



Department of Energy

Washington, DC 20585

November 29, 2011

Tim Fischer
U. S. Environmental Protection Agency
Region 5 (SR-6J)
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Brian Nickel
Ohio Environmental Protection Agency
401 E. Fifth Street
Dayton, OH 45402-2911

Subject: *Mound Site, Operable Unit 1 Rebound Study Work Plan and Groundwater Exit Strategy, September 2011*

Dear Mr. Fischer and Mr. Nickel:

The enclosed plan is the final version of the work plan and groundwater exit strategy for the Operable Unit 1 (OU-1) at the Mound site.

The rebound study is designed to determine the natural or unstressed groundwater flow conditions in the OU-1 area and the distribution of volatile organic compounds in groundwater without the pump and treatment system maintaining containment. This plan describes the study, identifies the monitoring locations, sampling frequencies, triggers, and reporting; and defines the actions that will be taken when trigger values are exceeded. The groundwater exit strategy is to consider the feasibility of moving away from containment to monitored natural attenuation if contaminant and groundwater behavior meets the conditions specified in this plan.

The U.S. Department of Energy, Office of Legacy Management (DOE-LM) appreciates the close cooperation of the U.S. Environmental Protection Agency and Ohio Environmental Protection Agency in developing this plan.

Electronic copies have been distributed and will also be available on the DOE-LM website at <http://www.lm.doe.gov/mound/Sites.aspx>.



November 29, 2011

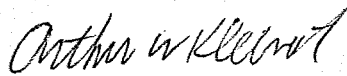
Mr. Fischer and Mr. Nickel

-2-

Please call me at (970) 248-6034 if you have any questions. Please send any correspondence to:

U.S. Department of Energy
Office of Legacy Management
2597 Legacy Way
Grand Junction, CO 81503

Sincerely,



Arthur W. Kleinrath
Site Manager

Enclosure

cc w/enclosure:

J. Powell, DOE (e)

K. Starr, DOE (e)

B. Cato, Stoller (e)

B. Hertel, Stoller (e)

B. Ransbottom, Stoller (e)

File: MND 410.02 (rc mound/rc grand junction)

Mound, Ohio, Site

**Operable Unit 1 Rebound Study
Work Plan and Groundwater
Exit Strategy**

September 2011



U.S. DEPARTMENT OF
ENERGY

Legacy
Management

This page intentionally left blank

Mound, Ohio, Site

**Operable Unit 1 Rebound Study Work Plan
and Groundwater Exit Strategy**

September 2011

This page intentionally left blank

**Operable Unit 1 Rebound Study Work Plan and
Groundwater Exit Strategy
September 2011**

Concurrence Page

The *Operable Unit 1 Rebound Study Work Plan and Groundwater Exit Strategy* identifies the monitoring locations, sampling frequencies, and triggers for this rebound study. Data from wells that have triggers will be used to determine whether additional sampling is necessary, if new wells should be installed, or if the P&T system will need to be turned back on to prevent unacceptable migration of VOC impacted groundwater.

This rebound study is being performed to obtain data to evaluate the changes in VOC concentrations in the monitoring network and changes in groundwater flow when the P&T system is not in operation. Samples will be collected from select wells and in situ sampling points to establish contaminant fate and transport patterns. These data will also be used to determine if the monitoring network is adequate to detect migration of the VOC impacted groundwater during the study period.

Since the source has been removed, the feasibility of moving away from containment to MNA is being considered. If contaminant and groundwater behavior meets the conditions specified in the *Operable Unit 1 Rebound Study Work Plan and Groundwater Exit Strategy*, MNA will be proposed as a viable alternative for the groundwater in the OU-1 area.

If there are no observed exceedances of the trigger levels specified in the *Operable Unit 1 Rebound Study Work Plan and Groundwater Exit Strategy* in any OU-1 monitoring wells for 24 consecutive months after rebound test initiation on June 20, 2011, then the rebound study will be considered complete and DOE may begin the process of remedy change to a passive MNA remedy for OU-1.

The following DOE, US EPA, and Ohio EPA personnel were involved during the review and approval stages of the *Operable Unit 1 Rebound Study Work Plan and Groundwater Exit Strategy*.



9/28/11

Paul Lucas, U.S. Department of Energy, Office of Environmental Management, Miamisburg, Ohio



9/28/11

Timothy J. Fischer, Remedial Project Manager, US EPA-Region 5, Chicago, Illinois



10/7/11

Brian K. Nickel, Project Manager, Ohio EPA, Dayton, Ohio

This page intentionally left blank

Contents

Abbreviations	ii
1.0 Introduction	1
1.1 Purpose	1
1.2 Objective.....	1
1.3 Background.....	2
1.3.1 2003–2004 Rebound Test	2
1.3.2 OU-1 Excavation Monitoring	3
1.3.3 Groundwater Flow	3
1.3.4 Capture Zone Evaluation.....	4
1.3.5 Capture Demonstration for Well 0418.....	4
1.3.6 Capture Demonstration for Wells P105 and P027	5
2.0 Rebound Study Monitoring Approach	5
2.1 Monitoring Well Sampling.....	5
2.2 Water Level Monitoring	7
2.3 Geoprobe Sampling	7
3.0 Contingency Actions	7
3.1 Exceedence of LOC Values in Monitoring Wells	8
3.2 Exceedence of Trigger Values in Monitoring Wells	8
3.3 Exceedence of LOC and Trigger Values in Geoprobe Locations	9
4.0 Data Evaluation	13
4.1 Contaminant Distribution	13
4.2 Groundwater Elevations	13
4.3 Adequacy of the Monitoring Network.....	13
5.0 Groundwater Exit Strategy.....	14
5.1 Consideration of an MNA Remedy	14
5.2 Period of Performance	14
6.0 Reporting.....	15

Figures

Figure 1. 2004 Rebound Test TCE Data.....	2
Figure 2. Rebound Test Groundwater Monitoring Locations.....	6
Figure 3. Decision Tree Regarding Level of Concern Exceedence in Monitoring Wells	10
Figure 4. Decision Tree Regarding Trigger Level Exceedence in Monitoring Wells	11
Figure 5. Decision Tree Regarding LOC and Trigger Level Exceedence in Geoprobe Locations	12

