PECO Energy Company

Statement of Basis

A Description of the Conditions and Proposed Cleanup at PECO's Chester, Pennsylvania Facility
Prepared by EPA Region III

Table of Contents

I. Purpose of the EPA Statement of Basis

This Statement of Basis explains the remedy proposed by the United States Environmental Protection Agency ("EPA") to address contaminated soils and groundwater at the PECO Energy Company (previously the Philadelphia Electric Company and now part of the Exelon Corporation) site in Chester, Pennsylvania ("PECO").

In 1993, EPA and PECO entered into an Administrative Order on Consent ("Order") under Section 3008(h) of the Resource Conservation and Recovery Act ("RCRA") to investigate the extent of environmental contamination and evaluate remedy options at a 17-acre portion ("Site") of the 90-acre property ("Property") PECO owns along the Delaware River in the City of Chester. The Order required work to occur in two major phases. In the first phase, PECO was required to identify and determine the sources, types, and extent of contamination, and to identify risks to human health and the environment.

PECO completed the investigation and submitted a RCRA Facility Investigation Final Report to EPA in January 1999. EPA approved this report in June, 1999. In the course of the investigation, PECO discovered oily sheens on the Delaware River. EPA required PECO to take immediate action to mitigate this environmental threat called "Interim Measures." The Interim Measures PECO instituted include a system to remove the oily sheens and prevent future sheens from reaching the Delaware River and the re-lining of storm sewers that traverse the property. These Interim Measures are described in more detail in Section III.C, Delaware River.

In the second phase of the Order, PECO was required to conduct a Corrective Measures Study ("CMS"). In this study, PECO evaluated the site conditions and considered cleanup alternatives. Before this work began, EPA and PECO approached the Pennsylvania Department of Environmental Protection ("PADEP") and proposed that PECO complete a combined study that simultaneously met EPA's requirements and addressed the requirements of Pennsylvania's land recycling program. On March 23, 2000, PECO submitted a report to EPA titled, "Remedial Investigation/Risk Assessment/Remedial Alternatives Analysis" in which they evaluated the risk to human health and the environment and proposed a cleanup remedy that met both EPA and PADEP program requirements. PECO submitted modifications to this plan on August 30, 2000, October 20, 2000, and November 15, 2000. EPA approved the report, as modified, on March 22, 2001.

In this Statement of Basis, EPA is asking for public comment on the Proposed Remedy. Key information from the above reports, as well as other environmental investigations are highlighted in this document. Complete copies of these reports and all other information that EPA considered in developing this Proposed Remedy can be found in the Administrative Record.

The Administrative Record is available for review at the following locations:

United States Environmental Protection Agency
Region III
1650 Arch Street
Mail Code: 3WC22
Philadelphia, Pennsylvania 19103-2029
Contact: Renee Gelblat
voice: (215) 814-3421
fax: (215) 814-3114
e-mail: gelblat.renee@epa.gov
Hours: Monday - Friday: 8:30 a.m - 4:30 p.m.

and

J. Lewis Crozier Public Library
620 Engle Street
Chester, Pennsylvania 19013
(610) 494-3454
Hours: Monday - Thursday: 9:00 a.m. to 5:45 p.m.
Friday: 9:00 a.m. to 5:00 p.m.
Saturday: 9:00 a.m. to 4:00 p.m.

EPA may modify the Proposed Remedy or select another remedy based on new information or comments submitted by the public. Therefore, the public is encouraged to review and comment on the Proposed Remedy, or suggest an alternative remedy.

A. Summary of Proposed Remedy

Since 1993, the Environmental Protection Agency has been working with PECO and the Pennsylvania Department of Environmental Protection to investigate and clean up environmental contamination at PECO's property along the Delaware River in Chester, Pennsylvania. This Statement of Basis provides a summary of environmental conditions discovered over the last several years at the 17-acre Site and describes the steps EPA is proposing to remediate the contamination. The result is a property which will be put to new, productive use while ensuring that public health and the environment are protected.

The contamination EPA and PECO detected is the result of past industrial operations that occurred on land now owned by or leased from PECO. The steps outlined in this Statement of Basis will safely address these contaminated areas and allow redevelopment of the property to proceed.

Redevelopment of the 90-acre PECO property was an important consideration for EPA in developing this remedy. PECO is one of the original four brownfield projects chosen by EPA Headquarters as part of a national pilot project to explore new ways to conduct cleanups that encourage and expedite redevelopment under RCRA. PECO was chosen due to its prime waterfront location, PECO's history of compliance with EPA regulations at this property, the interaction between EPA, PADEP, PECO, and the community, and because of the clear benefits associated with rebuilding the economic base in the City of Chester.

Accordingly, EPA, PECO, and PADEP have incorporated innovations in the remedy selection and implementation processes. PECO was the first project in Pennsylvania where environmental investigation was designed to simultaneously meet the needs of both state and federal cleanup programs. EPA's investigation of the 17-acre Site, where Chem Clear had operated a hazardous waste facility, was conducted in accordance with EPA guidance and policy established under the Resource Conservation and Recovery Act program known as Corrective Action.

As this investigation proceeded, EPA and PECO realized that additional investigations beyond the 17-acre Chem Clear parcel would enable future land development. At that point, the project was broadened to include the remainder of the property which PECO investigated using the Pennsylvania Land Recycling and Environmental Remediation Standards Act ("Act 2") program guidelines. Ultimately, the project comprised 90 acres of prime waterfront real estate with PECO, EPA, and PADEP sharing the responsibility for investigation and cleanup.

This Statement of Basis marks the end of the investigation and the beginning of the cleanup phase of this project. Much of the work that needs to be done has already been started by PECO. Problems related to groundwater and surface water were addressed as they were discovered, including PECO's voluntarily excavation and removal of the primary contamination source back in 1981. Thus, the cleanup EPA is proposing in the Statement of Basis will augment work already in progress or completed.

This section summarizes EPA's Proposed Remedy for the contamination found at the Site. Subsequent sections of this document describe the Site background, the results of several environmental investigations, and a more detailed description of EPA's Proposed Remedy. In addition, EPA's remedy selection process is explained.

The eight major elements of EPA's Proposed Remedy are summarized below.

1. PECO will survey the 17-acre Site and remove fragments of a resinous material found on the surface.

2. PECO will stabilize the Delaware River bank with rip rap (large rocks placed against the bank) to prevent erosion.

3. PECO will maintain and upgrade the 1996 interim measures installed to remove contamination floating on the surface of the groundwater and to prevent oil sheens from forming on the Delaware River.

4. PECO will sample the existing monitoring well network to confirm that dissolved-phase contamination levels in the groundwater are stable and are not a threat to the Delaware River.

5. The Proposed Remedy will restrict certain future land uses to ensure the effectiveness of the remedy. Current and future owners of the 17-acre Site covered by the Order will need to comply with these use restrictions. The specific restrictions necessary at the Site are described in Section VI of this document.

6. PECO will ensure that access to the Site is controlled until redevelopment is complete.

7. PECO will inform EPA of any changes to the redevelopment plans or land use which may impact the effectiveness or permanence of the Proposed Remedy.

8. EPA will re-evaluate the remedy in two years to determine the need for Alternate Concentration Limits for contamination dissolved in the groundwater as described above. EPA will also periodically re-evaluate the entire Remedy and modify it as necessary.

B. Description of Next Steps

PECO and EPA developed a public participation plan for this Proposed Remedy which allows any interested persons to ask questions, to suggest changes, to support, or to challenge EPA's Proposed Remedy. At the end of this process and after having considered all the public comments, EPA will respond to all substantive comments and issue a Final Remedy.

Once the remedy is finalized, EPA, PADEP, and PECO will develop a plan that will describe each activity necessary to implement each element of the remedy and make the plan available to the public. EPA is proposing that the plan be implemented through a Facility Lead Agreement with PECO rather than negotiating a new order. The Facility Lead Agreement provides a mechanism for EPA and the public to monitor the progress of the remedy without delaying implementation of the remedy or redevelopment. If, at any time, PECO does not meet the terms of the Facility Lead Agreement, EPA will take action, most likely through issuing an order, to enforce the provisions of the Final Remedy. EPA will continue to work with PECO, PADEP, the City of Chester, and other interested parties throughout the remedy implementation.

EPA is encouraging interested persons to comment on this Proposed Remedy. To provide comments to EPA, please see the Community Involvement/ Public Participation section at the end of this document (Section VII).

II. Facility Background

A. Site Description

The 90-acre PECO property is located along the Delaware River in Chester, Pennsylvania, approximately 20 miles south of Philadelphia and just downstream (south) of the Commodore Barry Bridge. A location map is included as Figure 1. The PECO property consists of 90 acres bordered by approximately 3000 feet of the Delaware River, Delaware Avenue, Front Street, Barry Bridge Park, and Highland Avenue. In 1993, EPA issued a corrective action order that required the investigation of an approximately 17-acre Site defined by the Delaware River, Delaware Avenue, Jeffery Street, Townsend Street, and Palmer Street. This was the area that PECO had leased to Chem Clear to operate a hazardous waste facility.

