Final Report

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

Site Optimization Tracker: Butz Landfill Superfund Site Jackson Township Monroe County, Pennsylvania

EPA Region III

Solid Waste and
Emergency Response
(5102P)

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

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

Site Optimization Tracker: Butz Landfill Superfund Site Jackson Township Monroe County, Pennsylvania

EPA Region III

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Butz Landfill Superfund Site
Jackson Township
Monroe County, 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
Butz Landfill	**3325A North Rd, Tannersville, PA 18360**	**3**

4a. EPA RPM	5a. State Contact
Romuald A. Roman	**Paul Panek**
4b. EPA RPM Phone Number	5b. State Contact Phone Number
215-814-3212	**570-826-5434**
4c. EPA RPM Email Address	5c. State Contact Email Address
roman.romuald@epa.gov	**panek.paul@dep.state.pa**

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)
ROD OU1 9/30/90; ROD OU2 6/20/92	**ESD 8/27/99**
2a. Date of O&F	2b. Date for transfer to State
July 2001	**July 2011**

3. What is the primary goal of the P&T system (select one)?	4. Check those classes of contaminants that are contaminants of concern at the site.
☐ Contaminant plume containment	☒ VOCs (e.g., TCE, benzene, etc.)
☐ Aquifer restoration	☐ SVOCs (e.g., PAHs, PCP, etc.)
☒ Containment and restoration	☐ metals (e.g., arsenic, chromium, etc.)
☐ Well-head treatment	☐ other

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

6. What is the approximate total pumping rate? **75 gpm**

7. How many active extraction wells (or trenches) are there?	**3**	8. How many monitoring wells are regularly sampled?	**~40 locations**
9. How many samples are collected from monitoring wells or piezometers each year? (e.g., 40 if 10 wells are sampled quarterly)	**40**	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)	**42**

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

☒ Air stripping	☐ Metals precipitation
☐ Carbon adsorption (liquid phase only)	☐ Biological treatment
☐ Filtration	☐ UV/Oxidation
☒ Off-gas treatment	☐ Reverse osmosis
☐ Ion exchange	☐ 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	**$39,000**	**$32,000**	**$32,000**
Labor: system operation	**$23,000**	**$22,000**	**$22,000**
Labor: ground water sampling	**$40,000**	**$35,000**	**$18,000**
Utilities: electricity	**$4,000**	**$7,000**	**$7,000**
Utilities: other	**$2,000**	**$2,000**	**$2,000**
Consumables (GAC, chemicals, etc.)	**$2,000**	**$2,500**	**$2,500**
Discharge or disposal costs	**$13,000**	**$13,000**	**$13,000**
Analytical costs	**$27,000****	**$18,000****	**$18,000****
Other (parts, routine maintenance, etc.)	**$8,000**	**$8,000**	**$8,000**
O&M Total	**$161,000**	**$140,000**	**$122,500**

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	**$3,000**	**$4,000**	**$54,000*****

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. Costs, with the exception of the analytical costs, were provided by the RPM.

2. FY05 and FY06 costs were estimated by the ROET based on the RPM projections and discussions during the optimization follow-up meetings.

* Decrease in sampling costs assumes the site team will reduce the ground water monitoring frequency as communicated during the optimization project.

** Analytical costs were estimated by the site contractor 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.

*** The increase of $50,000 in non-routine costs represents funding the site team will use to install and connect a source area extraction well. This funding was previously allocated toward pilot tests of another technology, but at the suggestion of the ROET have been diverted to the installation of the extraction well.

The "Other" costs are evenly distributed between equipment and travel

The discharge or disposal costs include GAC disposal costs.

D. Five-Year Review

1. Date of the Most Recent Five-Year Review	**9/28/2001**

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

The five-year review was completed four months after the P&T construction, therefore, the five-year review recommended monitoring and evaluation of P&T performance. The environmental monitoring (20 wells, approximately ...) and P&T performance monitoring were analyzed and evaluated in monitoring reports. The site remedy as a whole is protective and functioning as designed. However, the upgradient end of the plume is not strongly affected by the remedial design. The extent of the TCE plume has not significantly changed since treatment began. The TCE concentrations in three extraction wells slowly decrease (wells 1 and 3) or remain stable (well 2). At EW-2, (the extraction well with the highest TCE concentrations), the TCE concentrations fluctuate between 1,000 ug/L and 2,000 ug/L. The site team is considering in-situ chemical oxidation and/or enhanced bioremediation to decrease the hot spot within the plume and shorten the time P&T operates.

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.

- The site team reports that the community sympathizes with EPA remedy.