Tables

Table 1 Threshold Values for TCE and PCE during Initial Rebound Test (2003-2004)	2
Table 2. Trigger Levels for TCE and PCE during Excavation Activities in the OU-1 Area.....	3
Table 3. Proposed Trigger Levels for VOCs during OU-1 Rebound Test	8

Abbreviations

ft	foot
gpm	gallons per minute
LOC	level of concern
MCL	maximum contaminant level
µg/L	micrograms per liter
MNA	monitored natural attenuation
OU-1	Operable Unit 1
P&T	pump and treatment
PCE	tetrachloroethylene
TCE	trichloroethylene
VOC	volatile organic compound

1.0 Introduction

Groundwater with elevated volatile organic compound (VOC) concentrations is present upgradient of the Operable Unit 1 (OU-1) pump and treatment (P&T) extraction wells. A rebound study is being performed to obtain data to evaluate the changes in VOC concentrations in groundwater when the P&T system is not in operation.

Hydrologic data will be collected to determine the natural groundwater flow directions and gradients. The expectation is that the configuration of the water table can be determined under both low and high groundwater conditions.

Presently, VOC contaminated groundwater is being contained using two extraction wells to create a hydraulic barrier. Since the source has been removed, the feasibility of moving away from containment to a more passive remedy, namely monitored natural attenuation (MNA), is being considered. If contaminant and groundwater behavior meet specific conditions specified in Section 5.0, "Groundwater Exit Strategy," MNA would be evaluated and considered as a viable alternative for the groundwater in the OU-1 area.

1.1 Purpose

The purpose of the rebound study is to:

- Determine the natural or unstressed groundwater flow conditions in the OU-1 area.
- Determine the distribution of VOCs in groundwater without the OU-1 P&T system maintaining containment.

This plan identifies the monitoring locations, sampling frequencies, and triggers for this rebound test. Actions that will be taken when trigger values are exceeded are defined. Periodic in situ water sampling will be performed to evaluate the movement of VOCs in groundwater between the residual source area and downgradient monitoring locations.

1.2 Objective

The objective of the rebound study is to:

- Delineate the distribution of VOCs in groundwater under natural (non-pumping) conditions, taking into account the effects of seasonal variations in groundwater levels.
- Determine the natural groundwater flow direction and rate under seasonal conditions.
- Determine whether the existing monitoring well network is adequate to support an MNA remedy.
- Collect data to design the MNA remedy, which will include monitoring locations and sampling frequencies.
- Collect data to establish appropriate trigger locations and levels for contingency actions.
- Collect data to prepare predictive trends in contaminant concentrations to assess the performance of the remedy in the future.
- Collect data to establish a compliance boundary for the MNA remedy.

1.3 Background

An extensive body of data has been collected on the behavior of the contaminants in the groundwater under differing conditions. The bulk of this data was collected before the landfill was excavated; however, some information was used in the development of this work plan.

1.3.1 2003–2004 Rebound Test

A rebound test was performed from May 2003 to February 2004. The test was concluded because pre-determined VOC threshold concentrations were exceeded in well 0417 (Figure 1). Initially, wells were sampled weekly. In areas where concentrations were changing with time, the sampling frequency remained relatively high, whereas in areas where concentrations remained stable, sampling frequencies were reduced. The threshold values for the initial rebound test are summarized in Table 1, which presents tetrachloroethylene (PCE) and trichloroethylene (TCE) levels.

