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GERAGHTY & MILLER, INC.
Environmental Services

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July 31, 1995

Mr. Thomas Taccone
Olean Well Field Project Coordinator
Chief, New York, Caribbean Superfund Branch II
Emergency and Remedial Response Division
United States Environmental Protection Agency - Region II
290 Broadway - 20th Floor
New York, New York 10007-1866

Subject: Response to Comments, Olean Draft Feasibility Study Review - Second Submittal

Dear Mr. Taccone:

As indicated in our submittal to you on July 19, 1995, the Olean Cooperating Industries ("Olean CIs") have directed Geraghty & Miller, Inc. to submit the following additional change pages related to the comments made in the United States Environmental Protection Agency (EPA) comment letter dated June 29, 1995, and further clarified in our conference call on July 10, 1995.

The revised cost estimates (Appendix C), will be submitted by August 2, 1995, providing separate costs, by source area, under each alternative. Some minor editorial comments from Ms. Ford's review of the change pages, that she was not able to review prior to the July 19, 1995 submittal, will also be included.

If there are any questions or comments regarding responses provided or the revised pages, please do not hesitate to contact Ms. Libby Ford or the undersigned.

Sincerely,

GERAGHTY & MILLER, INC.

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Engineering Task Manager

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vapor extraction wells which are designed to withdraw the injected air. Once recovered, the air containing the contaminants is treated in order to comply with the discharge limitations. vented soil, strips the dissolved and trapped contaminants and is captured by a system of

3.2 SUMMARY OF REMEDIAL ACTION ALTERNATIVES FOR SOILS

In this section, the soil remedial action alternatives formulated are listed below, and the components of each alternative are identified .

- Alternative 1: No Action.
- Alternative 2: Institutional Controls.
- Alternative 3: Clay Capping.
- Alternative 4: In-Situ Treatment Using SVE or VER.
- Alternative 5: Excavation, Off-Site Thermal Treatment and Disposal.

3.2.1 Alternative 1: No Action

The no-action alternative is provided as a baseline for comparison with other alternatives. Under this option, no additional remedial activities are performed. Humans and animals may still potentially be exposed to the contaminants at the identified source areas, and treatment of the municipal wells would not be expedited.

Under this alternative, a 5-year CERCLA review will be performed on a regular basis to determine if additional remedial action should be implemented.

3.2.2 Alternative 2: Institutional Controls

This alternative would be implemented as described in Section 3.1.2.

3.2.3 Alternative 3: Clay Capping

Components of this alternative include the following:

- Obtain land use restrictions to prevent future disturbance of the soil.
- Install clay capping.
- Place 6-inch layer of topsoil.
- Vegetate surface to provide stabilization.
- Perform proper maintenance of capped area.
- Conduct 5-year reviews.

This alternative is designed to prevent contaminated soil particles from migrating off-site in storm-water runoff and/or airborne dust, and to prevent VOCs from leaching to the groundwater as water percolates through the soils.

Proper capping and grading effectively reduces or eliminates off-site migration by preventing dust and diverting the flow of storm water. It also avoids percolation through the contaminated soil to the groundwater and may expedite treatment of the municipal wells..

The unpaved area is prepared by proper grading of the existing soils to ensure that no collection of standing water occurs. A compacted layer of clay or bentonite admixture is then applied and a 6-inch thick layer of top soil is then placed atop this compacted layer. Finally, the surface is vegetated to provide stabilization and to promote evapotranspiration.

If after the underlying soil and groundwater have established a new equilibrium and natural groundwater attenuation and biodegradation have been given an opportunity to remove COCs from the source, (e.g. 5 pore volumes of groundwater have migrated from each identified source area to the municipal air strippers), on-site groundwater, downgradient of the capped soil source areas has not achieved the CGs identified in Table 2-1, the need for a

groundwater treatment program would be evaluated. The evaluation steps would include the following. First, a review of the water quality at municipal wells M18 and M37/38 would be done; if the quality is meeting or is better than the Table 2-1 CGs, no additional source are specific groundwater remediation would be necessary. If the CGs have not been met, but the quality at M18 and M37/38 is still improving, the decision to whether additional groundwater remediation is needed at a capped soil source area would be deferred until the remedial actions at all the source areas (including allowing the five pore volumes travel time to pass for each source area remediated pursuant to alternatives 3, 4, and 5), at which time the water quality at M18, M37/38 would again be evaluated. Second, if a decision is made that additional groundwater remediation is necessary at a capped soil source area, an evaluation of the available groundwater remedial technologies will take place and an appropriate groundwater remediation technique will be selected, installed, and implemented. One possible groundwater remedial system that would be evaluated would be groundwater pump and treat by installing a recovery well system and by removing contaminants using air stripping and polishing the treated water using a GAC adsorption system (if necessary). The treated groundwater would then be discharged to the publicly owned treatment works system (POTW). If necessary to meet the requirements of the NYS Air Guide 1, the off-gas from the air stripping system would be treated with Vapor Phase GAC (or other appropriate methods).

3.2.4 Alternative 4: In-Situ Treatment Using SVE or VER

Components of this alternative include the following:

- Install air injection and SVE, or VER system.
- Treat vapors or extracted groundwater containing contaminants.
- Perform environmental monitoring and 5-year review.

This alternative involves the installation of a system of air injection wells and SVE or VER wells. The injection wells and SVE installation would entail injecting air into the soil formation and

extracting the air back out of the unsaturated soil. The air, as it passes through the soil, strips it of the volatile contaminants. VER would entail installation of recovery well(s) and vapor and groundwater recovery system. Once recovered, the air and/or groundwater containing the contaminants is treated to comply with the applicable discharge limitations.

Once soil/groundwater quality improvement due to operation of the SVE/VER system has ceased and/or is judged to be no longer cost effective, an evaluation of the need for additional source-area related groundwater remediation will be undertaken.

The evaluation steps would include the following; first, a review of the water quality at Municipal Wells M1B and M37/38 would be done; if the quality is meeting or better than the Table 2-1 CGs, no additional source area specific groundwater remediation would be necessary. If the CGs have not been met, but the quality at M18 and M37/38 is still improving, the decision as to whether additional groundwater remediation is needed at a SVE/VER remediated soil source area would be deferred until the remedial actions at all the source areas (including allowing the five pore volumes travel time to pass for each source area remediated pursuant to Alternatives 3, 4, and/or 5), at which time the water quality at M18, M37/38 would again be evaluated. Second, if a decision is made that additional groundwater remediation is necessary at a SVE/VER remediated soil source area, an evaluation of the available groundwater remedial technologies will take place and an appropriate groundwater remediation technique will be selected, installed, and implemented. One possible groundwater remedial system that will be evaluated is groundwater pump and treat.