Heavy industrial activities have taken place along the Delaware River waterfront in the City of Chester for about 150 years. Between 1915 and 1975, PECO purchased various portions of the waterfront property for electrical generation and potential future expansion. The PECO property, which includes the 17 acres covered by the Order, has been host to a coke plant, a steel plant, an electrical generating station (PECO), a cement plant, a concrete plant, a chemical plant, and other industries. Also located on this property was the Pennsylvania Industrial Chemical Company ("PICCO"), an industrial resin manufacturer, and Chem Clear, a commercial waste treatment and storage facility. PECO currently uses only a 17.6 acre section in the southwest portion of the property for an electrical sub-station. (Figure 2).

The 17-acre parcel subject to the Order includes two main areas of environmental concern: the former PICCO area and the former Chem Clear area. PICCO built and operated a settling basin for resin disposal. In 1981, PECO removed about 5,000 cubic yards of resinous material from the basin and backfilled with clean material. Chem Clear operated a hazardous waste treatment facility on the Site from October, 1977 to January, 1989. Several years ago, PECO demolished the buildings and processing areas used by Chem Clear.

The investigation that followed showed that parts of the 17 acres subject to the Order are contaminated with waste resin and other compounds which consist of organic chemicals such as benzene, toluene, ethyl benzene, and xylene ("BTEX") and polycyclic aromatic hydrocarbons ("PAHs"). These compounds float on water and have been found floating on the groundwater and on the surface of the Delaware River. Organic chemicals which float on water are also referred to as Light Non-Aqueous Phase Liquids ("LNAPL").

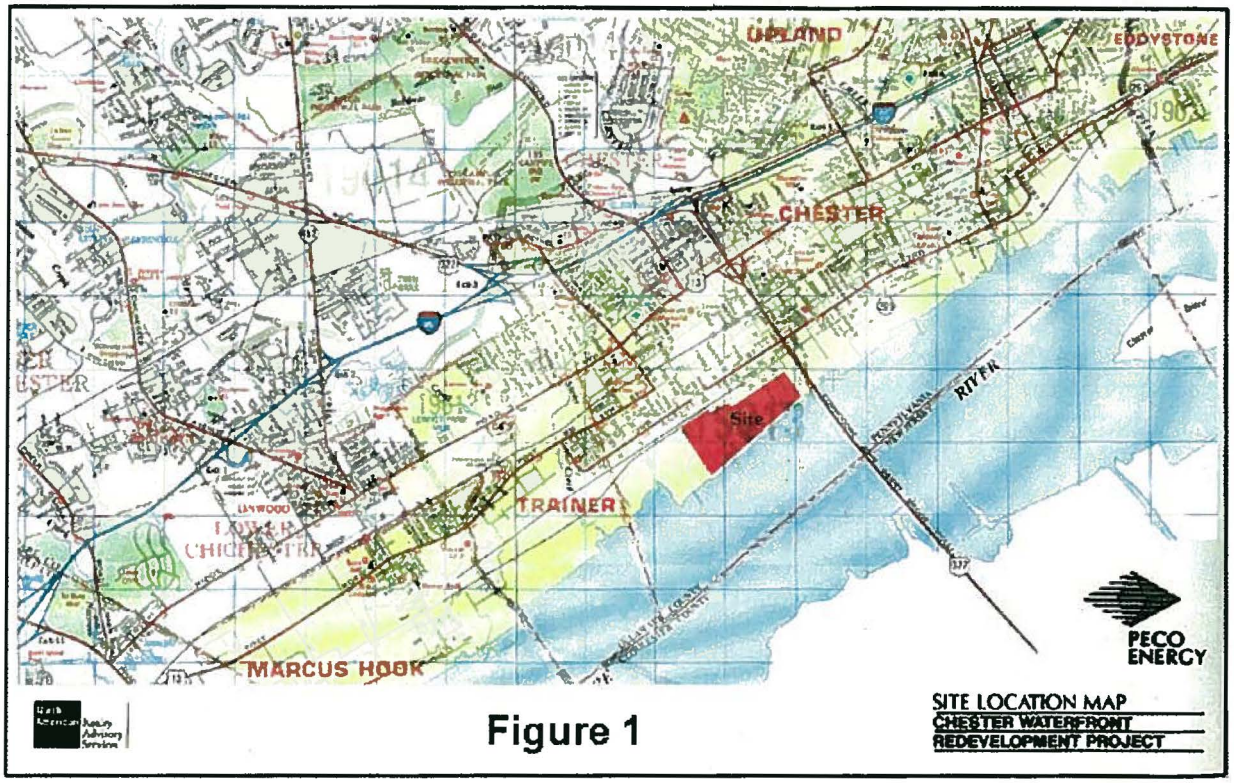


Figure 1

Figure 2

B. Site Geology and Water Use

The geology of the Site consists of man-made fill material which lies above the natural alluvial sediments of the Trenton Gravel Formation. Below the gravel lies the weathered rock (saprolite) of the metamorphic Wissahickon Formation.

The man-made fill is about 4 feet thick in the western portion of the Site and gradually increases in thickness eastward toward the Delaware River. The maximum thickness of this fill layer is about 25 feet at the riverfront. The fill material is a mix of demolition debris, slag, resin, and reworked natural soils. These materials were placed on the property to fill in part of the Delaware River to create usable land. Beneath the fill material are alluvial sediments which consist of silty clay to coarse sand that decrease in thickness toward the river. Below the alluvial sediments is saprolite, a layer of weathered bedrock. The saprolite begins about 25 feet below the surface and slopes toward the river. The depth to groundwater across the Site generally ranges from 6 to 12 feet below the surface but can be as shallow as 2 feet.

Site groundwater flow reflects the regional flow and is generally eastward toward the Delaware River. Along a small area on the inland (western) edge of the property, the groundwater flows to the west where it infiltrates the Delaware County Regional Water Quality Control Authority ("DELCORA") combined sewer overflow system. Waste water in the sewer system normally flows to a waste water treatment plant. However, during heavy storms, water may be diverted directly to the Delaware River.

The Delaware River generally flows south and is tidal near the property. The water is brackish and the river is wide and deep enough to support large cargo ships. According to the Delaware River Basin Commission regulations, the Delaware River bordering the PECO property is protected for maintenance of resident fish and aquatic life, passage of migratory fish, wildlife, recreation, navigation, and industrial water supplies.

The City of Chester requires all water users in the city to connect to the public water supplied by the Chester Water Authority, where available. Since access to the Chester Water Authority system is available throughout the PECO property, the drilling of drinking water wells is prohibited. Therefore, groundwater at PECO cannot be used as a supply of drinking water. Instead, drinking water at PECO and in the City of Chester comes from the Octararo Reservoir on the Susquehanna River. It is important to note that although the Delaware River is in places a source of drinking water, the nearest drinking water intake on the Delaware River is 27 miles upstream at the Baxter Water Treatment Plant in Philadelphia, Pennsylvania.

C. Regulatory History

In 1993, EPA and PECO entered into an Order to investigate the extent of environmental contamination and evaluate remedy options at a 17-acre parcel which had been leased to Chem Clear, a hazardous waste recycler. The Order required PECO to conduct a RCRA Facility

Investigation to identify and determine the sources, types, and extent of contamination, and to identify risks to human health and the environment.

During the RCRA Facility Investigation (Spring, 1996), PECO discovered oily sheens consisting of BTEX and PAHs on the Delaware River during low tide. PECO reported this discovery to EPA. The sheens were caused by movement of groundwater into the Delaware River and from infiltration of groundwater into two combined sewer overflow pipes which are located along the Site and flow to the Delaware River. In September 1996, EPA directed PECO to begin Interim Measures to remove these sheens and prevent future sheens from forming. The Interim Measures were successful in halting the problem.

After EPA approved the RCRA Facility Investigation, PECO was required to submit a Corrective Measures Study in which they used the environmental information they had gathered to propose a remediation plan.

It was at this point that PECO and EPA discussed expanding the investigation and cleanup beyond the 17-acre Chem Clear Site by using Pennsylvania's Land Recycling and Environmental Remediation Standards Act (commonly known as "Act 2"). PECO proposed to submit a single report to fulfill both EPA's requirement for a Corrective Measures Study and Pennsylvania's requirement under Act 2 for an evaluation of the entire 90-acre property. With EPA approval, PECO submitted a document called the Remedial Investigation/Risk Assessment/Remedial Alternative Analysis ("RI/RA/RAA") to both EPA (March, 2000) and the Pennsylvania Department of Environmental Protection (PADEP) (June, 2000). Under Act 2, PADEP was required to make a decision 180 days after the report was submitted. PADEP approved the report in September, 2000. Following further modification, EPA approved the report in March, 2001.

As part of this work, PECO submitted a risk assessment that compared the contamination levels measured at the 17-acre Site to Pennsylvania Statewide Health Levels and developed site-specific risk levels. Site-specific risk levels are based on a study of the contamination found at a site and an understanding of the toxicity of the substances and the possible exposure pathways. This risk assessment was evaluated and approved by EPA. Details of the risk assessment and EPA's evaluation can be found in the Administrative Record.

