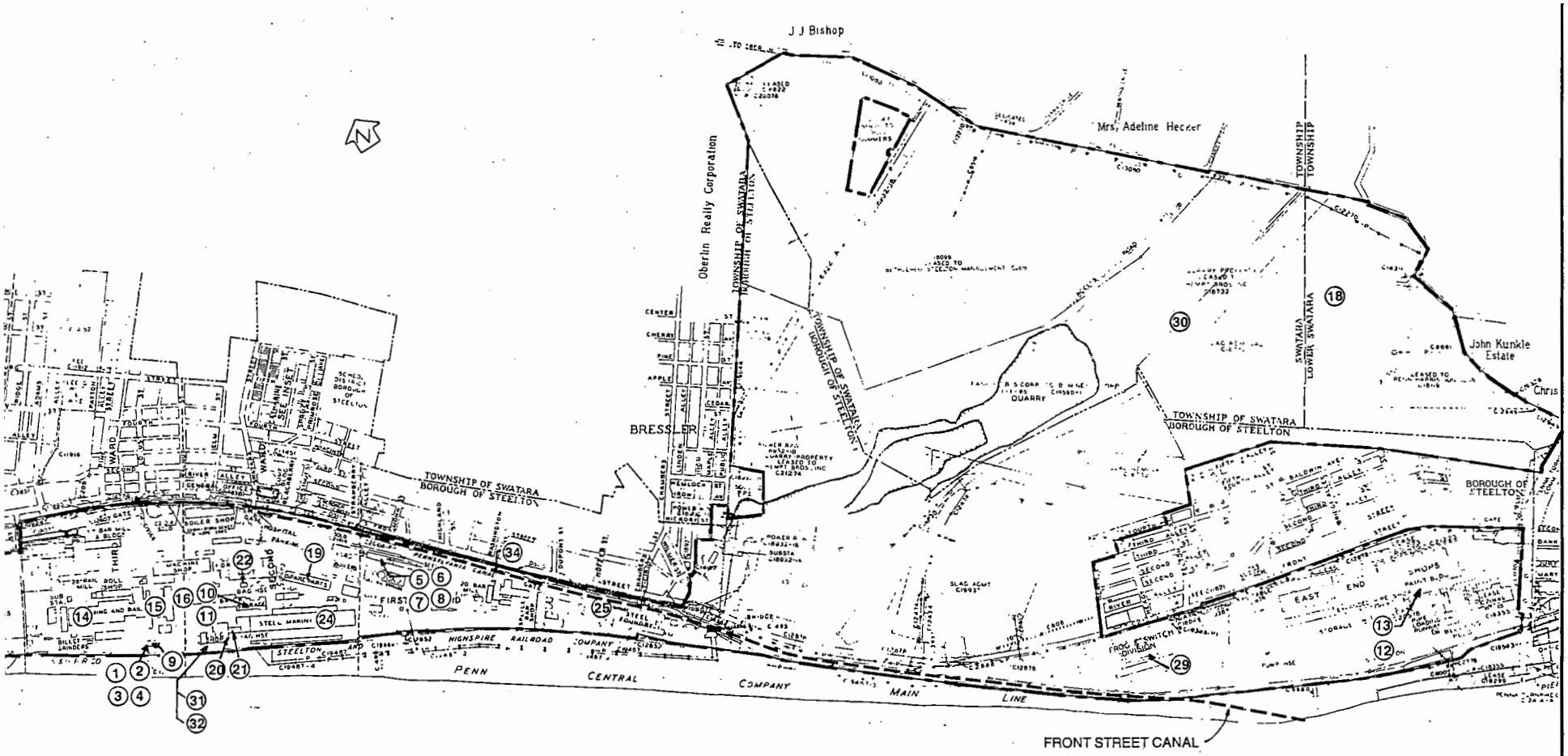

Legend

② SWMU Locations

—— Plant Boundary

0 500 1,000 2,000

Scale Feet

wn By: JS	Scale: As Noted	TheChesterEngineers	Bethlehem Steel Corporation Steelton, Pennsylvania SWMU Locations 312102
cked By: VEH	Date: April 1989		Dwg. No. Figure 3-1
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Oils are pumped from the sump, via a permanent pump and piping system, into an 8,000-gallon waste oil storage tank (SWMU 9) for reuse off-site as fuel. There have been no reported spills from this unit.

The oils which may be present in the settling basin sump include Nalco HM-20 Hot Mill Oil and Sunway Lubricant 90 which, according to the MSDS, contain naphthenic distillates, and 1659 Rando Oil HD 68 which, according to the MSDS, contains methacrylate copolymer. These or other oils may or may not have been present in the SWMU since it was put in operation.

3.3 SWMU NUMBERS 5, 6, AND 7 -- WASTEWATER TREATMENT LAGOONS

The wastewater treatment lagoons (Nos. 5, 6, and 7 on Figure 3-1) are three impoundments used to further treat plant water from the settling basins and the continuous caster scale pits, and to separate oil, grease, and settled solids from the water. The lagoons are concrete-lined, each measuring 207 feet by 72 feet by 9 feet deep, and have been in operation since the 1970s. The lagoons are run in parallel, with each one discharging to the polishing lagoon (SWMU 8). Oil is skimmed from the lagoons using a rope skimmer, collected in a holding tank, transferred to a dumpster, and transported to the 8,000-gallon waste oil storage tank (SWMU 9) for storage and eventual reuse off-site as fuel. Any overflow from the holding tank runs directly to a lagoon. The dumpster is located on a bermed concrete pad so that any spills are contained and returned to the treatment lagoons. When solids build up on the bottom of a treatment lagoon, the lagoon is drained into the polishing lagoon and allowed to stand for approximately one month until the solids dry to a cake form. The dry solids are then collected using a front end loader and deposited by dump truck on-site in the residual waste landfill (SWMU 30).

The treatment lagoons treat plant water containing iron scale, oil, and grease. The oils that may be present in the plant water include Nalco HM-20 Hot Mill Oil and Sunway Lubricant 90 which, according to the MSDS, contain naphthenic distillates, and 1659 Rando Oil HD 68 which, according to the MSDS, contains methacrylate copolymer. These or other oils may or may not have been present in the SWMUs since they were put in operation.

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312103

3.4 SWMU NUMBER 8 -- WASTEWATER POLISHING LAGOON

The polishing lagoon (No. 8 on Figure 3-1) receives water from the three treatment lagoons (SWMUs 5, 6, and 7) for further treatment. The lagoon is a concrete-lined structure measuring 490 feet by 14 feet by 5 feet deep, which was installed in conjunction with the treatment lagoons. Oil is skimmed from the surface of the polishing lagoon using a rope skimmer, collected in a dumpster, and transported to the waste oil storage tank (SWMU 9) for eventual reuse off-site as fuel. The dumpster is located on a concrete pad, and any spills are collected and discharged directly back into the polishing lagoon. Treated water is discharged to the plant canal (SWMU 34). The solids have been removed from the bottom of the polishing lagoon only once since the lagoon was put in operation. At that time a float and suction pump were used to remove the solids and deposit them in one of the three treatment lagoons for dewatering and disposal in the residual waste landfill.

The lagoon collects plant water containing iron scale, oil, and grease. In Attachment A to the 3013 Order, EPA indicates wastewater from the polishing lagoon also contains methylene chloride, lead, nickel, and selenium. The oils that may be present in the plant water include Nalco HM-20 Hot Mill Oil and Sunway Lubricant 90 which, according to the MSDS, contain naphthenic distillates, and 1659 Rando Oil HD 68 which, according to the MSDS, contains methacrylate copolymer. These or other oils may or may not have been present in the SWMU since it was put in operation.

3.5 SWMU NUMBER 9 -- CENTRAL WASTE OIL STORAGE TANK

The 8,000-gallon central waste oil storage tank (No. 9 on Figure 3-1) stores oil removed from plant waters in the settling basins (SWMUs 1, 2, and 3), treatment lagoons (SWMUs 5, 6, and 7), polishing lagoon (SWMU 8), continuous caster scale pits (SWMUs 10 and 11), pipe mill expander pit (SWMU 13), and the rolling mill scale pits (SWMUs 14, 15, and 16). The tank is located near the settling basins on a concrete pad surrounded by a concrete curb which ranges from 8 inches to 3.5 feet in height. The concrete pad was constructed in conjunction with the settling basins in the 1970s. Oils collected in the storage tank are sent off-site by tank truck for use as fuel at a rate of 72,000 gallons per year. The tank truck is located on a concrete pad when oil is being loaded from the waste oil storage tank, so that any spills or drippage will be contained and drained back to the settling basin sump. Any water

that separates from the oil in the oil storage tank is returned to the settling lagoons (SWMUs 1, 2, and 3).

Lubricant oils and oils removed from plant waters, are collected in the storage tank. Oils which may be collected include Nalco HM-20 Hot Mill Oil and Sunway Lubricant 90 which, according to the MSDS, contain naphthenic distillates, and Rando Oil HD68 which, according to the MSDS, contains methacrylate copolymer. These or other oils may or may not have been present in the SWMU since it was put in operation. No releases from the tank have been reported.

3.6 SWMU NUMBERS 10 AND 11 -- CONTINUOUS CASTER HEAVY SCALE PIT AND FINE SCALE PIT

The continuous caster scale pit (Nos. 10 and 11 on Figure 3-1) is a concrete pit used to separate water from iron scale, oil, and grease. The pit is divided into two interconnected separation sections, the heavy scale pit (SWMU 10) holding 11,000 gallons and the fine scale pit (SWMU 11) holding 34,000 gallons. Water overflows the heavy section into the fine scale separation section. This pit was put in operation in 1983, in conjunction with the continuous caster and has been continuously in use. The scale pit is concrete lined and the concrete walls extend approximately 3.5 feet above the surrounding ground.

Oil is recovered using an oil skimmer, collected in 55-gallon drums, and taken to the 8,000-gallon waste oil tank (SWMU 9). Any potential overflow from the 55-gallon oil collection drums would flow back into the scale pit. Iron scale is dredged from the pit using a clam shell, loaded into a truck, and sent for consolidation with other iron scales generated at the facility. The consolidated material is returned to the plant for 100 percent recycle in the electric furnaces. The scale load out area is paved and sloped back to the pit so that any drippage occurring when the solids are loaded, or drainage from the truck, is collected in the scale pit before the truck leaves the pit area. A portion of the water in the pit is reused on-site for industrial purposes and the remaining portion is discharged to one of the three wastewater treatment lagoons (SWMUs 5, 6, and 7).

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312105

3.7 SWMU NUMBER 12 -- PIPE MILL OIL SEPARATOR

The pipe mill oil separator (No. 12 on Figure 3-1) is a 7-foot diameter, 15-foot long tank which is approximately 75 percent below grade. The tank was put in operation in 1945 and is currently in use. The tank is located near the pipe mill and collects water and oil from the side and end planer, the press, and the crimper. Oil is contained in a baffled area of the tank and is removed by a suction truck approximately once every two months. The suction truck transports the oil to the 8,000-gallon waste oil storage tank (SWMU 9), where the oil is stored and eventually reused off-site as fuel. Water in the tank drains to a concrete pit, for oil skimming with a rope skimmer, and then to the plant canal for recycle back to plant intakes.

The tank receives water containing oil and grease. Lubricants used at the pipe mill include 831WR and Sunway 1190 which, according to the MSDS, contain naphthenic distillates. These or other oils may or may not have been present in the SWMU since it was put in operation.

3.8 SWMU NUMBER 13 -- PIPE MILL EXPANDER PIT

The pipe mill expander pit (No. 13 on Figure 3-1) is a rectangular concrete pit used to separate water from oil and grease. This pit was constructed and put in operation at the same time as the pipe mill and is currently in use. The expander pit measures 8 feet by 25 feet by 12 feet deep, is concrete lined, and is located indoors.

Oil is recovered using an oil skimmer, collected in 55-gallon drums, and taken to the 8,000-gallon waste oil tank (SWMU 9). Any potential overflow from the 55-gallon oil collection drums would flow back into the expander pit. Solid residues and waters are removed from the pit using a suction truck and are deposited in the treatment lagoons (SWMUs 5, 6, and 7) for dewatering. Any drippage occurring when the solids are loaded is collected in the expander pit. The expander pit water is cycled back to the pipe expander with makeup added as needed.

The pit receives water from the pipe expander containing oil and grease. The lubricating oil at the pipe mill includes Nalco HM-20 Hot Mill Oil and Sunway Lubricant 90 which, according to the MSDS, contain naphthenic distillates, and 1659 Rando Oil HD 68 which, according to the MSDS, contains methacrylate copolymer. These

or other oils may or may not have been present in the SWMU since it was put in operation.

