ORIG.

8710-32-10

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FIELD INVESTIGATION TEAM ACTIVITIES AT UNCONTROLLED HAZARDOUS SUBSTANCES FACILITIES — ZONE I

NUS CORPORATION
SUPERFUND DIVISION

441586

R-585-11-7-44

PRELIMINARY ASSESSMENT USING AVAILABLE INFORMATION OF USS FAIRLESS HILLS PREPARED UNDER

TDD NO. F3-8710-32
EPA NO. PA-475
CONTRACT NO. 68-01-7346

FOR THE

HAZARDOUS SITE CONTROL DIVISION
U.S. ENVIRONMENTAL PROTECTION AGENCY

APRIL 10, 1989

NUS CORPORATION
SUPERFUND DIVISION

SUBMITTED BY	REVIEWED BY	APPROVED BY
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Site Name: USS Fairless Hills
TDD No.: F3-8710-32

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SECTION 1

1.0 INTRODUCTION

1.1 Authorization

NUS Corporation performed this work under Environmental Protection Agency Contract No. 68-01-7346. This specific report was prepared in accordance with Technical Directive Document No. F3-8710-32 for the USS Fairless Hills site located in Fairless Hills, Bucks County, Pennsylvania.

1.2 Scope of Work

NUS FIT 3 was tasked to conduct a preliminary assessment using available information for the USS Fairless Hills site.

1.3 Summary

The United States Steel Fairless Hills site is located at the USS Fairless Works in Falls Township, Bucks County, Pennsylvania. The facility is a fully integrated steel manufacturing plant that produces a wide range of steel and finished steel products and operates as an EPA-registered (PAD002375376) hazardous waste generator. The Fairless Works is located in the 100-year flood plain of the Delaware River and is located on the river's western bank.

The manufacturing processes at the Fairless Works create a variety of hazardous and nonhazardous by-products and wastes. The primary hazardous waste streams emanating from the facility are pickle liquors (K062), electric arc furnace dust [(K061) (currently not generated)], coal plant decanter tar sludge (K087), and coke plant ammonia still lime sludge (K060). Nonhazardous wastes generated by the facility include furnace slags, emission control dusts, and sludges such as oil interception plant sludge.

The facility used a number of borrow pits created in the 1950s during the plant's construction to dispose many of its waste products. Some pits contain slags and construction debris, while others were used for temporary or permanent storage of wastes, including some hazardous materials. The pits that were used were unlined and several were excavated below the groundwater table. The wastes deposited in the pits can be expected to contain elevated levels of the following compounds: heavy metals including nickel, copper, zinc, and magnesium, organic compounds including toluene, naphthalene, and degreasers such as trichloroethene (TCE) and 1,1,1-trichloroethane, ammonia, and cyanide. Low levels of the aforementioned compounds have been identified in groundwater samples taken from monitoring wells (MWs) located at the facility.

Since 1983, the Fairless Works has no longer deposited hazardous wastes on the facility grounds for permanent disposal. All hazardous waste streams are reused in the plant or removed off site for reuse or proper disposal. MWs have been placed in many locations on the site's grounds and PA DER permits have been acquired for on-site disposal of nonhazardous wastes such as furnace slags.

SECTION 2

2.0 THE SITE

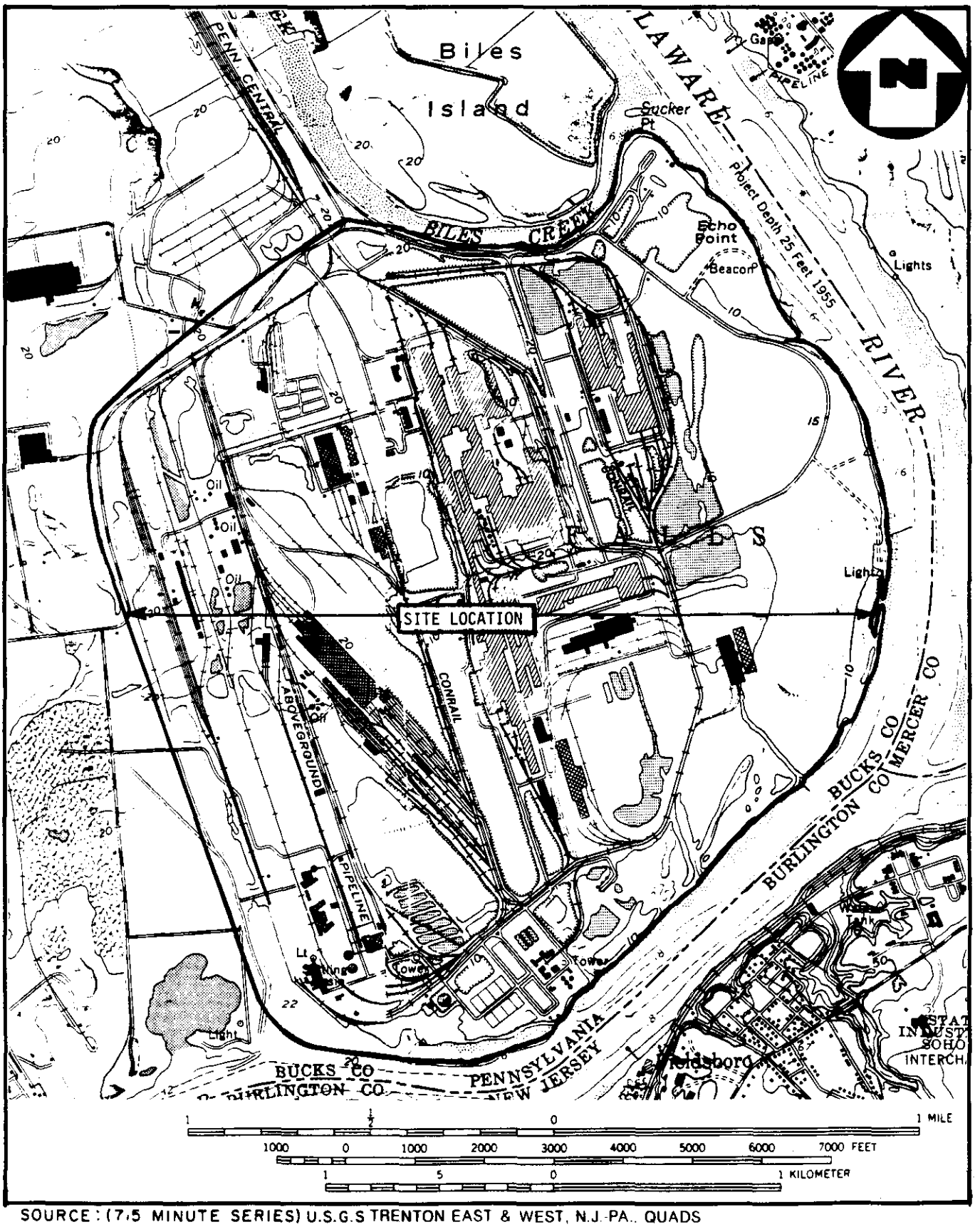
2.1 Location

United States Steel Fairless Works is located in Falls Township, Bucks County, Pennsylvania on the western bank of the Delaware River. The facility is one mile west of Bordentown, New Jersey, two miles south of Trenton, New Jersey, and three miles east of Levittown, Pennsylvania. The site may be found at the coordinates 40° 9' 20" north latitude and 74° 45' 00" west longitude (see figure 2.1, page 2-2).[1]

2.2 Site Layout

The USS Fairless Works is a 3,000-acre steel-making facility located on the western bank of the Delaware River in its 100-year flood plain. The region surrounding the facility is generally low-lying wetland and tidal marsh, with an elevation of approximately 20 feet. The facility consists of buildings that provide for a variety of steel-making operations, including a coke plant, open hearth furnaces, electric arc furnaces, blast furnaces, a sinter plant, a rolling mill, a wire mill, and a number of finishing operations (see figure 2.2, page 2-3). The steel-making operations are concentrated into the central areas of the property. Ringing the production areas are approximately 45 borrow pits, excavated during the facility's construction to elevate building foundations above the Delaware River's flood level. Many of the pits contain water that resulted from excavation below the groundwater table. Several of the borrow pits were used for the temporary or permanent disposal of hazardous and nonhazardous manufacturing wastes. Borrow pit (BP) 3 (BP-3), located near the open hearth furnace in the southern corner of the facility, contains flue dust, slag, and other materials and is nearly 100 acres in size. BP-20, located north of the coke plant on the western edge of the plant, is nearly 1/2 acre in size and contains decanter tank tar sludge (K087), along with scrap iron and wood. BP NT-3, situated southeast of the pipe mill on the eastern edge of the manufacturing area, is nearly 30 acres in size and contains oil interceptor sludge, ammonia still lime sludge (K060), and waste pickle liquor sludge (K062).[1,2]

Other borrow pits on the facility's grounds have had furnace slag, river dredging spoils, and other production wastes placed at their bottoms. Many of the pits are not used for any type of disposal and contain only groundwater.[2]



SOURCE: (7.5 MINUTE SERIES) U.S.G.S TRENTON EAST & WEST, N.J.-PA., QUADS

SITE LOCATION MAP

USS FAIRLESS WORKS, FAIRLESS HILLS PA.

SCALE 1:24000

FIGURE 2.1

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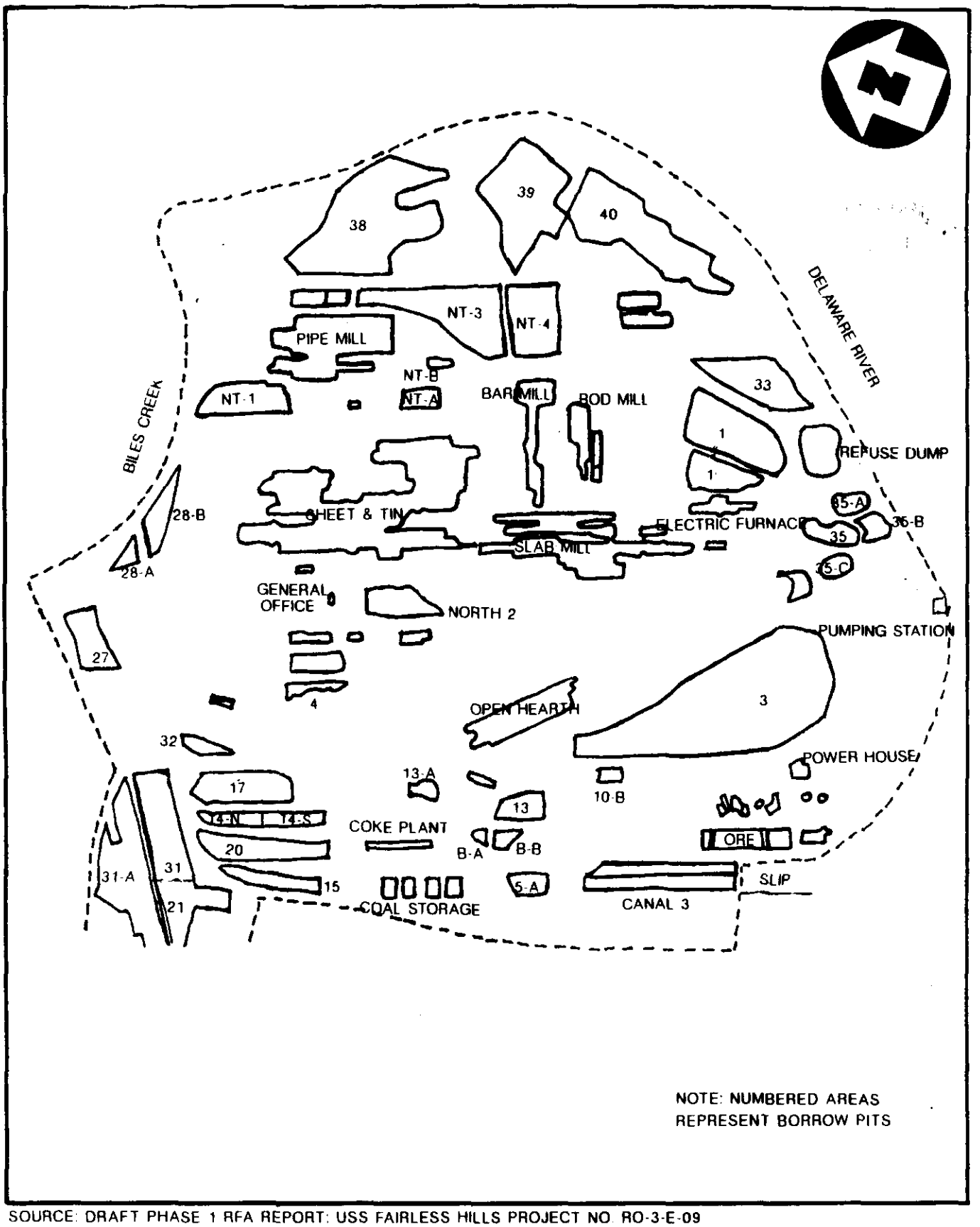

SOURCE: DRAFT PHASE 1 RFA REPORT: USS FAIRLESS HILLS PROJECT NO. RO-3-E-09

FIGURE 2.2

SITE SKETCH

USS FAIRLESS WORKS, FAIRLESS HILLS PA.

(NO SCALE)

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The Fairless Works is bounded on its eastern and southern edges by the Delaware River. Biles Creek forms its northern edge. The G.R.O.W.S. Landfill and Van Sciver Lake, which is a former sand and gravel pit, lie west of the site.[1,2]

2.3 Ownership History

The facility is owned and operated by the United States Steel Corporation, a division of USX Corporation. United States Steel has owned the property since the construction of the plant in the mid-1950s. Prior to this, the property was covered by tidal marsh and the lowland of the Delaware River flood plain.[2]

2.4 Site Use History

The USS Fairless Works is a fully integrated steel manufacturing facility that produces steel and finished steel products. The facility has been active since the 1950s and includes the following operations: a coke plant, nine open hearth furnaces, three blast furnaces, two electric arc furnaces, a sinter plant, a vacuum degreaser, continuous caster, hot forming (bar mill, rod mill, shale mill, hot strip mill, and pipe mill), pickling (sulfuric and hydrochloric acid), cold rolling, galvanizing, electrolytic tin lines, chrome-coating lines, continuous alkaline cleaning, and wire coating. The electric arc furnaces have been shut down since 1980; the coke plant is slated for shutdown.[2]

The Fairless Works' many manufacturing processes generate a variety of waste products (see appendix A). Slags are produced by the blast, open hearth, and electric furnaces. The air pollution control devices on the furnaces and the sinter plant generate pollution control dust, including electric arc furnace dust (K061), which is listed as a hazardous waste. There are several process water and aqueous sludge wastes generated by the steel-making processes. These include coke plant decanter tar sludge (K087), hazardous waste by-products of coal distillation, coke plant ammonia still lime sludge (K060), terminal treatment plant sludge, which contains oil, grease, and suspended solids, and electric furnace caster sludge resulting from contact cooling water from a continuous casting process. The oil interception plant, which receives contact cooling water, pickling rinses, alkaline washes, and rolling and lubricating oils from the sheet and tin mill generates sludges that contain oils and greases, which have a low pH. Waste pickle liquor acid (K062), an acidic solution listed as a hazardous waste, is stored in tanks at the pipe mill and the oil interception plant. The facility also generates general refuse, which includes waste paper, wooden pallets, broken furnace lining materials, refractory brick, construction debris, arc fines, and rubble.[2]

The facility currently reuses or transports off site for reuse or disposal all of the waste materials listed as hazardous wastes. The spent pickle liquor (K062) is sent to Pfizer Chemical in Easton, Pennsylvania or Diamond Shamrock Corporation in North Carolina. The ammonia still lime sludge (K060) is mixed with blast furnace flue dust and becomes a feed material for the sinter plant; this process was initiated in 1983.[2]

Since 1983, the coal tar decanter sludge (K087) has been placed in roll-off dumpsters and disposed in the Kelly Run Landfill. Electric arc furnace dust (K061) is no longer generated, since the electric arc furnace is no longer in operation.[2]

A series of borrow pits created during the Fairless Works construction has been used for waste disposal by the facility from the beginning of operations. Nonhazardous furnace slag has been placed in many of the pits, along with dredging spoils from the Delaware River. Some pits have been leveled and are now covered by parking areas or equipment storage lots.[2]

2.5 Permit and Regulatory Action History

The USS Fairless Hills plant operates under a number of permits. The steel plant is a RCRA-permitted hazardous waste generator under EPA Permit No. PAD002375376. The facility possesses NPDES Discharge Permit No. PA0013463 for its outfalls into the Delaware River. A description of the outfalls is included in appendix B.[2]

The USS Fairless Works also holds permits for several solid waste disposal practices. PA DER Solid Waste Disposal Permit Nos. 300824 to 300829 were received between August 2, 1982 and May 14, 1986 for slag and class III demolition waste disposal areas, a hazardous waste disposal area, and an industrial waste disposal area (see appendix C for a more thorough description).[3]

The Fairless Works had been the subject of several studies and RCRA-related regulatory action in the past. A Solid Waste Management Concept report completed by the Chester Engineers in June 1981 (Project No. 3122-01) included a study of hydrogeologic conditions at the site, along with waste disposal practices. This study included the installation of 84 MWs on the property from August 1980 to January 1981. These wells have been sampled on a regular basis since their installation (see appendix D). Baker/TSA Division of Michael Baker Jr., Incorporated of Beaver, Pennsylvania conducted a study in March 1985 that was titled a "Groundwater Quality Assessment for the Borrow Pit 20 Disposal Area."[2]

Environmental Science and Engineering, of Gainesville, Florida, produced a draft Phase I RFA (RCRA facility assessment) report on the site on June 17, 1986. This report is used as the basis for a similar RFA currently being prepared by Geoscience Consultants Limited, of Silver Springs, Maryland. Additionally, BCM, Incorporated, consultants of Plymouth Meeting, Pennsylvania, produced a Solid Waste Reduction study, Project No. 00-5039-20, in May 1987 for submission to PA DER.[2]

2.6 Remedial Action to Date

The USS Fairless Hills site has not been the subject of any remedial action to date.[2]

SECTION 3

3.0 ENVIRONMENTAL SETTING

3.1 Water Supply

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

3.2 Surface Waters

The USS Fairless Hills site is bordered to the east and south by the Delaware River, which is expected to receive most of the surface water drainage from the plant and is used for drinking water supply, commercial shipping, fishing, and recreational activity. Biles Creek, a tidal backwater filled and drained by the Delaware, forms the northern boundary of the Fairless Works. Van Sciver Lake, a former sand and gravel pit now used for recreational purposes, lies one mile west of the steel complex' western border. The Tidal wetlands of Crosswicks Creek lie on the eastern bank of the Delaware River in New Jersey, east and northeast of the site. The Delaware River and Rariton Canal, which is now a New Jersey state park, traverses the wetlands, parallel with the Delaware River.[1]

3.3 Hydrogeology

3.3.1 Geology

The USS Fairless Hills site lies within the Coastal Plain Physiographic Province, 3.5 miles southeast of the Fall Line. The term Fall Line is applied to the sharp junction between the Appalachian Piedmont Province and the Coastal Plain Physiographic Province. This area is marked by waterfalls and rapids on most streams crossing the area. The topography of the site area is generally of low relief.[8]

The formation underlying the site is mapped as the Quaternary age Trenton Gravel (see figure 3.1, page 3-4). The Trenton Gravel consists of unconsolidated, gray to pale reddish-brown, very gravelly sand with interbeds of crossbedded sand and clay-silt layers. The unconsolidated sediments are at least 65 feet deep in the site area.[9,10,11]

A small deposit of the Tertiary age Pensauken and Bridgeton Formations, undivided, crops out .5 mile to the west of the site. The Bridgeton Formation consists of extensively crossbedded clayey sand-stained reddish-brown. Locally, beds of gravel are present. The maximum thickness is approximately 30 feet thick. The Pensauken Formation consists of yellowish to dark reddish-brown sand with interbeds of coarse gravel. The maximum thickness is at least 30 feet.[10,11]

The Trenton Gravel is underlain by igneous and metamorphic rocks of Cambrian and Precambrian age. The following rock types underlie the Trenton Gravel in the site area: mafic gneiss, felsic gneiss, oligoclase-mica schist (the Wissahickon Formation), and quartzite (the Chickies Formation).[9]

