Final Report

Pilot Region-Based Optimization Program for Fund-Lead Sites in EPA Region 3

Site Optimization Tracker: Croydon TCE Site Bristol Towns, Pennsylvania

EPA Region III

Solid Waste and
Emergency Response
(5102P)

EPA 542-R-06-006i
December 2006
www.epa.gov

Pilot Region-Based Optimization Program for Fund-Lead Sites in EPA Region 3

Site Optimization Tracker: Croydon TCE Site Bristol Towns, Pennsylvania

EPA Region III

Site Optimization Tracker:

Croydon TCE Site
Bristol Towns, Pennsylvania

EPA Region III

December 30, 2005

SECTION 1:

CURRENT SITE INFORMATION FORM

Date: 12/30/05 Filled Out By: GeoTrans, Inc.

A. Site Location, Contact Information, and Site Status

1. Site name	2. Site Location (city and State)	3. EPA Region
Croydon TCE	**Bristol Township, PA**	**3**

4a. EPA RPM	5a. State Contact
Kelley Chase (used to be Jill Lowe)	**Mark Conaron**
4b. EPA RPM Phone Number	5b. State Contact Phone Number
215-814-3124	**484-250-5730**
4c. EPA RPM Email Address	5c. State Contact Email Address
chase.kelley@epa.gov	**mconaron@state.pa.us**

5. Is the ground water remedy an interim remedy or a final remedy? Interim ☐ Final ☒

6. Is the site EPA lead or State-lead with Fund money? EPA ☒ State ☐

B. General Site Information

1a. Date of Original ROD for Ground Water Remedy	1b. Dates of Other Ground Water Decision Documents (e.g., ESD, ROD Amendment)
06/29/90	**ROD OU1 - 12/28/88; ESD OU2 12/31/96**
2a. Date of O&F	2b. Date for transfer to State
11/21/95	**11/21/2005**

3. What is the primary goal of the P&T system (select one)?

- ☐ Contaminant plume containment
- ☐ Aquifer restoration
- ☒ Containment and restoration
- ☐ Well-head treatment

4. Check those classes of contaminants that are contaminants of concern at the site.

- ☒ VOCs (e.g., TCE, benzene, etc.)
- ☐ SVOCs (e.g., PAHs, PCP, etc.)
- ☐ metals (e.g., arsenic, chromium, etc.)
- ☐ other

5. Has NAPL or evidence of NAPL been observed at the site? Yes ☐ No ☒

6. What is the approximate total pumping rate? **62 gpm**

7. How many active extraction wells (or trenches) are there? **6**

8. How many monitoring wells are regularly sampled? **29**

9. How many samples are collected from monitoring wells or piezometers each year? (e.g., 40 if 10 wells are sampled quarterly) **29**

10. How many process monitoring samples (e.g., extraction wells, influent, effluent, etc.) are collected and analyzed each year? (e.g., 24 if influent and effluent are sampled monthly) **44**

11. What above-ground treatment processes are used (check all that apply)?

- ☒ Air stripping
- ☐ Carbon adsorption
- ☐ Filtration
- ☒ Off-gas treatment
- ☐ Ion exchange
- ☐ Metals precipitation
- ☐ Biological treatment
- ☐ UV/Oxidation
- ☐ Reverse osmosis
- ☐ Other

12. What is the approximate percentage of system downtime per year? 10% ☒ 10 - 20% ☐ >20% ☐

C. Site Costs

1. Annual O&M costs

O&M Category	Actual[1] Annual Costs for FY04	Estimated[2] Annual Costs for FY05	Estimated[2] Annual Costs for FY06
Labor: project management, reporting, technical support	**$31,500**	**$32,000**	**
Labor: system operation	**$31,000**	**$32,000**	**
Labor: ground water sampling	**$27,000**	**$27,000**	**
Utilities: electricity	**$16,300**	**$17,000**	**
Utilities: other	**$4,600**	**$5,000**	**
Consumables (GAC, chemicals, etc.)	**$0**	**$0**	**
Discharge or disposal costs	**$7,600**	**$8,000**	**
Analytical costs	**$7,500***	**$7,500***	**
Other (parts, routine maintenance, etc.)	**$9,400**	**$10,000**	**
O&M Total	**$134,900**	**$138,500**	**

The O&M total should be equal to the total O&M costs for the specified fiscal years, including oversight from USACE or another contractor. For costs that do not fit in one of the above cost categories, include them in the "Other" category. If it is not possible to break out the costs into the above categories, use the categories as best as possible and provide notes in the following box.

