III. RESPONSIVENESS SUMMARY

CROSSLEY FARM
SUPERFUND SITE

Hereford and Washington Townships

Berks County, Pennsylvania

RESPONSIVENESS SUMMARY

CROSSLEY FARM RESPONSE TO COMMENTS RECEIVED DURING THE MAY 31, 2007 TO JUNE 29, 2007 COMMENT PERIOD AND THE JUNE 14, 2007 PUBLIC MEETING

This section summarizes the questions and comments received during the proposed plan comment period for this Record of Decision Amendment for the second operable unit (OU-2 ROD Amendment) at the Crossley Farm Superfund Site in Hereford and Washington Townships, Berks County, Pennsylvania.

The questions and comments are grouped as follows:

A. Citizen Comments
B. Local Reporter Comments
C. County Comments
D. State Comments
E. Township Comments
F. Federal Comments
G. Public Meeting Transcript

A. Citizen Comments

COMMENT # 1:
A local citizen commented that building the treatment plant at the hot spot and extracting the water from the hot spot makes more sense that pumping from the valley plume area.

RESPONSE to Comment #1:
Because of the existing geology, EPA believes it is technically more feasible to control the flow of the contaminated groundwater at the base of Blackhead Hill which is downgradient of the source area at the top of the hill. Pumping the groundwater at the top of the hill will not contain or remediate the contaminated groundwater that has already migrated down the valley south of the Crossley Farm property.

COMMENT #2:
A citizen suggested that EPA should install wells at the valley location but pump water to the top of the hill.

RESPONSE to Comment #2:
EPA has reconsidered the possibility of locating the treatment plant at the top of Blackhead Hill. The water could be physically pumped to the top of the hill but the pumps themselves will cause a significant noise pollution problem. The use of a building to enclose the pumps will provide some noise attenuation, but will not eliminate the noise. Operation and Maintenance of well pumps and lift stations would be extensive. The final location of the treatment plant will be determined during the Remedial Design phase of remedy implementation. (See response to Comment #6 and Comment # 31)

COMMENT # 3:
Several commenters requested that the location of the proposed treatment plant be out of sight and not impact the aesthetics of their neighborhood.

RESPONSE to Comment #3:
As a result of comments received during the public comment period, EPA has reconsidered the approximate location of the treatment plant. As EPA stated at the public meeting, it has always been the Agency's intention to work with the local community in addressing their concerns over the location of the plant. EPA is evaluating three alternative locations to the area proposed (See response to Comment # 31 on page 16 of this Responsiveness Summary). The location of the treatment plant will be determined after further evaluation of several properties as part of the Remedial Design. The treatment plant itself can be constructed to blend in with the existing structures and farm buildings.

COMMENT # 4:
Several commenters asked why the extraction wells needed to be placed in the valley plume area which will also impact the aesthetics of their neighborhood.

RESPONSE to Comment #4:
EPA has selected a remedy which will intercept the groundwater plume in the valley as the first phase of remediation. As stated earlier in EPA's response to comment #1, based on the existing geology it is technically more feasible to control the flow of the contaminated groundwater in the valley plume area. EPA will construct the extraction wells and treatment plant to minimize the negative visual impacts. Most wells will be constructed at the road grade level and most piping will be underground. The water will need to be pumped to the treatment plant location but noise from the pumps will be minimized using architectural/acoustic structures.

COMMENT # 5:
Several commenters wanted to be sure that EPA still plans to remediate the hot spot area at the top of Blackhead Hill.

RESPONSE to Comment # 5:
EPA still plans to implement the remediation of the hot spot area once the plume is intercepted. Because of the complexity of the groundwater contamination, neither approach, top of the hill or valley alone, will address the contamination. EPA will design the treatment plant for the valley plume with the capacity to also treat the hot spot area in addition to the valley plume.

COMMENT # 6:
Another commenter suggested that only one plant would be needed to treat the valley plume and the top of the hill contamination.

RESPONSE to Comment # 6
Although EPA is not currently modifying the 2001 OU-2 ROD requirement for remediation at the top of Blackhead Hill, EPA agrees having only one treatment plant would be more cost effective. However, at this time EPA believes it is prudent to focus on getting the valley extraction phase implemented to intercept the plume. Upon successful control and containment

of the Valley Plume Area, remediation and reduction of the contaminants in groundwater at the Hot-Spot Area on top of Blackhead Hill could be performed.
It is likely that water extracted from the top of the hill contamination will be pumped to the treatment plant constructed for the OU-2 ROD Amendment valley plume remedy.

COMMENT # 7:
These commenters proposed using other in-situ treatment technology for the top of the hill hot spot.

RESPONSE to Comment # 7:
Once the plume is intercepted, EPA will consider whether an in-situ technology is appropriate at the source area or whether the pump and treat technology currently selected is still appropriate.

COMMENT #8:
A citizen asked about the potential for changing water levels in the aquifer and negatively impacting their home well.

RESPONSE to Comment # 8:
EPA's plan to remove the contaminants from the groundwater will impact the groundwater flow system and it is possible that the extraction of water and the pumping rates may impact your residential well. EPA will need to closely monitor the extraction pumping rates to be sure there is not a negative impact on residential wells. Pumping rates will be monitored and adjustments may be necessary to minimize impacts to residential wells in the area.

COMMENT # 9: A citizen asked about the potential for the OU-2 ROD Amendment remedy to accelerate migration of the contaminant hot spot and overwhelm existing home treatment units.

RESPONSE to Comment # 9:
The groundwater extraction well system will be designed to intercept the plume that has already moved down the valley, and not to pull more highly-contaminated groundwater from the top of Blackhead Hill. The groundwater levels in the immediate vicinity of the extraction wells will be lowered, which will increase the groundwater velocity in that area. While this may result in a higher volume of groundwater flow, it will not create more highly-contaminated groundwater. The most highly-contaminated groundwater will remain atop Blackhead Hill, and the groundwater concentrations in the valley (upgradient or upstream of the extraction wells) will remain near the historical levels. There should not be an increase of contaminants to overwhelm the residential treatment units. However, the current home well treatment units were designed with a built-in safety factor so that even if the groundwater concentrations were to increase, the residents will still be protected. In addition, EPA and PADEP will be conducting periodic sampling of the residential wells to ensure the continued protection of the residents.

COMMENT # 10:
A citizen asked why EPA needed to do anything more to remediate the contaminated groundwater plume since the in-home point-of-entry treatment units eliminated the threat posed from drinking the contaminated groundwater.

RESPONSE to Comment # 10:
The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) provide the basis for EPA to respond to releases of hazardous substances, pollutants and contaminants. There are many types of responses that EPA must develop, select and implement. When EPA prepared a Remedial Investigation and Feasibility Study (RI/FS) for the Crossley Farm Site, it evaluated remediation alternatives with an expectation that the remedy would return the groundwater at the Site to beneficial use. Restoration of the aquifer requires EPA to develop remediation alternatives which reduce the toxicity, mobility or volume of the hazardous substances. The remedies selected in the 2001 OU-2 ROD and this OU-2 ROD Amendment will, in part, meet the expectation for EPA to restore the groundwater quality and reduce further risk from the contaminated groundwater. The OU-1 ROD for point of entry treatment of residential wells will protect the residents but will not restore the aquifer to beneficial use.