- The site team has developed and is implementing a revised monitoring program that includes annual sampling of most site wells. The wells that are not sampled annually will be sampled every five years.

- GAC (for vapor only) is now changed out approximately semi-annually with 3,000 pounds per unit

- The site team used the last of the materials for field analysis of MNA parameters and will now discontinue MNA sampling. Consistent with the recommendation, the site team does not plan to purchase addition materials for future field analysis.

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 15, 2004 (Evaluation meeting) July 29, 2005 (Final Report)

	Meeting Date	Report Date	Item
X	July 20, 2005	July 29, 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	Butz Landfill Superfund 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
Brian Nishitani	U.S. EPA Region 3	215-814-2675	Nishitani.brian@epa.gov
Eric Johnson	U.S. EPA Region 3	215-814-3313	Johnson.eric@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 Region 3	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
Rom Roman	U.S. EPA Region 3 (RPM)	215-814-3212	Roman.romuald@epa.gov

IMPLEMENTATION STATUS OF ALL RECOMMENDATIONS UNDER CONSIDERATION BUT NOT PREVIOUSLY IMPLEMENTED

Recommendation	**E-2.1 Implement Institutional Controls**		
Recommendation Reason	Protectiveness	**Implementation Status**	In progress
Comments: The RPM indicated that the previous RPM had worked toward institutional controls for this site. Current efforts involve reviewing the previous work.			

Recommendation	**E-3.2 Reduce Process Monitoring Sampling**		
Recommendation Reason	Cost Reduction	**Implementation Status**	Partially Implemented (No further follow-up needed)
Comments: As recommended, the site team has eliminated the air stripper water discharge sample, which was redundant with the sample collected at the system discharge location. However, in contrast to the evaluation team recommendation, the site team will continue to collect samples from each of the recovery wells on a quarterly basis. This is consistent with the State's preference. The evaluation team agrees that continuing quarterly sampling of the recovery wells is a reasonable approach, particularly given the recent increase in contaminant concentrations seen in the influent and that analysis is provided at no cost to the site through the CLP.			

Recommendation	**E-4.2 Less System Downtime**		
Recommendation Reason	Technical Improvement	**Implementation Status**	In progress
Comments: The site team is in the process of looking for a reliable local person to provide the services suggested in the optimization evaluation recommendation.			

Recommendation	**E-5.1 Continue with P&T Instead of Alternative Remedial Approaches**		
Recommendation Reason	Site Closeout	**Implementation Status**	Implemented
Comments: The site team has decided to continue with a P&T remedy and has discontinued pilot efforts for other technologies as suggested in the optimization evaluation. The next step is to ask the site contractor for a cost for an additional extraction well in the source area. There should be adequate funds to cover this additional extraction well. The $50,000 that the site team had allocated for piloting other technologies will be put toward the installation and operation of a new source area extraction well.			

Recommendation	**F1-1 Consider Exit Strategy for P&T System**		
Recommendation Reason	Site Closeout	**Implementation Status**	Under consideration
Comments: The site team is considering this recommendation. The ROET acknowledges that this recommendation is a secondary priority relative to other recommendations, such as reducing system downtime, and secondary to other site activities, such as installing the source area extraction well. The RPM noted that these activities will also depend on the presence of DNAPL, which remains uncertain.			

Recommendation	F1-2 Revise Vapor Phase GAC Replacement Schedule		
Recommendation Reason	Cost Reduction	**Implementation Status**	Under consideration
Comments: The site team is considering this recommendation, although the RPM indicated that the State does not view this favorably. In the mean time, the GAC continues to be switched out on a semi-annual basis.			

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-2.2 Attempt to Sample Nearby Supply Wells for Residences that are not Attached to the Water Line		
Recommendation Reason	Protectiveness	**Implementation Status**	Will not be implemented
Comments: The site team has attempted to access these wells in the past but have repeatedly been refused access. The evaluation team understands these limitations. Other monitoring between the source area and these two wells shows non-detect, stable, and/or decreasing trends, so sampling of these two wells is not crucial, as long as these favorable trends continue.			

Recommendation	E-3.1 Proceed with Reduction of Ground Water Sampling Frequency		
Recommendation Reason	Cost Reduction	**Implementation Status**	Implemented
Comments: The site team reports that these changes have been implemented.			

Recommendation	E-3.3 Eliminate Analysis of MNA Parameters		
Recommendation Reason	Cost Reduction	**Implementation Status**	Implemented
Comments: The site team reports that these changes have been implemented.			

Recommendation	E-4.1 More Timely Ground Water Monitoring Report Submittals		
Recommendation Reason	Technical Improvement	**Implementation Status**	Implemented
Comments: The site team reports that these changes have been implemented.			