D. Redevelopment

PECO originally purchased the properties adjacent to the power plant in anticipation of future expansion. Ultimately, PECO decided not to expand electrical generation at the Chester, Pennsylvania location. Instead, PECO will retain a small portion of the property to operate an existing electrical substation. Thus, the remainder of the property is available for redevelopment.

In July, 2000 Preferred Real Estate Investments, Inc. ("Preferred") signed a sales contract with PECO for a portion of the 90-acre property which includes the 17 acres covered by the EPA Order. On October 11, 2000, Preferred announced redevelopment plans to the public (Figure 3).

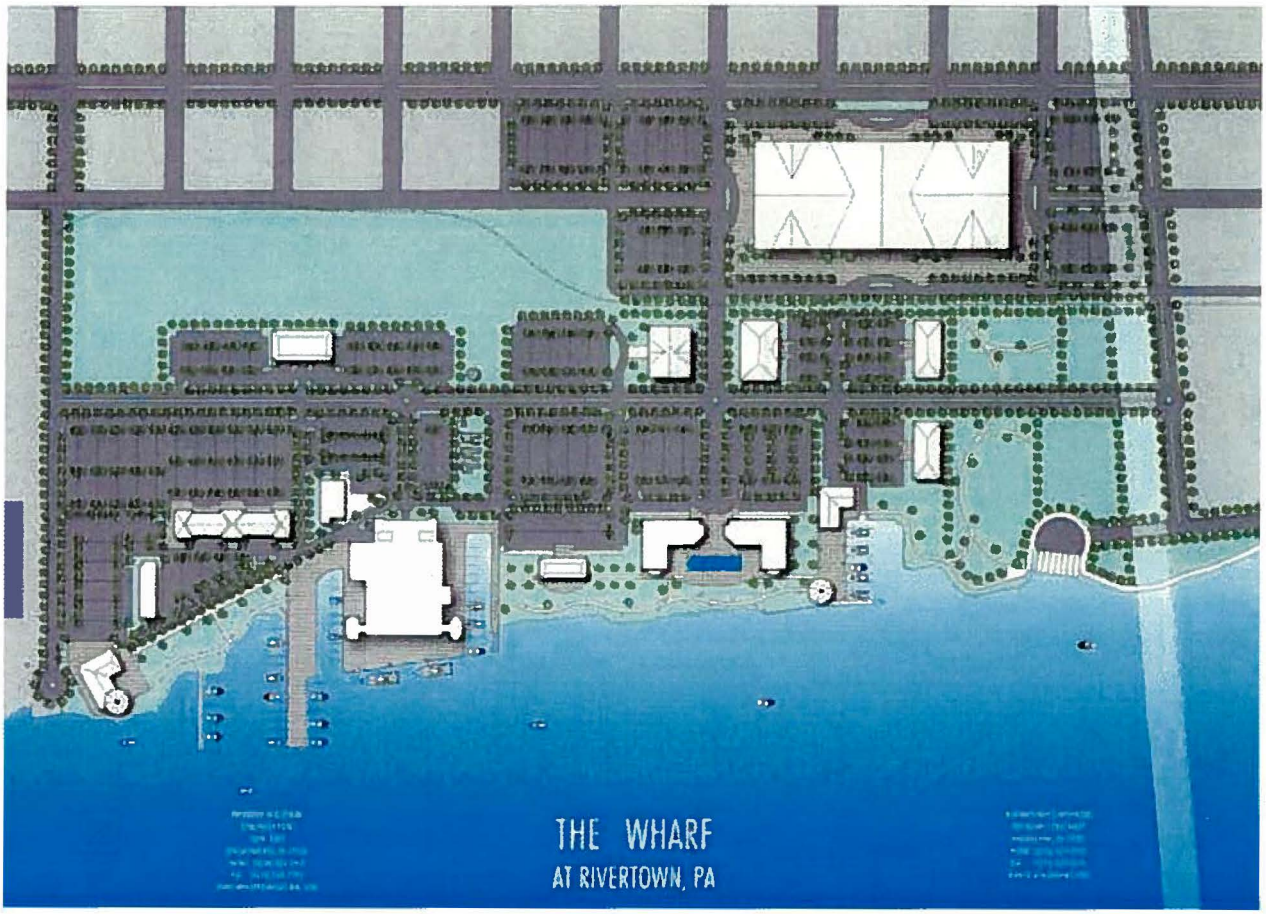


Figure 3

Under these plans, most of the property will be redeveloped. The redevelopment includes the construction of buildings, pavement, parking lots, and the addition of clean soil for landscaping. The remainder of the property, which includes some waterfront acreage, will be donated to the City of Chester for use as a park.

Preferred purchased the property in May, 2001. Preferred began redevelopment in June, 2001 with the conversion of the closed coal-fired power plant into office space. PECO retains the responsibility for environmental cleanup through an easement granted to PECO at the same time as the sale to Preferred and through a September 2001 Buyer-Seller Agreement among PECO, Preferred, and PADEP.

Since the redevelopment represents the future use of the property, EPA considered the redevelopment plans in selecting this Proposed Remedy. In recognition of the benefits of this project, and to expedite its implementation, EPA has streamlined some administrative steps in the corrective action process, most notably by engaging the PADEP in the process. However, EPA did not change the standards for protection of human health and the environment used in the development of the Proposed Remedy. EPA's proposed cleanup standards are based on a careful study of the materials found at the Site, potential exposure pathways, likely exposures to construction workers, and exposures to people who will use the area after redevelopment is complete. EPA and PECO have also continued their commitment to full public participation.

III. Environmental Conditions and Remedy Components

A. Soils

Summary of Investigations

The following section describes the results of the soil investigations conducted as part of the RCRA Facility Investigation and the RI/RA/RAA. EPA used the information from these reports to develop a Proposed Remedy to protect all potential users of the Site from any health risks related to contaminated soil.

EPA evaluated the amount of contamination found in the soil at sampling points both on the surface (0 to 2 feet deep) and subsurface (2 to 15 feet deep). In general, the soils were found to be clean and not a threat to human health through direct contact.

The details of the soil investigation are summarized below:

Surface Resin:

Pieces of resin are visible at the surface in many places within the 17-acre Site. The resin decomposes into benzene, toluene, ethyl benzene, and xylene ("BTEX") as well as various polycyclic aromatic hydrocarbons ("PAHs").

Delaware Riverbank:

Resin was found along the riverbank. Here, the resin has hardened due to exposure to the air and water for many years. EPA does not expect further releases of hazardous constituents from the hardened material.

PICCO Area:

The PICCO area, including the old surface impoundment, is located in the southeast corner of the Chem Clear parcel. In 1981, PECO removed about 5,000 cubic yards of soil and waste and replaced it with clean fill.

Risk Assessment for Soils:

EPA evaluated the soil data gathered during the various Site investigations to determine if there is any risk to human health or the environment from soil contamination. Initially, EPA compared the concentration found in the soil to a general set of standards called the Risk-Based Concentrations. EPA uses the Risk-Based Concentrations to eliminate constituents that are not a threat to human health. Many of the constituents found at PECO were screened out in this manner.

The constituents which were found in the soil above the Risk-Based Concentrations are arsenic, benzene, and PAHs.

PECO analyzed the impact of these constituents further by using a site-specific risk assessment. In a site-specific risk assessment, one considers parameters such as the physical soil conditions at a site and the exact paths by which people at a site may be exposed under current and future uses of the property.

EPA reviewed PECO's site-specific risk assessment and agreed that it accurately represented potential risk to human health from the soils. PECO showed that during redevelopment the most likely exposed individual would be adult construction workers and concluded that current contamination levels found at the Site are not a threat to them. Current zoning and the Buyer- Seller Agreement between PECO and Preferred prevent residential construction on the 17 acres. Therefore, the remedy is designed to protect the people most frequently using the property, namely future workers and visitors. This approach is consistent with EPA guidance regarding the use of reasonably anticipated land-use in the remedy selection process.

Proposed Remedy and Rationale for Soils

Based on the risk assessment and the expected redevelopment of the 90-acre property, EPA has determined that the surface and sub-surface soils do not pose a risk to human health or the environment. Therefore, general removal of soils is not necessary for the 17-acre Chem Clear Site. In areas where resin particles are visible at the surface, PECO will completely remove the resin and dispose of it off-site.

PECO will leave the hardened resin in place where it is found along the riverbank. This area will be covered with large stones called riprap. The riprap will further stabilize the bank and prevent direct contact with any surface resin without disturbing the riverbank.

Although the soils are not a direct threat to human health, they are a potential source of contamination to the groundwater underneath the Site because some resin will remain scattered in the Site soil. However, EPA has decided that the removal efforts already completed represent the limit of what can be practically expected for source removal. Thus, EPA's remedy will rely on groundwater collection and monitoring as the best response to the contaminated groundwater.

