

RECORD OF DECISION  
REVERE CHEMICAL SITE  
OPERABLE UNIT TWO

DECLARATION

SITE NAME AND LOCATION

Revere Chemical Site  
Operable Unit Two  
Nockamixon Township  
Bucks County, Pennsylvania

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for Operable Unit Two ("OU2") at the Revere Chemical Site ("Site") in Nockamixon Township, Bucks County, Pennsylvania, developed and chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended, ("CERCLA") 42 U.S.C. §§ 9601 to 9675 and to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300. This decision is based on the Administrative Record file for this Site.

The Commonwealth of Pennsylvania Department of Environmental Protection ("PADEP") has indicated agreement with the selected remedy, No Further Action With Stream Corridor Monitoring. However PADEP does not concur with EPA's assessment that Act 2 is not an ARAR for this Site and asserts that EPA has not complied with the statutory requirements for the selection of a remedy.

ASSESSMENT OF THE SITE

After consideration of the existing and future risks posed to human health and the environment, EPA's selected remedy for the contaminated ground water and stream sediments at this Site is No Further Action with Stream Corridor Monitoring. The shallow ground water unit beneath the Site is contaminated with organic chemicals above Maximum Contaminant Levels ("MCLs") established under the Federal Safe Drinking Water Act ("SDWA"), 42 U.S.C. §§ 300(f) to 300(j-26). For the selected remedy, MCLs have been identified as ARARs by EPA but are being waived under Section 121(d)(4)(c) of CERCLA, 42 U.S.C. § 9621 (d)(4)(c) as technically impracticable from an engineering perspective. Based on the information collected to date, EPA has determined that no additional remedial actions, other than those already selected as part of the Operable Unit One ("OU1") ROD for the Site, are required to ensure protection of human health and the environment. All the components of the OU1 remedy should be completed in the next twenty-four months. The Site will then


qualify for inclusion in the "sites awaiting deletion" subcategory of the Construction Completion category of the National Priorities List.

#### DESCRIPTION OF THE REMEDY

This Operable Unit is the second and final operable unit ROD for the Site. This ROD addresses shallow ground water contamination and mercury-contaminated sediments in the stream corridor. The selected alternative for OU2 is No Further Action with Stream Corridor Monitoring. The stream corridor monitoring will be conducted annually for seven years to ensure that the OU1 remedy is mitigating adverse impacts to the onsite tributaries. This data will be evaluated by EPA in consultation with PADEP to determine whether additional future monitoring will be required. The ground water will be monitored pursuant to the Remedial Action selected in the OU1 ROD.

#### STATUTORY DETERMINATIONS

Pursuant to duly delegated authority, I hereby determine, pursuant to Section 104 of CERCLA, 42 U.S.C. § 9604, that the selected remedy is protective of human health and the environment. Although no further remedial actions will be taken, ground water and stream corridor quality at and in the vicinity of the Site will be reviewed within five years in accordance with Section 121(c) of CERCLA, 42 U.S.C. § 9621(c) to ensure that human health and the environment continue to be adequately protected.

  
Thomas Voltaggio  
Hazardous Waste Division Director  
Region III

6/28/86  
Date

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RECORD OF DECISION  
REVERE CHEMICAL SITE OPERABLE UNIT TWO

DECISION SUMMARY

**I. SITE NAME, LOCATION, AND DESCRIPTION**

The Revere Chemical Site (the "Site") is located east of U.S. Route 611 approximately one mile south of Revere in Nockamixon Township, Bucks County, Pennsylvania. The Site was a former metal reclamation facility located on an approximate 113-acre parcel of property (Figure 1, Site Vicinity Map) which includes two unnamed tributaries of Rapp Creek. Rapp Creek is a tributary to Tinicum Creek, which flows into the Delaware River, approximately 4 miles from the Site. Rapp Creek has been nominated to the Pennsylvania Scenic Rivers System under the designation of Scenic, First Priority - Group A, Water Quality Group 1. The area surrounding the Site includes recreational streams, forests, fields, and Pennsylvania State Game Lands. Nockamixon State Park, located approximately 4,700 feet southwest of the Site contains Nockamixon Lake which has a surface area of 1,450 acres. State Game Land is located approximately 4,700 feet northeast of the Site. The Site is bounded on the south, east, and west by farm land, and Cotner Trailer, a commercial operation that manufactures horse trailers, abuts the Site to the north.

**II. SITE HISTORY AND ENFORCEMENT ACTIVITY**

Facility documents regarding the Revere Chemical Company were destroyed in a 1984 fire on the Site. Documents from EPA, the Pennsylvania Department of Environmental Protection ("PADEP") and the Bucks County Department of Health files provided most of the information regarding the historical layout of the Site and facility processes.

Beginning in approximately 1963, Echo, Inc. ("Echo") operated a reclamation facility. Echo's operations included metals reclamation from printed circuit boards, recycling of spent chromic acid, recovery of copper from plating solutions and production of copper chemicals. From 1963 to 1969 the Site was operated at various times by Echo, the DeRewal Chemical Company and the Revere Chemical Company. The companies arranged for the transport and onsite treatment of hazardous substances, including waste metal plating and etching solutions.

The area of the Site used for the processing of materials ("Process Area") covered approximately 25 acres. The Process Area, now enclosed by a fence, contained several buildings and structures that were used during the metal reclamation operations. Also included in this area were 19 storage and/or process lagoons; a waste lagoon; and a fresh water pond. The East and South Spray fields are located outside the Process Area.

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They were used for liquids disposal during the metal reclamation operations.

Detailed descriptions of past Site operations are unavailable. Similarly, no detailed records regarding the types and quantities of sludge and plating materials stored on the Site during the years of operation are available. However, samples of materials in the process basins and lagoons on Site were collected by the Commonwealth of Pennsylvania, Department of Health ("PADOH"), PADEP's predecessor, in March 1970. On the basis of this data, it was concluded that facility processes used chromic acid, copper sulfate, ammonia, ferric chloride, nickel, and sulfuric acid solutions.

In 1968, the Bucks County Department of Health determined that the facility had never submitted the required Pollution Incident Prevention Plan. Subsequent inspections revealed that waste material from the facility was escaping from the processing and holding lagoons on Site, and was entering the unnamed tributaries of Rapp Creek. The State and County Health Departments took enforcement action against the company in an attempt to bring them into compliance with existing laws. The operators abandoned the Site in December 1969.

PADOH performed a response action at the Site during 1970 and 1971. An estimated 3.5 million gallons of waste sludges and liquids were removed.

Pumpable sludges were removed and disposed of off-site. The remaining sludges were fixed with lime, sodium sulfide and sodium sulfite, mixed with native soils, and buried onsite in process lagoons, and storage lagoons. As a result of this remedial action, the Process Area has been extensively disturbed. No process or storage lagoons remain. Drums were reported to have been crushed and buried in former storage lagoon C and former process lagoon 7 during this action. (Figure 2, Site Features) Some of the lagoons were closed by the operator during the period of Site operation and the remainder have been closed during the remedial action by the PADOH. Present ground cover in the Process Area consists of rock fragments, soil, and miscellaneous debris (trash, uprooted brush, and small trees). For the most part, the ground surface is devoid of vegetation. The remaining 88-acre portion of the Site that was not used for metal reclamation is mostly vegetated.

EPA performed additional response work at the Site from March 28 through April 17, 1984. This included the removal of 30 drums containing chromic acid and etching wastes, and 30 cubic yards of chemical solids from surface soils. Liquid wastes went to Frontier Chemical in Niagara, New York, and solid wastes went to Fondessy in Oregon, Ohio.

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The Site was placed on the National Priorities List ("NPL") on July 22, 1987. The NPL is a list of hazardous waste Sites across the country in need of remedial evaluation and response. The Site scored 31.31 under EPA's Hazard Ranking System, which is above the level of 28.5 needed to be placed on the NPL.

In December 1988, EPA entered in to an Administrative Order on Consent Order with the following respondents to conduct a Remedial Investigation and Feasibility Study ("RI/FS"): AT&T Technologies, Inc.; Carpenter Technology Corporation; International Business Machines Corporation; and Yates Industries, Incorporated. The Respondents are also known as the Revere Steering Committee (hereinafter referred to as "RSC" or "Respondents"). Currently the RSC is comprised of AT&T Corporation, Inc. (currently Lucent Technologies), AT&T Global Information Solutions, Inc. (currently NCR Corporation), Carpenter Technology Corporation, General Electric Company, GTE Operations Support Incorporated (as successor to the interests of GTE Products Corporation), International Business Machines Corporation, Square D Company (on behalf of Yates Industries), and Unisys Corporation.

The first task performed under the RI was installation of an 8-foot-high security fence around the Process Area during the Phase I RI in October 1989.

Environmental conditions at the Site were initially characterized through implementation of the Phase I and Phase IA RIs. The results of these investigations are detailed in reports dated March 14, 1990, and July 23, 1990, respectively, prepared by Dames & Moore on behalf of the RSC and are included in the Administrative Record for the Site. The results of these investigations indicated that further study was necessary.

The Phase II investigation consisted of the additional collection and analysis of samples to further characterize Site soil, ground water, surface water, stream sediment, and the contents of the onsite septic tank and aboveground storage tank. The results indicate that the soil is contaminated with heavy metal and organic compounds. Some heavy metals were also detected in the sediments in the onsite tributaries to Rapp Creek. The ground water in the shallow ground water unit contains organic chemicals. The deep ground water aquifer is not contaminated. Chrysotile asbestos was detected in samples collected from the corrugated material covering the process building, the shingle pile, and the white material covering aboveground storage tank 1 (AST 1). Detailed results of the Phase II investigation are provided in the Phase II Remedial Investigation Report dated May 19, 1993.

In December 1991, EPA issued a Unilateral Administrative Order ("UAO") for removal response activities to all identified PRPs.

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The RSC responded and erected temporary soil erosion and sedimentation control structures, and conducted removal activities with regard to drums and soil staged onsite during the Phase II RI. The RSC completed the work in May 1992.