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

- The increase in influent concentration to one extraction well that was noted during the previous follow-up meeting has since declined to historical levels, perhaps confirming that the increase was a temporary rebound that may have occurred while the P&T system was not functioning for an extended period of time.

- The Bio-Traps installed by the site team and referenced in the previous follow-up report generated ambiguous results. The site team is discontinuing pilot efforts of alternative technologies to P&T and is continuing with the P&T remedy.

- The next Five-Year review will occur in 2006. The sampling data from the recent April 2005 event and from one more event in December will be used for the Five-Year review.

NEW OR UPDATED RECOMMENDATIONS FROM THIS FOLLOW-UP

- None.

SUMMARY OF FOLLOW-UP #1

Site or System Name	Butz Landfill Superfund Site
Date of This Follow-Up Summary	July 29, 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
Brian Nishitani	U.S. EPA Region 3	215-814-2675	nishitani.brian@epa.gov
Kathy Davies	U.S. EPA Region 3	215-814-3315	davies.kathy@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
Rom Roman	U.S. EPA Region 3 (RPM)	215-814-3212	Roman.romuald@epa.gov
Bruce Rundell	U.S. EPA Region 3 (Hydro)	215-814-3317	Rundell.bruce@epa.gov

IMPLEMENTATION STATUS OF PREVIOUSLY IDENTIFIED RECOMMENDATIONS

Recommendation	**2.1 Implement Institutional Controls**		
Recommendation Reason	Protectiveness	**Implementation Status**	In progress
Comments: The site team continues to work toward implementing institutional controls.			

Recommendation	**2.2 Attempt to Sample Nearby Supply Wells for Residences that are not Attached to the Water Line**		
Recommendation Reason	Protectiveness	**Implementation Status**	Will not implement
Comments: The site team has attempted to access these wells in the past but have repeatedly been refused access. The evaluation team understands these limitations. Other monitoring between the source area and these two wells shows non-detect, stable, and/or decreasing trends, so sampling of these two wells is not crucial, as long as these favorable trends continue.			

Recommendation	**3.1 Proceed with Reduction of Ground Water Sampling Frequency**		
Recommendation Reason	Cost Reduction	**Implementation Status**	Implemented
Comments: The site team has developed and is implementing a revised monitoring program that includes annual sampling of most site wells. The wells that are not sampled annually will be sampled every five years. The site team has not yet calculated the estimated savings from this new sampling program.			

Recommendation	**3.2 Reduce Process Monitoring Sampling**		
Recommendation Reason	Cost Reduction	**Implementation Status**	Partially Implemented
Comments: As recommended, the site team has eliminated the air stripper water discharge sample, which was redundant with the sample collected at the system discharge location. However, in contrast to the evaluation team recommendation, the site team will continue to collect samples from each of the recovery wells on a quarterly basis. The evaluation team agrees that continuing quarterly sampling of the recovery wells is a reasonable approach, particularly given the recent increase in contaminant concentrations seen in the influent and that analysis is provided at no cost to the site through the CLP.			

Recommendation	**3.3 Eliminate Analysis of MNA Parameters**		
Recommendation Reason	Cost Reduction	**Implementation Status**	Implemented
Comments: The site team used the last of the materials for field analysis of MNA parameters and will now discontinue MNA sampling. Consistent with the recommendation, the site team does not plan to purchase addition materials for future field analysis.			

Recommendation	4.1 More Timely Ground Water Monitoring Report Submittals		
Recommendation Reason	Technical Improvement	**Implementation Status**	Implemented
Comments: The most recent ground water monitoring report was submitted approximately two months after the sampling event.			

Recommendation	4.2 Less System Downtime		
Recommendation Reason	Technical Improvement	**Implementation Status**	Under consideration
Comments: The site team continuing to consider this recommendation.			

Recommendation	5.1 Continue with P&T Instead of Alternative Remedial Approaches		
Recommendation Reason	Site Closeout	**Implementation Status**	Under consideration
Comments: The site team has been considering using enhanced bioremediation at the site. The RPM has requested $50,000 for a pilot effort. Thus far, the site team has purchased and installed Bio-Traps in an attempt to identify the type of microorganisms that are present. The site team's focus is on addressing the former source area, which is located at the landfill, upgradient of the extraction wells. The evaluation team favors continued focus on P&T at this point rather than on the use of in-situ technologies and suggests that if the site team is considering removing additional mass that this be accomplished through the installation of another extraction well in the former source area.			