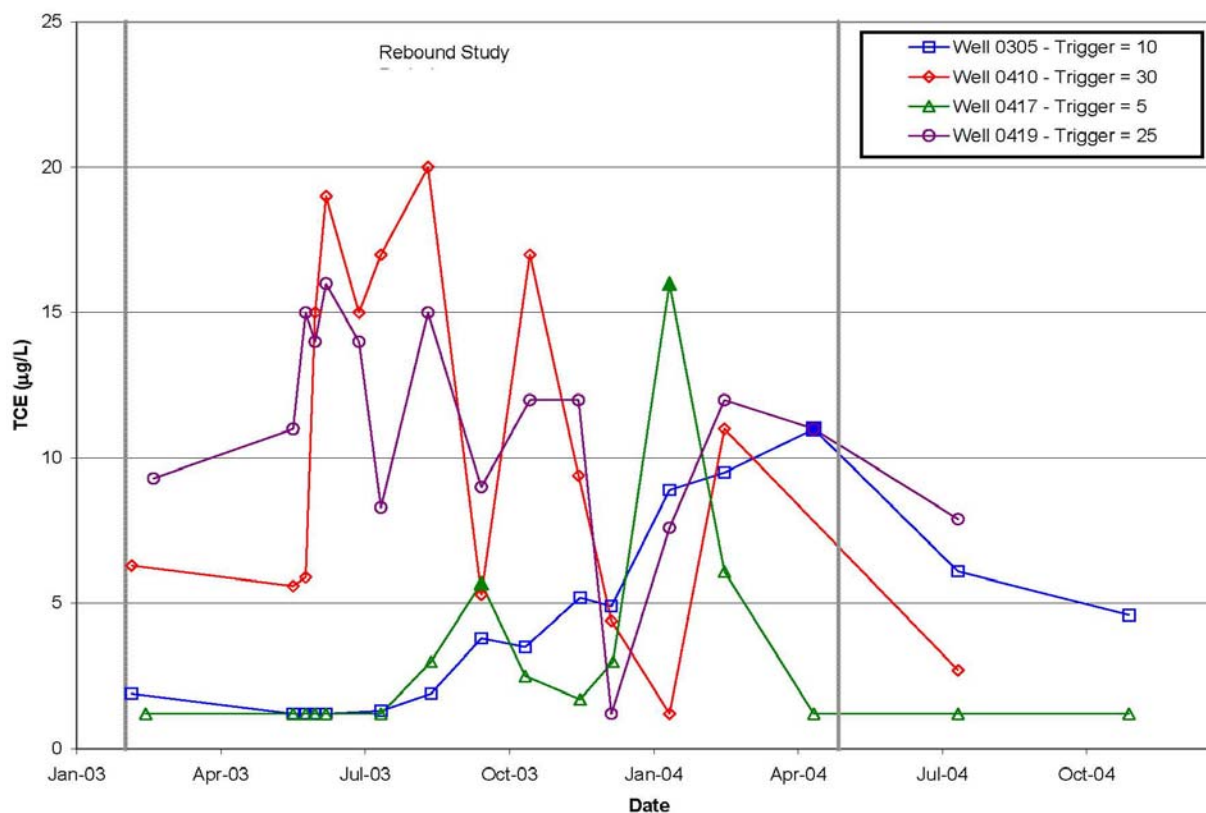


Figure 1. 2003–2004 Rebound Test TCE Data

Table 1. Threshold Values for TCE and PCE during 2003–2004 Rebound Test

Well ID	TCE (µg/L)	PCE (µg/L)
0305	10	10
0410	30	10
0417	5	5
0419	25	15

µg/L = micrograms per liter

1.3.2 OU-1 Excavation Monitoring

During the OU-1 excavation activities in 2007, trigger levels were developed as indicators of unacceptable migration of VOC impacted groundwater from the OU-1 area. These trigger levels are summarized in Table 2.

After the removal of the extraction wells, a more frequent monitoring program was initiated (Table 3). This consisted of sampling monitoring wells 0305, 0410, 0416, 0417, 0418, and 0419 every 2 weeks. Piezometers P015, P027, and P031 were sampled monthly. Based on groundwater flow velocities in the area, this frequency of sampling was determined to be sufficient to identify changes in the groundwater quality in a timely manner. The other wells were sampled at a less frequent interval. In addition, water levels were measured at these wells and at all other piezometers every 2 weeks.

Table 2. Trigger Levels for TCE and PCE during Excavation Activities in the OU-1 Area

Well ID	TCE (µg/L)	PCE (µg/L)
0305	20	20
0410	30	20
0416	20	7
0417	20	7
0418	20	20
0419	30	15

µg/L = micrograms per liter

Extraction wells 0413 and 0414 were removed on June 11, 2007, to facilitate the excavation of VOC-impacted soil in the southwest corner of the landfill. Data collected on June 18, 2007, indicated that the concentration of TCE in well 0417 was 21.4 micrograms per liter (µg/L), which was greater than the trigger level of 20 µg/L. Later, on July 11, 2007, the concentration of TCE in well 0305 was 24.9 µg/L. The new extraction wells 0449 and 0450 were installed on July 10 and 11, 2007, and started on July 13, 2007.

1.3.3 Groundwater Flow

An equilibration study was performed in April 2009 as part of an evaluation of the performance of the OU-1 P&T system. During the equilibration study, the extraction wells were shut down for 1 day to determine the configuration of the water table without external stresses caused by the operation of the P&T system. The configuration of the groundwater surface without the operation of the extraction wells is relatively flat. Groundwater flow beneath the landfill is to the south. The effects of the localized recharge from the canal area and the outwash boundary to the east are evident. A slight mounding is present in the southwestern corner of the landfill and may be the result of better recharge through the clean backfill as compared to the landfill wastes.

The estimated groundwater velocity of 1 foot (ft)/day for the OU-1 area was calculated using the following equation:

$$v = \frac{Ki}{n}$$

where:

- v = velocity
- K = hydraulic conductivity = 700 ft/day
- i = regional hydraulic gradient = 0.0003 ft/ft
- n = effective porosity = 0.3

This velocity was calculated using values for hydraulic conductivity and porosity presented in the *Rebound Test Plan for Operable Unit 1 Groundwater System at the Miamisburg Closure Project* (June 2003).

1.3.4 Capture Zone Evaluation

Capture zone width calculations were also performed as part of the P&T system evaluation (*OU-1 Pump and Treatment System Performance Evaluation*, March 2010). Using site-specific data, the total width of the capture zone along the axis of the extraction well ranges between 520 and 856 ft using the combined minimum and maximum pumping rates of 17 and 28 gallons per minute (gpm). The maximum total width of the capture zone ranges between 1,040 and 1,712 ft. The distance to the point where capture ends downgradient of the extraction wells (stagnation point) ranges between 165 and 272 ft.

At the conclusion of the equilibration study, the drawdown in wells near the extraction wells was monitored during system startup. Curves of the drawdown in each well were constructed to evaluate which wells responded to the operation of the two extraction wells and the cone of influence. Also, the time to establish the containment zone was estimated from these curves. Review of the curves indicated that the drawdown resulting from the operation of extraction wells 0449 and 0450 at a combined rate of 24 gpm was small, ranging from 0.030 to 0.055 ft. Drawdowns were observed in wells 0410, 0416, 0418, P053, P054, P055, and P056. The small drawdowns are the result of low pumping rates in an aquifer with relatively high conductivity. It took between 350 and 400 minutes for the drawdowns to stabilize.

Distance-drawdown plots for each time period from 50 to 400 minutes after pumping started were constructed using the drawdown curves. Distance-drawdown plots are used to evaluate the radius of influence of a pumping well at a given extraction rate. The distance-drawdown plot indicates that drawdown created by the extraction wells operating at a combined rate of 24 gpm extends to approximately 1,000 ft after 400 minutes.

1.3.5 Capture Demonstration for Well 0418

An evaluation of the capture of the OU-1 P&T system was performed in late 2010. Capture was demonstrated by putting rhodamine WT dye into select wells and measuring the concentration of dye in the extraction wells. One of the wells evaluated was well 0418, which is located immediately downgradient of the two extraction wells. Dye was introduced in the well and was detected in well 0450 the next day. It was determined from the demonstration that well 0418 is within the capture zone of the P&T system.

1.3.6 Capture Demonstration for Wells P105 and P027

Limited aquifer testing was performed in February 2011 to determine the effective downgradient extent of the capture zone created by the current extraction rates of the P&T system (*Assessment of the OU-1 Pump and Treat System Capture Zone Effective Area*, February 2011). In addition, several external effects on the local water levels that would affect the capture zone calculations were evaluated.