3.3.2 Soils

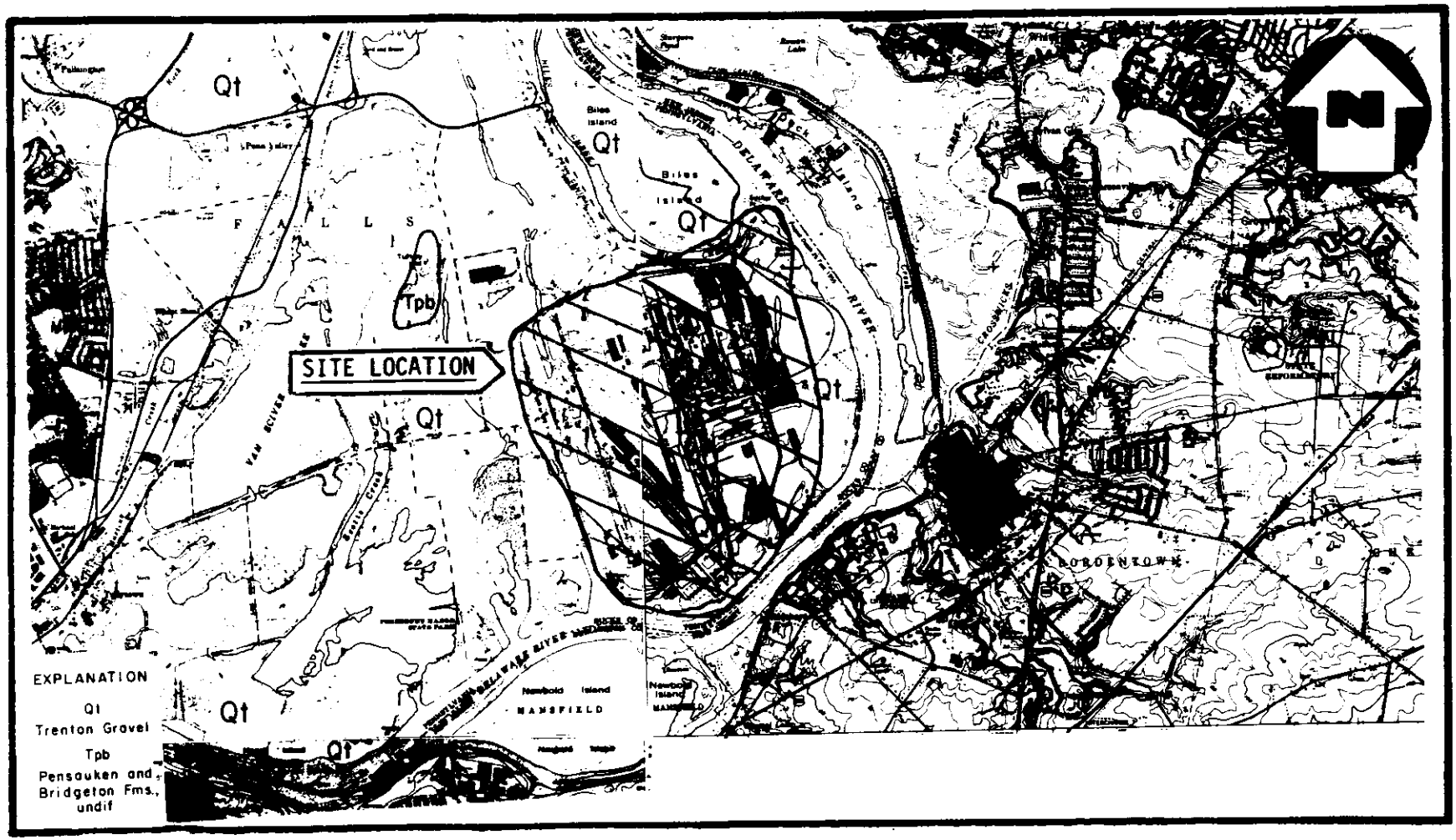
The soil underlying the site is mapped as Urban Land. Most areas classified as Urban Land have been disturbed, filled over, or otherwise destroyed prior to construction of structures.[12]

3.3.3 Groundwater

The Trenton Gravel is a good aquifer, due to high porosity and permeability, with some well yields in excess of 1,000 gallons per minute (gpm). The depth to water on the USS Fairless Works site ranges from 14 to 24 feet below the surface. Wells yields at the site range from 60 to 600 gpm.[10,11]

The Pensauken and Bridgeton Formations, undivided, have high porosity and permeability; however, the limited areal extent constricts the use of these formations as aquifers. Well yields within these units range from 2 to 1,200 gpm.[10,11]

Groundwater from the site is expected to flow generally east to southeast within the unconsolidated sediments, eventually discharging into the Delaware River.[9]



SOURCE: ATLAS OF PRELIMINARY GEOLOGIC QUADRANGLE MAPS OF PA.

SCALE: 1:62500

GEOLOGIC MAP

FIGURE 3.1

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3.4 Climate and Meteorology

The climate of Falls Township, Pennsylvania can be characterized as moderate continental and is affected by the area's proximity to the Atlantic Ocean. The average yearly temperature is 54.6°F, with a summer mean temperature of 74.4°F and a winter mean temperature of 34.1°F. Annual precipitation averages 41.38 inches per year, with a mean annual lake evaporation rate of 34 inches, resulting in a yearly net precipitation rate of 7.38 inches. Snowfall averages 22.0 inches per year and a 1-year, 24-hour rainfall can bring 2.75 inches of precipitation.[13]

3.5 Land Use

The USS Fairless Works occupies an area nearly one mile in radius from the center of the facility. Land usage within a two-mile radius includes the Crosswicks Creek tidal marsh to the northeast and east, the urban/industrial towns of Bordentown and Fieldsboro, New Jersey to the southeast and south. North and west of the site lie open lands used for agricultural and industrial purposes. The Graves Sanitary Landfill lies 1.5 miles southwest of the Fairless plant. The area located between two and three miles from the site are primarily urban/industrial or residential in the northern, eastern, and southern directions. Van Sciver Lake, a large recreational facility, lies west of the steel plant.[1]

3.6 Population Distribution

[redacted]

3.7 Critical Environments

No endangered species or critical environments are known to exist within a three-mile radius of the USS Fairless site.[14]

SECTION 4

4.0 WASTE TYPES AND QUANTITIES

The primary hazardous waste streams produced by the Fairless Works include spent pickle liquor acid (K062), coke plant ammonia still lime sludge (K060), and coke plant decanter tar sludge (K087). Electric arc furnace collector dust (K061) has not been produced since the shutdown in 1980 of the plant's two electric arc furnaces.[2]

Nonhazardous wastes produced by the facility include blast and open hearth furnace slags and air pollution control dusts from the blast furnaces, open hearth furnaces, and sinter plant. A variety of sludges are produced from the treatment of the plant's cooling waters and other processes, including terminal treatment plant sludge, power house water treatment sludge, oil interception plant sludge, and electric furnace caster sludge. General refuse generated by the steel-making operation includes waste paper, scrap wooden pallets, broken furnace lining material, refractory brick, construction debris, and ore fines (see appendix A for a listing of annual generating amounts).[2]

It is possible that all of the waste streams listed have been deposited on the grounds of the plant in the past. The borrow pits created during the construction of the facility were used from the 1950s until 1983 for the disposal of waste materials. The majority of the pits contain furnace slags and have been completely filled and leveled; others contain both hazardous and nonhazardous wastes in varying amounts (see appendix E).[2]

Hazardous constituents associated with the various waste types that are disposed in borrow pits on site have been identified in groundwater samples obtained from on-site monitoring wells and in surface water samples obtained from standing water in several borrow pits (see appendix E). Compounds identified in various on-site monitoring wells include benzene, ethylbenzene, toluene, chloroform, 1,1-dichloroethane, 1,2-trans-dichloroethylene, 1,1,1-trichloroethane, trichlorethylene, bromoform, bromodichloromethane, chlorodibromomethane, naphthalene, phenol, methylphenols, dimethylphenols, ammonia, cyanide, arsenic, heavy metals including nickel, copper, zinc, and magnesium, and oils and grease. Compounds identified in surface water samples include ammonia, cyanide, and oils and grease.[2]

SECTION 5

F3-8710-32

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT
PART 1 - SITE INFORMATION AND ASSESSMENT

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
PA	475

II. SITE NAME AND LOCATION

01 SITE NAME (Legal, common, or descriptive name of site)	02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER
USS Fairless Hills	Fairless Works

03 CITY	04 STATE	05 ZIP CODE	06 COUNTY	07 COUNTY CODE	08 CONG DIST
Fairless Hills	PA	19030	Bucks	017	PA08

09 COORDINATES LATITUDE	LONGITUDE
40° 09' 20" N	74° 45' 00" W

10 DIRECTIONS TO SITE (Starting from nearest public road)

From Bristol Pike make right (toward east) on Bordentown Road, north of Tullytown. Follow Bordentown Road 2 miles east to site.

III. RESPONSIBLE PARTIES

01 OWNER (If known)	02 STREET (Business, mailing, residential)
USS Division of USX Corporation	One Tech Center Drive

03 CITY	04 STATE	05 ZIP CODE	06 TELEPHONE NUMBER
Monroeville	PA	15146	(412) 825-2067

07 OPERATOR (If known and different from owner)	08 STREET (Business, mailing, residential)

09 CITY	10 STATE	11 ZIP CODE	12 TELEPHONE NUMBER
			( )

13 TYPE OF OWNERSHIP (Check one)

☒ A. PRIVATE ☐ B. FEDERAL _____ (Agency name) ☐ C. STATE ☐ D. COUNTY ☐ E. MUNICIPAL

☐ F. OTHER _____ (Specify) ☐ G. UNKNOWN

14 OWNER/OPERATOR NOTIFICATION ON FILE (Check all that apply)

☐ A. RCRA 3001 DATE RECEIVED ___/___/___ (MONTH DAY YEAR) ☐ B. UNCONTROLLED WASTE SITE (CERCLA 103 c) DATE RECEIVED ___/___/___ (MONTH DAY YEAR) ☒ C. NONE

IV. CHARACTERIZATION OF POTENTIAL HAZARD

01 ON SITE INSPECTION

☐ YES DATE ___/___/___ (MONTH DAY YEAR)
☒ NO

BY (Check all that apply)

☐ A. EPA ☒ B. EPA CONTRACTOR ☐ C. STATE ☐ D. OTHER CONTRACTOR
☐ E. LOCAL HEALTH OFFICIAL ☐ F. OTHER _____ (Specify)

CONTRACTOR NAME(S): NUS Corporation

02 SITE STATUS (Check one)	03 YEARS OF OPERATION
☒ A. ACTIVE ☐ B. INACTIVE ☐ C. UNKNOWN	Mid 1950s (BEGINNING YEAR) — present (ENDING YEAR) ☐ UNKNOWN

04 DESCRIPTION OF SUBSTANCES POSSIBLY PRESENT, KNOWN, OR ALLEGED

Facility is a producer of steel, wastes deposited on site include furnace slags, K060 coke plant ammonia still sludge, K061 Electric Arc furnace dust K062 spent pickle liquor acid, K087 coke plant decanter tar sludge, other process wastes include heavy metals.

05 DESCRIPTION OF POTENTIAL HAZARD TO ENVIRONMENT AND/OR POPULATION

Possible threat to groundwater and surface water via migration of heavy metals, organics, and other waste product into groundwater from unlined pits, or via surface water runoff.

V. PRIORITY ASSESSMENT

01 PRIORITY FOR INSPECTION (Check one. If high or medium is checked, complete Part 2 - Waste Information and Part 3 - Description of Hazardous Conditions and Incidents)

☐ A. HIGH (Inspection required promptly) ☐ B. MEDIUM (Inspection required) ☒ C. LOW (Inspect on time available basis) ☐ D. NONE (No further action needed, complete current disposition form)

VI. INFORMATION AVAILABLE FROM

01 CONTACT	02 OF (Agency/Organization)	03 TELEPHONE NUMBER
Paul Racette	US EPA	(215) 597-1073

04 PERSON RESPONSIBLE FOR ASSESSMENT	05 AGENCY	06 ORGANIZATION	07 TELEPHONE NUMBER	08 DATE
Randy R. Patarcity	NUS	FIT 3	(215) 687-9510	12 / 1 / 87 (MONTH DAY YEAR)

EPA FORM 2070-12 (7-81)

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 STATE	02 SITE NUMBER
PA	475

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 PHYSICAL STATES (Check all that apply)

- X A. SOLID
- B. POWDER, FINES
- X C. SLUDGE
- D. OTHER _____ (Specify)
- E. SLURRY
- X F. LIQUID
- G. GAS

02 WASTE QUANTITY AT SITE (Measures of waste quantities must be independent)

TONS _____

CUBIC YARDS unknown

NO. OF DRUMS _____

03 WASTE CHARACTERISTICS (Check all that apply)

- X A. TOXIC
- B. CORROSIVE
- C. RADIOACTIVE
- X D. PERSISTENT
- X E. SOLUBLE
- F. INFECTIOUS
- G. FLAMMABLE
- H. IGNITABLE
- X I. HIGHLY VOLATILE
- J. EXPLOSIVE
- K. REACTIVE
- L. INCOMPATIBLE
- M. NOT APPLICABLE

III. WASTE TYPE

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE	unknown		
OLW	OILY WASTE	unknown		A large variety of wastes resulting
SOL	SOLVENTS	unknown		from steel production were formerly
PSD	PESTICIDES			deposited in unlined pits and lagoons
OCC	OTHER ORGANIC CHEMICALS	unknown		on site. Contaminants include volatile
IOC	INORGANIC CHEMICALS	unknown		organic compounds, acids, bases, organic
ACD	ACIDS	unknown		and inorganic compounds and heavy meta'
BAS	BASES	unknown		
MES	HEAVY METALS	unknown		

IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
SOL	benzene	71-43-2	All compounds identified	unknown	
SOL	ethylbenzene	100-41-4	in on-site monitoring	unknown	
SOL	toluene	108-88-3	well samples.	unknown	
SOL	trichloroethylene	79-01-6	Ammonia and cyanide	unknown	
SOL	1,1,1,-trichloroethane	79-01-6	found in on site surface	unknown	
SOL	chloroform	67-66-3	water samples.	unknown	
OCC	naphthalene	91-20-3		unknown	
OCC	phenol	108-95-2		unknown	
OCC	bromochloromethane	75-27-4		unknown	
OCC	chlorodibromomethane	124-48-1		unknown	
IOC	ammonia	7664-41-7		unknown	
IOC	cyanide	158-85-5		unknown	
IOC	arsenic	7440-38-2		unknown	
MES	copper	7440-50-8		unknown	
MES	nickel	7440-20-0		unknown	
MES	zinc	7646-85-7		unknown	

V. FEEDSTOCKS (See Appendix for CAS Numbers) N/A

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Draft Phase I, RFA Report Project No. RO-3-E-09. U.S. Steel Corporation Fairless Hills. June 17, 1986. Environmental Science and Engineering, Incorporated.

EPA

POTENTIAL HAZARDOUS WASTE SITE PRELIMINARY ASSESSMENT

PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
PA	475

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 X A GROUNDWATER CONTAMINATION [redacted] 02 X OBSERVED (DATE 1980, 1981, 1984, 1985) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: [redacted] 04 NARRATIVE DESCRIPTION

Contaminants such as heavy metals, oils, organic and inorganic compounds have been identified in monitoring wells during periodic sampling in 1980, 1981, 1984, and 1985. Approximately 290 persons within 3-mile radius use groundwater as a drinking water source.

01 X B SURFACE WATER CONTAMINATION [redacted] 02 ☐ OBSERVED (DATE _____) X POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: [redacted] 04 NARRATIVE DESCRIPTION

Potential for migration of contaminants to surface water runoff into the Delaware River. Wastes are stored in pits which are diked, some may be below the river's flood stage. Workers on site use an on-site surface water intake on the Delaware River.

01 ☐ C CONTAMINATION OF AIR 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

None reported.

01 ☐ D FIRE EXPLOSIVE CONDITIONS 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

None reported.

01 X E DIRECT CONTACT [redacted] 02 ☐ OBSERVED (DATE _____) X POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: [redacted] 04 NARRATIVE DESCRIPTION

Potential exists for direct contact with some hazardous wastes including K050, K061, K062, K087 in borrow pits which have not been covered. Plant workers are the only population affected, as the site is guarded.

01 X F CONTAMINATION OF SOIL 02 X OBSERVED (DATE 06/17/86) ☐ POTENTIAL ☐ ALLEGED
03 AREA POTENTIALLY AFFECTED: approximately [redacted] Acres 04 NARRATIVE DESCRIPTION

A number of unlined borrow pits have been used for the disposal of hazardous and nonhazardous wastes generated by the facility.

01 X G DRINKING WATER CONTAMINATION [redacted] 02 ☐ OBSERVED (DATE _____) X POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: [redacted] 04 NARRATIVE DESCRIPTION

The Lower Bucks County Municipal Authority operates a surface water intake four miles downstream of the site on the Delaware River. Two hundred and ninety persons use groundwater within the study area. All are located greater than 2.5 miles from the site. Workers at the facility supplied by on-site surface water intake on the Delaware River. No other intakes exist within three miles upstream or downstream on the Delaware, which is tidally influenced in the study area.

01 ☐ H WORKER EXPOSURE/INJURY 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 WORKERS POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

None reported.

01 ☐ I POPULATION EXPOSURE/INJURY 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: _____ 04 NARRATIVE DESCRIPTION

None reported.

EPA

POTENTIAL HAZARDOUS WASTE SITE
PRELIMINARY ASSESSMENT
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 STATE	02 SITE NUMBER
PA	475

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 ☐ J DAMAGE TO FLORA — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported.

01 ☐ K DAMAGE TO FAUNA — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION (Include name(s) of species)

None reported.

01 ☐ L CONTAMINATION OF FOOD CHAIN — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported.

01 ☒ M UNSTABLE CONTAINMENT OF WASTES (Spills, runoff, standing liquids, leaking drums) — 02 ☒ OBSERVED (DATE June 17, 1986) ☐ POTENTIAL ☐ ALLEGED
03 POPULATION POTENTIALLY AFFECTED: [redacted] — 04 NARRATIVE DESCRIPTION

Processed wastes are stored on site in unlined borrow pits. Pits contain groundwater and surface water runoff mixed with the waste materials. Manufacturing process wastes were formerly disposed in unlined borrow pits on site, many of which contact groundwater. Several pits have not been filled or covered and contained groundwater and runoff water mixed with the waste materials.

01 ☐ N DAMAGE TO OFFSITE PROPERTY — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported.

01 ☐ O CONTAMINATION OF SEWERS, STORM DRAINS, WWTPs — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

None reported.

01 ☐ P ILLEGAL/UNAUTHORIZED DUMPING — 02 ☐ OBSERVED (DATE _____) ☐ POTENTIAL ☐ ALLEGED
04 NARRATIVE DESCRIPTION

The majority of wastes deposited in on-site pits were unpermitted. USS Fairless Hills holds PA DER permits for the on site disposal of non-hazardous residual wastes such as slag and demolition debris.

05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

None

III. TOTAL POPULATION POTENTIALLY AFFECTED: _____

IV. COMMENTS

The possibility of groundwater contamination exists because the waste disposal pits are unlined and may contact groundwater. THis may migrate into the Delaware River via tidal influenced fluctuations in the groundwater table.

V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Draft Phase I RFA Report. Project No. RO-3-E-09. United Steel Corporation Fairless Hill. June 17, 1986.

SECTION 6

6.0 REFERENCES FOR SECTIONS 1.0 THROUGH 5.0

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2. Environmental Science and Engineering. Draft Phase I RFA Report; United States Steel Corporation, Fairless Hills. EPA Work Assignment No. 06-30HW. June 17, 1986.

3. Lynn, Wayne L., Pennsylvania Department of Environmental Resources, with Mr. P.X. *Masciontonio, United States Steel Corporation. Correspondence. May 14, 1986.*

4. O'Brien, James, USS Division of USX, with Randy Patarcity, NUS FIT 3. Telecon. November 25, 1987.

5. NUS Corporation, FIT 3. Site inspection report of Morrisville Trailer Park; section 3. TDD No. F3-8704-77, May 28, 1987.

6. NUS Corporation, FIT 3. Site inspection report of Robertson-American, Incorporated; section 3. TDD No. F3-8706-22, July 17, 1987.

7. Caul, Betty, Bordentown Water Department, with Lisa Lillis, NUS FIT 3. Telecon. November 24, 1987.

8. Pennsylvania Department of Environmental Resources, Bureau of Topographic and Geologic Survey. Physiographic Provinces of Pennsylvania. Map 13, Third Printing, 1979.