Following the completion of the Phase II RI, EPA released a Proposed Plan to address all aspects of the Site in July 1993. That Proposed Plan included shallow ground water extraction as part of the proposed remedy for the Site. Based upon comments submitted and the complexity of the issues, EPA divided the Site into two operable units to facilitate the remedial activities at the Site. An operable unit is a portion of an overall response action that, by itself, eliminates or mitigates a release, a threat of a release, or an exposure pathway; however, it may reflect the final remediation of a defined portion of a site. At this Site, Operable Unit One addresses the contaminated soil, solid wastes, and debris. Operable Unit Two addresses ground water and stream sediment.

EPA issued the Operable Unit One Record of Decision ("OU1 ROD") for the Site on December 27, 1993. The major components of the OU1 ROD remedy are: offsite disposal of solid wastes and debris; treatment of VOC contaminated soil by insitu vacuum extraction; source containment by slurry wall; source containment by capping; fencing to limit access to the Site; Site restoration by revegetation; deed restrictions and long-term ground water monitoring.

In the OU1 ROD, EPA deferred the selection of a remedy for shallow ground water and stream sediments until additional data could be gathered to evaluate the practicability of actively pumping ground water to achieve cleanup, and to assess the natural attenuation rate of aquifer contaminants after source control measures have been implemented. Additional stream corridor sediment sampling was conducted to further define mercury contamination in the stream corridor sediments and to evaluate if active remedial options for the stream sediment were necessary.

In December 1994, EPA issued a UAO that required the PRPs to implement the remedial alternative selected by EPA in the OU1 ROD. The RSC complied with the UAO. Remedial Design/Remedial Action (RD/RA) work was initiated on January 13, 1995.

### III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

A Community Relations Plan for the Revere Chemical Site was completed in June 1989. This document lists contacts and interested parties throughout government and the local community. It also establishes communication procedures to ensure timely dissemination of pertinent information. The Comprehensive

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Remedial Investigation Report For Operable Unit 2; the Feasibility Study for Groundwater (OU2) and the Proposed Plan for the Site were released to the public as part of the Administrative Record on April 29, 1996, in accordance with Sections 113(k)(2)(B), 117(a), and 121(f)(1)(G) of CERCLA, 42 U.S.C. §§ 9613(k)(2)(B), 9617(a), and 9621(f)(1)(G). These and other related documents form the Administrative Record for the Site, which is located at the U.S. EPA Region III Office, 841 Chestnut Building, Philadelphia, Pennsylvania, 19107; and at the Site Repository: Nockamixon Township Building, Center Hill and Lake Warren Roads, Ferndale, Pennsylvania 18921.

A public meeting was held on May 15, 1996 to discuss the results of the RI/FS and the preferred alternative as presented in the Proposed Plan for the Site. Notice of the Proposed Plan and public meeting was published in two local newspapers of general circulation: The Morning Call (April 29, 1996); and the Bucks County edition of The Doylestown Daily Intelligencer (April 28, 1996). Additionally, copies of the Proposed Plan were mailed to residences in the vicinity of the Site and to other interested parties on the Site mailing list.

In accordance with 40 C.F.R. § 300.430 (f)(3)(F), all significant comments on the Proposed Plan which were received by EPA prior to the end of the public comment period, including those expressed orally at the public meeting, are addressed in the Responsiveness Summary which is attached to this Record of Decision ("ROD"). A copy of the transcript of the public meeting has been placed in the Administrative Record File.

#### IV. SCOPE AND ROLE OF OPERABLE UNITS

As set forth above, EPA had divided the Revere Chemical Site into two operable units:

- OU1 • Contaminated soil areas;  
Solid waste and miscellaneous debris.
- OU2 • Ground water and  
Mercury-contaminated stream sediments.

Offsite disposal of solid wastes and debris, drum excavation of Lagoon C, and the demolition of the Process Building were completed in the Spring of 1996. The Remedial Design for the remaining portions of the OU1 remedy is still underway. EPA expects the OU1 remedy to be completed in the next twenty-four months.

This ROD addresses OU2 and is the final ROD for the Site. The remedy addresses ground water contamination and contamination of the onsite stream corridor sediments by mercury.

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## V. SUMMARY OF SITE CHARACTERISTICS AND EXTENT OF CONTAMINATION

The Site is situated in the portion of the Piedmont Physiographic province designated as the Piedmont Upland which is characterized by gently rolling hills and sloping topography. Elevations at the Revere Chemical Site range from approximately 520 feet above mean sea level at the north corner of the Site to approximately 390 feet above mean sea level along Rapp Creek and its tributaries at the southwest property boundary. Two types of wetlands, Riverine and Palustrine, are found on the Site as well as the endangered floral species *Tomanthra auriculata* (false foxglove).

The Site is primarily drained by the east and west tributaries to Rapp Creek that join in the southeast portion of the Site and discharge to Rapp Creek approximately 300 feet beyond the property boundary.

The primary source of drinking water for the businesses and homes surrounding the Site is ground water. Private wells pump ground water from the Lockatong Formation.

### Soil Characteristics

The predominant soil types at the Revere Chemical Site are the Abbottstown Series, Alluvial Land, Bowmansville Series, Lansdale Series, and Urban Land.

The Abbottstown Series consists of deep, nearly level to sloping soils on uplands. They are formed at the base of slopes, on side slopes, and on broad ridge tops in loamy material weathered from red and brown shale and sandstone.

Alluvial land appears on the floodplains of small streams. Moderate stands of moisture tolerant trees grow in some areas of Alluvial land.

Bowmansville Series consists of deep, poorly drained, nearly level soils on floodplains. The Bowmansville Series forms along small meandering streams in loamy alluvium that washed from upland soils underlain by shale and sandstone.

Lansdale Series consists of deep, well-drained, soils on uplands. These soils occur on side slopes and ridges, and form loamy material weathered chiefly from brown and yellow-brown shale and sandstone.

Most areas of Urban Land have been graded, and the original soil material and structure have been disturbed, filled over, or otherwise destroyed. Urban land appears in highly developed areas of Bucks County.

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### Surface Drainage

Site drainage is characterized by two stream channels (the "East" and "West" tributaries) that form an onsite confluence and discharge to Rapp Creek approximately 400 feet southeast of the Site (see Figure 3). Rapp Creek flows into Tinicum Creek, which in turn empties into the Delaware River. The Delaware River is approximately four miles from the Site.

Both tributary streams are bedrock-base streams that flow intermittently in response to precipitation events.

### Geology

The area surrounding the Site is underlain by various members of the Triassic-age Newark Group. The Lockatong Formation which underlies the Site is fairly homogeneous. It is composed of black to dark-gray, thickly-bedded argillites, with local occurrences of thin-bedded black shales. The Lockatong and Brunswick Formations are interbedded in the Site vicinity. The Brunswick Formation ranges in composition from a thick-bedded, resistant red to dark-gray argillite to a thin-bedded, fissile, red shale, and siltstones. Fractures within the Lockatong and Brunswick Formations are found along bedding planes and as joints cutting across beds. The degree of fracturing is dependent on the thickness and brittleness of the beds. Bedrock is at ground surface to a depth of approximately 15 feet below ground surface.

### Hydrogeology

The primary porosity and associated permeabilities of the Lockatong and Brunswick Formations are very low. However, the development of fractures in the bedrock can increase permeability through secondary porosity. Regional and site-specific information on ground water flow in the Lockatong Formation indicates restricted ground water movement through small fractures (or cracks) in bedrock. The Lockatong Formation is utilized as an aquifer for residential and commercial purposes throughout Bucks County, including the Site vicinity.

The aquifer system at the Site consists of a shallow ground water unit and a deep ground water unit which are separated by a semi-permeable black shale unit (aquitard). Geophysical logs from the RI (temperature, fluid resistivity, and brine trace logs) indicated there is little vertical ground water movement between the shallow zone and the unimpacted deeper aquifer at the Site. In addition, shallow ground water in the Process Area at the Site probably discharges (through seeps) to the onsite tributaries. Sampling results indicate the limits of contamination do not extend to the tributaries.

The shallow zone is a low-permeability, fractured-rock ground water unit with few fracture interconnections. The results of the RI hydrologic evaluations indicate that the hydraulic conductivity of the shallow zone is extremely low resulting in very low ground water flow and very slow migration of impacted ground water beneath the Process Area. The lack of fracture interconnection may partially explain why ground water movement in the shallow ground water unit is minimal and has resulted in low-yielding wells.

#### Ground Water Investigation

The hydraulic conductivity of the shallow bedrock ground water unit at the Site is primarily controlled by fractures and is relatively low. Ground water flows from the northwest corner of the Site, downslope to the unnamed tributaries. Shallow ground water from the south and east portions of the Site (spray fields) also flows toward the onsite tributaries. Shallow ground water from the northwest corner and the south and east portions of the Site converges at the tributaries and discharges to the creek. Sampling results indicate that contamination does not extend to the tributaries. Deeper ground water may flow beneath the creek.

Shallow and deep ground water flowing beneath the Site are separated by a series of black unfractured shale beds. These beds occur at around 60 feet below ground surface and cause the ground water flow to behave as two systems. Ground water in the deeper flow system is not affected by the presence of the tributaries. Flow in the deeper system is to the southeast.

Volatile organic contaminants ("VOCs") were detected in 7 of the 10 shallow ground water unit monitoring wells at the Site. See Figure 3 for the locations of the ground water monitoring wells. These wells were all completed at a depth above the unfractured black shales.

The primary VOC contaminant, trichloroethene ("TCE") was detected in the shallow zone within a limited area of the Process Area (in the vicinity where the greatest concentrations of VOCs were detected in soil). The greatest TCE concentration was detected at a concentration of 220 parts per billion ("ppb") or micrograms per liter (ug/l) in monitoring well MW-14. The Maximum Contaminant Level ("MCL") for TCE is 5 ppb. MCLs are enforceable, health-based drinking water standards established under the Safe Drinking Water Act ("SWDA"), 42 U.S.C. §§ 300(f) to 300(j-26). Table 1 is a summary of detected VOC analytical data of the onsite monitoring wells from all the sampling events conducted during the RI.

Other VOCs detected in shallow ground water include methylene chloride, carbon disulfide, trichloroethane, tetrachloroethylene,

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and toluene. Each of these contaminants was well below its respective MCL and, in all cases, was less than 1 ppb.