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

- The influent concentration to one extraction well has increased by half an order of magnitude. The increase is presumably due to rebound that may have occurred while the P&T system was not functioning for an extended period of time. However, the data have not yet been interpreted to confirm this presumption. The RPM will provide the most recent report to the evaluation team so that the evaluation team can consider possible reasons for the increases and what the implications might be for the remedy as a whole.

- The site team has installed Bio-Traps as indicated in the followup to Recommendation 5.1 to determine which microorganisms are present for bioremediation. The site team is awaiting results. This effort is in conjunction with a pilot test to evaluate the use of bioremediation for the former source area.

- The next Five-Year review will occur in 2006. The sampling data from the recent April 2005 event and from one more event in December will be used for the Five-Year review.

NEW OR UPDATED RECOMMENDATIONS FROM THIS FOLLOW-UP

1. As the P&T system continues to operate, influent concentrations will eventually decline, effectively reducing the P&T system's ability to remove mass. Decreasing

concentrations and a reduction in P&T system effectiveness at removing mass would likely suggest attenuation of the residual source material (e.g., DNAPL), and it may become appropriate and more cost-effective to change the remedy to MNA (existing data suggest natural attenuation is occurring) or enhanced bioremediation through the addition of nutrients in select locations. The evaluation team suggests deferring further consideration of MNA and nutrient injection to a later date when the P&T system's effectiveness is diminishing. However, it is likely appropriate to start considering the set of site conditions and site data that would signal the appropriate time for a change in remedy. The set of conditions would likely consider the potential for plume migration in the absence of pumping and a comparison of mass removal through natural attenuation and mass removal through P&T. The cost for developing such an exit strategy for the P&T system might be $15,000

2. The site team currently changes the vapor GAC on a semi-annual basis but cannot switch the lead and lag units due to the system plumbing. As a result, the site team changes out both GAC units even though only the lead unit generally requires a changeout. The site team could change out the lead unit on a semi-annual basis and the lag unit on an annual basis. This approach would help save resources (approximately $3,500 per year) by reducing the number of unnecessary replacements of the lag unit while maintaining an effective lag unit that can prevent discharges to the atmosphere.

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 Implement Institutional Controls	Protectiveness	In progress	$15,000		$0	
2.2 Sample Nearby Supply Wells for Residences that are not Attached to the Water Line	Protectiveness	Will not be implemented	$2,000		$0	
3.1 Proceed with Reduction of Ground Water Sampling Frequency	Cost Reduction	Implemented	$0	Not yet quantified	($17,000)	Not yet quantified
3.2 Reduce Process Monitoring Sampling	Cost Reduction	Partially Implemented*	$0	$0	Minimal due to use of CLP laboratory	
3.3 Eliminate Annual Laboratory Analysis of MNA Parameters	Cost Reduction	Implemented	$0	($10,000)**	($10,000)	$0**
4.1 More Timely Ground Water Monitoring Report Submittals	Technical Improvement	Implemented	$0	Not yet quantified	$0	Not yet quantified
4.2 Less System Downtime	Technical Improvement	In progress	$0		$5,200	
5.1 Continue with P&T Instead of Alternative Remedial Approaches	Site Closeout	Implemented	$0	Not quantified***	$0	Not quantified***
New or Updated Recommendations from Follow-up #1, July 20, 2005						
1. Consider Exit Strategy for P&T System	Site Closeout	Under Consideration	$15,000		$0	
2. Revise Vapor Phase GAC Replacement Schedule	Cost Reduction	Under Consideration	$0		($3,500)	

New or Updated Recommendations from Follow-up #2, October 19, 2005						
None.						

Costs in parentheses imply cost reductions.

* *The site team has implemented part of the recommendation but will not implement the remaining portion of it. Therefore, no further follow-up is required for this recommendation.*

** *The site team will realize savings by avoiding the purchase of additional test kits that would have been used over several years. Therefore, the savings associated with this recommendation is more appropriately characterized as a reduction of $10,000 in capital expenditures rather than a reduction of $10,000 in ongoing annual expenditures.*

*** *The costs and savings associated with implementing this rcommendation have not been quantified, but as a result of this recommendation, the site team is not moving forward with pilot tests of alternative technologies. The $50,000 allocated to these pilot tests will be used toward the installation and operation of a source area extraction well.*

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

Butz Landfill Superfund Site
Jackson Township
Monroe County, Pennsylvania

EPA Region III

July 29, 2005

SECTION 1:

BASELINE SITE INFORMATION FORM

Date: 1/14/05 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
Butz Landfill	**3325A North Rd, Tannersville, PA 18360**	**3**