2. Non-routine or other costs			**

Additional costs beyond routine O&M for the specified fiscal years should be included in the above spaces. Such costs might be associated with additional investigations, non-routine maintenance, additional extraction wells, or other operable units. The total costs billed to the site for the specified fiscal years should be equal to the O&M total plus the costs entered in item 2.

Notes on costs:

1. FY04 Costs, with the exception of the analytical costs, were provided by the RPM.
2. FY05 costs are based on projections by the RPM and discussions during the optimization follow-up meetings.

* Analytical costs were estimated by the ROET based on the sampling program. The analytical costs are not incurred by the EPA site team because the samples are analyzed by the CLP program. However, analytical costs similar to those estimated will likely be incurred by the State when the site is transferred to the State after LTRA. The decrease from FY05 to FY06 reflects the assumed sampling reduction.

** FY06 costs are not provided because the site will be largely managed and financed by the State. Contractors and contractor costs may be different than those under EPA management.

- "Labor: Ground water sampling" includes shipment of samples, sampling supplies, rental of field instruments, and travel expenses.
- "Labor: Reporting" includes preparation of Annual O&M Report.
- "Utilities: Other" includes lawn mowing, and site security.
- "Disposal Costs" includes annual cleaning of AST, replacement and disposal of GAC.
- "Other Costs" (2004) includes replacement of blower and well repair.

D. Five-Year Review

1. Date of the Most Recent Five-Year Review	**12/12/2001**

2. Protectiveness Statement from the Most Recent Five-Year Review

☐ Protective	☐ Not Protective
☒ Protective in the short-term	☐ Determination of Protectiveness Deferred

3. Please summarize the primary recommendations in the space below

Implement IC to prohibit use of ground water

Enlarge ground water monitoring program

Renegotiate access

Optimize operation & effectiveness of P&T

Prepare for PADEP takeover in Novemeber 2005

E. Other Information

If there is other information about the site that should be provided please indicate that information in the space below. Please consider enforcement activity, community perception, technical problems to be addressed, and/or areas where a third-party perspective may be valuable.

There is a PRP plume associated with Rohm and Haas plant on other side of creek.

This PRP plume has TCE, plus ammounium sulfate. So far ammonium sulfate has not impacted Croydon Site wells.

The site is scheduled for transfer in November 2005, indicating that the site will likely be managed by the State during any subsequent follow-up events.

SECTION 2:

FOLLOW-UP HISTORY AND SUMMARIES

Note: Follow-up summaries are provided in reverse chronological order and include updated and/or new recommendations.

FOLLOW-UP HISTORY

Date of Original Optimization Evaluation	December 1, 2004 (Evaluation meeting) August 5, 2005 (Final Report)

	Meeting Date	Report Date	Item
X	July 20, 2005	August 5, 2005	Follow-Up #1 (conducted as part of pilot project)
X	October 19, 2005	December 30, 2005	Follow-Up #2 (conducted as part of pilot project)
			Follow-Up #3
			Follow-Up #4
			Follow-Up #5
			Follow-Up #6
			Follow-Up #7
			Follow-Up #8

"x" in box indicates the item has been completed

SUMMARY OF FOLLOW-UP #2

Site or System Name	Croydon TCE Site
Date of This Follow-Up Summary	December 30, 2005
Date of Follow-Up Meeting or Call (Indicate if Meeting or Call)	October 19, 2005 – Meeting

ROET MEMBERS CONDUCTING THE FOLLOW-UP EVALUATION:

Name	Affiliation	Phone	Email
Norm Kulujian	U.S. EPA Region 3	215-814-3130	kulujian.norm@epa.gov
Kathy Davies	U.S. EPA Region 3	215-814-3315	davies.kathy@epa.gov
Paul Leonard	U.S. EPA Region 3	215-814-3350	leonard.paul@epa.gov
Peter Ludzia	U.S. EPA Region 3	215-814-3224	ludzia.peter@epa.gov
Peter Rich	GeoTrans, Inc.	410-990-4607	prich@geotransinc.com
Rob Greenwald	GeoTrans, Inc.	732-409-0344	rgreenwald@geotransinc.com
Doug Sutton	GeoTrans, Inc.	732-409-0344	dsutton@geotransinc.com
Kathy Yager	U.S. EPA OSRTI	617-918-8362	yager.kathleen@epa.gov
Steve Chang	U.S. EPA OSRTI	703-603-9017	chang.steven@epa.gov