1,2,4-trichlorobenzene ("TCB") was detected at 90.2 ppb and 1,2-dichlorobenzene ("DCB") was detected at 2.31 ppb only in MW-4 during the OU2 sampling round. These semi-volatile contaminants were also detected at similar concentrations in the Phase II RI sampling rounds in only this well, MW-4, at concentrations ranging from 41 ug/l to 150 ug/l for TCB and at concentrations ranging from 3 ug/l to 5 ug/l for DCB. The MCL for TCB is 70 ug/l. The MCL for DCB is 600 ug/l.

TCE and TCB concentrations in ground water at the Site appear to be limited to the northwest portion of the Process Area. Neither TCE nor TCB were detected in any of the four quarterly ground water samples collected during the Phase II RI from monitoring wells MW-11, MW-5 & MW-10. These wells were all completed at a depth below the black shales in the deep aquifer.

Bis(2-ethylhexyl)phthalate ("BEHP") was detected in the following wells: MW-2, MW-5, MW-8, MW-10, MW-11, and MW-12 at concentrations ranging from 3 ppb to 42 ppb. The MCL for BEHP is 6 ppb.

Infrequent detection of the organic compounds acetone, methylene chloride, and carbon disulfide in the monitoring wells sampled does not indicate that the Site is a source of these compounds. The detected organic compounds acetone and methylene chloride are common laboratory contaminants and were detected in blank samples (i.e., control samples used to determine if contaminants are originating from sampling and analysis procedures).

No pesticides, PCBs, or acid extractable organic compounds ("AEOs") were detected in any of the onsite ground water samples.

With the exception of sporadic detections of lead above EPA Drinking Water Action Level (15 ppb) and one single detection of arsenic in the filtered sample from MW-9, inorganics have not been detected in ground water above MCLs during any phase of the RI.

The site-specific ground water quality data that has been collected over the course of the entire RI from 1990-1995 indicates that the contaminated ground water has not migrated substantially since disposal activities at the Site ceased in 1969. In addition, the low hydraulic conductivity of the shallow ground water unit indicates that it is not likely that it will migrate in the future. Ground water in the shallow zone discharges to the onsite tributaries. Sampling results indicate the limits of contamination do not extend to the tributaries.

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### Off-Site Well Sampling Results

TCE and 1,1,1-trichloroethane ("1,1,1-TCA") were detected in one offsite residential well south of the Site during round one ground water sampling at estimated concentrations of 2 ug/l and 3 ug/l, respectively. These concentrations are below MCLs for TCE (5 ug/l) and 1,1,1-TCA (200 ug/l). TCE was also detected in round four ground water samples collected from an offsite residential well north of the Site at 0.397 ug/l and at an offsite residential well west of the Site on the south side of Route 611 at a concentration of 0.422 ug/l. Each of these concentrations is less than the MCL for TCE.

With the exception of lead that was detected in the filtered ground water sample collected from an offsite residential well north of the Site during round one sampling, none of the metals or hexavalent chromium concentrations detected exceed MCLs in either the round one or round four filtered ground water samples collected from the residential wells.

No VOCs, semi-volatiles, or PCBs were detected in the Cotner ground water sample collected during round one. Lead was detected at a concentration that exceeded the MCL in the unfiltered ground water sample collected from the Cotner well during round one. No metals were detected above MCLs in the filtered samples.

Ground water elevation data obtained for residential wells in the Site vicinity and the results of a ground water elevation study conducted in the Site vicinity by the United States Geological Survey ("USGS") indicate that the Site is hydraulically downgradient of the residential wells that were subject to ground water sampling and analyses during the Phase II RI. Therefore, it is concluded that constituent concentrations detected in off-site well water samples are not attributed to the Site.

### Surface Water and Sediment Sampling Results

No VOCs, semi-Volatiles, pesticides, or PCBs were detected in any of the surface water or stream sediments samples during the RI.

During Phase I and Phase II several Site-related metals detected in surface water and sediment exceeded levels detected in background samples. Copper, chromium and mercury were detected in tributary sediment. Copper and manganese were detected in surface water samples at concentrations that exceed their corresponding background level. Mercury was not detected in background sediment samples.

Table 2 is a comparison of inorganic analytical results of surface water samples to background surface samples. Table 3 is a comparison of inorganic analytical results of sediment samples

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to background sediment samples. Figure 3 shows the location of the surface water and sediment samples for the Phase I and Phase II sampling events. Table 4 is a comparison of the analytical results for surface water samples to Pennsylvania Water Quality Criteria where the criteria were exceeded.

#### OU2 Additional Stream Sediment Sampling For Mercury

The objective of the additional OU2 stream corridor sampling was to further evaluate potential Site-related impacts regarding mercury concentrations in sediment within the onsite tributaries. The OU2 sampling consisted of collection and analysis of sediment samples from upstream (background) locations, onsite locations, and offsite locations between the southern property boundary and the confluence of the tributaries with Rapp Creek. The point of convergence of the tributaries with Rapp Creek occurs at an offsite location beyond the southern property boundary.

Observations made during the selection of sediment sampling locations suggested that the majority of sediment that enters the stream is not deposited on the bedrock base of the tributaries; rather, the fine-grained deposits are present along the stream banks and at inter-stream bars where flow velocities decrease. Sediment samples were collected from (14) fourteen locations within the onsite tributaries and along the banks of the tributaries where fine-grained sediment accumulations are present. Mercury was detected in sediment collected from three locations: Sediment locations TES003, TES004 and TES005. (See Figure 3 for locations and analytical results.) Replicate samples were collected at location TES005. Samples from these locations contained mercury above the detectable concentrations of 0.1 mg/kg or parts per million ("ppm"). No other samples contained mercury concentrations above the detectable concentrations. The greatest mercury concentration (0.64 mg/kg or ppm) was detected at the sample location TES003 immediately adjacent to a large eroded embankment where surface water runoff has historically discharged from the Site to the east tributary.

Based on the sediment transport and deposition characteristics of Rapp Creek and the relatively low levels of mercury detected during additional sampling events, EPA determined that further delineation of mercury contamination in Rapp Creek and its tributaries (adjacent and downstream of the Site) was not necessary.

#### **VI. SUMMARY OF SITE RISKS**

An assessment of the potential risks posed to human health and the environment was completed in accordance with the NCP [40 C.F.R. 300.430(d)]. The results of the baseline risk assessment are used to determine whether remediation is necessary, to help

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provide justification for performing the remedial action and to assist in determining what exposure pathways need to be remediated. The remedy outlined in the OU1 ROD addresses the current threats posed by the Site related to the areas of the Site soils contaminated with heavy metals and organics; asbestos siding on the Process Building; and asbestos insulation on storage tanks and miscellaneous debris.

In order for contaminants found at a site to pose a risk to human health, an exposure pathway must be identified. An exposure pathway is the course that a hazardous agent takes from a source of contamination to an individual through transport mechanisms such as breathing, eating, or direct contact.

### Ground Water

During the baseline risk assessment performed during OU1, it was assumed that individuals could be exposed to contaminants in the shallow ground water unit in the future if a residential drinking water well was constructed on the Site. However, the OU2 investigation demonstrated that this scenario would be unlikely to occur and, as a result ground water in the shallow unit does not pose a risk to human health.

The results of RI hydrologic evaluations indicate that the hydraulic conductivity of the shallow zone is extremely low. This results in very low horizontal and vertical ground water flow and, low yielding wells. The time period from well installation to the time static water levels were reached in wells MW-13, MW-14 and MW-16 (MW-15 is dry) was approximately two months. This period of water level equilibrium is extremely lengthy and indicates the rate of ground water movement in the shallow unit is very low. The capacity of the shallow ground water unit to recharge the wells and produce the amount of water needed for a ground water extraction and treatment system is insufficient. Therefore, installation of a ground water extraction system is impractical at this Site given the characteristics of the shallow ground water unit.

Additionally, based on the low yield and slow recharge of wells located in the shallow zone, the shallow ground water unit does not yield enough water to sustain residential well use. As discussed further below, EPA believes that exposure to contaminated shallow ground water is unlikely to occur because the low yielding aquifer is not useable for a potable water source, the contamination is not migrating outside the Process Area, and OU1 deed/use restrictions will preclude Site development in the area of ground water contamination.

Ground water in the shallow unit eventually discharges to the onsite tributaries of Rapp Creek. Sampling results indicate the limits of contamination do not extend to the tributaries.

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Organic contamination has not been detected in the stream corridor.

#### Stream Sediments

The stream sediment sampling results were compared to sediment quality guidelines developed by the National Oceanic and Atmospheric Administration ("NOAA"). These guidelines, the Effects Range-Low (ERL) value and the Effects Range-Median ("ERM") value concentration for mercury, are 0.15 ppm and 0.71 ppm.

The two guideline values, ERL and ERM, delineate three concentration ranges for a particular chemical. The concentrations below the ERL value represent a minimal-effects range, a range intended to estimate conditions in which effects would be rarely observed. Concentrations equal to and above the ERL, but below the ERM, represent a possible-effects range within which effects would occasionally occur. The concentrations equivalent to and above the ERM value represent a probable-effects range within which effects would frequently occur.

The detected concentrations for mercury adjacent to the Site were greater than the ERL but below the ERM suggesting that any potential for impacts to biological receptors would be limited to those areas onsite. Samples collected downstream of the Site's southeast property boundary indicate that mercury, if present, is at concentrations near or below the NOAA ERL, and therefore, does not represent a significant toxicological threat to potential downstream ecological receptors.

The OU2 mercury sampling data is consistent with Phase I and Phase II RI sediment data in that mercury concentrations in tributary sediment were greatest where surface water runoff from the Site had discharged to the tributaries and diminished to non-detect levels at offsite, downstream sampling locations.

Due to the reduction in aquatic community diversity and population observed in the onsite east and west tributaries of Rapp Creek, it has been concluded that the benthic macroinvertebrate community in the onsite tributaries has been adversely impacted. There is a rebound in the benthic community as distance from the Process Area increases and the concentration of Site-related contaminants diminish to natural background levels.

