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(RFI)

RCRA FACILITY INVESTIGATION
DESCRIPTION OF
CURRENT CONDITIONS REPORT
AL TECH SPECIALTY STEEL
WATERVLIET, NEW YORK

Prepared for:

AL Tech Specialty Steel
Willowbrook Avenue
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McLaren/Hart Project Nº AL379.01

November 6, 1991

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APPENDIX 1 -- DRAWINGS

1.0 INTRODUCTION

The AL Tech Specialty Steel facility is located in Watervliet, New York. This facility manufactures steel, carbon steel, alloy steel, high and low strength steels, stainless and heat resisting steels and tool steels.

McLaren/Hart Environmental Engineering Corporation (McLaren/Hart) was retained as AL Tech's consultant to provide a RCRA Facility Assessment (RFA) including a Description of Current Conditions Report in accordance with the Resource Conservation and Recovery Act (RCRA) Corrective Action Program. The main program objective is to identify and implement remediation of Solid Waste Management Units (SWMUs) which pose an unacceptable risk to human health and/or the environment. The RCRA Corrective Action Program in general was mandated in 1984 by the Hazardous and Solid Waste Amendments to RCRA which authorized the United States Environmental Protection Agency (USEPA) to enforce corrective action requirements on all permittees. This corrective program will be completed pursuant to a consent order to assure all EPA and NYSDEC requirements are met. AL Tech is taking the unique step of developing a corrective action program that utilizes a "manufacturing process orientation"; both historical and current. By this method, the corrective action investigation and implementation has the highest probability of identifying, characterizing and remedying those areas of greatest concern in the most effective manner.

In preparation for the RFA, a Description of Current Conditions Report (DCCR) is required to provide background information on the AL Tech facility. McLaren/Hart obtained the necessary information for the DCCR in December, 1990 and January, 1991. Information obtained from the site visit, records review and discussions with plant and other knowledgeable individuals, was used to prepare this DCCR. Included in this report is information regarding the site physical setting, site history and facility features, process and support operations, waste generation, the SWMUs identified, areas of concern, spill history and a summary of past enforcement actions. This information is described in detail in the following sections of this report.

2.0 DESCRIPTION OF DRAWINGS

The following drawings, referenced throughout the remainder of this report, have been prepared by AL Tech and are provided in Appendix 1. A summary of these drawings is presented below.

- **Nº 1 - (PT411-E-1) North Face Remediation; Watervliet Solid Waste Landfill; January, 1991; AL Tech Specialty Steel Corp.; Watervliet, New York.**

The preliminary drawing of AL Tech's landfill is a plan view of the existing site conditions. Locations of test borings, monitoring wells (in service, temporary, out of service), access roads, and the topography of the landfill are depicted. Sewer and leachate collection lines are also detailed on the map as well as the property immediately adjacent to the landfill boundaries.

- **Nº 2 - (10-D-10-057 [1/2]) API Separator and Outfall Intercepts; Dept. Plant Services, Bldg. Yard & Outside; March, 1990; AL Tech Specialty Steel Corp.; Watervliet, New York.**

Plan view depicts the location of electric, gas, sewer and water lines at AL Tech. The drawing provides specific information regarding size of sewers, outfall locations, voltage of lines, etc. It was prepared to facilitate a utilities relocation program.

- **Nº 3 - (10-D-10-058 (2/2)) API Separator and Outfall Intercepts; Dept. Plant Services, Bldg. Yard & Outside; March, 1990; AL Tech Specialty Steel Corp.; Watervliet, New York.**

Plan view depicts the location of electric, gas, sewer and water lines at AL Tech. The drawing provides specific information regarding size of sewers, outfall locations, voltage of lines, etc. It was prepared to facilitate a utilities relocation program.

- **Nº 4 - (10-F10-056) Plant Layout of Storm Sewer Systems; AL Tech Specialty Steel Corp.; Watervliet, New York.**

Plan view of the storm sewer at AL Tech's steel production facility in Watervliet portrays the location and size of sewer lines, and the location of manholes, septic tanks and yard drains. Number codes provide information on the names of shops and processes present in each structure.

- **Nº 5 - (Figure 2) Groundwater Flow Direction; 1989, AL Tech Specialty Steel Corp.; Watervliet, New York.**

The drawing depicts the location of monitoring wells at the manufacturing facility. Groundwater flow direction is indicated by arrows on the drawing. Groundwater flows in an east-southeast direction. Hazard Evaluations produced the drawing.