COMMENT # 11:
A citizen asked why EPA would want to use the West Branch of the Perkiomen, which is designated an Exceptional Value Stream, for discharge of the treated water from the Site remediation planned.

RESPONSE to Comment # 11:
EPA believes it is best to return the treated water to the hydrogeologic system. It is EPA's plan to comply with the requirement for the Exceptional Value Stream and minimize any impacts to the creek. All water extracted from the ground will be treated so that the contaminants are reduced to acceptable levels prior to their discharge to the West Branch of the Perkiomen Creek.

COMMENT # 12:
A citizen was appalled that any water will be discharged to the Perkiomen Creek and felt that the contaminated water should be treated on-site and disposed off-site

RESPONSE to Comment # 12:
The contaminated plume from the Crossley Farm property has traveled approximately three miles from the farm and currently discharges untreated into the West Branch of the Perkiomen Creek through numerous springs that seep to the surface and drain towards the creek. Some springs are immediately adjacent to the creek and contain concentrations of TCE as high as 200 parts per billion (ppb). EPA has also determined that groundwater enters the creek by coming up through the base of the creek. Fortunately concentrations are diluted when they reach the creek and the risk assessment did not indicate a direct contact threat for recreational use. The intent of this ROD Amendment is to reduce the amount of contamination currently entering the creek.

EPA cannot consider off-site disposal because of the volume of water. When EPA constructs a treatment plant and extraction well system to cut off and intercept the contaminated plume at the Crossley Farm Site there will be a lot of water extracted for treatment. Returning the treated water back into the water table is necessary to maintain the water level in the aquifer so that residents will continue to have sufficient water levels in their wells and that the current aquatic

life in the Perkiomen Creek can be sustained. All extracted groundwater will be treated so that the contaminants are removed to acceptable levels prior to their discharge. In order to return the water to the water table, the selected remedy in this OU-2 ROD Amendment involves a combination of discharge directly to the Perkiomen Creek, reinjection into the ground and infiltration into the ground. The creek will be closely monitored to ensure that the discharge will not have a negative impact.

As previously stated, the area that has been impacted by the disposal at the Crossley Farm Property extends down the valley for approximately three miles. It would be impossible to collect groundwater from the Site and transport it to a water treatment plant. For this reason, EPA has selected a remedy in this OU-2 ROD Amendment which requires the construction of an onsite groundwater treatment plant with several discharge options for the treated water (i.e. discharge to the creek, infiltration galleries and reinjection wells).

COMMENT # 13:
A citizen suggested the creek should be remediated.

RESPONSE to Comment # 13:
EPA has evaluated risk from exposure to water in the creek and did not find a direct contact risk. In addition, there are no data to suggest that fish from the creek have any accumulated concentration of contaminants. However, before any remedial action occurs that would involve discharge of treated water to the creek, an environmental/biological assessment of the Perkiomen Creek is planned for the Summer of 2008.

COMMENT # 14:
A citizen asked why EPA does not restrict development in this area and why the farm cannot be abandoned.

RESPONSE to Comment # 14:
To implement the groundwater remedy selected in this OU-2 ROD Amendment, EPA does not need to ban development in the area of the Site or require complete abandonment of the Crossley Farm property. With regard to the Crossley property, EPA in conjunction with PADEP has placed restrictions on the use of the farm property to allow EPA and the State access for the future construction of a treatment plant and has restricted any development which may interfere with the remediation of the Site.

COMMENT # 15:
A citizen suggests that residents should be consulted and asked where to build the treatment plant.

RESPONSE to Comment # 15:
The purpose of the proposed plan and the comment period that followed are to provide the opportunity for the affected residential community to participate in the decision making process. EPA plans to continue to inform and consult with the residents and local elected officials during the implementation of the remedy.

COMMENT # 16:
A citizen asked if emissions and vapors from the proposed treatment plant could negatively impact the ambient air quality.

RESPONSE to Comment # 16:
The proposed treatment plant would comply with PADEP air emission limitations. Emissions from the treatment plant will be captured and contained using carbon filtration systems so as not to negatively affect the local air quality.

COMMENT # 17:
A citizen asked about the parties responsible for contaminating the Site.

RESPONSE to Comment # 17:
EPA has the authority to pursue any responsible party. The owner of the property has entered into a judicial consent decree with EPA to pay an agreed upon portion of the investigation and remediation costs. In addition, settlement negotiations with the entity who generated waste that was disposed at the Site are ongoing.

COMMENT # 18:
A citizen suggested the use of Zero-Valent Iron technology

RESPONSE to Comment # 18:
The technology is not appropriate for the fractured bedrock aquifer system and the complex hydrogeology at the Site. The iron barrier could not be installed in a way that would intersect all of the contaminated fractures and therefore would be ineffective. Zero-Valent technology had been considered by EPA technical staff and was ruled out in the screening technology portion of the 2001 Feasibility Study.

COMMENT # 19:
A citizen supported the proposed plan saying; the influx of discharged water to the creek may alter the ecosystem but will not destroy it.

RESPONSE to Comment # 19:
EPA will conduct an assessment of the aquatic life and environment of the creek in the summer of 2008. Any discharge will be closely monitored and every effort will be made to minimize any impacts to the creek.

COMMENT # 20:
A citizen commented that the clean up is overdue and definitely needs to be done. The citizen urges EPA not to abandon the Proposed Plan because of community protests mainly about aesthetics.

RESPONSE to Comment # 20:

EPA is not abandoning the clean up but has considered public comments received regarding the location of the proposed treatment plant. EPA will make every effort to conduct the Remedial Action as soon as possible while maintaining the aesthetics of the neighborhood.

COMMENT # 21:

A citizen asked about traffic flow.

RESPONSE to Comment # 21:

Traffic flow may increase during the construction phase. However, EPA will develop traffic plans during the Remedial Design phase of remedy implementation and share those plans with the community prior to the start of construction.

B. Local Reporter Comments

COMMENT # 22:

A local reporter asked about the cost recovery case and how close is the case to settlement.

RESPONSE to Comment # 22:

EPA is engaged in settlement negotiations with Temrac, Inc. related to Temrac's liability for costs at the Site. The law relevant to cost recovery is found in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (CERCLA), 42 U.S.C. § 9607. The settlement negotiations are nearly complete and a settlement is expected in the near future. A settlement was reached with the prior owner/operator of the farm and is currently under review by a federal judge.

COMMENT # 23:

A local news paper reporter asked, "What was Alternative 3 from the 2001 ROD and is it likely to be reconsidered?"

RESPONSE to Comment # 23:

Alternative 3 in the 2001 ROD was an alternative where the groundwater extraction wells were to be located at the top of the hill on the Crossley Farm Property and the goal of the alternative was to contain the 1 part per millions (ppm) plume using approximately 41 extraction wells to intercept the plume before the contaminates left the top of the hill. Pumping rates were estimated to be about 350 gallons per minute (gpm). As part of
Alternative 3, the treated water would have been discharged on top of the hill using reinjection wells and discharge to surface water ponds on the farm.