Interim remedial measures which help to minimize surface water runoff and erosion of Process Area soil have been in place since May 1992. The OU1 remedy includes the installation of a clay cap over the Process Area, as well as revegetation of areas of the Site that have eroded, are barren, or are poorly vegetated due to historic Site activities. The OU1 remedy will further minimize

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or eliminate the discharge of metals-contaminated sediment to the onsite tributaries. Thus EPA expects the benthic macroinvertebrate community adjacent to the former Process Area to rebound after cap construction and Site restoration.

#### VII. DESCRIPTION OF THE SELECTED ALTERNATIVE OF NO FURTHER ACTION WITH STREAM CORRIDOR MONITORING

In accordance with Section 300.430 of the NCP, 40 CFR 300.430, a list of remedial response actions and representative technologies was identified and screened to determine whether they would meet the remedial action objectives at the Site.

Section 121(d) of CERCLA requires that remedial actions at CERCLA Sites attain legally applicable or relevant and appropriate federal and State standards, requirements, criteria and limitations which are collectively referred to as "ARARs", unless such ARARs are waived under CERCLA Section 121(d)(4). Applicable requirements are those substantive environmental protection requirements, criteria, or limitations promulgated under federal or State law that specifically address hazardous substances found at the Site, the remedial action to be implemented at the Site, the location of the Site, or other circumstances present at the Site. Relevant and appropriate requirements are those substantive environmental protection requirements, criteria or limitations promulgated under federal or State law which are not applicable to the hazardous materials found at the Site, however, the Site problems are sufficiently similar such that their use is well-suited to the Site. ARARs may relate to the substances addressed by the remedial action (chemical-specific), to the location of the Site (location-specific), or to the manner in which the remedial action is implemented (action-specific).

The Feasibility Study Report discusses alternatives that were considered to address the contaminants identified in the shallow ground water unit and provides the supporting information leading to the remedy selection by EPA. The three alternatives considered were no further action, institutional controls, and ground water extraction and treatment.

A common component of remedies proposed for many sites with ground water contamination above MCLs is ground water extraction and treatment. Ground water extraction and treatment was screened out of consideration for a full evaluation in the FS for the reason of technical impracticability as discussed, in Section VIII, below.

The alternative EPA has selected for OU2 is No-Further Action with Stream Corridor Monitoring. Under this alternative, EPA requires no further action to prevent exposure to the contaminated onsite ground water other than the actions which are part of the OU1 source control remedy which includes, among other things,

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institutional controls regarding ground water use and ground water monitoring. EPA believes the selected alternative will be protective of human health and the environment since, as discussed in Section VIII, below, the remedy for OU1 will eliminate any potential future exposure pathways associated with domestic use of the ground water. Stream corridor monitoring shall be conducted annually to ensure that the OU1 remedy is mitigating adverse impacts to the onsite tributaries due to the migration of contaminated soils. Costs for monitoring the stream corridor are estimated at \$45,000. This cost estimate assumes 7 years of stream corridor monitoring.

#### **Five-Year Review**

EPA will review the Site every five years in accordance with CERCLA § 121(c) to assure continued protection of human health and the environment. EPA has the authority to revisit the No Action decision with respect to the ground water and stream corridor sediments even if the Site is removed from the NPL. This action could occur if deep ground water or stream corridor contamination associated with the Site is found to pose an unacceptable risk to human health or the environment.

#### **Monitoring Requirements**

Stream corridor monitoring which includes surface water, sediment, and stormwater basin sampling shall be conducted annually to ensure that the OU1 remedy is mitigating adverse impacts to the onsite tributaries due to the migration of contaminated soils. Monitoring shall be conducted prior to construction of the cap, during the construction and five years after the construction. This data will be evaluated by EPA, in consultation with PADEP to determine the monitoring needs for the future if needed. The exact location of the sampling stations, and the analytical parameters and methods to be used shall be subject to written approval by EPA during the Monitoring Work Plan development.

#### **State Acceptance**

The Pennsylvania Department of Environmental Protection ("PADEP") has agreed with the selection of No Further Action with Stream Corridor Monitoring for Operable Unit Two of this Site. PADEP has identified the Land Recycling and Environmental Remediation Standards Act, the Act of May 19, 1995, P.L. 4, No. 1995-2, 35 P.S. §§ 6026.101 et seq. ("Act 2") as an ARAR for National Priority List Sites. However, EPA has determined that Act 2 is not an ARAR for this Site, therefore PADEP has indicated non-concurrence with the ROD.

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### VIII. BASIS FOR THE ARAR WAIVER

A determination that "No Further Action" is required takes into account both current and reasonable maximum exposure scenarios using appropriate health and environmental criteria and standards that relate directly to the media and hazardous substances being addressed. A "No Further Action" decision with regard to a particular media or operable unit is made with the understanding that no unacceptable exposures to site-related contaminants will occur.

At the Revere Chemical Site the attainment of Maximum Contaminant Levels (MCLs) enacted under the Safe Drinking Water Act 42 U.S.C. §§ 300(f) to 300(j-26) are considered to be Relevant and Appropriate standards, however, for the selected remedy they are waived under Section 121(d)(4)(c) of CERCLA as technically impracticable from an engineering perspective for the reasons discussed below.

As discussed in the Summary of Site Risks, Section VI, the capacity of the shallow ground water unit to recharge the wells and produce the amount of water needed for a ground water extraction and treatment system is not sufficient. Therefore, attainment of the MCL standard for ground water through installation of a ground water extraction system is technically impracticable at this Site given the characteristics of the shallow ground water unit.

In addition, the construction of the low permeability cap will significantly limit or eliminate the infiltration of rainwater through contaminated soil and the subsequent release of additional contamination to the ground water in the shallow zone. Because contaminated soils at the Site present the source of ground water impacts, the physical isolation and/or remediation of contaminated soil will reduce or prevent potential future degradation of ground water quality at the Site. Further, ground water sampling results indicate the limit of the shallow ground water contamination does not extend beyond the area to be capped under the OUI remedy. Therefore, the remedial action required for OUI will have a direct influence on improving the quality of the shallow ground water unit at the Site.

In addition, the OUI ROD called for institutional controls in the form of deed restrictions and ground water use limitations. This will prevent any future potential human exposure to ground water at the Site. Since residential wells in the vicinity of the Site draw water from the deeper aquifer and are hydraulically upgradient of the Process Area, they are not likely to be impacted by the contaminated ground water in the shallow ground water unit beneath the Process Area. Finally, the OUI ROD requires long-term shallow and deep ground water monitoring to evaluate the effectiveness of the OUI remedial actions in terms of constituent concentration reductions and the potential migration of the impacted shallow

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ground water. Should ground water monitoring reveal that the remedy under OU2 is no longer protective, EPA may take additional action under the 5-year review provisions of CERCLA § 121(c).

#### **IX. EXPLANATION OF SIGNIFICANT CHANGES**

The Proposed Plan for OU2 of the Revere Chemical Site was released for public comment on April 29, 1996. The Proposed Plan identified "No Action" as EPA's preferred alternative for shallow ground water remediation and stream corridor sediments. EPA reviewed all written and verbal comments submitted during the public comment period. Upon review of these comments, EPA determined that no significant changes to the remedy, as originally identified in the Proposed Plan, were necessary.

#### **X. RESPONSIVENESS SUMMARY**

This Responsiveness Summary documents public comments received by EPA during the public comment period on the Proposed Plan for OU2 of the Revere Chemical Site and provides EPA's responses to those comments. The Responsiveness Summary is organized as follows:

- Overview
- Summary of Citizens' Comments Received During the Public Meeting and EPA's Responses
- Summary of Written Comments Received and EPA's Responses

#### **A. OVERVIEW**

The public comment period on the Proposed Plan for OU2 of the Site began on April 29, 1996 and ended on May 28, 1996. EPA held a public meeting at the Palisades Middle School in Kintnersville, Pennsylvania on May 15, 1996.

At the meeting, EPA representatives summarized the results of the additional OU2 ground water investigation and the stream corridor sampling. EPA explained that the Proposed Plan called for no action to be taken in response to the contaminants in the shallow ground water unit beneath the Process Area of the Site. EPA also explained that the OU1 Remedy for the Site which includes source control measures is expected to prevent migration of contaminated soil to the onsite tributaries. As a result of the source control measures EPA expects a decline in mercury concentrations in the stream corridor. The OU2 Remedy will require stream corridor monitoring to measure the effectiveness of the source control measures.

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Comments received from the public suggest that area residents do not object to the No Further Action Alternative. The residents' chief concern was that deed restrictions proposed for the Site under the OU1 Remedy may not be sufficiently protective unless the entire parcel of property is addressed by the deed restrictions. The residents believe the property owners will develop or use the property in a manner which will result in harm to human health and the environment. Specifically residents expressed the following concerns: 1) the property owners will quarry the areas of the property outside the areas which encompass the OU1 Site remedy; 2) blasting will cause fractures in the shale thereby releasing contamination to the uncontaminated deep aquifer; and 3) any use of the property will result in migration of contaminated soil to the onsite tributaries. These comments and EPA's responses are addressed in more detail in the following section.

#### **B. SUMMARY OF CITIZENS' COMMENTS RECEIVED**

Comments made during the public meeting and EPA's responses are summarized below:

##### Public comment #1

What remediation measures including revegetation will be used to stop the erosion of sediments into the stream? If the revegetation dies, will the process be redone?

##### EPA Response:

As part of the remedy for OU1, a cap will be installed over the Process Area to contain those soils that exceed performance standards specified in the OU1 ROD. In the areas requiring the cap, the design will include a layer of soil sufficient to sustain vegetation. The OU1 Rod states that careful attention shall be paid to the selection of plant species (with emphasis on use of native grasses or vegetation indigenous to the area) and planting patterns. Eroded areas that are outside the capped area will also be stabilized with a soil cover and revegetated. Secondly, if the vegetation dies the Potentially Responsible Parties (PRPs) would be required to revegetate. The PRPs are required to maintain the integrity of the final cover. This will be outlined in a post-construction maintenance plan.

##### Public comment #2

You stated that the shallow ground water is contaminated but the deep ground water is not and that there is very little movement from one to the other. Where does the water come from in the deep aquifer if it is not coming from above?