- **Nº 6 - (T-03136) General Arrangement, 13,200 Volt Lines; November 4, 1950; Allegheny-Ludlum Steel Corp.; Watervliet, New York.**

The drawing depicts the location of 13,200 volt lines supplying power to the facility.

- **Nº 7 - (10-C05-052) Gas Lines; AL Tech Specialty Steel Corp.; Watervliet, New York.**

The drawing depicts the location of the gas lines at the AL Tech Facility. The main line, extrusion main, main line valve and boilers are depicted on the drawing.

- **Nº 8 - (T-02044) Steam Pipe Layout; Ludlum Steel Co.; January 1, 1937; Watervliet, New York.**

The location of the exhaust steam and live steam pipes are depicted. The drawing is a photocopy of a blue-print. It appears the drawing was produced in 1937.

- **Nº 9 - (T-02042) Sewer and Oil Pipe; Ludlum Steel Company; Watervliet, New York.**

The drawing depicts the location of the sewers and drains and the oil pipe system. The drawing is a photocopy of a blue-print.

- **Nº 10 - (10-F09-001) Plant Layout of Sanitary Sewer Systems; August, 1984; Allegheny-Ludlum Steel Corp.; Watervliet, New York.**

Plan view depicts the location, length and diameter of the sanitary sewer system pipes at the AL Tech facility. The larger structures on the property are labeled.

- **Nº 11 - (11-D19-001-A) AL Tech Specialty Steel Corp.; May 4, 1990; Watervliet, New York.**

The drawing depicts the locations of the underground and aboveground hazardous substance storage tanks.

- **Nº 12 - (11-D04-008) Hazardous Source Location Map, Best Management Plan; May, 1990; AL Tech Specialty Steel Corp.; Watervliet, New York.**

The drawing depicts the locations of the underground and aboveground petroleum storage tanks.

- **Nº 13 - (11-D04-008-A)**

This drawing depicts the locations of SWMU's and AOC's.

- **Nº 14 - (11-D01-178) Acid Neutralization Plant, Flow Equalization, Chrome Reduction and Sludge Holding Flow Chart; October, 1988; AL Tech Specialty Steel Corp.; Watervliet, New York.**

Plan view depicts the location of the chromium reduction system and the acid neutralization plant. The flow between the facilities and the acid storage tanks is depicted. The drawing is detailed with tank labels and process/machinery labels.

- **Nº 15 - (2141) Location Map of Outfalls to Hudson River via Kromma Kill Creek; June, 1971; Allegheny Ludlum Steel Corp.; Watervliet, New York.**

The drawing depicts and labels the outfalls of that time from the Allegheny Ludlum Steel Corp. which entered the Kromma Kill. The direction of flow of the Kromma Kill is shown; the Kromma Kill discharges into the Hudson River.

- **Nº 16 - (887-001) Surface Impoundment Closure Plan and Sections; October, 1988; AL Tech Specialty Steel Corporation; Watervliet, New York.**

Plan view of the surface impoundment (landfill leachate collection) closure shows the existing grade contours of the landfill and the proposed final grade contours of the landfill. The location of the leachate collection trench, the multi-layer cap, collection manhole, etc. are depicted on the drawing. Detailed cross sections of the cap and the collection trench are depicted.

- **Nº 17 - (35173-1) Site Plan; February, 1988; AL Tech Specialty Steel Corp.; Watervliet, New York.**

The site plan shows the proposed location for a new leachate collection system as planned in 1988 and storage tank facilities at AL Tech's Watervliet Facility.

- **Nº 18 - (11-D01-170) Holding Ponds Landfill Area; May, 1979; AL Tech Specialty Steel Corp.; Watervliet, New York.**

The drawing shows an area plan of the landfill area (preleachate collection lagoon period). An enlarged area depicting the holding ponds for the landfill is depicted. Three holding ponds ranging from 136,000 gallons up to 745,000 gallons in capacity are shown along with the overflow channel for the ponds.

- **Nº 19 - (11-D01-168) Contract Nº 2 Hydromation Overflow Filtration Building: Structural Foundation Plans, Section Details; February, 1976; Allegheny Ludlum Steel Corp.; Watervliet, New York.**

The foundation plans and section details of the hydromation overflow filtration building are depicted in this drawing.