A 5-year review of the site would also be performed as outlined in Alternative 2.

3.2.5 Alternative 5: Excavation, Off-Site Thermal Treatment and Disposal

Components of this alternative include the following:

- Restrict access through institutional controls during excavation.
- Excavate soil contaminated above CGs.
- Process and treat soil by off-site low temperature thermal desorption.
- Backfill excavation with clean fill.
- Revegetate or pave the disturbed area as required.
- Perform environmental monitoring and 5-year review.

This alternative removes the soil contaminants through thermal desorption. The soils are first excavated, then screened to remove large debris. The remaining soil is then treated using thermal desorption. During the excavation and handling of the soil, proper health and safety measures would have to be implemented, since some of the VOCs in the soils would be released to the air.

The low temperature thermal desorption process volatilizes the VOCs and the organic compounds from the soil particles. The vapors produced in this process are collected and treated. The treated soils would then be disposed of in accordance with all regulations. Clean backfill would be brought onto the site.

If after the underlying soil and groundwater have established a new equilibrium and natural groundwater attenuation and biodegradation have been given an opportunity to remove COCs from the source, (e.g. 5 pore volumes of groundwater have migrated from each identified source area to the municipal air strippers), on-site groundwater downgradient of the soil source areas has not achieved the CGs identified in Table 2-1, the need for an additional groundwater treatment program would be evaluated. The evaluation steps would include the following. First, a review of the water quality at municipal wells M18 and M37/38 would be done; if the quality is meeting or is better than the Table 2-1 CGs, no additional source area specific groundwater remediation would be necessary. If the CGs have not been met, but the quality at M18 and M37/38 is still improving, the decision as to whether additional groundwater remediation is needed at a source area, which had been remediated through soil

removal, would be deferred until the remedial actions at all the source areas (including allowing the five pore volumes travel time to pass for each source area remediated pursuant to Alternatives 3, 4, and 5) have been completed. At that time, the water quality at M18, M37/38 would again be evaluated. Second, if a decision is made that additional groundwater remediation is necessary at a soil source area which has been remediated through soil removal, an evaluation of the available groundwater remedial technologies will take place and an appropriate groundwater remediation technique will be selected, installed, and implemented. One possible groundwater remedial system that would be evaluated would be groundwater pump and treat.

3.3 MERGING OF REMEDIAL ALTERNATIVES INTO SOURCE AREA REMEDIAL ALTERNATIVES

Having developed alternatives for the treatment for both soil and groundwater, remedial alternatives must combine the alternatives individually developed for each of the two media. The purpose of merging the remedial alternatives is to develop feasible strategies that will be effective and that can be implemented together. The combined remedial alternatives are as follows:

Remedial Alternative 1:	No Action.
Remedial Alternative 2:	Institutional Controls.
Remedial Alternative 3:	Capping, On-Site Treatment of Groundwater Using Air Stripping and Carbon Polishing and Discharge to POTW.
Remedial Alternative 3A:	On-Site Treatment of Groundwater Using Air Stripping and Carbon Polishing and Discharge to POTW.
Remedial Alternative 4:	In-Situ Treatment of Soil and Groundwater Using Air Sparging and SVE or VER.

Remedial Alternative 5: Soil Excavation and Off-Site Thermal Treatment and Disposal and On-Site Treatment of Groundwater Using Air Stripping, Carbon Polishing, and Discharge to POTW.

Remedial Alternative 5A: Soil Excavation and Off-Site Thermal Treatment (if necessary) and Disposal.

3.4 DETAILED ANALYSIS OF REMEDIAL ALTERNATIVES

In this section a description of the combined remedial alternatives is provided and the results of its subsequent evaluation is summarized.

3.4.1 Description of Combined Remedial Alternatives

This section presents a description of the combined remedial alternatives, outlined in Section 3.3, which are considered for detailed analysis.

3.4.1.1 Alternative 1: No Action

Implementation of Alternative 1: No Action results in leaving the source areas as they currently exist with no additional work to be performed within or outside of the source area boundaries. At present, groundwater recovery and treatment with air strippers on the municipal water supply wells and the production well at the McGraw-Edison site is in operation and a quarterly Site Monitoring Program is carried out. Every 5 years, a review of site conditions will be conducted to determine if the remedial action requires modification. These operations would continue and are considered part of the No Action alternative.

3.4.1.2 Alternative 2: Institutional Controls

Instituting Alternative 2 would involve implementing the following:

- Public education programs.
- Site monitoring program of selected monitoring wells and Olean Well Field municipal wells (this may involve an expansion or modification of the current SMP).
- Prohibit the use of area groundwater for potable purposes.
- Place deed restrictions on the sale of source area properties for residential use.
- Access restrictions to the identified source areas.
- Perform environmental monitoring and conduct a 5 year review of site conditions.

This alternative includes education programs, such as public meetings and presentations, designed to increase public awareness about the hazards present in the identified source areas. The public education programs would involve a public meeting where a fact sheet would be distributed and maintenance of an information repository with the results of the SMPs and the results of the analyses of the effluent water quality from the municipal wells after treatment.

This alternative also involves implementation, relative to the identified source areas, of land use, deed restrictions or other legally enforceable restrictions to limit on-site excavation, and to prevent installation of domestic or industrial groundwater wells for potable water purposes until soil and groundwater clean-up levels identified in Table 2-1 are achieved. Excavation restrictions would ensure that excavation in or near an identified soil source area is accompanied by implementation of a worker/local area health and safely plan and appropriate off-site treatment and/or disposal of any contaminated excavated soils. Legal activities associated with instituting land use restrictions could include incorporating necessary language into site property deeds. Access restrictions could include installation of a 6-foot high fence with lockable gates (to the extent such fencing is not already in place) around each source area. The integrity of the site fencing would be maintained indefinitely. A health and safety plan would govern future access to, or work within, the identified source areas.

Monitoring of groundwater wells would consist of monitoring an appropriate subset of the existing monitoring wells. Additionally, influent monitoring would continue at the Olean Well Field supply wells to monitor changes in influent and effluent quality. Every 5 years this monitoring schedule would be re-evaluated to determine if sampling frequencies and/or the wells being monitored should be changed. Figure 3-1 illustrates the limits of fencing proposed at the Olean Well Field site source areas.