##### EPA Response:

The aquifer system needs to be examined as an area-wide aquifer system. The ground water units beneath the Site are just a small portion of an area-wide system. There maybe upgradient recharge

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areas where water is moving underground to the lower aquifer. Although EPA has stated there is an aquitard separating the shallow from the deep ground water, it does not necessarily mean there is zero percolation. However, there is not a significant amount of water recharging the lower aquifer at this Site. This is evident in that no contamination has been detected in the lower aquifer.

Public comment #3

Is EPA saying that the water in the lower aquifer where residential wells draw water is being recharged from off-site?

EPA Response:

Yes, that is what EPA is saying.

Public Comment #4

A citizen commented that they thought the Boarhead Farms Site and the Revere Site might be part of the same aquifer?

EPA Response:

The Boarhead Farms Site is upgradient of this Site and is not impacted by ground water flow from the Revere Site. There is also no indication that the Boarhead Farms Site has impacted ground water at this Site.

Public Comment #5

Is there any information about other sites that have had similar conditions and similar remediations, i.e., the cap that EPA is proposing here? Could we take a look at this information and see how well the actual remediation worked in those cases?

EPA Response:

EPA does have several databases where you can search citations and abstracts of ROD of sites with similar remedies. This can be accessed through the Internet at <http://www.epa.gov/>. We also have cap design guidance. There is currently no database on post-ROD information. Capping is a technology that has been widely used to isolate both municipal and hazardous waste from the surrounding environment. For additional information contact the EPA Region III Hazardous Waste Technical Information Center at (215) 566-5364.

Public comment #6

A citizen commented that EPA should consider pressure-grouting the bedrock surrounding the Site to make a concrete barrier to stop contaminants migrating laterally offsite.

EPA Response:

The contaminated ground water at this Site is not migrating off-site. The contaminated ground water has not migrated beyond the limits of the former Process Area. This area will be capped which will prevent percolation and further minimize the potential migration of the contaminants. In addition, the natural conditions (i.e., the tributaries) serve as hydraulic divides for the flow of

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ground water in the shallow unit. No ground water contaminants have been detected in the surface water. A monitoring well network will also be developed to detect contamination long before it could impact residential wells which is our greatest concern.

Public comment #7

When you refer to the Site you're talking about 113 acres. When you spoke about deed restrictions on the property you said they would relate only to areas of the cap or contaminated area. What happens to the other remaining acres? I understand the owner's rights are suspended? What are the property owners rights once it is turned back to the owner?

EPA Response:

The Revere Site is located on a 113-acre parcel of property. The extent of the Superfund Site is defined by the areas of contamination. The owner's rights are not "suspended" for those areas of the property not impacted by the Superfund Site. The owners have the property rights allowable by the local and state laws and can pursue development and use of its property pursuant to the local and state laws so long as those pursuits do not endanger the integrity of the remedy for the Site. Future uses of the property must be evaluated in light of the remedial activities at the Site.

Public comment #8

Is EPA saying that the owner could develop the remaining portions of the property as a quarry? Wouldn't blasting at a quarry effect the permeability of the rock at this Site if the remaining portions of the property were developed as a quarry?

EPA Response:

EPA does not regulate land use development. Land use is regulated by the local government under the act of July 31, 1969 (P.L.805, No.247), known as the Pennsylvania Municipalities Planning Code, not by EPA. The owners would have to obtain permits at the local level for any proposed quarrying operations. EPA will cooperate with local officials in reviewing any permits received. The local and state officials responsible for reviewing permits are aware of the Superfund activities at this property. The local officials will need to coordinate potential permitting with EPA to ensure that any use or development of the property would not adversely impact the selected remedies for this Site. The deed restrictions which will be developed during the remedial design/remedial action and which are required by the OU1 remedy for the Site will prohibit activities that will undermine the integrity of the remedy.

If plans for a quarry are filed, the impacts of blasting and its impacts on the rock permeability will be evaluated by the local and state officials who are aware of the remediation activities at the Site, in cooperation with EPA.

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Public comment #9

What action, if any, is being taken against the parties who are responsible for contaminating the Site?

EPA Response:

EPA has placed a federal lien on the property until past funds that were spent on Site cleanup are recovered. Another option would be issuance of an administrative order which requires the PRPs to conduct the remedy at the Site. EPA has issued a unilateral order to the PRPs. Only a group of the PRPs identified, known as the Revere Steering Committee, has complied. Another option is to pursue a cost recovery action. This option is used when EPA is aware of individuals or companies that are potentially responsible but are not paying for the cleanup. EPA has not exercised this option yet.

Public comment #10

Is the person who was behind this a free man?

EPA Response

No criminal charges were brought against any person with regard to this Site.

**C. SUMMARY OF WRITTEN COMMENTS RECEIVED AND EPA'S RESPONSES**Comment #1

Two commenters wrote that it is irresponsible to return the Site to the owners given the "alleged" record of the Site owner's past use of the Site and probable future use of the Site as a quarry.

EPA Response:

EPA has not taken the property from its owners, Harbucks Inc. EPA has required that deed restrictions be imposed on the areas of the Site where residual contamination will remain. Under CERCLA § 106(a) EPA has authority to issue orders or take other appropriate actions "as may be necessary to protect public health and the environment." Therefore, EPA can only impose deed restrictions that are reasonable in light of the level of contamination remaining on the Site (i.e., the contaminated portions of the property) and which are related to the contamination. Future use of the portions of property which are not contaminated and, therefore, not Superfund-related, falls under the local land use regulations imposed by the local government. However, since it is not clear at this time what activities the landowner intends to take and the consequences of these activities, it is unclear which portions of the property are not Superfund-related.

Comment #2

Commenters expressed concern that any blasting for quarry on the property could provide a migration pathway for the contamination in the shallow ground water unit, thereby contaminating the deeper

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aquifer from which the residential wells draw water.

EPA Response:

EPA believes this is a valid concern. EPA is not aware of any plans currently filed with the local or state governments to develop the property as a quarry. If plans for a quarry are filed, the impacts of blasting and the potential for ground water contamination to be released will be evaluated through the permitting process. The local and state governments would need to coordinate with EPA to ensure that any development of the property would not adversely impact the selected remedies for this Site. EPA has notified the Pennsylvania Bureau of Mining and Reclamation, Division of Permits, regarding the Superfund Site located on this parcel of property. EPA has requested that the Bureau contact EPA Chief of the Superfund Program if they receive a permit application regarding this property.

Comment #3

A commenter states that the Site owners will probably quarry the uncontaminated portions of the property. The commenter states that activities related to quarrying (e.g., blasting, truck traffic, etc.) could easily intrude on the contaminated areas and is concerned that will result in a release.

EPA Response:

EPA agrees this a valid concern. However, governmental institutional controls, by definition, involve restrictions that are generally within the traditional police power of state and local governments to impose and enforce. The implementation of the deed restrictions required by the OU1 remedy will require discussion with local and state government officials. As a result of the deed restrictions placed on the property, additional discussion with EPA will be required before local and state governments may approve a quarry operation on the remaining portions of the property. The role of the EPA may be limited to specifying the standards for the controls, however, in order to maintain the integrity of the remedy, EPA must be privy to any negotiations regarding land use of the property.

Comment #4

All of the written comment letters received referred to the use of deed restrictions. All of the commenters felt that in order to be effective EPA should deed restrict the entire parcel of property from future development rather than limiting the deed restrictions to areas which encompass the remedy for the Site.

EPA Response:

The Site is located on a 113-acre parcel of property of which a portion is contaminated. EPA does not have the authority to restrict all uses of this 113-acre property. Deed restrictions are used to protect the public from exposure to contamination. Although EPA cannot deed restrict the property to disallow

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quarrying on the entire 113-acre parcel, EPA can impose deed restrictions on the Site to prevent activities that will undermine the integrity of the remedy.

By letter dated May 22, 1996 the Tinicum Creek Watershed Association submitted the following comments on the Proposed Plan:

Comment #5

The commenter notes that on page 10 of the Proposed Plan, EPA stated that the ground water in the shallow ground water unit eventually discharges to Rapp Creek. The commenter is concerned about this contaminated ground water reaching Rapp Creek, the headwaters of the Tinicum Creek watershed, providing an exposure pathway for the contaminated ground water.

EPA Response:

Although the ground water in the shallow unit is contaminated with organic chemicals, predominately TCE and TCB, sampling data indicates that the boundary of the contaminated ground water plume is within the Process Area and does not extend to the tributaries. No organic contaminants have been detected in the stream corridor. This is stated on pages 8 and page 10 of the PRAP. Therefore, the stream is not providing an exposure pathway for the contaminated ground water.

Comment #2

The commenter recommends that attempts to remove the contaminated sediments from the stream corridor be included in the remedy and more importantly that deed restrictions placed on the property require that all vegetation be supplemented within 500 hundred feet of each tributary and that these buffer areas be restricted from development. The commenter recommends that the deed restrictions placed on the 500 feet buffer prohibit all disturbance, including, but not limited to, the installation of sewage systems, stormwater pipes or management components, roads, and structures. The commenter recommends that a well-defined maintenance plan be recorded with the deed restrictions which clearly limit activities effecting the vegetation.

EPA Response:

The natural stream bed of the onsite tributaries are composed of bedrock outcroppings and discrete areas of sediment deposition are rare. The stream flow is intermittent. Based on the sediment transport and depositional characteristics of Rapp Creek, EPA has determined that attempts to remove contaminated sediments are impractical.

Deed restrictions are institutional controls used to protect the public and environment from exposure to contaminants. If it will be necessary to restore and revegetate any of the banks on the tributaries as part of the OU1 remedy, these areas will be subject to deed restrictions since they are within the area of Site-related

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contamination. Maintenance plans and monitoring plans are future work requirements, therefore, they do not qualify as deed restrictions.

Comment #3

The commenter stated that: 1) it is unacceptable that stream corridor monitoring be discontinued; 2) it appears that the US EPA is stating that the monitoring program provided under the ROD for OU1 would provide sufficient protection to the stream; and, 3) any monitoring program would be continued for a period of fifteen (15) years or more to account for any release of contaminants as a result of the future development or use of the property.

EPA response:

EPA has not stated that monitoring in itself is providing protection of the stream. The OU1 remedy includes source control measures. The inorganic contaminants (heavy metals) detected in the stream corridor are due to contamination reaching the stream via surface water runoff. Once this pathway is eliminated, there should be no future impacts to the stream and the levels of inorganic contaminants should decline through natural processes. EPA has proposed that monitoring be conducted for at least seven years to ensure that this occurs.