- **Nº 20 - (7749P) General Arrangement of Proposed Equalization Tank for Waste Acid Neutralization System; April, 1975; Allegheny Ludlum Steel Corp.; Watervliet, New York.**

The drawing depicts the proposed location of the then proposed equalization tank for the waste acid neutralization system. The clarifier, lime slurry tank, aerator tank, waste acid pits, acid tanks, pumps, etc. are detailed in the drawing. Also shown is the piping system and the discharge pipe to outfall 010.

- **Nº 21 - (7747-P) 43' Steel Shell with Polypropylene Liner Sections; December, 1968; Allegheny Ludlum Steel Corp.; Watervliet, New York.**

The drawing shows the pickle tank details. The tank is a 43' steel shell with a polypropylene liner.

- **Nº 22 - (14656) Extrusion Division Pickling Building - Floor Slab & Trenches, Plan & Sections; June, 1951; Allegheny Ludlum Steel Corp.; Watervliet, New York.**

The plan view of the pickling building shows the location and contents of the tanks in the descaling operation. Also shown is the cross-sectional view of the dimensions and construction materials used for the trenches located in the facility (original construction drawing).

- **Nº 23 - (14653) Extrusion Division Buildings - Pickle Building, Lean-To; 1951; Allegheny Ludlum Steel Corp.; Watervliet, New York.**

The detailed drawing depicts the foundations at the pickling building. The elevations of the foundations, the dimensions of the facilities and the materials of construction are depicted on the drawing (original construction drawing).

- **Nº 24 - (76-143R) Survey of Lands of Allegheny Ludlum Industries Inc. for AL Tech Specialty Steel Corporation; August, 1976.**

The drawing depicts the plant and landfill site property boundaries, building locations, roadways, and adjacent lands.

3.0 PHYSICAL SETTING

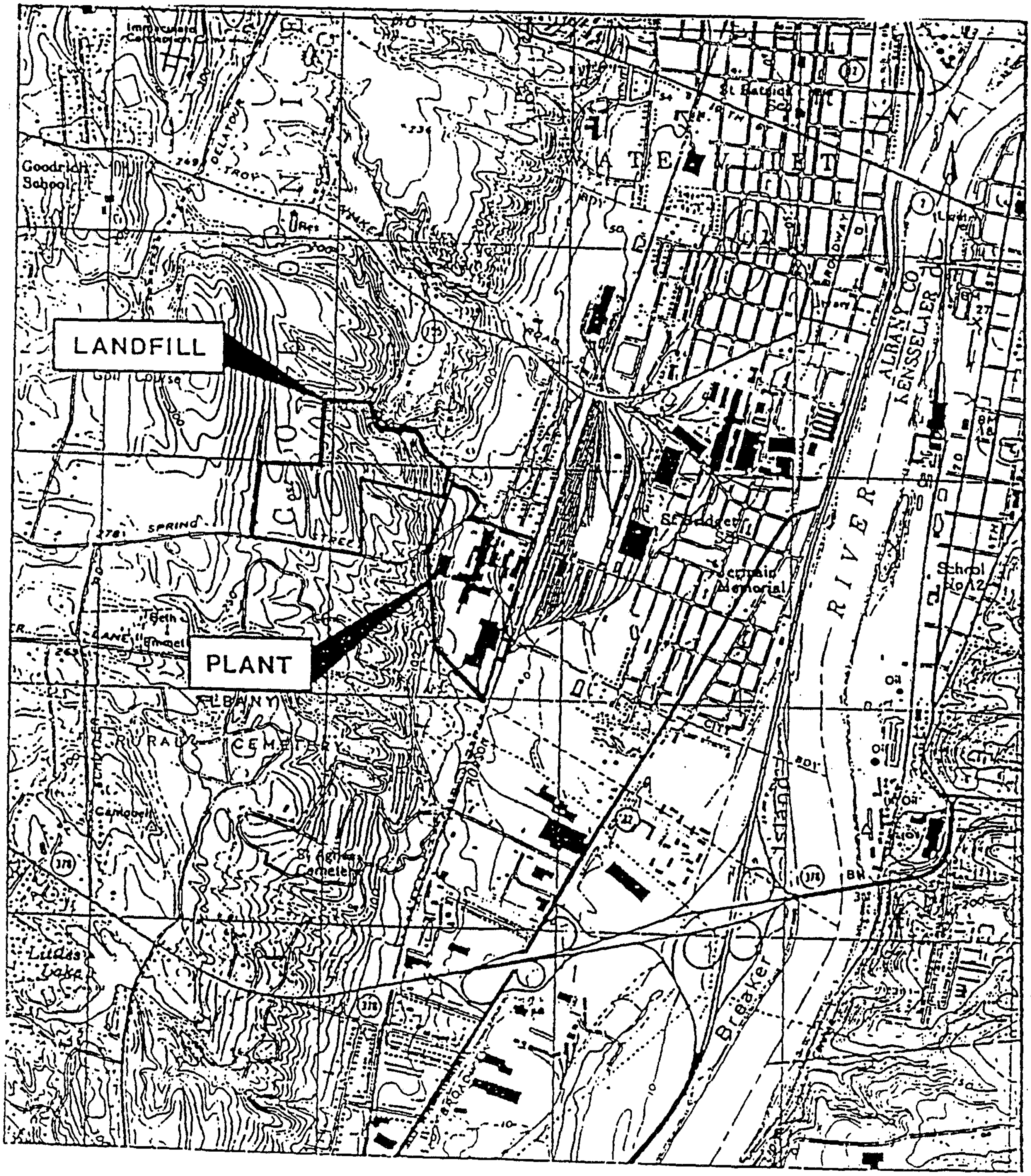
3.1 Site Boundaries, Adjacent Property Owners and Land Use