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11. Pennsylvania Topographic and Geologic Survey. Groundwater Resources of Bucks County, Pennsylvania. 1955.

12. United Sates Department of Agriculture, Soil Conservation Service. Soil Survey of Bucks and Philadelphia Counties, Pennsylvania. July 1975.

13. National Oceanic and Atmospheric Administration. Climatography of the United States. Local Climatological Data. Philadelphia, Pennsylvania. 1983.

14. Kulp, Charles J., United States Fish and Wildlife Service, to Garth Glenn, NUS FIT 3. Correspondence. November 4, 1987.

APPENDIX A

Table 2-1. Annual Amount of Waste Produced by U.S. Steel, Fairless Hills

	Annual Amount	
	Tons	Cu Yd
Hazardous Waste		
Coke Plant Decant Tar Sludge	1,877	1,504
Coke Plant Lime Sludge	730	584
Electric Furnace Sludge	4,563	4,443
Oil Interception Plant	9,125	7,509
SUBTOTAL	16,295	14,040
Non-Hazardous Waste		
Open Hearth Dust	54,750	40,557
Terminal Treatment Sludge	36,500	36,052
Sanitary Sludge	323	319
Electric Furnace Caster Sludge	2,086	2,060
Power House Water Treatment Sludge	2,282	2,253
SUBTOTAL	95,941	81,241
Slag		
Track Debris	5,214	3,511
Pipe Mill Refuse	5,214	3,511
Wire Mill Refuse and Borax Refuse	8,343	5,618
Waste Brick	16,686	11,237
Contractor Refuse	3,129	2,317
Open Hearth Slag	803,000	495,679
Blast Furnace Slag	94,900	58,580
Electric Furnace Slag	65,804	40,556
SUBTOTAL	1,002,290	621,009

Source: Chester Engineers, 1981.

Table 2-2. Slag Analyses (Percent)

Constituent	Open Hearth Slag	Electric Furnace Slag	Blast Furnace Slag
CaO	25.0	44.00	31.49
SiO_2	15.00	8.50	34.72
FeO	38.45*	28.95	0.68
Al_2O_3	5.00	8.50	12.60
MgO	9.0	8.00	15.96
MnO	5.17	1.50	0.52
P_2O_5	2.29	0.50	--
S	0.07	0.09	1.65

***Some FeO is present as Fe_2O_3.**

Source: The Chester Engineers, 1981.

Table 2-3. Slags Water Leachates*

Source	Open Hearth Slag	Electric Furnace Slag	Blast Furnace Slag
Log No. 80-	6663	6664	6665
Date Collected	10/17/80	10/17/80	10/17/80
pH	10.6	11.4	10.6
Total Dissolved Solids, mg/l	363	643	473
Arsenic, mg/l As	<0.0005	<0.0005	<0.0005
Barium, mg/l Ba	0.1	<0.1	0.1
Cadmium, mg/l Cd	<0.01	<0.01	<0.01
Chromium, mg/l Cr	<0.01	<0.01	<0.01
Lead, mg/l Pb	<0.02	<0.02	<0.02
Mercury, mg/l Hg	<0.0002	<0.0002	<0.0002
Selenium, mg/l Se	<0.0005	0.0015	0.0008
Silver, mg/l Ag	<0.01	<0.01	<0.01

*Made in accordance with ASTM Method A

NOTE: The above referenced slags contain none, or small amounts of the following constituents: oil and grease, Ammonia-Nitrogen, Phenol, Cyanide, Copper, Molybdenum and Nickel.

Source: The Chester Engineers, 1981.

Table 2-4. Sludge Analyses

Source	Open Hearth	Terminal Treatment Sludges
Log No. 80-	7347	7341
Date Collected	12/4/80	12/4/80
pH	7.8	7.7
Solids, wt %	77.58	91.94
Mineral Solids, wt %	51.54	89.95
Volatile Solids, wt %	26.04	1.99
COD, wt %	0.21	9.74
Freon Extractables, wt %	0.0103	0.153
Ammonia, wt % N	0.0017	0.0116
Phenols, wt % PhOH	0.0003	0.0074
Total Cyanide, wt % CN	<0.00001	<0.00001
Arsenic, wt % As	0.00155	0.00067
Barium, wt % Ba	0.004	<0.004
Cadmium, wt % Cd	0.0048	0.0004
Copper, wt % Cu	0.026	0.0112
Chromium, wt % Cr	0.0536	0.059
Lead, wt % Pb	0.228	0.015
Mercury, wt % Hg	<0.0001	<0.0001
Molybdenum, wt % Mo	0.004	<0.004
Nickel, wt % Ni	0.0088	0.014
Selenium, wt % Se	0.00007	0.00008
Silver, wt % Ag	0.005	0.003

Source: The Chester Engineers, 1981.

Table 2-4. Sludge Analyses (Continued, Page 2 of 2)

Source	Electric Furnace Caster Sludge	Power House Water Treatment Sludge
Log No. 80-	7348	7339
Date Collected	12/4/80	12/4/80
pH	6.1	7.0
Total Solids, mg/l	163,620	4,130
Total Mineral Solids, mg/l	108,060	3,100
Total Volatile Solids, mg/l	55,560	1,030
Dissolved Solids, mg/l	540	352
Dissolved Mineral Solids, mg/l	244	212
Dissolved Volatile Solids, mg/l	296	140
COD	13.81 wt %	704 mg/l
Freon Extractables	2.75 wt %	10.0 mg/l
Total Organic Carbon, mg/l C	--	260 mg/l
Ammonia, N	0.0014 wt %	1.04 mg/l
Phenols, PhOH	0.0156 wt %	0.240 mg/l
Total Cyanide, CN	<0.01 mg/l	<0.01 mg/l
Arsenic, As	0.00024 wt %	0.094 mg/l
Barium, Ba	<0.004 wt %	<1 mg/l
Cadmium, Cd	0.002 wt %	<0.05 mg/l
Copper, Cu	0.0016 wt %	0.8 mg/l
Chromium, Cr	0.0056 wt %	0.80 mg/l
Lead, Pb	0.0016 wt %	2.4 mg/l
Mercury, Hg	<0.0001 wt %	0.0011 mg/l
Molybdenum, Mo	<0.004 wt %	<0.5 mg/l
Nickel, Ni	0.0036 wt %	1.1 mg/l
Selenium, Se	<0.00005 wt %	0.0374 mg/l
Silver, Ag	<0.001 wt %	<10 mg/l

Source: The Chester Engineers, 1981.

Table 2-5. Sludge Water Leachate*

Source	Electric Furnace Caster Sludge	Power House Water Treatment Sludge
Log No. 80-	7348	7339
Date Collected	12/4/80	12/4/80
pH	6.1	7.0
Dissolved Solids, mg/l	159	112
Dissolved Mineral Solids, mg/l	84	52
Dissolved Volatile Solids, mg/l	75	60
COD, mg/l	144	16
Freon Extractables, mg/l	4.7	<0.05
Total Organic Carbon, mg/l C	43	3
Specific Conductance, μmhos/cm	180	130
Ammonia, mg/l N	1.12	0.050
Phenols, mg/l PhOH	1.30	0.058
Total Cyanide, mg/l CN	<0.002	<0.002
Arsenic, mg/l As	0.0061	0.0029
Barium, mg/l Ba	<0.1	<0.1
Cadmium, mg/l Cd	<0.01	0.01
Copper, mg/l Cu	0.01	<0.01
Chromium, mg/l Cr	0.03	0.02
Lead, mg/l Pb	0.04	0.02
Mercury, mg/l Hg	0.0005	0.0004
Molybdenum, mg/l Mo	<0.1	0.1
Nickel, mg/l Ni	0.04	0.02
Selenium, mg/l Se	0.0013	0.0047
Silver, mg/l Ag	<0.01	<0.01

*Made in accordance with ASTM Method A

Source: The Chester Engineers, 1981.

Table 2-5. Sludge Water Leachate* (Continued, Page 2 of 2)

Source	Open Hearth	Terminal Treatment Sludges
Log No. 80-	7347	7341
Date Collected	12/4/80	12/4/80
pH	7.8	7.7
Dissolved Solids, mg/l	172	112
Dissolved Mineral Solids, mg/l	108	76
Dissolved Volatile Solids, mg/l	64	36
COD, mg/l	8	24
Freon Extractables, mg/l	5.3	1.3
Total Organic Carbon, mg/l C	1	3
Specific Conductance, μmhos/cm	230	170
Ammonia, mg/l N	0.282	0.112
Phenols, mg/l PhOH	0.008	0.013
Total Cyanide, mg/l CN	<0.002	<0.002
Arsenic, mg/l As	0.0550	0.0039
Barium, mg/l Ba	<0.1	<0.1
Cadmium, mg/l Cd	0.01	0.01
Copper, mg/l Cu	0.01	<0.01
Chromium, mg/l Cr	0.04	0.04
Lead, mg/l Pb	0.04	0.05
Mercury, mg/l Hg	<0.0002	0.0012
Molybdenum, mg/l Mo	0.4	<0.1
Nickel, mg/l Ni	0.06	0.01
Selenium, mg/l Se	0.0663	0.0070
Silver, mg/l Ag	<0.01	<0.01

*Made in accordance with ASTM Method A

Source: The Chester Engineers, 1981.

Table 2-6. Sludge Analyses

Source	Coke Plant Decant Tar	Coke Plant Ammonia Still Lime Sludge
Log No. 80-	7351	7349
Date Collected	12/4/80	12/4/80
pH	7.3	11.8
Total Solids, mg/l	—	97,680
Total Mineral Solids, mg/l	—	90,400
Total Volatile Solids, mg/l	—	7,280
Dissolved Solids, mg/l	--	18,452
Dissolved Mineral Solids, mg/l	--	14,008
Dissolved Volatile Solids, mg/l	--	4,954
Total Solids, wt %	68.13	—
Mineral Solids, wt %	23.47	—
Volatile Solids, wt %	44.66	—
COD, wt %	179	1.37
Freon Extractables, wt %	46.5	0.0207
Total Organic Carbon, mg/l C	—	1,900
Ammonia, wt % N	0.0136	0.080
Phenols, wt % PhOH	0.157	0.00219
Total Cyanide, CN	0.0003 wt %	107 mg/l
Arsenic, wt % As	0.00008	0.00041
Barium, wt % Ba	<0.004	<0.004
Cadmium, wt % Cd	<0.0004	<0.0004
Copper, wt % Cu	0.0008	0.0008
Chromium, wt % Cr	0.0008	<0.0004
Lead, wt % Pb	0.0032	0.012
Mercury, wt % Hg	<0.0001	<0.0001
Molybdenum, wt % Mo	<0.004	0.004
Nickel, wt % Ni	0.0004	0.0008
Selenium, wt % Se	0.00014	0.00030
Silver, wt % Ag	<0.001	<0.001

Source: The Chester Engineers, 1981.

Table 2-6. Sludge Analyses (Continued, Page 2 of 2)

Source	Electric Furnace Sludge	Oil Interception Plant Sludges
Log No. 80-	7350	7346
Date Collected	12/4/80	12/4/80
pH	10.7	10.5
Total Solids, mg/l	—	17,690
Total Mineral Solids, mg/l	--	13,710
Total Volatile Solids, mg/l	—	3,980
Dissolved Solids, mg/l	--	1,180
Dissolved Mineral Solids, mg/l	—	896
Dissolved Volatile Solids, mg/l	—	284
Total Solids, wt %	67.16	--
Mineral Solids, wt %	61.27	—
Volatile Solids, wt %	5.89	—
COD	0.32 wt %	5,520 mg/l
Freon Extractables	0.017 wt %	5.5 mg/l
Total Organic Carbon, mg/l C	—	1,225
Ammonia, N	0.0043 wt %	0.60 mg/l
Phenols, PhOH	<0.0001 wt %	3.24 mg/l
Total Cyanide, mg/l	<0.002	<0.01
Arsenic, As	0.00156 wt %	0.094 mg/l
Barium, Ba	0.012 wt %	3.0 mg/l
Cadmium, Cd	0.0016 wt %	<0.05 mg/l
Copper, Cu	0.0428 wt %	1.7 mg/l
Chromium, Cr	0.0552 wt %	14.6 mg/l
Lead, Pb	0.156 wt %	5.8 mg/l
Mercury, Hg	<0.0001 wt %	<0.0002 mg/l
Molybdenum, Mo	<0.004 wt %	<0.5 mg/l
Nickel, Ni	0.0052 wt %	2.0 mg/l
Selenium, Se	0.00015 wt %	0.0037 mg/l
Silver, wt % Ag	0.004	0.001

Source: The Chester Engineers, 1981.

Table 2-7. Sludge Water Leachate Quality*

Source	Oil Interception Plant Clarifier	Electric Furnace Sludge	Decanter Tank Sludge	Ammonia Still Lime Sludge	Landfill Sludge Composite
Log No.	80-7436	80-7350	80-7351	80-7349	81-1615
Date Collected	12/4/80	12/4/80	12/4/80	12/4/80	
pH	10.5	10.7	7.3	11.8	11.6
Dissolved Solids, mg/l	452	208	388	5,096	837
Dissolved Mineral Solids, mg/l	328	128	44	3,460	--
Dissolved Volatile Solids, mg/l	124	80	344	1,636	--
COD, mg/l	172	8	280	560	388
Freon Extractables, mg/l	2.0	1.3	7.3	1.3	--
Total Carbon, mg/l C	16	5	95	80	132
Inorganic Carbon, mg/l C	2	2	10	6	6
Total Organic Carbon, mg/l C	14	3	85	74	126
Specific Conductance, µmhos/cm	740	410	600	9,400	--
Ammonia, mg/l N	0.104	0.164	42.4	34.6	20.5
Phenols, mg/l PhOH	0.172	<0.002	102	4.25	49
Total Cyanide, mg/l CN	0.006	<0.002	0.080	0.475	0.012
Arsenic, mg/l As	<0.0005	<0.0005	0.0112	0.0039	0.0045
Barium, mg/l Ba	<0.1	<0.1	<0.1	0.8	--
Cadmium, mg/l Cd	0.01	0.01	0.01	0.02	--
Copper, mg/l Cu	<0.01	<0.01	<0.01	<0.01	--
Chromium, mg/l Cr	0.02	0.88	<0.01	<0.01	0.80
Lead, mg/l Pb	0.04	0.03	<0.02	0.24	--
Mercury, mg/l Hg	<0.0002	0.0003	0.0007	0.0004	--
Molybdenum, mg/l Mo	<0.1	<0.1	<0.1	<0.1	--
Nickel, mg/l Ni	0.06	0.04	0.04	0.09	--
Selenium, mg/l Se	0.0010	0.0056	0.0105	0.0759	0.0021
Silver, mg/l Ag	<0.01	<0.01	<0.01	0.03	--
wt % Going in Landfill	56	28	11.5	4.5	100

*Analyzed

Source: The Chester Engineers, 1981

2.1.5 Land Use and Population

As described in Section 2.1, land use in the area is commercial, industrial, and residential. The numerous water bodies and the Pennsbury Moran State Park provide areas of recreational uses.

The production and manufacturing processes at the Fairless Works facility are summarized in the following sections. Ammonia still lime sludge (K060), spent pickle liquor (K062), and decanter tar sludge (K087) are listed hazardous wastes which have been generated at the facility.

2.2 WASTE WATER GENERATION

2.2.1 Industrial Wastewater

Noncontact cooling water accounts for approximately two-thirds of the facility wastewater discharge. Noncontact cooling water is discharged through three storm water outfalls on the Delaware Estuary. The outfalls are regulated by NPDES Permit Number PA0013463.

Currently, most process wastewaters are collected via an industrial sewer system and conveyed to the Terminal Treatment Plant. Treatment at this plant consists of oil skimming and settling before discharge via the Number 3 west canal to the Delaware River. There is also an Oil Interception Plant (OIP) which serves the Sheet and Tin Mills. This facility provides oil skimming, acid neutralization, and metal precipitation. The effluent from the OIP is discharged to the Terminal Treatment Plant. The wastewater discharge is regulated by the NPDES permit previously referenced.

2.2.2 Sanitary Wastewater

The sanitary sewage is collected throughout the Fairless Works in a sanitary sewer and treated by the Sewage Treatment Plant. The

treatment plant has a primary clarifier and a trickling filter system. The treated effluent is discharged to the river.

2.3 SOLID WASTES GENERATION

The Fairless Works produces a variety of solid wastes, which can be separated into the following general categories:

1. General refuse,
2. Slags,
3. Sludges from air pollution abatement systems, and
4. Sludges separated from process and aqueous wastes.

2.3.1 General Refuse

General refuse is composed primarily of waste paper, wooden pallets, broken furnace lining materials, refractory bricks, waste building materials, ore fines, and rubble.

Some of this material was deposited in Borrow Pit NT-2. The majority of this type of debris, however, was piled in an area located southeast of Borrow Pit 35A (see Figure 2-1).

2.3.2 Slags

Slags are produced as a waste product from steel production furnaces. The slags are commonly classified by the type of furnace. The Fairless Works has slags originating from blast furnaces, open hearth furnaces, and electric furnaces. The open hearth slag is processed to reclaim metal before disposal into the borrow pits. The blast furnace slag is granulated, cooled in slag pits, and sold to an outside contractor as construction material. The electric furnace slag is hauled by truck to disposal pits.

2.3.3 Solids from Air Pollution Abatement Devices

This material consists of dusts from electric furnaces, open hearth furnaces, blast furnaces, and the sinter plant. The dusts

are removed from flue gases by various air pollution control devices.

2.3.3.1 Electric Furnace Sludge--There are two electric furnaces at Fairless Works. Flue dust is drawn by induced fans from the furnaces and passes through a quencher/scrubber and mist eliminators. The dusts and sludges from the emission controls for the electric furnace are a listed hazardous waste (K061).

The quenchers/scrubbers use two water sources: (1) once-through service water; and (2) recycled slurry water from the mist eliminators. At present, once-through water overflows the mist eliminators and discharges to the industrial sewer system, which leads to the Terminal Treatment Plant. Blowdown from the mist eliminator recycle system is discharged to Borrow Pit No. 3. Periodically, the water from Borrow Pit No. 3 is pumped to the Terminal Treatment Plant.

2.3.3.2 Open Hearth Precipitator Dust--The dusts from the open hearth gases are removed by dry precipitators. The red-colored dust is mixed with water and slurried to Borrow Pit No. 3 where it is settled. Excess water in BP No. 3 is pumped to the Delaware River via Canal No. 2.

2.3.3.3 Blast Furnace--Gas wash water from three blast furnaces is treated at the north and south thickeners and clarifiers. Sludge from the thickeners and clarifiers is dewatered, and the water is pumped to the filter plant. Particulates in the gases from the blast furnace are removed by a dust catcher. These particulates are collected and mixed with the blast furnace dewatered sludges and reused in the sinter plant.

2.3.3.4 Sinter Plant--The sinter plant flue dust is removed by rotocyclones. There are four wet rotocyclones employed on the

west side sinter line and two on the east side. The sludges from the rotocyclones are discharged through a pumping station to Borrow Pit No. 3.

2.3.4 Process Water and Aqueous Waste Sludges

2.3.4.1 Coke Plant Decanter Tar Sludge--Tar is produced as a waste product during the high temperature distillation of coal. The gases and volatile vapors leaving the coke ovens are cooled by spraying with flushing liquor at different points along the collection main. Flushing liquor provides a carrying medium for condensable tars and other compounds formed in the operations. The tar is separated from the flushing liquor in decanter tanks. The coke plant decanter tar sludge is a listed hazardous waste (K087). The liquor is recycled, and the settled tar is moved into hoppers by scrapers. Tar sludge was deposited in Borrow Pit 9 and 20 until 1983. U.S. Steel has subsequently shipped this waste for offsite disposal.

2.3.4.2 Coke Plant Ammonia Still Lime Sludge--The noncondensed gas and vapors leaving the collection and suction mains from the coke ovens are cooled from 165-175° to about 95°F in order to remove additional tar. During the cooling process, weak liquor containing ammonia is formed. The weak liquor is concentrated in the ammonia stills. The downcoming fluid is withdrawn from the middle of column and passes into the "lime leg," where it is treated with lime. Ammonia gas is liberated by reaction with lime, and the treated liquid is reintroduced into the still. The bottoms are discarded from the still as a sludge and placed into Borrow Pit NT-3. The ammonia still lime sludge is a listed hazardous waste (K060).