EPA hydrogeologists developed a conceptual model which is presented in the response to the Berks County Commissioners and their contractor, Keystone G-Sciences Group Inc. (See response to comment #26 on page 10) The model, as written, describes the complexity of the fractured bedrock groundwater flow system. Because of the existing geology, it is technically more feasible to control the flow of the contaminated groundwater at the base of Blackhead Hill which is downgradient of the source area at the top of the hill. Pumping the groundwater at the top of the hill will not contain nor remediate the contaminated groundwater in the valley south of the Crossley Farm property. Therefore, the previous Alternative 3 was no longer considered.

COMMENT # 24:
The same local reporter asked about funding for the Remedial Action.
RESPONSE to Comment # 24:
EPA funding for the OU-1 Remedial Action at the Site is $1,465,150.
No funding has been obligated for the OU-2 remedy at this time

C. County Comments

Written comments received from Keystone E-Sciences Group Inc. on behalf of Berks County Commissioners

Comment #25:
The County of Berks is very concerned with the lack of appropriate funding, and the resultant lack of any real remediation, for the extensive groundwater contamination source and plume at the Crossley Farm Superfund site. This project has been under investigation by the USEPA for 20 years, and the source of groundwater contamination has been in place at, and migrating from, the top of Blackhead Hill since the 1960's or 70's. It was not until approximately 10 years ago that point of entry treatment units were installed on affected residential wells, an interim measure that has been considered as Operable Unit 1 (OU-1). The OU-1 work (i.e., installation of the residential supply well treatment units) is not a remedy for the extensive groundwater contamination problem (a plume that extends over 7,000 feet), nor has anything been done to date to actually remediate the problem. The original OU-2 remedy was established via a Record of Decision (ROD) issued in 2001. However, there has been absolutely no work conducted to date to actually remove the mass of contaminants from the groundwater at the source area.

The County of Berks recognizes that the PRAP is presented as an addendum to an already selected groundwater remedy for the widespread OU-2 plume. The earlier selected remedy (a pump and treat system in the highly contaminated source area) was presented in a 2001 Record of Decision (ROD) for the site. However, that remedy has not yet been implemented. The USEPA acknowledged during the public meeting of 14 June 2007 that the remediation is not funded, and that it would probably be at least 2009 before any real remedial action could occur.

It is understood that this is an agency-led Superfund project and that progress has been stifled by a lack of funding. However, big problems often require expensive solutions, and when there are a large number of residents in an affected area, we believe that it should be given priority. The point of entry treatment units at the residential wells might be preventing direct ingestion of contaminated groundwater, but the lack of remedial action on the OU-2 regional groundwater plume leaves the source of the problem unattended.

There are other Superfund sites in southeast Pennsylvania that are under Consent Orders and funded by potentially responsible parties (PRPs) where the agency has required much more extensive investigation and a faster tracked remedial program. The Malvern TCE Site in Chester County and the Occidental Chemical Site in Montgomery County are two examples of Superfund sites where TCE is present in deep, fractured bedrock and where there are concerns with offsite migration and discharge to a water body. On both of these other TCE projects, the CERCLA projects have had to

progress into actual remediation at a much more rapid pace and with substantial investigation and remediation costs incurred by the PRPs in a shorter timeframe. Neither of these other sites pose the same magnitude of a problem as the Crossley Farm Superfund site, which has a much more extensive plume in a publicly used groundwater aquifer. We believe that the USEPA should be required to address the concerns at this agency-led site with at least as stringent an agenda and proper funding as that required for other PRP-funded TCE sites.

RESPONSE to Comment #25:
EPA completed the design and bid specifications for the hot spot pump and treat system at the top of Blackhead Hill and requested funding for the remedy selected in the 2001 ROD. Upon the completion of the Remedial Design in 2004, funding for implementation of the remedy was requested through EPA's National Risk Based Priority Panel. This panel is comprised of national program experts from each EPA regional office and Headquarters. New projects are evaluated using factors such as risk to human population exposed, stability of site contamination, characteristics of site contaminants, ecological threats, and other program management considerations. New projects are primarily funded based on the panel's evaluation of these risk factors. Based on the Panel's review of site projects in 2004, the Crossley Farm Site did not receive funding at that time. As a result, EPA Region 3 requested that program experts review the technical aspects of the OU-2 remedy to help ensure the project was in the best position for subsequent review by the Panel. Reviews by program experts led EPA Region 3 to revise the implementation of the remedy and phase the project as described in this ROD Amendment. After this ROD Amendment is issued, EPA Region 3 will again request funding to implement the remediation of the valley plume (Phase 1). It is anticipated that EPA Region 3 will request funding in the fall of 2008. After implementation and operation of the OU-2 ROD Amendment for the valley plume remedy, EPA will also request additional funding to implement the 2001 OU-2 ROD remediation at the top of Blackhead Hill.

Comment #26:
Planning an addendum second-step remedial approach for the valley plume before implementing a remediation program for the source area at Blackhead Hill seems premature and ill advised. The USEPA has presented the PRAP as being a "proposed concept," and we believe that it needs to remain as such during a thorough discussion period and not be considered for a ROD amendment until such discussions are complete. The EPA has made the case that the plume downstream from the source, including the affected residential wells, are in a fairly steady-state; that is, the dimensions of the plume seem to have been relatively constant for over a decade and contaminant concentrations have not fluctuated substantially. However, these concentrations far exceed groundwater criteria and remain in that relative steady state because the source continues to supply contamination to the groundwater from atop Blackhead Hill. A first step in breaking this steady-state condition, which itself is unacceptable is to remove the source. The County of Berks believes that available funding should first be applied to implementing mass removal from the source area. This is a very complex hydrogeological setting and one that will no doubt dictate some changes to even the best-designed pump and treatment system. There will be technical lessons to be learned from the start-up, shakedown, and initial operation of a proposed system. We believe that these lessons would be better learned from first implementing a removal and treatment program at the source area, where at least a general hydrogeological characterization has been conducted, rather

than implementing a removal and treatment program in a much broader area of the valley plume where there exists very little knowledge of the hydrogeoloical conditions.

RESPONSE to Comment #26:
EPA agrees with the commenter that the Site is located in a very complex hydrogeological system. However, based on a thorough review of the Site conditions, EPA does not agree that the source area remedy should be implemented first. To further explain why EPA believes this, the following Conceptual Site Model (CSM) of the groundwater contamination at this Site is presented.

TCE contamination entered the bedrock at the top of Blackhead Hill as a non-miscible (i.e. having a very low solubility in water), denser than water, separate phase liquid (commonly referred to as Dense, Non-Aqueous Phase Liquid or DNAPL). The DNAPL moved downward due to gravity and distributed itself throughout the fracture network in a complex pattern in the bedrock. Where there existed sufficient thickness of DNAPL to cause the DNAPL to continue to migrate, it moved into smaller fractures until the resisting capillary pressure within the fractures prevented further movement. In some areas, there is continuous and potentially mobile DNAPL within bedrock fractures and movement of this DNAPL may be induced by drilling directly through the fractures or by lowering aquifer pressures through pumping the bedrock below the DNAPL. In other areas of the Site where DNAPL is present, but is not physically connected within the fractures, the DNAPL will not move because it is held within the fractures by capillary pressures. DNAPL under the latter conditions is referred to as 'residual DNAPL'.