4a. EPA RPM	5a. State Contact
Romuald A. Roman	**Paul Panek**
4b. EPA RPM Phone Number	5b. State Contact Phone Number
215-814-3212	**570-826-5434**
4c. EPA RPM Email Address	5c. State Contact Email Address
roman.romuald@epa.gov	**panek.paul@dep.state.pa**

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)
ROD OU1 9/30/90; ROD OU2 6/20/92	**ESD 8/27/99**
2a. Date of O&F	2b. Date for transfer to State
July 2001	**July 2011**

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? **75 gpm**

7. How many active extraction wells (or trenches) are there? **3**

8. How many monitoring wells are regularly sampled? **20 westbay wells**

9. How many samples are collected from monitoring wells or piezometers each year? (e.g., 40 if 10 wells are sampled quarterly) **118; 59 (2005)**

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) **60**

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

- ☒ Air stripping
- ☐ Carbon adsorption (liquid phase only)
- ☐ 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	**$25,000**	**$39,000**	**$32,000**
Labor: system operation	**$33,000**	**$23,000**	**$22,000**
Labor: ground water sampling	**$46,000**	**$40,000**	**$35,000**
Utilities: electricity	**$4,000**	**$4,000**	**$7,000**
Utilities: other	**$2,000**	**$2,000**	**$2,000**
Consumables (GAC, chemicals, etc.)	**$3,000**	**$2,000**	**$2,500**
Discharge or disposal costs	**$15,000**	**$13,000**	**$13,000**
Analytical costs	**$27,000**	**$27,000**	**$18,000**
Other (parts, routine maintenance, etc.)	**$11,000**	**$8,000**	**$8,000**
O&M Total	**$173,000**	**$161,000**	**$140,000**

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	**$7,000**	**$3,000**	**$4,000**

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:

Other costs include equipment and travel

Equipment	**$5,000**	**$4,000**	**$4,000**
Travel	**$6,000**	**$4,000**	**$4,000**

Non-routine costs include repairs, snow removal, replace components, electrical work, fencing, etc.

The discharge or disposal costs include GAC disposal costs.

D. Five-Year Review

1. Date of the Most Recent Five-Year Review	**9/28/2001**

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

The five-year review was completed four months after the P&T construction, therefore, the five-year review recommended monitoring and evaluation of P&T performance. The environmental monitoring (20 wells, approximately ...) and P&T performance monitoring were analyzed and evaluated in monitoring reports. The site remedy as a whole is protective and functioning as designed. However, the upgradient end of the plume is not strongly affected by the remedial design. The extent of the TCE plume has not significantly changed since treatment began. The TCE concentrations in three extraction wells slowly decrease (wells 1 and 3) or remain stable (well 2). At EW-2, (the extraction well with the highest TCE concentrations), the TCE concentrations fluctuate between 1,000 ug/L and 2,000 ug/L. The site team is considering in-situ chemical oxidation and/or enhanced bioremediation to decrease the hot spot within the plume and shorten the time P&T operates.

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.

- Community sympathizes with EPA remedy.

- Ground water sampling and reporting is being changed from semi-annual to annual frequency, therefore, the associated FY05 costs may be further reduced.

- GAC (for vapor only) is changed out approximately quarterly with 3,000 pounds per unit

- Analytical costs inlcuded on cost table are primarily for natural attenuation parameters.

SECTION 2:

STREAMLINED OPTIMIZATION EVALUATION FINDINGS AND RECOMMENDATIONS

Butz Landfill Superfund Site

Date of Evaluation Meeting: December 15, 2004 Date of Final Report: July 29, 2005

ROET MEMBERS CONDUCTING THE STREAMLINED OPTIMIZATION EVALUATION:

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SITE TEAM MEMBERS (INCLUDING CONTRACTORS) INTERVIEWED

Name	Affiliation	Phone	Email
Rom Roman	U.S. EPA Region 3 (RPM)	215-814-3212	Roman.romuald@epa.gov
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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 ground water contamination reaches deep bedrock (up to 300 feet below ground surface). The contaminant plume is extensive, approximately 0.6 square miles in area. Contamination has historically been pulled in multiple directions, presumably caused by former pumping from former domestic wells.

- EPA has extended a waterline through the neighborhood, effectively creating a local water authority, placing nearby residences on public water, and eliminating any reasonable potential receptors. Some of the old supply wells have been converted into monitoring wells. Two wells in the area have remained on well water, but these residences were not contaminated at the time of the Remedial Investigation and were never officially considered part of the site.