SITE TEAM MEMBERS (INCLUDING CONTRACTORS) INTERVIEWED

Name	Affiliation	Phone	Email
Kelley Chase	U.S. EPA Region 3 (RPM)	215-814-3124	chase.kelley@epa.gov
Bruce Rundell	U.S. EPA Region 3 (Hydro)	215-814-3317	rundell.bruce@epa.gov

IMPLEMENTATION STATUS OF ALL RECOMMENDATIONS UNDER CONSIDERATION BUT NOT PREVIOUSLY IMPLEMENTED

Recommendation	**E-2.1 Work with County to Institute Institutional Controls**		
Recommendation Reason	Protectiveness	**Implementation Status**	Deferred to State
Comments: The site team has not made progress on this recommendation. Now that the site has transferred, EPA will need to work with the State regarding appropriate institutional controls. In addition, after further review of the ROD, EPA is not completely sure that institutional controls are required by the ROD.			

Recommendation	**E-2.2 Extend Access Agreement with Rohm and Haas**		
Recommendation Reason	Protectiveness	**Implementation Status**	Deferred to State
Comments: Now that the site has transferred to the State, EPA no longer needs site access. The State will need to move forward with obtaining access.			

Recommendation	**E-5.1 Defer P&T System Exit Strategy to After Transfer of the Site to the State**		
Recommendation Reason	Site Closeout	**Implementation Status**	Implemented
Comments: EPA has deferred development of an exit strategy to the State.			

Key for recommendation numbers:

- *E denotes a recommendation from the original optimization evaluation*
- *F1, F2, etc. denote recommendations from the first, second, etc. follow-up meeting*
- *The number corresponds to the number of the recommendation as stated in the optimization evaluation or follow-up summary where the recommendation was provided*

RECOMMENDATIONS PREVIOUSLY IMPLEMENTED OR THAT WILL NOT BE IMPLEMENTED

Recommendation	**E-3.1 Reduce Process Monitoring**		
Recommendation Reason	Cost Reduction	**Implementation Status**	Will not be implemented
Comments: The State will not deviate from the current process monitoring program for both aqueous and vapor sampling.			

Key for recommendation numbers:

- *E denotes a recommendation from the original optimization evaluation*
- *F1, F2, etc. denote recommendations from the first, second, etc. follow-up meeting*
- *The number corresponds to the number of the recommendation as stated in the optimization evaluation or follow-up summary where the recommendation was provided*

OTHER CHANGES, UPDATES, OR SIGNIFICANT FINDINGS SINCE LAST FOLLOW-UP

- It was reported during the follow-up meeting that the State is scheduled to take over the site in November 2005.

NEW OR UPDATED RECOMMENDATIONS FROM THIS FOLLOW-UP

- None.

SUMMARY OF FOLLOW-UP #1

Site or System Name	Croydon TCE Site
Date of This Follow-Up Summary	August 5, 2005
Date of Follow-Up Meeting or Call (Indicate if Meeting or Call)	July 20, 2005 – Meeting

ROET MEMBERS CONDUCTING THE FOLLOW-UP EVALUATION:

Name	Affiliation	Phone	Email
Norm Kulujian	U.S. EPA Region 3	215-814-3130	kulujian.norm@epa.gov
Kathy Davies	U.S. EPA Region 3	215-814-3315	davies.kathy@epa.gov
Paul Leonard	U.S. EPA Region 3	215-814-3350	Leonard.paul@epa.gov
Peter Rich	GeoTrans, Inc.	410-990-4607	prich@geotransinc.com
Rob Greenwald	GeoTrans, Inc.	732-409-0344	rgreenwald@geotransinc.com
Doug Sutton	GeoTrans, Inc.	732-409-0344	dsutton@geotransinc.com

SITE TEAM MEMBERS (INCLUDING CONTRACTORS) INTERVIEWED

Name	Affiliation	Phone	Email
Kelley Chase	U.S. EPA Region 3 (RPM)	215-814-3124	chase.kelley@epa.gov
Bruce Rundell	U.S. EPA Region 3 (Hydrogeologist)	215-814-3317	rundell.bruce@epa.gov
Colleen Becker	U.S. EPA Region 3		

IMPLEMENTATION STATUS OF PREVIOUSLY IDENTIFIED RECOMMENDATIONS

Recommendation	**2.1 Work with county to Institute Institutional Controls**		
Recommendation Reason	Protectiveness	**Implementation Status**	Under consideration
Comments: Update status during next follow-up.			