2.3.4.3 Terminal Treatment Plant Sludge--The Terminal Treatment Plant (TTP) receives wastewater from several areas of the plant. Sources include wastewater from scale pits in the hot forming

area and pipe mill, mist eliminator overflow, effluent from the oil interception plant (OIP) and miscellaneous discharges from the open hearth, coke plant, and power house water treatment plant. The primary contaminants are oil and grease, and suspended solids. Treatment consists of aeration followed by skimming and sedimentation in American Petroleum Institute (API) separators and final settling in lagoons. Supernatant is discharged to the Delaware River.

Sludge at the TTP is removed periodically by dredging. Dredged material from the lagoons is pumped to Borrow Pits 35, 35A, 35B, and 35C located east of the TTP.

2.3.4.4 Power House Water Treatment Sludge--Processes in the Power House Treatment Plant consist of clarification, filtration, and softening. The plant generates clarifier sludge blowdown, filter backwash water, and spent softener regenerants. These discharges are currently conveyed to the industrial waste sewer.

2.3.4.5 Oil Interception Plant Sludge--The Oil Interception Plant (OIP) treats waste discharges from the Sheet and Tin Mill. Waste streams include contact cooling water, pickling rinses, alkaline washes, and assorted rolling and lubricating oils. The treatment system at the OIP consists of gravity separation with oil skimmers, flash mixing for pH adjustment followed by metal precipitation, and final clarification. The clarifier effluent is pumped to Borrow Pit NT-3.

2.3.4.6 Electric Furnace Caster Sludge--The contact cooling water from the continuous caster is discharged to Scale Pit No. 8 then pumped to an adjacent concrete basin. Surface oil is skimmed from the basin to an oil-storage tank, and the sediments are periodically dredged and placed in borrow pits.

2.3.4.7 Sanitary Sludge--The primary and secondary clarifier sludges are discharged to drying beds. The dried sludges are utilized as fertilizer for the plant grounds.

2.4 WASTE CHARACTERISTICS

The amount of wastes and waste characteristics produced by the Fairless facility were reported in the Chester Engineers Report (1981) and are presented in Table 2-1 and Tables 2-2 through 2-7.

3.0 LOCATION OF SWMUs

The SWMUs identified by the EPA and Pennsylvania Department of Environmental Resources (PADER) file information and the remaining borrow pits and process units are indicated in Figure 3-1 and 3-2 (see map pocket). Identified and suspected SWMUs are described in Sections 4 and 5.

4.0 SOLID WASTE MANAGEMENT UNIT RELEASE INFORMATION

The following section provides release information for the SWMU on the U.S. Steel, Fairless Hills facility. From the available information, site conditions and site geology vary little over the facility. Therefore, the borrow pits (SWMU) have been grouped together based on the type of wastes received. According to site records, borrow pits NT-1, 1, 5, 28A, and 28B were never used for waste disposal. These pits are not considered to be SWMUs. No reference to borrow pits 6, 7, 12, 16, 18, 22, and 34 has been found in the site records and it is not known whether these borrow pits exist. During the site visit, the status of these borrow pits will be determined.

4.1 BORROW PITS 10, 10A, 15, 19, 21, 23, 24, 25, 26, 27, 29, 30, 31, 31A, 32, 33, 36, 37, 38, AND NT-2

4.1.1 Unit Characteristics

These borrow pits were constructed when the U.S. Steel facility was built in the 1950s and were backfilled prior to 1972 (or

ORIGINAL
(Red)

APPENDIX B

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES

1875 New Hope Street
Norristown, PA 19401
215 631-2411

September 28, 1983

ORIGINAL (Red)

RECEIVED

SEP 30 1983

BUCKS CO. DEPT. OF HEALTH

United States Steel Corporation
Mail Station CM-08
Fairless Hills, PA 19030

Attention: Mr. Ross E. Marteney
Chief Engineer

Re: Industrial Waste NPDES Permit PA 0013463
United States Steel Corporation
Falls Township
Bucks County

Gentlemen:

Referenced permit is enclosed.

Please study the permit carefully and direct any questions to the Permits Section of this office at 215 631-2411.

With respect to the oil interception plant discharge (monitoring station 405), tetrachloroethylene and naphthalene are included because of their presence in most cold rolling wastewaters. We wish to call your attention to the absence of monitoring data for these organics and the possible need for a toxics reduction plan to achieve compliance.

Enclosed with the copies to Mr. Moniot is a Consent Order and Agreement relating to the sinter plant discharges. Both copies should be signed by the appropriate officials and returned to our office for execution.

Very truly yours,

Joseph A. Fedla

JOSEPH A. FEDLA
Regional Water Quality Manager

JAF:JR:sk

ENCLOSURES: Permit
Master Discharge Monitoring Report
Consent Order and Agreement

cc: J. David Moniot, Manager
Environmental Control East
EPA (3WM52)
DRBC
Bucks County Health Department
Falls Township (Transmittal letter only)
Permits & Compliance
Re 30 KS52

INTERNAL REVIEW AND RECOMMENDATIONS

For Department Use Only ORIGINAL (Red)

REGIONAL ENGINEER'S REVIEW

NAME OF APPLICANT: United States Steel Corporation
PROJECT LOCATION: Falls Township Bucks County
APPLICATION NUMBER: PA0013463

BRIEF DESCRIPTION OF PROJECT: The application was submitted to renew the NPDES permit. The Fairless Works is a completely integrated steel mill producing a variety of end products including sheet, plate, bar, rod, wire, and pipe. There are a total of nine outfalls discharging various combinations of process water, contact and noncontact cooling water, and sanitary wastewater to the Delaware Estuary.

DISCUSSION (Use Additional Sheets If Necessary):
On May 27, 1982 EPA promulgated technology based effluent guidelines for the Iron and Steel Manufacturing industry, thus allowing us to process the application. For those subcategories in which EPA held BCT limits in reserve (iron making and vacuum degassing), BCT was assumed as equal to BPT.

In response to various challenges of the Guidelines, EPA entered into a settlement agreement which will require EPA to amend the May 27, 1982 Regulation. This February 24, 1983 Settlement Agreement and the unpublished Guideline amendments have been taken into account in writing this permit.

(CONTINUED ON ATTACHED SHEET)

CURRENT ESTIMATE OF COMPLETION DATE OF PROJECT (Industrial Wastes Only)

RECOMMENDATION AND ACTION

APPROVAL – RELEVANT LAWS, REGULATIONS, STANDARDS, AND POLICIES HAVE BEEN COMPLIED WITH:

Issue By Region	Issue By Central Office	Refuse	Signature	Date
☒	☐	☐	James P. Lidogh REVIEWING ENGINEER	9-27-83
☒	☐	☐	Michael D. Krisle FACILITIES ENGINEER	9/27/83
☒	☐	☐	Joseph A. Feola REGIONAL ENGINEER	9/28/83
	☐	☐	DIV. FACILITIES ENGINEER	
	☐	☐	DIVISION DIRECTOR	
		☐	BUREAU DIRECTOR	

PERMIT CONDITIONS:
1. STANDARD – N/A

2. SPECIAL (Use Additional Sheets If Necessary) –

See page 6

ORIGINAL (Red)

Discussion Continued:

A copy of the draft permit was sent to DRBC on September 22, 1982. As a result of DRBC's review changes were made to the BOD limits for the two STPs and to the metal limits for the sintering plant.

EPA designated the application for joint review and was sent an official draft permit on January 27, 1983. Prior to this a series of preliminary draft permits were sent to EPA and the applicant so that an official draft permit could be negotiated; therefore, no comments were received from EPA on the official draft.

The following is a discussion of each outfall:

Outfall 001

The discharge consists of 0.020 MGD of treated sewage from the American Can Company plant. The effluent limits are based on secondary treatment, and the discharge is expected to be in compliance.

Outfall 002

This is the east canal which has an average flow of 50.62 MGD, mostly noncontact cooling water. Process wastewaters are limited at three internal monitoring stations:

102

Process water (7.06 MGD) from the rod mill's hot forming operation discharges to the east canal at this station. One set of effluent limits, which are the same as those used in the previous NPDES permit, are in effect from issuance through June 30, 1984. The concept of using effluent limits from the previous permit was discussed at a conference on Iron and Steel industry permits in Harrisburg on August 11, 1982 and was agreed to by Central Office. A second set of limits, based on BCT, are in effect from July 1984 through expiration. Compliance with both sets of limits is expected.

202

This monitoring station carries 2.06 MGD of scrubber wastewater and contact cooling water from the electric furnace and continuous caster shop. These facilities have not operated in several years and are not expected to reopen, but the applicant wishes to keep the option available. The effluent limits up to June 30, 1984 are the same as those used in the previous NPDES permit. The limits in effect from July 1, 1984 through expiration are based on BCT and BAT. If production does resume additional treatment will be required to meet the final limits.

302

The discharge consists of 0.042 MGD of barometric condenser water from a vacuum degassing operation. Since this operation is an integral part of the electric furnace and caster shop, it too has been idle for several years. This discharge was not covered in the original NPDES permit. Initially only monitoring is required; after July 1, 1984 effluent limits based on BCT and BAT are imposed. If production does resume treatment will be required to meet the final limits.

Outfall 003

This is the central canal which has an average calculated flow of 84.93 MGD. Tidal effects make obtaining a representative sample from this outfall impossible. All wastewaters entering this outfall are limited at four internal monitoring stations:

103

This is the 68 MGD discharge from the terminal treatment plant. Processes currently contributing wastewater to this plant are the hot rolling mills, acid pickling, cold rolling mills, alkaline cleaning, galvanizing, electroplating, and coke works. The wastewater containing significant concentration of toxic metals (pickling, cold rolling, alkaline cleaning, galvanizing, and electroplating) are collected and treated at the oil interception plant (see monitoring station 403) prior to being sent to the terminal treatment plant. The effluent limits from issuance through June 30, 1984 are the same as those used in the previous NPDES permit. For the period July 1, 1984 through June 30, 1987 the suspended solids and oil & grease limits are based on BCT while the other parameters which relate to the coke wastewater remain unchanged. The effluent limits from July 1, 1987 through expiration are based on BCT. The above dates coincide with the schedule to provide separate treatment of coke wastewater (see discussion under monitoring station 107). It should be noted that DER and EPA have accepted the applicant's request for a net TSS limit for this discharge. The applicant is expected to be in compliance with each set of limits.

203

This discharge consists of 1.0 MGD of treated sewage from the U.S. Steel Corporation STP. The effluent limits are based on secondary treatment, and the discharge is expected to be in compliance.

ORIGINAL
(Red)

303

This discharge consists of 3.32 MGD of noncontact cooling water and intermittent slab spray (contact) cooling water. The effluent limits are entirely water quality based, and the discharge is expected to be in compliance.

403

Process wastewater containing significant concentrations of toxic metals (listed in 103 above) are treated by lime precipitation at the oil interception plant prior to the terminal treatment plant. This flow averages 2.82 MGD and will be limited for metals at monitoring station 403. The effluent limits, lasting from issuance through expiration, are based on BAT. Tetrachloroethylene and naphthalene are included because of their presence in most cold rolling wastewaters. No data exists on the current discharge concentrations of these organics so compliance may require a toxics reduction plan. The discharge is expected to be in compliance with respect to metals and cyanide.

Outfall 004

The discharge consists solely of 18.4 MGD of noncontact cooling water from the power house. Effluent limits are for temperature and pH only. The discharge is expected to be in compliance.

Outfall 005

This discharge consists of 30.32 MGD of cooling and process water from the blast furnaces. Only temperature and pH are limited at the outfall. Process water is limited at an internal monitoring station:

105

The blast furnace recycle system blowdown (9.94 MGD) is limited at this location. From issuance through June 30, 1984 the effluent limits are the same as those used in the original NPDES permit. From July 1, 1984 through expiration the limits are based on BCT and BAT. Total residual chlorine is limited under BAT because the EPA model treatment system uses alkaline chlorination for cyanide destruction. The discharge is expected to be in compliance. Most of this wastewater will probably be evaporated on slag.

Oufall 006

The discharge consists of 0.83 MGD of cooling and process water from the sinter plant. EPA's technology limits for sintering only cover wastewater generated by scrubbers. The sinter plant at Fairless uses dry dust collectors but generates other process waters not covered by EPA guidelines. The effluent limits in

effect from issuance through June 30, 1984 are the same as those used in the original NPDES permit. The final limits are based on DRBC regulations and guidelines (TSS, Temperature, hex chrome, lead), a wasteload allocation (zinc), and DER regulations (Oil & Grease, pH). Mass limits are not used in the final limits because of uncertainty about the flow rate after 1984. Apparently the sinter plant is in need of major repairs, and U.S. Steel has not decided between repair, shut down or rebuild. This decision will determine the post-1984 flow rate. U.S. Steel has proposed diverting wastewater from the sinter plant over to the terminal treatment plant in anticipation of being unable to meet the final suspended solids limit. The diversion is scheduled for completion in October 1985; however, the compliance deadline is July 1, 1984. U.S. Steel has requested a DER-USSC consent order and agreement to extend the deadline to 1985. Such agreement has been prepared by the review engineer and approved by DER's Bureau of Litigation. The agreement will be sent to US Steel with the final permit for signature.

Outfall 007

At present this west canal discharges 41.33 MGD of noncontact cooling water from the open hearth and coke works. Effluent limits are for temperature and pH only. The discharge is expected to be in compliance.

107

Process water from the coke works (approximately 0.68 MGD) currently discharges to the terminal treatment plant where it is diluted by over 100 times with less contaminated wastewater. Continuation of this practice is prohibited in EPA's BAT regulations so the renewed permit will require segregation and separate treatment of coke process water. Monitoring station 107 will require compliance with the BCT and BAT limits by July 1, 1987. The three year extension of the compliance date beyond 1984 is based on our acceptance of U.S. Steel's proposal to use innovative technology. U.S. Steel claims this technology, which omits the costly ammonia distillation equipment of a conventional system, can meet the technology based effluent limits at a lower cost. The permit contains a compliance schedule. Note that only the BAT indicator pollutants (total phenols, benzene, benzo(a)pyrene, and naphthalene) were used to control toxic organics. At this time there is no site specific data on the effluent levels of any of the 129 toxic pollutants in the coke wastewater. Such data should be available in five years for permit reissuance when coke wastewater is segregated and is being properly treated.

Outfall 008

This outfall formerly carried water treatment plant sludges to the river. Such sludges are no longer discharged, and the permit prohibits use of this outfall.

ORIGINAL
(Red)

Outfall 009

This discharge consists solely of 0.11 MGD of noncontact cooling water from the wire mill. Effluent limits are for temperature and pH only. The discharge is expected to be in compliance.

Public notice appeared in the Pennsylvania Bulletin on January 22, 1983. The only comments came from the applicant.

This will be a five year permit.

A Part II permit or amendment will be required to cover the facilities needed to divert the sinter plant discharge to the terminal treatment plant. A Part II permit will be required for the coke wastewater treatment plant.

Other Requirements:

A. DRBC FSOD Allocation: 87 lbs/day sewage
2500 lbs/day industrial waste

B. DRBC BOD_5 zone removal requirement of 88.5%.

C. DRBC TSS removal requirement of 85%.

D. Monitoring requirements for intake water to allow calculation of net effluent limits.

E. Definition of effective disinfection for sewage discharges.

F. Prohibition of use of chemical additives in cooling water without prior DER approval.

G. Effluent limits and monitoring requirements of all Part II permits superseded.

H. DMR's to DRBC and BCHD.

I. Thermal criteria and mixing zones. The mixing zones are based on U.S. Steel's thermal study and application for Section 316(a) variance.

ZA845.2
J. Test procedures for toxic pollutants

ER-BWQ-15.1 9/78 (Rev. 5/81)

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF WATER QUALITY MANAGEMENT

ORIGINAL
(Red)

AUTHORIZATION TO DISCHARGE UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

INDUSTRIAL PERMIT NO. PA 0013463

AMENDMENT NO. 1

In compliance with the provisions of the Clean Water Act, 33 U.S.C. Section 1251 et seq. (the "Act") and Pennsylvania's Clean Streams Law, as amended, 35 P.S. Section 691.1 et seq.,

United States Steel Corporation
Fairless Works

is authorized to discharge from a facility located at

Falls Township
Bucks County

to receiving waters named

Delaware River

in accordance with effluent limitations, monitoring requirements and other conditions set forth in Parts A, B, and C hereof.

This permit and the authorization to discharge shall expire at midnight, September 28, 1988.

The authority granted by this permit is subject to the following further qualifications:

1. If there is a conflict between the application, its supporting documents and/or amendments and the terms and conditions of this permit, the terms and conditions shall apply.

2. Failure to comply with the terms or conditions of this permit is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or for denial of a permit renewal application.

3. Application for renewal of this permit, or notification of intent to cease discharging by the expiration date, must be submitted to the Department at least 180 days prior to the above expiration date (unless permission has been granted by the Department for submission at a later date), using the appropriate NPDES permit application form. In the event that a timely and complete application for renewal has been submitted and the Department is unable, through no fault of the permittee, to reissue the permit before the above expiration date, the terms and conditions of this permit will be automatically continued and will remain fully effective and enforceable pending the grant or denial of the application for permit renewal.

4. This NPDES permit does not constitute authorization to construct or make modifications to wastewater treatment facilities necessary to meet the terms and conditions of this permit.

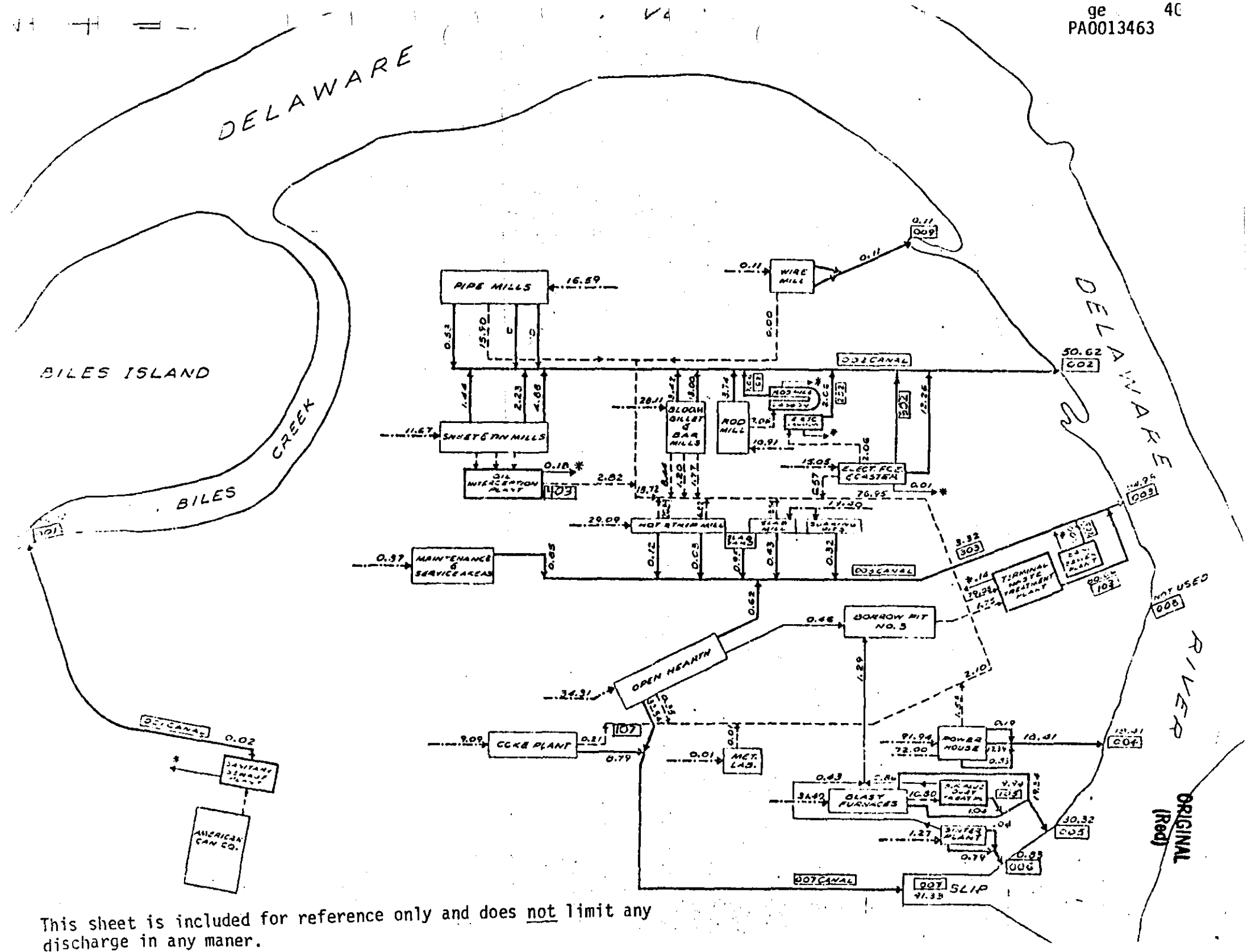
PERMIT ISSUED

DATE 3-13-84

BY Joseph A. Feola

Joseph A. Feola
Regional Water Quality Manager

TITLE



ORIGINAL (Red)

This sheet is included for reference only and does not limit any discharge in any maner.