The AL Tech Specialty Steel Corp. (AL Tech) plant is located in the Town of Colonie, Albany County, New York (Figure 3-1).

The site which incorporates a steel processing/production facility and a landfill is comprised of essentially two separate parcels (Figure 3-2). The plant site is bordered on the east by the Canadian Pacific Rail Road line and Lincoln Avenue. Undeveloped land, the Albany Rural Cemetery and the landfill site form the southern and western perimeter of the site. Spring Street and a stream known as the Kromma Kill which also flows along the plants eastern property line forms the northern boundary.

The landfill site is bordered to the south by Spring Street across from which lies the Albany Rural Cemetery. Open fields abut the landfill to the west. Undeveloped property and an extension of the plant site property are adjacent to the east while the Kromma Kill essentially forms the northern boundary.

The adjacent properties to the north of the plant and landfill sites are zoned industrial, however, there are residential property owners in the area. To the east, (i.e. east of Lincoln Avenue) the land is zoned industrial while to the south of the landfill site (and south/west for the plant site) the land is zoned for cemetery use with the exception of the parcels owned by Bearoff Metallurgical, Inc. and URE which are zoned industrial.



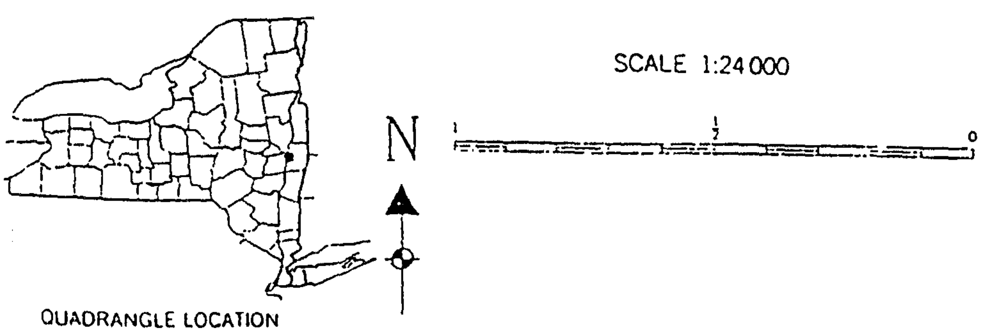


FIGURE 3-1
SITE LOCATION MAP
AL TECH SPECIALTY STEEL CORP.