3.4.1.3 Alternative 3: Capping, On-Site Treatment of Groundwater Using Air Stripping and Carbon Polishing and Discharge to POTW

This alternative would involve the following major elements:

- Capping at identified soil source areas.
- Implement land use/access restrictions (if necessary).
- Monitoring programs at selected monitoring wells and at Olean Well Field municipal wells.
- Implementation of groundwater treatment at the groundwater source areas.
- Conduct a 5 year review of site conditions.

Alternative 3 would require capping of impacted soils at the soil source areas with a clay and soil cap. This would prevent further migration of the contamination from the soil to the groundwater under the action of water infiltration due to precipitation. Land use restrictions, and groundwater monitoring as described for Alternative 2 could also be implemented if judged necessary.

The soil source areas would be capped with a clay cap. The surface area capped would be approximately 9,800 square feet (approximately 0.25 acres) at the Alcas site, and approximately 3,200 square feet (approximately 0.07 acres) at the AVX site. No soil

contamination has been identified at the McGraw-Edison site therefore capping is not required. The surface area capped at the Olean Clean All site would be approximately 6,000 square feet (approximately 0.14 acres). The limits of capping are provided in Figure 3-2.

If after the underlying soil and groundwater have established a new equilibrium and natural groundwater attenuation and biodegradation have been given an opportunity to remove COCs from the source, (e.g. 5 pore volumes of groundwater have migrated from each identified source area to the municipal air strippers), on-site groundwater, downgradient of the capped soil source areas has not achieved the CGs identified in Table 2-1, the need for a groundwater treatment program would be evaluated. The evaluation steps would include the following. First, a review of the water quality at municipal wells M18 and M37/38 would be done; if the quality is meeting or is better than the Table 2-1 CGs, no additional source are specific groundwater remediation would be necessary. If the CGs have not been met, but the quality at M18 and M37/38 is still improving, the decision to whether additional groundwater remediation is needed at a capped soil source area would be deferred until the remedial actions at all the source areas (including allowing the five pore volumes travel time to pass for each source area remediated pursuant to alternatives 3, 4, and 5), at which time the water quality at M18, M37/38 would again be evaluated. Second, if a decision is made that additional groundwater remediation is necessary at a capped soil source area, an evaluation of the available groundwater remedial technologies will take place and an appropriate groundwater remediation technique will be selected, installed, and implemented. One possible groundwater remedial system that would be evaluated would be groundwater pump and treat by installing a recovery well system and by removing contaminants using air stripping and polishing the treated water using a GAC adsorption system (if necessary). The treated groundwater would then be discharged to the publicly owned treatment works system (POTW). If necessary to meet the requirements of the NYS Air Guide 1, the off-gas from the air stripping system would be treated with Vapor Phase GAC (or other appropriate methods).

The pilot tests at the Alcas site and AVX site revealed that the groundwater recovery from the shallow aquifer for treatment is difficult. Pumping in the deeper aquifer is anticipated to be ineffective at containing the impacts associated with either of the identified source areas for several reasons; (1) The influence that the continuous pumping of the municipal wells has on the capture zones of any proposed on-site containment wells, at AVX and Alcas would be difficult to overcome; (2) AVX has effectively implemented a deeper aquifer groundwater recovery system, through the active pumping of the on-site production well, but this has not contained the groundwater impacts associated with the AVX source area; and (3) groundwater recovery from the deep aquifer at any of the soil source areas could create a migration of COCs from the shallow aquifer to the less contaminated deep aquifer.

Because no soil source area has been found on the McGraw Edison site, groundwater recovery and treatment would begin immediately under this alternative. The pumping test performed at the McGraw Edison site revealed that the groundwater from the shallow aquifer can be removed for treatment. The test also revealed that the recovery flows were sufficient to control off-site migration of COCs from the site and pumping from the shallow aquifer would be useful in removing the COCs from the groundwater. Impacted groundwater will be pumped to the central air stripper for treatment and disposal.

Groundwater pumping and treatment may be possible at the Olean Clean All site, however, pumping tests would have to be performed to determine the rate at which groundwater could be extracted, and the effectiveness of capture that could be obtained through pumping.

As stipulated by Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) 121(c), a 5-year review is required under this alternative. It is also necessary to periodically monitor the effectiveness of the remedial system on the prevention of contaminant migration. This would be done as part of, or as a modification to, the SMP.

3.4.1.4 Alternative 3A: On-Site Treatment of Groundwater Using Air Stripping and Carbon Polishing and Discharge to POTW

The description for this alternative is similar to Alternative 3, except soil related remediation (capping) would not be done, and the groundwater remedy would be implemented immediately.

3.4.1.5 Alternative 4: In-Situ Treatment of Soil Using Air Sparging and Soil Vapor Extraction or Vacuum Enhanced Recovery

This alternative consists of implementing the following:

- Installation of an air sparging/soil vapor extraction (SVE) system and/or vacuum-enhanced recovery (VER) system.
- Access restrictions (if necessary).
- Monitoring.

This alternative provides integrated soil and groundwater treatment. For source areas where the geology is suitable, groundwater within the areas would be treated through an air sparging system which is comprised of a system of injection wells through which air is forced. As the air rises towards the vadose zone it carries VOCs with it. Soil treatment would be accomplished by installing and operating a SVE system. If source area conditions are not appropriate (primarily due to the presence of less permeable soils) variations of the SVE technique would be applied using either a VER system or a dual extraction SVE system. If necessary, an off-gas treatment system would be installed to remove contaminants from the air stream of the SVE or VER system(s) prior to discharge, to meet ARARs and TBCs (primarily SGCs and AGCs included in NYDEC's Air Guide 1).

There is no soil contamination noted at the McGraw-Edison source area and the groundwater can be pumped by conventional methods and treated through the existing air stripper; VER is not considered to be directly applicable to the source area.

Based on the data collected for Olean Clean All it appears that air sparging and SVE or VER could be applied. The soil data collected in the vicinity of the source area indicates a heterogeneous and silty clay formation that would seem to indicate that VER would be more directly applicable than air sparging and SVE. Pilot testing would be required to evaluate whether VER is indeed implementable at Olean Clean All.