The cost for this monitoring program was based on seven years of monitoring and includes: one sampling event prior to construction of the cap and Site revegetation; one event to occur during the construction process; and, five sampling events on an annual basis following the completion of the cap and Site restoration and revegetation. This data will be used in the five-year review that is required to be conducted since hazardous waste are being left on Site. The continuing need for stream corridor monitoring will be re-evaluated during the five-year Site reviews conducted pursuant to Section 121(c) of CERCLA.

Comment #4

The commenter writes that a deed restriction should be established that requires any and all future use and development activities by the owner to include installation and maintenance of a permanent stream monitoring program and any other enforcement requirements.

EPA response:

EPA has no authority under the Superfund Law to require the property owner to establish a monitoring program when the owner chooses to develop uncontaminated portions of this parcel of property that are not impacted by the hazards, or the threat thereof, that gave rise to the selected OU1 remedy. These types of concerns should be addressed at the local and state level when the owner is seeking permits for development of the property.

Concerns raised by the public with regard to future development of the uncontaminated areas of this property and, therefore, the

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potential for this future activity to cause negative impacts to the stream that are unrelated to the contaminants from this Site cannot legally be addressed by the Superfund process, but should be addressed by the local and state permitting processes.

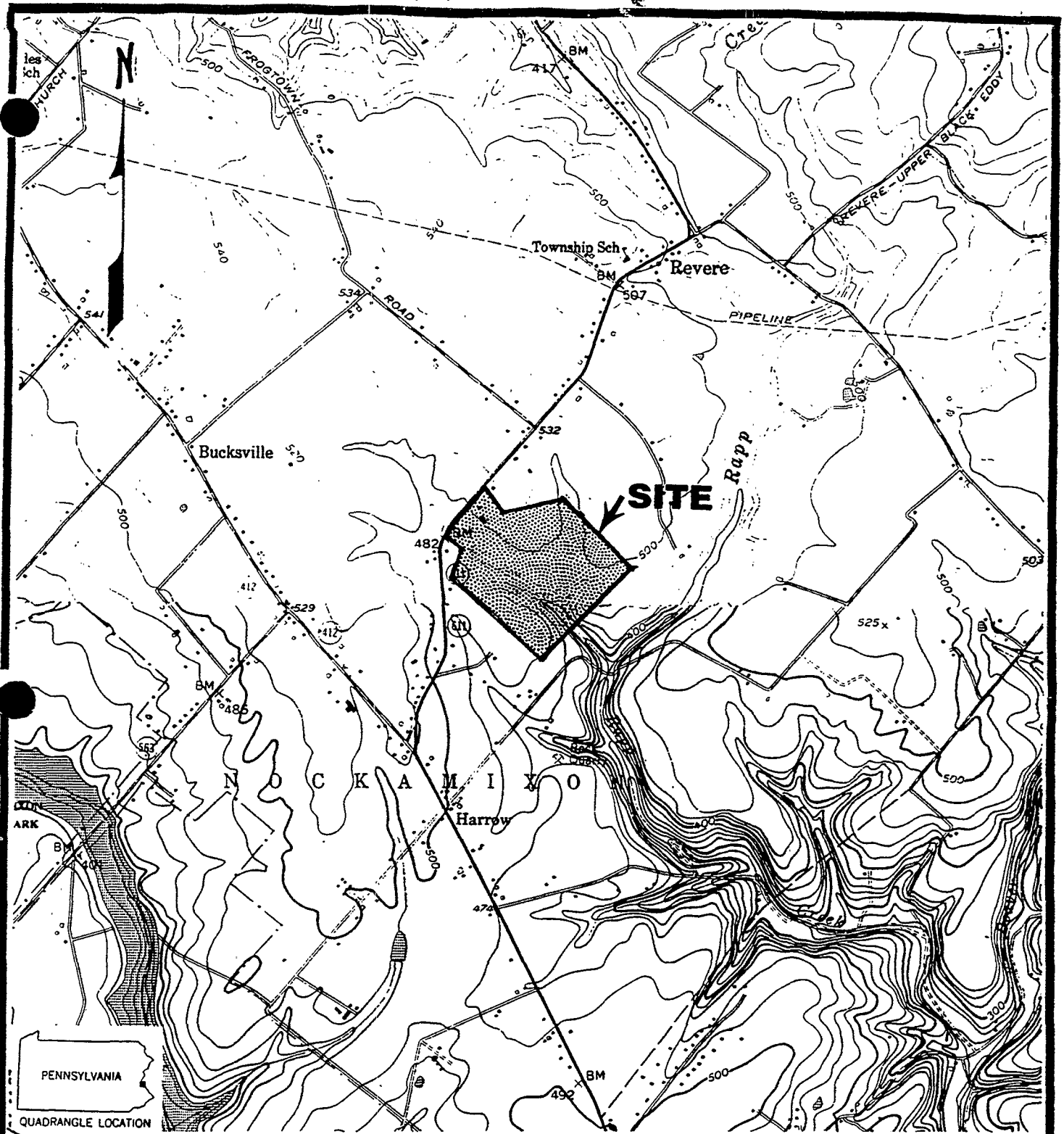
Comment# 5

The commenter states that the Tincum Watershed Association believes institutional controls, are the most cost effective method available to ensure a limit of impact to the Tincum Creek watershed system. They requested an outline of the proposed restrictions be provided for public comment prior to the ROD being issued.


EPA Response:

The Deed restrictions are a component of the OU1 ROD which was issued on December 27, 1993. The purpose of the deed restrictions is to ensure the integrity and protectiveness of the Site remedies. These deed restrictions will prohibit any activity that would interfere with the integrity or compromise the effectiveness of the selected remedies. The exact language of the deed restrictions is not formally open for public comment by EPA. However, since discussion with local officials will be necessary in order to implement and enforce the deed restrictions, concerns of the Tincum Watershed Association may be addressed through the local land use zoning officials.

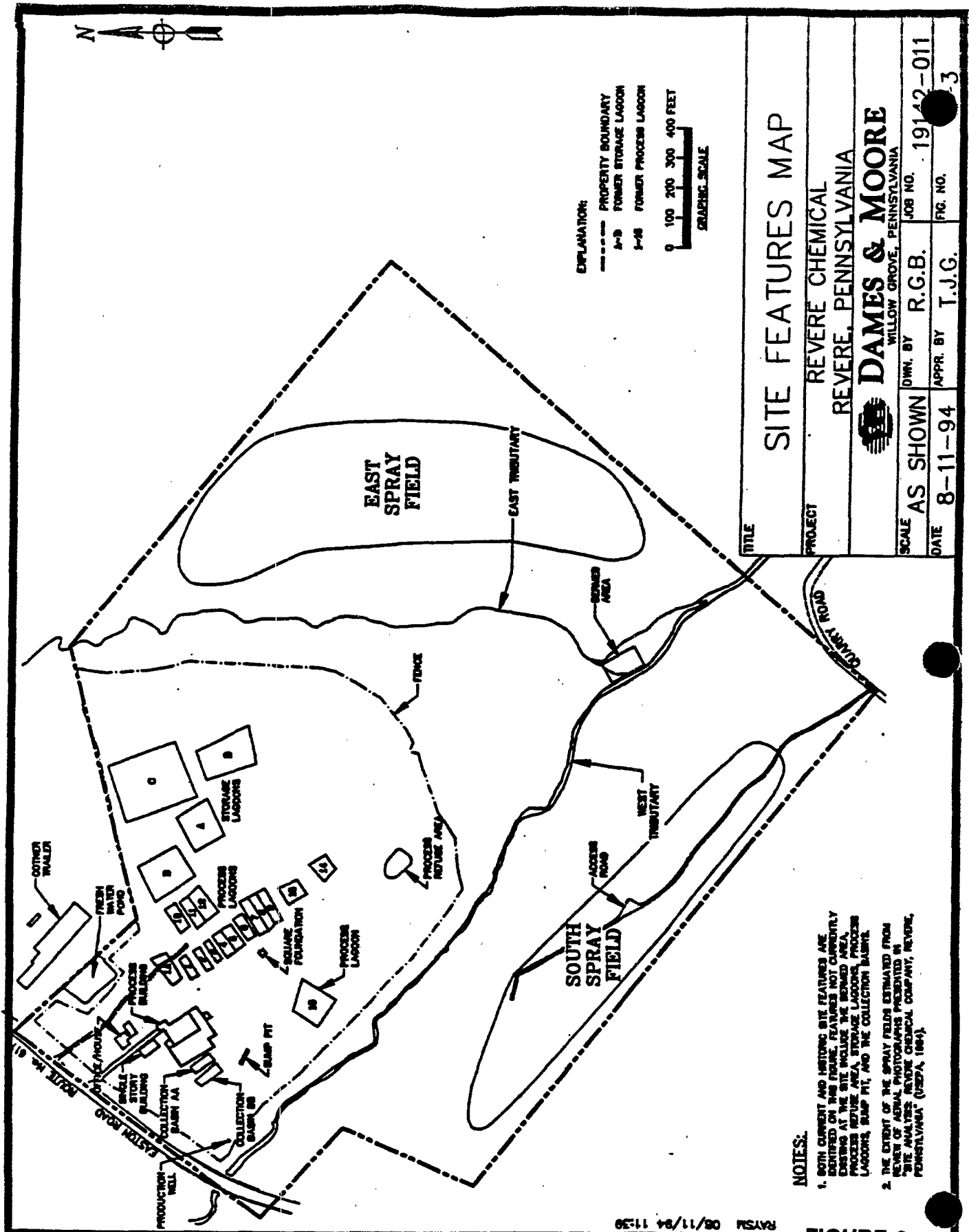
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0 1000 2000 3000 FEET  
 GRAPHIC SCALE  
 CONTOUR INTERVAL = 10 FEET  
 REFERENCE:  
 A PORTION OF USGS 7.5 MINUTE TOPOGRAPHIC  
 MAPS; RIEGELSVILLE AND BEDMINSTER QUADRANGLES,  
 PENNSYLVANIA; 1956, PHOTOREVISED 1968 AND  
 1973; 1957, PHOTOREVISED 1983; RESPECTIVELY.

