspection participants observed the remainder of the railroad yard. The facility is very secure with fencing and personnel on-site at all times. Railroad police are also on-site at all times and video cameras are used to monitor the facility. The Site is in good condition and site inspection participations observed no issues during the site inspection.

Skeo staff visited the site information repository and found no site-related documents. The EPA has since provided the library with five copies of the administrative record on compact disc.

V. TECHNICAL ASSESSMENT

QUESTION A: Is the remedy functioning as intended by the decision documents?

Question A Summary:

Yes, the remedy is generally functioning as intended by the decision documents. The MEME technology is reducing the amount of free product in subsurface. The ROD estimated a total volume of PSH of approximately 14,000 gallons. The ROD also noted the uncertainty associated with the total volume that could be recovered and used an estimate of 50% recovery (7,000 gallons) of PSH as a basis for comparison of the remedial alternatives. The selected remedy assumed that 7,200 gallons of PSH could be recovered in two years. In practice, the PRP has recovered PSH through the periodic MEME events since 2008 and have recovered a total of 10,475 gallons, with 100 or more gallons of free product typically removed per event. The volume of PSH recovered per event has varied since 2008, but indicates a generally declining overall trend between 2008 to 2016.

At the beginning of the July 2016 MEME event, ten wells had PSH thicknesses exceeding the 0.01-inch cleanup goal, and eight of those wells still exceeded the cleanup goal at the conclusion of that MEME event. Nine groundwater wells could not be sampled in the September 2016 sampling event due to the presence of LNAPL (i.e. free product) on the surface of those wells. Additionally, there appears to be rebound in individual wells between MEME treatments, with PSH thicknesses consistently above the

cleanup goal. However, the number of monitoring wells with elevated levels of PSH have declined over time. These findings point to a need for ongoing free product extraction.

The EPA and TDEC reviewed a recent request from the PRP to transition from active MEME remediation to the passive enhanced bioremediation phase of cleanup to address residual groundwater contamination at concentrations above cleanup goals. The EPA and TDEC responded to the PRP that it was too soon to entirely stop the MEME events given that several feet of PSH does eventually accumulate in at least two on-site monitoring wells. However, it would be acceptable to reduce the frequency of the MEME events to a quarterly basis and that it was acceptable to begin the deployment of the ORC socks, particularly in monitoring wells with lower levels of PSH.

Annual groundwater MNA sampling continues to detect arsenic and lead in both the Fluvial Aquifer and Shallow Perched Zone. Institutional controls are in place to prevent exposure to Site contamination, so the longer than anticipated cleanup process does not present any new or unacceptable risks as all pathways are controlled.

Generally, monitoring has shown plume stability, and the groundwater plume area impacted by Site contamination is not migrating. However, MW-10 showed an order of magnitude increase in both lead and arsenic concentrations from 2014 to 2015, but concentrations declined in the subsequent 2016 sampling. This well and nearby wells need to be closely monitored in subsequent sampling events to determine whether this increase suggests plume migration or are outlier results. The well is located within the center of the property so if it were to indicate plume movement, it does not appear to be migrating off-site, and the on-site parcels all have institutional controls in place to prevent potable use of groundwater.

A Notice of Deed Restriction is in place for all affected parcels, which prohibits the use of groundwater for potable purposes, limits land use to commercial/industrial uses, and prohibits disruptions of any remedial activity or disturbance of soil at the Site without express prior approval. The Site is secured with fencing, and the around the clock presence of personnel related to active railyard operations.

QUESTION B: Are the exposure assumptions, toxicity data, cleanup levels and remedial action objectives (RAOs) used at the time of the remedy selection still valid?

Question B Summary:

The toxicity data, cleanup levels and RAOs used at the time of the remedy selection are still valid. None of the chemical-specific ARARs have changed (see Appendix H), which supports that toxicity information for the COCs has not changed since the signing of the 2010 ROD. To date, the remedy is working towards achieving the RAOs of removing free product in the subsurface to the extent practicable and stabilizing the contaminated groundwater plume to prevent potential off-site migration. The RAO of addressing dissolved phase groundwater contamination to comply with ARARs will be addressed at the conclusion of the MEME treatment to remove free product. Although the Site continues to operate as a railyard, which is consistent with the exposure assumptions explored in the HHRA, the HHRA did not evaluate the potential for subsurface vapors to enter on-site buildings.

The EPA has since revised the standardized risk assessment methodology to include a vapor intrusion evaluation if volatile organic compounds (VOCs) are present in the subsurface at a site. LNAPL, as weathered diesel, is likely present in the subsurface beneath the waste water treatment plant (WWTP)

building and the nearby fuel pump building. The presence of LNAPL is evidenced by the free product observed in certain monitoring wells (such as shallow wells MW-7, MW-44, and MW-46 and fluvial wells MW-33, MW-35, MW-37, MW-38, and MW-55) in this area of the Site. The WWTP building and fuel pump building are the only occupied buildings that are currently believed to be located above PSH impacted soil/groundwater. According to the railyard, these two buildings are minimally staffed; the WWTP building is reportedly occupied by one person about two hours per day. These buildings do have operating HVAC systems. The railyard reports that the WWTP building has an eight-inch concrete slab while the fuel pump building has a six-inch concrete slab with a vapor barrier. According to the EPA's 2015 Vapor intrusion (VI) Guidance for Petroleum release sites, buildings are not likely to be impacted by petroleum VI if the building is determined to be outside of the lateral and vertical exclusion zones (distance from contamination). The lateral zone is site-specific and is based on the distance between clean monitoring points and includes the consideration of preferential pathways. The vertical exclusion distance is generally greater than 6 feet from the dissolved phase or 15 feet from the LNAPL. It is recommended that the VI pathway be further evaluated following the EPA's petroleum VI guidance given that diesel LNAPL may be present at depths less than 15 feet under the WWTP building and fuel pump building. The next closest buildings are the current car shop and truck shop. A much more limited area of shallow LNAPL is present near the former car shop (e.g., MW-13 and MW-26).

QUESTION C: Has any other information come to light that could call into question the protectiveness of the remedy?

No, no other information has come to light that could call into question the protectiveness of the remedy.

VI. ISSUES/RECOMMENDATIONS

Issues/Recommendations

Issues and Recommendations Identified in the FYR:

OU(s): 1 (sitewide)	Issue Category: Other			
	Issue: A vapor intrusion assessment was not performed as part of the original risk assessment; two small on-site buildings that are minimally occupied are located near the PSH plumes, which may contain petroleum VOCs. Current site conditions and building characteristics reduce the potential for exposure.			
	Recommendation: Evaluate the vapor intrusion pathway following the EPA's petroleum VI guidance.			
Affect Current Protectiveness	Affect Future Protectiveness	Party Responsible	Oversight Party	Milestone Date
No	Yes	PRP	EPA	10/30/2018

OTHER FINDINGS

In addition, the following recommendations were identified during the FYR, but do not affect current and/or future protectiveness:

- Annual groundwater MNA sampling at MW-10 detected an order of magnitude increase in arsenic and lead concentrations from 2014 to 2015, but concentrations dropped again in 2016. Continue to closely monitor concentrations at this and other nearby wells to determine whether this change is indicative of plume movement.
- The values of PSH thicknesses in MW-35 fluctuate, but have increased from 2008 to 2016, despite MEME treatment. Continue to monitor PSH thicknesses and adjust MEME pumping events or consider other modifications as needed.

VII. PROTECTIVENESS STATEMENT

Protectiveness Statement	
<i>Operable Unit:</i> OU1 (Sitewide)	<i>Protectiveness Determination:</i> Short-term Protective
<i>Protectiveness Statement:</i> The remedy at OU1 (sitewide) currently protects human health and the environment because institutional controls prevent exposure to unacceptable risks and remedial actions continue to address free product present in the subsurface at the Site. However, an evaluation of vapor intrusion potential need to be addressed to ensure long term protectiveness.	

VIII. NEXT REVIEW

The next FYR Report for the Illinois Central Railroad Company's Johnston Yard Site is required five years from the completion date of this FYR.

APPENDIX A – REFERENCE LIST

2013 Annual Groundwater Monitoring Report, Illinois Central Railroad Johnston Yard Site, Memphis Tennessee. Prepared for USEPA Region IV, Atlanta, Georgia. Prepared by TRC Environmental Corporation. March 2014.

2014 Annual Groundwater Monitoring Report, Illinois Central Railroad Johnston Yard Site, Memphis Tennessee. Prepared for USEPA Region IV, Atlanta, Georgia. Prepared by TRC Environmental Corporation. February 2015.

2015 Annual Groundwater Monitoring Report, Illinois Central Railroad Johnston Yard Site, Memphis Tennessee. Prepared for USEPA Region IV, Atlanta, Georgia. Prepared by TRC Environmental Corporation. December 2015.

Addendum to the Remedial Investigation Report, Illinois Central Railroad, Johnston Yard Site. Prepared for Illinois Central Railroad Company, Memphis, Tennessee. Prepared by TRC Environmental Corporation, Houston, Texas. February 2009.

Enhanced Fluid Recovery Results, Events No. 89 through 92. EcoVac Services. March 7, 2014.

Enhanced Fluid Recovery Results, Events No. 98 through 101. EcoVac Services. June 25, 2014.

Enhanced Fluid Recovery Results, Events No. 117 through 119. EcoVac Services. February 18, 2015.

Enhanced Fluid Recovery Results. EcoVac Services. October 26, 2015.

Enhanced Fluid Recovery Results, Events No. 162 through 164. EcoVac Services. July 14, 2016.

Human Health Risk Assessment, Illinois Central Railroad Company's Johnston Yard Site. Prepared for Illinois Central Railroad Company, Memphis, Tennessee. Prepared by TRC Environmental Corporation, Houston, Texas. January 2007.

Record of Decision Summary of Remedial Alternative Selection, Illinois Central Johnston Yard Site, Memphis, TN. Prepared by U.S. Environmental Protection Agency, Region 4, Atlanta, Georgia. September 2010.

Remedial Investigation Report, Illinois Central Railroad, Johnston Yard Site. Prepared for Illinois Central Railroad Company, Memphis, Tennessee. Prepared by TRC Environmental Corporation, Houston, Texas. October 2006.

Request to Transition from Active Remediation to Passive Phase Remediation, Illinois Central Railroad Johnston Yard Site, Memphis, Tennessee. Prepared for USEPA Region IV by TRC Environmental Corporation for Illinois Central Railroad. December 2016.

U.S. EPA Office of Solid Waste and Emergency Response (OSWER) Memorandum 9838.1, (Scope of the CERCLA Petroleum Exclusion) July 31, 1987

APPENDIX B – CURRENT SITE STATUS

Environmental Indicators

- Current human exposures at the Site are under control.
- Current groundwater migration is under control.

Are Necessary Institutional Controls in Place?

All Some None

Has EPA Designated the Site as Sitewide Ready for Anticipated Use?

Yes No

Has the Site Been Put into Reuse?

Yes No – Continued use as an active railyard.

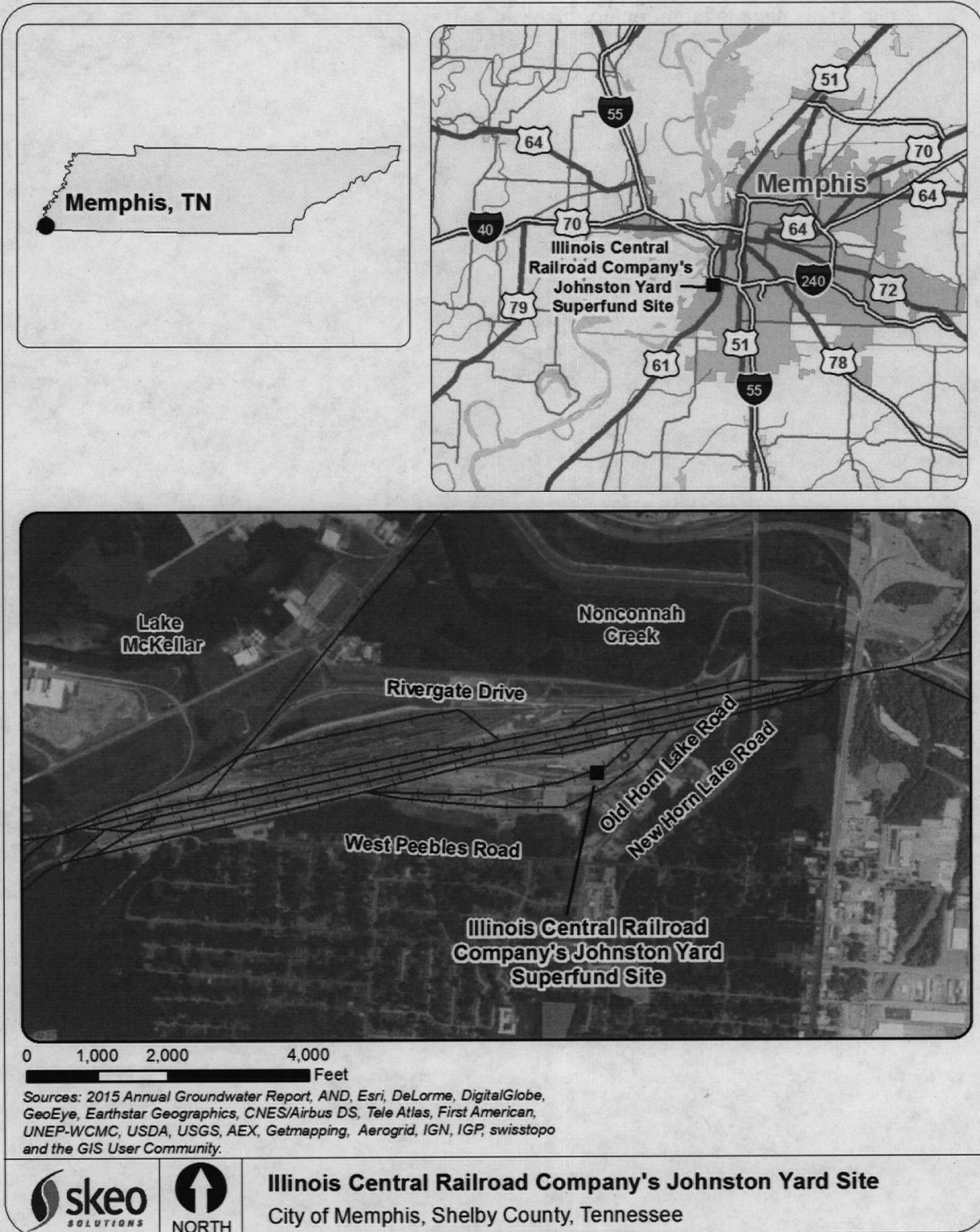
APPENDIX C – SITE CHRONOLOGY

Table C-1: Site Chronology

Event	Date
Initial discovery of contamination	April 1, 1980
TDEC (formerly called Tennessee Department of Health and Environment) performed a preliminary assessment of the Site	August 1, 1984
The EPA conducted a site inspection to characterize the severity of contamination	October 31, 1991
The EPA began a reassessment of the Site	November 30, 1999
The EPA completed reassessment of the Site	November 30, 2000
The EPA began an expanded site inspection	February 21, 2001
The EPA completed the expanded site inspection and recommended the Site for Hazardous Ranking System Scoring	August 19, 2002
The EPA and ICRR, the PRP, began negotiations for the remedial investigation/feasibility (RI/FS) study	June 30, 2003
RI/FS negotiations completed; the EPA and ICRR entered into an administrative order by consent for ICRR to perform the RI/FS	September 19, 2003
ICRR completed the RI	October 2006
ICRR completed the Addendum to the RI	February 2009
ICRR completed the RI/FS; the EPA issued the ROD; the EPA and ICRR began negotiations for remedial design/remedial action (RD/RA)	September 30, 2010
The EPA and ICRR completed RD/RA negotiations; ICRR began the RD	August 26, 2011
The EPA and ICRR entered into a consent decree for ICRR to perform the RD/RA	October 27, 2011
ICRR completed the RD and began the RA	April 17, 2012
ICRR submitted request to the EPA to transition from active to passive remedial action.	December 2016

APPENDIX D – SITE VICINITY MAP

Figure D-1: Site Vicinity Map



Disclaimer: This map and any boundary lines within the map are approximate and subject to change. The map is not a survey. The map is for informational purposes only regarding the EPA's response actions at the Site.