In the original redevelopment plan, submitted to EPA on March 25, 2000, PECO proposed to donate the waterfront portion of the 17-acre Site to the City of Chester for use as a park. After discussions with EPA and the City of Chester, PECO amended the redevelopment plan in August, 2000 and the entire 17-acre Site was offered to Preferred for redevelopment. The City of Chester will instead receive a parcel at the northern end of the property that was less impacted by past industrial operations. This donated parcel, which abuts the existing public boat ramp, will allow city officials to expand resident and visitor access to the river area and create a park.

EPA is aware that the City of Chester has proposed to rezone the waterfront, including the PECO property, to allow more flexibility in redevelopment. Chester plans to allow residential use within the waterfront zone. However, residences and similar uses are prohibited by the Buyer-Seller Agreement and the Easement unless Preferred conducts additional cleanup activities. At this time, there are no known plans for residential use. Under this Proposed Remedy, PECO must inform EPA of any changes (e.g. construction of housing or schools) that could impact the protection provided under this remedy . EPA will then re-evaluate the risk assessment for the Site and may require additional remediation. PECO's obligation to inform EPA of any land use changes will be part of the Facility Lead Agreement.

Finally, PECO and Preferred have agreed to restrict access to the entire area during remediation and redevelopment.

Rationale

The Proposed Remedy for soils which includes removing surface resin and stabilizing the Delaware River bank is protective of human health and the environment for the following reasons.

The only discrete area of contamination on the property is the area where PICCO operated a disposal basin. PECO excavated this area in 1981, at which time about 5,000 cubic yards of contaminated soil were removed and replaced with clean material. As a result of this excavation, the risk of exposure to material in the old surface impoundment has been minimized and further excavation is not necessary to reduce health or environmental risk. In addition, further excavation will be harmful to the environment because it would require digging below the water

table. This would disrupt the near shore environment and may mobilize any scattered resin below the surface.

Under EPA's Proposed Remedy some weathered resin will remain beneath the 17 acres subject to the Order. Further excavation would be difficult and disruptive to the waterfront environment, given the shallow depth to groundwater and the fact that much of the area is land created by filling parts of the river many years ago. Consistent with EPA policy, when the major source of contamination has been removed and the exposure pathway has been eliminated, further removal actions are unnecessary. After redevelopment is complete, the current surface will be covered thereby preventing exposure to any contamination remaining within the soils. Through the Facility Lead Agreement, PECO will be expected to inform EPA if the actual redevelopment differs significantly from the proposed redevelopment and may result in exposure to contaminated soil. (from the Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action, September 2001: Section 8: Source Control, available at http://www.epa.gov/correctiveaction) .

B. Groundwater

Summary of Investigations

In the 17-acre Site, groundwater is commonly found 6 to 12 feet below the surface, although in places the groundwater is as shallow as 2 feet below the surface. Investigations by PECO show that most of the contaminated groundwater was found in the vicinity of the former PICCO area, the Delaware River shoreline, and, to a lesser extent, near the western (inland) boundary of the old Chem Clear Facility. The main groundwater contaminants are BTEX and PAHs which originate mostly from the resins. These contaminants are less dense than water and are generally found floating on or near the top of the groundwater.

PECO also found arsenic, beryllium, cadmium, chromium, and lead in the shallow groundwater. In some wells, these levels exceeded the Maximum Concentration Levels for drinking water established in the Safe Drinking Water Act, 42 U.S.C. §§ 300f, et seq. In all cases, however, the concentration of these metals was below PADEP statewide health levels for a non-use aquifer.

Low concentrations of BTEX and PAHs have been found dissolved in the groundwater. In 1998, PECO tested wells throughout the Site to analyze for dissolved BTEX and PAHs. Wells in the shallow aquifer show relatively high levels. However, these shallow samples also contained small particles of resin floating in the groundwater. Therefore, it is difficult to know the true level of contaminants dissolved in the groundwater. PECO also sampled the water from the deeper aquifer. The deeper aquifer wells did not have detectable levels of contamination.

For a complete set of test results, please see the Administrative Record.

Sitewide Groundwater Flow:

Evaluation of the groundwater flow at PECO shows that most of the groundwater flows eastward to the Delaware River. At the western edge of the Site, some groundwater flows to the west where it is captured by the DELCORA combined sewer/storm water overflow system pipe which runs along the western edge of the Site.

Under normal weather conditions, material in the combined sewer/storm water overflow system flows to the DELCORA wastewater treatment plant. Under heavy rain conditions, some of this flow is diverted directly to the Delaware River through the overflow system. The storm overflow events are covered by DELCORA's National Pollutant Discharge Elimination System permit.

Status of Interim Measures

BTEX and PAHs floating on the groundwater once seeped into the Delaware River. These constituents continue to be removed by the Interim Measures (see Section V: Delaware River and the Administrative Record for a more detailed description). As documented in the bi-monthly reports PECO submits to EPA, the Interim Measures are successful in removing and treating the contaminants. PECO is required to maintain and upgrade the system as necessary under the current Order. Copies of the bi-monthly reports are included in the Administrative Record.

The Interim Measures are designed to remove the floating component of the contaminants but not the fraction dissolved in the groundwater. Dissolved contaminants may, therefore, be entering the Delaware River through seeps and will be addressed under the proposed remedy.

Proposed Remedy and Rationale for Groundwater

The currently operating Interim Measures are successfully removing contaminants from the surface of the groundwater. Under the Proposed Remedy, PECO will be required to continue to remove material floating on the groundwater and to monitor for contamination dissolved in the groundwater. Since the resin and metals have been found as tiny particles in the groundwater, PECO will be required to submit unfiltered and filtered sample results to determine how much contamination is dissolved in the water and how much contamination is from the particles.

EPA is requiring PECO to monitor the groundwater for dissolved contaminants to determine if any trend exists. PECO will monitor eleven existing wells quarterly for 2 years. (MW1 through 5, MW9, and MW11 through 15 - see Figure 4) If any of the wells have contamination floating on the groundwater, then the contamination will be removed and that well will not be sampled for dissolved contamination during that sampling event. The well will be checked at the next sampling event and, if no free product is present, will be sampled for dissolved constituents.

PECO will monitor each well for the following constituents:

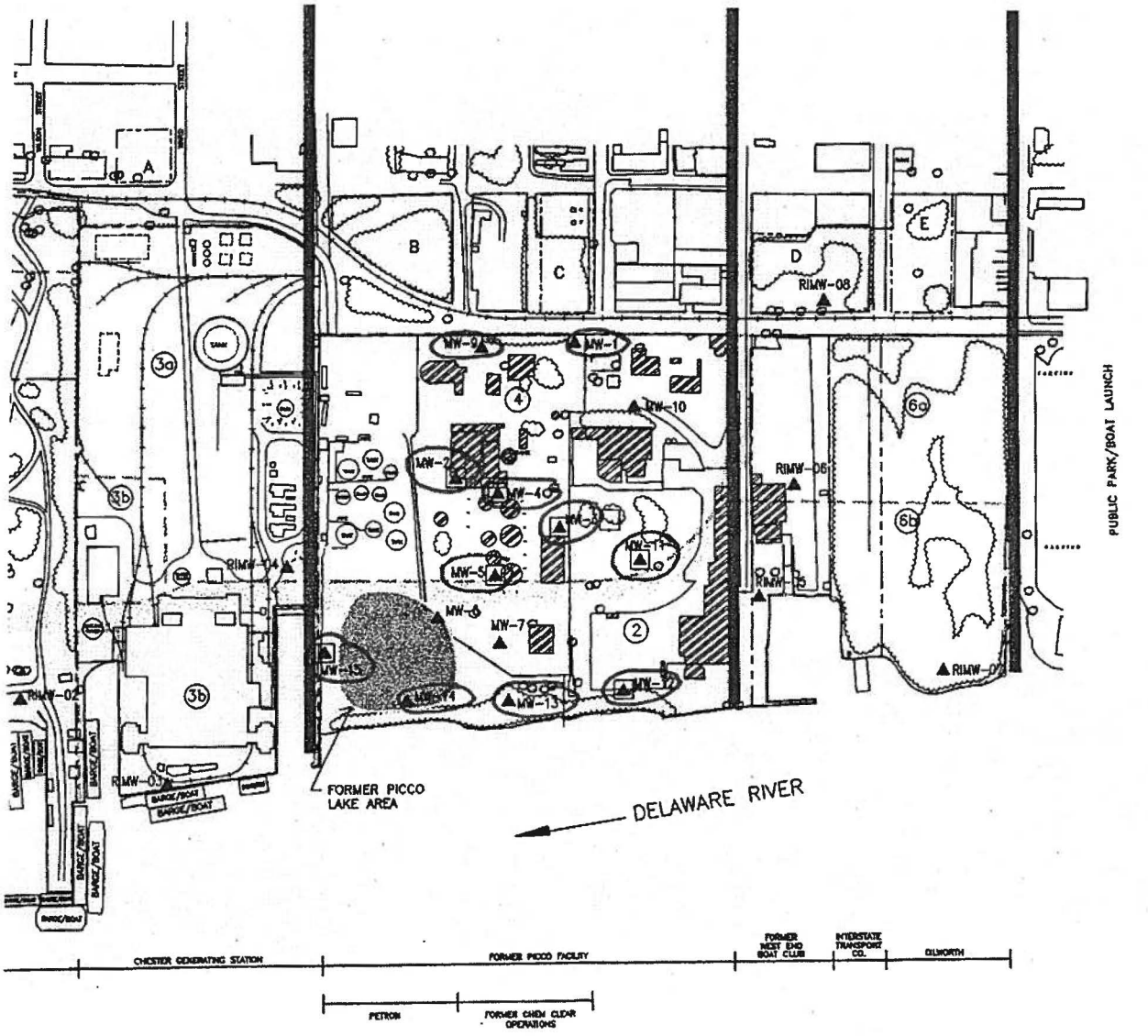
Organic Contaminants: *Benzene, Toluene, Ethylbenzene, Xylene, Acenaphthalene, 2-Methylnapthalene, and Napthalene*
Inorganic Constituents: *Arsenic, Beryllium, Cadmium, and Lead*