3.9 SWMU NUMBER 14 -- SMALL ROLLING MILL SCALE PIT (28" ROLLING MILL PIT)

The 28" rolling mill scale pit (No. 14 on Figure 3-1) is a rectangular concrete pit used to separate iron scale from rolling mill quench water. The scale pit measures 24 feet by 12 feet by 10 feet deep, is concrete lined, and is located indoors.

The wastewater collected in the 28" rolling mill pit is discharged to the three wastewater settling basins (SWMUs 1, 2, and 3).

Iron scale is dredged from the pit using a clam shell, loaded into a hopper car, and sent for consolidation with other iron scales generated at the facility. The consolidated material is returned to the plant for 100 percent recycle in the electric furnaces. The scale load out area is paved and sloped back to the pit so that any drippage occurring when the solids are loaded, or drainage from the car, is collected in the scale pit before the car leaves the scale pit area.

The scale pit receives water containing iron scale, oil, and grease. The lubricating oil at the rolling mill includes Nalco HM-20 Hot Mill Oil which according to the MSDS contains naphthenic distillates. These or other oils may or may not have been present in the SWMU since it was put in operation.

3.10 SWMU NUMBER 15 -- MEDIUM ROLLING MILL SCALE PIT (35" ROLLING MILL PIT)

The 35" rolling mill scale pit (No. 15 on Figure 3-1) is a rectangular concrete pit used to separate iron scale from rolling mill quench water. The scale pit measures 60 feet by 10 feet by 6 feet deep, is concrete lined, and is located indoors.

The wastewater collected in the 35" rolling mill scale pit is discharged to the three wastewater settling basins (SWMUs 1, 2, and 3).

Iron scale is dredged from the pit using a clam shell, loaded into a hopper car, and sent for consolidation with other iron scales generated at the facility. The consolidated material is returned to the plant for 100 percent recycle in the electric

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312107

furnaces. The scale load out area is paved and sloped back to the pit so that any drippage occurring when the solids are loaded, or any drainage from the car, is collected in the scale pit before the car leaves the scale pit area.

The scale pit receives water containing iron scale, oil, and grease. The lubricating oil at the rolling mill includes Nalco HM-20 Hot Mill Oil which, according to the MSDS, contains naphthenic distillates. These or other oils may or may not have been present in the SWMU since it was put in operation.

3.11 SWMU NUMBER 16 -- LARGE ROLLING MILL SCALE PIT (44" ROLLING MILL PIT)

The 44" rolling mill scale pit (No. 16 on Figure 3-1) is a rectangular concrete pit used to separate iron scale from rolling mill quench water. The scale pit measures 83 feet by 12 feet by 5 feet deep. The pit is concrete lined and is located indoors.

The wastewater collected in the 44" rolling mill scale pit is discharged to the three wastewater settling basins (SWMUs 1, 2, and 3).

Iron scale is dredged from the pit using a clam shell, loaded into a hopper car, and sent for consolidation with other iron scales generated at the facility. The consolidated material is returned to the plant for 100 percent recycle in the electric furnaces. The scale load out area is paved and sloped back to the pit so that any drippage occurring when the solids are loaded, or any drainage from the car, is collected in the scale pit before the car leaves the scale pit area.

The scale pit receives water containing iron scale, oil, and grease. The lubricating oil at the rolling mill includes Nalco HM-20 Hot Mill Oil which, according to the MSDS, contains naphthenic distillates. These or other oils may or may not have been present in the SWMU since it was put in operation.

3.12 SWMU NUMBER 18 -- HWM1 LANDFILL

HWM1 (No. 18 on Figure 3-1) is an unlined monofill land disposal facility located in Swatara and Lower Swatara Townships, Dauphin County, Pennsylvania, about 3.4 miles southeast of Harrisburg, 1 mile southeast of Steelton Borough limits, and approximately 4,000 feet northeast of the Susquehanna River. HWM1 covers

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312108

approximately 10.3 acres and is within the boundaries of a residual waste landfill (SWMU 30) which has been used for waste disposal since 1875.

The HWM1 landfill contains about 300,000 cubic yards of electric arc furnace (EAF) dust, which is a listed hazardous waste (K061). Land disposal of the EAF dust began in 1968. Since January 1, 1986, the EAF dust generated at the plant has been shipped off-site for recycling. Groundwater in the vicinity of HWM1 is being monitored in compliance with RCRA and with the Pennsylvania Department of Environmental Resources (PaDER) Consent Order and Agreement Requirements.

Landfill closure construction is presently being done, in accordance with a PaDER approved Closure Plan. A summary of approved closure activities is provided in Attachment A.

3.13 SWMU NUMBER 19 -- HWM2 WASTE PILE STORAGE BUILDING

HWM2 waste pile storage building (No. 19 on Figure 3-1) is a fully enclosed building measuring 110 feet by 504 feet with a capacity of 10,000 cubic yards. The building stored EAF dust. Two waste areas inside the building, each 40 feet by 290 feet, were separated by a 10-foot wide access aisle and surrounded by two rows of 3-foot high concrete barriers, used to contain the dust on a concrete floor. Periodically the EAF dust was removed from the building and shipped to an off-site vendor for metal recovery.

This storage building has been cleaned and closure was approved by Pennsylvania DER on December 13, 1988; therefore, it is not addressed further in this work plan.

3.14 SWMU NUMBER 20 -- HWM3 PELLETIZER

HWM3 Pelletizer (No. 20 on Figure 3-1) is a treatment unit for pelletizing EAF dust captured from the exhaust hoods of the three electric arc furnaces. This unit measures 15 feet by 19 feet and has a capacity of 10 tons/hour.

The EAF dust is transported from the No. 1 baghouse to a holding silo in the Pelletizer Building via a screw conveyor, and then fed through a revolving drum where it is sprayed with water to prevent any release of dust. Currently, the dust is not being pelletized. The EAF dust is then transported by truck to an off-site vendor for

metal recovery. During the loading of the EAF dust into trucks, the truck is driven under the pelletizer and the loose EAF dust is allowed to drop through a trough into the truck. Approximately 8,000 tons/year of EAF dust is managed at the Pelletizer Building although the Pelletizer itself is not currently operating.

The Pelletizer is located on an asphalt pad surrounded by an 8-inch curb. The pad slopes to the center so that accidental dust spills and stormwater drain to the center and into an underground concrete tank (SWMU 21- Pelletizer Runoff Tank).

Spillage which occurs during loading or unloading of either the suction truck or dust transport truck is contained on the asphalt pad and collected in the runoff tank. Any dust which accumulates in the underground concrete tank is periodically removed using a suction truck and is recycled back into the pelletizer.

3.15 SWMU NUMBER 21 -- PELLETIZER RUNOFF TANK

The pelletizer runoff tank (No. 21 on Figure 3-1) is an underground precast concrete tank located beneath the pelletizer. The tank receives EAF dust and runoff from the pelletizer loading area. Suction trucks are used to remove both solids and liquids from the tank and to recycle them back to the pelletizer.

3.16 SWMU NUMBER 22 -- NO. 2 PELLETIZER

The pelletizer (No. 22 on Figure 3-1) was closed in 1981. It was previously used to solidify EAF dust from No. 2 baghouse. The pelletized dust was transported to the HWM1 landfill on-site (SWMU 18). Non-pelletized material is currently loaded into trucks through a "sock" for transport to a reclaimer. The loading area is in an enclosed metal building on a concrete pad. Roughly 2,000 tons/year are handled through this facility.

3.17 SWMU NUMBER 24 -- EAF SPRAY CHAMBERS DROP LEGS

Fumes generated during steel refining are routed to baghouses to capture particulate matter. The air flow from each of the furnace exhausts is cooled by water sprays. The cooling takes place in the three spray chambers, one for each furnace. As a by-product of the cooling, damp particulate matter falls into the spray chambers drop legs (No. 24 on Figure 3-1).

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312110

This damp particulate matter is raked out of the flat bottom tank onto a bermed concrete pad, where excess water drains into a sump, and is then pumped back to the spray tower. The damp material is shoveled onto a second concrete pad, from which it is loaded onto trucks by front-end loaders and then transported to an off-site vendor for zinc recovery. Approximately 50 tons/year of drop-leg material is generated. Because the material is damp, it is readily loaded and transported without dust emissions.

3.18 SWMU NUMBER 25 -- STEEL FOUNDRY ELECTRIC FURNACE BAGHOUSE BIN

The steel foundry baghouse bin (No. 25 on Figure 3-1) is an enclosed metal dumpster which collects steel foundry electric furnace (SFEF) dust from the SFEF baghouse. The dumpster collects approximately 150 tons of SFEF dust each year and has been in operation since 1968. There is a concrete pad beneath the dumpster, and transfer from the baghouse to the dumpster is enclosed to minimize escape of the SFEF dust to the environment. The dumpster is maintained under negative pressure by a vent pipe which runs from the dumpster back to the inlet side of the baghouse fans. The dust is transported to the electric furnace facility in an enclosed hopper so that dust cannot escape during transport. The SFEF dust is then combined with steel, making electric furnace dust, and then sent to an off-site vendor for metal recovery.

3.19 SWMU NUMBER 29 -- FROG AND SWITCH GRINDER CYCLONE HOLDING ROOM

The frog and switch grinder cyclone holding room (No. 29 on Figure 3-1) accepts dust which is collected in the frog and switch grinder cyclone. The dust flows directly from the cyclone to a container in the holding room and is periodically loaded into a dump car. The dust is then disposed of in the on-site residual waste landfill (SWMU 30). A concrete pad is located at the entrance to the holding room and in the dump car loading area, and contains dust spills that may occur.

The dust collected by the cyclone consists mainly of iron fines. In Attachment A to the 3013 Order, EPA indicates the dust may also contain dust from the grinding wheels which are bonded with phenolic resins.

3.20 SWMU NUMBER 30 -- RESIDUAL WASTE LANDFILL

The residual waste landfill (No. 30 on Figure 3-1) is a 54-acre land disposal facility that includes HWM1 within its perimeter. The residual waste landfill has been used by the Borough of Steelton and the Steelton Plant since 1875, and was permitted by the PaDER in 1976 under PA permit No. 300583. The landfill is used by the Borough of Steelton on occasion, with DER approval.

A variety of wastes have been deposited in the residual waste landfill including: scrubber solids (zinc, iron oxide, calcium, silicon and carbon products), wastewater treatment sludges, waste casting sands, other miscellaneous wastes from mill operations, municipal refuse, tar sludges (incinerated by covering with hot slag), rubble, scrap steel, wood, cardboard, paper, rags, tires, bricks, and grass clippings. EAF dust outside HWM1 has been moved into that monofill facility. (This is exclusive of the EAF dust contained in Area 8, which is also being closed in the same manner as HWM1.)

Groundwater in the area of the residual waste landfill is monitored on a quarterly basis. EPA documents indicate that chromium, cadmium, arsenic, selenium, chlorides, sodium and sulfates have been found above background levels.

Historically, the waste has been deposited in 2-foot deep cells, which are covered and compacted when completed. Each lift is graded to a 1 percent to 3 percent slope to facilitate the drainage of surface water run-off.

3.21 SWMU NUMBERS 31 & 32 -- CAUSTIC WASTE RINSEWATER TANKS

The units manage rinsewater resulting from the rinsing of parts which have been dipped in caustic solution (Oakite Stripper). Constituents present in the Oakite Stripper solution include sodium hydroxide and sodium carbonate.

The caustic waste rinsewater tanks (Nos. 31 and 32 on Figure 3-1) are concrete-lined, steel storage tanks used to store the rinsewater. The tanks have covers with top vents, measure 6 feet by 4 feet by 4 feet deep, and are situated on a concrete pad with a 6-inch curb to collect spills and overflow. A roof was constructed over the tanks to divert rainwater away from the tanks and prevent buildup of water within the concrete pad. Approximately once every three months the rinsewater is

removed from the tanks using a suction truck and deposited in the settling basins (SWMUs 1, 2 and 3).

3.22 SWMU Number 34 -- Plant Canal

The plant canal (No 34 on Figure 3-1) is an earthen channel which extends from the Susquehanna River on the southeast portion of the Plant near the Frog & Switch Division to the Swatara Street pump station on the northwest portion of the Plant. The canal is approximately 13,000 feet long and an average of 20 feet wide. The canal is used to supply water from the Susquehanna River to plant processes. The plant canal was originally constructed as part of the Pennsylvania Canal system, and portions of this system still exist in many areas of Pennsylvania. Construction on the Steelton portion began on July 4, 1826.

Water is pumped into the canal from the river. Additional water flows into the canal from city storm water outfalls, plant non-contact cooling water outfalls, surface runoff, and plant process wastewater discharge after treatment (NPDES monitoring point 102). The roughly 24 million gallons per day (MGD) pumped into the canal is balanced by the approximately 24 MGD discharged to the River through monitoring point 002. Overflows from the canal to the river are monitored and reported on a monthly basis, as required under NPDES Permit PA 0008303.