APPENDIX E – SITE INSPECTION CHECKLIST

FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST					
I. SITE INFORMATION					
Site Name: Illinois Central Railroad Company's Johnston Yard	Date of Inspection: <u>10/19/2016</u>				
Location and Region: Memphis, Tennessee 4	EPA ID: TND073540783				
Agency, Office or Company Leading the Five-Year Review: EPA	Weather/Temperature: <u>80s and partly sunny</u>				
Remedy Includes: (Check all that apply) <table style="width: 100%; border: none;"> <tr> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input checked="" type="checkbox"/> Other: _____ </td> <td style="width: 50%; vertical-align: top;"> <input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls </td> </tr> </table>				<input type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input checked="" type="checkbox"/> Other: _____	<input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls
<input type="checkbox"/> Landfill cover/containment <input type="checkbox"/> Access controls <input checked="" type="checkbox"/> Institutional controls <input type="checkbox"/> Groundwater pump and treatment <input type="checkbox"/> Surface water collection and treatment <input checked="" type="checkbox"/> Other: _____	<input type="checkbox"/> Monitored natural attenuation <input type="checkbox"/> Groundwater containment <input type="checkbox"/> Vertical barrier walls				
Attachments: <input checked="" type="checkbox"/> Inspection team roster attached <input type="checkbox"/> Site map attached					
II. INTERVIEWS (check all that apply)					
1. O&M Site Manager	<u>Chelsea Wenhardt</u> Name	<u>Staff Scientist, TRC Environmental Corporation</u> Title	<u>11/29/2016</u> Date		
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone: <u>713-244-1002</u> Problems, suggestions <input type="checkbox"/> Report attached: _____					
2. O&M Staff	_____ Name	_____ Title	_____ Date		
Interviewed <input type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone: _____ Problems/suggestions <input type="checkbox"/> Report attached: _____					
3. Local Regulatory Authorities and Response Agencies (i.e., state and tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices). Fill in all that apply.					
Agency <u>Tennessee Department of Environment and Conservation</u>					
Contact <u>Alison Campany</u>	<u>Remediation</u>	<u>1/4/2017</u>	<u>901-371-3040</u>		
Name	Project Manager	Date	Phone No.		
Problems/suggestions <input type="checkbox"/> Report attached: _____					
Agency _____					
Contact _____	_____	_____	_____		
Name	Title	Date	Phone No.		
Problems/suggestions <input type="checkbox"/> Report attached: _____					
Agency _____					
Contact _____	_____	_____	_____		
Name	Title	Date	Phone No.		
Problems/suggestions <input type="checkbox"/> Report attached: _____					

Agency _____				
Contact _____	Name _____	Title _____	Date _____	Phone No. _____
Problems/suggestions <input type="checkbox"/> Report attached: _____				
Agency _____				
Contact _____	Name _____	Title _____	Date _____	Phone No. _____
Problems/suggestions <input type="checkbox"/> Report attached: _____				

4. **Other Interviews** (optional) Report attached: _____

Illinois Central Railroad Company, Site PRP

III. ON-SITE DOCUMENTS AND RECORDS VERIFIED (check all that apply)

1. **O&M Documents**

<input checked="" type="checkbox"/> O&M manual	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> As-built drawings	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A
<input checked="" type="checkbox"/> Maintenance logs	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A

Remarks: _____

2. **Site-Specific Health and Safety Plan** Readily available Up to date N/A

Contingency plan/emergency response plan Readily available Up to date N/A

Remarks: _____

3. **O&M and OSHA Training Records** Readily available Up to date N/A

Remarks: _____

4. **Permits and Service Agreements**

<input type="checkbox"/> Air discharge permit	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Effluent discharge	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Waste disposal, POTW	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Other permits: _____	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A

Remarks: _____

5. **Gas Generation Records** Readily available Up to date N/A

Remarks: _____

6. **Settlement Monument Records** Readily available Up to date N/A

Remarks: _____

7. **Groundwater Monitoring Records** Readily available Up to date N/A

Remarks: _____

8. **Leachate Extraction Records** Readily available Up to date N/A

Remarks: _____

9. **Discharge Compliance Records**

<input type="checkbox"/> Air	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
<input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A
Remarks: _____			

10. **Daily Access/Security Logs** Readily available Up to date N/A
 Remarks: Facility is very secure with staff presence and video camera monitoring at all times.

IV. O&M COSTS

1. **O&M Organization**

<input type="checkbox"/> State in-house	<input type="checkbox"/> Contractor for state
<input type="checkbox"/> PRP in-house	<input checked="" type="checkbox"/> Contractor for PRP
<input type="checkbox"/> Federal facility in-house	<input type="checkbox"/> Contractor for Federal facility
<input type="checkbox"/> _____	

2. **O&M Cost Records**

Readily available Up to date

Funding mechanism/agreement in place Unavailable

Original O&M cost estimate: _____ Breakdown attached

Total annual cost by year for review period if available

From: <u>Jan 2012</u>	To: <u>Dec 2012</u>	<u>\$70,000</u>	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From: <u>Jan 2013</u>	To: <u>Dec 2013</u>	<u>\$60,000</u>	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From: <u>Jan 2014</u>	To: <u>Dec 2014</u>	<u>\$70,000</u>	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From: <u>Jan 2015</u>	To: <u>Dec 2015</u>	<u>\$100,000</u>	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From: <u>Jan 2016</u>	To: <u>Dec 2016</u>	<u>\$130,000</u>	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	

3. **Unanticipated or Unusually High O&M Costs during Review Period**
 Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS Applicable N/A

A. Fencing

1. **Fencing Damaged** Location shown on site map Gates secured N/A
 Remarks: Fencing is secure.

B. Other Access Restrictions

1. **Signs and Other Security Measures** Location shown on site map N/A
 Remarks: Site is very secure as it is an operational railyard.

C. Institutional Controls (ICs)

1. Implementation and Enforcement			
Site conditions imply ICs not properly implemented	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Site conditions imply ICs not being fully enforced	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	<input type="checkbox"/> N/A
Type of monitoring (e.g., self-reporting, drive by): _____			
Frequency: _____			
Responsible party/agency: _____			
Contact _____			
Name	Title	Date	Phone no.
Reporting is up to date <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A			
Reports are verified by the lead agency <input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A			
Specific requirements in deed or decision documents have been met <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A			
Violations have been reported <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A			
Other problems or suggestions: <input type="checkbox"/> Report attached			
2. Adequacy <input checked="" type="checkbox"/> ICs are adequate <input type="checkbox"/> ICs are inadequate <input type="checkbox"/> N/A			
Remarks: _____			
D. General			
1. Vandalism/Trespassing <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> No vandalism evident			
Remarks: _____			
2. Land Use Changes On Site <input checked="" type="checkbox"/> N/A			
Remarks: _____			
3. Land Use Changes Off Site <input checked="" type="checkbox"/> N/A			
Remarks: _____			
VI. GENERAL SITE CONDITIONS			
A. Roads <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1. Roads Damaged <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Roads adequate <input type="checkbox"/> N/A			
Remarks: _____			
B. Other Site Conditions			
Remarks: _____			
VII. LANDFILL COVERS <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
A. Landfill Surface			
1. Settlement (low spots) <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident			
Areal extent: _____		Depth: _____	
Remarks: _____			
2. Cracks <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Cracking not evident			
Lengths: _____		Widths: _____	
		Depths: _____	
Remarks: _____			

3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Erosion not evident
	Areal extent: _____		Depth: _____
	Remarks: _____		
4.	Holes	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Holes not evident
	Areal extent: _____		Depth: _____
	Remarks: _____		
5.	Vegetative Cover	<input type="checkbox"/> Grass	<input type="checkbox"/> Cover properly established
	<input type="checkbox"/> No signs of stress	<input type="checkbox"/> Trees/shrubs (indicate size and locations on a diagram)	
	Remarks: _____		
6.	Alternative Cover (e.g., armored rock, concrete)	<input type="checkbox"/> N/A	
	Remarks: _____		
7.	Bulges	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Bulges not evident
	Areal extent: _____		Height: _____
	Remarks: _____		
8.	Wet Areas/Water Damage	<input type="checkbox"/> Wet areas/water damage not evident	
	<input type="checkbox"/> Wet areas	<input type="checkbox"/> Location shown on site map	Areal extent: _____
	<input type="checkbox"/> Ponding	<input type="checkbox"/> Location shown on site map	Areal extent: _____
	<input type="checkbox"/> Seeps	<input type="checkbox"/> Location shown on site map	Areal extent: _____
	<input type="checkbox"/> Soft subgrade	<input type="checkbox"/> Location shown on site map	Areal extent: _____
	Remarks: _____		
9.	Slope Instability	<input type="checkbox"/> Slides	<input type="checkbox"/> Location shown on site map
	<input type="checkbox"/> No evidence of slope instability		
	Areal extent: _____		
	Remarks: _____		
B. Benches <input type="checkbox"/> Applicable <input type="checkbox"/> N/A			
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)			
1.	Flows Bypass Bench	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
	Remarks: _____		
2.	Bench Breached	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
	Remarks: _____		
3.	Bench Overtopped	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> N/A or okay
	Remarks: _____		
C. Letdown Channels <input type="checkbox"/> Applicable <input type="checkbox"/> N/A			
(Channel lined with erosion control mats, riprap, grout bags or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill)			

cover without creating erosion gullies.)			
1.	Settlement (Low spots)	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of settlement
	Areal extent: _____		Depth: _____
	Remarks: _____		
2.	Material Degradation	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of degradation
	Material type: _____		Areal extent: _____
	Remarks: _____		
3.	Erosion	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of erosion
	Areal extent: _____		Depth: _____
	Remarks: _____		
4.	Undercutting	<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> No evidence of undercutting
	Areal extent: _____		Depth: _____
	Remarks: _____		
5.	Obstructions	Type: _____	<input type="checkbox"/> No obstructions
	<input type="checkbox"/> Location shown on site map	Areal extent: _____	
	Size: _____		
	Remarks: _____		
6.	Excessive Vegetative Growth	Type: _____	
	<input type="checkbox"/> No evidence of excessive growth		
	<input type="checkbox"/> Vegetation in channels does not obstruct flow		
	<input type="checkbox"/> Location shown on site map	Areal extent: _____	
	Remarks: _____		
D. Cover Penetrations <input type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	Gas Vents	<input type="checkbox"/> Active	<input type="checkbox"/> Passive
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> Good condition
			<input type="checkbox"/> N/A
	Remarks: _____		
2.	Gas Monitoring Probes		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> Good condition
			<input type="checkbox"/> N/A
	Remarks: _____		
3.	Monitoring Wells (within surface area of landfill)		
	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> Good condition
			<input type="checkbox"/> N/A
	Remarks: _____		
4.	Extraction Wells Leachate		

	<input type="checkbox"/> Properly secured/locked	<input type="checkbox"/> Functioning	<input type="checkbox"/> Routinely sampled	<input type="checkbox"/> Good condition
	<input type="checkbox"/> Evidence of leakage at penetration	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> N/A	
	Remarks: _____			
5.	Settlement Monuments	<input type="checkbox"/> Located	<input type="checkbox"/> Routinely surveyed	<input type="checkbox"/> N/A
	Remarks: _____			
E. Gas Collection and Treatment		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A	
1.	Gas Treatment Facilities			
	<input type="checkbox"/> Flaring	<input type="checkbox"/> Thermal destruction	<input type="checkbox"/> Collection for reuse	
	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance		
	Remarks: _____			
2.	Gas Collection Wells, Manifolds and Piping			
	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance		
	Remarks: _____			
3.	Gas Monitoring Facilities (e.g., gas monitoring of adjacent homes or buildings)			
	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance	<input type="checkbox"/> N/A	
	Remarks: _____			
F. Cover Drainage Layer		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A	
1.	Outlet Pipes Inspected		<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks: _____			
2.	Outlet Rock Inspected		<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks: _____			
G. Detention/Sedimentation Ponds		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A	
1.	Siltation	Area extent: _____	Depth: _____	<input type="checkbox"/> N/A
	<input type="checkbox"/> Siltation not evident			
	Remarks: _____			
2.	Erosion	Area extent: _____	Depth: _____	
	<input type="checkbox"/> Erosion not evident			
	Remarks: _____			
3.	Outlet Works		<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks: _____			
4.	Dam		<input type="checkbox"/> Functioning	<input type="checkbox"/> N/A
	Remarks: _____			
H. Retaining Walls		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A	
1.	Deformations		<input type="checkbox"/> Location shown on site map	<input type="checkbox"/> Deformation not evident
	Horizontal displacement: _____		Vertical displacement: _____	
	Rotational displacement: _____			

Remarks: _____		
2.	Degradation	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Degradation not evident Remarks: _____
I. Perimeter Ditches/Off-Site Discharge <input type="checkbox"/> Applicable <input type="checkbox"/> N/A		
1.	Siltation	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Siltation not evident Area extent: _____ Depth: _____ Remarks: _____
2.	Vegetative Growth	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> N/A <input type="checkbox"/> Vegetation does not impede flow Area extent: _____ Type: _____ Remarks: _____
3.	Erosion	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Erosion not evident Area extent: _____ Depth: _____ Remarks: _____
4.	Discharge Structure	<input type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks: _____
VIII. VERTICAL BARRIER WALLS <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A		
1.	Settlement	<input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident Area extent: _____ Depth: _____ Remarks: _____
2.	Performance Monitoring	Type of monitoring: _____ <input type="checkbox"/> Performance not monitored Frequency: _____ <input type="checkbox"/> Evidence of breaching Head differential: _____ Remarks: _____
IX. GROUNDWATER/SURFACE WATER REMEDIES <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A		
A. Groundwater Extraction Wells, Pumps and Pipelines <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A		
1.	Pumps, Wellhead Plumbing and Electrical	<input type="checkbox"/> Good condition <input type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A Remarks: <u>Extraction unit is mobile so only wells are on site. No pumps or electrical.</u>
2.	Extraction System Pipelines, Valves, Valve Boxes and Other Appurtenances	<input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs maintenance Remarks: <u>Extraction unit is mobile so only wells are on site. No pumps or electrical.</u>
3.	Spare Parts and Equipment	<input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks: _____

B. Surface Water Collection Structures, Pumps and Pipelines		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Collection Structures, Pumps and Electrical	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks: _____			
2.	Surface Water Collection System Pipelines, Valves, Valve Boxes and Other Appurtenances	<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
Remarks: _____			
3.	Spare Parts and Equipment	<input type="checkbox"/> Readily available	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Requires upgrade	<input type="checkbox"/> Needs to be provided
Remarks: _____			
C. Treatment System		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Treatment Train (check components that apply)	<input type="checkbox"/> Metals removal	<input checked="" type="checkbox"/> Oil/water separation
		<input type="checkbox"/> Air stripping	<input type="checkbox"/> Carbon adsorbers
		<input type="checkbox"/> Filters: _____	<input type="checkbox"/> Bioremediation
		<input type="checkbox"/> Additive (e.g., chelation agent, flocculent): _____	
		<input type="checkbox"/> Others: _____	
		<input type="checkbox"/> Good condition	<input type="checkbox"/> Needs maintenance
		<input type="checkbox"/> Sampling ports properly marked and functional	
		<input type="checkbox"/> Sampling/maintenance log displayed and up to date	
		<input type="checkbox"/> Equipment properly identified	
		<input type="checkbox"/> Quantity of groundwater treated annually: _____	
		<input type="checkbox"/> Quantity of surface water treated annually: _____	
Remarks: <u>Recovered over 430,000 gallons of water and almost 10,500 gallons of free product by July 2016.</u>			
2.	Electrical Enclosures and Panels (properly rated and functional)	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Needs maintenance	
Remarks: _____			
3.	Tanks, Vaults, Storage Vessels	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Proper secondary containment	<input type="checkbox"/> Needs maintenance
Remarks: _____			
4.	Discharge Structure and Appurtenances	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Good condition
		<input type="checkbox"/> Needs maintenance	
Remarks: _____			
5.	Treatment Building(s)	<input checked="" type="checkbox"/> N/A	<input type="checkbox"/> Good condition (esp. roof and doorways)
		<input type="checkbox"/> Chemicals and equipment properly stored	<input type="checkbox"/> Needs repair

Remarks: _____	
6. Monitoring Wells (pump and treatment remedy) <input checked="" type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs maintenance <input type="checkbox"/> N/A Remarks: _____	
D. Monitoring Data	
1. Monitoring Data <input checked="" type="checkbox"/> Is routinely submitted on time <input checked="" type="checkbox"/> Is of acceptable quality	
2. Monitoring Data Suggests: <input checked="" type="checkbox"/> Groundwater plume is effectively contained <input type="checkbox"/> Contaminant concentrations are declining	
E. Monitored Natural Attenuation	
1. Monitoring Wells (natural attenuation remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs maintenance <input checked="" type="checkbox"/> N/A Remarks: _____	
X. OTHER REMEDIES	
If there are remedies applied at the site and not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.	
XI. OVERALL OBSERVATIONS	
A. Implementation of the Remedy	
Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is designed to accomplish (e.g., to contain contaminant plume, minimize infiltration and gas emissions). <u>The remedy includes institutional controls and MEME to extract and recover free product from the subsurface near the former fueling area. This will be followed with enhanced bioremediation, as needed, to address residual groundwater contamination after the free product extraction is complete. Free product extraction is taking longer than estimated by the ROD. MEME continues to be implemented with almost 1,300 gallons of free product extracted in 2016.</u>	
B. Adequacy of O&M	
Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy. <u>No issues identified.</u>	
C. Early Indicators of Potential Remedy Problems	
Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs that suggest that the protectiveness of the remedy may be compromised in the future. <u>In the September 2016 groundwater sampling event, a few wells showed exceedances for lead (MW-48 and MW-BG) and arsenic (MW-26 and MW-48), which had not had exceedances in the last several years for those contaminants.</u>	
D. Opportunities for Optimization	
Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy. <u>One likely change to the operation of the remedy includes a reduction in the frequency of the MEME events and the placement of ORC socks in the monitoring wells, as appropriate.</u>	

Site Inspection Participants:

Joe Phelps, Canadian National

Devin Sprinkle, Canadian National

Gary Schwartz, Canadian National

Chelsea Wenhardt, TRC Environmental Corporation

Randy Bryant, EPA

Alison Campany, TDEC

Sarah Alfano, Skeo

Johnny Zimmerman-Ward, Skeo

APPENDIX F – PRESS NOTICE



The U.S. Environmental Protection Agency, Region 4 Announces First Five-Year Review for The Illinois Central Railroad Company's Johnston Yard Site, Memphis, Shelby County, Tennessee

Purpose/Objective: The EPA is conducting a Five-Year Review of the remedy for the Illinois Central Railroad Company's Johnston Yard site (the Site) in Memphis, Tennessee. The purpose of the Five-Year Review is to make sure the selected cleanup actions effectively protect human health and the environment.