Recommendation	**2.2 Extend Access Agreement with Rohm and Haas**		
Recommendation Reason	Protectiveness	**Implementation Status**	Under consideration
Comments: Update status during next follow-up.			

Recommendation	**3.1 Reduce Process Monitoring**		
Recommendation Reason	Cost Reduction	**Implementation Status**	Will not be implemented
Comments: RPM indicates that State is not inclined to deviate from the current process monitoring.			

Recommendation	**5.1 Defer P&T System Exit Strategy to After Transfer of the Site to the State**		
Recommendation Reason	Site Closeout	**Implementation Status**	In Progress
Comments: EPA and PADEP are coordinating regarding the best approach for the P&T system exit strategy.			

Other Changes, Updates, Or Significant Findings Since Last Follow-Up

None.

New or Updated Recommendations from This Follow-up

None.

UPDATED COST SUMMARY TABLE

Recommendation	Reason	Implementation Status	Estimated Capital Costs ($)	Actual Capital Costs ($)	Estimated Change in Annual Costs ($/yr)	Actual Change in Annual Costs ($/yr)
Original Optimization Evaluation Recommendations						
2.1 Work with County to Institute Institutional Controls	Protectiveness	Deferred to State	$15,000		$0	
2.2 Extend Access Agreement with Rohm and Haas	Protectiveness	Deferred to State	Not quantified		Not quantified	
3.1 Reduce Process Monitoring	Cost Reduction	Will not be implemented	$0		($2,000)	
5.1 Defer P&T System Exit Strategy to After Transfer of the Site to the State	Site Closeout	Implemented	$0	$0	($80,000)*	$0
New or Updated Recommendations from Follow-up #1, July 20, 2005						
None.						
New or Updated Recommendations from Follow-up #2, October 19, 2005						
None.						

Costs in parentheses imply cost reductions.

** Potential savings that might be implemented if the P&T system is shut down and the site is still managed with monitoring and reporting.*

APPENDIX: A

ARCHIVE OF TECHNICAL ASSISTANCE PROVIDED BY THE ROET

Note: Technical assistance items are provided in reverse chronological order.

Technical assistance has not been provided by the ROET to date.

APPENDIX: B

BASELINE SITE INFORMATION SHEET AND OPTIMIZATION EVALUATION REPORT

Streamlined
Optimization Evaluation Report

Croydon TCE Site
Bristol Towns, Pennsylvania

EPA Region III

August 5, 2005

SECTION 1:

BASELINE SITE INFORMATION FORM

Date: 1/14/05 Filled Out By: GeoTrans

A. Site Location, Contact Information, and Site Status

1. Site name	2. Site Location (city and State)	3. EPA Region
Croydon TCE	**Bristol Township, PA**	**3**

4a. EPA RPM	5a. State Contact
Kelley Chase (used to be Jill Lowe)	**Mark Conaron**
4b. EPA RPM Phone Number	5b. State Contact Phone Number
215-814-3124	**484-250-5730**
4c. EPA RPM Email Address	5c. State Contact Email Address
chase.kelley@epa.gov	**mconaron@state.pa.us**

5. Is the ground water remedy an interim remedy or a final remedy? Interim ☐ Final ☒

6. Is the site EPA lead or State-lead with Fund money? EPA ☒ State ☐

B. General Site Information

1a. Date of Original ROD for Ground Water Remedy	1b. Dates of Other Ground Water Decision Documents (e.g., ESD, ROD Amendment)
06/29/90	**ROD OU1 - 12/28/88; ESD OU2 12/31/96**
2a. Date of O&F	2b. Date for transfer to State
11/21/95	**11/21/2005**

3. What is the primary goal of the P&T system (select one)?

- ☐ Contaminant plume containment
- ☐ Aquifer restoration
- ☒ Containment and restoration
- ☐ Well-head treatment

4. Check those classes of contaminants that are contaminants of concern at the site.

- ☒ VOCs (e.g., TCE, benzene, etc.)
- ☐ SVOCs (e.g., PAHs, PCP, etc.)
- ☐ metals (e.g., arsenic, chromium, etc.)
- ☐ other