A review of the analytical data developed to prepare the NPDES permit application shows the following for discharges to the canal from the treatment plant, and from the canal to the river through Outfall 002:

- Lead concentrations in the Susquehanna River and canal are comparable (Attachments B1 and B2);
- Both nickel and selenium were below detectable concentrations during two of the three sampling events (Attachment B2);
- None of the base neutrals/acid extractables, volatile organics or phenolics were found at detectable levels (Attachment B2).

Dredging operations are conducted on parts of the canal each year, and removed sediments are stored at the Residual Waste Landfill (SWMU 30). EP toxicity leach

tests have been performed on six samples of sediment, and leachates were analyzed for EP metals. In all cases the concentrations were well below the levels required for characteristic of EP toxicity (Attachment B3). It should also be noted that the sludges meet the metal limitations set by the PaDER May 1988 Guidelines for land-farming sludges.

4.0 SITE CHARACTERIZATION

4.1 CLIMATOLOGY

The Bethlehem Steel Corporation, Steelton Plant is situated in the Susquehanna River Basin. The Susquehanna River transects a broad, low-lying, east-west trending valley in which the town of Steelton is situated.

The Susquehanna River drains the central portion of Pennsylvania and flows into the Chesapeake Bay. The Susquehanna is subject to floods during virtually any month of the year, although they occur with greatest frequency in the spring months of March and April. The most widespread flooding occurs during the winter and spring when associated with heavy rains, or heavy rains combined with snowmelt. Storms of tropical origin sometimes cause flood-producing rains, such as those produced by Hurricane Agnes in 1972. Some years in which major flooding has occurred along the Susquehanna include 1865, 1889, 1894, 1902, 1904, 1936, 1964, and 1972.

The Steelton Area is considered to have a humid continental climate. The prevailing westerly winds carry most of the weather disturbances that affect the region from the interior of the continent. The Atlantic Ocean has a limited influence on the climate of the area, with coastal storms of tropical origin having the greatest effects.

Normal temperatures range from about 76°F in July to about 31°F in January, and average about 53°F for the entire year. Mean maximum and minimum temperatures for January are approximately 40°F and 24°F, respectively. Mean maximum and minimum temperatures for July are 88°F and 66°F, respectively.

Annual precipitation consists of approximately 38 inches, with around 2.3 inches falling in February, and 3.9 inches falling in May.

4.2 REGIONAL PHYSIOGRAPHY, GEOLOGY AND HYDROGEOLOGY

4.2.1 Physiography

The Steelton Plant is situated in both the Great Valley Section of the Valley and Ridge Physiographic Province and the Triassic Lowland Section of the Piedmont

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312115

Physiographic Province (Figure 4-1). The main portion of the plant is situated within the floodplain of the Susquehanna River.

The northwest part of the plant is situated in the Great Valley Section, about 2 miles south of Blue Mountain, which is the southernmost feature of the Valley and Ridge Province. This area consists of an east-west trending limestone valley that is relatively flat or very gently undulating, having elevations ranging between 350 and 500 feet above sea level, with most of the area below 400 feet. The carbonates present in the plant area include the Ordovician Martinsburg Formation, Myerstown Formation, Annville Formation, and Epler Formation. The Great Valley is separated structurally from the Triassic Lowland section by a normal fault.

The southeast part of the plant is situated in the Triassic Lowland Section. In the immediate vicinity of the plant, this part of the Triassic Lowland is very similar to the Great Valley Section described above; however, this Section exhibits steeper terrain and higher elevations to the east. This part of the plant is underlain by the Triassic Gettysburg Formation of red sandstone and shale.

4.2.2 Regional Geology

The geology of the Lower Susquehanna River basin is characterized by diverse rock types and structural settings. As a result, the area has been divided into the three physiographic provinces or six sections shown in Figure 4-1.

4.2.2.1 Valley and Ridge Province

The Valley and Ridge Province consists of the Appalachian Mountain Section and the Great Valley Section.

The Appalachian Mountain section consists of broadly folded, Paleozoic sedimentary rocks that range in age from Ordovician to Pennsylvanian. The rock sequence can be grossly divisible into a lower carbonate (nonclastic) interval, overlain by two clastic intervals (sandstone and shale) which are separated by a thinner nonclastic carbonate and shale group.

The rocks of the Great Valley Section (Figure 4-2) do not constitute a single stratigraphic sequence because faulting has brought together rocks that were originally

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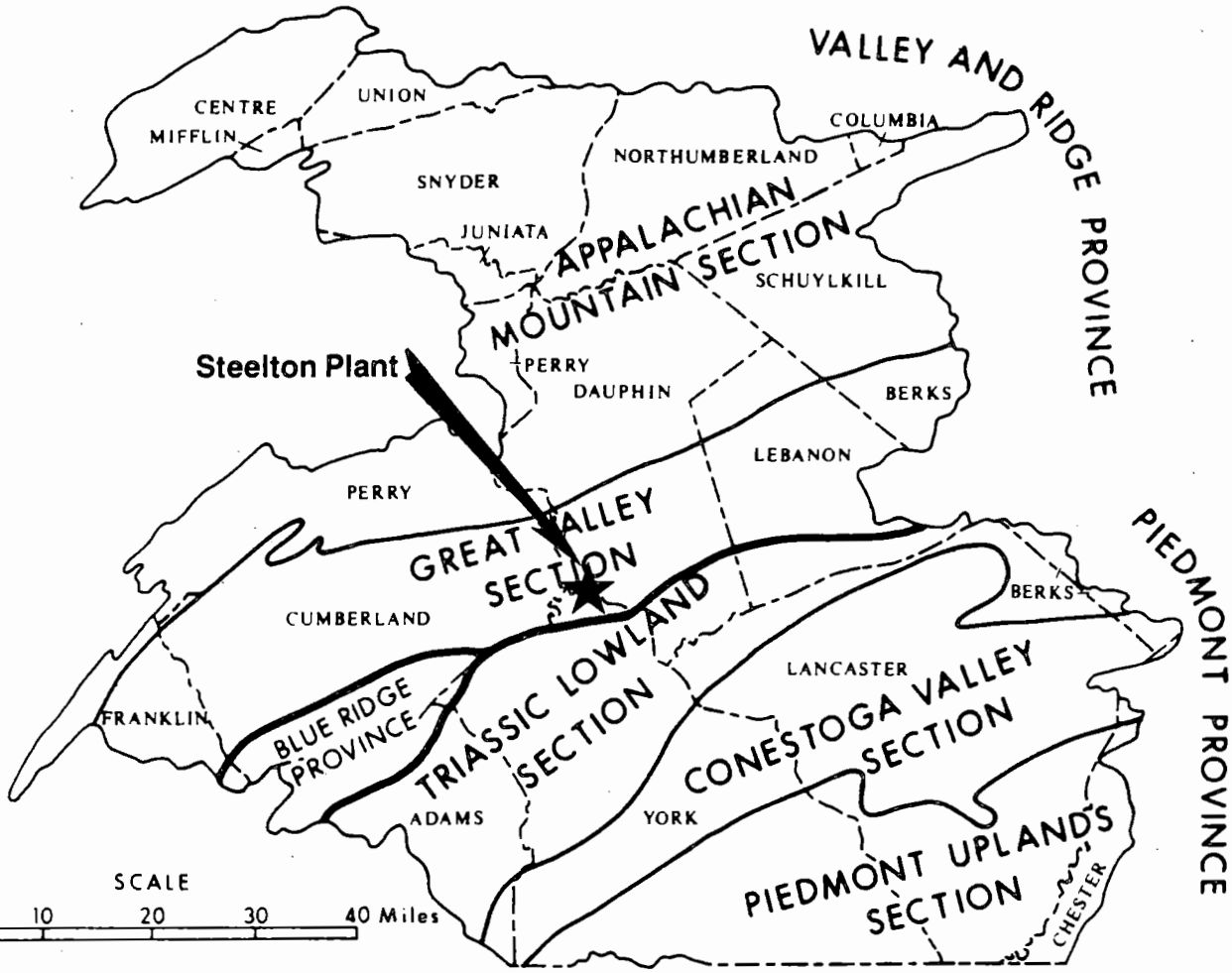
312116



TheChesterEngineers			SHEET NO.	Bethlehem Steel Corporation Steelton, Pennsylvania Physiographic Provinces and Sections In The Lower Susquehanna River Basin
DWN.BY: JS	SCALE: As Shown	DATE	DWG. NO.	
CHK'D.BY: JP	APPR.BY:	12/88	Figure 4-1	

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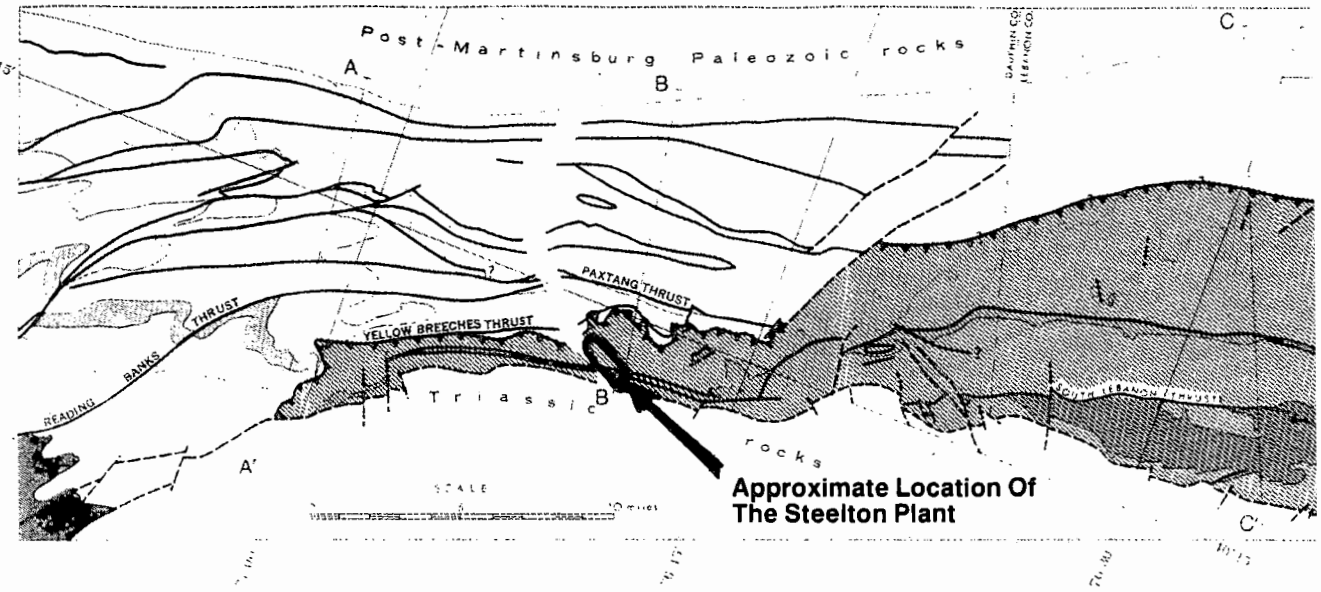

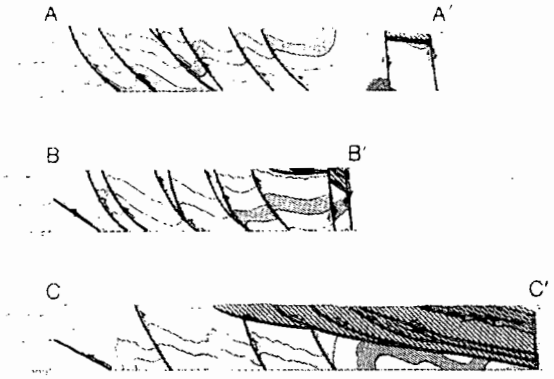

KEY TO TECTONIC MAP AND SECTIONS

- Middle and Upper Ordovician Martinsburg Formation
- Middle Ordovician limestones
- Lower Ordovician Beekmantown Group
- Upper Cambrian Conococheague Group
- Middle Cambrian Elbrook and Buffalo Springs Formations
- Lower Cambrian, mostly clastics and Tomstown Dolomite
- Precambrian volcanics

Crosshatch overprint indicates allochthonous rocks of Lebanon Valley sequence. Area without overprint indicates autochthonous rocks of Cumberland Valley sequence with exception of inadequately known probable allochthonous slices within the Martinsburg Formation.