The results of the aquifer test program indicated that the current combined pumping rate of approximately 36.5 gpm created a capture zone that includes wells P015 and P027. Also, the aquifer in the OU-1 area is predominantly unconfined and can be recharged through localized infiltration.

2.0 Rebound Study Monitoring Approach

A rebound study is being performed to obtain data to evaluate the changes in VOC concentrations in the monitoring network and changes in groundwater flow when the P&T system is not in operation. Samples will be collected from select wells and in situ sampling points to establish contaminant fate and transport patterns. Data will be collected at locations and frequencies that will allow for adequate time to prevent unacceptable migration of VOCs in groundwater. Water level measurements will be made to determine groundwater flow directions and changes caused by seasonal events. These data will also be used to determine if the monitoring network is adequate to detect migration of the VOC impacted groundwater during the study period.

2.1 Monitoring Well Sampling

Groundwater samples will be collected for VOC analysis from select wells in the OU-1 area (Figure 2). Initially, wells will be sampled biweekly in order to monitor the changes in VOC distribution and to ensure that unacceptable migration of VOC-impacted groundwater does not occur. If it is determined that changes in VOC concentrations are not occurring rapidly, a proposal to lengthen the sampling frequency will be made. Monitoring wells have been divided into the following categories:

- **Source Area Monitoring:** Monitoring locations 0305, 0417, P053, P054, and P056 are located within the landfill footprint or immediately upgradient of the extraction wells. Well P056 represents the highest VOC impact in the landfill area. Since these wells are upgradient of the P&T system, it is known that VOC-impacted groundwater can be captured at these locations.
- **Capture Zone Monitoring:** Monitoring wells 0410, 0416, 0418, 0419, and 0424 are located within the capture zone either along the side or downgradient of the extraction wells.
- **Downgradient Monitoring:** Downgradient wells P015 and P027 are along the edge the capture zone of the P&T system. However, well P031 is not within the capture zone.

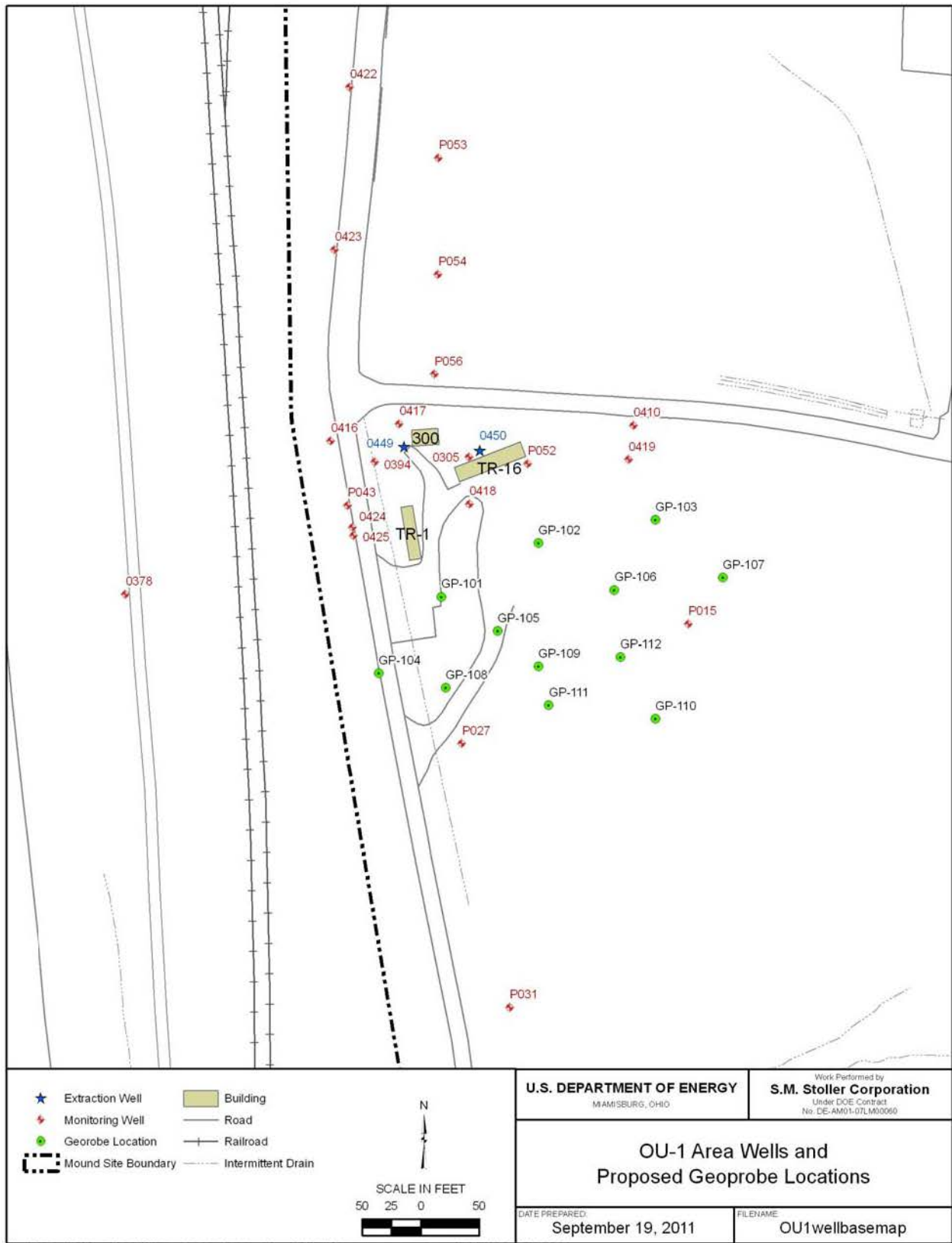


Figure 2. Rebound Test Groundwater Monitoring Locations

2.2 Water Level Monitoring

Water level measurements will be made biweekly for the OU-1 network that is presently used to construct the water table maps (Figure 2). These measurements will be used to determine the natural groundwater flow directions and gradients. The expectation is that the configuration of the water table can be determined under both low and high groundwater conditions.