5. Has NAPL or evidence of NAPL been observed at the site? Yes ☐ No ☒

6. What is the approximate total pumping rate? **62 gpm**

7. How many active extraction wells (or trenches) are there? **6**

8. How many monitoring wells are regularly sampled? **29**

9. How many samples are collected from monitoring wells or piezometers each year? (e.g., 40 if 10 wells are sampled quarterly) **29**

10. How many process monitoring samples (e.g., extraction wells, influent, effluent, etc.) are collected and analyzed each year? (e.g., 24 if influent and effluent are sampled monthly) **11 quarterly**

11. What above-ground treatment processes are used (check all that apply)?

- ☒ Air stripping
- ☐ Carbon adsorption
- ☐ Filtration
- ☒ Off-gas treatment
- ☐ Ion exchange
- ☐ Metals precipitation
- ☐ Biological treatment
- ☐ UV/Oxidation
- ☐ Reverse osmosis
- ☐ Other

12. What is the approximate percentage of system downtime per year? 10% ☒ 10 - 20% ☐ >20% ☐

C. Site Costs

1. Annual O&M costs

O&M Category	Actual Annual Costs for FY03	Actual Annual Costs for FY04	Projected Annual Costs for FY05
Labor: project management, reporting, technical support	**$37,500**	**$31,500**	**$32,000**
Labor: system operation	**$31,000**	**$31,000**	**$32,000**
Labor: ground water sampling	**$17,700**	**$21,000**	**$21,000**
Utilities: electricity	**$13,800**	**$16,300**	**$17,000**
Utilities: other	**$4,700**	**$4,600**	**$5,000**
Consumables (GAC, chemicals, etc.)	**$0**	**$0**	**$0**
Discharge or disposal costs	**$0**	**$7,600**	**$8,000**
Analytical costs	**$5,500**	**$6,000**	**$6,000**
Other (parts, routine maintenance, etc.)	**$11,000**	**$9,400**	**$10,000**
O&M Total	**$121,200**	**$127,400**	**$131,000**

The O&M total should be equal to the total O&M costs for the specified fiscal years, including oversight from USACE or another contractor. For costs that do not fit in one of the above cost categories, include them in the "Other" category. If it is not possible to break out the costs into the above categories, use the categories as best as possible and provide notes in the following box.

2. Non-routine or other costs		

Additional costs beyond routine O&M for the specified fiscal years should be included in the above spaces. Such costs might be associated with additional investigations, non-routine maintenance, additional extraction wells, or other operable units. The total costs billed to the site for the specified fiscal years should be equal to the O&M total plus the costs entered in item 2.

Notes on costs:

Labor Reporting(2003): Includes preparation of QAPP/FSP and Annual O&M Report
Labor Reporting(2004): Includes preparation of Annual O&M Report.
Utilities: Others: Also includes lawn mowing, and site security.
Disposal Costs (2004): Includes annual cleaning of AST, replacement and disposal of GAC
Analytical Costs: Includes only shipment of samples, sampling supplies, rental of field instruments, and travel expenses. Analytical costs are paid by ASQAB.

Other Costs (2003): Includes repair of control panel.

Other Costs (2004): Includes replacement of blower and well repair.

D. Five-Year Review

1. Date of the Most Recent Five-Year Review	**12/12/2001**

2. Protectiveness Statement from the Most Recent Five-Year Review

☐ Protective	☐ Not Protective
☒ Protective in the short-term	☐ Determination of Protectiveness Deferred

3. Please summarize the primary recommendations in the space below

Implement IC to prohibit use of ground water

Enlarge ground water monitoring program

Remegotiate access

Optimize operation & effectiveness of P&T

Prepare for PADEP takeover in Novemeber 2005

E. Other Information

If there is other information about the site that should be provided please indicate that information in the space below. Please consider enforcement activity, community perception, technical problems to be addressed, and/or areas where a third-party perspective may be valuable.

There is a PRP plume associated with Rohm and Haas plant on other side of creek.

It also has TCE, plus ammounium sulfate. So far ammonium sulfate has not impacted Croydon Site wells.