- Yellow Breeches thrust
- Other thrust faults
- Normal faults and tear faults

TheChesterEngineers			SHEET NO.	Bethlehem Steel Corporation Steelton, Pennsylvania Tectonic Sketch Map of Central Great Valley
DWN.BY: JS	SCALE: As Shown	DATE 12/88	DWG. NO. Figure 4-2	
CHK'D.BY: JP	APPR.BY:			

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deposited in widely separated parts of the Appalachian Basin. The northern portion of the Great Valley Section is underlain by the Martinsburg Formation, which consists of folded and faulted shale, limestone, and some sandstone and greywacke of Upper Ordovician age. The remainder of the section is underlain primarily by tightly folded and faulted carbonate rocks of Cambrian and Middle Ordovician age.

4.2.2.2 Blue Ridge Province

The Blue Ridge Province contains some of the oldest rocks in the Appalachian Basin. They consist of Precambrian volcanic rocks which are overlain by metamorphosed sedimentary rocks. The geologic structure of this province is extremely complex.

4.2.2.3 Piedmont Province

The Triassic Lowlands Section is underlain by relatively nonresistant red shale, sandstone, and conglomerate of terrestrial origin, and minor amounts of limestone. Structurally, the rock layers form a monocline having a predominantly northwesterly dip of about 15 to 35 degrees. Many areas of the lowland are criss-crossed by ridges and hills formed by diabase dikes and sheets intruded into sedimentary rocks.

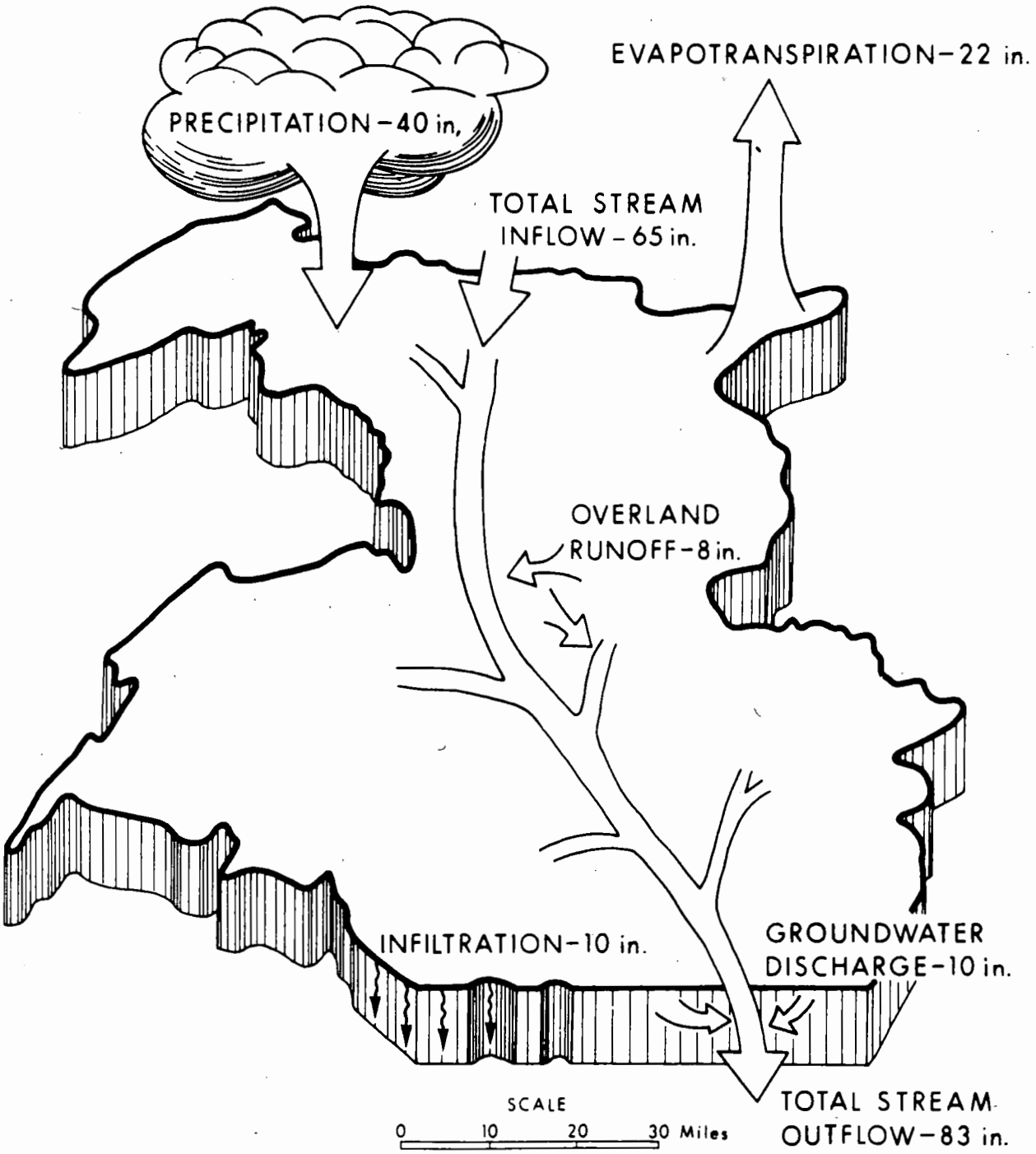
The Conestoga Valley Section is underlain chiefly by carbonate rocks and shales of Cambrian and Ordovician age. These rocks are highly folded and faulted due to severe and recurring stresses throughout a large portion of their geologic history.

The Piedmont Uplands Section is primarily composed of metamorphosed sedimentary rocks, but also contains some igneous rocks. The geologic structure of this section is extremely complex.

4.2.3 Regional Hydrogeology

The interrelationship among atmospheric water, surface water, and groundwater is the hydrologic cycle. For the Lower Susquehanna River Basin, the hydrologic cycle is shown diagrammatically in Figure 4-3.

In this basin, the water table fluctuates according to the relative amounts and rates of recharge to and discharge from the groundwater system. Groundwater levels show only a marginal relationship to precipitation. Groundwater levels are inversely



The Chester Engineers			SHEET NO.	**Bethlehem Steel Corporation** **Steelton, Pennsylvania** The Annual Hydrologic Cycle For The Lower Susquehanna River Basin
DWN.BY: JS	SCALE: As Shown	DATE 12/88	DWG. NO. Figure 4-3	
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related to temperature, due to the large effect of evapotranspiration on recharge. Most groundwater recharge occurs 1) after the spring thaw and prior to the onset of vigorous plant growth in April and May; and 2) after the first killing frost in October and before the ground freezes in December.

The ability of a body of rock or soil to transmit groundwater depends on the size, distribution, and degree of interconnection of the water-filled openings present in the area. Geologic factors that control the size, type and distribution of the openings or water-bearing zones include lithology, geologic structure, and topography.

4.2.3.1 Lithology

Rock type is the most important factor affecting groundwater movement. The occurrence of both primary and secondary porosity and permeability is essentially controlled by lithology. Development of secondary openings, rock susceptibility to solution, rock susceptibility to fracturing, size and spacing of bedding-plane partings, are all controlled by bedrock lithology.

4.2.3.2 Geologic Structure

Geologic structure, which includes faults, folds, fractures, and orientation of the layers of rocks, are also important factors affecting groundwater movement.

Faulting may create zones of fractured rock that yield substantial amounts of water. Occasionally, however, faults may be filled with clay or cemented with calcite or quartz and may yield little or no water. This is a common situation with carbonate rocks of this basin.

Fold hinges represent areas where considerable secondary permeability may be developed because of an increase in fracture abundance and occasional well-developed cleavage.

Fractured bedrock will transmit more water than bedrock that is unfractured. The locations of valleys are frequently controlled by fractures or fracture zones (discussed below). Indicators of fractured bedrock are faults and lineaments or fracture traces that are natural linear features observable on aerial photographs that may be the surface expression of subsurface disturbances.

Well yields generally increase with decreasing dip of the strata because more of the openings that normally occur between beds (bedding plane partings) are penetrated by a well in nearly horizontal strata than in steeply dipping strata.

4.2.3.3 Regional Topography and Drainage

Topographic position has a large effect on the yield of a well in this area. Wells in higher topographic positions (such as hilltops and hillsides) have smaller yields than those in lower topographic positions (valleys and gullies).

Valleys and gullies often form where bedrock is most susceptible to physical and/or chemical weathering. Lithologic variations and weaknesses in rocks caused by bedding plane partings, joints, cleavage, and faults may promote rapid weathering and produce areas relatively low with respect to the surrounding areas. These types of geologic features often create high permeability zones which transmit and yield significant quantities of groundwater.

Because limestones and dolomites are soluble in the humid climate in the Lower Susquehanna River Basin, the geomorphology of the Great Valley is characterized by low relief topography.

The Great Valley is crossed by through-flowing streams but is not itself a stream valley. In fact, so far as there is a systematic development of direction of permanent stream flow, it is transverse to the valley. Some smaller streams rising on the adjacent shales and sandstones do gradually sink into their beds on reaching the limestone valley, and others start abruptly at large springs. However, the drainage pattern of the valley is integrated, i.e., every area, exclusive of sinkholes, has a potential watercourse connecting it to a permanent through-flowing stream. Some of these watercourses are more or less well-defined intermittent streams. Many are merely gentle swales, indicating that only the most transient flow is encountered during intervals of maximum run-off. Together they compose a dendritic system, in places controlled to some extent by variations in the bedrock, which contribute to the regional stream flow. The large areas lacking permanent streams indicate that the bulk of the drainage from the limestone area is through the subsurface.

4.3 SITE PHYSIOGRAPHY, GEOLOGY AND HYDROGEOLOGY

The main area of the plant (operational portion) must be considered separately from the landfill area north of Front Street for the following reasons:

- The main part (operational portion) of the plant is underlain by six different lithologies and the landfill area is underlain only by the Epler Formation; and
- The two areas are covered by different soils having differing permeabilities.

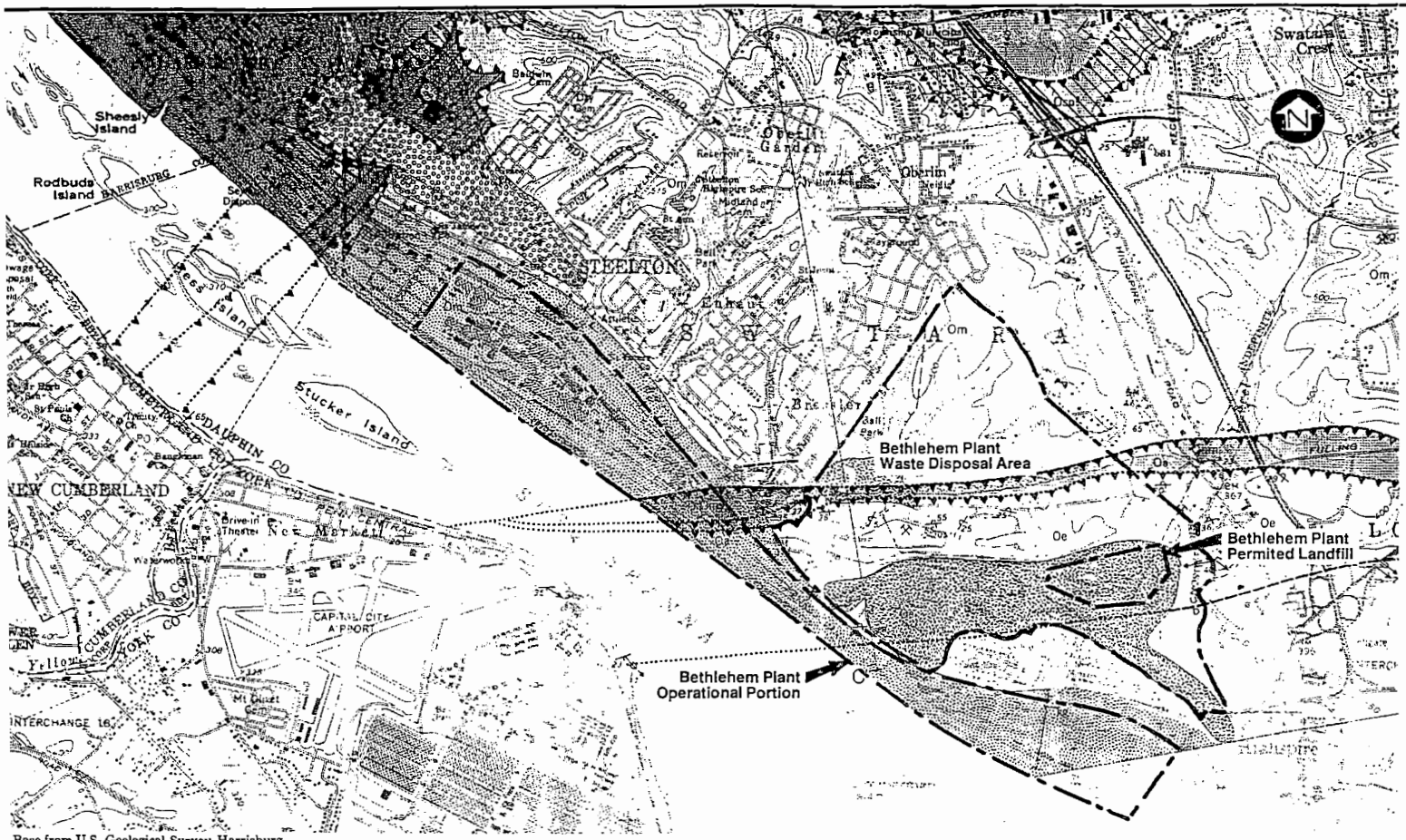
4.3.1 Site Physiography

The operational portion of the plant is situated along the flat floodplain of the Susquehanna River at an elevation of between 310 to 320 feet above sea level. Elevations of Bethlehem property north of Front Street (waste disposal) range from about 250 feet above sea level at the base of the Hempt Brother's Quarry, about 420 feet above sea level in the area of the permitted landfill, to about 530 feet above sea level in the most northern part of the property.