2.3 Geoprobe Sampling

Geoprobe sampling will be performed periodically to evaluate the movement of VOC impacted groundwater south of the extraction well system. A baseline sampling event will be performed at the start of the study, and additional events will be performed quarterly during the first year of the study period. These data will be used to determine the following:

- The downgradient edge of VOC impact between the extraction wells and the edge of the known capture zone.
- Potential flow paths not monitored by the existing monitoring well network.
- Potential changes in VOC concentrations caused by changes in groundwater flow directions.

Ten locations were designated for the collection of groundwater samples using direct-push methods (Figure 2). Two additional locations (GP-111 and GP-112) were added to the network based on data obtained during the baseline sampling event. Groundwater samples will be collected using either a screen point sampler or a mill slot sampler. One sample will be collected from each location. Review of the depth to the outwash in nearby wells compared to the groundwater elevations indicates that the groundwater only occurs in the outwash. This is the portion of the aquifer that will be targeted since the majority of groundwater movement occurs in the more permeable units. It is proposed that the sampler be pushed to a depth that will result in the sample being collected from the same interval as nearby wells.

3.0 Contingency Actions

Level of concern (LOC) values have been set for wells and Geoprobe locations within the source area and capture zone, and triggers have been set for capture zone and downgradient wells and Geoprobe locations (Table 3). LOCs will be used as indicators that conditions in the OU-1 area need to be evaluated more closely. Trigger values have been set for locations downgradient of the extraction system. Data from wells that have triggers will be used to determine whether additional sampling is necessary, if new wells should be installed, or if the P&T system will need to be turned back on to prevent unacceptable migration of VOC impacted groundwater. Triggers have been set at levels that will allow the test to run for as long as possible without negatively impacting the groundwater.

The P&T system may be restarted based on an exceedence of triggers in monitoring wells. While this test plan focuses on TCE and PCE values to initiate contingency actions, significant changes in the other VOCs could prompt evaluating the impacts on downgradient groundwater. The Mound Groundwater Technical Team will investigate exceedences of LOC values and initial exceedences of trigger values and provide a recommendation to the Core Team on additional

actions, if warranted. The Core Team will be notified in the event of a second exceedence of a trigger value in the downgradient wells.

Table 3. Proposed Trigger Levels for VOCs during OU-1 Rebound Test

Well	Level of Concern (TCE only)	Trigger Level (TCE and PCE)	Notes
Source Area Monitoring			
0305	425	---	LOC—2.5x maximum concentration in upgradient well P056 in 2010
0417	425	---	
P056	425	---	
P053	15	---	LOC—2.5x maximum concentration in this well in 2010
P054	50	---	
Capture Zone Monitoring			
0416		5	Trigger—MCL; close proximity of property boundary
0424		5	
0410	25	50	LOC—2.5x maximum concentration seen in 2010
0418	37.5	75	Trigger—2x LOC
0419	15	30	
Downgradient Monitoring			
P015	---	5	Trigger—MCL; concentrations less than MCL
P027	---	5	Trigger—MCL; concentrations less than 1 µg/L
P031	---	5	
Geoprobe Locations			
GP-101	25	50	LOC and trigger—Similar to capture zone well 0410
GP-102	25	50	
GP-103	25	50	
GP-104	---	5	Trigger—MCL; downgradient edge of capture zone
GP-105	10	20	LOC—2x MCL
GP-106	10	20	Trigger—2x LOC
GP-107	10	20	
GP-108	10	20	
GP-109	---	5	Trigger—MCL; downgradient edge of capture zone
GP-110	---	5	
GP-111	---	5	
GP-112	---	5	

3.1 Exceedence of LOC Values in Monitoring Wells

If the TCE concentration in a well exceeds an LOC value (Table 3), the data from that well will be evaluated for trends, and additional wells could be added to the monitoring program to ensure that unacceptable migration is not occurring. Water level data will also be evaluated to determine flow directions and ensure adequate monitoring of migration pathways. Figure 3 provides a decision tree outlining actions that could be taken.

3.2 Exceedence of Trigger Values in Monitoring Wells

TCE and PCE data will be compared to trigger values outlined in Table 3. An exceedence of a trigger value will result in the well being resampled to confirm that it does not exceed the trigger. Resampling will be performed within 10 days of discovery of the exceedence. The data will be submitted for accelerated analysis, with a minimum turnaround time of 7 days.

A confirmed exceedence of a trigger in well 0410, 0416, 0418, or 0419 will result in evaluation of trends and hydrologic conditions at that location, and other locations and additional wells may be added to the monitoring program to ensure that unacceptable migration is not occurring. If any of these locations exceeds the trigger for two consecutive sampling events (not including the resampling event), the contingency action may include reactivating the P&T system. Figure 4 provides a decision tree outlining actions that could be taken.

A confirmed exceedence of a trigger in well P015, P027, or P031 will result in the wells being sampled more frequently. If the trigger is exceeded a second time (not including the resampling event), the P&T system will be restarted.

3.3 Exceedence of LOC and Trigger Values in Geoprobe Locations

If the TCE concentration in a Geoprobe location exceeds an LOC value, the data from that location and nearby monitoring wells will be evaluated for trends. Water level data will also be evaluated to determine flow directions and ensure adequate monitoring of migration pathways. Figure 5 provides a decision tree outlining actions that could be taken.

Geoprobe locations within the capture zone that have TCE or PCE concentrations that exceed trigger values will be evaluated for trends. The sampling frequency will be increased in the downgradient monitoring wells in response to the trigger exceedence.

An exceedence of a trigger value for TCE or PCE in a downgradient Geoprobe location (GP-004, GP-109, GP-110, GP-111, or GP-112) will be verified by performing another Geoprobe sampling event of the subject location, and possibly nearby locations, within 14 days of discovery of the exceedence.

A confirmed exceedence of a trigger in the downgradient Geoprobe location will result in the installation of a monitoring well at the subject location. The new well will be installed and sampled within 21 days of the confirmation of the exceedence. The data will be submitted for accelerated analysis, with a minimum turnaround time of 7 days. If the data from the new well exceed the MCL, the P&T system will be restarted. If the data do not exceed the MCL, future data from the well will be evaluated using the decision tree in Figure 4.