At the end of the initial 2-year monitoring period, PECO will submit a report to EPA containing the data and an analysis of the results. If the investigation confirms that the levels of contamination are in equilibrium or decreasing, EPA will develop Alternate Concentration Limits ("ACLs") for the groundwater. These ACLs will set permanent standards for the dissolved contaminants which may be leaving the Site and entering the Delaware River. These standards will be calculated to protect the surface water quality of the Delaware River. EPA and PECO will also develop a plan for long-term groundwater monitoring. If the levels of contamination increase above these standards, PECO will be expected to develop and implement additional measures to protect surface water quality. This approach will be included in the Facility Lead Agreement.

Rationale

EPA considered three primary issues in developing the groundwater part of the Proposed Remedy. First, EPA believes that additional removal of the man-made fill of the shallow aquifer would be impracticable and harmful to the environment. Second, EPA recognizes that the shallow aquifer cannot be used as a source of drinking water. Third, the shallow groundwater discharges directly to the Delaware River. Each of these was a factor in the decision to continue the Interim Measures to actively contain the contamination and to monitor the shallow groundwater as the most effective remediation strategy for the groundwater at PECO.

Groundwater contamination at PECO is mostly caused by decomposition of resin buried at the Site or mingled with the man-made fill. PECO has removed the main source of resin through the excavation and off-site disposal of 5,000 cubic yards of the old surface impoundment. As part of this Proposed Remedy, PECO will remove any remaining resin found on the surface of the property. As discussed before, EPA considered whether additional excavation would be warranted. Since the remaining resin exists as widely dispersed particles within the fill, further removal would require excavating the man-made fill in which the groundwater flows. EPA believes that this approach is impracticable because it would destroy the aquifer and impact the near-shore environment.


A
B
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RIMW-08
MW-9
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MW-10
MW-2
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MW-3
MW-11
MW-5
MW-6
MW-7
MW-15
MW-14
MW-13
MW-12
RIMW-06
RIMW-05
RIMW-04
RIMW-02
RIMW-03
RIMW-07
3a
3b
4
2
6a
6b
PUBLIC PARK/BOAT LAUNCH
FORMER PICCO LAKE AREA
DELAWARE RIVER
BARGE/BOAT
CHESTER GENERATING STATION
FORMER PICCO FACILITY
FORMER WEST END BOAT CLUB
INTERSTATE TRANSPORT CO.
ELLWORTH
PETRON
FORMER CHEM CLEAR OPERATIONS

Figure 4

According to EPA's Directive 9234.2-25, "Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration"(September, 1993), "[a] demonstration that groundwater restoration is technically impracticable should be accompanied by a demonstration that contamination sources have been, or will be, identified and removed or treated to the extent practicable... Where complete source removal or treatment is impracticable, use of migration control or containment measures should be considered." (Page 13). EPA believes that by removing the historic source of contamination and continuing the Interim Measures to contain and to monitor the LNAPL plume, the Proposed Remedy will be protective of the surface water quality in the area of the Site. Supporting documentation can be found in the RCRA Facility Investigation Final Report in the Administrative Record.

Given that the groundwater beneath the PECO property is prohibited from use as a drinking water source, EPA guidance allows the establishment of Alternate Concentration Limits ("ACLs") to protect the surface water quality. Alternate concentration limits are site specific limits that are unique to the circumstances at a given site. To establish ACLs, it is necessary to prove that the level of contamination is not increasing. EPA will consider establishing ACLs for the limits of the dissolved contaminants if PECO can show that the concentration of contaminants in the dissolved phase of the groundwater is stable or decreasing. PECO must demonstrate this through 2 years of quarterly sampling required by this remedy.

There are several EPA guidance documents that detail the ACL process and its use in remedy selection. For those with further interest in this subject, the most relevant documents are listed below and have been included in the Administrative Record. [OSWER directive 9481.00-6C, Alternate Concentration Limit Guidance and 40 CFR 264.94. CERCLA Section 121(d)(2)(B)(ii) and September 24, 1996 memo "Coordination between RCRA Corrective Action and Closure and CERCLA Site Activities"]

Maximum Beneficial Use of Groundwater:

EPA's groundwater policy and remedy selection process establish a goal of restoring groundwater to its "maximum beneficial use" in a given area. At PECO, EPA believes that the maximum beneficial use of the groundwater is as a source of water to the Delaware River. The shallow groundwater beneath the PECO property cannot be used as drinking water since the City of Chester code prohibits private supply wells within the city limits where water supply connections are available. There are no water supply wells currently on the site and the entire site is serviced by the public water supply system.

Therefore, restoration of the shallow groundwater at PECO to drinking water standards is unnecessary to protect human health. EPA believes that drinking water standards are not an achievable goal for the shallow groundwater at PECO, given the technical difficulties, cost, and low probability of success. EPA will instead establish contaminant concentration levels that will protect the Delaware River water quality and people using the waterfront.

Third, PECO built a passive recovery system to remove LNAPL (lighter than water contaminants) from the surface of the groundwater before it reaches the Delaware River which prevents sheens from forming. For this step, PECO constructed sumps and wells from which they remove LNAPL. This part of the Interim Measures also continues to operate.

As of March 31, 2001, about 1,487 gallons of material have been removed from the groundwater by these Interim Measures.

Proposed Remedy and Rationale for the Delaware River

EPA is proposing that continued operation of the bioslurping and passive recovery system, as described above, become a permanent part of the remedy for the Site. PECO estimates that this system will need to operate for approximately 10 years. EPA will periodically re-evaluate the operation and need for continued operation of this system. More information about the Interim Measures can be found in the "Interim Measures Investigation Program" of April 9, 1997, the "Operations and Maintenance Plan for the Interim Measures Groundwater Extraction and Pretreatment System at the Former Chem Clear Facility" of April, 1998, and the RCRA Facility Investigation Final Report of January, 1999. All of these documents are part of the Administrative Record.

In addition, PECO is required to monitor the groundwater for at least two years to develop standards protective of the surface water. Based on the results of this monitoring program, EPA will calculate ACLs to protect the Delaware River from groundwater seepage. These levels will be protective of the Delaware River environment as well as protective of anyone who may come into physical contact with water from the Delaware River.

Rationale

Once PECO undertook these Interim Measures, the sheens on the Delaware River disappeared. EPA concluded that these measures were successful, but still necessary. Therefore, EPA is proposing that they continue as part of the final remedy. In addition, EPA is proposing a monitoring program to evaluate the potential impact from dissolved contaminants.

D. Institutional Controls

EPA recognizes that some of the requirements of the Proposed Remedy will be maintained through Institutional Controls. Institutional Controls are non-engineering instruments such as administrative or legal controls that minimize the potential for human exposure to contamination by limiting land or resource use. Examples of Institutional Controls include enforcement orders, easements, covenants, local well drilling ordinances, zoning restrictions, and public advisories. At the PECO Site, Institutional Controls will be used along with physical controls. (For background information on institutional controls, the reader is directed to the EPA document: "Institutional Controls: A Site Manager's Guide to Identifying, Evaluation and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups, prepared

by U.S. EPA, 09/00."

At the PECO Site, the public will be protected by a variety of Institutional Controls. For example, a city ordinance requires all structures to be connected to the Chester Water Authority system where such connections are available. The PECO property has access to the Chester Water Authority system, effectively prohibiting the drilling of drinking water wells on the Site.

As a part of the Proposed Remedy, EPA is requiring that PECO, EPA, and PADEP have access to the Site for sampling and necessary repairs of the groundwater monitoring and remediation system; current owners, subsequent owners, or other Site users not interfere with any part of the remedy; and access to the Site be restricted until redevelopment is complete. This will be accomplished through the following:

> An easement, granted by the current property owner, Preferred (through Rivertown Developers, L.P.), which imposes certain use restrictions. The easement, which PECO and Preferred intend to run with the land, includes granting access to the Site for EPA, PECO and PADEP in order to implement the Final Remedy, as well as prohibiting construction of basements, prohibiting the use of groundwater, and prohibiting the building of homes.
>
> A Buyer-Seller Agreement among PADEP, PECO, and Preferred to grant to PECO the easement, to assure that the agreement runs with the land, as well as to assure that the Buyer-Seller Agreement is recorded with the local land records.