4.3.2 Site Geology - Operational Portion

The operational portion of the plant is underlain by formations ranging in age from Lower Ordovician to Triassic. All contacts between formations are fault contacts.

The oldest rocks exposed at the Steelton Plant Site (Figure 4-4) are the Epler Formation (Lower Ordovician). The entire area of the landfill is underlain by the Epler Formation and soils of the Hagerstown-Duffield Association. The Epler exhibits a thrust fault contact with the Annville Formation (Middle Ordovician). The Annville Formation exhibits a thrust fault contact with the overlying Myerstown Formation (Middle Ordovician). The Myerstown Formation exhibits a thrust fault contact with the overlying Martinsburg Formation (Upper Ordovician). In the southern part of the Plant Site, the southernmost portion of the Epler Formation exhibits a normal fault contact with the Triassic Gettysburg Formation. Along the



Base from U.S. Geological Survey Harrisburg East, Hummelstown, Palmyra, Steelton and Middletown 7½-minute quadrangles.

Geology originally printed on base from U.S. Army Map Service Harrisburg East, Hummelstown, and Palmyra 7½- minute quadrangles and U.S. Geological Survey Steelton and Middletown preliminary 7½- minute quadrangles.

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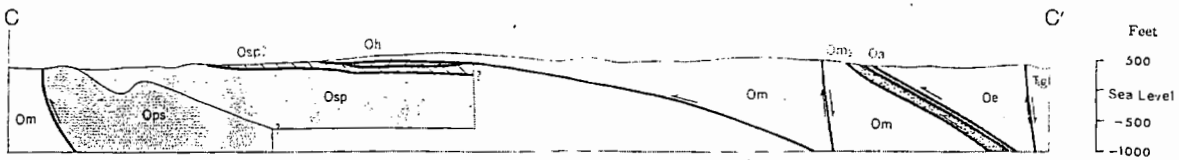

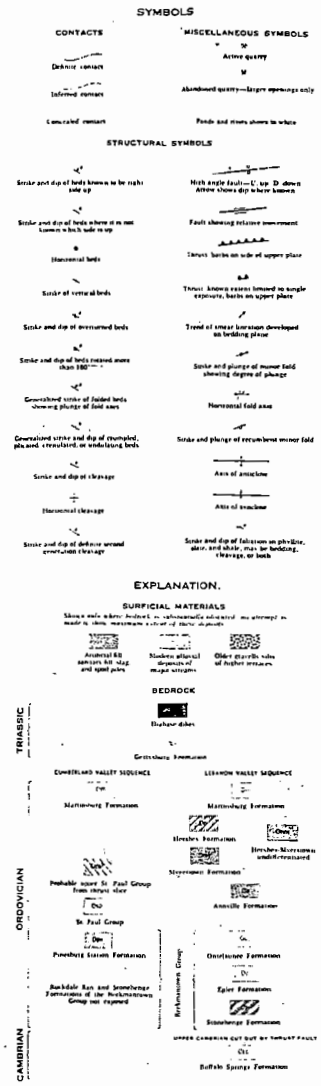

Drawn By: JS	Scale: 1" = 2,000'	The Chester Engineers	Bethlehem Steel Corporation Steelton, Pennsylvania Geologic Map of the Area of the Steelton Plant
Checked By: JP	Date: 12/88		312124
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floodplain of the Susquehanna, in the area of the main part of the plant (operational portion), all the formations are unconformably overlain by Quaternary alluvium deposited by the Susquehanna River.

The following sections give details on the stratigraphy and structure of the formations present in the area of the Steelton Plant.

4.3.2.1 Epler Formation

The Epler Formation consists of interbedded dark gray, distinctly laminated, finely crystalline limestone having beds typically 1 to 4 feet thick with subordinate interbeds of massive to faintly laminated, dark gray, finely crystalline dolomite and magnesian limestone, having beds typically 6 inches to 2 feet thick.

The dolomite was substantially more brittle during deformation than was the enclosing limestone, and is, therefore intensely jointed and, in places, broken into boudins. Solution activity has been limited to this highly fractured lithology, and, as a consequence, solution cavities are much more common in the dolomites than in the limestone. The limestone weathers to a light gray with yellow to gray-brown argillaceous laminae.

The Epler Formation has been subjected to intense structural stresses which have formed tight, highly fractured folds which are often overturned. Joints in the Epler Formation are well developed, spaced at an interval on the order of two feet, and are generally filled with clay or calcite.

4.3.2.2 Annville Formation

The Annville Formation is characterized by thick-bedded to massive, light gray, finely crystalline, high calcium limestone, which weathers to a very light gray, smooth or fluted surface. It is, apparently, a tectonic facies produced by recrystallization under shear. As such, it indicates the presence of intense faulting in the area where it is present.

4.3.2.3 Myerstown Formation

The Myerstown Formation is predominantly a thin, regularly bedded, medium-to dark-gray, fine grained, dense limestone, which weathers to medium light gray with

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312125

a distinct blue cast. Very thin, shaley interbeds are present throughout the formation in the area of the Plant.

4.3.2.4 Martinsburg Formation

The Martinsburg Formation is a structurally and stratigraphically complex unit consisting mostly of shale and siltstone with minor amounts of sandstone interbedded with silty limestones. Greywacke turbidite flows become increasingly abundant higher in the section.

4.3.2.5 Gettysburg Formation

The Gettysburg Formation consists of interbedded red and maroon micaceous and silty mudstones and shales that are locally calcareous, with interbedded red siltstone, and fine grained brown and gray sandstone. The shale is thin to medium bedded, usually fissile, with a hackly fracture. These rocks are relatively flat-lying, and undeformed.

4.3.2.6 Quaternary Alluvium

Quaternary alluvium occurring along the floodplain of the Susquehanna River consists of clay, silt, sand, and gravel. This unconsolidated material usually grades from coarse on the bottom to fine at the top in a given unit. Frequently, individual units are observed to lens into adjacent units.

4.3.2.7 Soils

Two major soil associations are present in the area of the Steelton Plant. These are the Ducannon-Chavies-Tioga Association in the main area of the plant, and the Hagerstown-Duffield Association in the waste disposal area of the plant.

In the area of the operational portion of the plant, along the Susquehanna River, the plant is underlain by soil of the Duncannon-Chavies-Tioga Association. This type of soil consists of deep, well-drained, nearly level soils developed on river terraces and flood plain along the Susquehanna River. The soil has developed from sand, silt, and clay underlain by gravel and sand. The soil has moderate to moderately-high permeability and moderate to high available moisture capacity.

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312126

In the area north of Front Street, the waste disposal area is underlain by soil of the Hagerstown-Duffield Association. This type of soil consists of deep, well drained, nearly level to gently sloping soils that tend to be shallow in areas where edges of folded limestone bedrock protrude the surface. The soil has developed from weathered limestone and dolomite, the topography is gently undulating with numerous concave depressions. The soil has moderate permeability and high available moisture capacity.

4.3.3 Site Geology - Waste Disposal

The bedrock in the immediate vicinity of HWM1 consists of the carbonate Epler Formation. Depth to bedrock beneath HWM1 ranges from 6 feet to about 41 feet. The maximum bedrock depth (up to 26 feet) is found in the areas where the fill material is thick. Natural ground surface and bedrock topography beneath HWM1 generally slope to the south and east toward Laurel Run Valley.

Natural soils in the vicinity of the landfill consist of the Hagerstown series. These soils are residual sands, silts and clays formed from the weathering of carbonate rock. The Hagerstown series consist of silty sands, clayey sands, and clays.

4.3.4 Site Hydrogeology - Operational Portion

The following sections give details on the hydrogeologic characteristics of the formations present in the area of the Steelton Plant.

4.3.4.1 Epler Formation

Surficial drainage goes directly to the groundwater system through open solution cavities, where present. Very large (up to 1,000 gal/min) water yields are possible from parts of this unit. Water is very hard (approximately 17 gr/gal) and high in dissolved solids (660 micromhos).

4.3.4.2 Annville Formation

Surficial drainage goes directly to the groundwater system through open solution cavities, where present. Very large (up to 1,000 gal/min) water yields are possible from parts of this unit. Water is very hard (approximately 18 gr/gal) and high in dissolved solids (760 micromhos).

4.3.4.3 Myerstown Formation

Limited data indicates that this formation has relatively low transmissivities. Limited data indicates water yield in the range of 25 gpm. Water is very hard (14 gr/gal) and high in dissolved solids (570 micromhos).

4.3.4.4 Martinsburg Formation

The Martinsburg Formation has low effective porosity and permeability, and low transmissivities. Water is reported to be hard and very slightly alkaline. Limited data indicates 25-300 gpm water yields are possible from this unit.

4.3.4.5 Gettysburg Formation

The Gettysburg Formation has low effective porosity and permeability, and low transmissivities. Water is reported to be hard to very hard and high in sulfate. Limited data indicates water yields up to 185 gpm are possible from this unit.

4.3.5 Site Hydrogeology - Waste Disposal (the local unconfined flow system)

The uppermost saturated zone existing in the vicinity of the landfill consists of a local unconfined flow system. This system exists within the secondary porosity features of the Epler Formation. Groundwater in the Epler flows preferentially through joints and fractures which have developed within the rock rather than through intergranular voids which lie between the grains of the rock. Water level data obtained during the September 1986 sampling event were contoured in order to define groundwater flow patterns within the local, unconfined flow system (Figure 4-4). The groundwater flow patterns indicated by the water table contour map are probably more simplistic than actual flow paths found within the fractured bedrock; however, interpretation of the water level data can provide insight on general groundwater flow patterns in the vicinity of the landfill.

Groundwater in the local unconfined flow system beneath HWM1 flows primarily in an east/northeast direction and discharges into Laurel Run. This observation appears to be consistent with hydrochemical trends observed in samples of surface water and groundwater collected and analyzed as part of the report entitled Groundwater Quality Assessment and Abatement Program for HWM1, Bethlehem

Steel Plant, Steelton Plant reported to the Pennsylvania DER in November, 1987. Quarrying operations and subsequent dewatering activities have affected groundwater flow and imposed a secondary groundwater flow direction beneath HWM1 to the north toward the quarry.

For the Epler Formation, hydraulic conductivities ranging from about 4 to 713 feet per day have been estimated. Assuming a hydraulic gradient of about 0.06 feet per foot and an effective porosity of 0.10, the groundwater velocity in this formation ranges from 2.6 to 428 feet per day. The estimated transmissivities of the Epler Formation range from slightly less than 100 square feet per day (636 gpd/foot) to slightly above 14,000 square feet per day (106,596 gpd/foot).

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312130

5.0 PRELIMINARY PUBLIC HEALTH AND ENVIRONMENTAL ASSESSMENT

This section presents a preliminary assessment of the potential human health risks associated with the previously identified SWMUs at the Steelton Facility. This assessment focuses on potential non-occupational public health and environmental risks, and consists of the following components:

- Identification of potential contaminants of concern
- Identification of exposure pathways
- Preliminary exposure assessment
- Data quality objectives

This first component, identification of potential constituents of concern (PCOCs), identifies those constituents which have the greatest relative potential to affect human health and the environment. The second component, screening of exposure pathways, identifies the pathways whereby people could potentially be exposed to chemicals from the SWMUs. The third component, exposure assessment, examines the potential exposures that could arise from each of the previously identified exposure pathways. The fourth component, data quality objectives, identifies data gaps in the present database for the SWMUs and outlines data requirements for the work plan.

5.1 IDENTIFICATION OF POTENTIAL CONSTITUENTS OF CONCERN

The PCOCs are those constituents which, because of their mobility, persistence, and potential toxicity have the greatest relative potential to affect human health and the environment.