ORIGINAL
(Red)

APPENDIX C

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
1875 New Hope Street
Norristown, PA 19401
215 631-2413

ORIGINAL
(Red)

June 2, 1981

Mr. Lee W. Thomas, Director
Bureau of Environmental Health
Bucks County Department of Health
Neshaminy Manor Center
Doylestown, PA 18901

Dear Mr. Thomas:

Enclosed is a copy of our review letter on areas A through F from the U.S. Steel Corporation, Fairless Works site, located in Falls Township, Bucks County. In our review of these applications we have attempted to address the comments mentioned in your letter of March 26, 1981 to Mr. Wayne Lynn.

We are in receipt of permit applications filed by the U.S. Steel Corporation involving encroachments on the Delaware River. Our Regional Hydrogeologist did not feel that an embankment was necessary for disposal site C and D as long as there was an adequate isolation distance between the eight foot sea level elevation and the bottom of the slag disposal area.

The concerns mentioned in your letter about area F (industrial waste disposal site) should be covered in the Phase II submission of the application which covers detailed design.

The submission for area E (hazardous waste disposal area) is very difficult for us to review at this time because we do not have regulations which adequately cover this type of site and I am not sure if we can approve a site like this which is within the 100 year flood plain area even if the area is modified.

Very truly yours,

LAWRENCE H. LUNSK
Regional Solid Waste Facilities Supervisor

Re V497

RECEIVED
QUAKERTOWN
JUN 10 1981
BUCKS CO.
DEPT. OF HEALTH

Department of Environmental Resources
1875 New Hope Street
Norristown, PA 19401
215 631-2413

ORIGINAL
(Red)

June 3, 1981

U.S. Steel Corporation
Fairless Hills, PA 19030

Attention: R. E. Gunstron
CI - 03

Gentlemen:

Our technical staff has reviewed the solid waste permit applications submitted for areas A, B, C and D which are for slag and demolition waste, area E for hazardous waste and area F for industrial or residual waste disposal at the U.S. Steel Corporation, Fairless Works site. Our comments are as follows on these applications

Area A - proposed for slag and Class III demolition waste. This site is divided into two sections, north and south. Both sections are old borrow pits. The north section contains standing water for most, if not all, of the year. This water is a combination of surface runoff and groundwater. The water level elevation is approximately 6.5 feet above sea level and appears to reflect the water elevation of Biles Creek and the Delaware River. This is also true for the south section although perhaps not the entire bottom of the pit. The depth to the bottom of the pits where they contain water is not known, however it is unlikely to be more than a few feet. From the information submitted, it is apparent that the bottom surface of both sections are less than 40 inches to the groundwater table.

The bottoms of both sections are below the 100 year flood level. However both sections are surrounded by a substantial 20 foot plus embankment. This precludes the possibility of flooding well above the 100 year level. There is an opening in the embankment of the south section which will have to be closed if Class II demolition waste and slag is to be disposed of in this section. Class III demolition waste is not permitted to be disposed of in a 100 year flood plain area. Slag and Class II demolition waste material can be disposed of on both sections of area A but this area must be prefilled with clean fill or Class I demolition waste to the eight foot elevation above sea level. The opening in the embankment would have to be filled in with Class I demolition waste only up to the eight foot elevation above sea level. Above this point it would be all right for slag disposal.

Area B - proposed for slag and Class III demolition waste. Area B is a large area partially filled with water to the east of area A. It is very similar to

ORIGINAL
(Red)

area A and the same conclusions and recommendations mentioned for area A would also apply to this area. This entire area is surrounded by 20 foot embankments. No Class III demolition waste disposal is permitted in this area.

Area C - proposed for slag and Class III demolition waste disposal. This site is the most southerly of the six areas. It appears that only minimal excavation has occurred on this site and therefore only a small portion of the area is below the normal level of the Delaware River. It is also noted that the entire site is below the 15 foot, 100 year flood elevation line and no embankment is present or proposed. This site can be suitable for slag and Class II demolition waste disposal if the low areas are filled with clean fill or Class I demolition material to at least the eight foot elevation above sea level before slag disposal begins. No Class III demolition waste disposal is permitted for this area.

Area D - proposed for slag and Class III demolition waste disposal. This site is the largest of all the proposed sites and is located to the north and adjacent to area C. This site is similar in its physical characteristics to area C and the same conclusions and recommendations made for area C would also apply to area D.

We must be supplied with cross-sectional plans of areas A through D which must indicate maximum final elevation of each disposal area and the maximum side slope angle. The enclosed module No. 6 must also be submitted along with module No. 8 for the monitoring well which will monitor each of these particular sites. This must include a plan for the restoration of the disposal area. An operational narrative must be submitted according to Chapter 75.37(k). All of this above information should be submitted to this office. We will need five copies for each site.

The quarterly analysis for the monitoring well for these four sites must also include sulfate and aluminum. This is not to be confused with groundwater information we have requested as part of your on-going groundwater study. This is specific for these sites only. Upon receipt and review of the information requested in the previous paragraphs, it is our feeling that we would be able to issue solid waste permits for areas A through D.

Area E - proposed for hazardous waste storage and disposal. We cannot complete our review of this portion of the application at this time because the detailed design regulations for hazardous waste land disposal sites have not been promulgated. I am not sure at this particular time whether we can approve the concept of a hazardous waste disposal site in a flood plain below the 100 year flood elevation even if this area is built up to a point where the bottom of the

ORIGINAL
(Red)

disposal area is above this level. You may proceed with a Phase II application submission for area F after the announcement of our hazardous waste regulation covering the design of land disposal sites. In the meantime, you must contact the EPA Regional Office in Philadelphia concerning any requirements they may have on hazardous waste disposal sites at this time. We are currently operating under an interim primacy agreement with EPA regarding the hazardous waste program. This is why you must be in contact with both agencies involving anything having to do with hazardous waste disposal.

Area F - proposed for industrial waste disposal. The plans for this area indicate that the bottom elevation of the lagoons will be brought up to the 16 foot elevation above sea level before a liner is emplaced and the embankment elevation will be at 36 feet. This should preclude any possibilities of flooding or instability caused by liner placement below or too near the water table. The design details for such things as liner installation and the collection system will have to be worked out in the Phase II review. The Phase II design must follow the format outlined in Chapter 75.38 on page 40 of the regulations. I am assuming at this time that this site is for the disposal of industrial or residual wastes only and not trash, otherwise you will have to follow the entire section for the design of sanitary landfills also. This must include an operational narrative plus the information required in Chapter 75.38(b)(3) such as utilities which must be included in the map submitted with this portion of the application.

An erosion and sedimentation control plan for earthmoving activities, which is approved by the county conservation district, will be necessary prior to the start of any construction on these sites. All trash refuse and other debris on these sites will have to be removed prior to the start of construction upon the receipt of any Department permits.

If you have any questions concerning the review of these particular applications, please contact me at 621-2413.

Very truly yours,

LAWRENCE H. LINSK
Regional Solid Waste Facilities Supervisor

CC: Mr. Lee Thomas, BCHD
Mr. T.V. Masciantonio
Mr. David Cooper
Mr. Leon Gonshor
Re 6426

Department of Environmental Resources

1875 New Hope Street
Norristown, PA 19401
215 631-2420

ORIGINAL
(Red)

October 19, 1981

United States Steel Corporation
600 Grant Street
Pittsburgh, Pa. 15230

RE: Area A
Slag Disposal Site

Gentlemen:

I am pleased to enclose Permit No. 300824 for the operation of your processing or disposal facility. It is issued in accordance with Act 97, the Pennsylvania Solid Waste Management Act.

Compliance with the limitations and stipulations that have been set forth on your permit is mandatory. You have the right to appeal any limitation or stipulation as stated on your permit.

This action of the Department may be appealed to the Environmental Hearing Board, First Floor Annex, Blackstone Building, 112 Market Street, Harrisburg, PA 17120, (717) 787-3483, by any aggrieved person pursuant to Section 1921-A of the Administrative Code of 1929, 71 P.S. §510-21; and the Administrative Agency Law, 2 Pa. C.S. Chapter 5A. Appeals must be filed with the Environmental Hearing Board within 30 days of receipt of written notice of this action unless the appropriate statute provides a different time period. Copies of the appeal form and the regulations governing practice and procedure before the Board may be obtained from the Board.

If you have any questions concerning the enclosed permit and/or the requirements set forth by the Pennsylvania Solid Waste Management Act, please contact the Bureau of Solid Waste Management, 1875 New Hope Street, Norristown, PA 19401, AC215-631-2413.

Sincerely yours,

WAYNE L. LYNN
Regional Solid Waste Manager

cc: Falls Township
Bucks County Health Department ✓
Solid Waste Management
SW23

ER-SWM-8: Rev. 9/80

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF SOLID WASTE MANAGEMENT

Permit
For

Solid Waste Disposal and/or Processing Facility
FORM NO. 8

ORIGINAL
(Red)

Permit No. 300824
Date Issued 10/19/81
Date Expired

Under the provisions of the Pennsylvania Solid Waste Management Act of July 7, 1980, Act 97, a permit for a solid waste disposal and/or processing facility at (municipality) Falls Township in the County of Bucks is granted to (applicant) United States Steel Corporation

(address) 600 Grant Street
Pittsburgh, PA 15230

This permit is applicable to the facility named as United States Steel Corporation Fairless Works and described as:

United States Steel Corporation Slag Disposal Site - Area A

Latitude 40°10'03"
Longitude 74°45'05"

This permit is subject to modification, amendment and supplement by the Department of Environmental Resources and is further subject to revocation or suspension by the Department of Environmental Resources for any violation of the applicable laws or the rules and regulations adopted thereunder, for failure to comply in whole or in part with the conditions of this permit and the provisions set forth in the application no. 300824 which is made a part hereof, or for causing any condition inimical to the public health, safety or welfare.

See attachment for waste limitations and/or special conditions

Wayne L. Lynn
FOR THE DEPARTMENT OF
ENVIRONMENTAL RESOURCES

ICD44

THIS PERMIT IS NON-TRANSFERABLE

ER-SWM-8A:5/79

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF SOLID WASTE MANAGEMENT

ORIGINAL (Red)

Permit
For

Solid Waste Disposal and/or Processing Facility
FORM NO. 8

Permit No. 300824
Date Issued 10/19/81
Date Expired

1. This solid waste permit is based upon application No. 300824 which was submitted to the Department of Environmental Resources' Regional Office in Norristown on January 7, 1981. This is for a site known as Area A which is permitted for the disposal of open hearth slag, electric furnace slag and blast furnace slag which is generated by the United States Steel Corporation Fairless Works facility. This approved solid waste permit application includes Groundwater Module No. 2 - Phase I, Site Application Module - Phase II, Groundwater Module No. 8 - Phase II, Slag Disposal Area Module No. 6, Industrial and Hazardous Waste Disposal Site Module No. 7, Site Plans and an Operational Narrative.

2. Nothing in this permit shall be construed to supersede, amend, or authorize violation of, the provisions of any valid and applicable local law, ordinance, or regulation, provided that said local law, ordinance, or regulation is not pre-empted by the Pennsylvania Solid Waste Management Act, the Act of July 7, 1980, Act 97, 35 P.S. 6018.101, et seq.

3. Prior to the start of operation both sections of this area must be prefilled with clean fill or Class I demolition waste material to an 8 foot elevation above sea level. The opening in an existing embankment must be completely closed with soil prior to the start of any filling operations.

4. Monitoring well Nos. 42, 43 and 44 must be sampled and analyzed for the following parameters on an annual basis starting with the date of permit issuance: pH, alkalinity, TDS, NH_4-N, Cl, COD, Ni, Cu, Zn, Pb, Cd, TOC, phenols, Cn, plus a general VOA scan. These same wells must be sampled and analyzed on a quarterly basis or four times per year starting with the date of permit issuance for the following parameters: pH, alkalinity, TDS, NH_4-N, Cl, COD, TOC, phenols, and a VOA scan. Prior to the start of operation you will be required to submit two complete annual analysis reports from samples taken at each monitoring well. The sampling and analysis work must be done on two occasions one month apart before the filling operation begins.

5. Form No. 6, Certification of Facility Design and Construction must be submitted to the Department of Environmental Resources Regional Office after the construction work for this facility has been completed. This should be done prior to the start of any filling activities.

THIS PERMIT IS NON-TRANSFERABLE

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL RESOURCES
BUREAU OF SOLID WASTE MANAGEMENT

ORIGINAL
(Red)

Permit
For

Solid Waste Disposal and/or Processing Facility
FORM NO. 8

Permit No. 300824
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6. An erosion and sedimentation control plan for earthmoving activities which is approved by the County Conservation District must be obtained prior to the start of construction on this site. A copy of the approval letter from the County Conservation District must be sent to this office.

7. The disposal of municipal waste, residual waste other than slag, hazardous waste or Class III demolition waste at this site is prohibited.

1CD44.1

THIS PERMIT IS NON-TRANSFERABLE

ORIGINAL
(Red)

APPENDIX D

Table A
Groundwater Monitoring Well Data
U.S. Steel Corporation

Fairless Works
March 22, 1984

Well No. *	Elevation (ft.)	Static Work Level; Distance from top of Steel casing (ft.)		Elevation of Static Water Level (ft.)	Depth of well measured from top of steel casing (ft.)		
		EPA 3/22/84	Constractor 3/20/84		EPA 3/22/84	Contractor 3/20/84	Driller 7/2-7/8/80
5 up grd.	21.6	11.0	10.9	10.6	26.6	26.6	26.5
6 up grd.	21.7	10.6	10.3	11.1	23.9	23.9	22.0
7A dwn grd.	23.9	14.6	14.3	9.3	28.4	28.3	27.0
8 dwn grd.	18.1	7.5	7.5	10.6	31.2	31.5	21.5
10 dwn grd.	16.8	8.5	8.4	8.3	25.6	25.5	26.5

*See Rigure 2 for location of monitoring wells.

ORIGINAL (Red)

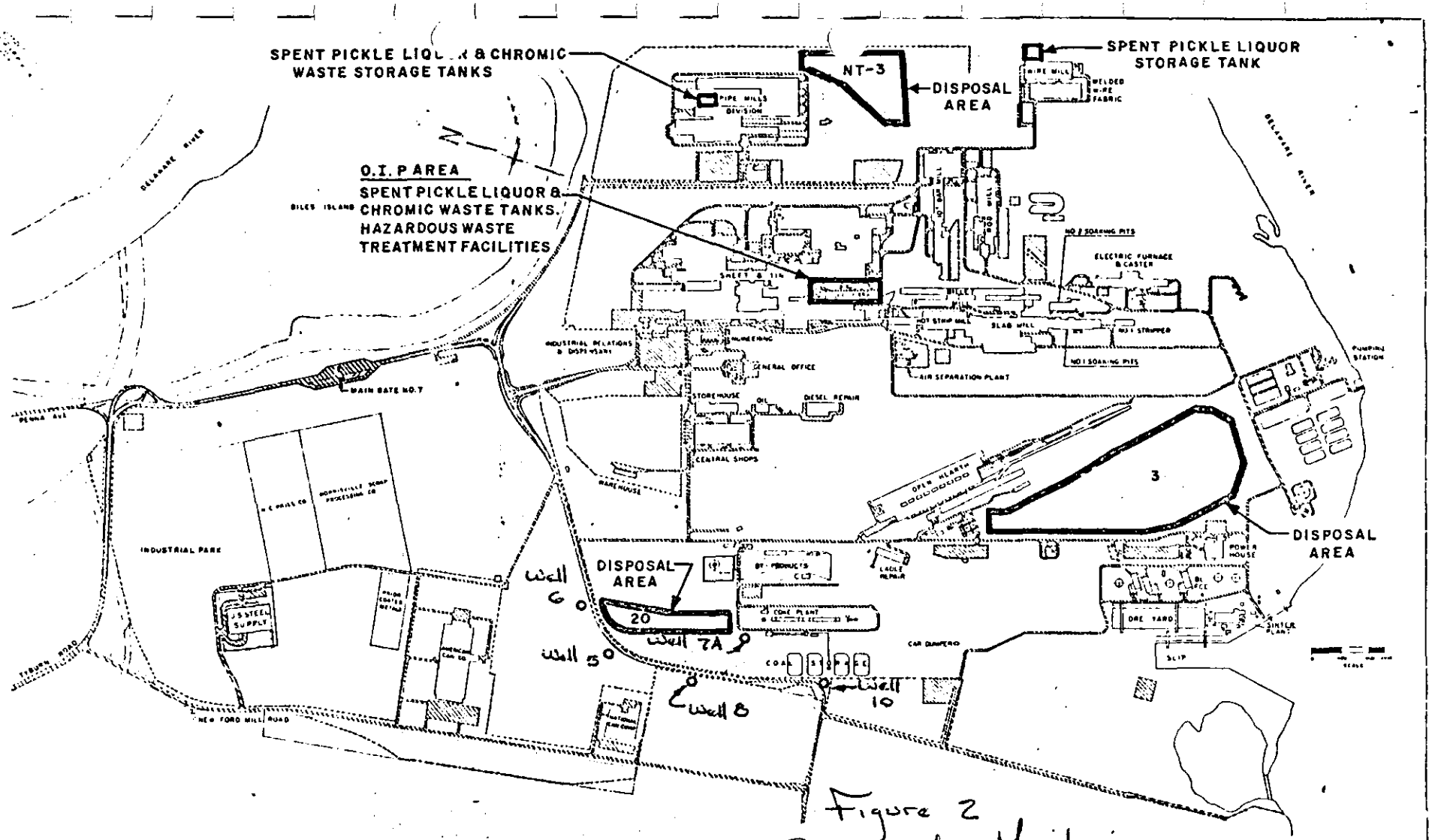

Figure 2
Groundwater Monitoring Well Locations
U. S. Steel Corp.
Fairless Hills, Pa.

NOTE:
NT-3, 20 & 3 = EXISTING BORROW PITS

R.C.R.A. FACILITIES INSPECTION
HAZARDOUS WASTE
40 CFR PART 265, § 265.15

UNITED STATES STEEL CORPORATION
FAIRLESS WORKS
FAIRLESS HILLS, PENNA.

DRN. BY J.F.M.
DATE: 12-1-80

SK-10813

ORIGINAL (Red)

RECEIVED
OCT 07 1985

RICHARD DWOREK
DIRECTOR—ENVIRONMENT
ENVIRONMENTAL AFFAIRS

United States Steel Corporation
ONE TECH CENTER DRIVE
MONROEVILLE, PENNSYLVANIA 15146
412/825-2974

ORIGINAL (Red)

October 3, 1985

Mr. Leon Gonshor
Regional Director
Department of Environmental Resources
1875 New Hope Street
Norristown, Pennsylvania 19401

Dear Mr. Gonshor:

Re: FAIRLESS WORKS GROUNDWATER MONITORING

In conformance with regulatory requirements, please find enclosed the following reports for the June 1985 sampling round.

Slag Sites: Summary Report

Borrow Pit 20:

Summary Report
Statistical Comparison
Exception Report
Comparison with Drinking Water Standards
PennDER Form ER-SWM-92

As shown in the enclosures for Site 20, statistically significant changes (SCC) have been determined for the following parameters:

ph: upgradient Well 5; downgradient Wells 6, 8 and 10

Specific Conductance: upgradient Well 5

TOC: upgradient Well 6

OCT 07 1985

United States Steel Corporation
ORIGINAL (Red)

Statistical comparisons were performed using 1983 data from Wells 5 and 6 as background. These results compare to previous SSCs using 1983 background data as shown on the following summary:

	Well No.				
Quarter	5*	6*	7A	8	10
8401	pH, S.C.	-	pH	-	pH
8402	pH, S.C.,TOX	pH, TOX	-	pH	pH
8403	pH, S.C.	pH	-	-	pH
8404	pH, S.C.	TOC	pH	-	pH
8501	S.C.	pH, TOC	pH	pH	pH
8502	pH, S.C.	pH, TOC	-	pH	pH

*Upgradient

SSCs for TOC in upgradient Well 6 have been detected for the last three rounds. However, the following tabulation of TOC data from previous rounds does not suggest that a trend toward increasing concentrations is developing in the well.