IV. EPA's Criteria for Remedy Selection

The criteria EPA considers in a remedy are set forth in EPA's "Guidance on RCRA Corrective Action Decision Documents: The Statement of Basis Final Decision Response to Comments" (OSWER Directive 9902.6) dated February, 1991, and the Advance Notice of Proposed Rulemaking, 61 *Federal Register*, no. 85:19451-52 (1996). These documents describe four general standards and five corrective measure selection decision factors that assist in evaluating the overall effectiveness of the Proposed Remedy. The general standards for corrective measures are:

> 1. *Overall Protection of Human Health and the Environment* addresses whether a remedy provides adequate protection and describes how risks are eliminated, reduced, or controlled.
>
> 2. *Attainment of Cleanup Standards* addresses whether a remedy will meet the appropriate federal and state cleanup standards.
>
> 3. *Controlling the Sources of Contamination* relates to the ability of the selected remedy to reduce or eliminate, to the maximum extent practicable, further releases.

4. *Compliance with the Waste Management Standards* assures wastes are managed in a protective manner during the implementation of the corrective measures.

The five selection decision factors for corrective action are:

1. *Long-Term Reliability and Effectiveness* refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals are achieved.

2. *Reduction of Toxicity, Mobility, or Volume of Waste* addresses the degree to which remedial alternatives employ recycling or treatment that reduces toxicity, mobility, or volume of contaminants.

3. *Short-Term Effectiveness* addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be imposed during the construction and implementation period until cleanup goals are achieved.

4. *Implementability* addresses the technical and administrative feasibility of the remedy, including the availability of materials and services needed to implement a particular remedy.

5. *Cost* includes estimated capital costs, operation costs, and present worth costs.

V. Evaluation of Proposed Remedy

A. Four General Standards for Corrective Action

1. Overall Protection of Human Health and the Environment

This Proposed Remedy protects human health and the environment from contamination in the soil, groundwater, and surface water. The soils are not a risk to human health since contamination levels in the surface soils are below either the Pennsylvania statewide health-based values or site-specific risk based values approved by EPA. To protect the public further, PECO will survey the Site for any resin visible at the surface and completely remove it. In addition, all surface soils will be covered by buildings, paving, and parking lots, or, in areas of incidental landscaping, clean soil. Until redevelopment is complete, PECO and Preferred will limit access to the Site. These efforts will prevent exposure to the resin.

The public will not be exposed to contaminated groundwater because the groundwater cannot be used as a source of drinking water. Due to the shallow groundwater, the buildings in the redeveloped area will not have basements, thereby preventing contaminated groundwater from seeping into the buildings.

The surface water is protected from contaminants by the Interim Measures and will continue to be protected when the Interim Measures become part of the Final Remedy. In addition, PECO will sample groundwater to determine the level of contaminants dissolved in the groundwater. The results of this program will be used to evaluate potential impacts to the Delaware River. Any adverse impacts identified will be addressed under the Facility Lead Agreement.

2. Attainment of Cleanup Standards

PECO proposed a combination of Pennsylvania state-wide health and site-specific risk standards as appropriate cleanup levels for soil and for contaminants floating on the groundwater at this Site. For contaminants dissolved in the groundwater, PECO will test selected wells quarterly for two years. If there is no increase in contamination levels, EPA will develop Alternate (non-drinking water) Concentration Limits to protect the Delaware River.

EPA has reviewed the proposed standards and concludes that the standards embodied in this remedy, which are site-specific risk based standards for the soils, no visible sheens for the surface water, and site-specific non-drinking water standards (ACLs) to be determined based on the results of the monitoring program for the groundwater, will be protective of human health and the environment. Further, EPA has concluded that the actions described in the Proposed Remedy will meet these cleanup standards.

3. Controlling the Sources of Contamination

The only discrete source of contamination at PECO was the former PICCO surface impoundment. In 1981, PECO removed about 5,000 cubic yards of contaminated soil from PICCO Lake and replaced it with clean fill, thereby removing as much of the source material as possible. The remainder of the waste resin is buried and scattered as a component of the man-made fill.

Under the Proposed Remedy, source control will continue through use of the Interim Measures.

4. Compliance with the Waste Management Standards

This Proposed Remedy complies with all relevant state and Federal laws concerning the management of remediation and other wastes.

B. Five Remedy Selection Decision Factors for Corrective Action

1. Long-Term Reliability and Effectiveness

EPA expects the Proposed Remedy to provide long-term protection of human health and the environment. There is no effect on human health from residual groundwater contamination

as long as there is a prohibition on using the groundwater as a source of drinking water. There will be no impact on human health from exposure to the soils because the soils are not a risk and will be covered by the construction. All large sources of contamination that can be removed have been removed. As part of the Proposed Remedy, PECO will survey the Site and remove any resin visible at the surface which will complete removal of contamination sources.

PECO will continue to actively manage groundwater contamination to prevent sheens from impacting the Delaware River. PECO will also monitor the groundwater for dissolved contamination for the next two years, after which, EPA will establish, if necessary, Alternative Concentration Limits for long-term monitoring of groundwater.

2. Reduction of Toxicity, Mobility, or Volume of Waste

PECO has already removed about 5,000 cubic yards of resin-contaminated soil from the PICCO area and continues to remove contamination from groundwater under Interim Measures. With this Proposed Remedy, PECO will continue to reduce the volume of contamination that is floating on the groundwater and prevent sheens from escaping to the Delaware River. The volume of waste will be further reduced as PECO removes visible resin from the surface soil.

3. Short-Term Effectiveness

The Interim Measures already in place have removed contamination from the surface of the groundwater and removed the oily sheens on the Delaware River. PECO plans to enhance the system to completely prevent the sheens. This system has proven to be effective and will be required as long as necessary. EPA will monitor these measures to ensure long-term effectiveness. In addition, EPA does not expect any further construction of this remedy will cause short-term threat to human health and the environment.

4. Implementability

The Proposed Remedy will be easy to implement since the Interim Measures and monitoring wells are already in place and operating. Additional activities necessary to complete the remedy can be accomplished using readily available technology without interfering with the planned redevelopment activities.

5. Cost

PECO estimates the cost of maintaining and improving the existing Interim Measures, removing resins, and stabilizing the river banks to be about $2.25 million. Sampling for dissolved phase contaminants in the groundwater, as proposed, will add some additional costs. PECO estimates that cleanup costs for the entire 90-acre property will exceed $5 million.

VI. Implementation through a Facility Lead Agreement

Early in the Corrective Action program, the investigation of facilities occurred under a Corrective Action Permit or Order and the implementation of remedies took place under modifications to the Permit or a second Order. However, many facilities were successfully following EPA guidelines to undertake corrective action without a permit or order. As a result of this experience, EPA Region III (Philadelphia Office) developed a Facility Lead Program. In the Facility Lead Program, a facility with a demonstrated record of financial and technical capability could assume the lead in implementing corrective action without a Permit or Order.

EPA Region III believes that PECO is a suitable candidate for the Facility Lead Program because PECO has demonstrated technical and financial capability by successfully implementing and maintaining the Interim Measures. Since remediation and redevelopment activities have already begun at PECO, EPA believes an expedited administrative method for cleaning up the property is advisable and should streamline completion of the environmental work at the property.

After the Proposed Remedy becomes finalized, EPA will meet with PECO and PADEP to develop a plan for carrying out the Final Remedy. This plan will follow EPA's Corrective Measures Implementation guidance (Appendix 1) and will include details of the Final Remedy such as sampling specifications, monitoring end points, and other relevant requirements. PECO will then sign a Facility Lead Agreement with EPA in which they commit to follow the plan. If PECO does not meet the terms of the Facility Lead Agreement, EPA will take action, most likely through issuing an order, to enforce the provisions of the Final Remedy.

This streamlined process, in which EPA will use the Facility Lead Program in lieu of an Order, follows the concepts set forth under the second round of RCRA Reforms (EPA 530-F-01-001) and EPA's January 2, 2001 guidance document "Enforcement for Expediting RCRA Corrective Action." This guidance states that "EPA encourages the appropriate use of innovative mechanisms and creative approaches for accomplishing corrective action." EPA expects that using a Facility Lead Agreement at PECO will facilitate and hasten redevelopment at PECO's Chester facility.

VII. Community Involvement/Public Participation

EPA is asking anyone interested in this cleanup to review this Statement of Basis and provide comments to EPA. The public comment period will last sixty (60) calendar days from May 10 to July 9, 2002. EPA will hold a Public Meeting at 6:30 p.m. on June 11, 2002 at the Life in Christ Cathedral of Faith, 3016 West 3rd Street in Chester. EPA will introduce and explain the Proposed Remedy to the public and to hear and collect public comments. A formal public hearing will be held if requested by the community or any other interested party. Requests for a public hearing should be made to Ms. Renee Gelblat (215-814-3421) of the EPA Region III Office. Written comments may be submitted to the EPA either at the Public Meeting or directly

to EPA at the address below.