The Material Safety Data Sheets (MSDS) and the U.S. EPA Draft Consent Order were reviewed for materials potentially present at each SWMU. The following broad classes of compounds were selected as preliminary PCOCs:

- Polycyclic aromatic hydrocarbons

- Volatile organic compounds
- Phenols
- Metals

A breakdown of PCOCs for the individual SWMUs is presented in Table 5-1. A brief description of each of the selected criteria used in choosing the PCOCs is given below.

5.1.1 Toxicity

Potential toxicity of the preliminary PCOCs is important when evaluating their potential effects on possible receptors either on-site or off-site. Some characteristics related to potential toxicity are carcinogenic, mutagenic, and teratogenic properties of the chemicals for both human and environmental receptors. Reproductive toxicity and acute and chronic systemic effects are also addressed. Toxicological profiles for a generic list of constituents are included in Appendix E.

5.1.2 Mobility

Physical and chemical properties of a compound control its transport and fate in the environment. For example, these attributes determine whether a chemical will readily volatilize into the air or be transported via advection or diffusion through the soil, groundwater, and surface water. These characteristics also describe a chemical's tendency to adsorb to soil/sediment particles, in turn reducing its mobility through the environment.

5.1.3 Persistence

Persistence of a chemical in the environment depends on factors such as the microbial content of soil and water and the ability of these organisms to degrade the chemical. In addition, chemical and photochemical degradation may contribute to the elimination of a particular compound.

TABLE 5-1

PRELIMINARY PCOCs FOR INDIVIDUAL SWMUs

	PAHs	VOCs	Phenols	Metals
Wastewater Settling Basins (SWMUs 1-3)	X	X		X
Settling Basin Sump (SWMU 4)	X	X		X
Wastewater Treatment Lagoons (SWMUs 5-7)	X	X		X
Polishing Lagoons (SWMU 8)	X	X		X
Central Waste Oil Storage Tank (SWMU 9)	X	X		
Continuous Caster Heavy Scale Pit (SWMU 10)	X	X		X
Continuous Caster Fine Scale Pit (SWMU 11)	X	X		X
Pipe Mill Oil Separator (SWMU 12)	X	X		
Pipe Mill Expander Pit (SWMU 13)	X	X		X
Small Rolling Mill Scale Pit (SWMU 14)	X	X		X
Medium Rolling Mill Scale Pit (SWMU 15)	X	X		X
Large Rolling Mill Scale Pit (SWMU 16)	X	X		X
HWM1 Landfill (SWMU 18)				X
HMW3 Pelletizer (SWMU 20)				X
Pelletizer Runoff Tank (SWMU 21)				X
No. 2 Pelletizer (SWMU 22)				X
EAF Spray Chamber Drop Legs (SWMU 24)				X
Steel Foundry EF Baghouse Bin (SWMU 25)				
F & S Grinder Cyclone Holding Room (SWMU 29)			X	X
Residual Waste Landfill (SWMU 30)	X	X		X
Caustic Waste Rinsewater Tanks (SWMUs 31 and 32)	X	X		X
Plant Canal (SWMU 34)	X	X		X

VOC - Volatile Organic Compounds
PAHs - Polynuclear Aromatic Hydrocarbons
BNA - Base Neutral Acid Extractables

5.1.4 Prevalence

Frequency of detection and concentration of PCOCs are parameters that characterize the extent of contamination in the various media studies. Also, a comparison of background PCOC concentrations with concentrations of on-site PCOCs is made to determine actual levels of contamination.

5.2 IDENTIFICATION OF EXPOSURE PATHWAYS

PCOCs may potentially migrate from a potential source to a potential receptor through potential exposure pathways. Potential exposure to a PCOC depends on the existence of a pathway which starts at a source and ends with intake by a receptor. These pathways require four basic elements: 1) a source; 2) the release of a PCOC from a source and subsequent migration through an environmental medium; 3) contact between a potential receptor and the medium; and 4) an uptake mechanism associated with the potential receptor.

5.2.1 SWMU Numbers 1, 2, and 3 - Wastewater Settling Basins

The settling basins consist of three rectangular impoundments which provide separation of solids, oil, and grease from plant waters. Potential exposure pathways for PCOCs include:

- Volatilization from water and oil;
- Release to soil or groundwater as a result of spills during dredging;
- Release to soil or groundwater as a result of overflowing of settling basins; and
- Release to soil or groundwater as a result of leaking of settling basins.

5.2.2 SWMU Number 4 - Settling Basin Sump

The settling basin sump receives oil skimmed from the settling basins, in addition to other plant oil. The oil is pumped from the sump into the waste oil storage tank (SWMU 9). Potential exposure pathways for PCOCs include:

- Volatilization from oil;

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312134

- Release to soil or groundwater as a result of leaking of settling basin sump; and

- Release to soil or groundwater as a result of spills during loading of oil into sump.

5.2.3 SWMU Numbers 5, 6, and 7 - Wastewater Treatment Lagoons

The treatment lagoons are three rectangular impoundments used to treat plant waters received from the settling basins. Oil is skimmed from the lagoons and stored in the waste oil storage tank. Potential exposure pathways for PCOCs include:

- Volatilization from water and oil;

- Release to soil or groundwater as a result of spills during dredging, or transfer of materials into lagoons;

- Release to soil or groundwater as a result of overflowing of treatment lagoons; and

- Release to soil or groundwater as a result of leakage from treatment lagoons.

5.2.4 SWMU Number 8 - Polishing Lagoon

The polishing lagoon is a rectangular impoundment used to treat plant water received from the three treatment lagoons. Potential exposure pathways for PCOCs include:

- Volatilization from water and oil;

- Release to soil or groundwater as a result of spills during dredging, or transfer of materials into lagoons;

- Release to soil or groundwater as a result of overflowing of polishing lagoon; and

- Release to soil or groundwater as a result of leakage from polishing lagoon.

5.2.5 SWMU Number 9 - Central Waste Oil Storage Tank

The waste oil storage tank receives oils removed from the settling basins, treatment lagoons, polishing lagoon, and scale pits. The tank also provides for oil/water separation and return of the separated water stream to the settling lagoons. Potential exposure pathways for PCOCs include:

- Release to soil or groundwater as a result of leakage from tank; and
- Release to soil or groundwater as a result of spills during tank loading or unloading.

5.2.6 SWMU Numbers 10 and 11, 13, 14, 15, and 16 - Scale Pits

The continuous caster scale pits are located outdoors. The pipe mill expander pit and rolling mill scale pits are covered and are located indoors. The scale pits are used primarily to separate iron scale from water. In the continuous caster and pipe mill expander pits, oil and grease is also separated. Potential exposure pathways for PCOCs include:

- Volatilization from the continuous caster scale pit; and
- Release to soil or groundwater as a result of spills or leaks.

5.2.7 SWMU Number 12 - Pipe Mill Oil Separator

The pipe mill oil separator collects water and oil from the side and end planer, the press, and the crimper. Potential exposure pathways for PCOCs include:

- Release to soil or groundwater due to overflowing of the pipe mill oil separator;
- Release to soil or groundwater as a result of material leaking from the pipe mill oil separator; and

- Release to soil or groundwater during removal of water and oil from the pipe mill oil separator.

5.2.8 SWMU Number 18 - HWM1 Landfill

HWM1 is part of the residual waste landfill (SWMU 30) and contains Electric Arc Furnance (EAF) dust. Potential exposure pathways for PCOCs prior to capping include:

- Releases to subsurface soil and groundwater by leaching;
- Releases due to runoff; and
- Exposure to trespassers on the landfill.

5.2.9 SWMU Number 20 - HWM3 Pelletizer

HWM3 is a unit to pelletize EAF dust captured from the electric arc furnaces. The pelletized EAF dust is loaded into trucks on a paved loading pad located underneath the pelletizer. Potential exposure pathways for PCOCs contained in EAF dust include:

- Releases to soil or groundwater if the loading pad is cracked; and
- Releases from the loading pad to the surrounding soil by way of vehicular and/or personnel traffic.

5.2.10 SWMU Number 21 - Pelletizer Runoff Tank

The pelletizer runoff tank collects EAF dust and runoff from the pelletizer loading area. Water used to wash the trucks after loading is collected in the tank. Potential exposure pathways for PCOCs contained in EAF dust include:

- Release to soil or groundwater as a result of material leaking from the pelletizer runoff tank; and
- Release to soil or groundwater during removal of material from runoff tank.

5.2.11 SWMU Number 22 - No. 2 Pelletizer

This unit was previously used as a second pelletizer for pelletizing EAF dust. The pelletizer was shut down in 1981. Currently, non-pelletized material is loaded into trucks through a "sock" for transport to a reclaimer. The loading area is in an enclosed building on a concrete pad. Potential exposure pathways for PCOCs contained in EAF dust include:

- Releases from surface soils to underlying soil and groundwater; and
- Releases from surface soils in the vicinity of No. 2 pelletizer to other areas by way of vehicular and/or personnel traffic.

5.2.12 SWMU Number 24 - EAF Spray Chambers Drop Legs

The hot effluent gases evacuated from the furnace prior to their entry into the baghouse are cooled in the Spray Chambers with water sprays. As a result of cooling, some particulate matter is generated and is routinely raked out onto a concrete pad. Potential exposure pathways for PCOCs contained in particulate matter include:

- Releases from spray chamber drop legs to other areas outside the building by way of vehicular and/or personnel traffic; and
- Releases to soil or groundwater if the concrete pad is cracked.

5.2.13 SWMU Number 25 - Steel Foundry Electric Furnace Baghouse Bin

Metal fume from the steel foundry's electric furnace (SFEF) are collected by a baghouse system. SFEF dust from the baghouse is collected in a bin prior to disposal. Potential exposure pathways for PCOCs contained in the SFEF dust include:

- Release to soil or groundwater during transfer of SFEF dust from the baghouse to collection bin; and
- Release to soil or groundwater during emptying of SFEF baghouse bin.

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312138

5.2.14 SWMU Number 29 - Frog and Switch Grinder Cyclone Holding Room

Dust from the frog and switch (F & S) grinder is collected by a cyclone which empties into a drum in the holding room, prior to disposal in the on-site residual waste landfill (SWMU 30). Potential exposure pathways for PCOCs contained in dust from the F & S grinder cyclone include:

- Release to soil or groundwater during transfer of dust from the F & S grinder cyclone to the collection drum; and
- Release to soil or groundwater during emptying of F & S grinder cyclone drum.

5.2.15 SWMU Number 30 - Residual Waste Landfill

The residual waste landfill covers 54 acres and contains municipal and plant refuse. The landfill has a surface cover but is unlined. Potential exposure pathways for PCOCs include:

- Releases to underlying soil and groundwater by leaching;
- Releases off-site by surface water runoff prior to being covered; and
- Exposure to trespassers on the landfill.

5.2.16 SWMU Numbers 31 and 32 - Caustic Waste Rinsewater Tanks

Two metal storage tanks are used to store rust stripper rinses. Potential exposure pathways for PCOCs include:

- Release to soil or groundwater due to overflowing of caustic waste rinsewater tanks;
- Release to soil or groundwater as a result of material leaking from the caustic waste rinsewater tanks; and
- Release to soil or groundwater during emptying of the caustic waste rinsewater tanks.

5.2.17 SWMU Number 34 - Plant Canal

A canal borders the site on the northeast and supplies water for plant processes. The canal receives water from the Susquehanna River through outfalls from the process water treatment facility, and discharges from the town of Steelton's storm sewers. The canal is occasionally dredged, and the solids are disposed of at the residual waste landfill. There are no reported recreational uses (fishing, swimming, etc.) of the plant canal. Public access to the canal is restricted by a guard rail, and only possible by trespassing on Bethlehem property. Plant guards regularly patrol the street along the canal. Potential exposure pathways for PCOCs include:

- Volatilization from the canal water;
- Releases to soil or groundwater as a result of spills during dredging;
- Releases to groundwater through infiltration; and
- Direct contact with canal water by trespassers.

5.3 PRELIMINARY EXPOSURE ASSESSMENT

In Section 5.2, potential exposure pathways were identified whereby chemicals could release from a source to a receptor. In this section, each exposure pathway is evaluated in greater detail, and the potential human exposures and health risks associated with these exposures are examined.

The plant is surrounded by fences, waterways, and railroads and the only authorized access is through guarded gates. Therefore, except for the plant canal and the residual waste landfill, there are no readily accessible opportunities for direct contact exposures to the general public.

5.3.1 SWMU Numbers 1, 2, and 3 - Wastewater Settling Basins

The settling basins consist of three rectangular units which provide separation of solids and oils from plant waters. Constituents of the oils and water in the settling basins include volatile organics. Off-site individuals downwind from the settling basin could potentially be exposed to PCOCs that have volatilized from the water

TheChesterEngine
312140

and oils in the settling basin. This potential exposure pathway requires further evaluation.