Groundwater passing through the fractures where DNAPL exists dissolves some of the TCE DNAPL and a contaminated groundwater plume, with high TCE concentrations, develops within and immediately downgradient of the DNAPL area. Further downgradient of the DNAPL area, the dissolved TCE mixes with clean water and sorbs to aquifer material to form a dilute plume with lower concentrations. At the Crossley Farm Site, the natural groundwater flow gradient ranges from vertically downward at the top of Blackhead Hill, where the groundwater migrates deeper into the aquifer, to vertically upward in the adjacent and topographically lower Dale valley, where groundwater discharges into springs and the West Branch of the Perkiomen Creek. Maps depicting TCE concentrations reflect the highly complex hydrogeology of the area, including higher concentrations of TCE in some of the wells at depth (where the DNAPL resides due to gravity), discontinuous plume boundaries due to the tortuous path of DNAPL in the fractures, and apparently a 'clean' shallow zone in the vicinity of wells HN06 and HN07 where the flow gradient has not yet sufficiently reversed to allow the upward migration of contamination towards the streams in this area.

The remedial alternatives for the groundwater were evaluated based on this CSM. In the area atop Blackhead Hill where the DNAPL is continuously connected in the fractures, drilling through the fractures or lowering the upward capillary pressure by pumping below the DNAPL could allow the DNAPL to move and redistribute itself in potentially uncontaminated or lesser contaminated portions of the aquifer. From there it would act as an additional source of contamination for clean groundwater passing by it and a new or potentially more contaminated plume could emerge. There is an inherent difficulty in identifying the location of the fractures, and where within these fractures, the DNAPL exists. This difficulty presents two major problems: 1) drilling within or below the

DNAPL can mobilize the DNAPL and create a larger groundwater contaminant plume, as noted above, and 2) it is extremely difficult to target the delivery of a clean-up solution such as an oxidant or bioremediation amendment into the aquifer so that it contacts and remediates all of the DNAPL within the fractures. Consequently, additional wells would need to be drilled to better understand the geometry and interconnectedness of the bedrock fractures, the flow patterns within these fractures, the actual locations of the DNAPL, and the effectiveness of the in-situ treatment solution. This additional drilling would also be subject to the risks discussed above that are associated with drilling in the vicinity of the DNAPL.

Thus, EPA believes that it is technically more advisable to initially control the highly contaminated groundwater immediately downgradient of the DNAPL source area and prevent it from continuing to feed into the more dilute plume that extends down the valley. By controlling the groundwater flow direction and capturing the highly contaminated groundwater, source reduction and source removal in the DNAPL area on Blackhead Hill becomes manageable and could then be implemented. Specifically, if DNAPL is subsequently and inadvertently mobilized when remediating the DNAPL source area on the hill, the groundwater carrying the contaminants down into the valley would be intercepted and contained if an interceptor well network is operating. Furthermore, by controlling the influx of the highly contaminated groundwater into the valley, the contaminant concentrations in the dilute segment of the plume would then likely dissipate to below levels of concern.

In addition, since the 2001 ROD was issued, another exposure pathway has been identified. Vapors emanating from the shallow contaminated groundwater are moving into ambient air at some spring locations, and into some houses and other structures through vapor intrusion into indoor air. EPA is currently performing additional work to determine the full extent of this problem. Cutting off the highly contaminated portion of the plume will eventually improve the quality of the shallow groundwater in the downgradient portions of the plume, and prevent or reduce the potential for vapor intrusion issues.

From March 2006 through January 2007, EPA investigated vapor intrusion for 24 residences in the area where the highest groundwater concentrations were found in residential wells at the Site. The primary objective of this initial investigation was to obtain and analyze sub-slab vapor samples from beneath the residences and indoor air samples from within the basements and first floor of these residences. To date, EPA has determined that vapor intrusion is occurring at the Site and a removal action to address this pathway was necessary at two homes. The work to address the problem in the two homes has been completed.

In summary, this CSM explains the remedial challenges and the problems associated with these complexities. The source of contamination at the top of Blackhead Hill exists as DNAPL in the fractured bedrock, as evidenced by the direct observation of DNAPL in extraction wells EW-1, -2, -4, and at monitoring well cluster MW-25. There are no current technologies which can either completely define where DNAPL is located, or remove all of the DNAPL from the fractures within the bedrock. While implementation of a remedy to reduce the source using extraction wells or in-situ treatment technologies can reduce the source at the top of the hill, it cannot reduce the size of the plume in the valley since the DNAPL will continue to remain in fractures at depths in Blackhead Hill and will continue to feed the valley plume. As discussed, EPA is concerned that implementing

a source area remediation prior to this OU-2 ROD Amendment could also potentially mobilize the DNAPL and create a larger groundwater contamination problem. Therefore, the intent of this OU-2 ROD Amendment, with extraction wells in the valley, is to successfully manage a multistep groundwater cleanup with this ROD amendment as the first step. This first step is designed to remediate the downgradient segment of the plume within the valley by intercepting the highly contaminated groundwater plume that is being continually fed by the DNAPL source area on Blackhead Hill. The subsequent step of the remediation process will be to address the DNAPL source area at the top of Blackhead Hill.

Comment #27:
Ecological resources that have not been well identified or investigated to date may be currently at risk as the result of unaddressed contamination. Berks County has concerns with the limited level of ecological study for the affected region of this Superfund site. The July 2001 Remedial Investigation report prepared by Tetra Tech NUS for the USEPA indicates that the Ecological Assessment was limited in scope (and potentially by budget). The time spent onsite by a pair of biologists was just two days. Their study area was defined to focus on the areas "closest to and downgradient of the known and suspected source locations. Peripheral areas were investigated by a rapid scan from roadways or convenient overlook points." We do not believe that this limited extent of site investigation was adequate to evaluate the ecological setting and the potential risks to it. Considering the extensive area covered by the Site, the varied terrain and topography, and the possibility of yet identified springs, wetlands, and sensitive habitat areas, we believe that a more comprehensive evaluation of potentially impacted ecological receptors is warranted.

RESPONSE to Comment #27:
Ecological risks were evaluated by EPA at the time of the Remedial Investigation (RI) at this Site. EPA believes the most significant ecological impact to be from contaminated springs which reach the surface throughout the study area. The RI identified ecological risks from TCE contamination at surface springs and seeps. To address this risk, one of the remedial action objectives of this interim action is to reduce contamination at surface springs and seeps. As far as the ecological assessment, EPA plans to conduct an additional ecological investigation of the Perkiomen Creek during the Remedial Design Phase prior to remediation and during the long-term treatment to ensure that discharge of treated water is carefully monitored and does not have a detrimental impact on the Perkiomen Creek.

Comment #28:
All human health risk factors have not been considered in the plans to date, and the PRAP does nothing to rectify this. A focus of the risks and remedial planning for this Superfund site has involved TCE in groundwater. While we concur that TCE is indeed the most relevant chemical of concern (COC) for this site, there appear to be other COCs in other media that have been overlooked in the risk assessment and remedial planning. A visit to the source area shows that it is not fenced. Although rural and somewhat remote, it is easily accessible. An EPA memo in the Administrative Record (11 May 1998) indicated that lead and the PCB Aroclor 1254 were present and could potentially migrate from the site if not mitigated. Lead, which is a heavy metal that has been linked to brain cancer and developmental problems in children, is reported in that memo to have been present at concentrations up to 801 mg/kg in the near surface soil. This far exceeds the

current PADEP statewide health standard of 500 mg/kg for lead in soil for a direct contact scenario. This is one exposure scenario that should be further considered.