TITLE		
SITE VICINITY MAP		
PROJECT		
REVERE CHEMICAL REVERE, PENNSYLVANIA		
 <b>DAMES &amp; MOORE</b> WILLOW GROVE, PENNSYLVANIA		
SCALE	AS SHOWN	DWN. BY R.G.B.
DATE	8-11-94	APPR. BY T.J.G.
JOB NO. 19142-011		<b>Figure 1</b>

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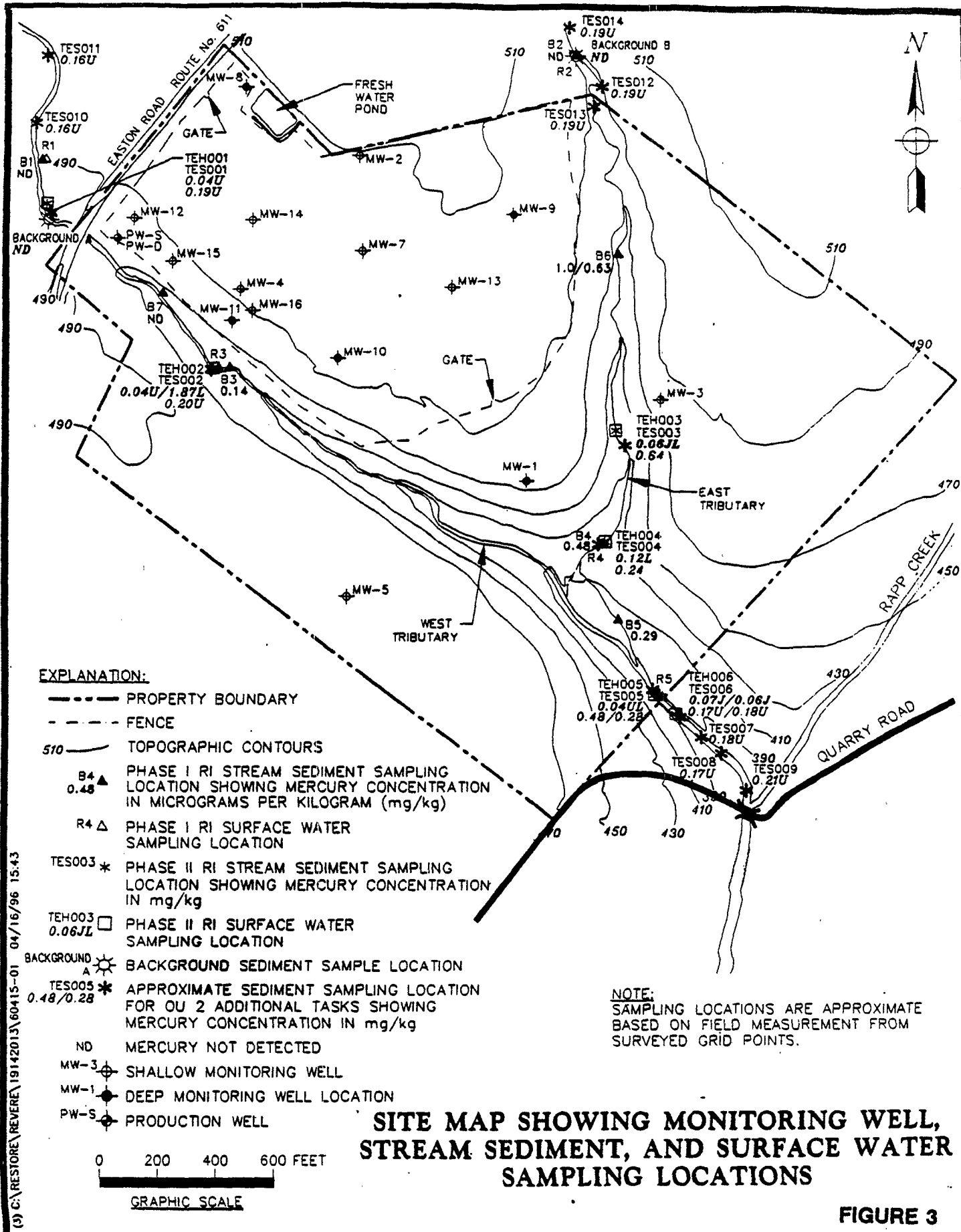
RAYSEA 08/11/94 11:39

**NOTES:**

1. BOTH CURRENT AND HISTORIC SITE FEATURES ARE IDENTIFIED ON THIS DRAWING. FEATURES NOT CURRENTLY EXISTING AT THE SITE INCLUDE THE BOMBED AREA, PROCESS REFUSE AREA, STORAGE LAGOONS, PROCESS LAGOONS, SLUMP PIT, AND THE COLLECTION BASIN.
2. THE EXTENT OF THE SPRAY FIELDS ESTIMATED FROM REVERE OF AERIAL PHOTOGRAPHS PRESENTED IN "SITE ANALYSIS REVERE CHEMICAL COMPANY, REVERE, PENNSYLVANIA" (USEPA, 1984).

**FIGURE 2**

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(3) C:\RESTORE\REVERE\19142013\60415-01 04/16/96 15:43

**FIGURE 3**

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**TABLE 1**  
**HITS-ONLY SUMMARY OF VOLATILE ORGANIC COMPOUND ANALYTICAL DATA**  
**ONSITE MONITORING WELLS**  
**REVERE CHEMICAL SITE**  
**REVERE, PENNSYLVANIA**

(all concentrations in ug/l)

Well Point/ Parameter	FPDWS	Phase I RI				Phase II RI				OU 2 Additional Tasks		
		Round 1	Round 2	Round 3	Round 4	Round 1	Round 2	Round 3	Round 4			
		Nov. 1989	Dec. 1989	Jan. 1991	Sept. 1991	Dec. 1991	Feb. 1992	Dec. 1994				
MW-2												
Trichloroethene (TCE)	5	--	ND	7		3	J	1	J	4	J	1.73
MW-4												
Trichloroethene (TCE)	5	110		100		110		44		140	L	51.9
1,1,1-Trichloroethane	200	--	ND	--	ND	3	J	1	J	3	J	--
Tetrachloroethene (PCE)	5	--	ND	--	ND	2	J	0	--	2	J	--
MW-7												
Trichloroethene (TCE)	5	--	ND	--	ND	2	J	3	J	7		17.6
MW-12												
Trichloroethene (TCE)	5	--	ND	--	ND	8		7		8		1.02
MW-13												
Trichloroethene (TCE)	5	--	NT	--	NT	--	NT	--	NT	--	NT	0.852
MW-14												
Trichloroethene (TCE)	5	--	NT	--	NT	--	NT	--	NT	--	NT	220
MW-16												
Trichloroethene (TCE)	5	--	NT	--	NT	--	NT	--	NT	--	NT	25.1
Tetrachloroethene (PCE)	5	--	NT	--	NT	--	NT	--	NT	--	NT	0.909

**Explanation:**

- ug/l - micrograms per liter
- ND - not detected
- J - estimated value
- B - compound detected in field or trip blank
- L - biased low
- FPDWS - Federal Primary Drinking Water Standard (MCL)
- RJ - Remedial Investigation

**Notes:**

1. Toluene was detected at an estimated concentration of 1 ug/l in both MW-2 and MW-4 during Round 1 of the Phase II RI.
2. Carbon disulfide was detected at a concentration of 0.778 ug/l in MW-12 during the OU 2 Additional Task sampling event.
3. Shading represents detected concentrations that exceed the FPDWS.
4. During OU 2 Additional Tasks, methylene chloride was detected in MW-13 at an estimated concentration of 0.802 ug/l, and chloroform was detected in wells MW-13 and MW-16 at concentrations of 0.462 ug/l (estimated) and 0.947 ug/l, respectively.
5. Monitoring wells MW-2, MW-4, MW-7, MW-12, MW-13, MW-14, and MW-16 are shallow wells. VOCs were not detected above FPDWS in the remaining shallow wells or any of the deep wells at the Site.

Dames & Moore

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TABLE 2

COMPARISON OF INORGANIC ANALYTICAL RESULTS OF  
SURFACE WATER TOXICITY SAMPLES TO  
BACKGROUND SURFACE WATER SAMPLES

REVERE CHEMICAL SITE  
REVERE, PENNSYLVANIA

(all concentrations in ug/l)

SAMPLE DESIGNATION	TAL METALS CONCENTRATIONS <sup>(1)</sup>	BACKGROUND CONCENTRATION <sup>(2)</sup>
TEH0020A - Unfiltered	Calcium - 12,200 Chromium - 4.30 J Copper - 8.70 J Magnesium - 5,040 Potassium - 1,550 J Sodium - 7,300 J	11,000 -- -- 4,690 1,470 6,560
TEH0020A - Unfiltered	Calcium - 12,300 Copper - 6.10 J Sodium - 7,010 J	11,000 -- 6,080
TEH002RA - Unfiltered	Barium - 8.20 J Calcium - 12,100 Magnesium - 4,880 J Sodium - 6,900 J	7.80 11,000 4,690 6,560
TEH002RA - Filtered	Arsenic - 2.10 JL Calcium - 12,100 Copper - 6.40 J Mercury - 0.10 J Sodium - 6,810 J	2.10 11,000 -- 0.10 6,080
TEH0030A - Unfiltered	Arsenic - 1.60 JL Barium - 8.30 J Copper - 78.2 Lead - 2.80 J Manganese - 51.4 Potassium - 1,450 J Sodium - 16,700 J Zinc - 17.5 J	-- -- -- -- 37.7 -- 16,700 --
TEH0030A - Filtered	Aluminum - 738 K Arsenic - 1.40 JL Barium - 14.1 J Copper - 98.1 Iron - 634 Lead - 2.50 J Manganese - 66.6 Nickel - 18.2 J Potassium - 1,530 J Zinc - 31.3	-- -- -- -- -- -- -- -- -- --
TEH0040A - Unfiltered	Arsenic - 1.10 JL Barium - 9.70 J Calcium - 15,000 Copper - 98.8 Lead - 2.10 J Manganese - 97.7 Nickel - 14.0 J Potassium - 1,370 J Zinc - 45.0	-- -- 14,800 -- -- 37.7 -- -- --