Site Background: The EPA did not list the Site on the National Priorities List (NPL) but considers it an NPL-caliber site and is addressing the Site through the Superfund Alternative Approach. The 288-acre site includes an active rail yard, a locomotive fueling and servicing center and a freight car repair facility. Since 1910, an active rail yard since has operated at the Site. An intermodal facility transferring freight from trains to trucks operated on site until 2006. Site investigations found contamination in groundwater and soil in limited areas at the Site. Contamination resulted from prior operations at the Site. Contaminants of concern include diesel fuel and related constituents, and also arsenic and lead.

Cleanup Actions: EPA selected a cleanup method for the Site in 2010. The cleanup method includes periodic pumping to remove old diesel from below ground with proper offsite disposal. Once the diesel pumping is complete, enhanced bioremediation will be used as needed to address any remaining groundwater contamination. Long term monitoring of groundwater is ongoing. Deed restrictions are in place on the Site so that only commercial or industrial uses are permitted and to prevent the potential future use of groundwater at the Site until cleanup goals are met. The potentially responsible party performs the work with oversight by EPA and the State of Tennessee.

Five-Year Review Schedule: The National Contingency Plan requires review of remedial actions that result in any hazardous substances, pollutants or contaminants remaining at the Site above levels that allow for unlimited use and unrestricted exposure every five years to ensure the protection of human health and the environment. The first of the Five-Year Reviews for the Site should be completed by May 2017. The completed five year review report will then be available at the library noted below.

EPA Invites Community Participation in the Five-Year Review Process: The EPA is conducting this Five-Year Review to evaluate the effectiveness of the Site's remedy and to ensure that the remedy remains protective of human health and the environment. As part of the Five-Year Review process, EPA staff is available to answer any questions about the Site. Community members who have questions about the Site or the Five-Year Review process, or who would like to participate in a community interview, are asked to contact:

Randy Bryant, EPA Remedial Project Manager
Coordinator

Phone: (404) 562-8794

Email: bryant.randy@epa.gov

Kyle Bryant, EPA Community Involvement

Phone: (404) 562-9073

Email: bryant.kyle@epa.gov

Mailing Address: U.S. EPA Region 4, 61 Forsyth Street, S.W., 11th Floor, Atlanta, GA 30303-8960

Additional information is available at the Site's local document repository, located at Memphis Shelby County Public Library (Levi Branch), 3676 South Third Street, Memphis, TN 38109 and online at:

www.epa.gov/superfund/illinois-central-railroad.

APPENDIX G – SITE INSPECTION PHOTOS



Signage at entrance of the Site.



Fuel tank in area of old fuel spill plume with locomotive laundry on left.



Railroad yard near car shop.



Flush mounted wells with bollards in free product plume area.



Flush mounted well with trains in background.



Vicinity of smaller plume area behind locomotive repair center.



Locomotive in front of locomotive repair center.



Former round house area with wheel turning shop in background.

APPENDIX H – DETAILED ARARs REVIEW TABLES

This FYR included a review of relevant site-related documents, including the ROD and recent monitoring data. Appendix A provides a complete list of the documents reviewed.

Groundwater ARARs

The 2010 ROD identified Tennessee General Water Quality Criteria as chemical-specific ARARs for arsenic, lead and benzo(a)pyrene, as well as Federal Primary Drinking Water Standards for arsenic and benzo(a)pyrene (i.e. state and federal ARARs were the same for these two COCs). For PSH, the ROD identified the Requirements for Free Product Management Technical Guidance Document No. 004 produced by Tennessee’s Division of Underground Storage Tanks. None of these ARARs have changed and they remain valid and applicable to the site cleanup. See Table H-1 for reference.

Table H-1: Groundwater ARARs Review

Contaminant	Cleanup Level Selected in 2010 ROD	2016 Cleanup Standard ^{d,e}	Change
Arsenic	0.01 mg/L ^a	0.01 mg/L ^{d,e}	None
Lead	0.005 mg/L ^b	0.005 mg/L ^d	None
Benzo(a)pyrene	0.0002 mg/L ^a	0.0002 mg/L ^{d,e}	None
PSH	Attempt removal if PSH thickness greater than 0.01 feet in a well. ^c	Attempt removal if PSH thickness greater than 0.01 feet in a well. ^f	None

a. Tennessee General Water Quality Criteria (also Federal Primary Drinking Water Standard).
 b. Tennessee General Water Quality Criteria.
 c. State of Tennessee Division of Underground Storage Tanks’ Technical Guidance Document No. 004, “Requirements for Free Product Management.”
 d. Rules of The Tennessee Department of Environment and Conservation Chapter 0400-40-03 General Water Quality Criteria (<https://www.epa.gov/sites/production/files/2014-12/documents/tn-chapter1200-4-3.pdf>; accessed December 2, 2016).
 e. National Primary Drinking Water Regulations (<https://www.epa.gov/ground-water-and-drinking-water/table-regulated-drinking-water-contaminants>; accessed December 2, 2016).
 f. State of Tennessee Department of Environment and Conservation Division of Underground Storage Tanks Technical Guidance Document - 004 Effective Date - November 1, 2007 (https://tn.gov/assets/entities/environment/attachments/ust_guidance_tgd-004.pdf; accessed December 2, 2016).
 mg/L = milligrams per liter

APPENDIX I – PERFORMANCE MONITORING DATA

Figure I-1: Total PSH Recovery and Total Fluids Recovery, 2008-2016

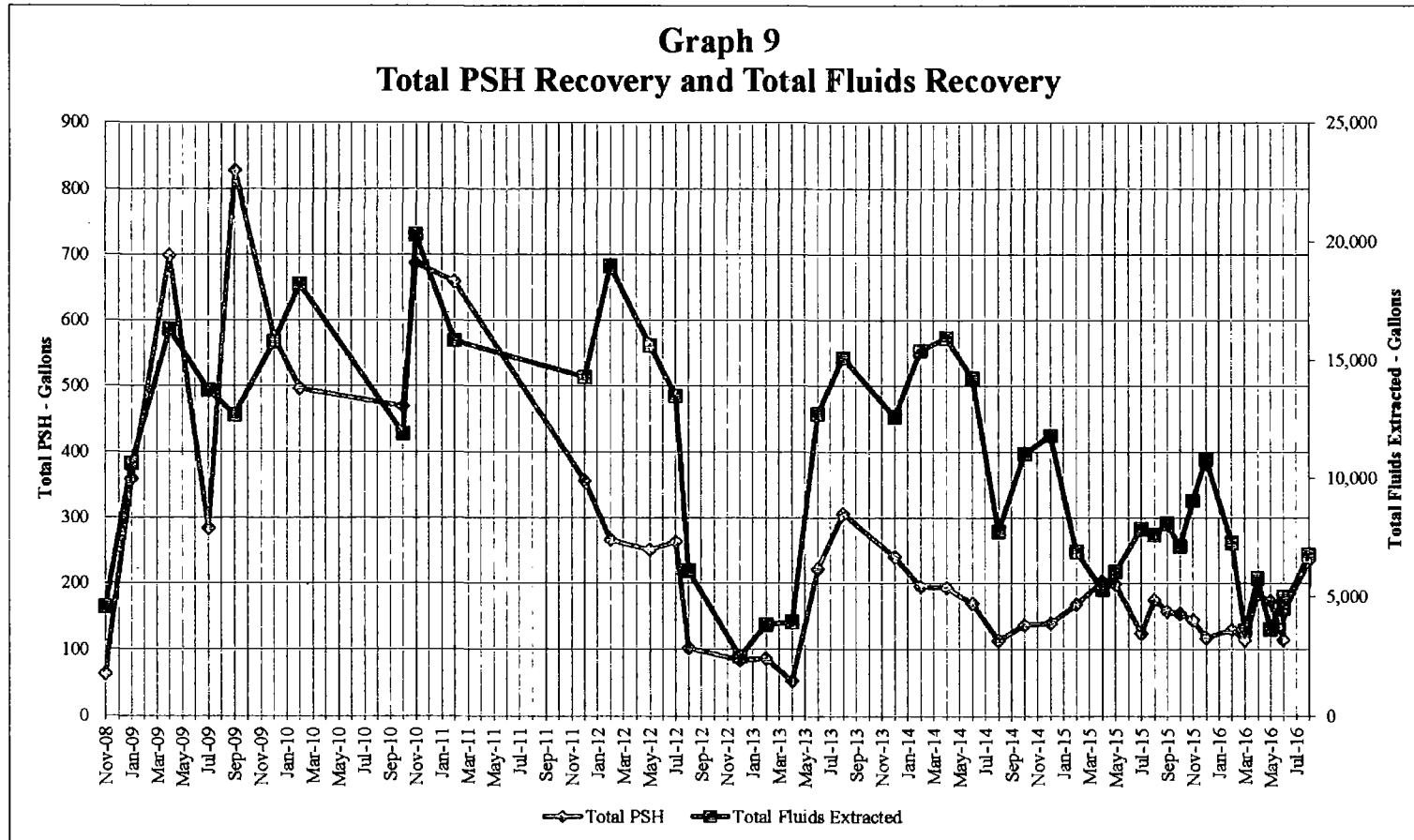
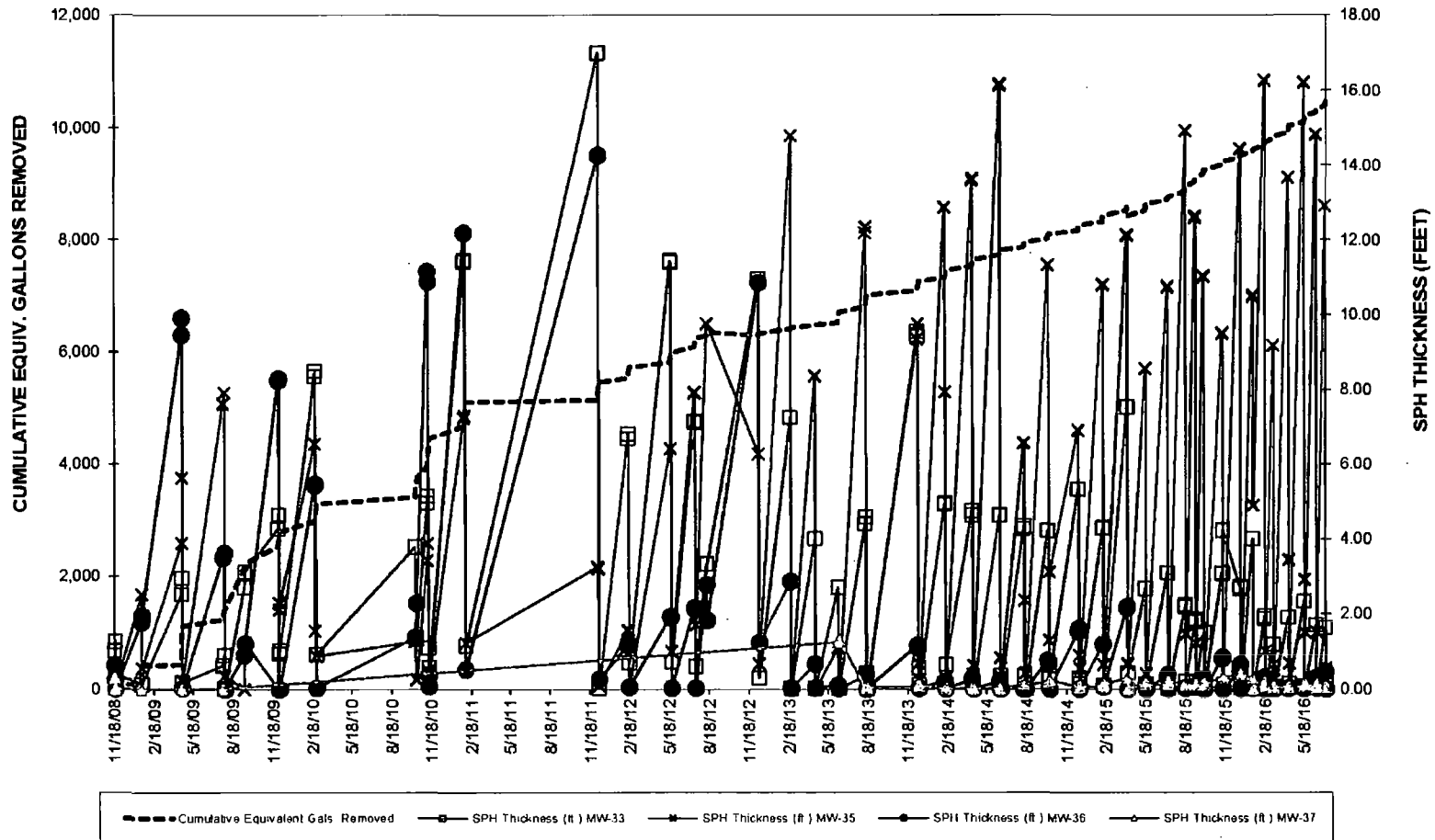


Figure I-2: Cumulative PSH (referred to as SPH in figure) Thickness Measurements for Wells MW-33, MW-35, MW-36 and MW-37 in the Fluvial Aquifer, 2008-2016

**CUMULATIVE EFR® GRAPH
FLUVIAL AQUIFER**
CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

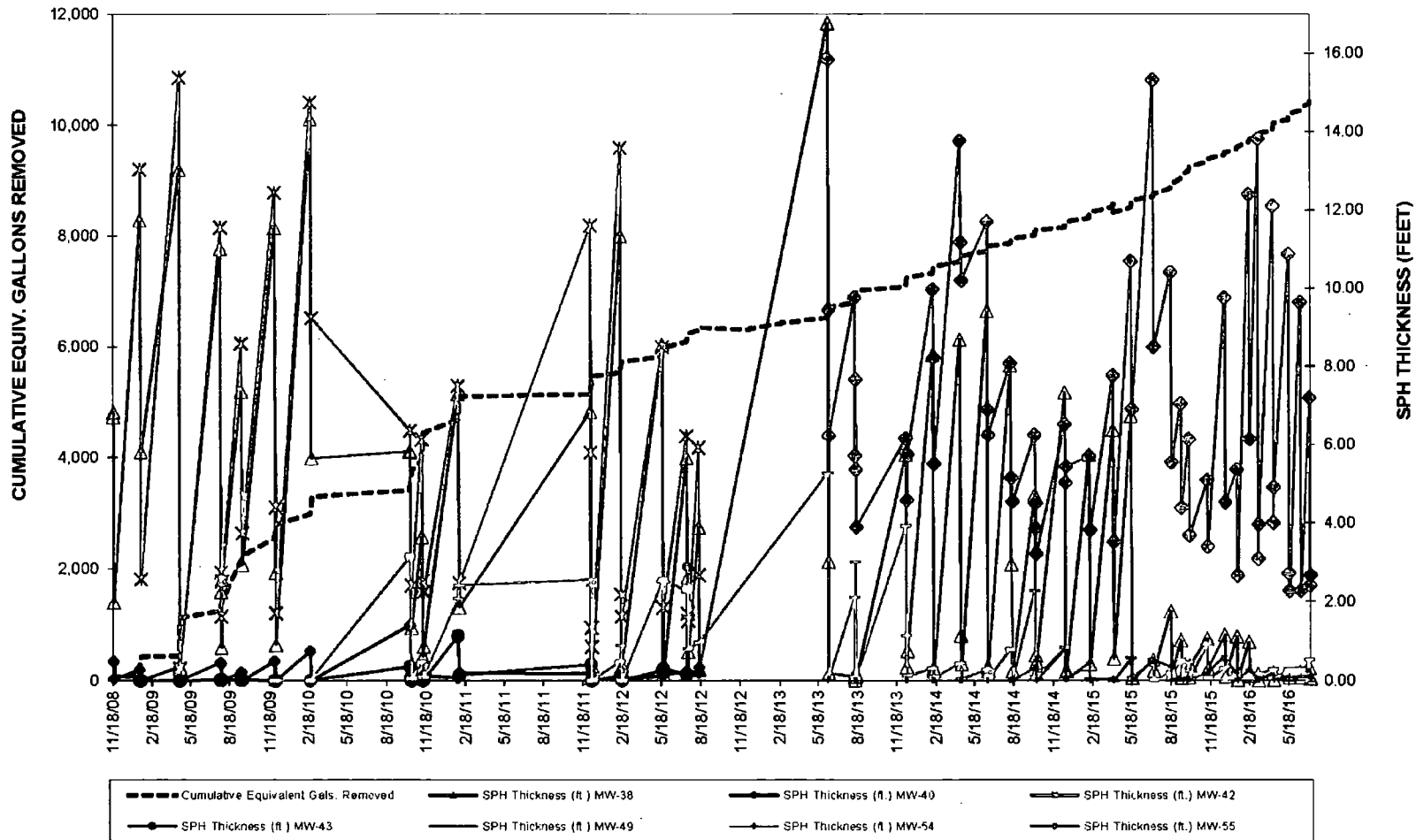


Last Update: 7/14/2016

Figure I-3: Cumulative PSH (referred to as SPH in figure) Thickness Measurements for Wells MW-38, MW-40, MW-42, MW-43, MW-49, MW-54 and MW-55 in the Fluvial Aquifer, 2008-2016