- The objective of the P&T system is plume containment and mass removal in the high concentration area, allowing attenuation of the remaining larger portion of the plume. The extraction wells were originally placed based on high TCE concentrations and to capture that high-concentration area. The remaining portion of the plume would be expected to attenuate naturally. The TCE concentrations at the extraction wells EW-1, EW-2, and EW-3 decreased by 96%, 86%, and 77%, respectively, from system startup (May 2001) to June 2004. The system now treats on average over 400 pounds per year at an average operating cost of $164,000 per year.

- As the remedy has progressed, the site team has reduced ground water monitoring from an initial frequency of monthly to quarterly and then to semi-annually. In 2005, the site team will further reduce the ground water sampling frequency to annually but will increase the number of locations sampled. Overall, the number of samples collected per year should decrease from approximately 40 to 35. The sampling has included sampling for natural attenuation parameters with both field and laboratory methods. Laboratory analysis for natural attenuation parameters were discontinued in September 2003. Field colorimetric samplers, which were purchased in bulk, were utilized for the last time in April 2005 to test for dissolved oxygen, ferric and total iron, carbon dioxide, and sulfide.

- System monitoring includes aqueous samples from the following locations collected on a monthly basis: each of the three extraction wells, the air stripper water discharge, and the discharge location. Additionally, system monitoring includes air samples collected from the following locations: air stripper air discharge, between the carbon units, after the second carbon unit, and an outside air sample. Air monitoring was originally conducted on a monthly schedule but was reduced over time to quarterly and then recently (December 2004) to semi-annually.

- The system operates efficiently and is only visited once per month; however, there are a number of power outages due to storms and high winds that shut down the system. In addition, there have been a number of problems with the telemetry system that is used to monitor the system remotely. Within the one-year time span from Summer 2003 through Summer 2004, there were at least four instances of electrical storms and one instance of high winds that resulted in power outages. There were at least three instances of computer or phone-line problems that required additional site visits to repair the telemetry system. However, there was only one instance where the telemetry system notified the site team of a

problem (a leak) that was not power related. A few instances of vandalism were also reported, but these were only evident from site visits and not from remote monitoring. In addition, mice have been eating the insulation on the electrical wiring. A length of 1,200 feet of wire was damaged by mice in December 2003. EPA will be modifying its efforts to the control this problem by using new traps and a sonic system to repel mice.

- The reports are very good, including pertinent information and useful cross-sections. However, there is a substantial delay in receiving the reports. The report summarizing March 2003 was dated August 2004 and previous reports had at least five to six month delays. The delay in submitting the August 2004 report was largely the result of an extensive reinterpretation of the site hydrogeology.

- All site data is provided in electronic format to the Site Team by the contractor. These data include all laboratory and field data provided in an Access™ database designed by the Region and all site maps provided in CAD format. These data are incorporated into an Intranet-based GIS system and used to track remedial progress.

2.0 RECOMMENDATIONS TO IMPROVE SYSTEM PROTECTIVENESS

2.1 IMPLEMENT INSTITUTIONAL CONTROLS

With the assistance of the county, the site team plans to implement institutional controls to prevent anyone in the neighborhood (i.e., within the "ring of the waterline") from using ground water. The site team should continue to work on those controls with the county to have them implemented in a timely manner. 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 ATTEMPT TO SAMPLE NEARBY SUPPLY WELLS FOR RESIDENCES THAT ARE NOT ATTACHED TO THE WATER LINE

Two relatively nearby residences with private wells (R10 and RW14) were apparently not connected to the water line. These two wells were not impacted at the time of the Remedial Investigation and therefore have not been included as part of the site. It is recommended that the site team consider sampling these two wells to confirm that they are still not contaminated. Historical sampling results indicate the residential pumping, in general, has had an effect on plume migration, and confirming that these two wells are still not impacted would be prudent. Implementing this recommendation should not require a significant cost increase because the analyses would likely be provided by the CLP. Efforts associated with sample collection and access might cost $2,000.

3.0 RECOMMENDATIONS TO REDUCE SYSTEM COST

3.1 PROCEED WITH REDUCTION OF GROUND WATER SAMPLING FREQUENCY

The site team has planned to reduce the ground water sampling frequency from semi-annual to annual in year 2005 but to increase the number of locations sampled. Overall, the number of samples collected per year should decrease from about 40 to about 35. It is recommended that the site team proceed with this plan, and, as a result, reduce the ground water monitoring reporting to annual as well. The reduction in sampling should save approximately $10,000 per year. In addition, the reduction in reporting should save approximately $7,000 per year.