SECTION 2:

STREAMLINED OPTIMIZATION EVALUATION FINDINGS AND RECOMMENDATIONS

Croydon TCE Site

Date of Evaluation Meeting: December 1, 2004 Date of Final Report: August 5, 2005

ROET MEMBERS CONDUCTING THE STREAMLINED OPTIMIZATION EVALUATION:

Name	Affiliation	Phone	Email
Kathy Davies	U.S. EPA Region 3	215-814-3315	Davies.kathy@epa.gov
Norm Kulujian	U.S. EPA Region 3	214-814-3130	Kulujian.norm@epaa.gov
Peter Schaul	U.S. EPA Region 3	215-814-3183	schaul.peter@epa.gov
Peter Rich	GeoTrans, Inc.	410-990-4607	prich@geotransinc.com
Rob Greenwald	GeoTrans, Inc.	732-409-0344	rgreenwald@geotransinc.com
Kathy Yager (by phone)	U.S. EPA OSRTI	617-918-8362	Yager.Kathleen@epa.gov
Steve Chang (by phone)	U.S. EPA OSRTI		Chang.steve@epamail.epa.gov

SITE TEAM MEMBERS (INCLUDING CONTRACTORS) INTERVIEWED

Name	Affiliation	Phone	Email
Bruce Rundell	U.S. EPA Region 3 (Hydro)	215-814-3317	rundell.bruce@epa.gov
Tony Dappolone	U.S. EPA Region 3 (Sec. Chief)	215-814-3188	dappalone.anthony@epa.gov
Kelley Chase	U.S. EPA Region 3 (RPM)	215-814-3124	chase.kelley@epa.gov
Jill Lowe	U.S. EPA Region 3 (old RPM)	215-814-3123	lowe.jill@epa.gov
Harish Mital	Tetra Tech	302-738-7551	harish.mital@tetratech.com
Mark Conaron	PADEP	484-250-5730	mconaron@state.pa.us
Tim Cherry	PADEP	484-250-5728	tcherry@state.pa.us

1.0 SIGNIFICANT FINDINGS BEYOND THOSE REPORTED ON SITE INFORMATION FORM

The evaluation team observed an RPM who appears to be an effective manager of a complex site, making decisions based on a comprehensive understanding of the site that considers the hydrogeology, engineering, costs, and relationships with other entities. The RPM appears to effectively utilize Regional technical resources (e.g., hydrogeologists), and Regional Management appears to be well informed regarding site progress. The observations and recommendations herein are not intended to imply a deficiency in the work of either the designers or operators, but are offered as constructive suggestions in the best interest of the EPA and the public. Recommendations made herein obviously have the benefit of site characterization data and the operational data unavailable to the original designers.

Findings beyond those reported on the site information form include the following:

- The site is located west of Hog Run Creek, and ground water flows east towards the creek and its tributaries. The primary contaminant, TCE, is also found in a separate plume located on the other side of Hog Run Creek which is being addressed by a private party (Rohm & Haas). The ROD only pertains to the plume west of Hog Run Creek. The plume east of Hog Run Creek also contains ammonium sulfate, and monitoring to date does not indicate impacts from ammonium sulfate west of Hog Run Creek (i.e., the P&T system for the Croydon TCE site does not appear to be drawing ammonium sulfate from the other side of the creek).

- The OU-2 ROD specifies ground water cleanup goals based on background, and subsequent to the ROD, PADEP issued new statewide health standards for ground water remediation that are less stringent but still protective of human health (e.g., TCE cleanup goal in the ROD is 1 ug/l, but under newer standards it would be 5 ug/l). Although there is general agreement that changing the ROD to these newer standards would be appropriate, no action has yet been taken in this regard. EPA would need to issue an appropriate decision document to change the ground water cleanup standards for the site.

- The ROD calls for institutional controls, but no progress has yet been made regarding instituting institutional controls. However, OU-1 included the extension of a waterline to potentially impacted residences, and during the 5-year review in 2001 it was verified during a site visit that existing residences did match the customer address of the water company. It is reported that no new users of ground water in the potentially impacted area are evident. EPA suggested during the evaluation meeting that the County is the most likely entity to get institutional controls established.