Environmental monitoring of groundwater quality at each source area (through the SMP) remediated pursuant to this alternative will be conducted, along with influent groundwater quality at the municipal wells. Once soil/groundwater quality improvement due to operation of the SVE/VER system has ceased and/or is judged to be no longer cost effective, an evaluation of the need for additional source-area related groundwater remediation will be undertaken.

The evaluation steps would include the following; first, a review of the water quality at Municipal Wells M1B and M37/38 would be done; if the quality is meeting or better than the Table 2-1 CGs, no additional source area specific groundwater remediation would be necessary. If the CGs have not been met, but the quality at M18 and M37/38 is still improving, the decision as to whether additional groundwater remediation is needed at a SVE/VER remediated soil source area would be deferred until the remedial actions at all the source areas (including allowing the five pore volumes travel time to pass for each source area remediated pursuant to Alternatives 3, 4, and/or 5) were complete, at which time the water quality at M18, M37/38 would again be evaluated. Second, if a decision is made that additional groundwater remediation is necessary at a SVE/VER remediated soil source area, an evaluation of the available groundwater remedial technologies will take place and an appropriate groundwater remediation technique will be selected, installed, and implemented.

One possible groundwater remedial system that will be evaluated is groundwater pump and treat.

Deed restrictions and/or access restrictions and periodic monitoring similar to that described in Alternative 2 could also be implemented, if judged necessary.

As stipulated by Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) 121(c), a 5-year review is required under this alternative. This would be done as part of or as a modification to the SMP. It is also necessary to periodically monitor the effectiveness of the remedial system on the prevention of contaminant migration. The methodology and schedule for this will be developed during the design phase.

3.4.1.6 Alternative 5: Soil Excavation And Off-Site Thermal Treatment and Disposal, On-Site Treatment of Groundwater Using Air Stripping and Carbon Polishing and Discharge to POTW

Alternative 5 would consist of implementing the following:

- Excavation and removal of soil at the identified soil source area(s).
- Off-site low temperature desorption of soil contaminants.
- Installation of on-site groundwater collection and treatment system(s)
- Land use/access restrictions (if necessary).
- Site monitoring.

The soil source area(s) would be excavated to the extent that is practical (usually to the groundwater table) and the soils would be tested to determine if the excavated soils are hazardous. If classified as hazardous, the soils would be transported off-site to a facility for low temperature desorption of soil contaminants. If not classified as hazardous, the soils would be disposed of at a local landfill. Clean fill material would be brought in to restore each of the areas to grade. Confirmatory soil sampling and analyses would be conducted during the

excavation operations to ensure that all source area soils above the water table with contaminant levels higher than the levels indicated on Table 2-1 were removed. Until restoration is complete, land use/access restrictions (if necessary) would be placed on the source area restricting current and future use. During all phases of the soil removal, it would be necessary to implement dust and volatile emission control measures, soil erosion, and sediment control measures.

If after the underlying soil and groundwater have established a new equilibrium and natural groundwater attenuation and biodegradation have been given an opportunity to remove COCs from the source, (e.g. 5 pore volumes of groundwater have migrated from each identified source area to the municipal air strippers), on-site groundwater downgradient of the soil source areas has not achieved the CGs identified in Table 2-1, the need for an additional groundwater treatment program would be evaluated. The evaluation steps would include the following. First, a review of the water quality at municipal wells M18 and M37/38 would be done; if the quality is meeting or is better than the Table 2-1 CGs, no additional source area specific groundwater remediation would be necessary. If the CGs have not been met, but the quality at M18 and M37/38 is still improving, the decision as to whether additional groundwater remediation is needed at a source area, which had been remediated through soil removal, would be deferred until the remedial actions at all the source areas (including allowing the five pore volumes travel time to pass for each source area remediated pursuant to Alternatives 3, 4, and 5) have been completed. At that time, the water quality at M18, M37/38 would again be evaluated. Second, if a decision is made that additional groundwater remediation is necessary at a soil source area which has been remediated through soil removal, an evaluation of the available groundwater remedial technologies will take place and an appropriate groundwater remediation technique will be selected, installed, and implemented. One possible groundwater remedial system that would be evaluated would be groundwater pump and treat.

Deed restrictions and/or access restrictions and periodic monitoring similar to that described in Alternative 2 could also be required if judged necessary.

As stipulated by Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) 121(c), a 5-year review is required under this alternative. This would be done as part of or as a modification to the SMP. It is also necessary to periodically monitor the effectiveness of the remedial system on the prevention of contaminant migration. This would be done as part of or as a modification to the SMP. The methodology and schedule for this will be developed during the design phase.

3.4.1.7 Alternative 5A: Soil Excavation and Off-Site Thermal Treatment (if necessary) and Disposal

This alternative involves the excavation and removal of soil source areas without implementing a groundwater remedy. It is basically the same as remedial alternative 5 without implementation of a groundwater pump and treat remedy. This alternative involves implementing the following:

- Excavation and removal of soil at the identified soil source area(s).
- Off-site low temperature desorption of soil contaminants.(if required)
- Land use/access restrictions (if necessary).
- Site monitoring.

The soil source area(s) would be excavated to the extent that is practical (usually to the groundwater table) and the soils would be tested to determine if the excavated soils are hazardous. If classified as hazardous, the soils would be transported off-site to a facility for low temperature desorption of soil contaminants. If not classified as hazardous, the soils would be disposed of at a local landfill. Fill material would be brought in to restore each of the areas to grade. Confirmatory soil sampling and analyses would be conducted during the excavation operations to ensure that all source area soils with contaminant levels higher than

the levels indicated on Table 2-1 were removed. Until restoration is complete, land use/access restrictions (if necessary) would be placed on the property restricting current and future use. During all phases of the remediation, it would be necessary to implement dust and volatile emission control measures, soil erosion, and sediment control measures.

If after the underlying soil and groundwater have established a new equilibrium and natural groundwater attenuation and biodegradation have been given an opportunity to remove COCs from the source, (e.g. 5 pore volumes of groundwater have migrated from each identified source area to the municipal air strippers), on-site groundwater downgradient of the soil source areas has not achieved the CGs identified in Table 2-1, the need for an additional groundwater treatment program would be evaluated. The evaluation steps would include the following. First, a review of the water quality at municipal wells M18 and M37/38 would be done; if the quality is meeting or is better than the Table 2-1 CGs, no additional source area specific groundwater remediation would be necessary. If the CGs have not been met, but the quality at M18 and M37/38 is still improving, the decision as to whether additional groundwater remediation is needed at a source area, which had been remediated through soil removal, would be deferred until the remedial actions at all the source areas (including allowing the five pore volumes travel time to pass for each source area remediated pursuant to Alternatives 3, 4, and 5) have been completed. At that time, the water quality at M18, M37/38 would again be evaluated. Second, if a decision is made that additional groundwater remediation is necessary at a soil source area which ad been remediated through soil removal, an evaluation of the available groundwater remedial technologies will take place and an appropriate groundwater remediation technique will be selected, installed, and implemented. One possible groundwater remedial system that would be evaluated would be groundwater pump and treat.