**COMPARISON OF INORGANIC ANALYTICAL RESULTS OF  
SURFACE WATER TOXICITY SAMPLES TO  
BACKGROUND SURFACE WATER SAMPLES**

**REVERE CHEMICAL SITE  
REVERE, PENNSYLVANIA**

SAMPLE DESIGNATION	TAL METALS CONCENTRATIONS <sup>(1)</sup>	BACKGROUND CONCENTRATION <sup>(2)</sup>
TEH0040A - Filtered	Aluminum - 505 K Arsenic - 1.40 J Barium - 11.5 J Copper - 169 Iron - 452 Lead - 2.50 J Manganese - 95.8 Potassium - 1,440 J Zinc - 26.3	-- -- -- -- -- -- -- -- --
TEH0050A - Unfiltered	Barium - 11.1 J Calcium - 14,700 Copper - 54.3 Lead - 3.80 Magnesium - 5,350 Manganese - 52.3 Mercury - 0.40 Nickel - 18.0 J Potassium - 1,470 J Sodium - 9,850 J Zinc - 20.3	7.80 11,000 -- -- 4,690 23.0 0.20 -- 1,470 6,560 20.1
TEH0050A - Filtered	Calcium - 16,200 Copper - 66.9 Mercury - 0.10 J Sodium - 10,000	11,000 -- 0.10 6,080
TEH0060A - Unfiltered	Calcium - 12,700 Copper - 66.4 Lead - 3.92 B Magnesium - 5,150	11,000 -- -- 4,690
TEH0060A - Filtered	Copper - 82.5	--
TEH006RA - Unfiltered (replicate of TEH0060A)	Calcium - 13,900 Copper - 103 Lead - 2.79 BJ Magnesium - 5,490	11,000 -- -- 4,690
TEH006RA - Filtered (replicate of TEH0060A)	Copper - 84.7 Mercury - 0.17 J	-- 0.10

Explanation:

- J The associated numerical value is an estimated quantity.  
 B The result is qualitatively suspect because the compound was detected in a field and/or laboratory blank at a similar concentration.  
 K The associated numerical value is biased high.  
 L The associated numerical value is biased low.  
 D The sample was diluted to bring the compound into the linear calibration range.  
 -- Background concentration for indicated parameter has not been established. Parameter was not detected in any of the background samples that were used to determine the representative background concentrations.

Note:

- This table summarizes TAL metals detected at each sampling location that exceeded the respective background concentration.
- Background level for TEH0020A was determined based on background samples collected from the west tributary during the Phase I RI (two samples, each designated R1U) and the Phase II RI (TEH0010A). Background level for TEH0030A and TEH0040A were determined based on background sample collected from the east tributary during the Phase I RI (2 samples, each designated R2U). Background level for TEH0050A and TEH0060A was determined based on background samples collected from both tributaries during the Phase I RI and the Phase II RI.

COMPARISON OF INORGANIC ANALYTICAL RESULTS OF  
PHASE II RI STREAM SEDIMENT TOXICITY SAMPLES TO  
BACKGROUND STREAM SEDIMENT SAMPLES

REVERE CHEMICAL SITE  
REVERE, PENNSYLVANIA

(all concentrations in mg/kg)

SAMPLE DESIGNATION	TAL METAL CONCENTRATION <sup>11</sup>	BACKGROUND LEVEL <sup>12</sup>
TES0020A	Aluminum - 25,300 D Arsenic - 9.12 DJ Barium - 305 Beryllium - 2.41 Cadmium - 0.41 Calcium - 2,070 Chromium - 86.3 Cobalt - 64.4 Copper - 111 Iron - 65,500 DJ Lead - 39.1 Magnesium - 12,500 Manganese - 6,650 D Nickel - 48.1 Potassium - 1,270 Vanadium - 117 Zinc - 228	11,200 7.60 59.1 0.71 - 894 25.6 10.7 12.4 23,200 13.0 3,910 534 13.2 995 47.9 78.6
TES0020RA (Replicate of TES0020A)	Aluminum - 24,300 D Arsenic - 12.9 J Barium - 65.1 Beryllium - 1.91 Calcium - 1,490 Chromium - 104 Cobalt - 28.4 Copper - 161 Iron - 55,100 DJ Lead - 27.6 Magnesium - 13,200 Manganese - 1,920 D Mercury - 1.87 L Nickel - 48.5 Potassium - 1,000 J Sodium - 43.0 J Vanadium - 110 Zinc - 188	11,200 7.60 59.1 0.71 894 25.6 10.7 12.4 23,200 13.0 3,910 534 - 13.2 995 31.5 47.9 78.6
TES0030A	Aluminum - 31,700 D Arsenic - 44.9 DJ Beryllium - 7.28 Chromium - 80.1 Cobalt - 73.8 Copper - 1,500 D Iron - 65,500 DJ Magnesium - 14,600 Manganese - 3,570 D Mercury - 0.06 JL Nickel - 65.4 Potassium - 730 J Sodium - 51.5 J Vanadium - 108 Zinc - 142	16,200 23.4 1.50 36.7 14.8 25.2 36,200 6,960 1,580 - 18.1 - - 73.5 106

TABLE 3

**COMPARISON OF INORGANIC ANALYTICAL RESULTS OF  
PHASE II RI STREAM SEDIMENT TOXICITY SAMPLES TO  
BACKGROUND STREAM SEDIMENT SAMPLES**

**REVERE CHEMICAL SITE  
REVERE, PENNSYLVANIA**

SAMPLE DESIGNATION	TAL METAL CONCENTRATION <sup>(1)</sup>	BACKGROUND LEVEL <sup>(2)</sup>
TES0040A	Aluminum - 31,700 D Arsenic - 39.1 DJ Barium - 93.7 Beryllium - 10.2 Cadmium - 1.12 J Chromium - 131 Cobalt - 90.6 Copper - 2,560 D Iron - 64,100 DJ Lead - 52.0 Magnesium - 17,700 Manganese - 4,610 D Mercury - 0.12 L Nickel - 89.2 Potassium - 1,110 Sodium - 60.5 J Vanadium - 144 Zinc - 219	16,200 23.4 85.6 1.50 1.10 36.7 14.8 25.2 36,200 47.4 6,960 1,580 -- 18.1 -- -- 73.5 106
TES0050A	Aluminum - 36,200 D Arsenic - 45.7 DJ Barium - 81.7 Beryllium - 8.56 Calcium - 1,160 Chromium - 336 Cobalt - 60.1 Copper - 1,160 D Iron - 85,900 DJ Lead - 35.4 Magnesium - 16,800 Manganese - 3,440 D Nickel - 69.3 Sodium - 32.3 J Vanadium - 206 Zinc - 222	11,200 7.60 59.1 0.71 894 25.6 10.7 12.4 23,200 13.0 3,910 534 13.2 31.5 47.9 78.6
TES0060A	Copper - 1,170 Mercury - 0.07 J	12.4 --
TES006RA (replicate of TES0060A)	Copper - 1,010 Mercury - 0.06	12.4 --

Explanation:

- J The associated numerical value is an estimated quantity.
- B The result is qualitatively suspect because the compound was detected in a field and/or laboratory blank at a similar concentration.
- K The associated numerical value is biased high.
- L The associated numerical value is biased low.
- D The sample was diluted to bring the compound into the linear calibration range.
- Background concentration for indicated parameter has not been established. Parameter was not detected in any of the background samples that were used to determine the representative background concentrations.

Notes:

1. This table summarizes TAL metals detected at each sampling location that exceed the respective background concentration.
2. Background level for TES0020A was determined based on background samples collected from the west tributary during the Phase I RI (sample B1) and the Phase II RI (sample TES0010A). Background levels for TES0030A and TES0040A were determined based on background sample collected from the east tributary during the Phase I RI (sample B2). Background level for TES0050A and TES0060A was determined based on background samples collected from both tributaries during the Phase I RI and the Phase II RI.

**TABLE 4**

**EXCEEDANCE SUMMARY  
COMPARISON OF ANALYTICAL RESULTS FOR SURFACE WATER  
TOXICITY SAMPLES TO PENNSYLVANIA WATER QUALITY CRITERIA  
FOR TOXICITY SUBSTANCES (FISH AND AQUATIC LIFE CRITERIA)**

**REVERE CHEMICAL SITE  
REVERE, PENNSYLVANIA**

(all concentrations in ug/l)

SAMPLE	TAL METALS CONCENTRATION	CRITERIA CONTINUOUS* CONCENTRATION
TEH0010A - Unfiltered	Mercury - 0.20 J	0.012
TEH0010A - Filtered	Lead - 8.30	1.3
TEH0020A - Unfiltered	Copper - 8.70 J	0.67
TEH0020A - Filtered	Lead - 3.40	1.4
TEH002RA - Filtered	Lead - 3.20	1.3
TEH0030A - Unfiltered	Copper - 78.2 Lead - 2.80 J	7.3 1.6
TEH0030A - Filtered	Copper - 98.1 Lead - 2.5 J	7.3 1.6
TEH0040A - Unfiltered	Copper - 98.8 Lead - 2.1 J	7.6 1.7
TEH0040A - Filtered	Copper - 169 Lead - 2.5 J	7.6 1.7
TEH0050A - Unfiltered	Copper - 53.4 Lead - 3.8 Mercury - 0.4	7.5 1.7 0.012
TEH0050A - Filtered	Copper - 66.9	7.5
TEH0060A - Unfiltered	Copper - 66.4 Lead - 3.92 B	6.9 1.4
TEH0060A - Filtered	Copper - 82.5 Lead - 5.61	6.9 1.4
TEH006RA - Unfiltered	Copper - 103 Lead - 2.79 BJ	7.3 1.6
TEH006RA - Filtered	Copper - 84.7 Lead - 3.92 J Mercury - 0.17 J	7.3 1.6 0.012

Explanation:

- \* Taken from Pennsylvania Code, Title 25 - Environmental Resources, Chapter 16 - Water Quality Toxics Management Strategy, Appendix A, Table 1.
- J The associated numerical value is an estimated quantity.
- B The associated numerical value is qualitatively suspect as this compound was detected in a field and/or laboratory blank at a similar concentration.