**CUMULATIVE EFR® GRAPH
FLUVIAL AQUIFER**

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee



Last Update: 7/14/2016

Table I-1: Phase Separated Hydrocarbon (PSH; referred to as SPH in table) Thickness Measurements, 2008-2016

CUMULATIVE DATA TABLE

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

	11/18/08	11/19/08	11/20/08	11/21/08	1/19/09	1/20/09	1/21/09	1/22/09	1/23/09	4/21/09	4/22/09	4/23/09	4/24/09
Event No.	1	2	3	4	5	6	7	8	9	10	11	12	13
Event Duration (hours)	10	12	12	6	8	8	8	8	7.5	8	11	13	8.0
SPH Thickness (ft.) MW-7		0.33	0.36	0.11		0.00					0.04	0.04	0.00
SPH Thickness (ft.) MW-13	1.08	0.25		0.42	0.42			0.27		0.35			0.00
SPH Thickness (ft.) MW-33		1.01	1.27	0.37		0.15	0.14				2.54	2.86	0.18
SPH Thickness (ft.) MW-35		0.00	0.00	0.00		2.53	0.56				3.90	5.64	0.22
SPH Thickness (ft.) MW-36		0.63	0.25	0.01		1.79	1.97				9.46	9.92	0.03
SPH Thickness (ft.) MW-37		0.30	0.00	0.00		0.00					0.00		
SPH Thickness (ft.) MW-38		6.70	6.82	1.97		11.73			5.80		13.02	0.36	0.31
SPH Thickness (ft.) MW-40			0.48	0.03		0.28			0.00		0.34	0.00	0.00
SPH Thickness (ft.) MW-42						13.04			2.56		15.38	0.31	0.28
SPH Thickness (ft.) MW-43						0.00			0.00		0.00	0.00	0.00
SPH Thickness (ft.) MW-44													
SPH Thickness (ft.) MW-46													
SPH Thickness (ft.) MW-49													
SPH Thickness (ft.) MW-54													
SPH Thickness (ft.) MW-55													
SPH Thickness (ft.) RW-1	0.36	0.06		0.04	0.04			0.00		0.00			0.00
Liquid Removed/Event (Gallons)	165	627	3,708	50	148	5,191	252	118	4,933	133	8,731	1,978	5,438
Cumulative Liquid Removed (Gallons)	165	792	4,500	4,550	4,698	9,889	10,141	10,259	15,192	15,325	24,056	26,034	31,472
Pounds Removed/Event	39	14	11	12	13	1.2	27	12	1.1	4.0	1.2	5.1	0.7
Cumulative Pounds Removed	39	53	64	76	89	90	117	129	130	134	135	141	142
Equiv. Gals. of Vapor Removed/Event	5.5	2.0	1.5	1.7	1.8	0.2	3.8	1.7	0.1	0.6	0.2	0.7	0.1
Gals. of SPH in vac truck/Event	19	19	9	5.0	30	135	37	44	105	15	520	138	24
Equiv. Gals. Diesel Fuel Removed/Event	24	21	11	6.7	32	135	41	46	105	16	520	139	24
Cumulative Equivalent Gals. Removed	24	45	56	63	95	230	271	316	421	437	957	1,096	1,120

Not Gauged
Not Installed

CUMULATIVE DATA TABLE

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

	7/27/09	7/28/09	7/29/09	7/30/09	7/31/09	9/14/09	9/15/09	9/16/09	9/17/09	11/30/09	12/1/09	12/2/09	12/3/09	12/4/09
Event No.	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Event Duration (hours)	6.0	10	10	10	4.0	10.5	10.0	10.0	9.5	8.0	8.0	8.0	8.0	8.0
SPH Thickness (ft.) MW-7	0.14			0.14	0.00	0.31		0.27		0.19	0.13		0.02	0.05
SPH Thickness (ft.) MW-13		0.49					0.00					0.40		0.00
SPH Thickness (ft.) MW-33	0.63			0.91	0.01	2.71		3.12		4.28	4.65		0.95	1.01
SPH Thickness (ft.) MW-35	7.62			7.91	0.35	0.00*		1.23		0.00	2.30		2.12	2.28
SPH Thickness (ft.) MW-36	3.49			3.63	0.00	0.91		1.21		8.23	8.29		0.00	0.00
SPH Thickness (ft.) MW-37	0.00													
SPH Thickness (ft.) MW-38	11.01		2.24	0.83	2.55	7.35			2.93	11.54			2.73	0.90
SPH Thickness (ft.) MW-40	0.45		0.42	0.00	0.00	0.21			0.00	0.49			0.00	0.00
SPH Thickness (ft.) MW-42	11.55		2.74	1.62	2.51	8.58			3.73	12.44			4.39	1.70
SPH Thickness (ft.) MW-43	0.02		0.02		0.02	0.02			0.02	0.00			0.00	0.00
SPH Thickness (ft.) MW-44										0.00				0.00
SPH Thickness (ft.) MW-46										0.00				0.00
SPH Thickness (ft.) MW-49										0.00				
SPH Thickness (ft.) MW-54														
SPH Thickness (ft.) MW-55														
SPH Thickness (ft.) RW-1		0.00					0.02					0.00		0.00
Liquid Removed/Event (Gallons)	2,749	329	6,731	1,157	2,749	6,103	496	1,433	4,658	6,924	1,501	496	5,457	1,393
Cumulative Liquid Removed (Gallons)	34,221	34,550	41,281	42,438	45,187	51,290	51,786	53,219	57,877	64,801	66,302	66,798	72,255	73,648
Pounds Removed/Event	0.6	10	1.1	6.5	0.4	1.8	9.4	12	1.8	2.7	48	17	1.5	28
Cumulative Pounds Removed	143	153	154	161	161	163	172	184	186	189	237	254	255	283
Equiv. Gals. of Vapor Removed/Event	0.1	1.4	0.2	0.9	0.1	0.3	1.3	1.7	0.3	0.4	6.8	2.4	0.2	3.9
Gals. of SPH in vac truck/Event	119	10	73	68	12	751	0	0	73	310	81	0	105	54
Equiv. Gals. Diesel Fuel Removed/Event	119	11	73	69	12	751	1.3	1.7	73	310	88	2.4	105	58
Cumulative Equivalent Gals. Removed	1,239	1,250	1,323	1,392	1,404	2,155	2,157	2,159	2,232	2,542	2,630	2,632	2,737	2,795

Not Gauged
Not Installed

Last Update: 7/14/2016

CUMULATIVE DATA TABLE

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

	2/22/10	2/23/10	2/24/10	2/25/10	2/26/10	10/11/10	10/12/10	10/13/10	10/14/10	10/15/10	11/8/10	11/9/10	11/10/10	11/11/10	11/12/10
Event No.	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42
Event Duration (hours)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
SPH Thickness (ft.) MW-7	0.00	0.05			0.03				0.20		0.05	0.08		0.08	0.03
SPH Thickness (ft.) MW-13			0.09		0.00			0.10							0.06
SPH Thickness (ft.) MW-33	8.35	8.49			0.92	3.79			1.35		4.95	5.14		1.10	0.57
SPH Thickness (ft.) MW-35	6.54	1.55			0.88	1.27			0.25		3.42	3.88		0.47	0.28
SPH Thickness (ft.) MW-36	5.43	5.47			0.03	1.38			2.29		11.15	10.87		0.37	0.07
SPH Thickness (ft.) MW-37															
SPH Thickness (ft.) MW-38	14.32			5.64		5.82	5.81			1.32	3.64		0.61		0.86
SPH Thickness (ft.) MW-40	0.74			0.00		1.40	1.39			0.35	0.02		0.13		0.13
SPH Thickness (ft.) MW-42	14.75			9.23			6.35			2.40	6.12		2.52		2.24
SPH Thickness (ft.) MW-43	0.00						0.35	0.04		0.00	0.02		0.00		0.01
SPH Thickness (ft.) MW-44	0.00					0.18	0.22	0.24		0.13	0.00		0.00		0.03
SPH Thickness (ft.) MW-46	0.00					0.19	0.19	0.18		0.03	0.00		0.00		0.00
SPH Thickness (ft.) MW-49	0.00					3.12	3.20			0.05	0.46		0.50		0.08
SPH Thickness (ft.) MW-54															
SPH Thickness (ft.) MW-55															
SPH Thickness (ft.) RW-1			0.00					0.01							0.02
Liquid Removed/Event (Gallons)	2,749	2,184	613	6,610	2,058	1,312	3,790	589	1,447	4,753	5,370	1,636	6,736	1,876	4,666
Cumulative Liquid Removed (Gallons)	73,648	75,832	76,445	83,055	85,113	86,425	90,215	90,804	92,251	97,004	102,374	104,010	110,746	112,622	117,288
Pounds Removed/Event	0.6	14	2.8	1.6	10	63.0	1.6	185	70	1	1.5	94	2.0	51.0	2
Cumulative Pounds Removed	285	300	303	305	315	378	379	564	634	636	637	731	733	784	786
Equiv. Gals. of Vapor Removed/Event	0.1	2.0	0.4	0.2	1.4	8.9	0.2	26	10	0.2	0.2	13	0.3	7.2	0.3
Gals. of SPH in vac truck/Event	182	112	0	136	62	108	182	0	54	80	191	81	204	79	111
Equiv. Gals. Diesel Fuel Removed/Event	182	114	0.4	136	63	117	182	26	64	80	191	94	204	86	111
Cumulative Equivalent Gals. Removed	2,977	3,091	3,091	3,228	3,291	3,407	3,589	3,615	3,679	3,759	3,950	4,044	4,249	4,335	4,446

Not Gauged

Not Installed

Last Update: 7/14/2016

CUMULATIVE DATA TABLE

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

	1/31/11	2/1/11	2/2/11	2/3/11	2/4/11	2/5/11	2/6/11	2/7/11	2/8/11	2/9/11	2/13/12	2/14/12	2/15/12	2/16/12	2/17/12
Event No.	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57
Event Duration (hours)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.5
SPH Thickness (ft.) MW-7	0.12	0.10			0.02		0.12	0.14		0.03	0.09	0.08			
SPH Thickness (ft.) MW-13			0.16			0.00								0.00	
SPH Thickness (ft.) MW-33	11.41	11.45			1.16		16.98	17.00		0.03	6.68	6.80		0.70	
SPH Thickness (ft.) MW-35	7.22	7.29			1.23		3.25	3.21		0.10	1.57	1.57		0.07	
SPH Thickness (ft.) MW-36	12.19	12.19			0.52		14.25	14.27		0.26	1.17	1.23		0.06	
SPH Thickness (ft.) MW-37															
SPH Thickness (ft.) MW-38	7.29			1.85		6.83	0.06		0.17	0.36	11.33		0.26		0.37
SPH Thickness (ft.) MW-40	0.06			0.20			0.17	0.00	0.00	0.00	0.06		0.06		0.00
SPH Thickness (ft.) MW-42	7.49			2.46		11.60	5.79		1.33	0.84	13.58		2.17		1.61
SPH Thickness (ft.) MW-43	1.13			0.14			0.40	0.00		0.00	0.11		0.11		0.00
SPH Thickness (ft.) MW-44	0.13						0.00			0.00	0.00				0.04
SPH Thickness (ft.) MW-46	0.07						0.09	0.00		0.00	0.00				
SPH Thickness (ft.) MW-49	2.07		2.41				2.55		2.41	0.00	0.48		0.88		0.00
SPH Thickness (ft.) MW-54															
SPH Thickness (ft.) MW-55															
SPH Thickness (ft.) RW-1			0.00			0.00								0.00	
Liquid Removed/Event (Gallons)	4,302	1,876	2,720	4,753	1,903	2,720	3,766	2,352	3,085	1,636	5,065	1,744	5,008	1,555	5,596
Cumulative Liquid Removed (Gallons)	121,590	123,466	126,186	130,939	132,842	135,562	139,328	141,680	144,765	146,401	151,466	153,210	158,218	159,773	165,369
Pounds Removed/Event	3.5	28	1.7	1.3	8.4	8.2	2.0	18	3.6	17	3.1	18	2.7	18	1.4
Cumulative Pounds Removed	790	818	819	821	829	837	839	857	861	878	881	899	902	919	921
Equiv. Gals. of Vapor Removed/Event	0.5	3.9	0.2	0.2	1.2	1.2	0.3	2.6	0.5	2.4	0.4	2.5	0.4	2.5	0.2
Gals. of SPH in vac truck/Event	230	110	35	188	90	35	88	112	52	62	69	56	56	45	34
Equiv. Gals. Diesel Fuel Removed/Event	230	114	35	188	91	36	88	115	53	64	69	59	56	47	34
Cumulative Equivalent Gals. Removed	4,676	4,790	4,826	5,014	5,105	5,141	5,229	5,344	5,396	5,461	5,530	5,589	5,645	5,693	5,727

Not Gauged

Not Installed

Last Update: 7/14/2016

CUMULATIVE DATA TABLE

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

	5/21/12	5/22/12	5/23/12	5/24/12	7/16/12	7/17/12	7/18/12	7/19/12	7/20/12	8/13/12	8/14/12	12/10/12	12/11/12	2/21/13	2/22/13
Event No.	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72
Event Duration (hours)	10	10	10	10	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
SPH Thickness (ft.) MW-7	0.20	0.20		0.03	0.09	0.10		0.08				0.35	0.04	0.16	0.00
SPH Thickness (ft.) MW-13															
SPH Thickness (ft.) MW-33	11.44	11.40		0.73	7.14	7.13		0.61		3.34	3.33	10.95	0.30	7.25	0.03
SPH Thickness (ft.) MW-35	6.41	6.42		1.00	7.90	7.92		1.71		9.76	9.75	6.27	0.67	14.79	0.00
SPH Thickness (ft.) MW-38	1.93	1.91		0.03	2.16	2.13		0.03		2.78	1.83	10.85	1.24	2.87	0.03
SPH Thickness (ft.) MW-37															
SPH Thickness (ft.) MW-38	8.54		0.16		5.65		2.61		0.72	3.88	0.27				
SPH Thickness (ft.) MW-40	0.13		0.14		0.24		2.88		0.19	0.20	0.33				
SPH Thickness (ft.) MW-42	8.48		1.84		6.21		1.69		1.50	5.91	2.67				
SPH Thickness (ft.) MW-43	0.25		0.30		0.15										
SPH Thickness (ft.) MW-44	0.24		0.23		0.11										
SPH Thickness (ft.) MW-46	0.65		0.88	1.00	1.46										
SPH Thickness (ft.) MW-49	2.50		2.57		2.25		2.36		0.80	0.96	0.96				
SPH Thickness (ft.) MW-54															
SPH Thickness (ft.) MW-55															
SPH Thickness (ft.) RW-1			0.00		0.00		0.00								
Liquid Removed/Event (Gallons)	5,583	1,876	6,635	1,876	4,238	1,447	3,149	1,501	3,145	3,141	2,945	1,231	1,258	1,974	1,846
Cumulative Liquid Removed (Gallons)	170,952	172,828	179,463	181,339	185,577	187,024	190,173	191,674	194,819	197,960	200,905	202,136	203,394	205,368	207,214
Pounds Removed/Event	1.7	24	1.3	14	6.6	38	5.1	41	7.1	6.6	8.7	32	21	21	8.3
Cumulative Pounds Removed	922	946	948	962	968	1,006	1,011	1,052	1,059	1,065	1,074	1,091	1,111	1,132	1,141
Equiv. Gals. of Vapor Removed/Event	0.2	3.4	0.2	2.0	0.9	5.3	0.7	5.7	1.0	0.9	1.2	4.5	2.9	3.0	1.2
Gals. of SPH in vac truck/Event	88	79	52	26	110	42	48	18	32	48	52	55	22	66	16
Equiv. Gals. Diesel Fuel Removed/Event	88	82	52	28	111	47	49	24	33	49	53	60	25	69	17
Cumulative Equivalent Gals. Removed	5,816	5,898	5,951	5,979	6,089	6,137	6,185	6,209	6,242	6,291	6,344	6,302	6,327	6,413	6,430