Deed restrictions and/or access restrictions and periodic monitoring similar to that described in Alternative 2 could also be required if judged necessary.

3.4.2 Evaluation of Source Area Remedial Alternatives

In this section, the alternatives described in Section 3.4.1 are analyzed to determine each alternative's effectiveness in addressing the impacts to human health and the environment attributed to contaminant source areas that have impacted soil and groundwater quality at the Olean Well Field site. Each alternative is evaluated based on the evaluation criteria described in Section 3.4.2.1, and the effectiveness in achieving the CGs outlined on Table 2-1.

3.4.2.1 Evaluation Criteria

As outlined in the USEPA Draft Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA (USEPA 1988), the detailed analysis of alternatives is the analysis and presentation of the relevant information needed to allow decision-makers to select source area remedies. During the detailed analysis, each alternative is assessed against nine evaluation criteria pursuant to Section 300.430(e)(9)(iii) of the NCP.

The detailed evaluation of remedial alternatives for the identified source areas was prepared in accordance with the requirements of the NCP (40 CFI 300.430(e)(9)), using the following criteria:

- Overall protection of human health and environment.
- Compliance with ARARs.
- Long-term effectiveness and permanence.
- Short-term effectiveness.
- Reduction of toxicity, mobility, or volume through treatment.
- Implementability.
- Cost.
- State acceptance.
- Community acceptance.

3.4.3 Analysis of Remedial Alternatives

In the sections which follow, each alternative is analyzed in reference to the evaluation criteria described in Section 3.4.2.1. A summary of the results of this analysis is provided in Table 3-1.

3.4.3.1 Alternative 1: No Action

The No-Action alternative would require no additional action be undertaken to reduce and/or remove the contaminants from the source area soils or groundwater beyond those already in place.

At this time, this alternative is not in compliance with the ARARs and does not offer any increased overall protection of human health and the environment. No remedial action is associated with this alternative; therefore, implementation poses no risks to workers or the community and environmental impacts will remain as they are presently. This alternative offers no reduction of toxicity, mobility, or volume through treatment; however, it is easy to implement as there is nothing to be done. There are no capital or operation and maintenance costs involved with this alternative.

If implemented, this alternative would require a 5-year environmental review, at which time the need for further remedial action will be decided.

3.4.3.2 Alternative 2: Institutional Controls

This alternative offers limited increased protection to human health and the environment. Fencing and land use/deed/access restrictions can prevent human and animal contact with impacted soils at source areas. The potential for unauthorized access or use of impacted environmental media would still exist. The potential for contaminant migration

would still exist as the impacted soils would be exposed to natural forces. Wind and precipitation could cause the contaminants to migrate further.

Implementation of this alternative will not reduce the level of VOCs in the soils or reduce the leaching of VOCs into the groundwater from soil source areas. The CGs/chemical-specific ARARs would not be achieved in the source areas. Action-specific and location-specific ARARs are expected to be met through proper implementation.

Long-term benefits would include reduction of human and animal exposure to impacted environmental media. However, since this alternative does not expedite the reduction of VOCs in the impacted media, long-term benefits are limited.

The toxicity, mobility, and volume of contamination in impacted soil will not be substantially reduced. The potential for leaching of contaminants into the groundwater will not be reduced. The amount of residual contamination will not be reduced.

Short-term effectiveness should be favorable as standard dust control measures together with use of equipment specified by the health and safety plan, can control exposure to workers.

The implementation of Alternative 2 is favorable. Land use and/or deed restrictions and access restrictions can be implemented quickly. Standard construction practices should be followed with the appropriate health and safety protective measures.

Costs for this Alternative would consist of administrative expenses related to implementing land use/deed and/or access restrictions, some enhancement of the current SMP, instituting public education programs, engineering, material, and construction costs. The estimated costs for implementing Alternative 2 is given in Table 3-2. A cost breakdown for Alternative 2 is provided in Appendix C.

3.4.3.3 Alternative 3: Capping, On-Site Treatment Using Air Stripping and Carbon Polishing and Discharge to POTW

This alternative should be protective of human health and the environment. Capping would reduce the downward migration or leaching of contaminants to the groundwater through infiltration and subsequently to off-site receptors. Capping will also reduce the potential for contaminants to come in contact with human and animals and reduce erosion. Capping will require periodic maintenance and annual inspection to check integrity.

If after the underlying soil and groundwater have established a new equilibrium and natural groundwater attenuation and biodegradation have been given an opportunity to remove COCs from the source, (e.g. 5 pore volumes of groundwater have migrated from each identified source area to the municipal air strippers), on-site groundwater, downgradient of the capped soil source areas has not achieved the CGs identified in Table 2-1, the need for a groundwater treatment program would be evaluated. The evaluation steps would include the following. First, a review of the water quality at municipal wells M18 and M37/38 would be done; if the quality is meeting or is better than the Table 2-1 CGs, no additional source are specific groundwater remediation would be necessary. If the CGs have not been met, but the quality at M18 and M37/38 is still improving, the decision to whether additional groundwater remediation is needed at a capped soil source area would be deferred until the remedial actions at all the source areas (including allowing the five pore volumes travel time to pass for each source area remediated pursuant to alternatives 3, 4, and 5), at which time the water quality at M18, M37/38 would again be evaluated. Second, if a decision is made that additional groundwater remediation is necessary at a capped soil source area, an evaluation of the available groundwater remedial technologies will take place and an appropriate groundwater remediation technique will be selected, installed, and implemented. One possible groundwater remedial system that would be evaluated would be groundwater pump and treat by installing a recovery well system and by removing contaminants using air stripping and polishing the treated water using a GAC adsorption system (if necessary). The treated

groundwater would then be discharged to the publicly owned treatment works system (POTW). If necessary to meet the requirements of the NYS Air Guide 1, the off-gas from the air stripping system would be treated with Vapor Phase GAC (or other appropriate methods).