A memo in the Administrative Record from the Department of Health and Human Services (February 1992) presented a recommendation that biomedical testing, such as liver functions, be performed on individuals that had been long exposed to contaminated drinking water. A February 1993 report by the Agency for Toxic Substances and Disease Registry (ATSDR) presented the same recommendation for biomedical monitoring for exposed persons. There was no other subsequent information found in the Administrative Record indicating that such recommended biomedical testing was ever performed. That same 1993 report indicated planned annual follow-ups by ATSDR, though no additional information was found regarding actual biomedical monitoring or annual follow-ups by ATSDR.
It is indicated in the 1993 report that TCE levels as high as 23,000 ug/l (compared to a groundwater drinking standard of 5 ug/l) had been found in the residential well area in 1986. EPA did not start installation of the carbon filtration systems until the following year, and these TCE high levels were apparently present in the area for several years prior to the initial testing. That 1993 report also reported that some known springs were also contaminated in the area, and stated the possibility that other contaminated springs may exist in the area that are used for bathing, wading, or fishing. From a review of the other information in the files, it does not appear that a comprehensive study has been conducted to rule out the possibility that such other springs exist where direct human contact with contaminated water may pose a risk.

The July 2001 Feasibility Study report prepared by Tetra Tech NUS for the USEPA discusses the presence of other organic compounds in surface water bodies close to the source area. These include vinyl chloride and trichlorofluoromethane. The database for these other compounds is not extensive, and the locations of all seeps and springs within the affected plume area that may be impacted are not documented.

RESPONSE to Comment #28:
With regard to lead and PCBs found at Site, neither compound represents an elevated risk in the Trash Dump soils or the groundwater on the Crossley Farm property. Even though lead has been detected in many of the residential wells at the Site, it is not a Site related contaminant. Since pH levels found in groundwater in the area of the Site are low, the lead levels detected in residential wells are naturally occurring.

With regard to reports from the Pennsylvania Department of Health and Human Services and the Agency for Toxic Substances and Disease Registry (ATSDR) recommending biomedical testing, the testing has not been done. EPA assisted both agencies in 1993 when they met with the local residents to begin the registry activities but EPA does not conduct biomedical testing and must rely on these health agencies to follow up their recommendations. The ATSDR started the Trichloroethylene (TCE) Sub-registry in 1989 as part of the National Exposure Registry (NER). The goal of the TCE Sub-registry is to collect and provide information that would help ATSDR explore any possible links between exposure to TCE and health problems and to keep registrants informed of all current information related to their TCE exposure. Registrants are persons who were exposed to TCE at 14 sites in five (5) states: Michigan, Illinois, Indiana, Arizona, and Pennsylvania. The Crossley Farm Site registrants (also referred to as the Hereford Groundwater

Site by ATSDR) were added to the TCE Sub-registry in 1992. The "biomedical monitoring" was comprised of phone surveys and questionnaires that collected self-reported health conditions by TCE registrants during multiple interviews. The registrants' conditions were compared with health conditions reported by the general population in a nationwide survey.

EPA understands that the TCE Sub-registry is no longer active, registrant follow-ups have ceased, and no further reports will be written. Historic information and report summaries can be accessed at: http://www.atsdr.cdc.gov/NER/tce.html

With regard to the surface water sampling, EPA has conducted significant reconnaissance throughout its investigative history of this Site to identify and sample seeps, springs, and surface water bodies. During the initial reconnaissance of all home wells, EPA asked each resident to identify any springs and seeps on their property. EPA sampled many of these springs and seeps in the Remedial Investigation, and those that were not sampled were catalogued. EPA subsequently sampled additional ponds and springs at the request of residents during the extensive home well testing program conducted for OU-1, and also performed a study of the interactions between groundwater and surface water by burying passive diffusion bag (PDB) samplers within the Perkiomen Creek streambed. EPA is confident that all of the major or significant springs and seeps have at least been identified, if not sampled. In addition, further site reconnaissance, identification, and sampling of springs, seeps, and surface water bodies will be conducted as part of the remedial design for OU-2 and a new remedial investigation will be conducted to delineate the extent of vapor intrusion.

Comment #29:
There appears to be very little hydrogeological characterization for the proposed extraction well area, and without such information there is a lack of technical justification for the proposed well locations. Our assessment of the site investigation efforts available for review through the Administrative Record is that a limited amount of hydrogeological characterization has been performed in the bedrock around the source area on Blackhead Hill, and that virtually none has been performed in the plume area where the extraction wells are proposed as per the PRAP. We feel that this is a critical point since the bedrock and flow characteristics in the two areas may be very different. The bedrock at the source area is the gneiss of the Hardyston formation, in which groundwater flow is controlled by a series of fractures and a fault that cuts across the bedrock. All of the subsurface investigation involving borehole geophysics, camera logs, and pumping tests of specific zones has occurred in the Hardyston formation close to the source area. The results of these subsurface investigations have been used to locate extraction zones from the fractured gneissic bedrock. The proposed extraction well locations in the PRAP are near the contact of the Hardyston formation and the dolomitic rock of the Leithsville formation. There has been no similar level of investigation in the dolomitic bedrock of the Leithsville formation in the valley plume area. Contaminant flow through a dolomitic bedrock and a metamorphic bedrock is typically quite different.

The Administrative Record includes a Regional Hydrogeologic Investigation report prepared for the USEPA by Weston, dated August 1988. At that time, 19 years ago, it was recognized that radial groundwater flow occurred in both the overburden and bedrock from the top of Blackhead Hill, where the source area is located. It was also recognized at that time that a predominant flow direction was to the south through the fractured gneiss and quartzite bedrock of the Hardyston

formation and then into the carbonate bedrock (predominantly dolomite) of the Leithsville formation. Although the flow of the contamination plume was continuous from the one bedrock type into the other, it was reported in the 1988 report that the geostructure and flow characteristics were expected to be very different. As the plume flows downgradient from the source area, with a flow path controlled mostly by fractures and the fault zone, the plume narrows. The 1988 report indicates that this is probably related to the constraints of a massive crystalline matrix that intrudes from the east and the west.

The 1997 Focused Feasibility Study (FFS) prepared for EPA offered an evaluation of remedial options for the affected residential wells while a more comprehensive Remedial Investigation of the whole plume was conducted. The 1997 FFS eliminated one alternative for a new high-capacity supply well(s) with treatment (Alternative 5) because of the uncertainties with the current status of the contaminated plume. The concern registered in the FFS was that withdrawal from high capacity wells could exacerbate the existing groundwater problem before a remedy could be implemented. We agree with this conclusion and believe that the proposed use of high-capacity wells pumping 1,000 to 2,500 gpm from the valley plume area presents the same concerns today; i.e., there is no new understanding of the hydrogeologic conditions yet in the valley plume area to say that the proposed system would not exacerbate the existing problem.