Not Gauged
Not Installed
Well Inaccessible
Wells removed

Last Update: 7/14/2016

CUMULATIVE DATA TABLE

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

	4/18/13	4/19/13	6/10/13	6/11/13	6/12/13	6/13/13	8/12/13	8/13/13	8/14/13	8/15/13	8/16/13
Event No.	73	74	75	76	77	78	79	80	81	82	83
Event Duration (hours)	8.0	8.0	10	10	10	10	8	8	8	10	6
SPH Thickness (ft.) MW-7	0.10	0.00	0.03		0.03		0.25	0.24		0.02	0.04
SPH Thickness (ft.) MW-13											
SPH Thickness (ft.) MW-33	4.01	0.03	2.71		0.02		4.40	4.58		0.43	0.01
SPH Thickness (ft.) MW-35	8.36	0.00	1.10		0.03		12.19	12.34		0.22	0.08
SPH Thickness (ft.) MW-36	0.67	0.03	0.10		0.02		0.34	0.40		0.00	0.03
SPH Thickness (ft.) MW-37			1.25		1.33		0.02	0.04		0.04	0.02
SPH Thickness (ft.) MW-38			16.77	16.76	3.01	0.18	0.09	0.02	0.20	0.10	0.10
SPH Thickness (ft.) MW-40											
SPH Thickness (ft.) MW-42											
SPH Thickness (ft.) MW-43											
SPH Thickness (ft.) MW-44			0.35	0.34	0.31	0.06	0.20	0.10	0.11	0.00	0.05
SPH Thickness (ft.) MW-46							0.02	0.02	0.01	0.00	0.00
SPH Thickness (ft.) MW-49			5.27	5.26	0.01		2.10	0.08	3.00	0.06	0.08
SPH Thickness (ft.) MW-54			0.00	0.00			0.00	0.00		0.00	0.00
SPH Thickness (ft.) MW-55			15.86	15.84	9.44	6.22	9.76	5.71	7.66	5.35	3.88
SPH Thickness (ft.) RW-1											
Liquid Removed/Event (Gallons)	1,750	2,203	2,687	5,514	1,759	2,765	5,514	1,649	2,719	2,498	2,719
Cumulative Liquid Removed (Gallons)	208,964	211,167	213,854	219,368	221,127	223,892	229,406	231,055	233,774	236,272	238,991
Pounds Removed/Event	17	8.3	26	12	40	82	3.6	32	65	24	3.6
Cumulative Pounds Removed	1,158	1,166	1,192	1,204	1,244	1,326	1,330	1,362	1,427	1,451	1,454
Equiv. Gals. of Vapor Removed/Event	2.4	1.2	3.7	1.7	5.6	12	0.5	4.4	9.1	3.4	0.5
Gals. of SPH in vac truck/Event	34	16	28	117	36	18	98	48	68	42	32
Equiv. Gals. Diesel Fuel Removed/Event	36	17	32	119	42	30	99	52	77	45	33
Cumulative Equivalent Gals. Removed	6,467	6,484	6,516	6,634	6,676	6,706	6,804	6,856	6,933	6,978	7,011

Not Gauged
Not Installed
Well Inaccessible
Wells removed

Last Update: 7/14/2016

CUMULATIVE DATA TABLE

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

	12/9/13	12/10/13	12/11/13	12/12/13	12/13/13	2/10/14	2/11/14	2/12/14	2/13/14	4/14/14	4/15/14	4/16/14	4/17/14	4/18/14
Event No.	84	85	86	87	88	89	90	91	92	93	94	95	96	97
Event Duration (hours)	8.0	8.0	8.0	8.0	8.0	10	10	10	10	9.0	9.0	8.0	8.0	6.0
SPH Thickness (ft.) MW-7	0.25	0.21		0.08	0.03	0.19	0.20		0.00	0.10	0.09			0.01
SPH Thickness (ft.) MW-13														
SPH Thickness (ft.) MW-33	9.54	9.42		0.56	0.11	4.92	4.95		0.66	4.75	4.64		0.12	0.08
SPH Thickness (ft.) MW-35	9.34	9.75		0.69	0.25	12.86	7.92		0.30	13.58	13.64		0.39	0.82
SPH Thickness (ft.) MW-36	1.16	1.09		0.03	0.02	0.20	0.21		0.00	0.25	0.29		0.01	0.00
SPH Thickness (ft.) MW-37	0.06				0.07	0.00			0.00	0.00				0.00
SPH Thickness (ft.) MW-38	5.74		0.34		0.75	8.30		0.31	0.25			1.13		0.41
SPH Thickness (ft.) MW-40														
SPH Thickness (ft.) MW-42														
SPH Thickness (ft.) MW-43														
SPH Thickness (ft.) MW-44	0.18		0.10		0.00	0.04		0.03	0.00	0.06		0.07		0.00
SPH Thickness (ft.) MW-46														
SPH Thickness (ft.) MW-49	3.92		1.13		0.11	0.31		0.08	0.07	0.43		0.44		0.03
SPH Thickness (ft.) MW-54	0.00				0.00	0.00			0.00	0.00				0.00
SPH Thickness (ft.) MW-55	6.15		5.78	4.57	5.73	9.96		8.21	5.50	13.76		11.17		10.19
SPH Thickness (ft.) RW-1														
Liquid Removed/Event (Gallons)	4,953	1,447	2,550	1,231	1,929	7,325	1,420	3,685	2,720	5,451	1,609	6,097	836	1,929
Cumulative Liquid Removed (Gallons)	243,944	245,391	247,941	249,172	251,101	258,426	259,846	263,531	266,251	271,702	273,311	279,408	280,244	282,173
Pounds Removed/Event	11	27	5.6	19	2.8	14	28	18	13	14	31	12	16	8.4
Cumulative Pounds Removed	1,465	1,492	1,498	1,517	1,520	1,534	1,562	1,580	1,593	1,607	1,638	1,650	1,666	1,674
Equiv. Gals. of Vapor Removed/Event	1.5	3.8	0.8	2.7	0.4	2.0	4.0	2.5	1.9	2.0	4.4	1.6	2.3	1.2
Gals. of SPH in vac truck/Event	74	39	54	24	40	72	27	57	28	84	10	67	5	18
Equiv. Gals. Diesel Fuel Removed/Event	76	43	55	27	40	74	31	60	30	86	14	69	7.3	17
Cumulative Equivalent Gals. Removed	7,086	7,129	7,184	7,211	7,251	7,325	7,356	7,416	7,446	7,531	7,546	7,614	7,622	7,639

Not Gauged

Wells removed

Last Update: 7/14/2016

CUMULATIVE DATA TABLE

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

	6/17/14	6/18/14	6/19/14	6/20/14	8/11/14	8/12/14	8/13/14	8/14/14	8/16/14	10/6/14	10/7/14	10/8/14	10/9/14	10/10/14
Event No.	98	99	100	101	102	103	104	105	106	107	108	109	110	111
Event Duration (hours)	12.0	12.0	10.0	6.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
SPH Thickness (ft.) MW-7	0.12	0.12		0.01	0.10	0.09		0.04	0.00	0.20	0.18		0.02	0.02
SPH Thickness (ft.) MW-13														
SPH Thickness (ft.) MW-33	4.62	4.63	0.35	0.04	4.28	4.34		0.36	0.00	4.22	4.23		0.28	0.35
SPH Thickness (ft.) MW-35	16.12	16.17	0.83	0.30	6.56	6.56		2.36	0.42	11.32	11.34		1.30	3.12
SPH Thickness (ft.) MW-36	0.20	0.22	0.00	0.00	0.00	0.00		0.00	0.00	0.76	0.70		0.02	0.00
SPH Thickness (ft.) MW-37	0.00				0.13					0.16				0.24
SPH Thickness (ft.) MW-38	9.41		0.34	0.25	8.02		2.94		0.24	4.71		0.63	0.18	0.46
SPH Thickness (ft.) MW-40														
SPH Thickness (ft.) MW-42														
SPH Thickness (ft.) MW-43														
SPH Thickness (ft.) MW-44	0.00			0.00	0.00		0.22		0.00	0.00				0.00
SPH Thickness (ft.) MW-46														
SPH Thickness (ft.) MW-49	0.28		0.08	0.04	0.79		0.80		0.04	2.27		0.05	0.09	0.10
SPH Thickness (ft.) MW-54	0.00			0.00	0.00				0.00	0.32		0.34		0.00
SPH Thickness (ft.) MW-55	11.70		6.89	6.24	8.07		5.14		4.54	6.24		4.50	3.85	3.21
SPH Thickness (ft.) RW-1														
Liquid Removed/Event (Gallons)	5,522	1,824	3,024	1,876	2,736	1,113	2,736	1,168	2,322	4,539	965	2,736	2,784	1,876
Cumulative Liquid Removed (Gallons)	287,695	289,519	292,543	294,419	297,155	298,268	301,004	302,172	304,494	309,033	309,998	312,734	315,518	317,394
Pounds Removed/Event	23	40	12	6.7	12	11	6.3	7.1	8.8	1.9	15.0	2.9	2.1	3.9
Cumulative Pounds Removed	1,697	1,736	1,748	1,755	1,766	1,777	1,783	1,790	1,799	1,801	1,816	1,819	1,821	1,825
Equiv. Gals. of Vapor Removed/Event	3.2	5.6	1.6	0.9	1.6	1.5	0.9	1.0	1.2	0.3	2.1	0.4	0.3	0.6
Gals. of SPH in vac truck/Event	83	15	45	16	52	20	25	12	24	64	42	16	12	14
Equiv. Gals. Diesel Fuel Removed/Event	86	21	47	17	54	21	26	13	25	64	44	16	12	15
Cumulative Equivalent Gals. Removed	7,725	7,746	7,792	7,809	7,863	7,884	7,910	7,923	7,948	8,013	8,057	8,073	8,086	8,100

Not Gauged

Wells removed

Last Update: 7/14/2016

CUMULATIVE DATA TABLE

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

	12/15/14	12/16/14	12/17/14	12/18/14	12/19/14	2/10/15	2/11/15	2/12/15	4/8/15	4/7/15	4/8/15	5/18/15	5/19/15	5/20/15
Event No.	112	113	114	115	116	117	118	119	120	121	122	123	124	125
Event Duration (hours)	8.0	8.0	8.0	8.0	8.0	7.0	8.0	9.0	8.0	8.0	8.0	8.0	8.0	8.0
SPH Thickness (ft.) MW-7	0.18	0.18		0.02	0.02	0.16	0.15	0.02	0.00	0.00	0.02	0.02	0.02	0.00
SPH Thickness (ft.) MW-13														
SPH Thickness (ft.) MW-33	5.33	5.33		0.30	0.15	4.29	4.30	0.10	7.52	7.52	0.43	2.67	2.67	0.14
SPH Thickness (ft.) MW-35	6.91	6.89		0.90	0.55	10.78	10.80	0.65	12.13	12.11	0.67	8.55	8.55	0.40
SPH Thickness (ft.) MW-36	1.54	1.61		0.00	0.02	1.19	1.19	0.06	2.16	2.19	0.00	0.08	0.08	0.00
SPH Thickness (ft.) MW-37	0.05				0.05	0.07		0.12	0.29		0.00	0.12		0.12
SPH Thickness (ft.) MW-38	7.33		0.22		0.24	5.73		0.41	6.36		0.55	6.72		0.06
SPH Thickness (ft.) MW-40														
SPH Thickness (ft.) MW-42														
SPH Thickness (ft.) MW-43														
SPH Thickness (ft.) MW-44	0.00				0.00	0.00		0.00	0.07		0.00	0.00		0.00
SPH Thickness (ft.) MW-48														
SPH Thickness (ft.) MW-49	0.83		0.08		0.08	0.33		0.04	0.00		0.00	0.57		0.05
SPH Thickness (ft.) MW-54	0.78		0.03		0.04	0.45		0.02	0.05		0.00	0.51		0.00
SPH Thickness (ft.) MW-55	6.51		5.02		5.43	5.70		3.81	7.76		3.51	10.68		6.90
SPH Thickness (ft.) RW-1														
Liquid Removed/Event (Gallons)	4,488	1,339	3,272	519	2,184	4,059	619	2,228	3,202	844	1,250	3,685	589	1,770
Cumulative Liquid Removed (Gallons)	321,882	323,221	326,493	327,012	329,196	333,255	333,874	336,102	339,304	340,148	335,124	339,787	339,893	341,918
Pounds Removed/Event	1.4	19	1.8	12	2.0	2.8	23	3.1	5.7	22	3.9	2.1	11	2.1
Cumulative Pounds Removed	1,826	1,845	1,847	1,859	1,861	1,864	1,887	1,890	1,896	1,918	1,891	1,892	1,907	1,920
Equiv. Gals. of Vapor Removed/Event	0.2	2.7	0.3	1.7	0.3	0.4	3.2	0.4	0.8	3.1	0.5	0.3	1.6	0.3
Gals. of SPH in vac truck/Event	56	52	22	5	16	62	55	47	95	58	45	87	48	62
Equiv. Gals. Diesel Fuel Removed/Event	56	55	22	6.7	16	62	58	47	96	61	46	87	50	62
Cumulative Equivalent Gals. Removed	8,156	8,211	8,233	8,240	8,256	8,319	8,377	8,424	8,520	8,581	8,422	8,512	8,570	8,644

Not Gauged

Wells removed

Last Update: 7/14/2018

CUMULATIVE DATA TABLE

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

	7/8/15	7/9/15	7/10/15	8/18/15	8/19/15	8/20/15	9/10/15	9/11/15	9/12/15	9/29/15	9/30/15	10/1/15
Event No.	126	127	128	129	130	131	132	133	134	135	136	137
Event Duration (hours)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
SPH Thickness (ft.) MW-7	0.11	0.12	0.00	0.09	0.10	0.02	0.29	0.28	0.01	0.14	0.15	0.02
SPH Thickness (ft.) MW-13												
SPH Thickness (ft.) MW-33	3.09	3.09	0.03	2.20	2.24	0.21	1.80	1.85	0.18	1.50	1.50	0.06
SPH Thickness (ft.) MW-35	10.73	10.76	0.07	14.92	14.91	1.47	12.58	12.63	1.22	11.03	11.01	0.31
SPH Thickness (ft.) MW-36	0.34	0.38	0.01	0.02	0.03	0.02	0.07	0.05	0.09	0.25	0.25	0.00
SPH Thickness (ft.) MW-37	0.12		0.18	0.13		0.11	0.10		0.11	0.10		0.15
SPH Thickness (ft.) MW-38	0.52		0.25	1.74		0.14	1.01		0.06	0.07		0.38
SPH Thickness (ft.) MW-40												
SPH Thickness (ft.) MW-42												
SPH Thickness (ft.) MW-43												
SPH Thickness (ft.) MW-44	0.03		0.03	0.07		0.09	0.15		0.02	0.00		0.01
SPH Thickness (ft.) MW-46												
SPH Thickness (ft.) MW-49	0.52		0.00	0.22		0.13	0.53		0.05	0.46		0.05
SPH Thickness (ft.) MW-54	0.51		0.50	0.35		0.03	0.04		0.04	0.03		0.03
SPH Thickness (ft.) MW-55	15.32		8.49	10.40		5.54	7.04		4.38	6.12		3.67
SPH Thickness (ft.) RW-1												
Liquid Removed/Event (Gallons)	4,167	1,339	3,272	4,821	566	2,233	4,854	760	2,465	3,738	1,018	2,465
Cumulative Liquid Removed (Gallons)	348,085	347,424	350,696	355,517	356,083	358,316	363,170	363,930	366,395	370,133	371,151	373,616
Pounds Removed/Event	2.3	14	1.8	2.1	11	2.5	4.4	9.0	1.9	1.8	11	1.7
Cumulative Pounds Removed	1,922	1,936	1,938	1,940	1,951	1,953	1,958	1,967	1,969	1,970	1,982	1,984
Equiv. Gals. of Vapor Removed/Event	0.3	2.0	0.3	0.3	1.6	0.3	0.6	1.3	0.3	0.3	1.6	0.8
Gals. of SPH in vac truck/Event	58	52	22	95	62	16	97	37	22	82	35	35
Equiv. Gals. Diesel Fuel Removed/Event	58	32	22	95	64	16	98	38	22	82	37	36
Cumulative Equivalent Gals. Removed	8,702	8,734	8,756	8,851	8,915	8,931	9,029	9,067	9,089	9,172	9,208	9,244