This option has the potential of being in compliance with location, action specific ARARs and TBCs. Chemical specific ARARs related to soils would continue to be exceeded. If subsequent evaluation indicates that source-area related groundwater treatment is needed and such treatment is implemented, groundwater chemical-specific ARARs could be achieved. Location-specific and action-specific ARARs are expected to be met through proper remedial design.

This alternative will not reduce the toxicity or volume of soil contamination at the capped source areas, as no soil treatment or removal is proposed. Mobility of contaminants in these areas would be reduced; however, the mobility of mass below the water table will not be significantly reduced. If the establishment of a new soil/groundwater equilibrium does not sufficiently reduce groundwater toxicity, mobility, and volume at the source areas, the Phase II groundwater treatment portion of the alternative would be implemented, which would reduce toxicity, mobility, and volume.

Moderate short-term impacts, such as fugitive emissions and erosion may be associated with cap installation and recovery well installation. Air monitoring would be performed to identify harmful emissions during installation of the caps. Standard health and safety precautions would be maintained to mitigate any risks from construction operations. Standard dust control measures would control exposure to workers during construction. A health and safety plan would be required.

This alternative is implementable. Construction of the caps and on-site groundwater pumping and treatment system(s) is not expected to involve any implementation problems. Capping is an easily implementable technology and involves little or no implementation

problems. Discharge to the POTW or a surface-water body for the groundwater treatment system will require either approval from the POTW or a SPDES permit from the state. Modification to the existing air stripper (at McGraw-Edison) to include an off-gas discharge permit may be required. There has been three air strippers installed in the Olean well field (at McGraw-Edison and the municipal wells). The implementability issues related to Stage II groundwater source area treatment should be similar and should not impact the implementability of the Alternative.

Technical implementability of a Stage II groundwater treatment remedy, such as pumping and treatment, is questionable at several of the source area properties. Shallow groundwater can not be effectively pumped at the AVX and Alcas properties, and the pumping of groundwater in the deep aquifer has been shown in the past to be ineffective at the AVX facility. This could reduce the effectiveness of the remedial alternative if capping proves insufficient at addressing the impacts to groundwater associated with the source areas. Groundwater pumping and treatment is technically implementable at the McGraw-Edison site, and there is insufficient information regarding groundwater pumping at the Olean Clean All site, to determine if this alternative would be technically implementable.

The preliminary capital cost estimate for implementation of the alternative includes the costs of the construction of caps, groundwater treatment equipment (assumed, for cost analyses purposes to be the Stage II groundwater treatment technique), piping, engineering, and administration. The preliminary annual costs will include maintenance and annual inspections of the capped areas, monitoring, operation of the groundwater treatment system(s), permit and discharge fees for discharge of treated groundwater, and operation and maintenance of the groundwater treatment facility(ies). The estimated costs for implementing Alternative 3 are given on Table 3-2. The basis of these cost estimates is provided in Appendix C.

3.4.3.4 Alternative 3A: On-site Treatment Of Groundwater Using Air Stripping and Carbon Polishing and Discharge to POTW

As described in Section 3.4.1.4, this alternative is exactly the same as Alternative 3 as proposed excluding the proposed soil remedy of capping, and there is no delay in implementing the groundwater remedy. The NCP evaluation would be very much similar to that performed in Section 3.4.3.3. Costs for this Alternative would consist of administrative expenses related to implementing land use/deed and/or access restrictions, implementing groundwater pump and treat, some enhancement of the current SMP, instituting public education programs, engineering, material, and construction costs. The estimated cost for implementing Alternative 3A is given in Table 3-2. A cost breakdown for Alternative 3A is provided in Appendix C.

Groundwater at the McGraw-Edison site would be treated as a source area and would involve activation of the existing recovery well (EW-3) and treatment of the groundwater by the existing on-site air stripper at McGraw-Edison. This groundwater treatment program would reduce the potential for off-site migration of contaminated groundwater, and be protective of human health and the environment.

Toxicity, mobility and volume can effectively be reduced through groundwater pumping and treatment at the McGraw-Edison site.

3.4.3.5 Alternative 4: In-situ Treatment of Soils Using Air Sparging and SVE or VER

This alternative is protective of human health and the environment. The technologies proposed, air sparging and SVE and VER modifications, are very effective in reducing contaminant levels in soils and groundwater. Subsequent to the development of this alternative, pilot testing was completed for the AVX and Alcas source area properties. The results indicate that both Alcas and AVX source areas will require use of VER technology.

Data collected to date support the implementation of VER at Olean Clean All. Pilot testing has to be done at the Olean Clean All source area to verify its effectiveness.

SVE or VER will reduce the level of contaminants in the soil source areas, thus reducing the dissolution and leaching of contaminants to groundwater from the soil and subsequent off-site migration. If needed, air emission controls on the SVE system(s) will be protective of human health and the environment by meeting emission permit standards. Air sparging will reduce the level of contaminants in the groundwater by stripping the VOCs from the groundwater and soils, and transferring them into a vapor phase. The off-gas is then either treated and/or discharged to the atmosphere. VER and/or dual extraction SVE techniques will be utilized where the geologic characteristics of a site do not allow for the practical use of air sparging and SVE. Where VER is implemented, contaminants in groundwater and soil will be treated ex-situ prior to discharge, thus effectively eliminating the potential for contaminant migration.

Once soil/groundwater quality improvement due to operation of the SVE/VER system has ceased and/or is judged to be no longer cost effective, an evaluation of the need for additional source-area related groundwater remediation will be undertaken.

The evaluation steps would include the following; first, a review of the water quality at Municipal Wells M1B and M37/38 would be done; if the quality is meeting or better than the Table 2-1 CGs, no additional source area specific groundwater remediation would be necessary. If the CGs have not been met, but the quality at M18 and M37/38 is still improving, the decision as to whether additional groundwater remediation is needed at a SVE/VER remediated soil source area would be deferred until the remedial actions at all the source areas (including allowing the five pore volumes travel time to pass for each source area remediated pursuant to Alternatives 3, 4, and/or 5), at which time the water quality at M18, M37/38 would again be evaluated. Second, if a decision is made that additional groundwater remediation is necessary at a SVE/VER remediated soil source area, an evaluation of the

available groundwater remedial technologies will take place and an appropriate groundwater remediation technique will be selected, installed, and implemented. One possible groundwater remedial system that will be evaluated is groundwater pump and treat.