EPA has prepared an Administrative Record for this decision that includes all the environmental data gathered during the site investigation, the risk assessment documents, and all other relevant material. The Administrative Record is available to the public and can be found at the following locations:

United States Environmental Protection Agency
Region III
1650 Arch Street
Mail Code: 3WC22
Philadelphia, Pennsylvania 19103-2029
Contact: Renee Gelblat
voice: (215) 814-3421
fax: (215) 814-3114
e-mail: gelblat.renee@epa.gov
Hours: Monday - Friday: 8:30 a.m - 4:30 p.m.

and

J. Lewis Crozier Public Library
620 Engle Street
Chester, PA 19013
(610) 494-3454
Hours: Monday - Thursday: 9:00 a.m. to 5:45 p.m.
Friday: 9:00 a.m. to 5:00 p.m.
Saturday: 9:00 a.m. to 4:00 p.m.

Following the sixty (60) calendar day public comment period, EPA will prepare a final decision which will address all relevant comments. This final decision will be incorporated into the Administrative Record. If the comments are such that significant changes are made to the Proposed Remedy, EPA will seek public comment on the revised proposal.

May 9, 2002
Date

Maria Parisi Dicks for
James J. Burke, Director
Waste and Chemicals Management Division

Appendix I

CORRECTIVE MEASURES IMPLEMENTATION
SCOPE OF WORK

PURPOSE

This Scope of Work ("SOW") sets forth the requirements for the implementation of the design, construction, operation, maintenance, and monitoring of the corrective measures or measures pursuant to the Final Administrative Order on Consent ("Consent Order" or "Order") to which this SOW is attached. The work performed under this Order will implement the corrective measures that have been selected by EPA in the Final Decision and Response to Comments ("FDRTC") and any amendments thereto. The Respondent will furnish all personnel, materials, and services necessary for the implementation of the corrective measure or measures.

SCOPE

The Corrective Measures Implementation consists of four tasks:

Task I: Corrective Measures Implementation Work Plan
- A. Management Plan
- B. Community Relations Plan
- C. Sampling and Analysis Plan
- D. Corrective Measures Permitting Plan
- E. Supplemental Field Investigation Work Plan

Task II: Corrective Measure Design
- A. Design Plans and Specifications
- B. Operation and Maintenance Plan
- C. Cost Estimate
- D. Construction Quality Assurance Objectives
- E. Health and Safety Plan
- F. Sampling and Analysis Plan
- G. Final CMI Design

Task III: Corrective Measures Construction
- A. Inspections
- B. CMI Report

Task IV: Reports
- A. Progress Reports and Assessment Reports
- B. CMI Work Plan
- C. CMI Design Report
- D. CMI Report

Further specifications of the work outlined in this SOW will be provided in the Corrective Measures Implementation Work Plan and subsequent plans to be approved by EPA. Variations from the SOW will be made, if necessary, to fulfill the objectives of the Corrective measures set forth in the FDRTC and any amendments thereto.

Additional studies may be needed as part of the Corrective measures Implementation to supplement the available data. At the direction of EPA for any such studies required, the Respondent shall furnish all services, including field work, materials, supplies, plant, labor, equipment, investigations, and superintendence. Sufficient sampling, testing and analysis shall be performed to optimize the required treatment and/or disposal operations system.

TASK I: CORRECTIVE MEASURES IMPLEMENTATION WORK PLAN

The Respondent shall prepare a Corrective Measures Implementation ("CMI") Work Plan. The CMI Work Plan shall outline the design, construction, operation, maintenance and monitoring of all actions taken to implement the Corrective measures as defined in the Order and the FDRTC and any amendments thereto. This CMI Work Plan will include the development and implementation of several plans, which require concurrent preparation. It may be necessary to revise plans as necessary during the performance of this Order. The CMI Work Plan includes the following:

A. Management Plan

The Respondent shall prepare a Management Plan which will include:

1. Documentation of the overall management strategy for performing the design, construction, operation, maintenance, and monitoring of corrective measure(s);

2. Description of the responsibility and authority of all organizations and key personnel involved with the implementation;

3. Description of the qualifications of key personnel directing the CMI, including contractor personnel;

4. Conceptual design of the treatment and/or disposal system or any corrective measures to be installed as set forth in the requirements of the FDRTC;

5. An outline of proposed field activities necessary to complete the CMI Design;

6. Proposed locations of groundwater monitoring wells and a detailed well development plan;

7. Proposed discharge options for treated ground water, with a proposed option upon which the CMI Design will be based;

8. Proposed detailed performance criteria for groundwater treatment;

9. A description of how the conceptual design is expected to meet the technical requirements of the FDRTC and any amendments thereto; and

10. Flow chart and schedule of work to be performed during the CMI.

B. Community Relations Plan

The Respondent shall submit and/or revise the Community Relations Plan to include any material changes in the level of concern or information needs of the community during design and construction activities.

1. Specific activities which must be conducted during the design stage are the following:

a. The facility Community Relations Plan is to reflect knowledge of citizen concerns and involvement at this stage of the process; and

b. Prepare and distribute a public notice and an updated fact sheet at the completion of engineering design.

2. Specific activities to be conducted during the construction stage could be the following: depending on citizen interest at a facility at this point in the corrective action process, community relations activities could range from group meetings to fact sheets on the technical status.

C. Sampling and Analysis Plan

Respondent shall submit and/or revise the Sampling and Analysis Plan describing work to be performed during Corrective Measures Design, the 12 month evaluation Period, and after completion of construction. The Sampling and Analysis Plan shall be comprised of:

1. Data quality objectives for design phase activities,

2. A Quality Assurance Project Plan (QAPP),

3. A Field Sampling Plan, and

4. A Data Management Plan describing the steps to be followed in compiling, organizing, and reviewing data collected in accordance with the Sampling and Analysis Plan and identifying the frequency of periodic data reviews and evaluations.

The Sampling and Analysis Plan will include the existing soil and well sampling and analysis program, with appropriate revisions as necessary.

D. Corrective Measures Permitting Plan

Respondent shall submit a Corrective Measures Permitting Plan identifying all federal,

state, interstate and local permits and approvals required for the implementation of the Corrective Measures required by this Consent Order, and for the implementation of any institutional controls required by this Consent Order. The plan shall also identify all agreements or other arrangements with adjoining landowners, if any, known by Respondent to be necessary for the implementation of the Corrective measures, including, but not limited to, site access and easement agreements. The plan shall include a schedule indicating the time needed to obtain all such approvals and permits and to enter into such agreements and arrangements (this may be integrated with the design/implementation schedule items).

E. Supplemental Field Investigation Work Plan

Respondent shall submit a work plan setting forth the protocols and methodologies for any additional hydrogeologic investigations or other field work, if any such additional investigation or field work is necessary, for the proper design of the groundwater extraction and treatment systems. The work plan shall include an expeditious schedule for the completion of any such supplemental field work.

TASK II: CORRECTIVE MEASURES DESIGN

The Respondent shall prepare final construction plans and specifications to implement the Corrective measures at the facility as defined in the Corrective measures set forth in the FDRTC and any amendments thereto.

A. Design Plans and Specifications

The Respondent shall develop clear and comprehensive design plans and specifications which include, but are not limited to, the following:

1. Discussion of the design strategy and the design basis, including:

a. Compliance with all applicable or relevant environmental and public health standards;

b. Minimization of environmental and public health impacts; and

c. Update schedules, if necessary, from commencement through completion of construction of the CMI.

2. Discussion of the technical factors of importance including:

a. Use of currently accepted environmental control measures and technology;

b. The constructibility of the design; and

c. Use of currently acceptable construction practices and techniques.

3. Description of assumptions made and detailed justification of these assumptions;

4. Discussion of the possible sources of error and references to possible operation and maintenance problems;

5. Detailed drawings of the proposed design including;

a. Qualitative flow sheets; and

b. Quantitative flow sheets.

6. Tables listing equipment and specifications;

7. Tables giving material and energy balances;

8. Appendices including:

a. Sample calculations (one example presented and explained clearly for significant or unique design calculations);

b. Derivation of equations essential to understanding the report; and

c. Results of laboratory or field tests.

B. Operation and Maintenance Plan

The Respondent shall prepare or revise the Operation and Maintenance ("O&M") Plan to cover both implementation and long term maintenance of the Corrective measures. The O&M Plan is to identify the processes to occur, submissions during O&M, and schedule for O&M activities consistent with remedial objectives set forth in the FDRTC and any amendments thereto. The plan shall be composed of the following elements:

1. Description of normal O&M:

a. Description of tasks for operation;

b. Description of tasks for maintenance;

c. Description of prescribed treatment or operation conditions; and

d. Schedule showing frequency of each O&M task, also to be included in the Management Plan.

2. Description of potential operating problems:

a. Description and analysis of potential operation problems;

b. Sources of information regarding problems; and

c. Common and/or anticipated remedies.