Solids are dredged from the settling basins using a clam shell bucket and loaded into a hopper car for disposal in the residual waste landfill (SWMU 30). Currently, the area underneath the hopper car loading area is not paved. PCOCs may potentially be released into the surrounding soil and groundwater as a result of spills during dredging. This potential pathway requires further evaluation.

The settling basins are concrete lined and have a one foot high freeboard. Overflowing of the settling basins is prevented by discharge weirs. Therefore, potential releases of PCOCs into the soil or groundwater as a result of settling basin overflowing are not expected to pose significant public health or environmental risks.

The settling basis are presently concrete lined, thereby containing the process water and preventing its potential releases into the underlying soil and groundwater. If the settling basins have not always been concrete lined, then potential releases of PCOCs into the underlying soil and groundwater will require further evaluation.

5.3.2 SWMU Number 4 - Settling Basin Sump

Oil collected at the plant is deposited in the settling basin sump and then is pumped into the waste oil storage tank (SWMU 9). The area around the sump is paved with concrete and slopes toward the sump. Oil that might be spilled in the area during loading will drain back into the sump. Thus, potential releases of PCOCs to soil and groundwater as a result of spills during the loading of oils into the settling basin sump are not expected to pose significant public health or environmental risks.

Constituents of the oils loaded into the settling basin sump may include volatile organic compounds. Off-site individuals downwind from the settling basin sump could potentially be exposed to PCOCs that have volatilized from the oils in the settling basin sump. This potential exposure pathway requires further evaluation.

The settling basin sump is presently concrete lined, thereby containing the process water and preventing its potential release into the underlying soil and groundwater. If the settling basin sump has not always been concrete lined, then potential releases of PCOCs into the underlying soil and groundwater will require further evaluation.

5.3.3 SWMU Numbers 5, 6, and 7 - Wastewater Treatment Lagoons

The treatment lagoons are used to treat plant water from the settling basins by separating oils and settled solids from the water. Constituents of the oils and water in the treatment lagoons may include volatile organics. Off-site individuals downwind from the treatment lagoons could potentially be exposed to PCOCs that have volatilized from the water and oils in the treatment lagoons. This potential exposure pathway requires further evaluation.

Oils are skimmed from the treatment lagoons using a rope skimmer. The oils are collected in a dumpster and placed in the central waste oil storage tank (SWMU 9). The dumpster is located on a bermed concrete pad so that spills can be collected and returned to the treatment lagoons. Therefore, potential releases of PCOCs into soil or groundwater due to spills are not expected to pose significant public health or environmental risks.

When solids build up on the bottom of a treatment lagoon, the lagoon is drained and allowed to stand for approximately one month until the solids dry to a cake form. The dried solids are then loaded into dump trucks with the aid of a front end loader and disposed of in the residual waste landfill (SWMU 30). The loading of the dump trucks takes place inside the treatment lagoons so that spilled material remains in the lagoons. Therefore, potential releases of PCOCs into soil or groundwater from the treatment lagoons during dredging operations are not expected to pose significant public health or environmental risks.

The treatment lagoons are concrete lined and have a 1-foot high freeboard. Overflowing of the treatment lagoons is prevented by discharge weirs. Therefore, potential releases of PCOCs into soil or groundwater as a result of the treatment lagoons overflowing are not expected to pose significant public health or environmental risks.

The treatment lagoons are presently concrete lined, thereby containing the process water and preventing its potential releases into the underlying soil and groundwater. If the treatment lagoons have not always been concrete lined, then potential releases of PCOCs into the underlying soil and groundwater will require further evaluation.

TheChesterEnginee
312142

5.3.4 SWMU Number 8 - Polishing Lagoon

The polishing lagoon is a rectangular impoundment that receives water from the three treatment lagoons for further treatment. Constituents of the oils and water in the polishing lagoon may include volatile organic compounds. Off-site individuals downwind from the polishing lagoon could potentially be exposed to PCOCs that have volatilized from the water and oils in the polishing lagoon. This potential exposure pathway requires further evaluation.

Oils are skimmed from the polishing lagoon using a rope skimmer. The oils are collected in a dumpster and placed in the central waste oil storage tank (SWMU 9). The dumpster is located on a bermed concrete pad which slopes toward the polishing lagoon. If the oil dumpster overflows, the oil will drain back into the polishing lagoon. Therefore, potential releases of PCOCs into soil or groundwater are not expected to pose significant public health or environmental risks.

The polishing lagoon has been dredged only once since the lagoon was put in operation. At that time a float and a suction pump were used to remove the solids and directly deposit them in one of the three treatment lagoons (SWMUs 5, 6, and 7). Due to the infrequency and method of dredging, potential releases of PCOCs from the polishing lagoon into soil or groundwater during dredging are not expected to pose significant public health or environmental risks.

The polishing lagoon is concrete lined and has a 1-foot high freeboard. Overflowing of the polishing lagoon is prevented by discharge weirs. Therefore, potential releases of PCOCs into soil or groundwater as a result of the polishing lagoon overflowing are not expected to pose significant public health or environmental risks.

The polishing lagoon is presently concrete lined, thereby containing the process water and preventing its potential releases into the underlying soil and groundwater. If the polishing lagoon has not always been concrete lined, then potential releases of PCOCs into the underlying soil and groundwater will require further evaluation.

5.3.5 SWMU Number 9 - Central Waste Oil Storage Tank

Oil disposed of in the settling basin sump (SWMU 4) is pumped into the waste oil storage tank. A bermed concrete pad was constructed around the tank to contain

material in the event of a tank leak. If tank leaks have occurred in the past, PCOCs potentially could have been released into the soil and groundwater. This potential pathway requires further evaluation.

Oil collected in the tank is loaded into a tank truck and sent off-site for reuse as fuel. The tank truck loading area is located on a concrete pad which slopes toward the settling basin sump. Oil that might be spilled when oil is being loaded into the tank truck will drain into the settling basin sump. Therefore, potential releases of PCOCs into the soil or groundwater during tank unloading are not expected to pose significant public health or environmental risks.

5.3.6 SWMU Numbers 10 and 11, 13, 14, 15, and 16 - Scale Pits

The scale pits are very similar and unless otherwise noted the following discussion will apply to all six scale pits.

Oil and grease is collected from the continuous caster heavy scale pit and the pipe mill expander pit with a tubular skimmer. The skimmer drains into either a 55-gallon drum or another container. The container is checked periodically and, when full, is taken to the plant's waste oil tank (SWMU 9). The area where the containers are loaded is paved with concrete, diked, and slopes toward the scale pits. If the containers overflow, the oil will drain back into the scale pit. Therefore, potential releases of spilled oil into the surrounding environment are not expected to pose significant public health or environmental risks.

Periodically, solid residue consisting primarily of iron scale is removed from the scale pits. With the exception of the pipe mill expander pit, the solid residue is loaded onto trucks/hopper cars located on continuous paved areas. Any water drippage from the trucks/hopper cars drains back into the scale pits before the trucks/hopper cars are moved. Any spilled material is placed back into the scale pits. The iron scale is transported for consolidation and recycled entirely to the electric furnaces. Iron scale from the pipe mill expander pit is removed from the pit using a suction truck and deposited in the treatment lagoons (SWMU 5, 6, and 7) for dewatering. Therefore, releases of scale and solid residue from the scale pits during dredging into the surrounding environment are not expected to pose significant public health or environmental risks.

The MSDS sheets list volatile organic compounds as constituents of the oils and greases in the continuous caster scale pit. Persons off-site downwind from the scale pits could potentially be exposed to PCOCs that have volatilized from water in the caster scale pits or from the oil collection containers. This potential exposure pathway requires further evaluation.

The scale pits are presently concrete lined, thereby containing the process water and preventing its potential releases into the underlying soil and groundwater. If the scale pits have not always been concrete lined, then potential releases of PCOCs into the underlying soil and groundwater will require further evaluation.

5.3.7 SWMU Number 12 - Pipe Mill Oil Separator

The pipe mill oil separator collects water and oil from the side and end planer, the press, and the crimper. The oil separator is located near the pipe mill and is approximately 75 percent underground. Oil is separated in the tank prior to draining water for further treatment. The oil separator has been in use since 1945 with no reported leaks. The oil separator was tightness tested on November 29, 1988 prior to promulgation of the Federal Underground Storage Tank (UST) regulations. Testing showed that the oil separator met tightness standards. Therefore, potential releases of PCOCs as a result of material leaking from the oil separator onto surface soil, subsurface soil, and groundwater are not currently expected to pose significant public health or environmental risks.

During the site visit by Earth Technology Corporation, the oil separator and the ground around the separator were observed to be stained. The staining suggests that material may have been released from the separator. PCOCs in any material that has been released from the oil separator might potentially reach the subsurface soil and groundwater. This potential pathway requires further investigation.

5.3.8 SWMU Number 18 - HWM1 Landfill

HWM1 covers approximately 10.3 acres of the 54 acre residual waste landfill. HWM1 presently contains approximately 300,000 cubic yards of EAF dust. EAF dust was disposed in the residual waste landfill primarily in the area now referred to as HWM1 beginning in 1968. Since January 1986 EAF dust from the plant has been shipped off-site for metal reclamation.

HWM1 is an unlined landfill. PCOCs in the EAF dust could potentially leach from the dust into the underlying soil and reach the subsurface soil and groundwater. However, placement of the final cap will eliminate or greatly reduce the production and potential releases of leachate originating from the dust. This potential pathway requires further evaluation.

As a result of closure (presently underway) the cap and fence being constructed will prevent potential exposures to individuals who trespass on the landfill area.

5.3.9 SWMU Number 20 - HWM3 Pelletizer

HWM3 is a unit to pelletize EAF dust captured from the gases evacuated from the electric arc furnaces. The pelletized EAF dust is loaded into trucks on a paved loading pad underneath the pelletizer. Potential exposures may occur from PCOCs being released into the surrounding soil as a result of spillage during truck loading and PCOCs entering the underlying soil through cracks in the loading pad.

The pelletizer is located on an asphalt pad that is surrounded by an 8-inch curb. The pad slopes toward the pelletizer runoff tank (SWMU 21). Spillage which may occur during the loading of the trucks is contained on the paved pad. Material which may be spilled onto the pad is washed into the pelletizer runoff tank. Therefore, potential releases of PCOCs into the soil and potential releases to subsurface soil and groundwater during truck loading is not expected to pose significant public health or environmental risks.

The pelletizer is presently located on an asphalt loading pad, thereby containing spillage and preventing its potential releases into the underlying soil and groundwater. If the loading pad has not always been asphalt, then potential releases of PCOCs into the underlying soil and groundwater will require further evaluation.

5.3.10 SWMU Number 21 - Pelletizer Runoff Tank

The pelletizer runoff tank collects EAF dust and runoff from the pelletizer loading area. Water used to wash spillage which may occur during loading of the trucks is collected in the tank. Material collected in the runoff tank is recycled back to the HWM3 pelletizer.

The pelletizer runoff tank is an underground precast concrete tank that is located underneath the HWM3 pelletizer. Potential exposures may occur if material leaks from the tank into the subsurface soil and is released into the groundwater. This exposure pathway requires further evaluation.

Material is removed from the runoff tank with a suction truck and recycled back to the pelletizer. The area around the runoff tank is paved and slopes toward the runoff tank. Any material that is spilled will be returned to the runoff tank. Therefore potential exposure due to the spillage when material is removed from the runoff tank is not expected to pose significant public health or environmental risks.

5.3.11 SWMU Number 22 - No. 2 Pelletizer

This unit was previously used as a second pelletizer for EAF dust. Pelletized dust was transported and disposed in the on-site landfill (SWMU 18). The pelletizing operation was shut down in 1981. Potential exposure pathways from past uses of this unit include the releases of past releases from surface soil to underlying subsurface soil and groundwater and to other areas of the plant. These potential exposure pathways require further evaluation.

Currently the building which contained the No. 2 Pelletizer is being used to load non-pelletized material into trucks through a "sock" for transport to a reclaimer. The sock minimizes dust releases during loading of the truck. The loading area is in an enclosed building on a concrete pad. Any material that might be spilled during loading is contained by the concrete pad. Therefore, potential public health and environmental effects from present usage of the No. 2 pelletizer building are not expected to be significant.

5.3.12 SWMU Number 24 - EAF Spray Chambers Drop Legs

Three spray chambers are employed to collect particulate matter from the EAF exhausts. Particulate matter and water is routinely raked out of the spray chambers onto a concrete pad. During the Earth Technology Corporation site visit they reported that particulate matter from the EAF spray chambers drop legs was observed to have spread beyond the immediate vicinity of the concrete pad. PCOCs contained in the particulate matter that have spread beyond the spray chamber drop legs could potentially be transported to areas outside of the building by adhering to the tires of vehicles or the shoes of workers. This potential exposure pathway requires further evaluation.