Round	Average TOC Sampling Results (mg/l)
8301	73.3
8302	50.7
8303	80.9
8304	53.0
8401	50.3
8402	39.3
8403	46.9
8404	76.3
8501	74.7
8502	77.2

If your have any questions regarding this submittal, please call me.

Very truly yours,

A. A. Spinola

A. A. Spinola, Manager
Hazardous Waste
Environmental Affairs

AAS/es

attachment

3

ANTHONY A. SPINOLA
MANAGER—HAZARDOUS WASTE
ENVIRONMENTAL AFFAIRS

United States Steel Corporation
ONE TECH CENTER DRIVE
MONROEVILLE, PENNSYLVANIA 15146
412/825-2067

Bucks

ORIGINAL (Red)

JUL 14 1987

July 9, 1987

Mr. Leon T. Gonshor
Regional Director
Department of Environmental Resources
Commonwealth of Pennsylvania
1875 New Hope Street
Norristown, PA 19401

Dear Mr. Gonshor:

Re: Slag Disposal Site
Fairless Works Permit No. 300825
Groundwater Monitoring, First Quarter 1987

In conforming with requirements of Permit No. 300825, please find enclosed the first quarter 1987 groundwater monitoring results for the Fairless Works slag disposal site.

Very truly yours,

A. A. Spinola

AAS/d(2.56)
Enclosure

7/14/87

Lynn / Paula

For your review & return to me by [illegible]

[illegible]

Table 1
Groundwater Chemistry Data - Slag Area Monitoring Wells
USX Corporation, Fairless Works
First Quarter 1987

Parameter	Units	Well Number							
		38	39	39 Replicate	42	43	44	53	79
Groundwater Elevation	ft	3.1	3.4	3.4	4.9	6.5	5.1	3.7	6.6
Temperature	°C	13	11	11	12	13	13	16	16
pH	pH units	6.7	6.6	6.6	7.1	7.5	7.2	7.5	6.8
Specific Conductance @ 25°C	µmhos/cm	550	600	600	1100	700	1100	700	600
Total Organic Carbon	mg/l	11	4.1	3.4	6.8	4.2	5.3	5	2.7
Chemical Oxygen Demand	mg/l	44	31	31	70	31	31	18	18
Total Dissolved Solids @ 180°C	mg/l	327	347	333	633	383	647	380	340
Alkalinity	mg/l CaCO3	96	92	88	32	112	100	320	48
Chloride	mg/l	60	28	28	240	90	150	3	39
Sulfate	mg/l	80	110	120	58	74	120	14	140
Nitrate	mg/l NO3-N	< 0.1	< 0.1	< 0.1	0.7	< 0.1	< 0.1	< 0.1	< 0.1
Ammonia	mg/l NH3-N	3.7	0.2	< 0.1	27	6.7	21	6.7	< 0.1
Calcium	mg/l	48	57	57	97	66	120	79	53
Magnesium	mg/l	18	21	21	18	17	28	38	17
Sodium	mg/l	20	25	24	42	28	33	4.4	24
Potassium	mg/l	9.8	5.2	5.2	24	19	11	4.1	14
Cadmium	mg/l	0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Copper	mg/l	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.01
Lead	mg/l	< 0.001	< 0.001	0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001
Nickel	mg/l	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Zinc	mg/l	0.16	0.07	0.03	< 0.01	< 0.01	< 0.01	< 0.01	0.15
Cyanide	mg/l	0.01	0.01	0.02	0.02	0.03	0.02	0.02	0.02
Phenolics	mg/l	< 0.01	< 0.01	0.02	< 0.01	< 0.01	< 0.01	0.28	0.04

ORIGINAL (Red)

Table 2
Volatile Organic Chemistry Data - Slag Area Monitoring Wells
USX Corporation, Fairless Works
First Quarter 1987

Parameter	Units	Well Number							
		38	39	39 Replicate	42	43	44	53	79
Acrolein	µg/l	< 250	< 250	< 250	< 250	< 250	< 250	< 250	< 250
Acrylonitrile	µg/l	< 250	< 250	< 250	< 250	< 250	< 250	< 250	< 250
Benzene	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Carbon Tetrachloride	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorobenzene	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloroethane	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,1-Trichloroethane	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethane	µg/l	7	< 5	9	< 5	< 5	< 5	< 5	14
1,1,2-Trichloroethane	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1,2,2-Tetrachloroethane	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chloroethane	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
2-Chloroethylvinyl Ether	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chloroform	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,1-Dichloroethylene	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trans-1,2-Dichloroethylene	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,2-Dichloropropane	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
1,3-Dichloropropylene	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Ethylbenzene	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methylene Chloride	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methyl Chloride	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Methyl Bromide	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Bromoform	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Dichlorobromomethane	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Chlorodibromomethane	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Tetrachloroethylene	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Toluene	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5
Trichloroethylene	µg/l	8	28	28	< 5	< 5	< 5	< 5	< 5
Chloroethylene	µg/l	< 5	< 5	< 5	< 5	< 5	< 5	< 5	< 5

APPENDIX E

ORIGINAL (Red)

Table 5-1. Summary of SWMU Release Information (Continued, Page 2 of 2)

SWMU	Ground Water Migration	Surface Water Migration	Air Migration	Soil Migration	Subsurface Gas Migration	Comments
BP NT-3	D	NE	U	E	NE	Contaminated soil along the pit perimeter was removed in 1984-1985
BP NT-4	D	U	NE	E	NE	
BP 20	D	U	NE	E	NE	
BP NTA	D	NE	U	E	NE	
BP NTB	D	NE	U	E	NE	
BP 8	E	U	NE	E	NE	
BP 13A	D	U	U	E	NE	
BP 14N	E	E	E	E	NE	
BP 14S	E	E	E	E	NE	
BP 17	E	E	E	E	NE	
Oil Interception Plant	U	R*	U	U	NE	
Terminal Treatment Plant	U	R	U	U	NE	
Rod Mill Lagoon	U	R	U	U	NE	

*Regulated by NPDES permit.

Key:
D = Documented.
DOS = Documented, but probably caused by other source.
E = Expected.
NE = Not expected.
U = Unknown (additional information will be sought for all unknowns).

Source: ESE, 1986.

Table 5-1. Summary of SWMU Release Information

SWMU	Ground Water Migration	Surface Water Migration	Air Migration	Soil Migration	Subsurface Gas Migration	Comments
BP 10	DOS	NE	NE	NE	NE	
BP 10A	DOS	NE	NE	NE	NE	
BP 19	DOS	NE	NE	NE	NE	
BP 21	DOS	NE	NE	NE	NE	
BP 23	DOS	NE	NE	NE	NE	
BP 24	DOS	NE	NE	NE	NE	
BP 25	DOS	NE	NE	NE	NE	
BP 26	DOS	NE	NE	NE	NE	
BP 27	DOS	NE	NE	NE	NE	
BP 29	NE	NE	NE	NE	NE	
BP 30	NE	NE	NE	NE	NE	
BP 31	DOS	NE	NE	NE	NE	
BP 31A	DOS	NE	NE	NE	NE	
BP 32	NE	NE	NE	NE	NE	
BP 33	NE	NE	NE	NE	NE	
BP 36	NE	NE	NE	NE	NE	
BP 37	NE	NE	NE	NE	NE	
BP 38	NE	NE	NE	NE	NE	
BP NT-2	DOS	NE	NE	NE	NE	
BP 15	NE	U	NE	NE	NE	PB15 received slag from the blast furnace
BP 2S	E	U	NE	E	NE	
BP 2N	D	U	NE	E	NE	
BP 4	D	U	NE	E	NE	
BP 8A	D	U	NE	E	NE	
BP 10B	D	U	NE	E	NE	
BP 9	E	U	E	E	NE	
BP 13	D	U	E	E	NE	
BP 5A	D	U	NE	E	NE	
BP 8B	D	U	NE	E	NE	
BP 40	D	U	NE	E	NE	
BP 35	D	E	U	E	NE	
BP 35A	D	E	U	E	NE	
BP 35B	D	E	U	E	NE	
BP 35C	D	E	U	E	NE	
BP 3	D	U	U	E	NE	

2.3.4.7 Sanitary Sludge--The primary and secondary clarifier sludges are discharged to drying beds. The dried sludges are utilized as fertilizer for the plant grounds.

2.4 WASTE CHARACTERISTICS

The amount of wastes and waste characteristics produced by the Fairless facility were reported in the Chester Engineers Report (1981) and are presented in Table 2-1 and Tables 2-2 through 2-7.

3.0 LOCATION OF SWMUs

The SWMUs identified by the EPA and Pennsylvania Department of Environmental Resources (PADER) file information and the remaining borrow pits and process units are indicated in Figure 3-1 and 3-2 (see map pocket). Identified and suspected SWMUs are described in Sections 4 and 5.

4.0 SOLID WASTE MANAGEMENT UNIT RELEASE INFORMATION

The following section provides release information for the SWMU on the U.S. Steel, Fairless Hills facility. From the available information, site conditions and site geology vary little over the facility. Therefore, the borrow pits (SWMU) have been grouped together based on the type of wastes received. According to site records, borrow pits NT-1, 1, 5, 28A, and 28B were never used for waste disposal. These pits are not considered to be SWMUs. No reference to borrow pits 6, 7, 12, 16, 18, 22, and 34 has been found in the site records and it is not known whether these borrow pits exist. During the site visit, the status of these borrow pits will be determined.

4.1 BORROW PITS 10, 10A, 15, 19, 21, 23, 24, 25, 26, 27, 29, 30, 31, 31A, 32, 33, 36, 37, 38, AND NT-2

4.1.1 Unit Characteristics

These borrow pits were constructed when the U.S. Steel facility was built in the 1950s and were backfilled prior to 1972 (or

shortly after) with slag or dredging spoils. There is no evidence to indicate the presence of a liner or leachate colletion system. The dimensions and depths of these pits are unspecified. Generally, the portions of the pits not containing waste materials are filled with water. Several of the ponds contain aquatic life. Areas not covered by water are vegetated by trees and bushes.

BP 10A has been covered with asphalt and is being used as a parking lot as are portions of BP 23, 24, and 25. BP 30 and 19 have been filled and are currently covered by the roadway. BP 32 has been entirely filled with slag and is currently used as a storage area for refractory brick. Borrow pit 15 is located east of the coke plant and is approximately 300 ft long, 200 ft wide, and 10 ft deep. In 1972, the borrow pit was partially filled with slag from the blast furnace. Filling occurred by dumping. Areas not filled with slag contained water with a distinct sulfide odor. A site visit conducted in 1980 (The Chester Engineers, 1981) indicated that the pit had been filled with slag.

4.1.2 Waste Characteristics

These borrow pits have been either completely or partially filled with slag or dredging spoils. Waste characteristics of the slag and leachate from the slag are discussed in Section 2.3.

4.1.3 Pollutant Migration Pathways

4.1.3.1 Ground Water--Percolation through the slag and direct contact with ground water can generate leachate containing heavy metals. Ground water contours indicate that ground water flows toward Biles Creek and the Delaware River. Site records indicate that ground water is in contact with the slag during the seasonal high water table; however, since analysis of slag leachate (see

Table 2-3) indicates that heavy metal contamination is insignificant, ground water contamination is not expected.

4.1.3.2 Surface Waters--Available data indicate that most borrow pits are within the 100-year floodplain. Records do not indicate whether surface water runoff and runon are controlled; however, since limited hazardous constituents are present and the pit contents are below grade, surface water migration of contaminants is not expected.

4.2.3.3 Air--Since the site files indicate that the borrow pits are inactive, are covered with asphalt, or have a vegetative cover, volatile or particulate emissions are not expected.

4.1.3.4 Soils--Soils beneath the borrow pits can act as a transfer medium for contaminants. There are no records of soil sampling or contaminant migration for these borrow pits. Soils adjacent to and beneath the borrow pits are not expected to attenuate heavy metals; however, leachable heavy metals concentrations in the slag are insignificant. Soil contamination, therefore, is not expected.

4.1.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.1.4 Evidence of Release

4.1.4.1 Ground Water--There were no monitor wells located in proximity of BP 29, 30, 36, and 37 to determine the quality of the ground water in these areas. Ground water quality data (1981, 1984, and 1985) from monitor wells for BP 23, 24, 25, 26, 27, and NT-2 show significant increases in TDS and alkalinity. 1,2-trans-dichloroethylene, 1,1,1-trichloroethane, and trichloroethylene have been found in significant concentrations in these downgradient wells. These volatile compounds are not

expected to be present in slag and must be from some other source.

Significant increases in several parameters [ammonia, cyanide, phenol, TDS, and chloride] were observed in monitor wells in the vicinity of BP 10, 10A, 19, 21, 31, and 31A. This contamination may be caused by the proximity of these wells to other borrow pits which contain hazardous constituents. Ground water quality data (The Chester Engineers, 1981) for wells adjacent to BP 15 show an increase in TDS. The presence of chloroform was also detected in downgradient wells. This contamination may be caused by some other nearby source such as BP 20 or 41 because volatile components are not expected to be present in slag. No record of contaminant migration by ground water from Pits 29, 30, 32, 33, 36, 37, and 38 was in the files.

4.1.4.2 Surface Water--Very limited surface water quality data are available for these borrow pits; however, the information indicates no evidence of surface water contamination. No record of contaminant migration by surface water was available in the files.

4.1.4.3 Air--No ambient air analyses were available in the files nor was there evidence of releases to the air.

4.1.4.4. Soils--No soil analyses were available in the files.

4.1.4.5 Subsurface Gas--No record of the generation of subsurface gas was in the files.

4.1.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminants transported by ground water.

4.2 BORROW PITS 2N, 2S, 4, 8A, AND 10B

4.2.1 Unit Characteristics

The borrow pits were constructed when the facility was built in the 1950s. The pits do not have liners or a leachate collection system. These pits have been filled or partially filled with slag and other miscellaneous solid wastes. Some slag debris and coke fines have been dumped along the perimeter of BP 8A and 10B. The unfilled portions of the pits contain water described in the records as cloudy-milky green. The water in the pits indicates that the pits intersect the water table. BP 2S is part of the No. 2 (central) canal. Both BP 2S and 2N have two 6-ft diameter drain pipes at the south end of the pits. The purpose of these drains and discharge locations are not specified. These pits (in addition to BP 20) currently serve as storm runoff areas for the facility. BP 8A also receives occasional overflows of coke quench water from the coke plant ground sump.

4.2.2 Waste Characteristics

These borrow pits receive stormwater runoff from various areas of the plant. Analysis (Chester Engineers, 1981) of pit contents indicates the presence of small amounts of contaminants, particularly oil. These pits have also received slag and coal dust.

4.2.3 Pollutant Migration Pathways

4.2.3.1 Ground Water--Calculated permeabilities (5.6×10^{-4} - 1.75×10^{-3} cm/sec, Chester Engineers, 1981) for the soils in the vicinity of these borrow pits indicate that contaminants will readily migrate in the surficial aquifer. Ground water contours indicate that these borrow pits are in contact with the water table. Analysis of contents of the pits indicates the presence of contaminants; therefore, ground water migration is expected.

4.2.3.2 Surface Water--Analysis of the contents of the pits indicates:

1. High oil contents in all borrow pits grouped within this SWMU,
2. High alkalinity and TDS levels in BP 4 and 8A, and
3. High ammonia levels in BP 8A.

Although site records indicate the presence of hazardous materials, not enough information is available to determine if a release to surface waters has occurred via the drain pipes. This determination will be made during the visual site inspection.

4.2.3.3 Air--Based on the site records, air emissions are not expected.

4.2.3.4 Soils--Soils adjacent to the borrow pit can act as a transfer medium for contaminants. Since no liner exists, soil contamination is expected.

4.2.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.2.4 Evidence of Release

4.2.4.1 Ground Water--Ground water quality data (The Chester Engineers, 1981) from monitor wells in the vicinity of these borrow pits indicate that ground water contamination has occurred near BP 2N, 4, 8A, and 10B. There are elevated levels of alkalinity, TDS, ammonia, phenol, chloroform, and bromodichloromethane. Because of the proximity of other contaminated borrow pits, it is not known if the contamination is due solely to BP 2N, 4, 8A, or 10B.

4.2.4.2 Surface Water--No evidence of surface water contamination was available in the files.

4.2.4.3 Air--No ambient air quality data were available in the files.

4.2.4.4 Soil--No record of soil sampling was available in the files.

4.2.4.5 Subsurface Gas--No record of the generation of subsurface gas was in the files.

4.2.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminants transported by ground water. Aquatic species are target populations for surface water discharges.

4.3 BORROW PITS 9 AND 13

4.3.1 Unit Characteristics

BP 13, a rectangular-shaped pit approximately 800 ft long, 400 ft wide, and of unknown depth, was constructed when the facility was built in the 1950s. BP 9 was filled prior to 1972 and is currently used for iron ore storage. The borrow pits are unlined and have no leachate collection system.

4.3.2 Waste Characteristics

The wastes disposed in BP 13 and 9 are slag, ladle house solid wastes, Vac-All dust, paint waste, tar from the coke works, and coke plant tar decanter sludge. Hazardous constituents expected to be present in the wastes are heavy metals, phenols, and naphthalene. Coke plant decanter tar sludge is a listed hazardous waste (K087).

4.3.3 Pollutant Migration Pathways

4.3.3.1 Ground Water--Ground water contours indicate that the pits are in proximity to the shallow water table. The measured

permeability coefficients for soils in the vicinity of BP 13 and BP 9 (1.75×10^{-3} to 4.81×10^{-4} cm/sec, Chester Engineers, 1981) indicate that soils are moderately permeable. Therefore, ground water contamination is expected.

4.3.3.2 Surface Water--Analyses of surface water in BP 13 and 9 indicate elevated levels of ammonia, cyanide, phenols, and alkalinity. Information available in the records is insufficient to allow a surface water release determination. This determination will be made during the visual site inspection.

4.3.3.3 Air--Air emissions are expected because of the presence of volatile compounds in the wastes.

4.3.3.4 Soils--Soils adjacent to borrow pits can act as a transfer medium for contaminants. Since no liner exists, soil contamination is expected.

4.3.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.3.4 Evidence of Release

4.3.4.1 Ground Water--Ground water quality data (The Chester Engineers, 1981) from monitor wells in the vicinity of BP 13 indicate elevated concentrations of ammonia, dissolved solids, phenols, chloroform, and chlorodibromomethane. Monitor Well 19 downgradient of BP 9 has been destroyed and no data are available. However, other monitoring wells in the vicinity of BP 9 indicate an increase in TDS.

4.3.4.2 Surface Water--No record of surface water contamination was available in the files.

4.3.4.3 Air--No ambient air quality data were available in the files.

4.3.4.4 Soil--There is no record of soil sampling and analyses.

4.3.4.6 Subsurface Gas--No record of the generation of subsurface gas was available in the files.

4.3.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminants transported by ground water. Employees in proximity of the pits are potential receptors of volatile emissions.

4.4 BORROW PITS 5A AND 8B

4.4.1 Unit Characteristics

BP 5A is a rectangular shaped pit approximately 500 ft long and 200 ft wide. BP 8B is a rectangular shaped pit approximately 200 ft across the base. Both borrow pits are of unknown depth. BP 5A contains water and is the northern part of the No. 3 (western) canal. Since 1972, both borrow pits have received slag and coke fines. BP 8B has been filled with this material. In addition to slag and coke fines, BP 8B has received sump pump discharge from the coal conveyor pit since 1972. A sump at the coal car dumper also periodically discharged water to BP 5A. Approximately 200 gpm of water is pumped from BP 5A to quench the blast furnace slag. The excess quench water is returned to the borrow pit. The water in BP 5A is described as milky green.

4.4.2 Waste Characteristics

Waste characteristics for blast furnace slag have been discussed in Section 2.3. Coke dust is expected to contain heavy metals.

4.4.3 Pollutant Migration Pathways

4.4.3.1 Ground Water--Ground water contours indicate the bottoms of these borrow pits are in proximity to the shallow water table. Measured permeabilities (1.75×10^{-3} cm/sec, Chester Engineers, 1981) of soil in the vicinity of these borrow pits indicate that these soils are relatively permeable. Based on this information, ground water contamination is expected.