Not Gauged

Wells removed

Last Update: 7/14/2016

CUMULATIVE DATA TABLE

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

	11/10/15	11/11/15	11/12/15	12/21/15	12/22/15	12/23/15	1/19/16	1/20/16	1/21/16	2/16/16	2/17/16	2/18/16	3/8/16	3/9/16	3/10/16
Event No.	138	139	140	141	142	143	144	145	146	147	148	149	150	151	152
Event Duration (hours)	8.0	8.0	8.0	10	9.0	5.0	8.0	10.0	6.0	8.0	8.0	8.0	8.0	8.0	8.0
SPH Thickness (ft.) MW-7	0.08	0.07	0.00	0.01		0.01	0.00		0.00	0.05	0.03	0.02	0.10		0.03
SPH Thickness (ft.) MW-13															
SPH Thickness (ft.) MW-33	3.09	3.07	4.23	2.68	2.72	0.04	4.00	3.99	0.00	1.87	1.94	0.03	1.19		0.08
SPH Thickness (ft.) MW-35	9.48	9.51	0.15	14.43	14.42	0.32	10.46	10.52	4.89	16.27	16.24	1.01	9.17	0.65	0.50
SPH Thickness (ft.) MW-36	0.81	0.84	0.00	0.49	0.65	0.01	0.02	0.02	0.02	0.29	0.31	0.00	0.00		0.00
SPH Thickness (ft.) MW-37	0.28		0.32	0.37		0.38	0.28		0.00	0.16		0.08	0.04		0.04
SPH Thickness (ft.) MW-38	1.05		0.29	1.15		0.10	1.11		0.02	0.97		0.12	0.16		.25
SPH Thickness (ft.) MW-40															
SPH Thickness (ft.) MW-42															
SPH Thickness (ft.) MW-43															
SPH Thickness (ft.) MW-44	0.00		0.00	0.01		0.00	0.00		0.00	0.00		0.00	0.00		0.00
SPH Thickness (ft.) MW-46															
SPH Thickness (ft.) MW-49	0.92		0.04	0.32		0.03	0.20		0.09	0.09		0.12	0.16		0.17
SPH Thickness (ft.) MW-54	0.18		0.21	0.62		0.50	0.18		0.00	0.26		0.25	0.02		0.02
SPH Thickness (ft.) MW-55	5.08		3.39	9.75		4.52	5.35		2.65	12.39		6.13	13.81	3.08	3.95
SPH Thickness (ft.) RW-1															
Liquid Removed/Event (Gallons)	5,457	1,420	2,184	7,243	1,393	1,863	4,632	1,421	1,868	3,781	1,420	2,058	1,231	1,070	1,285
Cumulative Liquid Removed (Gallons)	379,073	380,493	382,677	389,920	391,313	392,976	397,608	399,029	400,897	404,678	406,098	408,156	409,387	410,457	411,742
Pounds Removed/Event	2.7	15	1.8	2.7	19	1.1	3.7	19	5.0	1.7	14	1.5	7.2	1.4	1.3
Cumulative Pounds Removed	1,986	2,001	2,003	2,006	2,025	2,026	2,029	2,048	2,053	2,055	2,069	2,071	2,078	2,079	2,080
Equiv. Gals. of Vapor Removed/Event	0.4	2.1	0.3	0.4	2.7	0.2	0.5	2.7	0.7	0.2	2.0	0.2	1.0	0.2	0.2
Gals. of SPH in vac truck/Event	87	30	25	72	32	10	56	24	14	78	25	25	64	19	29
Equiv. Gals. Diesel Fuel Removed/Event	87	32	25	72	35	10	57	27	15	78	27	25	65	19	29
Cumulative Equivalent Gals. Removed	9,332	9,364	9,389	9,461	9,496	9,506	9,563	9,589	9,604	9,682	9,709	9,734	9,799	9,819	9,848

Not Gauged

Wells removed

Last Update: 7/14/2016

CUMULATIVE DATA TABLE

CN Harrison Yard
2921 Horn Lake Road
Memphis, Tennessee

	4/12/16	4/13/16	4/14/16	5/18/16	5/19/16	5/20/16	6/14/16	6/15/16	6/16/16	7/6/16	7/7/16	7/8/16
Event No	153	154	155	156	157	158	159	160	161	162	163	164
Event Duration (hours)	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
SPH Thickness (ft.) MW-7	0.01		0.02	0.08		0.07	0.09		0.07	0.06		0.02
SPH Thickness (ft.) MW-13												
SPH Thickness (ft.) MW-33	1.91		0.15	2.33	0.08	0.05	1.70		0.05	1.63		0.22
SPH Thickness (ft.) MW-35	13.66	3.44	0.68	16.20	2.91	1.51	14.81	0.50	1.51	12.90	0.56	0.44
SPH Thickness (ft.) MW-36	0.01		0.03	0.01		0.02	0.29		0.02	0.46		0.00
SPH Thickness (ft.) MW-37	0.04		0.04	0.08		0.11	0.03		0.11	0.04		0.04
SPH Thickness (ft.) MW-38	0.20		0.02	0.14		0.07	0.22		0.07	0.30		0.05
SPH Thickness (ft.) MW-40												
SPH Thickness (ft.) MW-42												
SPH Thickness (ft.) MW-43												
SPH Thickness (ft.) MW-44	0.00		0.00	0.00		0.00	0.00		0.00	0.01		0.00
SPH Thickness (ft.) MW-46	0.00		0.00	0.00		0.00	0.00		0.00	0.03		0.03
SPH Thickness (ft.) MW-49	0.27		0.03	0.27		0.16	0.30		0.16	0.52		0.00
SPH Thickness (ft.) MW-54	0.12		0.02	0.08		0.11	0.07		0.11	0.09		0.05
SPH Thickness (ft.) MW-55	12.10	4.00	4.90	10.87	2.71	2.27	9.63	3.65	2.27	7.19	2.40	2.66
SPH Thickness (ft.) RW-1												
Liquid Removed/Event (Gallons)	1,609	1,981	2,184	1,338	616	1,677	1,150	2,184	1,663	1,124	1,690	1,717
Cumulative Liquid Removed (Gallons)	413,351	415,332	417,516	418,854	419,470	421,147	422,297	424,481	426,144	427,268	#####	430,675
Pounds Removed/Event	5.1	1.6	1.2	5.4	2.0	2.0	2.5	1.3	1.0	2.4	1.6	1.1
Cumulative Pounds Removed	2,086	2,087	2,088	2,094	2,096	2,098	2,100	2,102	2,103	2,105	2,107	2,108
Equiv. Gals. of Vapor Removed/Event	0.7	0.2	0.2	0.8	0.3	0.3	0.4	0.2	0.1	0.3	0.2	0.2
Gals. of SPH in vac truck/Event	54	78	50	67	48	57	55	32	27	64	37	54
Equiv. Gals. Diesel Fuel Removed/Event	55	78	50	68	48	57	55	32	27	64	37	54
Cumulative Equivalent Gals. Removed	9,902	9,981	10,031	10,099	10,147	10,204	10,260	10,292	10,319	10,383	10,420	10,475

Not Gauged

Wells removed

Last Update: 7/14/2016

Table I-2: Groundwater Monitoring Data, 2012-2016*

*2016 data are draft from the Request to Transition from Active Remediation to Passive Phase Remediation Report from December 2016.

TABLE 2
SUMMARY OF GROUNDWATER ANALYTICAL DATA
ICRR - JOHNSTON YARD
MEMPHIS, SHELBY COUNTY, TENNESSEE

Table with columns for Well ID, Aquifer, Well Type, Sample Event, Sample ID, Analytical Methods Performed, and various analytical results including SW 6010, SW 6070, EPH, RM, ASTA, RM2, and RSK.



TABLE 2 (Continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA
ICRR - JOHNSTON YARD
MEMPHIS, SHELBY COUNTY, TENNESSEE

Well ID	Aquifer	Well Type	Sample Event	Sample ID	Analytical Methods Performed												Analytical Results																									
					HW-6010 (Arsenic & Lead)	HW-6011 (Iron & Manganese)	SW-8270 (VOCs)	EPI (TN)	SM4500/300.0	ASTM D516 90.000.0	SM7320/10.1	HSK-175	HW-6010				SW-8270				EPI				SM4500/300.0				ASTM D516 90.000.0				SM7320/10.1				HSK-175					
													Value	(MDL)	Value	(MDL)	Value	(MDL)	Value	(MDL)	Value	(MDL)	Value	(MDL)	Value	(MDL)	Value	(MDL)	Value	(MDL)	Value	(MDL)	Value	(MDL)	Value	(MDL)	Value	(MDL)	Value	(MDL)	Value	(MDL)
													0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05		0.05	
MW-16	Fluvial Aquifer	O	Sep-13	1609-MW-16	Y																																					



TABLE 2 (Continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA
ICRR - JOHNSTON YARD
MEMPHIS, SHELBY COUNTY, TENNESSEE

Well ID	Aquifer	Well Type	Sample Event	Sample ID	Analytical Methods Performed	Analytical Results															
						SW 6010 mg/L				SW 8170 BLM mg/L		EPII (TDS) mg/L		SM 4500/300.0 mg/L		ASTM D816-90/300.0 mg/L		SME1310/10.1 mg/L		HSAK-175 mg/L	
						Ammonia (Total)	Iron	Lead	Manganese	Barium (n) pyrene	TPH (C13 - C40)	Fluoride	Sulfate	Alkalinity	Chloride						
Revised Action Plan Class 1 events						0.01		0.002		0.0002											
						Value (MDL)	Value (MDL)	Value (MDL)	Value (MDL)	Value (MDL)	Value (MDL)	Value (MDL)	Value (MDL)	Value (MDL)	Value (MDL)	Value (MDL)	Value (MDL)				
MW-38	Fluvial Aquifer	MVA	Jan-12	Not Included in Sampling Plan This Event	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
			Oct-07	MW-37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
			Oct-07	PLP-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Dec-12	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
			Mar-13	Not Included in Sampling Plan This Event	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Mar-13	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	
MW-39	Fluvial Aquifer	PS, MVA	Jan-12	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
			Jan-12	1206-MW-39	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
			Jan-12	MW-40	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
			Dec-12	1212-MW-37	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
			Mar-13	1303-MW-33	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
			Mar-13	1303-MW-39	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	
MW-40	Fluvial Aquifer	SINA	Jan-12	Well Plugged and Abandoned or Destroyed	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
			Jan-12	MW-41	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
			Jan-12	ELP-01	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
			Jan-12	Not Included in Sampling Plan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-12	Well Plugged and Abandoned or Destroyed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-12	Well Plugged and Abandoned or Destroyed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MW-41	Shallow Perched Zone	PS, MVA	Jan-12	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
			Dec-12	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
			Mar-13	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
			Mar-13	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
			Mar-14	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
			Mar-15	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
MW-43	Shallow Perched Zone	PS, MVA	Jan-12	1206-MW-43	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
			Jan-12	1206-MW-50 (Duplicate MW-43)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
			Dec-12	NY Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N		
			Mar-13	1303-MW-43	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
			Mar-13	1303-MW-44	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
			Mar-14	1409-MW-43	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y		
MW-46	Shallow Perched Zone	PS, MVA	Jan-12	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
			Dec-12	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
			Mar-13	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
			Mar-13	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
			Mar-14	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
			Mar-15	LNAPL Present, Well Not Sampled	N	N	N	N	N	N	N	N	N	N	N	N	N	N			
MW-47	Fluvial Aquifer	PS, MVA	Jan-12	1206-MW-47	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
			Dec-12	1212-MW-47	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
			Mar-13	1303-MW-47	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
			Mar-13	1409-MW-47	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
			Mar-14	1409-MW-47	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			
			Mar-15	1509-MW-47	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y			



TABLE 2 (Continued)
SUMMARY OF GROUNDWATER ANALYTICAL DATA
ICRR - JOHNSTON YARD
MEMPHIS, SHELBY COUNTY, TENNESSEE

Well ID	Aquifer	Well Type	Sample Event	Sample ID	Analytical Methods Performed	Analytical Results																	
						SW-6010 mg/L				SW-8179 SHH mg/L				EPI1 (TN) mg/L		K1550/100.0 mg/L		A-ATM1316-90000.0 mg/L		SM1310010.1 mg/L		RSK-175 mg/L	
						Arsenic (Total)	Iron	Lead	Manganese	Barium (0.5 ppm)	TPH (C13 - C40)	Fluoride	Sulfide	Alkalinity	Nitrate	Value	(MIDL)	Value	(MIDL)	Value	(MIDL)	Value	(MIDL)
					Remedial Action Plan Chem Tap Levels	0.01		0.05		0.0002													
17W-02	Fluvial Aquifer	O, HO	Jan-12	1106-07A-02	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-12	1112-07A-02	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-13	1302-07A-02	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-13	1308-07A-02	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-14	1405-07A-02	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-15	1506-07A-02	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-16	1609-07A-02	Y	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
17W-03	Fluvial Aquifer	-	-	-	Well Plugged and Abandoned or Destroyed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
17W-04	Fluvial Aquifer	-	-	-	Well Plugged and Abandoned or Destroyed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
17W-05	Fluvial Aquifer	-	-	-	Well Plugged and Abandoned or Destroyed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
18W-01	Shallow Perched Zone	MNA	Jan-12	-	Not Included in Sampling Plan Per Event	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-12	-	LNAPL Present, Well Not Sampled	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-13	-	Not Included in Sampling Plan Per Event	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-13	-	LNAPL Present, Well Not Sampled	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-14	-	LNAPL Present, Well Not Sampled	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-15	-	LNAPL Present, Well Not Sampled	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-16	-	LNAPL Present, Well Not Sampled	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	
18W-02	Shallow Perched Zone	-	-	-	Not Included in Sampling Plan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-12	-	LNAPL Present, Well Not Sampled	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-13	-	LNAPL Present, Well Not Sampled	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-13	-	LNAPL Present, Well Not Sampled	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-14	-	LNAPL Present, Well Not Sampled	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-15	-	LNAPL Present, Well Not Sampled	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	
			Jan-16	-	LNAPL Present, Well Not Sampled	N	N	N	N	-	-	-	-	-	-	-	-	-	-	-	-	-	

1 Well MNA - Spill Management Area Well, O - Other Well, HO - Background Well
 and based on the 7/22/12 Dept. of Environment & Conservation's 1/1/12 Annual Report
 results based on laboratory reporting of 100, 100,
 and adjusted reported data but above the maximum reported limit
 that were as well as results
 Method Detection Limit
 and detected at the method detection limit under a
 of 1 liter per day or higher in this concentration
 mg/L - in Region 1 per day
 (maximum amount of lead in the ground water) 1 mg/L
 is actually 100, the proper amount



APPENDIX J – INTERVIEW FORMS

**Illinois Central Railroad Company's
Johnston Yard Superfund Site**

Five-Year Review Interview Form

Site Name: Illinois Central Railroad
Company's Johnston Yard

EPA ID No.: TND073540783

Interviewer Name:

Affiliation:

Subject Name: Randy Bryant

Affiliation: EPA

Subject Contact Information: Superfund Division, 61 Forsyth St., SW Atlanta, GA
30303

Time:

Date: May 5, 2017

Interview

Location:

Interview Format (circle one): In Person Phone Mail Other: email

Interview Category: EPA Remedial Project Manager

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?
The remedy is improving conditions in the subsurface by removing the PSH (weathered diesel) from the impacted areas. The PRP has continued the periodic extraction events and performs the required annual groundwater monitoring and reporting in a timely manner.
2. What have been the effects of this Site on the surrounding community, if any?
I am not aware of any effects and would not expect any effects given the periodic and mobile nature of the extraction efforts.
3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities since the implementation of the cleanup?
No.
4. What is your assessment of the current performance of the remedy in place at the Site?
The PSH recovery effort has taken longer than originally estimated in the FS. However, as long as the extraction events continue to recover PSH, it is a worthwhile effort.
5. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues?
I am comfortable with the institutional controls since they have been in place since December 2011.
6. Are you aware of any community concerns regarding the Site or the operation and management of its remedy? No.
7. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy? As discussed with the PRP, EPA, and TDEC, the PRP will continue the PSH extraction events at a reduced frequency and begin the use of the ORC socks in certain monitoring wells.

**Illinois Central Railroad Company's Five-Year Review Interview Form
Johnston Yard Site**

Site Name: Illinois Central Railroad Company's Johnston Yard **EPA ID No.:** TND073540783

Subject Name: Robert Strong **Affiliation:** Illinois Central Railroad
Subject Contact Information: Phone or Email

Time: **Date:** 11/27/16

Interview

Location: Email

Interview Format (circle one): In Person Phone Mail Other: Email

Interview Category: Potentially Responsible Parties (PRPs)

1. What is your overall impression of the remedial activities at the Site?
My overall impression of remedial activities at the site is that the Mobile Enhanced Mobile Phase Extraction (MEME) has been effective in recovering product from the subsurface and in stabilizing the observed product plumes.
2. What have been the effects of this Site on the surrounding community, if any?
None that I am aware of.
3. What is your assessment of the current performance of the remedy in place at the Site?
Based on the evaluation of site data collected over the course of the remedy implementation, the product plume appears to be stable and product recovery is nearing completion to the extent practicable.
4. Are you aware of any complaints or inquiries regarding environmental issues or the remedial action from residents since implementation of the cleanup?
No, not to my knowledge.
5. Do you feel well-informed regarding the Site's activities and remedial progress? If not, how might the EPA convey site-related information in the future?
Yes, we have had an open and effective dialogue with EPA regarding site activities/remedial progress from the beginning of the project.
6. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy?
No, the project has progressed as well as could be anticipated.

**Illinois Central Railroad Company's Five-Year Review Interview Form
Johnston Yard Superfund Site**

Site Name: Illinois Central Railroad EPA ID No.: TND073540783
Company's Johnston Yard

Interviewer Name: Affiliation:
Subject Name: Chelsea Wenhardt Affiliation: TRC
Subject Contact (713)-244-1002 cwenhardt@trcsolutions.com
Information:

Time: Date: 11/29/2016

Interview

Location: N/A

Interview Format (circle one): In Person Phone Mail Other: E-mail

Interview Category: O&M Contractor

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)?