RESPONSE to Comment #29:

EPA does not agree with the commenter's reference to the 1997 FFS and the uncertainties of the contaminated plume for the following reasons:

The 1997 FFS was prepared to address the drinking water supply for the residential wells and was written prior to additional monitoring wells installed during the RI/FS in 1998 and 1999 to define the extent of contamination on Blackhead Hill and throughout the valley. In addition, significant investigation was conducted during the Remedial Design for OU-1 and the pre-design for OU-2. EPA has collected a substantial amount of data since 1997 which has assisted us in defining the Crossley Farm CSM presented above. This work includes an analysis of historical aerial photographs, a fracture trace analysis, site-specific geologic reconnaissance and mapping, borehole geophysics, and surface geophysics. The objective of the remedy set forth in the OU-2 ROD Amendment, the installation of a groundwater well extraction system near the base of Blackhead Hill, is to intercept the groundwater plume and prevent the highest levels of groundwater contamination from feeding the further downgradient segment of the valley plume. The estimated total groundwater withdrawal rate of 1000-2500 gpm presented in the proposed plan is a very conservative estimate based on drilling information, and is used to assist in estimating the potential maximum cost estimates for the treatment plant and extraction well system. EPA agrees that additional data are needed to properly design the extraction well system and treatment plant for this Site. This information will be collected during the remedial design to determine the actual flow rates and anticipated concentrations for the influent groundwater.

COMMENT # 30:

The July 2001 Remedial Investigation and Feasibility Study (RI/FS) reports prepared by Tetra Tech NUS for the USEPA further emphasizes the complexity and unknown characteristics of the flow regime. It reports that flow occurs through fractures of varying yields at significant depths, but that the "base of the groundwater flow system has not been defined or identified." These conclusions are drawn for the source area bedrock in particular, in which some fracture trace, downhole

geophysical logging, video logging, and other downhole monitoring had been conducted. A similar investigation of the dolomitic bedrock in the valley plume and the Hardyston formation near the proposed new extraction wells has not even been initiated. The same document reports that there are area ponds and springs whose hydraulic connectivities to the bedrock groundwater near the source area have not yet been determined.

The Administrative Record also includes a December 2005 Site Optimization Tracker report prepared by GeoTrans for the USEPA. This report suggests that the Airport Road/ Dale Road area would be potential area for high volume extraction wells. This appears to be the recommendation presented in the PRAP. That same report, however, also states that the geologic conditions of the area need to be studied and understood first. The PRAP does not, however, include any details for an investigation. We believe that a fairly extensive pre-design investigation (PDI) of the proposed downgradient area should be performed before a remedial approach to the plume in that portion of the affected area is even considered.

RESPONSE to Comment # 30:
EPA agrees with the commenter that further hydrogeological data are needed to design, locate, and construct the extraction well system and treatment plant. EPA will obtain this information during the design stage by performing additional investigation prior to the final design of the groundwater extraction well system and the treatment plant.

Comment #31:
The final well and treatment plant locations should consider the benefits of placing these where floodplain, historic site, and other community concerns regarding aesthetics would not be a factor. Several points of opposition to the proposed location of the wells and treatment plant were voiced during the public meeting of 14 June 2007. Among these were the beliefs that the planned facility was in close proximity to a historic landmark and building, and that the proposed treatment plant would also be in the floodplain. A general community concern appears to be that the proposed extraction wells and treatment plant would be an eyesore in the proposed setting. It is recognized that the PRAP is presented as a "proposal" and a "concept," and it appears that the locations shown in the PRAP might have been selected on the basis of convenience—i.e., easy access to the proposed extraction well locations within the right-of-ways of Airport, Dale, and Dairy Roads, and an open field with easy access for the treatment plant. There have been no studies performed to date to indicate that these would be the optimal or technically preferred locations for these wells and plant. The lack of any technical justification for the proposed locations is addressed in other comments. We believe that the community's concern with the aesthetic aspects of location need to be considered while a technical optimization study progresses. There will be likely multiple technically preferable locations for the extraction wells, and the community's preference for equally viable locations should be considered.

RESPONSE to Comment # 31:
In recognizing the community concerns regarding the proposed treatment plant location, EPA has developed and briefly evaluated several alternative locations for the groundwater treatment plant. During the Remedial Design, EPA will look at the following locations: Top of the Hill, North Dale Road, South Dale Road, Dairy Lane, and Crossley on Dairy. These alternate locations are not in the floodplain as identified by flood maps issued by Federal Emergency Management Agency (FEMA).

None of these locations are on the National Register of Historic Places in Berks County, Pennsylvania. A preliminary evaluation for these additional locations has been performed with respect to implementability, effectiveness, and relative costs. Specifically, the following factors were evaluated: land availability, design requirements, distances and hydraulic lifts between extraction wells and treatment plant locations, power requirements, operation and maintenance requirements, and pumping equipment costs.

For the Top of the Hill location, a treatment plant could be constructed near the Borrow Pit on the Crossley Farm. The groundwater could be extracted from wells on Dale Road and Dairy Lane to a central lift station and then pumped up to the treatment plant via Crossley Farm's property front on Dale Road. No land acquisition would be required. Incorporating the Hot-Spot area groundwater into the treatment plant is easily implementable. The horizontal distance between the extraction well system and the lift station are 1,200 feet to 3,800 feet, with an additional 1,000 feet from the lift station to the treatment plant. The vertical distance from the extraction wells to the lift station is approximately 30 feet to 100 feet and about 230 feet in vertical elevation between the lift station and the treatment plant. Significant power requirements to lift and transport groundwater from the extraction well system to the treatment plant are anticipated. Noise from the pumps may be an issue. Operation and maintenance (O&M) activities for the well pumps and lift station are expected to be intensive. Costs for pumping-related equipment are substantial.

For the North Dale Road location, a treatment plant could be constructed on a private property on Dale Road within the northern portion of the valley plume near the northern end of the extraction well system. Privately owned land will be needed for this option and EPA will enter into the necessary legal agreements with the impacted property owner. The groundwater will be extracted from the extraction wells system located along Dale Road and Dairy Lane and pumped directly to the treatment plant. The pipeline is not very long. The horizontal distance from the extraction well system to the treatment plant is 800 feet to 3,400 feet and the vertical distance from the extraction wells to the lift station is approximately 10 feet to 80 feet. Power requirements to lift and transport groundwater, O&M activities for the well pumps and lift station, and costs for equipment relating to pumping are all relatively small as compared to other options.

For the South Dale Road location, a treatment plant could be constructed on a private property on Dale Road within the southern portion of the valley plume near the middle of the extraction well system. Privately owned land will be needed for this option and EPA will enter into the necessary legal agreements with the impacted property owner. The groundwater will be extracted from the extraction wells system located along Dale Road and Dairy Lane and pumped directly to the treatment plant. The pipeline is not very long. The horizontal distance from the extraction well system to the treatment plant is approximately 40 feet to 2000 feet and the vertical distance is estimated to be about 10 feet. Power requirements to lift and transport groundwater, O&M activities for the well pumps and lift station, and costs for equipment relating to pumping are all relatively small as compared to other options.