3.2 REDUCE PROCESS MONITORING SAMPLING

Process monitoring currently includes monthly sampling of the 3 extraction wells, the air stripper discharge, and the system outfall. Because the system has operated efficiently on a regular maintenance schedule, it is recommended that one of the discharge samples be eliminated. In addition, instead of three extraction well samples per month, a single system influent sample could be taken and the individual extraction wells could be sampled on an annual basis. This would reduce the number of samples by 33 per year. Cost savings would be relatively minor given that samples are analyzed by the CLP and costs are not charged to the site.

3.3 ELIMINATE ANALYSIS OF MNA PARAMETERS

The site has gathered extensive MNA data and believes that additional analysis will not provide additional value. The evaluation team supports the site team's suggestion of dropping the MNA sampling and analysis from the monitoring program once the supplies for field analyses are depleted, and only resuming this analysis in the future based on the foreseen need. The associated cost savings from not purchasing additional supplies is likely on the order of $10,000 per year, which represents a large portion of the current analytical costs.

4.0 RECOMMENDATIONS FOR TECHNICAL IMPROVEMENT

4.1 MORE TIMELY GROUND WATER MONITORING REPORT SUBMITTALS

The ground water monitoring report for the March 2003 event is dated August 2004 and other quarterly reports have taken five or six months to be produced. With annual sampling and reporting, the report should generally be produced within approximately 8 weeks of the ground water sampling event (or within one month of receiving results from the EPA lab, if that takes longer than a typical lab). This faster turnaround time should not require an increase in cost.

4.2 LESS SYSTEM DOWNTIME

Significant downtime has previously occurred due to computer, lightning, and wiring issues. Those issues should be properly addressed to reduce system downtime. Damage to the system from lightning appears to be relatively limited or is not reported. Rather, the primary problem appears to be loss of power during lightning storms and/or high winds. It appears that even if the system had adequate lightning protection, failures at other points in the electricity grid could result in power failures. As a result, it is likely not cost-effective to evaluate or invest in lightning protection. Rather, the site team needs reliable notification when the system loses power so that it can be restarted promptly. The computer/telemetry problems have made the remote monitoring unreliable in many instances, and at times, the site team has had to increase the frequency of site visits.

The site team should consider identifying a local person that can visit the site once per week to provide routine checks for leaks, power outages, or other problems. When problems occur, the person could notify the site team, and the site team can make the determination if a problem needs to be addressed immediately or if the problem can be resolved during the next regularly scheduled site visit. Apparently, the air stripper and the other system components work very reliably and do not require much attention. The person would not require extensive training. Therefore, the visits should be relatively inexpensive, and this person would be able to report any problems with vandalism or other items that would not be evident from remote monitoring. A local person might be paid $100 per visit to conduct routine checks and make a followup phone call from the site. A checklist could be made available for the person to fill out for each visit so a written record is available. This recommendation might require $5,200 per year to implement, but equal or greater savings would likely be realized from eliminating repairs and extra site visits for the telemetry system.

5.0 RECOMMENDATIONS TO SPEED SITE CLOSEOUT

5.1 CONTINUE WITH P&T INSTEAD OF ALTERNATIVE REMEDIAL APPROACHES

DNAPL is likely present and continuing to serve as a source of ground water contamination. The contaminant plume is deep and relatively extensive. For example, the area impacted with over 1,000 ug/L is approximately 500,000 square feet in area. The P&T system appears to be providing mass removal, but the plume shape has changed little. It is unlikely that the aquifer will be restored in a reasonable time frame, and the evaluation team believes that meeting ARARs will likely be technically impracticable at this site. However, before making this determination, the site team should likely continue operation of the P&T system for several more years (e.g., five to 10 years) to confirm this suspicion.

The evaluation team supports additional source removal, but because P&T will likely need to continue for a number of years regardless of the success of the source removal effort, the site team should only consider source removal if it can be done for a relatively low cost. Given that there is an operating P&T system at the site with additional capacity, the most cost-

effective means of mass removal would likely be the installation of additional extraction wells in the source area. The costs would be primarily limited to the capital costs associated with installing the wells and minor annual costs associated with increased vapor GAC usage. The capital costs for this option might be $100,000, and the annual costs might increase by $3,000 per year to account for the increased GAC usage and a minimal amount of additional electricity usage. Assuming a new extraction well would have an average concentration of approximately 2,000 ug/L and an average flow rate of 20 gpm, approximately 200 additional pounds of TCE could be removed per year. Over a 10-year period (without discounting), the cost per pound removed would be approximately $65 per pound.