The Site is an active railyard that is well maintained. It is likely that the Site will maintain its current use for the foreseeable future. The remedial technology in place has effectively removed phase separated hydrocarbons (PSH) from the subsurface and aided in plume stability. Analytical data supports that natural degradation is also occurring at the Site and aiding in plume stability.

2. What is your assessment of the current performance of the remedy in place at the Site?

The current remedy in place at the Site is mobile-enhanced mobile-phase extraction (MEME). The MEME technology has successfully removed PSH from the subsurface and has reached its technical endpoint. Transitioning to a passive biological remediation technology would further help with reaching the Record of Decision clean-up goals.

3. What are the findings from the monitoring data? What are the key trends in contaminant levels that are being documented over time at the Site?

The monitoring data indicates that a dissolved-phase plume associated with PSH is limited in aerial extent to just beyond the PSH plume boundaries. Dissolved-phase constituents in exceedance of the clean-up goals are limited to arsenic and lead. Arsenic and lead exceedances appear to be isolated to a select set of wells that exhibit stable to decreasing trends.

4. Is there a continuous on-site O&M presence? If so, please describe staff responsibilities and activities. Alternatively, please describe staff responsibilities and the frequency of site inspections and activities if there is not a continuous on-site O&M presence.

There is not a fixed, stationary remedy in place at the Site therefore there is not a continuous on-site O&M presence. However, CN does employ an environmental technician on-site who inspects the monitoring well network on a periodic basis.

The MEME events are currently conducted on a monthly basis for 3 days at a time. Groundwater monitoring is conducted on an annual basis and usual occurs in September.

5. Have there been any significant changes in site O&M requirements, maintenance schedules or sampling routines since start-up or in the last five years? If so, do they affect the protectiveness or effectiveness of the remedy? Please describe changes and impacts.

The remedial technology does not require O&M. Minor changes have been made to the frequency at which the MEME events are conducted. When MEME was first implemented, the events were conducted every 2-3 months for 5 days at a time. In 2015 the schedule was changed to every 1-2 months for 3 days at a time, and in 2016 the events were conducted on a monthly basis for 3 days at a time. Changes in schedule were based on PSH recovery and product rebound. The PSH plume has remained stable therefore showing that the protectiveness and effectiveness of the remedy has not been adversely affected.

6. Have there been unexpected O&M difficulties or costs at the Site since start-up or in the last five years? If so, please provide details.

There have not been unexpected O&M difficulties or costs.

7. Have there been opportunities to optimize O&M activities or sampling efforts? Please describe changes and any resulting or desired cost savings or improved efficiencies.

Again, there are no O&M activities related to the selected remedy. Sampling is conducted on an annual basis. There are currently not any opportunities for optimization or cost savings.

8. Do you have any comments, suggestions or recommendations regarding O&M activities and schedules at the Site?

Not applicable.

**Illinois Central Railroad Company's
Johnston Yard Superfund Site**

Five-Year Review Interview Form

Site Name: Illinois Central Railroad
Company's Johnston Yard

EPA ID No.: TND073540783

Interviewer Name: First Name Last Name
Subject Name: Alison Company

Affiliation: Name
Affiliation: Tennessee Department of
Environment and
Conservation (TDEC) –
Division of Remediation
(DoR)

Subject Contact Information: Alison.campany@tn.gov (901) 371-3040

Information:

Time: MM:HH a.m/p.m.

Date: MM/DD/YYYY

Interview Location: Location Information Here

Location:

Interview Format (circle one): In Person Phone Mail Other:

Interview Category: State Agency

1. What is your overall impression of the project, including cleanup, maintenance and reuse activities (as appropriate)? My overall impression of the project is mixed. Communication among all stakeholders appears to be good. There are no "special" circumstances surrounding the project like attention from State or local officials or near-by residents. The institutional controls in place are comprehensive and protective. The Site use is the same as when the Record of Decision (RoD) was signed and it is anticipated to remain the same during the next 5 years, so there are no concerns regarding reuse. I believe the remedy chosen is still protective. There are some concerns regarding the effectiveness and efficiency of the selected remedy which are discussed in greater detail below in answers to questions 2 and 8.
2. What is your assessment of the current performance of the remedy in place at the Site? According to the January 2012 Remedial Design and Remedial Action (RD/RA) Work Plan, the Remedial Action (RA) was initiated on December 5, 2011. It was estimated that 12 Mobile-Enhanced Multi-Phased Extraction (MEME) events performed approximately every 2 months for a period of 2 years would successfully "extract all extractable PSH at the site." However, after 138 MEME events within 5 years, this was not accomplished. It does appear the selected remedy has been more effective in the shallow perched zone, but the fluvial aquifer still has a considerable amount of PSH present keeping the site from moving into the enhanced bioremediation phase of RA. Therefore, it is my assessment that the remedy in place at the Site has not performed up to established projections during this Five Year Reporting period.
3. Are you aware of any complaints or inquiries regarding site-related environmental issues or remedial activities from residents in the past five years? I am not aware of any complaints or

inquiries regarding site-related environmental issues or remedial activities from residents in the past five years.


4. Has your office conducted any site-related activities or communications in the past five years? If so, please describe the purpose and results of these activities. My office has not conducted any site-related activities or communications in the past five years aside from correspondence and meetings with stakeholders in accordance with typical case management and support to the EPA project manager.
5. Are you aware of any changes to state laws that might affect the protectiveness of the Site's remedy? I am not aware of any changes to state laws that might affect the protectiveness of the Site's remedy.
6. Are you comfortable with the status of the institutional controls at the Site? If not, what are the associated outstanding issues? I am comfortable with the status of the institutional controls at the Site.
7. Are you aware of any changes in projected land use(s) at the Site? I am not aware of any changes in projected land use(s) at the Site.
8. Do you have any comments, suggestions or recommendations regarding the management or operation of the Site's remedy? If it is anticipated the Site will not move into the enhanced bioremediation phase of the remedy during the upcoming Five Year Review period, I suggest considering an Explanation of Significant Differences (ESD) or RoD addendum to include some type of continuous groundwater/PSH extraction system to more aggressively remove the remaining PSH – especially for the fluvial aquifer as it appears the shallow perched zone is responding to the MEME implementation and natural attenuation more favorably. It is likely the current monitoring well network could be easily converted for this approach. Continuous dual-phase liquid-ring extraction systems have a strong history of success in this area with this type of contamination, but it is not necessarily the only technology that should be considered if the remedial approach is reevaluated.

APPENDIX K – INSTITUTIONAL CONTROLS



Tom Leatherwood
Shelby County Register

As evidenced by the instrument number shown below, this document
has been recorded as a permanent record in the archives of the
Office of the Shelby County Register.

	
12049772	
05/03/2012 - 02:16 PM	
13 PGS	
INSTR#	949183-12049772
VALUE	0.00
MORTGAGE TAX	0.00
TRANSFER TAX	0.00
RECORDING FEE	65.00
OP FEE	2.00
REGISTER'S FEE	0.00
WALK THRU FEE	0.00
TOTAL AMOUNT	67.00
TOM LEATHERWOOD	
REGISTER OF DEEDS SHELBY COUNTY TENNESSEE	

1075 Mullins Station, Suite W 165 ~ Memphis, Tennessee 38134 (901) 222-8100
Website: <http://register.shelby.tn.us> Email: Tom.L Leatherwood@shelbycountyttn.gov

RETURN TO:
FNTG
6060 Poplar Avenue, Ste LL37
Memphis, TN 38119
TG # 11/10

Prepared by:
Richard A. Verkler
Environmental Counsel
CN
17641 S. Ashland Ave.
Homewood, IL 60430

NOTICE OF LAND USE RESTRICTIONS

Notice is hereby given that pursuant to T.C.A. Section 68-212-225 of the *Hazardous Waste Management Act of 1985*, the Commissioner of the Tennessee Department of Environment and Conservation ("TDEC" or "the Department") has determined that land use restrictions are an appropriate remedial action at the below-described property. Pursuant to T.C.A. Section 68-212-225 (d) the register of deeds shall record this Notice and index it in the grantor index under the names of the owners of the land.

Witnesseth:

WHEREAS, the Grantor, Illinois Central Railroad Company, is the owner of the real property located in Shelby County, Tennessee, commonly and formerly known as the Illinois Central Railroad Company (Johnston Yard) Superfund Alternative Site, located at 297 Rivergate Road, Memphis, Tennessee ("the Property"), which was conveyed to Grantor by multiple deeds and recorded in the Registrar's Office of Shelby County at the Book Numbers, and Page Numbers as more particularly described in Exhibit 1 (List of Property Deeds for the Illinois Central Railroad Company (Johnston Yard) Superfund Alternative Site), attached hereto and incorporated herein by reference. The Property being restricted herein is legally described in Exhibit 2 (Certified Plat of Environmental Description);

WHEREAS, the Property is currently being remediated and monitored by Illinois Central Railroad Company under the oversight of the United States Environmental Protection Agency ("EPA"), in cooperation with TDEC, pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C. §§ 9601, et seq., as amended ("CERCLA"). The remediation and monitoring is being performed in a manner consistent with the National Contingency Plan, 40 C.F.R. Part 300, as amended ("NCP"), to levels protective of human health and the environment, as more particularly described in EPA's Record of Decision, issued in September, 2010 ("ROD"), which is supported by the Administrative Record located at the addresses following this paragraph, and the RD/RA Consent Decree which became effective on October 27, 2011;

U.S. EPA Records Center
61 Forsyth Street, S.W.
Atlanta, GA 30303
(404) 562-8946

Memphis Shelby County Public Library
3676 South Third Street
Memphis, TN
(901) 789-3140;

WHEREAS, the ROD requires the implementation of institutional controls;

WHEREAS, the Grantor has agreed to impose certain land use restrictions on the future use of the Property as set forth below:

NOW, THEREFORE, for and in consideration of the premises and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Grantor hereby declares that all of the Property shall be held, sold, and conveyed subject to the following restrictive covenants which shall run with the Property and shall be binding on all parties having any right, title, or interest in the Property or any part thereof, their heirs, successors, successors-in-title, and assigns, and shall inure to the benefit of each owner thereof, TDEC and the respective successors and assigns of such parties:

Location of Contamination:

The 316 acre Property is the Illinois Central Railroad Company (Johnston Yard) Superfund Alternative Site (TDEC # 79753) ("the Site") located at 297 Rivergate Road, Memphis, Tennessee, 38109. The Site is bordered to the south by a residential neighborhood, to the east and northwest by light industry, and to the north and west by undeveloped, wooded areas. Releases from historic fueling operations have contributed to diesel impacts to soil and groundwater in an area of approximately five acres located in the interior of the Site property, in the vicinity of the 500,000 gallon diesel storage tank, south of the car shop, and east of the former round house, as indicated by the highlighted area on the attached map (Exhibit 3). This five acre area is where the Mobile-Enhanced Multi-Phase Extraction portion of the remedy is located. Contaminants such as lead and arsenic have been detected in a few monitoring wells at the Site. The Record of Decision, issued by EPA in 2010, includes greater detail regarding the previous investigations and activities at the Site, and fully describes the selected remedy. The major components for the selected remedy include the following: (1) Mobile-Enhanced Multi-Phase Extraction to extract and recover phase separated hydrocarbons ("PSH") from groundwater wells located within the contaminant plumes; (2) Enhanced Bioremediation as necessary after PSH recovery to address residual groundwater contamination; (3) Performance monitoring; (4) Institutional controls to limit future use of the Site to industrial/commercial uses, and to prohibit future groundwater consumption; and (5) Additional groundwater monitoring as necessary.

Land Use Restrictions

1. The Property shall not be used in any manner that would interfere with the performance of the remedy called for in the ROD. Prohibited activities, include but are not limited to, any activity that would disturb wells or other equipment used to perform the remedy, or that would limit access to wells and equipment.
2. The Property shall be used for industrial/commercial purposes only. Before the Property may be used for any non-industrial/commercial purpose, including but not limited to, use as a residence, domicile, daycare, school, church, elder care, playground, recreation, or farming, Grantor, its heirs, successors, successors-in-title, and assigns must demonstrate to the satisfaction of TDEC that such proposed use will not pose a danger to public

health, safety or the environment, and must obtain written approval from TDEC before proceeding with the proposed use. Prior to approving such use, TDEC will notify EPA and provide EPA with a reasonable opportunity to comment, not to exceed 60 days from the day EPA receives notification from TDEC about such use. For any approval granted by TDEC to be effective, TDEC's approval shall be in writing, shall contain a reference to this instrument, and shall be filed in the Registrar's Office of Shelby County.

3. Before any land disturbing activity occurs on the Property which could threaten the structural integrity of groundwater wells used in connection with the ROD, or which could cause the dispersal of diesel impacted soils in the area where the Mobile-Enhanced Multi-Phase Extraction portion of the remedy is located, as indicated by the highlighted area on the attached map (Exhibit 3), Grantor, its heirs, successors, successors-in-title, and assigns, must demonstrate to the satisfaction of TDEC that such activity will not pose a danger to public health, safety, or the environment. Grantor, its heirs, successors, successors-in-title, and assigns must obtain written approval from TDEC before proceeding with such proposed activity. Land disturbing activities include but are not limited to, building, filling, grading, excavating, mining, and boring. Prior to approving such proposed activity, TDEC will notify EPA and provide EPA with a reasonable opportunity to comment, not to exceed 60 days from the day EPA receives notification from TDEC about such proposed activity. For any approval granted by TDEC to be effective, TDEC's approval shall be in writing, shall contain a reference to this instrument, and shall be filed in the Registrar's Office of Shelby County.
4. The groundwater under the Property shall not be used for any potable purposes. Prior to any use of the groundwater for any purpose, the Grantor, its heirs, successors, successors-in-title, and assigns, must demonstrate to the satisfaction of TDEC that such use of the groundwater will not pose a danger to public health, safety, or the environment, and must obtain written approval from TDEC before proceeding with the proposed use. Prior to approving such use, TDEC will notify EPA and provide EPA with a reasonable opportunity to comment, not to exceed 60 days from the day EPA receives notification from TDEC about such proposed use. For any approval granted by TDEC to be effective, TDEC's approval shall be in writing, shall contain a reference to this instrument, and shall be filed in the Registrar's Office of Shelby County.

Enforcement:

This Notice of Land Use Restrictions may be enforced by any owner of the Property. The Commissioner of TDEC, through issuance of an order or by means of a civil action, including one to obtain an injunction against present or threatened violations of the restriction, may also enforce this Notice of Land Use Restrictions. This Notice of Land Use Restrictions may also be enforced by any unit of local government having jurisdiction over any part of the Property, by means of a civil action without the unit of local government having first exhausted any available administrative remedy.

The parties expressly recognize and agree that EPA is a third party beneficiary of this Notice of Land Use Restrictions, and as such, has the right of enforcement, through means which include but are not limited to, a civil action, including one to obtain an injunction against present or threatened violations of the Notice of Land Use Restrictions. The parties expressly recognize and agree that this Notice of Land Use Restrictions does not grant EPA any interest in the Property.

Any person who owns or leases the Property shall abide by this Notice of Land Use Restrictions. Pursuant to T.C.A. Section 68-212-213, any person who fails, neglects or refuses to comply with a land use restriction commits a Class B misdemeanor, and in addition, is subject to a civil penalty of up to ten thousand (\$10,000) per day.

Notice:

Grantor, its heirs, successors, successors-in-title, and assigns, shall include the following notice on all deeds, mortgages, plats, or any legal instruments used to convey any interest in the Property (failure to comply with this paragraph does not impair the validity or enforceability of this Notice of Land Use Restrictions):

NOTICE: This Property Subject to Notice of Land Use Restrictions and any subsequent Amendments Recorded at _____ [reference the grantor index for this Notice of Land Use Restrictions]

Compliance:

Grantor and its heirs, successors, successors-in-title, and assigns shall submit an annual report to TDEC within thirty days after the anniversary of the date the Notice of Land Use Restrictions was signed by the Grantor, detailing the Property owner's compliance, and any lack of compliance with the terms of this Notice of Land Use Restrictions. Once title to all or a portion of the Property has been conveyed by Grantor or any subsequent owner, such predecessor in title shall no longer have any responsibility for submission of the report with respect to the portion of the Property it previously owned.

Term:

This Notice of Land Use Restrictions shall run with and bind the Property unless/until it is made less stringent or canceled as set forth under the paragraph entitled "Amendment and Termination."

Amendment or Termination:

In accordance with T.C.A. Section 68-212-225(e), after public notice and an opportunity for public input, this Notice of Land Use Restrictions may be made less stringent or canceled by the Commissioner of TDEC if the risk has been eliminated or reduced so that less restrictive land use controls are protective of human health and the environment. Prior to amending or terminating

the Notice of Land Use Restrictions, TDEC will notify EPA and provide EPA with a reasonable opportunity to comment, not to exceed 60 days from the day EPA receives notification from TDEC about such proposed amendment or termination. No amendment to, or termination of this Notice of Land Use Restrictions shall be effective until such amendment or instrument terminating this Notice of Land Use Restrictions is recorded in the Register of Deeds Office of Shelby County.

Any Party that petitions the Department for approval of restricted uses, or seeks to cancel or make a Restriction less stringent, shall be responsible for any costs incurred by the Department in the review and oversight of work associated with the restriction modification.