4.4.3.2 Surface Water--Insufficient information is available to determine whether contaminant migration by surface water is occurring. This determination will be made during the visual site inspection.

4.4.3.3 Air--Based on the waste characteristics, air emissions are not expected.

4.4.3.4 Soils--Soil contamination is expected because ground water contamination is documented.

4.4.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.4.4 Evidence of Release

4.4.4.1 Ground Water--Ground water quality data (The Chester Engineers, 1981) from wells downgradient of these borrow pits indicate high levels of alkalinity, TDS, and ammonia. A moderate increase in phenols and the presence of bromochloromethane and chlorodibromomethene were noted. No analyses for heavy metals are available.

4.4.4.2 Surface Water--No surface water analyses were available in the files.

4.4.4.3 Air--No ambient air quality data were available in the files.

4.4.4.4 Soils--No soil analyses were available in the files.

4.4.4.5 Subsurface Gas--No record of the generation of subsurface gas was available in the files.

4.4.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminants transported by ground water.

4.5 BORROW PIT 40

4.5.1 Unit Characteristics

BP 40 is located on the eastern edge of the facility and borders the Delaware River. The borrow pit is approximately 55 acres. There are no records to indicate that the pit is lined or contains a leachate collection system. A small portion of the pit has been filled with slag. A site visit in 1980 indicated that the pit contained no ponded water. The area was stained red, and nearby vegetation was dead.

4.5.2 Waste Characteristics

The pit had been used in 1977 to dispose of rinse acid water and borax from the wire mill. According to available records, this practice was stopped after the NPDES permit was issued, and the waste was diverted to the OIP. Waste acid is expected to be contaminated by metals and will lower the pH of receiving waters.

4.5.3 Pollutant Migration Pathways

4.5.3.1 Ground Water--Ground water contours indicate that ground water flow is toward the Delaware River and that the bottom of the pit is in contact with the water table. Measured permeability coefficients (3.21×10^{-3} to 3.16×10^{-3} cm/sec,

Chester Engineers, 1981) for soils in the vicinity of BP 40 indicate that the soils are relatively permeable. Based on this information, ground water contamination is expected.

4.5.3.2 Surface Water--Insufficient information is available to determine whether contaminant migration by surface water is occurring. This determination will be made during the visual site inspection.

4.5.3.3 Air--Air emissions are not expected.

4.5.3.4 Soils--Soil adjacent to the borrow pit can act as a transfer medium for contaminants. Since no liner exists, soil contamination is expected.

4.5.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.5.4 Evidence of Release

4.5.4.1 Ground Water--Ground water quality data (Chester Engineers, 1981) from wells downgradient of the borrow pit indicate a significant decrease in pH and a moderate increase in phenol.

4.5.4.2 Surface Water--No surface water analyses were available for the adjacent Delaware River. Analysis of surface water in BP 40 in 1980 indicated an elevated TDS level and a decreased pH.

4.5.4.3 Air--No measurements of ambient air quality were available in the files.

4.5.4.4 Soils--No soil analyses were available in the files. The reddish stained soil and dead vegetation suggest that soil contamination has occurred.

4.5.4.5 Subsurface Gas--No record of the generation of subsurface gas was available in the files.

4.5.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminants transported by ground water.

4.6 BORROW PITS 35, 35A, 35B, AND 35C

4.6.1 Unit Characteristics

Borrow pits 35, 35A, 35B, and 35C were constructed when the facility was built in the 1950s. These borrow pits are on the southern edge of the plant bordering the Delaware River. All lie within the 100-year floodplain of the Delaware River. These pits are similar in size (approximately 3.7 acres each), unlined, and of unknown depth. Ground water contours indicate that the bottoms of the pits are in contact with the shallow water table.

4.6.2 Waste Characteristics

Since 1977, underflow and dredgings from the TTP have been discharged to Borrow Pits 35, 35A, 35B, and 35C. Approximately 3,700 gpm of water containing greater than 200 tons per day (dry basis) of suspended solids has been discharged to these borrow pits (PADER file correspondence, 1977). Hazardous constituents expected to be present in the waste are heavy metals and organics as were indicated in Tables 2-4 and 2-5.

4.6.3 Pollutant Migration Pathways

4.6.3.1 Ground Water--Ground water contours indicate that ground water flow is toward the Delaware River. The bottom of the borrow pits is in contact with the shallow water table. Measured permeability coefficients (1.75×10^{-3} cm/s, Chester Engineers,

1981) for soils beneath these pits indicate that the soils are relatively permeable. Based on this information and the unit characteristics, ground water contamination is expected.

4.6.3.2 Surface Water--Insufficient information is available to determine whether contaminant migration by surface water is occurring. This determination will be made during the visual site inspection.

4.6.3.3 Air--Analysis of water in the BP 35, 35A, and 35B (1980) showed elevated levels of phenol and oil and grease. A release determination will be made during the visual site inspection.

4.6.3.4 Soils--Soils adjacent to the borrow pit can act as a transfer medium for contaminants. Since no liner exists, soil contamination is expected.

4.6.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.6.4 Evidence of Release

4.6.4.1 Ground Water--Ground water quality data (Chester Engineers, 1980 and 1981) from wells downgradient of these borrow pits show slightly elevated levels of phenol and decreased pH. Phenol concentrations, however, are approximately the same in downgradient wells as in upgradient wells, suggesting a different source. Chloroform and chlorodibromomethane were also detected in downgradient wells.

4.6.4.2 Surface Water--No surface water analyses were available in the files.

4.6.4.3 Air--No ambient air quality data were available in the files.

4.6.4.4 Soils--No soil analyses were available in the files.

4.6.4.5 Subsurface Gas--No record of the generation of subsurface gas was available in the files.

4.6.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminants transported by ground water. Employees in proximity to the area are potential receptors of volatile emissions.

4.7 BORROW PIT 3

4.7.1 Unit Characteristics

BP 3 was constructed when the facility was built in the 1950s and has been used at least since 1972 for the disposal of numerous wastes. This borrow pit (located between the Blast Furnace and the Open Hearth Furnace) is over 4,000 ft long, covers nearly 100 acres, and has an estimated volume of 1.335 million gallons. This large pit, of unknown depth, has been partially filled with flue dust, slag, and other materials. The remainder of the pit is filled with water. Dikes separate sections of the pit, and water color varies from red to greenish blue. The pit reportedly has no liner and has no leachate collection system.

4.7.2 Waste Characteristics

This pit receives waste pumped as a slurry from the open hearth gas cleaning system, quench water from the blast furnace slag pits, underflow sludge from the blast furnace thickeners and clarifiers, blast furnace dry dustcatcher dust, sludge from sinter plant scrubbers, electric furnace scrubber underflow, ore washing fines, and underflow from primary settling chambers at the TTP. Analyses performed in 1980 (Chester Engineers, 1981) indicated the presence of phenols and oil and grease. Excess

water in the pit is periodically pumped to the Delaware River via Canal No. 2. Analyses of discharged water shows high pH and suspended solids. The pit is also used for the collection of surface runoff. Hazardous constituents expected to be in the waste are heavy metals, organics, and cyanide.

4.7.3 Pollutant Migration Pathways

4.7.3.1 Ground Water--Ground water contours indicate that ground water flow is toward the Delaware River. The bottom of the pits is in contact with the shallow aquifer. Measured permeabilities (1.79×10^{-2} cm/sec, Chester Engineers, 1981) for soils beneath the borrow pits indicate that the soils are highly permeable. Based on this information, migration of contaminants to ground water is expected.

4.7.3.2 Surface Water--Insufficient information is available to determine whether contaminant migration by surface water is occurring. A release determination will be made during the site visit.

4.7.3.3 Air--Analyses of surface water in Borrow Pits 3A, B, C, D, C, F, G, and H performed in 1980 indicate the presence of phenols and oil and grease (Chester Engineers, 1981). A release determination will be made during the visual site inspection by HNU.

4.7.3.4 Soils--Soils adjacent to the borrow pits can act as a transfer medium for contaminants. Since no liner exists, soil contamination is expected.

4.7.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.7.4 Evidence of Release

4.7.4.1 Ground Water--Two wells are located downgradient of BP 3. Data from these wells show elevated levels of cyanide and phenol, and a decrease in pH. Chloroform, bromodichloromethane, and chlorodibromomethane have been detected.

4.7.4.2 Surface Water--No surface water analyses were available in the files.

4.7.4.3 Air--No ambient air quality data were available in the files.

4.7.4.4 Soils--No soils analyses were available in the files.

4.7.4.5 Subsurface Gas--No record of the generation of subsurface gas was available in the files.

4.7.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminants transported by ground water. Employees in proximity to the borrow pit are potential receptors of volatile emissions.

4.8 BORROW PIT NT-3

4.8.1 Unit Characteristics

Borrow Pit NT-3 was excavated when the facility was built in the 1950s. The present dimensions of the pit are not specified, but it has an estimated volume of 0.2 million gallons. The pit is unlined and has no leachate collection system. BP NT-3 began accepting wastes shortly after November 1980 and ceased in the latter part of 1982. Ammonia still lime sludge (K060) was placed in waste piles along the perimeter of BP NT-3. These piles were used for storage before sending the K060 sludge to the Sinter

Plant for recycling. A site visit conducted in 1972 indicated that water in BP NT-3 had a yellow color and a strong chemical odor (Chester Engineers, 1981).

4.8.2 Waste Characteristics

Waste pickle liquor sludge (K062), ammonia still lime sludge (K060), and oil interceptor sludge have been disposed in BP NT-3. Hazardous constituents expected in the waste are heavy metals, cyanide, naphthalene, and phenolics.

4.8.3 Pollutant Migration Pathways

4.8.3.1 Ground Water--Hydrogeologic information for this area contains conflicting data pertaining to ground water flow directions. Ground water contours indicate that the bottom of the pit is in contact with the shallow water table. Measured permeabilities (1.03×10^{-2} cm/sec) for soils in the vicinity of BP NP-3 indicate that soils are highly permeable. Based on this information, ground water contamination is expected.

4.8.3.2 Surface Water--Because no information is available to indicate that runoff from the K060 waste pile was controlled, it is probable that surface water migration occurred from 1980 to 1982. However, since the records (Chester Engineers, 1981) indicate that contaminated soils have been removed, continuing release of hazardous constituents to surface water is not expected.

4.8.3.3 Air--Analyses of water in BP NT-3 indicate elevated levels of phenols and oils. A release determination will be made during the visual site inspection.

4.8.3.4 Soils--Based on soil sampling conducted in 1985 (GCA Technology Division, Inc., 1986), soil contamination is expected. Soils adjacent to BP NT-3 contained elevated levels of

cyanide, phenols, and arsenic. The highly permeable soil can act as a transfer medium for contaminants.

4.8.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.8.4 Evidence of Release

4.8.4.1 Ground Water--Ground water quality data (1981) for NT-3 indicated that ground water was contaminated with phenols, trace metals (Ni, Cu, Zn, and Mn), oil and grease, chloroform, and chlorodibenzomethane. Upgradient wells were also found to be contaminated, indicating that the contamination may be caused, in part, by other sources.

Results of ground water sampling in 1985 indicated that butyl-benzylphthalate and benzene were detected in Well 33. 1,1-Dichloroethane was detected in Well 36, and phenol was present at elevated levels in all downgradient wells.

4.8.4.2 Surface Water--No surface water analyses were available in the files.

4.8.4.3 Air--No ambient air quality data were available in the files.

4.8.4.4 Soils--Soil sampling conducted in 1985 indicated that soil was contaminated with cyanide, arsenic, and phenol. From 1984 to 1985, U.S. Steel removed 18 inches of contaminated soil in an effort to reach background levels. GLA Corporation obtained three soil samples in 1985, and all three samples were found to contain arsenic. No cyanide or naphthalene was found in any samples. Phenol and a number of semi-volatile compounds were detected in the north background soil sample.

4.8.4.5 Subsurface Gas--No evidence of the generation subsurface gas was in the files.

4.8.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminants transported by ground water. Employees in proximity to the borrow pit are potential receptors of volatile emissions.

4.9 BORROW PIT NT-4

4.9.1 Unit Characteristics

BP NT-4 was constructed when the facility was built in the 1950s. The present dimensions of the pit are unknown, but in 1972 the volume was estimated to be 0.016 million gallons (Chester Engineers, 1981). The borrow pit is unlined and has no leachate collection system. The pit is located on the eastern edge of the facility and is adjacent to BP NT-3. BP NT-4 was used from 1972 to 1977 as a waste oil dump. The pit received skimmings from the OIP and various other locations on the facility. At that time, the pit was covered with a thick, heavy black oil waste. According to site records, after 1977 no additional waste oil was dumped in BP NT-4. A contractor was hired to remove and reprocess this waste oil. A 1980 site visit indicated that the pit had been filled in with slag and building debris.

4.9.2 Waste Characteristics

Waste oil from the OIP was disposed for 5 years. Hazardous constituents expected to be present are organics and heavy metals.

4.9.3 Pollutant Migration Pathway

4.9.3.1 Ground Water--Hydrologic information for this area contains conflicting information pertaining to ground water flow

direction. Ground water contours indicate that the pits are in contact with the shallow water table. Measured permeabilities (1.03×10^{-2} cm/sec, Chester Engineers, 1981) for soils in the vicinity of BP NT-4 indicate that soils are highly permeable. Based on this information, the unit characteristics, and waste characteristics, ground water contamination is expected.

4.9.3.2 Surface Water--No information is available concerning runon and runoff controls. Surface water migration of contaminants will be evaluated during the visual site inspection.

4.9.3.3 Air--Volatile emissions are not expected due to the age of the disposal site, reports that the waste oil has been removed, and because the pit has been filled.

4.9.3.4 Soils--Measured permeabilities indicate that soils are highly permeable. Soils adjacent to BP NT-4 can act as a transfer medium for the contaminants. Because of the unit characteristics and waste characteristics, soil contamination is expected.

4.9.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.9.4 Evidence of Release

4.9.4.1 Ground Water--Ground water quality data (1981) for wells downgradient of NT-4 indicate that ground water is contaminated with phenols, heavy metals (Ni, Cu, Zn , and Mn), oil and grease, chloroform, and chlorodibenzomethane.

Results of ground water sampling in 1985 indicated the presence of butylbenzylphthalate in Well 33. Benzene was detected in Well 33 and 1,1-dichloroethane was detected in Well 36. Phenol was present at elevated levels in all downgradient wells.

4.9.4.2 Surface Water--No surface water analyses were available in the files.

4.9.4.3 Air--No ambient air quality data were available in the files.

4.9.4.4 Soils--No soil analyses were available in the files.

4.9.4.5 Subsurface Gas--No subsurface gas analyses were available in the files.

4.9.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminants transported by ground water.

4.10 BORROW PIT 20

4.10.1 Unit Characteristics

BP 20 was constructed when the facility was built in the 1950s and was partially filled with slag prior to permitting the pit as an interim hazardous waste facility in November 1980. The pit is approximately 250 ft by 75 ft. The pit contains slightly solidified coal tar sludge, old tires, scrap iron, and large pieces of wood. A sulfurous odor emanates from the pit.

4.10.2 Waste Characteristics

Decanter tank tar sludge (K087), which is a hazardous waste, was disposed in BP 20 from 1980 to January 1983. The hazardous constituents for which the waste was listed are phenol and naphthalene.

4.10.3 Pollutant Migration Pathways

4.10.3.1 Ground Water--Hydrologic information for this area is limited, but ground water flow appears to be toward the

south-southwest. Ground water contours indicate that the pit is in proximity to the shallow water table. Measured permeability (2.03×10^{-4} cm/sec, Chester Engineers, 1981) of soils in the vicinity of BP 20 indicate that soils are relatively permeable. Based on this information, ground water contamination is expected.

4.10.3.2 Surface Water--No information is available concerning runon and runoff controls. Surface water migration of contaminants will be evaluated during the visual site inspection.

4.10.3.3 Air--Because of the age of the unit, volatile emissions are not expected.

4.10.3.4 Soil--Measured permeabilities indicate that soils are permeable and migration of contaminants is expected.

4.10.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.10.4 Evidence of Release

4.10.4.1 Ground Water--With the exception of Monitor Well 7A, downgradient monitor wells are judged to be located too far from BP 20 to adequately evaluate the impact of the waste management unit on ground water. The number and location of other waste management units in the area indicate that BP 20 monitor wells are affected by other units.

Ground water quality data indicate that the ground water in the vicinity of BP 20 is contaminated with industrial waste constituents. Data from downgradient wells in 1980 and 1981 (Chester Engineers, 1981) show elevated concentrations of ammonia, phenol, cyanide, chloroform, bromoform, TOC, TOS, specific conductivity, and alkalinity.

Recent results of analyses from downgradient wells indicate the presence of phenol, naphthalene, methylphenols, and dimethylphenol in Well 7. Phenol was also found in Wells 5 and 7A. Volatile organic analyses revealed 1,1-Dichloroethene in Wells 8, 5, and 10. Benzene, ethylbenzene, and toluene were present in Well 7. Well 10 was found to contain 1,1,1-trichloroethane.

4.10.4.2 Surface Water--No surface water analyses were available in the files.

4.10.4.3 Air--No ambient air quality data were available in the files.

4.10.4.4 Soils--No soil analyses were available in the files.

4.10.4.5 Subsurface Gas--No record of the generation of subsurface gas was available in the files.

4.10.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminants transported by ground water.

4.11 BORROW PIT NTB AND NTA

4.11.1 Unit Characteristics

BT NTB and NTA were constructed when the facility was built in the 1950s. These borrow pits are located adjacent to BP NT-3. The present dimensions of these pits are not known, however, the estimated volume of BP NTA is 0.008 million gallons. Site records indicate that both borrow pits are unlined and have no leachate collection system. According to plant records, 1972 BP NTA was used occasionally as an emergency bypass for the National Tube intake water pump station. Sludge from the National Tube

Works pumping station is periodically dumped into the northern end of this pit. Borrow Pit NTB has been partially filled with bricks and miscellaneous solid wastes. This solid waste apparently came from the Tube Mill. Analyses of water in 1972 from these pits indicated the presence of oil. During heavy rains, runoff from the area adjacent to BP NTA enters the pit.

4.11.2 Waste Characteristics

Site records are incomplete concerning the nature and characteristics of the wastes disposed in BP NTA and NTB. Analyses of water in the pits indicate the presence of oil. Based on the limited file information, organic hazardous constituents are expected in these wastes.

4.11.3 Pollutant Migration Pathways

4.11.3.1 Ground Water--Ground water contours indicate that these borrow pits are in proximity to the shallow water table. Measured permeabilities (1.03×10^{-2} cm/sec, Chester Engineers, 1981) of soils in the vicinity of these borrow pits indicate that the soils are highly permeable. Based on this information, migration of contaminants in ground water is expected.

4.11.3.2 Surface Water--Insufficient information is available to determine whether contaminant migration by surface water is occurring. This determination will be made during the visual site inspection.

4.11.3.3 Air--Due to limited file information concerning the contents of BP NTA and NTB, a release determination will be made after the visual site inspection.

4.11.3.4 Soils--Soils can act as a transfer medium for the migration of hazardous constituents. Since soils in the vicinity of these borrow pits are highly permeable, soil contamination is expected.

4.11.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.11.4 Evidence of Release

4.11.4.1 Ground Water--Ground water quality data from 1980, 1981, and 1985 (Chester Engineers, 1981, and GCA Technology, 1986), indicated that phenol was detected at elevated concentrations in Wells 64, 34, 36, and 33. Butylbenzylphlthalate and benzene were detected in Well 33, and 1,1-Dichloroethene was detected at Well 36. Elevated levels of ammonia were detected in Wells 33, 34, and 36. Because of the proximity of BP NT-3, it is not known if this contamination is caused solely by BP NTA and NTB.

4.11.4.2 Surface Water--No surface water analyses were available in the files.

4.11.4.3 Air--No ambient air quality data were available in the files.

4.11.4.4 Soils--No soil analyses were available in the files.

4.11.4.5 Subsurface Gas--No record of the generation of subsurface gas was available in the files.

4.11.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminants migrating by ground water.

4.12 BORROW PIT 8

4.12.1 Unit Characteristics

BP 8 was constructed when the facility was built in the 1950s. Site records indicate that the borrow pit is unlined. This borrow pit is located at the south end of the coke quencher. Prior to 1972 this pit was partially filled with slag and dredging spoils. At that time the pit had an estimated volume of 0.0467 million gallons. Plant records indicate that in 1972, overflow from the coke quencher was being discharged at the north end of this pit. The water in the pit had a strong phenol odor, and analysis indicated elevated levels of ammonia, phenol, and oil. By 1980, the pit had been filled and was being used for iron ore storage.