An in-situ technology in the source area would likely require significantly higher costs, and there is no certainty that it would provide results that would significantly reduce the operating lifetime of the P&T system. If, however, the site team chooses to move forward with an in-situ technology for the source area, the evaluation team recommends in-situ chemical oxidation over biostimulation because in-situ chemical oxidation produces quicker results than biostimulation, is easier to apply over a select area, and can be monitored for effectiveness more easily than biostimulation. In addition, in-situ chemical oxidation has much less potential to negatively impact (i.e., foul) the P&T system. Anaerobic biostimulation requires altering aquifer conditions (in general terms-lowering ORP) in the area desired for treatment by injecting food sources such as lactate, soy oil, or molasses. This injection is typically done to form a zone perpendicular to aquifer flow. Attempting to form this zone in a small portion of the plume generally requires hydraulic control to prevent outside higher ORP ground water from disturbing the treatment area. If hydraulic control is not provided, determining the success of the injection is difficult, and having to maintain hydraulic control defeats much of the advantages of an in-situ technology. Although establishing hydraulic control in an unconsolidated aquifer is relatively straightforward, establishing hydraulic control in a fractured bedrock environment can be difficult. Assuming similar conditions as those described for the addition of another extraction well (e.g., an average concentration of 2,000 ug/L), the removal of 1,000 pounds of TCE would require that in-situ chemical oxidation treat approximately 14 million cubic feet of ground water (e.g., 20 gpm × 1440 min/day × 365 days/year × 10 years). Assuming an aquifer thickness of approximately 50 feet, this would be a treatment area of 280,000 square feet. Treatment of an area this large might require anywhere from 10 to 100 wells. At an installation cost of $20,000 per well, the cost for installing these wells might range from $200,000 to $2 million. Additional costs would be required for potassium permanganate and the work and oversight associated with injecting it. If the same mass of contamination is concentrated into a smaller area as DNAPL, it is unlikely that the potassium permanganate would fully remove the DNAPL, making it very likely that repeated applications would be required.

If this site did not have an effectively operating P&T system and had to choose an in-situ remedy, the evaluation team would recommend considering biostimulation as a full-scale remedy over in-situ chemical oxidation because the food source lasts longer in the subsurface than oxidating chemicals and therefore fewer injection points would be needed to apply it since natural ground water flow would spread the food source through the aquifer. However, bioremediation in fractured bedrock aquifer is still an innovative technology. The evaluation team knows of one site in Region 3 where it is being applied, in one well in a small plume with hydraulic control, and results to date have been mixed. At the Butz site, a closed-loop

pilot test consisting of an injection and extraction well and monitoring points would be strongly suggested to effectively test the concept. This test would cost a minimum of $150,000 based on our experience but would likely be higher at the Butz site. If the pilot was successful, a full scale implementation might include a line of injection points extending about 1,000 feet in a north-south orientation across the plume just east of the landfill. These injection wells would be spaced at maximum 30 foot intervals (likely closer) to allow injection of adequate food source quantities and downgradient coverage of the aquifer. They would be about 250 feet deep and have screen to allow injection over the total depth of contamination. Injection at select depths could be accomplished with packers or by nesting wells. Assuming 35 single wells at $20,000 per well (EPA verbal estimate) the injection points would cost $700,000. The food source and labor for injecting would require an estimated $300,000 total (based on a proposal from a vendor for a similar site in New Jersey). These costs do not include any planning, management or monitoring. Additional applications of a food source would likely be required to maintain contaminant degradation. An aggressively priced full-scale application would likely cost more than $1.2 million. The results of a pilot test (as described above) and quotes from vendors would provide additional information on what a more realistic cost might be. Regardless, an effective P&T system is already operating and removing a significant amount of mass. Given the cost and uncertainty of the success of applying biostimulation at full-scale, it appears that continuing operation of the existing P&T system would be more cost-effective over the next several years.

PRIORITIZATION AND SEQUENCING OF RECOMMENDATIONS

None

OTHER ACTION ITEMS

None

Cost Summary Table

Recommendation	Reason	Estimated Additional Capital Costs ($)	Estimated Change in Annual Costs ($/yr)
2.1 Implement Institutional Controls	Effectiveness	$15,000	$0
2.2 Attempt to sample nearby supply wells for residences that are not attached to the water line	Effectiveness	$2,000	$0
3.1 Reduce Ground Water Sampling Frequency	Cost Reduction	$0	($17,000)
3.2 Reduce Process Monitoring Sampling	Cost Reduction	$0	minimal due to use of CLP laboratory
3.3 Eliminate Analysis of MNA Parameters	Cost Reduction	$0	($10,000)
4.1 More Timely Ground Water Monitoring Report Submittals	Technical Improvement	$0	$0
4.2 Less System Downtime	Technical Improvement	$0	$5,200
5.1 Continue with P&T instead of alternative remedial approaches	Site Closeout	$0	$0

Costs in parentheses imply cost reductions.