The components of this alternative would be designed to meet the CGs for each soil source area. While it is anticipated that the soil and groundwater CGs can be achieved, this will be dependent upon the level of contamination that can be extracted and upon the duration of remedial action. Confirmatory monitoring will be conducted to determine compliance with chemical-specific ARARs. Action-specific and location-specific ARARs are expected to be met through proper remedial design and engineering and through careful implementation.

This alternative reduces the toxicity, mobility, and volume of contamination in the soil and groundwater through treatment. The potential for leaching of contaminants into the groundwater will be reduced since the source areas will be treated. The amount of residual contamination remaining will depend on the effectiveness of the systems implemented.

Moderate short-term impacts, such as fugitive emissions, may be associated with the installation of well and recovery systems. Air monitoring will be performed and contingency actions taken as necessary to avoid potentially harmful emissions during construction activities and equipment installation. Standard health and safety precautions would be maintained to mitigate any risks from drilling extraction wells and well points. Standard dust control measures and personal protective equipment specified by the Health and Safety plan will control exposure to workers.

With the exception of the McGraw-Edison source area, Alternative 4 is expected to be an effective method of reducing the level of VOCs in the impacted soils and groundwater. Pilot testing at the Alcas and AVX facilities have confirmed the use of VER and have provided enough information to establish a basis of design. The reduction of contaminants in groundwater and soil would reduce the migration of contaminants and thus make this

alternative successful in providing long-term effectiveness and permanence. Additional pilot testing will be necessary at the Olean Clean All source area to determine the technologies implementability, and the basis for the design. Based upon the data provided in Appendix G to the SRI, it appears that VER can be applied at the Olean Clean All Site.

This remedial alternative is administratively implementable. VER pilot testing was successful and indicates that VER is implementable. Standard construction practices will be followed with the appropriate health and safety protective measures will ensure off-site impacts are minimized.

Based on pilot testing results, the technical implementability of VER is favorable at the Alcas and AVX sites. Because of the lack of a soil source area, technical implementability of this alternative is not favorable at the McGraw-Edison site as other alternatives (such as Alternative 3A). Further pilot testing must be performed at the Olean Clean All site to determine technical implementability.

Costs associated with implementation of this alternative would include the cost of design and construction of air sparging/SVE or VER systems. The preliminary annual costs will include operation of the VER treatment system, permit and discharge fees for treated groundwater and air discharge, and operation and maintenance of the groundwater treatment facility at McGraw-Edison. The estimated costs for implementing Alternative 4 are given on Table 3-2. The cost breakdown for Alternative 4 is presented in Appendix C.

3.4.3.6 Alternative 5: Soil Excavation, Off-Site Thermal Treatment and Disposal of Soils, On-Site Treatment of Groundwater Using Air Stripping and Carbon Polishing and Discharge to the POTW

This alternative can protect human health and the environment by effectively removing the contamination from the source area soils and groundwater (if necessary). Source removal in combination with groundwater containment and treatment (if necessary) to achieve the

groundwater CGs in downgradient wells would reduce the risk to human health and the environment. Depending on the plan for implementation, impacted soils below the water table may continue to act as a source after implementation of this alternative and may have to be addressed in a Stage II remedial action. The remediated area would be backfilled with clean backfill and graded to restore existing grade. Erosion control measures would be implemented. If soil-source area remediation does not lead to the desired groundwater quality improvement for Stage II, a remedy (such as groundwater pump and treat) could be implemented (if necessary), reducing the potential migration of contaminants off-site.

If after the underlying soil and groundwater have established a new equilibrium and natural groundwater attenuation and biodegradation have been given an opportunity to remove COCs from the source, (e.g. 5 pore volumes of groundwater have migrated from each identified source area to the municipal air strippers), on-site groundwater downgradient of the soil source areas has not achieved the CGs identified in Table 2-1, the need for an additional groundwater treatment program would be evaluated. The evaluation steps would include the following. First, a review of the water quality at municipal wells M18 and M37/38 would be done; if the quality is meeting or is better than the Table 2-1 CGs, no additional source area specific groundwater remediation would be necessary. If the CGs have not been met, but the quality at M18 and M37/38 is still improving, the decision as to whether additional groundwater remediation is needed at a source area, which had been remediated through soil removal, would be deferred until the remedial actions at all the source areas (including allowing the five pore volumes travel time to pass for each source area remediated pursuant to Alternatives 3, 4, and 5) have been completed. At that time, the water quality at M18, M37/38 would again be evaluated. Second, if a decision is made that additional groundwater remediation is necessary at a soil source area which has been remediated through soil removal, an evaluation of the available groundwater remedial technologies will take place and an appropriate groundwater remediation technique will be selected, installed, and implemented. One possible groundwater remedial system that would be evaluated would be groundwater pump and treat.

This alternative would require air monitoring, use of personal protective equipment, and engineering controls for the control of VOCs during the excavation and handling of waste materials to protect human health in the short term.

This alternative is expected to meet chemical-specific ARARs for the soil source areas by removing the contaminated soil and the potential for leaching of contaminants into the groundwater. Action and locations specific ARARs can be met through engineering controls. Depending on the plan for implementation, impacted soils below the water table may continue to act as a source after implementation of this alternative. If this was the case, chemical specific ARAR exceedances for groundwater may continue longer than would be expected, after implementation, and necessitate the implementation of a second stage groundwater remedy.

Off-site treatment and disposal of contaminated soils, and replacement with clean fill will reduce the toxicity, mobility, and volume of the contaminated soils in the soil source areas. Source removal will decrease leaching of contaminants into groundwater. The volume of contamination in the soil media will be significantly reduced on-site. A substantial volume of impacted soil can be found beneath the water table (i.e. at the Olean Clean All site), and may remain in place after implementation of this remedy, reducing its effectiveness and ability to reduce toxicity and volume.

Short-term impacts associated with this alternative include the potential release of harmful emissions during excavation, handling, and transport of soils and remedial system installation. Measures such as temporary enclosures and daily cover may be needed to contain these emissions. Air monitoring combined with action levels set in the Health and Safety Plan would ensure that off-site migration of volatile emissions at levels of concern does not occur during implementation.

To prevent migration of soils away from individual source areas, berms, and/or tarps may have to be used to control erosion. Health and safety practices that will be outlined in the Health and Safety Plan for the site will be followed to control exposure to on-site workers and personnel.