- The contaminant of primary concern is TCE. Concentrations are relatively low. In 2003 the maximum TCE concentration in a monitoring well was 16 ug/l. The maximum observed TCE concentration in a monitoring well has been declining:

    - 48 ug/l in 1997-98
    - 44 ug/l in 1999
    - 39 ug/l in 2000-01
    - 29 ug/l in 2002
    - 16 ug/l in 2003

- TCE concentrations are no longer measured at individual extraction wells, but are measured in observation wells located near extraction wells. Influent TCE concentration to the treatment plant is also quite low, and averaged approximately 15 ug/l in 2003. Changes in average influent concentration over time are reported as follows:

    - 24 ug/l in 1996
    - 24.4 ug/l in 1998
    - 14 ug/l in 2000
    - 12 ug/l in 2001-02
    - 15 ug/l in 2003

- There are little or no TCE daughter products observed. This suggests that concentration reductions over time are likely due to some combination of mass removal caused by pumping and/or natural processes such as dilution from net recharge and dispersion, but not largely due to biodegradation. The degree to which pumping is the cause of the observed concentration decreases, relative to other natural processes, is not easily determined.

- Given the pumping rate of 60-70 gpm from the 6 extraction wells, and an influent concentration of 15 ug/l, the approximate TCE mass removal rate is 4.3 lbs/yr. The stripper effectively treats the TCE in water to below the effluent discharge standard of 3 ug/l prior to discharge to Hog Run Creek.

- Off-gas from the stripper is heated and treated with VGAC, which is changed every other year. Air sampling on the VGAC is conducted quarterly using 7 canisters (GAC influent, GAC effluent, field blank, upwind, downwind, and at two residences). This requires two people for four hours per event. Analysis is performed by EPA contract lab (no charge to site). Given the low mass removed by the system (4.3 lbs/yr) the daily discharge of TCE to the air would be minimal even with carbon breakthrough.

- Surface water in Hog Run Creek is no longer sampled because of the very low contaminant concentrations in ground water (historically very low detections of VOCs in surface water were observed, but that was when ground water concentrations were much higher).

- The source of the TCE impacts west of Hog Run Creek (i.e., associated with the Croydon TCE site) has never been determined, despite attempts to do so as described in the OU2 ROD.

- Air stripper influent (and all other process monitoring) is analyzed quarterly. A sampling method is used where three different samples are taken 30 minutes apart, and each is analyzed. Although the site does not pay for the analyses (performed by the contract lab), the evaluation team noted during the evaluation meeting that analyzing three samples seems unnecessary from a technical standpoint, and given the consistency of past results, requesting a variance from any such regulation should be considered.

- The planned turnover date to PADEP is November 2005.

- A formal capture zone analysis has not been performed. However, given the lack of potential receptors, and the fact that such low TCE concentrations in ground water would not be expected to negatively impact the creek (where it discharges), some gaps in capture would likely not be a great concern at this site.

- The treatment plant is located on Rohm & Haas property, and the access agreement reportedly expired in 2004. This needs to be extended if the State plans on continuing operation. Also, any new wells near the creek that might be installed to better monitor conditions if the system is shut down would require an easement from Rohm and Haas.

Although concentrations are declining and are quite low, current cleanup standards in the ROD will not likely be met for many years. A primary issue at this site in the future will be whether or not P&T should continue. Considerations pertinent to this issue include the following: (1) the current cleanup levels are below MCLs, and ultimately changing these standards to MCLs to be consistent with other RODs is likely appropriate and should be considered; (2) although dilution and dispersion are occurring, breakdown products are not observed (although that may be due to the low TCE concentrations and therefore low concentrations of breakdown products) and a strong argument for MNA as a result of degradation cannot easily be made,; (3) concentrations of TCE are decreasing in key monitoring wells and mass continues to be removed from the affected aquifer; and (4) if at some point in the future trends of contaminant concentration and mass removal become asymptotic and it becomes apparent that ARARs will not be met, a TI waiver could be pursued.

2.0 RECOMMENDATIONS TO IMPROVE SYSTEM PROTECTIVENESS

2.1 WORK WITH COUNTY TO INSTITUTE INSTITUTIONAL CONTROLS

Although no potential receptors are apparent, the ROD indicates that institutional controls should be implemented as part of the remedy. EPA and PADEP should meet with the County to determine what (if anything) needs to be done to make sure no new wells can be drilled in areas potentially impacted by the site. EPA efforts for coordinating and/or participating in these activities might cost $15,000 assuming contractor support for meetings and other support tasks are required.

2.2 EXTEND ACCESS AGREEMENT WITH ROHM AND HAAS

If not already done, the access agreement with Rohm and Haas should be extended to allow for continued operation of the P&T system, monitoring of existing wells on Rohm and Haas property, and installation plus continued monitoring of potential new wells on Rohm and Haas property. The cost for these efforts cannot easily be quantified as part of this evaluation.