No Property Interest Created in EPA:

This Notice of Land Use Restrictions does not in any way create any interest by EPA in the Property. Furthermore, the Act of approving this Notice of Land Use Restrictions does not in any way create any interest by EPA in such Property.

Severability:

Invalidation of any of these covenants or restrictions by judgment or court order shall in no way affect any other provisions, which shall remain in full force and effect.

IN WITNESS WHEREOF, The undersigned has executed this instrument on this 29th day of November, 2011.

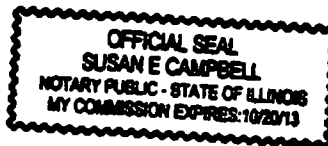
[Signature] Grantor, ILLINOIS CENTRAL RAILROAD COMPANY
SENIOR MANAGER BUSINESS DEVELOPMENT & REAL ESTATE

Before me, the undersigned Notary Public in and for the State aforesaid, personally appeared Michael F. Deegan and by their signature executed the foregoing instrument for the purpose therein contained.

WITNESS, this 29th day of NOVEMBER, 2011.

Notary Public Susan E. Campbell

Commission Expiration 10/20/13



IN WITNESS WHEREOF, the TDEC has determined that the land use restrictions herein are the appropriate remedial action at the Property, and hereby approves this instrument pursuant to Tenn. Code Ann. Section 68-212-225(a) on this 29th day of March, 2012.

Tennessee Department of Environment and Conservation

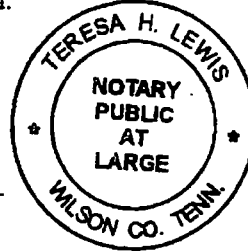
Robert A. Binford Director, Division of Remediation
Tennessee Department of Environment and Conservation

Before me, the undersigned Notary Public in and for the State aforesaid, personally appeared Robert H. Binford and by their signature executed the foregoing instrument for the purpose therein contained.

WITNESS, this 29th day of March, 2012.

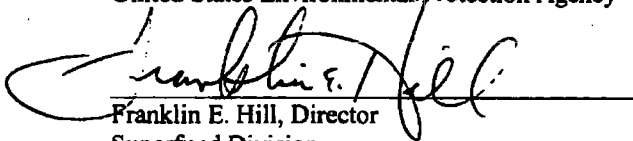
Notary Public Teresa H. Lewis

Commission Expiration Nov. 8, 2015



This Notice of Land Use Restrictions is hereby approved by the United States Environmental Protection Agency as a third party beneficiary this 13 day of December, 2011.

United States Environmental Protection Agency



Franklin E. Hill, Director
Superfund Division
U.S. Environmental Protection Agency, Region 4

Before me, the undersigned Notary Public in and for the State aforesaid, personally appeared Franklin E. Hill and by their signature executed the foregoing instrument for the purpose therein contained.

WITNESS, this 13 day of December, 2011.

Notary Public Zelicia Jackson

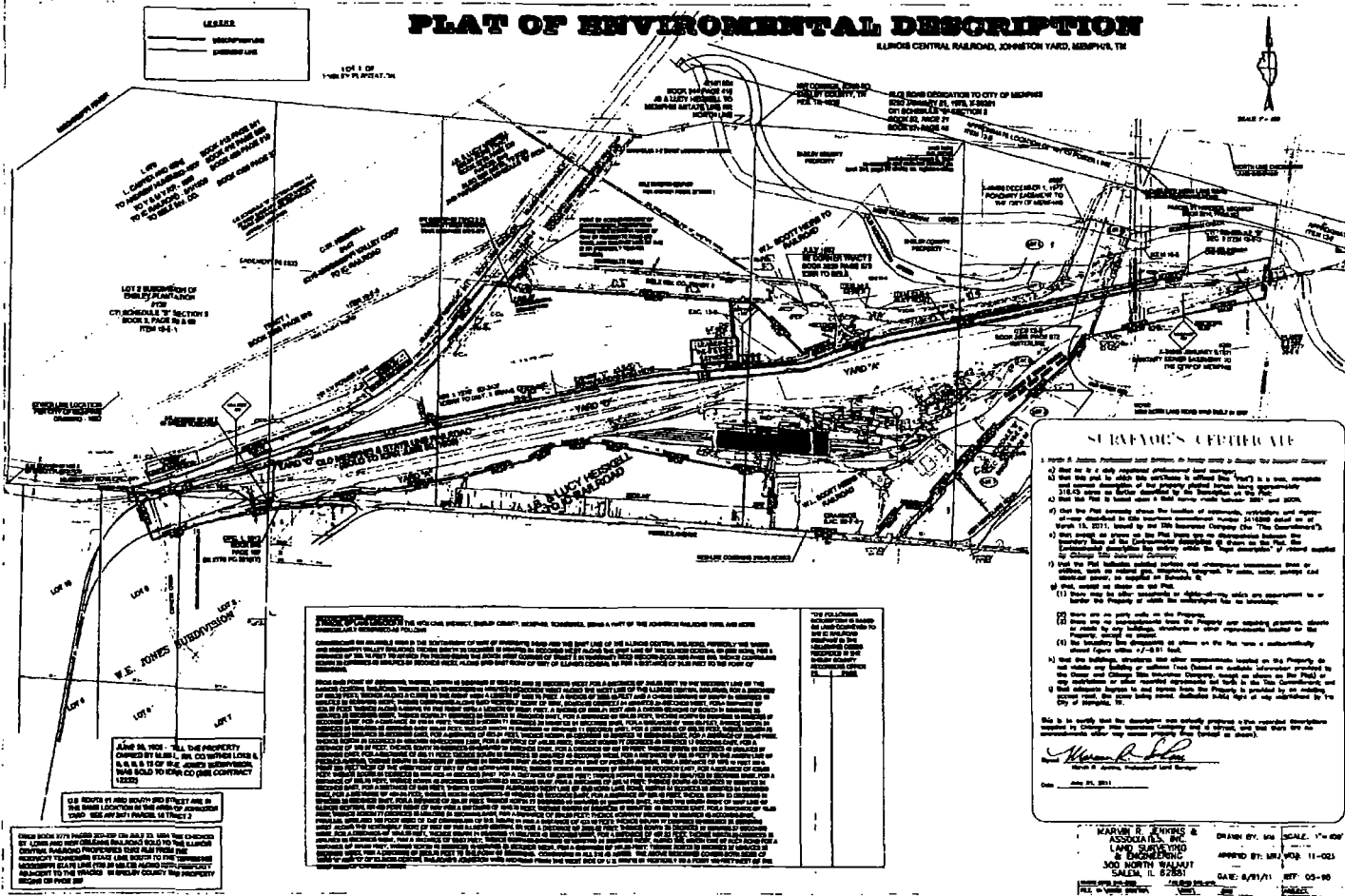
Commission Expiration August 15, 2015

EXHIBIT 1

List of Property Deeds for Illinois Central Railroad (Johnston Yard) Superfund Alternative Site located at 297 Rivergate Road, Memphis, TN	
	Page
Book 146	373
Book 150	038
Book 177	320
Book 227	473
Book 344	032
Book 344	244
Book 344	245
Book 344	246
Book 344	248
Book 344	251
Instr# 344	252
Book 344	415
Book 344	417
Book 344	566
Book 416	529
Book 325	393
Book 325	318
Book 460	510
Book 596	407
Book 695	356
Book 695	357
Book 696	369
Book 1919	391
Book 2778	207
Instr# H2	883
Instr# BD	3969
Instr# CZ	3205
Instr# DY	4053
Instr# DT	4619
-	06034122
Book 426	487
Book 2084	239
Book 1572	543
Book 3855	578
Book 4350	037
Book 5803	251
Instr# E5	1650
Instr# J8	4896
Instr# L3	5421
Instr# M4	8893
Instr# P1	6389
Instr# U1	4080
Instr# U1	8059
Instr# U3	7340
Instr# X3	2708
Instr# R6	9964
Instr# S2	2437
Instr# BG	9380
-	2080925-GL

PLAT OF ENVIRONMENTAL DESCRIPTION

MEMPHIS CENTRAL RAILROAD, JOHNSON YARD, MEMPHIS, TN



K-12

SURFACE CERTIFICATE

I, **MARVIN R. PERVIS & ASSOCIATES, INC.**, a duly organized professional land surveying firm, do hereby certify that the following is a true and correct description of the surface of the land shown on the attached plat, to-wit:

- That the land shown on the attached plat is a part of the land owned by the City of Memphis, Tennessee, and is located in the City of Memphis, Tennessee.
- That the land shown on the attached plat is a part of the land owned by the City of Memphis, Tennessee, and is located in the City of Memphis, Tennessee.
- That the land shown on the attached plat is a part of the land owned by the City of Memphis, Tennessee, and is located in the City of Memphis, Tennessee.
- That the land shown on the attached plat is a part of the land owned by the City of Memphis, Tennessee, and is located in the City of Memphis, Tennessee.
- That the land shown on the attached plat is a part of the land owned by the City of Memphis, Tennessee, and is located in the City of Memphis, Tennessee.
- That the land shown on the attached plat is a part of the land owned by the City of Memphis, Tennessee, and is located in the City of Memphis, Tennessee.
- That the land shown on the attached plat is a part of the land owned by the City of Memphis, Tennessee, and is located in the City of Memphis, Tennessee.
- That the land shown on the attached plat is a part of the land owned by the City of Memphis, Tennessee, and is located in the City of Memphis, Tennessee.
- That the land shown on the attached plat is a part of the land owned by the City of Memphis, Tennessee, and is located in the City of Memphis, Tennessee.
- That the land shown on the attached plat is a part of the land owned by the City of Memphis, Tennessee, and is located in the City of Memphis, Tennessee.

Witness my hand and the seal of my office this 11th day of August, 2015.

Marvin R. Pervis
 Marvin R. Pervis, Professional Land Surveyor
 No. 1100
 State of Tennessee

MARVIN R. PERVIS & ASSOCIATES, INC.
 LAND SURVEYING & ENGINEERING
 300 NORTH WALNUT
 GALENA, IL 62521
 DRAWN BY: MRP SCALE: 1" = 400'
 APPROVED BY: MRP 11-021
 DATE: 8/11/15 EST: 03-00
 FILE: 15-08-000

DESCRIPTION OF ACTIVE REMEDIATION AREA:

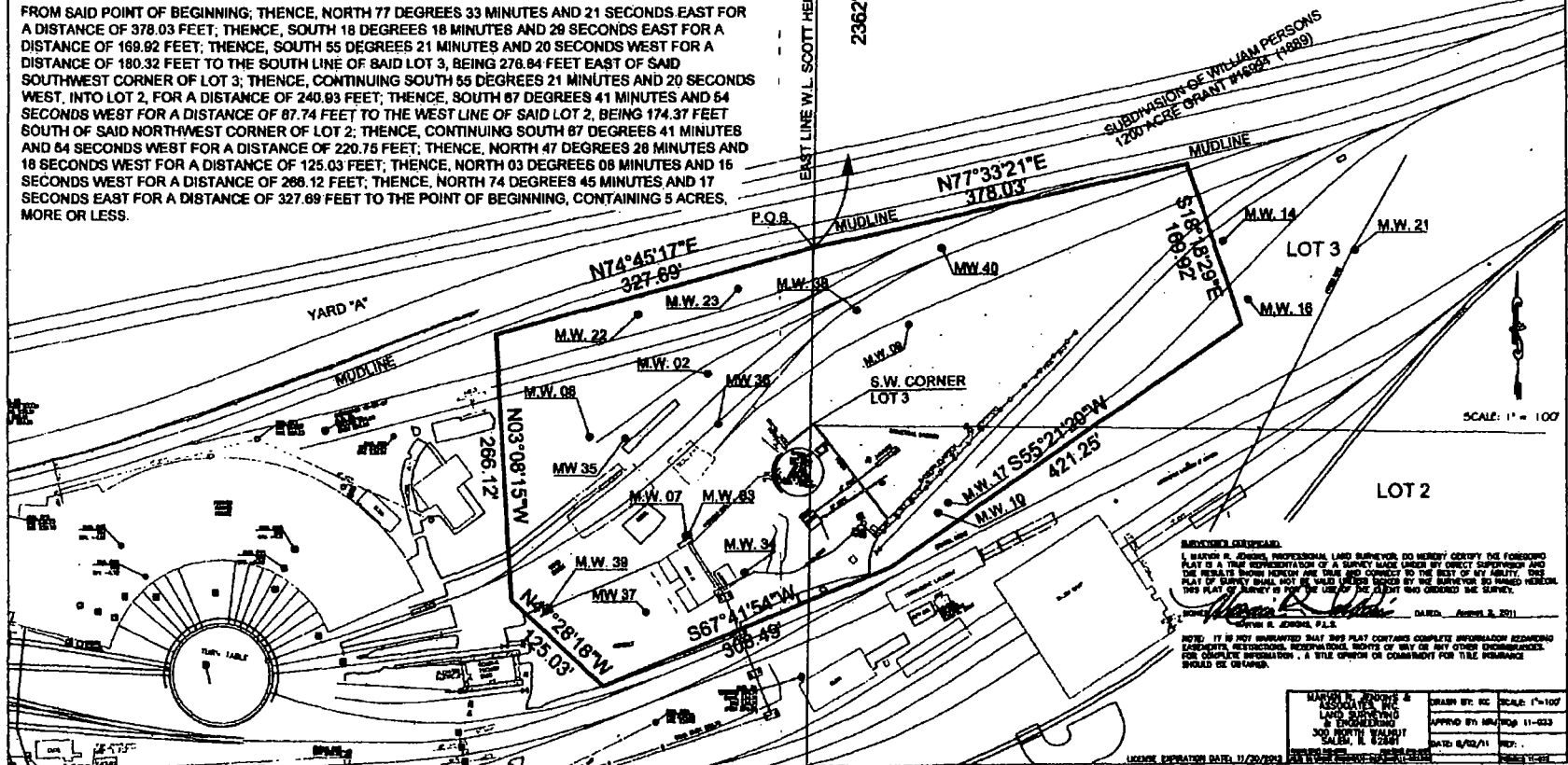
A PARCEL OF LAND LOCATED IN THE 13TH CIVIL DISTRICT, SHELBY COUNTY, MEMPHIS, TENNESSEE, BEING A PART OF THE W.L. SCOTT HEIRS PROPERTY (CONVEYED TO MEMPHIS AND STATE LINE RAILROAD COMPANY MARCH 8, 1904 IN BOOK 344, PAGE 32 OF THE SHELBY COUNTY REGISTERS OFFICE) AND A PART OF LOTS 2 & 3 OF THE SUBDIVISION OF WILLIAM PERSONS 1200 ACRE GRANT #18994 (1899), MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF THE W.L. SCOTT HEIRS PROPERTY; THENCE, SOUTH ALONG THE EAST LINE OF SAID SCOTT HEIRS PROPERTY FOR A DISTANCE OF 2,362 FEET TO THE POINT OF BEGINNING, BEING 178.30 FEET NORTH OF THE SOUTHWEST CORNER OF LOT 3 OF THE SUBDIVISION OF WILLIAM PERSONS 1200 ACRE GRANT #18994.

FROM SAID POINT OF BEGINNING; THENCE, NORTH 77 DEGREES 33 MINUTES AND 21 SECONDS EAST FOR A DISTANCE OF 378.03 FEET; THENCE, SOUTH 18 DEGREES 18 MINUTES AND 28 SECONDS EAST FOR A DISTANCE OF 169.92 FEET; THENCE, SOUTH 55 DEGREES 21 MINUTES AND 20 SECONDS WEST FOR A DISTANCE OF 180.32 FEET TO THE SOUTH LINE OF SAID LOT 3, BEING 276.84 FEET EAST OF SAID SOUTHWEST CORNER OF LOT 3; THENCE, CONTINUING SOUTH 55 DEGREES 21 MINUTES AND 20 SECONDS WEST, INTO LOT 2, FOR A DISTANCE OF 240.93 FEET; THENCE, SOUTH 67 DEGREES 41 MINUTES AND 54 SECONDS WEST FOR A DISTANCE OF 87.74 FEET TO THE WEST LINE OF SAID LOT 2, BEING 174.37 FEET SOUTH OF SAID NORTHWEST CORNER OF LOT 2; THENCE, CONTINUING SOUTH 87 DEGREES 41 MINUTES AND 54 SECONDS WEST FOR A DISTANCE OF 220.75 FEET; THENCE, NORTH 47 DEGREES 28 MINUTES AND 18 SECONDS WEST FOR A DISTANCE OF 125.03 FEET; THENCE, NORTH 03 DEGREES 08 MINUTES AND 15 SECONDS WEST FOR A DISTANCE OF 268.12 FEET; THENCE, NORTH 74 DEGREES 45 MINUTES AND 17 SECONDS EAST FOR A DISTANCE OF 327.69 FEET TO THE POINT OF BEGINNING, CONTAINING 5 ACRES, MORE OR LESS.

PLAT OF SURVEY JOHNSTON YARD ACTIVE REMEDIATION AREA

W.L. SCOTT HEIRS
N.E. CORNER
LAND DEEDED MARCH 8, 1904
TO MEMPHIS AND STATE LINE RAILROAD CO.
BOOK 344, PAGE 32, SHELBY CO. REGISTERS OFFICE



K-13