For the Dairy Lane location, a treatment plant could be constructed on a private property on Dairy Lane. Privately owned land will be needed for this option and EPA will enter into the necessary legal agreements with the impacted property owner. The groundwater will be extracted from the extraction wells located along Dale Road and Dairy Lane and pumped directly to the treatment

plant. The horizontal distance between the extraction well system and the treatment plant is estimated to be 1,000 feet to 3,600 feet and vertical distance ranges between -40 feet to 30 feet. Extraction pipelines for this option are long, but are considered implementable. Power requirement to transport groundwater in this option is relatively small. O&M activities for the well pumps and lift station are moderate. Therefore, costs for equipment related to pumping are also moderate.

For the Crossley on Dairy location, a treatment plant could be constructed on the Crossley Farm property front on Dairy Lane. No land acquisition would be required. The groundwater would be extracted from wells located along Dale Road and Dairy Lane and transported to the treatment plant via a lift station. For the Crossley on Dairy option, the horizontal distance between the extraction well network and the lift station is estimated to be 100 feet to 2,700 with an additional 2,100 feet from the lift station to the treatment plant. The vertical distance between the top of the extraction wells to the lift station range between -80 to -20 feet (that is, the water will flow downhill by gravity to the lift station), and about 80 feet between the lift station and the treatment plant which will be located slightly up hill. The power requirements and O&M activities for this location would be more than the South Dale Road location and Dairy Lane location, but are expected to be significantly less than the Top of the Hill location. Costs for pumping-related equipment are therefore expected to be moderate.

Further analysis of technical practicability from hydrogeologic and engineering perspectives of these potential locations will be performed in the remedial design phase. EPA will consider the aesthetic aspect of a selected location and any structure above it. All structures, i.e., lift station, treatment plant, and extraction wells, which are in public areas, will be designed to blend in with the surrounding environment. For example, a treatment plant may be designed and constructed to resemble a barn. Also, prior to implementation, EPA will discuss the design with the community. If EPA selects a location that involves private property, EPA will enter into the necessary legal agreements with the impacted property owner.

Comment #32:
Removal of 1,000 to 2,500 gpm of groundwater for treatment represents a potential misuse of a resource; it is recommended that less intrusive, less energy-consuming alternatives be considered for remediation of the valley plume as the evaluation moves forward. Flow through the fractured bedrock on Blackhead Hill during the RI pump tests ranged from 5 to 20 gpm. Groundwater flow was monitored in 20 wells under non-pumping conditions. In 10 of these wells, there was no observed borehole flow under non-pumping conditions; in 5 there was a detected upward flow, and in the other 5 there was a detected downward flow. Yield and flow were noted to be greatest in the proximity of the thrust fault and geological contacts and where there was a reported “chance penetration of interconnected water-bearing zones.” These characterization results from the Blackhead Hill rocks suggest that contaminant mass removal can be optimized by finding these flow zones in the fractured bedrock, where low volume removal of higher concentrations is possible. The PRAP appears to promote capturing the plume close to where it enters the dolomitic valley rocks, where the plume is diluted and where a pumping rate of 1,000 to 2,500 gpm is projected. There does not appear to be any technical justification in the reports of the Administrative Record to indicate that these pumping rates would be either optimal or sustainable, as none of the in-situ testing that was conducted in the gneissic bedrock of the source area on Blackhead Hill (e.g., geophysical logging, downhole camera surveys, pumping tests) were

performed in the bedrock of the proposed extraction area. Nonetheless, the removal of 1,000 to 2,500 gpm of groundwater from the aquifer seems like a large depletion of a natural resource. It should be considered that removal of such a large volume might draw clean water into the plume area. Also, the effect of such large volume removal on the area's residential wells is not certain; there is no current basis to determine whether the sustained yields presented in the PRAP would cause a dewatering of any of the residential wells. There appears, however, to be much less of a risk for dewatering residential wells if the wells are placed in the fractured bedrock upgradient of the PRAP locations, where a lower removal rate of groundwater with a higher concentration can be applied to achieve the same mass removal of contaminant.

RESPONSE to Comment #32:
As explained in the Conceptual Site Model (Response to Comment #26 above), the intent of this phase of the remedial action is to pump enough water to intercept the highly contaminated groundwater plume emanating from the DNAPL source area. Interception of the plume will also provide for protection if DNAPL mobilizes during remediation at the top of Blackhead Hill. EPA believes the 1000-2500 gpm is an overly conservative estimate that was used to define the high end of the treatment plant costs. EPA will collect the necessary data during the design to more specifically define the ultimate groundwater withdrawal rate of the extraction system. Most likely, dual purpose wells (i.e. designed such that they can be used as monitoring and extraction wells) will be installed and pumping tests will be performed to determine the minimum extraction rate necessary to collect the highly contaminated groundwater emanating from Blackhead Hill. The design will recognize, evaluate, and incorporate any potentially adverse impacts to the existing residential wells such that either the residential wells will not be adversely impacted, or if necessary, they will be replaced if the extraction wells cannot be relocated.

COMMENT # 33:
The commenter stated that a less energy-consuming and less obtrusive remedial approach is better for treatment of the plume in the valley area. These should be considered as the evaluation of alternatives moves forward. For example, a field treatability study conducted in the source area (July 2005 report) showed that the use of potassium permanganate was effective in treating 98% of the groundwater VOC contaminants (including TCE). Delivery of the potassium permanganate to the contaminants in the fractured gneissic bedrock in the source area, however, was a concern. A detailed investigation of the valley dolomite, however, might locate solution channels or other karst features that would be more amenable for the delivery of a permanganate solution to cause an in-situ oxidation of the TCE. This, and other in-situ treatment options should be considered as the hydrogeological characterization of the valley bedrock is developed.

RESPONSE to Comment # 33:
EPA recognizes the potential benefits associated with the in-situ treatment of groundwater. However, the hydrogeological data collected to date at the Crossley Farm Site indicate that the complex fracture network within the valley bedrock would make it extremely difficult or impossible to adequately distribute the biological or chemical amendments such that complete remediation of the plume would be achieved. However, once EPA implements the action described in this ROD Amendment, in-situ technologies can be considered. As described above, if the DNAPL area were not controlled, the concentrations in the downgradient plume would continuously be replenished and the necessity of adding amendments would be a continuous process.

COMMENT #34:

The PRAP alternative does not satisfy the nine evaluation criteria specified in the National Contingency Plan (NCP) as well as the alternative already approved by the September 2001 ROD. The PRAP alternative has been proposed for implementation *prior* to implementing the previously selected alternative for source removal and treatment on Blackhead Hill. We do not believe that this decision would be consistent with an evaluation of the two alternatives in conformance with the NCP. A discussion of the two alternatives and their abilities to satisfy the threshold, primary balancing, and modifying criteria is presented below.

The PRAP alternative does not offer an improvement over the original alternative in terms of overall protection of human health and the environment. In fact, because of the unknowns associated with the proposed withdrawal and discharge close to the Perkiomen Creek, there is less certainty associated with protection of the environment with the PRAP alternative.