4.12.2 Waste Characteristics

BP 8 was used to dispose of overflow from the coke quencher and slag. The hazardous constituents expected are heavy metals and organics.

4.12.3 Pollutant Migration Pathways

4.12.3.1 Ground Water--Ground water contours indicate that the bottom of this pit is in proximity to the shallow water table. Measured permeabilities (1.75×10^{-3} cm/sec, Chester Engineers, 1981) for soils in the vicinity of this pit indicate that the soils are relatively permeable. Based on this information, ground water contamination is expected.

4.12.3.2 Surface Water--There was no description of surface water release controls in the site records. A release determination will be made after the site visit.

4.12.3.3 Air--Since the borrow pit has been filled in, air emissions are not expected.

4.12.3.4 Soils--Measured permeabilities indicate that soils are relatively permeable. Since soil can act as a transfer medium for migration of contaminants, soil contamination is expected.

4.12.3.5 Subsurface Gas--The generation of subsurface gas is not expected, and no evidence was in the files.

4.12.4 Evidence of Release

4.12.4.1 Ground Water--The wells used to monitor BP 8 are poorly located and are limited in number. Monitor Well 57, located closest to BP 8, contained slightly elevated levels of phenol and cyanide. Wells farther downgradient (15 and 74) revealed elevated concentrations of chloroform, bromochloromethane, chlorodibromomethane, and bromoform.

4.12.4.2 Surface Water--No surface water analyses were available in the files.

4.12.4.3 Air--No ambient air quality data were available in the files.

4.12.4.4 Soils--No soil analyses were available in the files.

4.12.4.5 Subsurface Gas--No record of the generation of subsurface gas was in the files.

4.12.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminants migrating by ground water.

4.13 BORROW PIT 13A

4.13.1 Unit Characteristics

BP 13A was constructed when the facility was built in the 1950s. Its present dimensions are unknown but in 1972, the pit was

estimated to have a volume of 1.34 million gallons. Since 1972, overflow from the cooling tower on the final recirculation system of the coke plant has been disposed in the pit. This process water has high alkalinity, solids, and cyanide. This impoundment also received an estimated 6,000 gallons per month of phenol-bearing spent caustic solution. Site records do not indicate if disposal of this waste has ceased. A site inspection in 1980 indicated that the borrow pit contained brown water which had a chemical odor.

4.13.2 Waste Characteristics

Phenol-bearing spent caustic and overflow from the recirculation system of the coke plant have been disposed in BP 13A. The hazardous constituents expected in this waste are cyanide, heavy metals, and organics.

4.13.3 Pollutant Migration Pathways

4.13.3.1 Ground Water--Ground water contours indicate that there is a ground water high in this area and that the bottom of the borrow pit is in proximity to the shallow water table. Measured permeabilities (2.03×10^{-4} cm/sec, Chester Engineers, 1981) of soils in this area indicate that the soils are relatively permeable. Based on this information, ground water contamination is expected.

4.13.3.2 Surface Water--There was no description of surface water release controls in the site records. A release determination will be made after the site visit.

4.13.3.3 Air--A release determination will be made during the visual site inspection.

4.13.3.4 Soils--Soils adjacent to the borrow pit can act as a transfer medium for contaminants. Measured permeabilities of

soils indicate that they are relatively permeable. Therefore, contamination is expected.

4.13.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.13.4 Evidence of Release

4.13.4.1 Ground Water--Ground water data (1980 and 1981) indicate highly elevated levels of phenol, ammonia, and cyanide. Chloroform was also detected in all adjacent wells.

4.13.4.2 Surface Water--No surface water analyses were available in the files.

4.13.4.3 Air--No ambient air quality data was available in the files.

4.13.4.4 Soils--No soil analyses were available in the files.

4.13.4.5 Subsurface Gas--No record of the generation of subsurface gas was in the files.

4.13.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminant migration to ground water. Employees in proximity to the borrow pit are potential receptors of volatile emissions.

4.14 BORROW PITS 14N, 14S, AND 17

4.14.1 Unit Characteristics

These borrow pits were constructed when the facililty was built in the 1950s. Plant records indicate that these pits are unlined and have no leachate collection system. The pits remained unused until 1972 when the borrow pits were partially filled with slag.

Because of the disposal of slag, the present dimensions of the pits are unknown, but the initial volume was estimated to be 0.643, 0.054, and 0.643 million gallons for BP 14N, 14S, and 17, respectively.

In addition to slag, these pits received industrial waste from 1972 until the NPDES permit was issued in 1980. BP 14N and 14S received untreated coke plant wastes during repairs or emergency shutdowns of the facility. These pits also received lime sludge from the ammonia still. BP 17 received the overflow from BP 14N and 14S. BP 17, when full, would discharge to Biles Creek. It is unknown whether this discharge is continuing.

A site visit in 1980 indicated that the pits had been partially filled, and those areas not filled contained water. The water was brown in color and had a chemical odor. Some oil could be seen floating on the surface of the water. Analysis of the contents of the pit indicated high concentrations of phenol, cyanide, oil and ammonia, chloride, sulfate, and TDS.

4.14.2 Waste Characteristics

Untreated coke plant wastes and ammonia still lime sludge were disposed in BP 14S and 14N. BP 17 received the overflow from BP 14S and 14N. Ammonia still lime sludge (K063) is a listed hazardous waste. The hazardous constituents expected in these wastes are heavy metals, organics, and cyanide.

4.14.3 Pollutant Migration Pathways

4.14.3.1 Ground Water--Ground water contours indicate that the bottoms of the borrow pits are in proximity to the shallow water table. Measured permeabilities (2.03×10^{-4} cm/sec, Chester Engineers, 1981) of soil in the vicinity of these borrow pits indicate that the soils are relatively permeable. Based on this information, ground water contamination is expected.

4.14.3.2 Surface Water--Plant records indicate that the overflow from BP 14S and 14N was disposed in BP 17. When BP 17 was full, discharge would occur to Biles Creek. Plant records indicate that surface water runoff is not controlled. Based on this information, there is a continuing release of hazardous constituents to surface water.

4.14.3.3 Air--Analyses of the contents in the three borrow pits indicate extremely high levels of phenol (940, 1,630, and 270 mg/L). Air emissions, therefore are expected.

4.14.3.4 Soils--Soils can act as a transfer medium for the migration of hazardous constituents. Measured permeabilities indicate that soils adjacent to the borrow pit are relatively permeable. Therefore, soil contamination is expected.

4.14.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.14.4 Evidence of Release

4.14.4.1 Ground Water--The ground water in this area is highly contaminated, but because of the proximity and density of borrow pits containing hazardous constituents, it is not clear if this contamination is caused solely by BP 17, 14N, and 14S. Ground water quality data from wells in this area show elevated levels of ammonia, chlorides, TDS, and alkalinity. In 1980 and 1981, cyanide, oil and grease, and phenol were detected in high concentrations in most wells. Chloroform, bromodichloromethane, and chlorodibromoethene were also present. Sample analyses during 1985 did not detect cyanide. Naphthalene, methylphenols, and dimethylphenol were detected in ground water obtained from

Well 7. Well 7 contained ground water contaminated by a variety of volatile organic compounds including benzene, ethylbenzene, and toluene.

4.14.4.2 Surface Water--No surface water analysis were available in the files.

4.14.4.3 Air--No ambient air quality data were available in the files.

4.14.4.4 Soils--No soil analyses were available in the files.

4.14.4.5 Subsurface Gas--No record of the generation of subsurface gas was in the site files.

4.14.5 Target Populations

Aquatic species and ground water users are the primary potential receptors of contaminated ground water and surface water. Employees in the proximity of the borrow pits are potential receptors of volatile air emissions.

4.15 OIL INTERCEPTION PLANT

4.15.1 Unit Characteristics

The Oil Interception Plant (OIP) is located adjacent to the Sheet and Tin Metal on the north central portion of the property. The OIP is a pretreatment facility for waste discharge from the Sheet and Tin Mill. Waste sources include contact cooling, pickling rinses, alkaline washes, and rolling and lubricating oils. The facility provides oil skimming, acid neutralization, and metal precipitation. The effluent from the OIP is discharged to the Terminal Treatment Plant (TTP) and is regulated by NPDES Permit No. PA0013463, Discharge No. 202.

The OIP receives Sheet and Tin Mill discharge waste from an 8-inch underground pipe and from the Wire Mill by a 4-inch underground pipe.

The treatment facility at the OIP consists of gravity separation with skimmers, flash mixing with pH adjustment for metal precipitation, and final clarification.

Sludges from the Primary Reciever, Floculators/Clarifiers, API Separator, and Acid Neutralization Plant are discharged to borrow pits in the vicinity. Effluent from the OIP is discharged to the TTP via an industrial sewer system.

4.15.2 Waste Characteristics

The OIP treats waste discharges from the Sheet and Tin Mill and from the Wire Mill. These wastes include acid rinses, insoluble oils, oily water, alkaline rinses and dumps, waste pickle liquor, chromic rinse, and chromic dip solution. The effluent from this pretreatment facility is discharged to the Terminal Treatment Plant via an industrial sewer system. Sludges from the primary receiver, floculaters/clarifiers, API Separator, and Acid Neutralization Plant are discharged to NT3 and other sludge lagoons. Hazardous constituents expected to be in the wastes and which are currently monitored (NPDES Permit No. PA0013463) include heavy metals (Cr, Pb, and Zn) cyanide, tetrachloro-ethylene, and naphthalene.

4.15.3 Pollutant Migration Pathways

4.15.3.1 Ground Water--Insufficient examination is available to determine whether continuing release of hazardous constituents to ground water is occurring.

4.15.3.2 Surface Water--Discharge of effluent per NPDES Permit No. PA0013463, Discharge No. 403 is regulated by the NPDES program.

4.15.3.3 Air--Insufficient information is available to determine whether continual contaminant migration by air is occurring. This determination will be made during the visual site inspection by HNU.

4.15.3.4 Soils--Insufficient information is available to determine whether continual contaminant migration to soils is occurring.

4.15.3.5 Sursurface Gas--The generation of subsurface gas is not expected.

4.15.4 Evidence of Release

4.15.4.1 Ground Water--No ground water quality data are available in the files.

4.15.4.2 Surface Water--The discharge is regulated by the NPDES program.

4.15.4.3 Air--No ambient air quality data were available in the files.

4.15.4.4 Soils--No soil analyses were available in the file.

4.15.4.5 Subsurface Gas--No record of the detection of subsurface gas was available in the files.

4.16 TERMINAL TREATMENT PLANT

4.16.1 Unit Characteristics

The Terminal Treatment Plant (TTP) is located in the south central portion of the facility adjacent to the Delaware River. The TTP currently treats wastewater from the lot forming area and Pipe Mill, mist eliminator overflow, effluent from the OIP, and discharges from the open hearth, ladle shop, coke plant, and power house water treatment plant. The primary contaminants are organics and heavy metals.

Treatment consists of aeration and pre-sedimentation at the terminal pump station followed by oil skimming and sedimentation in API separators and final settling in lagoons. The effluent from the TTP is discharged to the Delaware River via the River Pump Station. This discharge is regulated by NPDES Permit No. PA0013463, Discharge No. 103.

Sludge at the TTP lagoons and API separator are periodically removed by dredging and pumped to BP 35, 35A, 35B, and 35L. Skimmed oil is sent to the oil and scum thickener and the sludge is deposited in sludge lagoons.

4.16.2 Waste Characteristics

The primary contaminants treated by the TTP are oil and grease and suspended solids. Waste characteristics of TTP sludges have been discussed in Table 2.4 and 2.5. Hazardous constituents expected in the wastes and which are currently monitored are lead, zinc, ammonia, phenols, cyanide, and organic contaminants.

4.16.3 Pollutant Migration Pathways

4.16.3.1 Ground Water--Insufficient information is available to determine whether continual contaminant migration by ground water is occurring.

ORIGINAL (Red)

4.16.3.2 Surface Water--Discharge of effluent per NPDES Permit No. PA0013463, Discharge No. 103 is occurring.

4.16.3.3 Air--Insufficient information is available to determine whether continual contaminant migration by air is occurring. This determination will be made during the visual site inspection by HNU.

4.16.3.4 Soils--Insufficient information is available to determine whether continual contaminant migration to soils is occurring.

4.16.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.16.4 Evidence of Release

4.16.4.1 Ground Water--No ground water quality data are available in the files.

4.16.4.2 Surface Water--The discharge is regulated by the NPDES program.

4.16.4.3 Air--No ambient air quality data were available in the files.

4.16.4.4 Soils--No soil analyses were available in the file.

4.16.4.5 Subsurface Gas--No record of the detection of subsurface gas was available in the files.

4.17 ROD MILL WASTEWATER LAGOON

4.17.1 Unit Characteristics

The Rod Mill Wastewater Lagoon is adjacent to the Rod Mill. The lagoon is used to dispose of oily wastes and suspended solids

produced in the Rod Mill. The facility provides sludge removal and drying, and oil skimming. No engineering drawings are available for the lagoon.

Wastewater from the Rod Mill enters the lagoon at a rate of 12,000 gpm. Sludge is removed to the sludge drying beds by a floating hydraulic dredge. Oil is removed by a drum oil skimmer. The effluent from this facility is discharged to a drainage ditch (No. 2 Canal) via a manhole. This discharge is permitted by NPDES Permit No. PA0013463, Discharge No. 202.

4.17.2 Waste Characteristics

The Rod Mill lagoon receives wastewater from the Rod Mill. These wastes include oil and grease and suspended solids. The hazardous constituents expected in these wastes are heavy metals and organic compounds (not specified).

4.17.3 Pollutant Migration Pathways

4.17.3.1 Ground Water--Insufficient information is available to determine whether release to ground water is occurring.

4.17.3.2 Surface Water--Discharge of effluent is regulated by NPDES Permit No. PA0013463.

4.17.3.3 Air--Insufficient information is available to determine whether continual contaminant migration by air is occurring. This determination will be made during the visual site inspection by HNU.

4.17.3.4 Soils--Insufficient information is available to determine whether continual contaminant migration to soils is occurring.

4.17.3.5 Subsurface Gas--The generation of subsurface gas is not expected.

4.17.4 Evidence of Release

4.17.4.1 Ground Water--No ground water quality data were available in the files.

4.17.4.2 Surface Water--The discharge is regulated by the NPDES program.

4.17.4.3 Air--No ambient air quality data were available in the files.

4.17.4.4 Soils--No soil analyses were available in the file.

4.17.4.5 Subsurface Gas--No record of the detection of subsurface gas was available in the files.

4.18 FACILITY-WIDE RELEASE TO GROUND WATER

Extensive data deficiencies were noted during a review of the Fairless Works ground water monitoring program and the characterization of site hydrogeology performed by several consultants for U.S. Steel Corporation. Several of these deficiencies pertain to specific Solid Waste Management Units (SWMU) and have been discussed in previous sections. This section presents a discussion of deficiencies related to the ground water monitoring program and site hydrogeology of the entire Fairless Works site.

There are numerous data deficiencies and problems in the Fairless Works hydrogeologic study implemented in 1980 by the Chester Engineers. The uppermost aquifer has not been adequately characterized. The number of intermediate soil borings is insufficient to define a confining layer with permeabilities low

enough to mitigate the movement of contaminants. Only six soil borings (out of a total of 81) were deep enough to encounter the confining clay unit. Furthermore, no record exists of laboratory analyses to determine the permeability of the clay unit.

There is also insufficient information concerning the horizontal and vertical flow components of ground water, and conflicting information in the records concerning ground water flow direction. In the report submitted by the Chester Engineers (1980), ground water flow in the vicinity of Borrow Pits NT-3, NT-4 and 38 was determined to be in an easterly direction; however, in a report submitted by Ertec Atlantic, Inc. (1982), a ground water elevation contour map derived from measurements obtained by U.S. Steel personnel indicated a reversed flow direction.

The regional hydrogeology and its relationships with site-specific hydrogeology have not been considered. Limited data are available on the effects of seasonal variation and tidal fluctuations on ground water flow directions.

These data deficiencies are coupled with a lack of documentation of methods to correlate and analyze the information concerning site hydrogology; therefore, the existing Fairless Works hydrogeologic characterization is insufficient to adequately assess the site.

The relationship between well design and the variability in the thickness of shallow unconfined aquifers is crucial in detecting hazardous contaminants in ground water. Well depth, screen placement, and screen length are related to the thickness of the saturated section and can determine whether a contaminant bypasses the screened interval and avoids detection. In most cases, the monitoring wells on the Fairless site were installed

with little regard for specific site conditions. A generic diagram of well construction details (The Chester Engineers, 1981) indicates that wells have only 4 ft of screen. Furthermore, the majority of wells do not encounter, or are screened far above, the confining clay unit. Organic contaminants, particularly phenol and napthalene, are slightly denser than water and have a tendency to sink during lateral migration through an aquifer. Thus, the contaminant plume could underflow monitoring wells and avoid detection, particularly when wells only monitor the upper 5 to 10 ft of an aquifer and a significant portion of the saturated column lies below the wells.

Well construction diagrams indicate that the annulus for all monitoring wells was filled with drill cuttings. These drill cuttings are not sufficiently impermeable to properly seal the annulus. The cuttings may also have become contaminated by contact with contaminated surficial soils, since historical file information indicates that the ground surface of the plant (especially the western portion of the facility) is covered with pools of oil and other debris.

It appears that numerous monitor wells designated as being upgradient are highly contaminated. This contamination may have been caused by improper location of the background wells due to misinterpretation of ground water flow directions. Contamination of background wells in many instances is likely due to the widespread nature of disposal activities on the Fairless site. It may be extremely difficult to obtain background measurements for many of the disposal sites because of the proximity and number of the borrow pits which contain hazardous constituents. Background data for most SWMUs, as well as for the entire Fairless site, are not available and thus interpretation of the data in the site records is very difficult.

The placement and number of monitor wells is inadequate to define th extent of ground water contamination associated with the disposal of waste at individual borrow pits. Because of monitor well placement, it is extremely difficult to distinguish specific constituents coming from one borrow pit versus another. For example, wells located around BP 20, 3, and NT-3 are inadequate to monitor these specific pits. Ground water quality throughout the facility is poor.

The Concept Report on Solid Waste Management by Chester Engineers (1981) indicates, through a series of discharge flux calculations, that the total discharge of various contaminants emanating from the Fairless Works is small and that effects on the Delaware River are negligible. This conclusion is suspect because:

1. Many significant flow paths or segments were omitted from the calculations;
2. The direction of ground water movement on the site suggests that ground water flow paths from the center of the site will also contribute to ground water flow along the perimeter; and
3. The ground water data in the report indicate that the ground water flow paths in some areas of the site are comparatively narrow as they cross the site boundaries. The data from individual wells indicate that some of the flow paths could contain significant contamination; however, when the pollutant concentrations in the individual wells are averaged with less contaminated wells (or often omitted from the calculations) in the same flux segment, the significance of the contaminated flow paths is masked.

For example, if one set of calculations in the report had included three additional flow segments (54-55, 55-57, and 12-57)

and the site average permeability, a 100-fold increase in the flux of total phenols is observed. In another example, if calculations in the report had expanded the width of flow path/segment 4-57 to encompass additional wells (some of which are highly contaminated), the total phenol flux from the Fairless Works doubled.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF RELEASE INFORMATION

Table 5-1 presents a summary of release information for each SWMU, based on available file information.

5.2 DATA GAPS AND RECOMMENDATIONS

5.2.1 Data Gaps

Review of available records indicates that the following information is required to complete the preliminary assessment:

1. A description of the manufacturing process units (i.e., type of units, age of units, and waste flow);
2. Ambient air measurements, if available, of volatile organic compounds near Borrow Pits NT-3, 2C, 14S and N, NT-4, 3, 35 (A, B, and C), and 9;
3. Surface water quality data, if available, from the three onsite canals (west, central, and east), Biles Creek, and Delaware River;
4. A description of wastes deposited in all the borrow pits, excluding BP 20 and NT-3, since 1981;
5. Whether all waste oil was removed from BP NT-4 by the contractor hired in 1977;
6. Information on whether the overflow from BP 17 is currently discharged to Biles Creek, and analysis of this discharge, if available;
7. An inventory of all water wells (potable, industrial, and irrigation) within a 0.25-mile radius of the facility;