Excavation of contaminated soils and transfer to an off-site landfill is expected to be moderately difficult to implement. The depth and location of some excavations (e.g., soils near buildings at the AVX and the Olean Clean All source area) may require the installation of lateral support members (i.e., sheet piles). At Olean Clean all, the depth of impacted soils was significant (to 22 feet at soil boring OSW-SB48). A significant amount of soil mass would remain below the water table at Olean Clear All. The logistics of transporting the material from the site to the off-site facility must be tightly controlled and will be administratively difficult to implement.

Additionally, the technical implementability of an excavation and disposal options may be less effective due to contaminated soils below the water table. A significant amount of soil mass would remain below the water table at Olean Clear All. Residual impacted soils could continue to impact groundwater, as well as impact replaced clean fill materials due to both seasonal fluctuations in groundwater levels and volatilization.

If after the specified passage of times the expected groundwater quality has not been achieved, implementing a Stage II groundwater remedy could reduce the migration of COCs beyond the source areas. Technical implementability may be difficult at several of the source area properties. Shallow groundwater can not be effectively pumped at the AVX and Alcas properties, and the pumping of groundwater in the deep aquifer has been shown in the past to be ineffective at the AVX facility. This could reduce the effectiveness of the remedial alternative if excavation proves insufficient at addressing the impacts to groundwater associated with the source areas. Administrative implementability for a Stage II remedy (such as groundwater pumping and treatment) is favorable.

Capital costs for this alternative would consist of administrative and engineering costs, and costs related to monitoring, materials, and construction. Additional costs for excavation, transport of contaminated soils, and replacement of clean fill would also be incurred. The preliminary annual costs will include the Stage II operation and maintenance of the groundwater treatment facility(s). The estimated costs for implementing Alternative 5 are given on Table 3-2. The cost breakdown for this alternative is provided in Appendix C.

3.4.3.7 Alternative 5A: Soil Excavation, Off-Site Thermal Treatment (if necessary) and Disposal of Soils

This alternative would protect human health and the environment by effectively removing impacted soils from the Olean Well Field. Source removal would reduce the risk to human health and the environment. However, several of the sites have impacted soils below the water table that may not be adequately addressed by this alternative. Impacted soils below the water table could act as a continuing source of impact to groundwater even after implementation. The remediated area would be backfilled with clean backfill and graded to restore existing grade. Erosion control measures would be implemented.

If after the underlying soil and groundwater have established a new equilibrium and natural groundwater attenuation and biodegradation have been given an opportunity to remove COCs from the source, (e.g. 5 pore volumes of groundwater have migrated from each identified source area to the municipal air strippers), on-site groundwater downgradient of the soil source areas has not achieved the CGs identified in Table 2-1, the need for an additional groundwater treatment program would be evaluated. The evaluation steps would include the following. First, a review of the water quality at municipal wells M18 and M37/38 would be done; if the quality is meeting or is better than the Table 2-1 CGs, no additional source area specific groundwater remediation would be necessary. If the CGs have not been met, but the quality at M18 and M37/38 is still improving, the decision as to whether additional groundwater remediation is needed at a source area, which had been remediated through soil

removal, would be deferred until the remedial actions at all the source areas (including allowing the five pore volumes travel time to pass for each source area remediated pursuant to Alternatives 3, 4, and 5) have been completed. At that time, the water quality at M18, M37/38 would again be evaluated. Second, if a decision is made that additional groundwater remediation is necessary at a soil source area which has been remediated through soil removal, an evaluation of the available groundwater remedial technologies will take place and an appropriate groundwater remediation technique will be selected, installed, and implemented. One possible groundwater remedial system that would be evaluated would be groundwater pump and treat.

This alternative would require air monitoring, use of personal protective equipment, and engineering controls for the control of VOCs during the excavation and handling of waste materials to protect human health in the short term. Short-term impacts associated with this alternative include the potential release of harmful emissions during excavation, handling, and transport of soils and remedial system installation. Measures such as temporary enclosures and daily cover may be needed to contain these emissions. Air monitoring combined with action levels set in the Health and Safety Plan would ensure that off-site migration of volatile emissions at levels of concern does not occur during implementation.

This alternative is expected to meet chemical-specific ARARs for the soil source areas by removing the contaminated soil and the potential leaching of contaminants from above the water table into the groundwater. Depending on the plan for implementation, impacted soils below the water table may continue to act as a source after implementation of this alternative. If this was the case, chemical specific ARARs for groundwater may continue after implementation, and necessitate the implementation of a second stage groundwater remedy.

Off-site treatment and disposal of contaminated soils, and replacement with clean fill will reduce the toxicity, mobility, and volume of the contaminated soils in the soil source areas. Source removal will decrease leaching of contaminants into groundwater. Impacted

soils below the water table would act as a continuing source of impact to groundwater even after implementation. The volume of contamination in the soil media will be significantly reduced on-site.

To prevent migration of soils away from individual source areas, berms, and/or tarps may have to be used to control erosion. Health and safety practices that will be outlined in the Health and Safety Plan for the site will be followed to control exposure to on-site workers and personnel.

Excavation of contaminated soils and transfer to an off-site landfill is expected to be moderately difficult to implement. The depth and location of some excavations (e.g., soils near buildings at the AVX and the Olean Clean All source area) may require the installation of lateral support members (i.e., sheet piles). At Olean Clean all, the depth of impacted soils was significant (to 22 feet at soil boring OSW-SB48). The logistics of transporting the material from the site to the off-site facility must be tightly controlled and will be administratively difficult to implement.

Additionally, the technical implementability of an excavation and disposal options may be less effective due to contaminated soils below the water table. Residual impacted soils could continue to impact groundwater, therefore, groundwater could re-impact clean fill materials due to both seasonal fluctuations in groundwater levels and volatilization.

Capital costs for this alternative would consist of administrative and engineering costs, and costs related to monitoring, materials, and construction. Additional costs for excavation, transport, treatment and replacement of contaminated soils will also be incurred. The preliminary annual costs will include, the Stage II operation and maintenance of the groundwater treatment facilit(ies). The estimated costs for implementing Alternative 5A are given on Table 3-2. The cost breakdown for this alternative is provided in Appendix C.

EPA REGION II
SCANNING TRACKING SHEET

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DOC TITLE/SUBJECT:

FIGURE 3-1
LIMITS OF CAPPING
OLEAN WELL FIELD SUPPLEMENTAL RI/FS

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