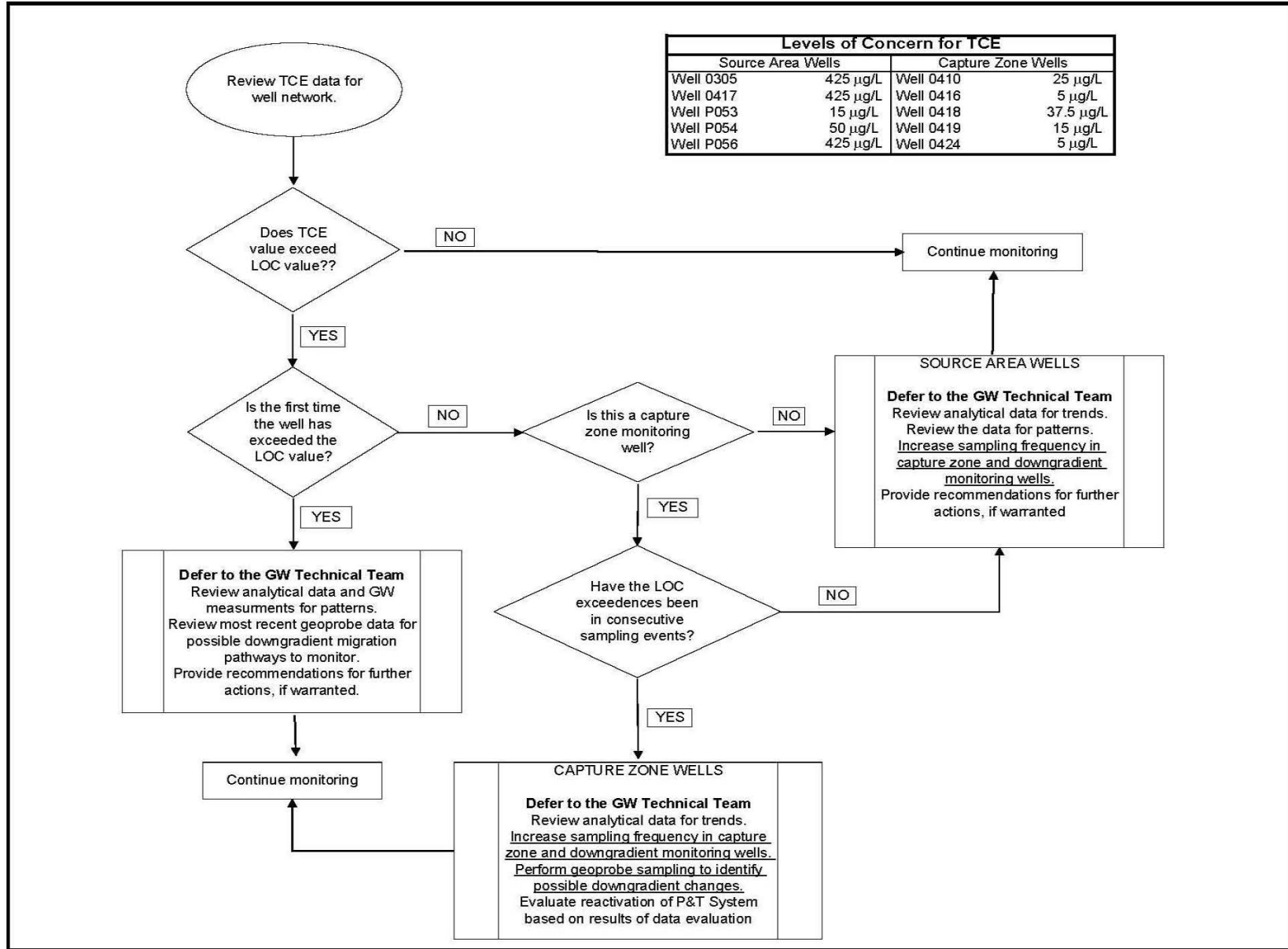


Figure 3. Decision Tree Regarding LOC Exceedence in Monitoring Wells

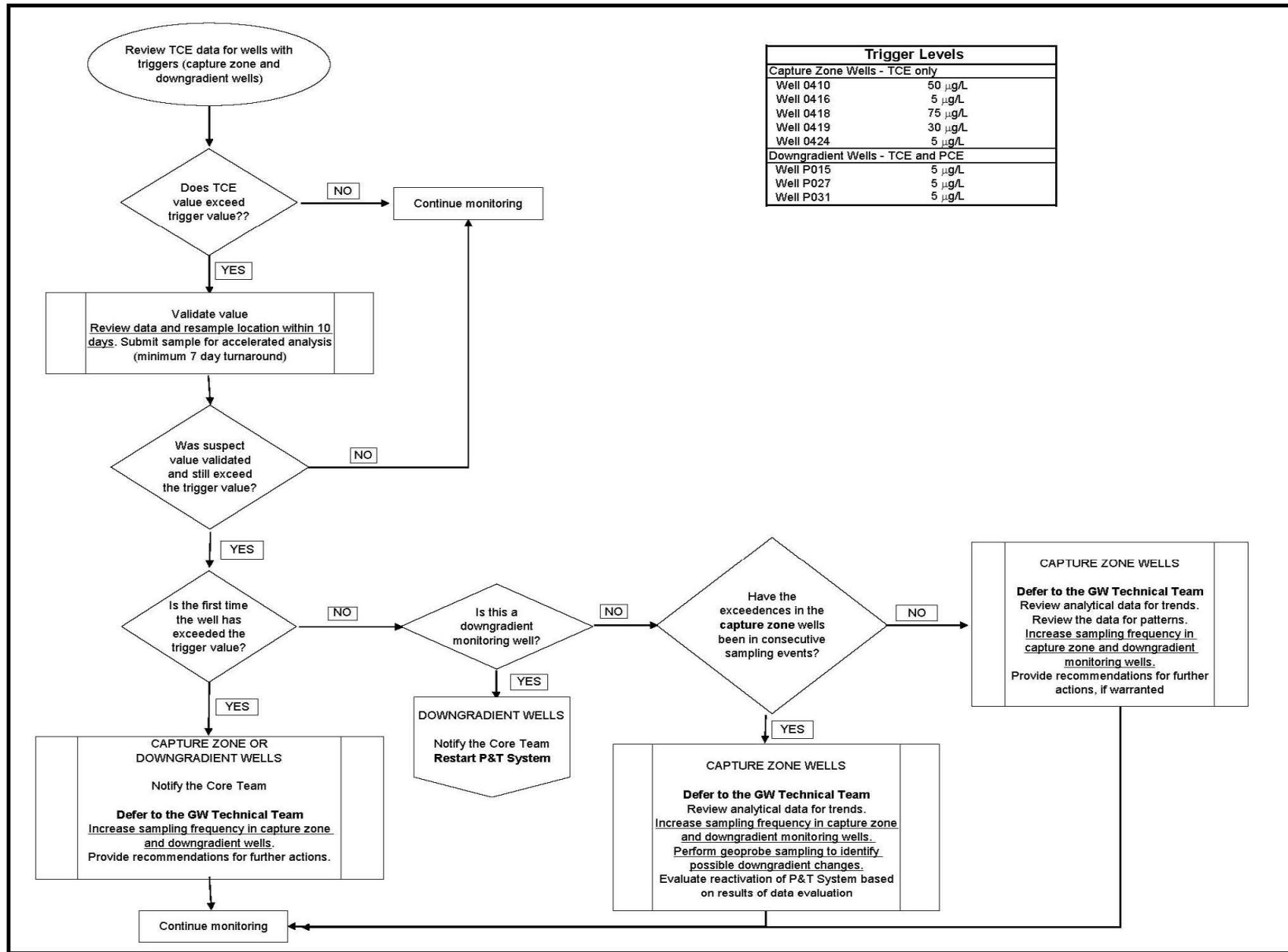
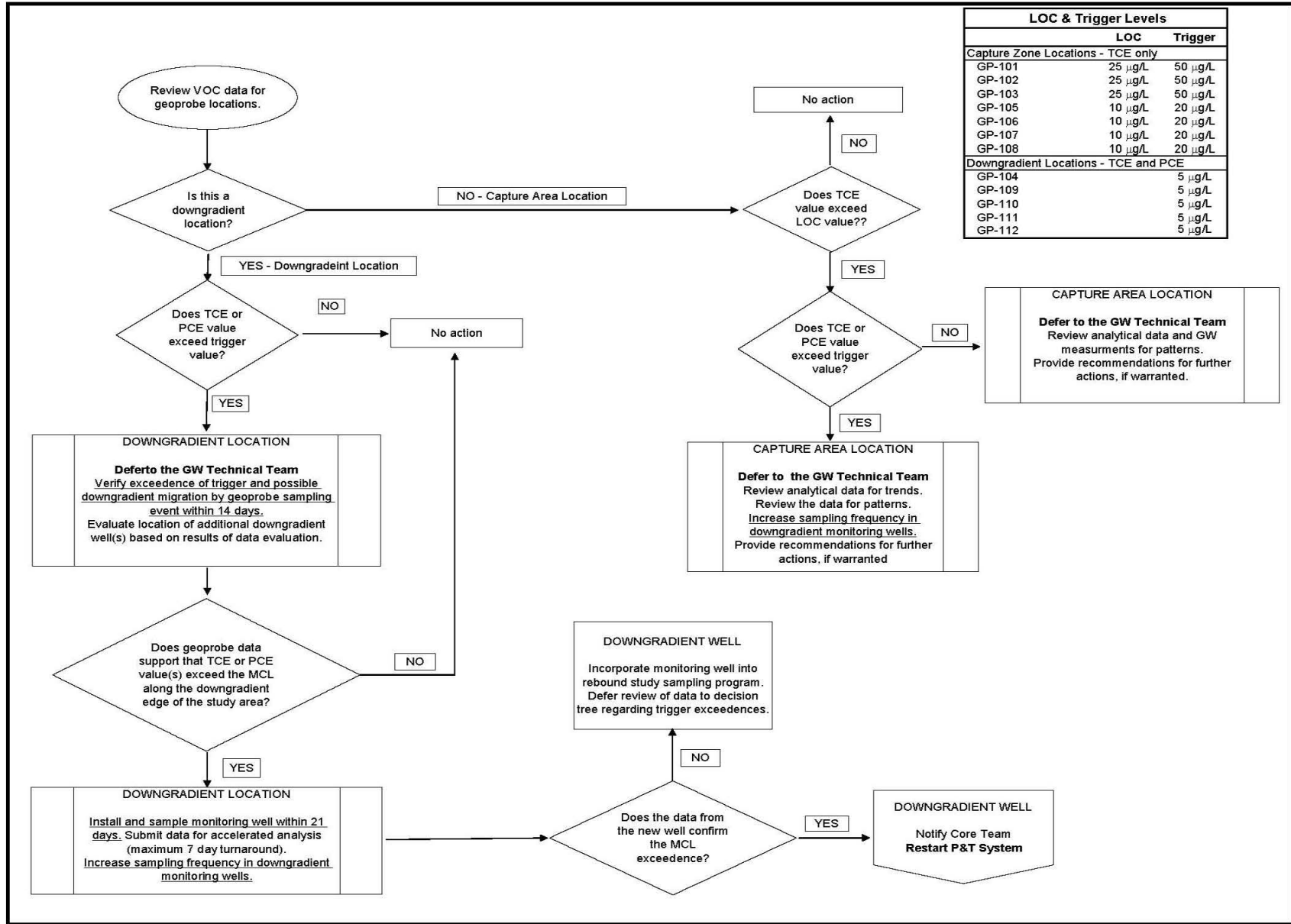


Figure 4. Decision Tree Regarding Trigger Level Exceedence in Monitoring Wells



LOC & Trigger Levels		
	LOC	Trigger
Capture Zone Locations - TCE only		
GP-101	25 µg/L	50 µg/L
GP-102	25 µg/L	50 µg/L
GP-103	25 µg/L	50 µg/L
GP-105	10 µg/L	20 µg/L
GP-106	10 µg/L	20 µg/L
GP-107	10 µg/L	20 µg/L
GP-108	10 µg/L	20 µg/L
Downgradient Locations - TCE and PCE		
GP-104		5 µg/L
GP-109		5 µg/L
GP-110		5 µg/L
GP-111		5 µg/L
GP-112		5 µg/L

CAPTURE AREA LOCATION

Defer to the GW Technical Team
 Review analytical data and GW measurements for patterns.
 Provide recommendations for further actions, if warranted.