3.0 RECOMMENDATIONS TO REDUCE SYSTEM COST

3.1 REDUCE PROCESS MONITORING

To the extent P&T continues, the practice of taking 3 samples 30 minutes apart for each event is technically not justified, based on the consistency of historical data. It is recommended that a variance be requested from whatever requirement is the basis for such sampling. The cost savings for the site are negligible given that analysis is performed by contract lab, but the current practice causes unnecessary effort with respect to sampling, analysis at the lab, and reporting.

To the extent that P&T continues, it is recommended that air monitoring for the VGAC effluent be discontinued, or at most conducted once every other year (i.e., between changeouts to verify breakthrough has not occurred). Given the low TCE concentrations that result in very little mass removed by the system (4.3 lbs/yr = 0.01 lbs/day) it can be easily demonstrated that no impacts will occur to receptors even if there is VGAC breakthrough. Currently, VGAC is changed every other year, and cost to do those changes is low (estimated at approximately $2,000/yr). Therefore, it is recommended that VGAC changeouts continue to occur at the same frequency but monitoring be discontinued (or at most occur once every two years, between changeouts). Assuming this sampling is completely eliminated, estimated savings in labor is approximately $2,000/yr (4 hrs × 2 people × $60/hr × 4 events). Again, the laboratory analysis savings will not be realized by the site, but unnecessary effort with respect analysis at the lab, and reporting, will also be avoided.

4.0 RECOMMENDATIONS FOR TECHNICAL IMPROVEMENT

None. If P&T is expected to continue for a long period of time, the site team could perhaps consider an evaluation to modify pumping rates to target the most impacted areas. However, this effort is likely not merited if the system will only operate for a relatively short period in the future. Given the current low TCE concentrations in ground water, and the potential for current (or potentially modified) ARAR's to be met within several (i.e., two to three) years, such an evaluation to modify pumping rates should only be performed if the site team determines it to be likely that the system will continue to operate for many years.

5.0 RECOMMENDATIONS TO SPEED SITE CLOSEOUT

5.1 DEFER P&T SYSTEM EXIT STRATEGY TO AFTER TRANSFER OF THE SITE TO THE STATE

The TCE concentrations at the site are relatively low (a maximum of approximately 16 ug/L relative to the MCL of 5 ug/L), and concentrations continue to decrease. Although this represents significant progress toward aquifer restoration, it also means that the P&T system is having a diminishing effect on removing contaminant mass and progressing toward aquifer restoration. The site team should begin to consider the point at which P&T will provide no additional benefit to the natural processes of dilution and dispersion (and possibly degradation) that are occurring. With P&T operation, TCE concentrations may continue to

decline or they may become asymptotic, indicating the impracticability of the P&T system to meet the current (or potentially modified) cleanup standard. It is unlikely that any decision to shut down the P&T system will be made before the site is transferred to the State. As a result, the evaluation team suggests that an exit strategy for the P&T system be deferred until after the site is transferred to the State in November 2005. The State can then work with EPA to consider the concentration trends, determine the effect the P&T system has on reaching the cleanup standard, develop an appropriate cleanup standard, and determine an appropriate point to discontinue P&T. If the State (in concert with EPA) determines that P&T can be appropriately discontinued before the cleanup standard is met (perhaps in association with a technical impracticability determination), the costs for annual O&M will likely decrease to approximately $50,000 or less, which would result in a savings of approximately $80,000 per year compared to continuing to operate the P&T system.

PRIORITIZATION AND SEQUENCING OF RECOMMENDATIONS

All of the recommendations can be implemented within the next several months, and should be substantially completed within FY05.

OTHER ACTION ITEMS

No other action items are provided.

Cost Summary Table

Recommendation	Reason	Estimated Additional Capital Costs ($)	Estimated Change in Annual Costs ($/yr)
2.1 Work With County To Institute Institutional Controls	Effectiveness	$15,000	$0
2.2 Extend Access Agreement With Rohm And Haas	Effectiveness	Not quantified	Not quantified
3.1 Reduce Process Monitoring	Cost Reduction	$0	($2,000)
5.1 Defer P&T System Exit Strategy to After Transfer of the Site to the State	Site Closeout	Not Quantified	($80,000)*

Costs in parentheses imply cost reductions.

* Potential estimated annual savings that might be realized if P&T system is ultimately shut down.