3. Description of routine monitoring and laboratory testing:

a. Description of monitoring tasks;

b. Description of required laboratory tests and their interpretation;

c. Required QA/QC; and

d. Schedule of monitoring frequency and date, if appropriate, when monitoring may cease.

4. Description of alternate O&M:

a. Should systems fail, alternate procedures to prevent undue hazard; and

b. Analysis of vulnerability and additional resource requirements should a failure occur.

5. Safety plan:

a. Description of precautions, of necessary equipment, etc., for site personnel; and

b. Safety tasks required in event of systems failure.

6. Description of equipment:

a. Equipment identification;

b. Installation of monitoring components;

c. Maintenance of site equipment; and

d. Replacement schedule for equipment and installed components.

7. Records and reporting mechanisms required:

a. Daily operating logs;

b. Laboratory records;

c. Records for operating and maintenance costs;

d. Mechanism for reporting emergencies;

e. Personnel and maintenance records;

f. Contents of periodic progress reports described in Task IV.A and providing details on how Task IV. A requirements will be met; and

g. Monthly/annual reports to State agencies.

C. Cost Estimate

The Respondent shall develop cost estimates of the Corrective Measures for the purpose of assuring that the Respondent has the financial resources necessary to construct and implement the Corrective measures. The cost estimate developed in the Corrective Measure Study shall be refined to reflect the more detailed/accurate design plans and specifications being developed. The cost estimate shall include both capital and operation and maintenance costs.

D. Construction Quality Assurance Objectives

The Respondent shall identify and document the objectives and framework for the development of a construction quality assurance program including, but not limited to the following: responsibility and authority; personnel qualifications; inspection activities; sampling requirements; and documentation.

E. Health and Safety Plan

The Respondent shall prepare a Health and Safety Plan or modify the Health and Safety Plan developed for the RCRA Facility Investigation to address the activities to be performed at the facility to implement the corrective measures.

F. Sampling and Analysis Plan Revision

Respondent shall update the Sampling and Analysis Plan, including the QAPP, during each phase of the project, as appropriate, to reflect changes in the following: responsibility and authority; personnel qualifications; inspection activities; sampling requirements; documentation, and other changes to the sampling and analysis program.

G. Final CMI Design

The Final CMI Design submittal shall consist of the Final Design Plans and Specifications (100% complete), the Respondent's Final Cost Estimate, the Final Draft Operationand Maintenance Plan, Final Quality Assurance Plan, Final Project Schedule, and Final Health and Safety Plan specifications. The quality of the design documents should be such that the Respondent would be able to include them in a bid package and

invite contractors to submit bids for the construction project.

TASK III: CORRECTIVE MEASURES CONSTRUCTION

Following EPA approval of the Final CMI Design Report, the Respondent shall develop and implement construction in accordance with procedures, specifications, and schedules in the EPA-approved Final CMI Design Report and the EPA approved CMI Work Plan. During the Construction Phase, Respondent will continue to submit periodic progress reports. The Respondent shall also implement the elements of the approved O&M plan.

The Respondent shall update the Sampling and Analysis Plan, including the QAPP, during the Construction Phase, as appropriate, to reflect changes in the following: responsibility and authority, personnel qualification, construction quality assurance, inspection activities, documentation, and other changes affecting quality assurance.

The Respondent shall conduct the following activities during construction:

A. Inspections

1. Respondent will conduct inspections to monitor the construction and/or installation of components of the Corrective measures. Inspections shall verify compliance with all environmental requirements and include, but not limited to, review of air quality and emissions monitoring records, waste disposal records (e.g. RCRA transportation manifests), etc, as applicable. Inspections will also ensure compliance with all health and safety procedures. Treatment and/or disposal equipment will be operationally tested by the Respondent. The Respondent will certify that the equipment has performed to meet the purposes and intent of the specifications. Retesting will be completed where deficiencies are revealed.

2. When all construction is complete, the Respondent shall notify EPA for the purposes of conducting a final inspection. The final inspection will consist of a walk through inspection of the project site. The inspection is to determine whether the project is complete and consistent with contract documents and the EPA approved corrective measures. Any outstanding construction items will be identified and noted. If necessary, Respondent shall notify EPA upon completion of any outstanding construction items and another final inspection consisting of a walk-through inspection of the project site to confirm all outstanding items have been resolved.

B. CMI Report

Upon completion of construction and an initial period, not to exceed fourteen (14) days, of performance monitoring after starting, and in accordance with the schedule included in the Management Plan, Respondent will prepare and submit a CMI Report.

TASK IV: REPORTS

The Respondent shall prepare plans, specifications, and reports as set forth in Tasks I through III

to document the design, construction, operation, maintenance, and monitoring of the corrective measure. The documentation shall include, but not be limited to the following:

A. Progress Reports and Assessment Reports

Quarterly

The Respondent shall provide the EPA with signed, semi-annual progress reports containing:

1. A description of the work perfomed during the preceding monitoring interval and estimate of the percentage of the CMI completed;

2. Summaries of all findings;

3. Summaries of all changes made in the CMI during the reporting period;

4. Summaries of all contacts with representative of the local community, public interest groups, or State government during the reporting period;

5. Summaries of system performance during the reporting period including a summary of all problems or potential roblems encountered or anticipated during the reporting period;

6. Actions being taken to rectify problems;

7. Changes in personnel during the reporting period;

8. Projected work for the next reporting period; and

9. Copies of daily reports, inspection reports, laboratory/monitoring data, etc.

Annual Progress Reports and Assessment Reports

Annual Progress Reports, the CMI Assessment Report of the initial recovery network and the Five-Year Assessment Reports shall contain:

1. A narrative summary of principal activities conducted during the reporting period,

2. Graphical or tabular presentations of monitoring data, including but not limited to average monthly system pumping rates and throughput, efficiency, groundwater levels and flow direction, and groundwater quality,

3. A schedule of sampling and field activities to be performed in the reporting period, and

4. An O&M Evaluation. The O&M Evaluation shall assess performance of the corrective measure over time and provide one basis for EPA's Five-Year evaluation of the corrective

measure. Annual O&M Evaluation shall include:

a. Summarized data representing corrective measure performance during the reporting period;

b. Any proposed changes to the corrective measure and summary of changes to have been previously made;

c. Isoconcentration maps for each contaminant of concern listed in the Order and any other hazardous constituent identified above its MCL;

d. Statistical assessment of the progress of the corrective measure towards achievement of media clean-up standards;

e. When appropriate, notification that the media cleanup standards have been achieved.

An Annual Progress Report shall not be required for any year in which the Respondent is required to submit a Corrective Measures Five-Year Assessment Report.

B. CMI Work Plan

The Respondent shall submit a CMI Work Plan as outlined in Task I. The QAPP, included with the CMI Work Plan, will be revised, as appropriate, throughout the CMI.

C. The CMI Design Report

The CMI Design Report shall include:

1. A summary of activities performed and data generated during Corrective Measure Design, including results and interpretation of treatability studies;

2. Draft detailed Corrective Measure Design Plans and Specifications reflecting the design work to be completed;

3. Final performance criteria for the corrective measures, consistent with comments to have been provided by EPA on the Conceptual Design proposed in the Management Plan;

4. Proposal of means to evaluate system performance against media cleanup standards listed in the FDRTC and any amendments thereto;

5. A Final O&M Plan;

6. A revised Cost Estimate;

7. Revision to the Sampling and Analysis Plan, including the QAPP, to address sampling

activities to be performed during the Corrective Measures Construction Phase and Evaluation Period including the sampling activities, sample size, sample locations, frequency of testing, acceptance and rejection criteria, and plans for correcting problems as addressed in the project specification;

8. Sampling and construction activities to be performed during the Corrective Measure Construction Phase;

9. Proposed changes to the Project Schedule, if appropriate, with emphasis on short-term Construction schedule. These proposed changes in schedule also will be included in the revised Management Plan.

F. CMI Report

The Respondent shall submit the CMI Report as outlined in Task III to this SOW. The CMI Report shall describe activities performed during construction, provide actual specifications of the implemented remedy, and provide a preliminary assessment of CMI performance. The CMI Report shall include, but not be limited to, the following elements:

1. Synopsis of the corrective measure and certification of the design and construction;

2. Explanation of any modifications to the EPA-approved construction and/or design plans and why these were necessary for the project;

3. Listing of the criteria, established in the EPA-approved CMI Work Plan, for judging whether the corrective measure is functioning properly, and also explaining any modification to these criteria;

4. Certification by registered professional engineer that the construction is complete, consistent with contract documents, and the EPA-approved corrective measure, and that the equipment perfoms to meet the intent of the specifications;

5. Results of Facility monitoring, assessing the likelihood that the Corrective Measure will meet or exceed the media clean-up standards set forth in the FDRTC and any amendment thereto.

This report should include all of the daily inspection summary reports, inspection summary reports, inspection data sheets, problem identification and corrective measure reports, block evaluation reports, photographic reporting data sheets, design engineers' acceptance reports, deviations from design and material specifications (with justifying documentation), and as-built drawings, unless otherwise agreed to by EPA.