CAPTURE AREA LOCATION

Defer to the GW Technical Team
 Review analytical data for trends.
 Review the data for patterns.
 Increase sampling frequency in downgradient monitoring wells.
 Provide recommendations for further actions, if warranted

DOWNGRADIANT LOCATION

Defer to the GW Technical Team
 Verify exceedence of trigger and possible downgradient migration by geoprobe sampling event within 14 days.
 Evaluate location of additional downgradient well(s) based on results of data evaluation.

DOWNGRADIANT LOCATION

Install and sample monitoring well within 21 days. Submit data for accelerated analysis (maximum 7 day turnaround).
 Increase sampling frequency in downgradient monitoring wells.

DOWNGRADIANT WELL

Incorporate monitoring well into rebound study sampling program.
 Defer review of data to decision tree regarding trigger exceedences.

DOWNGRADIANT WELL

Notify Core Team
Restart P&T System

Figure 5. Decision Tree Regarding LOC and Trigger Level Exceedence in Geoprobe Locations

4.0 Data Evaluation

Meeting the objectives of the study will be based on data obtained from wells and Geoprobe locations in the source area, the capture zone, and the downgradient edge of the capture zone. Data will be evaluated to prevent unacceptable increases in VOC concentrations that would affect the downgradient Buried Valley Aquifer. Also, groundwater level data will be used to ensure that the monitoring network is adequate to monitor migration pathways throughout the study period.

These data will also be used to determine the feasibility of implementing MNA to address the residual VOCs in groundwater and the adequacy of the existing monitoring network to support an MNA remedy.

4.1 Contaminant Distribution

The distribution of VOCs in groundwater will change without the hydraulic containment created by the P&T system. Residually impacted soil is present within the OU-1 landfill footprint and provides a source for groundwater impact. Samples will be collected from wells within the source area of the landfill, the capture zone of the P&T system, and downgradient of the extraction wells to determine the distribution of VOCs in groundwater. Data from the Geoprobe sampling efforts can be used to fill in the area between the extraction wells and downgradient wells P015 and P027. Also, data from the monitoring wells will be evaluated to determine changes in concentrations and possible decreasing trends that would result in attaining MCLs. Data will be compared to LOCs and trigger values to ensure that actions are taken to prevent unacceptable migration of the VOC impacted groundwater.

4.2 Groundwater Elevations

Groundwater elevations in the OU-1 area will return to a natural or unstressed state after the P&T system is turned off. The previous equilibration study indicated that the groundwater elevations should stabilize within approximately 24 hours. Water levels do rise and fall in response to precipitation events and changes in river levels.

The localized groundwater flow beneath the landfill area without influence from the extraction wells is to the south. Hydrologic (recharge from canal) and geologic (outwash/bedrock contact) controls also promote the southward movement of groundwater. The differences in groundwater elevations across the OU-1 area are small (on the order of 0.1 ft) and result in low hydraulic gradients.

Maps of the groundwater elevations will be generated to evaluate groundwater flow in the OU-1 area to ensure that the proposed monitoring network adequately monitors the movement of impacted groundwater throughout the study period. Also, this data will be used to select a groundwater monitoring network for evaluation of the remedy.

4.3 Adequacy of the Monitoring Network

The existing monitoring well network will be evaluated to determine if it adequately provides data to confirm that MNA is functioning as expected if that remedy is selected to address the

residual VOC impact in groundwater. The network should provide data that meet the following objectives:

- Monitor the VOC concentrations in the area of highest impact.
- Demonstrate that the area of impact is not expanding outside the area where expected migration will occur.
- Demonstrate that the downgradient Buried Valley Aquifer is not being adversely impacted.
- Provides data under all hydrologic conditions (i.e., seasonal groundwater flow variations).

5.0 Groundwater Exit Strategy

Since the source has been removed, the feasibility of moving away from containment to MNA is being considered. If contaminant and groundwater behavior meets the conditions specified in this section, MNA will be proposed as a viable alternative for the groundwater in the OU-1 area.

5.1 Consideration of an MNA Remedy

The following conditions should be met in order to consider an MNA remedy to address the residual VOCs in the OU-1 groundwater:

- Decreasing trends in source area wells (0305, 0417, P053, P054, and P056).
- Stable concentrations that do not exceed the trigger values in the capture zone wells (0410, 0416, 0418, 0419, and 0424).
- Concentrations less than the trigger values in the downgradient wells (P015, P027, and P031).
- A monitoring network that is deemed adequate to meet the objectives set in Section 4.3.

5.2 Period of Performance

The following criteria will be used to determine the duration of the rebound study and the exit strategy for transitioning to a passive MNA remedy: If there are no observed exceedances of the trigger levels in Table 3 in any OU-1 monitoring wells for 24 consecutive months after initiation of the rebound study on June 20, 2011, then the rebound study will be considered complete, and DOE may begin the process of changing to a passive MNA remedy for OU-1. If the OU-1 treatment system is restarted at any time due to an exceedance of Table 3 trigger levels:

- DOE will operate the P&T system for 12 consecutive months or until the source at P056 decreases to 75 percent of the concentration measured when the P&T system was reactivated and no trigger exceedances are measured in the monitoring network.
- At the end of the 12-month operating period, if no trigger exceedances have occurred, a new rebound test will be initiated, and the same criteria listed above shall be used to determine when the rebound test is complete.

6.0 Reporting

The groundwater quality, sampling frequencies, and static water level measurements will be documented in a monthly report. This report will also document any changes made to the monitoring program as the study progresses.

This page intentionally left blank