The September 2001 ROD alternative has already been evaluated with regard to its ability to comply with Applicable or Relevant and Appropriate Requirements (ARARs). The alternative presented in the PRAP leaves the mechanisms and details to demonstrate such compliance undermined; and, with regards to certain ARARs, the ability to comply is doubtful. The ability to achieve discharge limits required under the Federal Ambient Water Quality Criteria (AWQCs) and compliance with the Commonwealth's statewide human health standards has not been established. Implementing the PRAP alternative instead of the ROD alternative offers a less certain protection of wetlands and sensitive habitat. The effects of large volume groundwater withdrawal from the valley plume area on these natural features are unknown. In addition, the PRAP alternative presents a concern with meeting the requirements of the National Historical Preservation Act of 1966 and the Commonwealth's Historic Preservation Act.

There is no perceived improvement in long-term effectiveness and permanence in selecting the PRAP alternative for implementation over the 2001 ROD alternative. The 2001 ROD alternative offers a far superior ability in the reduction of toxicity, mobility, and volume of the contaminants, as it would remove from the environment much higher concentrations of these contaminants. Mass removal per unit time would be substantially greater with the 2001 ROD alternative, with less negative impact to the community; thus, the 2001 ROD alternative is a better choice in terms of the short term effectiveness criterion.

The ability to implement the 2001 ROD alternative is superior to the PRAP alternative. It has already been deemed to be technically and administratively feasible, while the PRAP alternative may show potential locations of obvious easy access but no certainty of technical optimization. Access to locations in the valley plume that might be determined to be technically better locations for withdrawal may not be readily accessible for administrative reasons, and this would further delay the remediation program. In comparison, access to the source area on Blackhead Hill is already available and the remediation can be initiated anytime upon funding.

The cost for the PRAP alternative is projected to be between $19.5 and $33 million. The cost for the 2001 ROD alternative is projected at $8.7 million. Due to the fact that there have already been more investigation, characterization, treatability study, and remedial plans developed for the 2001

ROD alternative, the cost estimate for that alternative is likely more accurate. The USEPA has had trouble funding any real start-up of the remedial program, which is unfortunate. It is reasonable to assume that a funding level for the 2001 ROD alternative could be obtained before the funding level for the PRAP alternative would be considered. Thus, for all the criteria considered, including the ability to fund a remedial action, we believe that the 2001 ROD alternative should be first implemented while alternatives for the plume remediation continue to be studied.

RESPONSE to Comment # 34:
EPA conducted a detailed analysis of the threshold criteria and the primary balancing criteria and for the hot spot alternative selected in the 2001 ROD and the selected remedy for the valley plume in this ROD Amendment. The detailed analysis for the 2001 OU-2 remedy and this ROD Amendment remedy are very similar. Both are interim remedies and a full, final clean up is not achieved by either alternative. The main consideration for EPA, in this ROD Amendment, is that the valley plume remedy is not replacing the hot spot remedy but rather is planned as the first phase in groundwater remediation for the Site. EPA plans to address the hot spot area after the first phase is implemented.

COMMENT # 35:
What was the total amount of funding for the Site?

RESPONSE to COMMENT # 35:
The same question was asked by a local reporter and the response to Comment # 24 above provides this information.

COMMENT #36:
From Berks County Conservation District and from the Pine Creek Valley Watershed Association Inc.
The commenters requested that the remedial action proposed would not have any impact on or degrade the existing classification of any receiving stream in eastern areas of Berks County. They expressed concerns over adversely impacting the West Branch of the Perkiomen Creek.

RESPONSE to Comment #36:
The remediation plans for treating contaminated groundwater from the Crossley Farm Site will likely require some discharge of treated "clean" water to the Perkiomen Creek or one of its tributaries. EPA plans to meet the requirements for the Exceptional Value Stream designation and the Pennsylvania Department of Environmental Protection standards as they apply to the discharge location.

D. Comments from State Agencies

COMMENT # 38:
A Pennsylvania Department of Environmental Protection (PADEP) supervisor asked about the correlation between groundwater concentrations in groundwater and the possible TCE vapor intrusion.

RESPONSE to Comment # 38:
At the Crossley Farm Site, it is not the concentration of TCE found in the groundwater well located at the residence, but rather the residence's close proximity to springs and seeps that have been found to be the primary reason TCE contamination at or above 200 ppb in the springs and groundwater seeps was present at both residences where Vapor Intrusion (VI) was addressed. EPA is expanding its vapor intrusion investigation this fall and will continue to collect data.

COMMENT #39:
The Pennsylvania Bureau of Fisheries noted that the West Branch of the Perkiomen Creek is designated as an Exceptional Value Stream by PADEP and as a Class A Wild Trout Stream by the Pennsylvania Fish and Boat Commission. They commented that the stream appears to be able to handle the planned discharge as long as the flows are kept constant and not pulsed. They also commented that it is imperative that the stream's designated uses be maintained and that there are no negative impacts to the water quality, fish community and steam habitat throughout and subsequent to remediation. They recommended best management practices to prevent thermal pollution and erosion at the discharge points. They agreed that baseline data for biological, chemical and physical information is necessary and that long-term monitoring is essential.

RESPONSE to Comment #39:
EPA plans to meet the requirements for the Exceptional Value Stream designation and the PADEP standards as they apply to the discharge location. EPA also plans to conduct a West Branch Perkiomen Creek Biological Assessment for the Crossley Farm Superfund Site. In addition, EPA will conduct an additional chemical analysis of the creek and temperature and flow volumes will be monitored during the remediation period.

E. Township Comments

COMMENT #40:
Hereford Township Board of Supervisors requested that EPA utilize the Alternative #3 from the 2001 ROD.

RESPONSE to Comment #40:
EPA's hydrologists reviewed the comments of the Hereford Township supervisors which are similar to the issues were raised by the Berks County Commissioners. (See Comment # 26 and EPA's response on page 10 of this Responsiveness Summary). Also, please note the Site Conceptual Model (SCM) provided describes the complexity of the fractured bedrock groundwater flow system. Because of the existing geology, EPA believes it is technically more feasible to control the flow of the contaminated groundwater in the valley at the base of Blackhead Hill which is downgradient of the source area at the top of the hill. Pumping the groundwater at the top of the hill will not be effective in containment or remediation of the contaminated groundwater in the valley south of the Crossley Farm property.

In order to capture and contain the groundwater plume, EPA will need to place the extraction wells along the public right of way along the Dale Road and Dairy Lane intersection but will

further evaluate the location of the treatment plant and the location of the treated discharge to the groundwater and surface water so as to minimize concerns of the local residents in that area.

F. Federal Comments:

COMMENT #41:
A letter was received from Congressman Jim Gerlach who commented on the size of the proposed treatment plant and the possibility that the proposed Alternative 10 would have significant impact on the market value and aesthetic values of the homes in the area.

RESPONSE to Comment #41:
At the public meeting held on June 14, 2007, EPA acknowledged that the dimensions of the treatment plant would actually measure 7500 square feet (sq. ft.), rather than 75,000 sq. ft. as originally presented in the proposed plan. While this typographical error was explained and seemed to be accepted by those who attended the public meeting, many still expressed concern about the proposed location of the treatment plant. Many were still concerned about the adverse effects on the aesthetics of the homes and farm properties in the vicinity of the Site as well as the perceived negative impact on the neighborhood and property values.
In this Responsiveness Summary, comments # 3 and # 4 on page 2 and comment # 31 on page 16 above, EPA addressed comments received regarding the location and the plans to minimize impacts on the local residents.

G. June 14, 2007 Public Meeting Transcript