The spray chambers are presently located on a concrete pad, thereby containing spillage and preventing its potential release into the underlying soil and groundwater. If the area under the EAF spray chambers drop legs has not always been concrete, then potential releases of PCOCs into the underlying soil and groundwater will require further evaluation.

5.3.13 SWMU Number 25 - Steel Foundry Electric Furnace Baghouse Bin

The SFEF baghouse bin (SWMU 25) is an enclosed metal dumpster which collected SFEF dust from the steel foundry's electric furnace baghouse. The dumpster is connected to the baghouse with a cloth sock which prevents SFEF dust from being released into the environment during transfer. A concrete pad was installed underneath the dumpster. During the site visit by Earth Technology Corporation the cloth sock connecting the baghouse to the dumpster was observed to be ripped and visible SFEF dust was being released into the surrounding environment. As long as the cloth sock is intact, potential releases of PCOCs onto the soil and into subsurface soils and groundwater during SFEF dust transfer to the dumpster is not expected to pose significant public health or environmental risks. However, if the cloth sock is torn, PCOCs might potentially be released into the environment. This potential path requires further evaluation.

Approximately every four months the dumpster is unloaded by sealing off the openings to the baghouse and dumpster. The sealed dumpster is then transported to the electric furnace and emptied onto a concrete pad. Therefore, potential

releases of PCOCs onto the soil and potential releases into subsurface soil and groundwater during dumpster unloading are not expected to pose significant public health or environmental risks.

5.3.14 SWMU Number 29 - Frog and Switch Grinder Cyclone Holding Room

The frog and switch grinder cyclone holding room (SWMU 29) accepts dust from the frog and switch grinder. The dust reportedly consists primarily of iron fines, but might also contain dust from the grinding wheels which are bonded with phenolic resins. The dust is collected by a cyclone which empties into a container in the holding room. During the site visit by Earth Technology Corporation dust was present outside of the holding room on the surface soil. If PCOCs in the dust were present on the surface soil, they might potentially be released into the subsurface soil and groundwater. This potential exposure pathway requires further evaluation.

The drum is emptied approximately every two months into a dump car and disposed of in the on-site residual waste landfill (SWMU 30). A concrete pad was installed in front of the holding room in the dump car loading area to contain possible dust spills. PCOCs present due to previous spillage may potentially be released into the subsurface soil and groundwater. This potential exposure pathway requires further evaluation.

5.3.15 SWMU Number 30 - Residual Waste Landfill

The residual waste landfill covers approximately 54 acres, however only 4 acres are presently active. The residual waste landfill has been used since 1875. Currently the residual waste landfill receives approximately 17,000 cubic yards per year of solid waste from the plant.

Material is deposited in 2-foot deep cells. Each week a cell is covered and compacted. The surface of each compacted cell is graded to a 1 to 3 percent slope to facilitate surface water runoff. These controls have only been utilized for the last ten years. In the past PCOCs potentially may have been released off-site by soil erosion during periods of rainfall. This potential pathway requires further evaluation.

Since the residual waste landfill is not lined, PCOCs contained in material disposed of in the landfill could potentially leach from the landfill into the underlying soil and be released to the subsurface soil and groundwater. This potential pathway requires further evaluation.

Although the residual waste landfill is posted with no trespassing signs, it is still possible for non-plant personnel to access the site. Therefore potential exposures to individuals who trespass on the residual waste landfill will require further evaluation.

5.3.16 SWMU Numbers 31 and 32 - Caustic Waste Rinsewater Tanks

The caustic waste rinsewater tanks are concrete lined steel storage tanks which are used to store rinsewater from the rust stripping process. The stripper rinses consist of water, sodium hydroxide, and sodium carbonate. There are no known past releases from the caustic waste rinsewater tanks. Approximately two years ago a concrete pad with a 6-inch curb was installed underneath the tanks to contain releases from the tanks. A cover was constructed over the tanks to prevent the buildup of rainwater on the concrete pad. During the site visit by Earth Technology Corporation the outsides of the tanks were observed to be stained. The staining suggests that material has been released from the tanks. PCOCs in material that possibly had been released from the caustic waste rinsewater tanks before the installation of the concrete pad may have potentially been released into the soil and groundwater. This potential pathway requires further investigation.

Approximately every three months the caustic waste rinsewater tanks are emptied. Spent material is suctioned out of the caustic waste rinsewater tanks into a tank truck. The tank truck then disposes of the spent material in the settling basins (SWMUs 1, 2 and 3). Therefore, potential releases of PCOCs onto the soil and potential releases into subsurface soil and groundwater during removal of material from the caustic waste rinsewater tanks are not expected to pose significant public health or environmental risks.

5.3.17 SWMU Number 34 - Plant Canal

The plant canal extends from the Susquehanna River on the southeast portion of

the Plant near the Frog & Switch Division to the Boiler shop on the northwest portion of the plant. The town of Steelton is directly east of the plant canal. Public access to the canal is restricted by a guard rail and is only possible by trespassing on Bethlehem property. Plant guards regularly patrol the street along the canal. Potential exposure may occur from direct contact with the canal water by trespassers. This potential exposure pathway requires further evaluation.

Constituents of the water in the plant canal may include volatile organic compounds. Off-site individuals downwind from the plant canal could potentially be exposed to PCOCs that have volatilized from the water in the plant canal. This potential exposure pathway requires further evaluation.

Dredging operations are conducted in the canal each year. PCOCs can potentially release to soil and groundwater as a result of spills during dredging operations. This potential exposure pathway requires further evaluation. The plant canal is unlined. PCOCs in the water from the plant canal could potentially release to the underlying groundwater. This potential exposure pathway requires further evaluation.

Reportedly, during periods of heavy rainfall, water from the plant canal has overflowed into the Susquehanna River. PCOCs in the water from the plant could potentially release into the Susquehanna River when the plant canal overflows. This potential exposure pathway requires further evaluation.

5.4 ADDITIONAL DATA REQUIREMENTS

This section outlines additional data requirements for the work plan. The requirements outlined in this section address gaps in available information for the group of SWMUs evaluated in this report. Collection of the information identified here will facilitate the characterization of potential public and environmental risks associated with the SWMUs.

5.4.1 Historical Review of SWMUs

The operating history of the SWMUs should be investigated to determine if they have always 1) been concrete lined and/or 2) situated on concrete or paved pads, whichever is appropriate, since being placed into operation. The investigation should determine how the water/waste was handled prior to the construction of the

TheChesterEngineer
312151

SWMU. If the historical investigation shows that a SWMU has not either been concrete lined or situated on concrete or paved pads, then the soils in the vicinity of a SWMU should be investigated to establish if PCOCs have potentially released from a SWMU.

The preliminary list of PCOCs presented in Section 5.1 were derived from the MSDSs for the constituents presently used at the plant and the RCRA Facility Assessment report. If it is established that there have been past releases from the SWMUs, then the PCOC list may have to be revised to include constituents used in the plant in the past.

5.4.2 Characterization of SWMUs "Waste" Material

Review of the MSDSs for the processes which discharge to each SWMU identified a set of PCOCs for the material contained in the SWMUs. Sampling and analysis of the contents of the following SWMUs are required to establish if any of the PCOCs are present at levels that could pose significant risks to the public health and the environment:

SWMU	Description
1-3	Wastewater Settling Basins
4	Settling Basin Sump
5-7	Wastewater Treatment Lagoons
8	Wastewater Polishing Lagoon
9	Central Waste Oil Storage Tank
10-11	Continuous Caster Heavy Scale Pit and Fine Scale Pit
12	Pipe Mill Oil Separator
13	Pipe Mill Expander Pit
14	Small Rolling Mill Scale Pit (28" Rolling Mill Pit)
15	Medium Rolling Mill Scale Pit (35" Rolling Mill Pit)
16	Large Rolling Mill Scale Pit (44" Rolling Mill Pit)
31-32	Caustic Waste Rinsewater Tanks

5.4.3 Volatilization of Organic Compounds from SWMUs

Review of the MSDSs and the RCRA Facility Assessment report for the processes which discharge into the continuous caster scale pits, settling basins, settling basin sump, and treatment and polishing lagoons identified volatile PCOCs in the wastewater discharging to these SWMUs. If characterization of the "waste" material

TheChesterEngineer
312152

in the SWMUs indicates that volatile compounds are present in the SWMUs above significant risk based levels, the characterization of potential release of these volatile compounds into the air above this group of SWMUs is necessary to evaluate potential health risks to off-site downwind receptors.

5.4.4 Dredging of Settling Basins

Additional information is required on the dredging procedure for the settling basins; particularly, the measures that are taken to reduce the potential releases of PCOCs due to spilled material and water drippage from the trucks.

5.4.5 Plant Canal

Information in the following areas is required to evaluate potential health and environmental risks:

- Characterization of the plant canal water;
- Characterization of the plant canal sediment; and
- Characterization of canal overflow water (i.e., frequency of occurrence, and volume of overflow into the Susquehanna river).

If the characterization of the plant canal surface water and sediment indicates that significant levels of PCOCs are present then the following additional data will be required:

- Characterization of flow patterns and PCOC concentrations in groundwater beneath the plant canal; and
- Identification of sources discharging to the plant canal.

5.4.6 SFEF Baghouse Bin

During the Earth Technology Corporation site visit the cloth sock connecting the baghouse to the dumpster was found to be torn and SFEF dust was being released into the surrounding environment. The surface soil in the vicinity of the SFEF baghouse bin should be sampled and analyzed to determine if PCOCs associated with the baghouse are present in the soil. If PCOCs are detected above background

levels in the soil, then additional sampling and analysis should be performed to determine the extent of the release.

5.4.7 Frog and Switch Grinder Cyclone Holding Room

The dust from the frog and switch grinder holding room should be sampled and analyzed to determine if the dust contains phenolics or other potentially hazardous constituents. If the analytical results indicate that potentially hazardous constituents are present in the dust, then the soil in the vicinity of the holding room should be sampled and analyzed to determine if PCOCs are present in the soil. If PCOCs are detected above background levels in the soil then additional sampling and analysis should be performed to determine the extent of the release.

5.4.8 No. 2 Pelletizer

The soil in the vicinity of the No. 2 pelletizer should be sampled to determine if there have been past releases of EAF dust.

5.4.9 EAF Spray Chambers Drop Legs

The soil underneath the pad should be sampled to determine if PCOCs contained in the particulate matter and water from the EAF spray chamber drop legs have released into the underlying soil.

5.4.10 HWM1 Landfill and Residual Waste Landfill

Information in the following areas is required to evaluate potential health and environmental risks from the residual waste landfill and the HWM1 landfill:

- Confirm or disprove PCOC releases to subsurface soil and groundwater by leaching;
- Confirm or disprove PCOC releases off-site due to soil erosion from surface water runoff; and
- Characterize the landfill surface soils to evaluate direct contact exposures.

TheChesterEngine
312154

6.0 SWMU INVESTIGATION

6.1 SWMU NUMBERS 1, 2 AND 3 -- WASTEWATER SETTLING BASINS

6.1.1 Historical Investigation

An extensive evaluation of the history of SWMUs 1, 2 and 3 will be necessary to determine the extent to which each SWMU will be investigated. Detailed drawings, historical plot plans of the site, and specifications related to SWMUs 1 through 3 will be inspected to determine if they have provided complete containment from the time they were put in operation until the present. The investigation will also determine how the wastewater was handled prior to construction of these SWMUs. The historical investigation will also identify, where possible, oils and their constituents, in addition to those identified in Section 3.0, that were used in facilities sending wastewater to these SWMUs.

6.1.2 Constituent Sampling Plan

It is also necessary to determine the concentrations of constituents in SWMUs 1 through 3 to evaluate if the detected constituents are considered potentially hazardous. Three sampling rounds will be conducted, spaced at least two weeks apart. During each sampling round, one water sample will be collected from the discharge from each basin (SWMUs 1, 2, and 3). The water samples will be filtered and preserved as appropriate and all samples will be placed in clean, labeled glass jars. The samples will be cooled to $4^{o}C$ for transport to the laboratory, where they will be analyzed for the parameters listed in Table 6-1.

In addition to water sampling and analysis, it will be necessary to collect and analyze samples of the settled solids at the bottom of each basin (SWMUs 1, 2, and 3). Three rounds of solids sampling will be performed coincident with the water sampling rounds. During each round of solids sampling, three samples from each basin will be collected using a ponar sampler and then composited. Non-dedicated sampling equipment will be cleaned between locations using a brush, soapy water, fresh water, acetone, and a final distilled water rinse. The solids will be placed in clean, unpreserved, air-tight containers and packed in iced coolers for transport to