WATERVLIET, NY

MCLAREN/HART

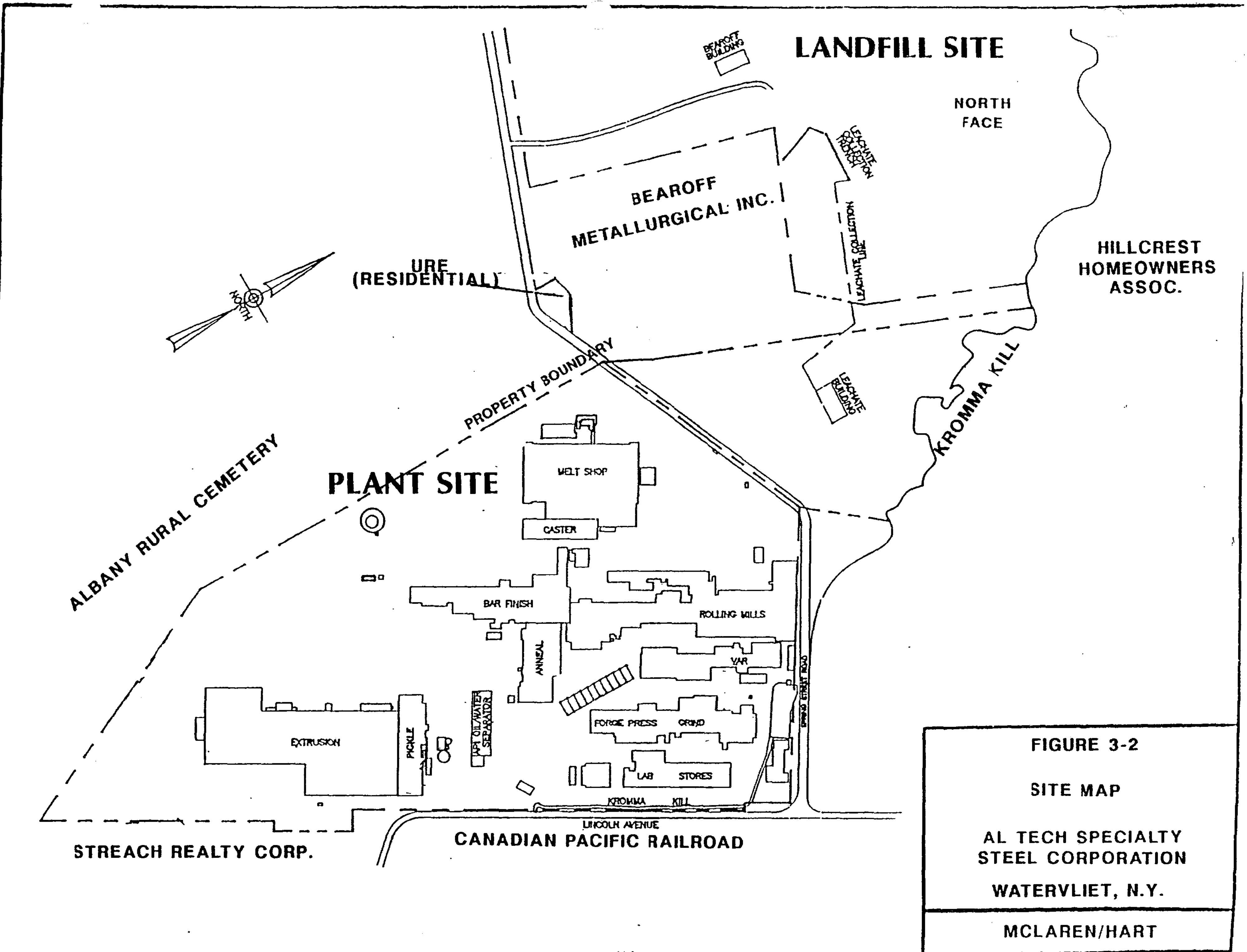


FIGURE 3-2

SITE MAP

AL TECH SPECIALTY STEEL CORPORATION

WATERVLIET, N.Y.

MCLAREN/HART

3.2 Topography

The AL Tech site is located in the Hudson-Mohawk Lowlands physiographic province (Cadwell and Dineen, 1987). The topography of the Hudson-Mohawk Lowlands ranges in elevation from near sea level along the Hudson River to more than 1,500 feet in the rugged Rensselaer plateau just east of the Hudson. In addition to the Hudson River Valley, the province contains a large number of lakes, ponds, streams and ancient drainage patterns which developed as a result of glaciation. Drumlins are very abundant in the area as are kame and esker deposits.

As illustrated on Drawing Nº 1 and Figure 3-2, ground surface elevations at the landfill site vary significantly ranging from approximately 260 feet MSL along the eastern portion of the parcel to 60 feet MSL along the western-most segment of the parcel.

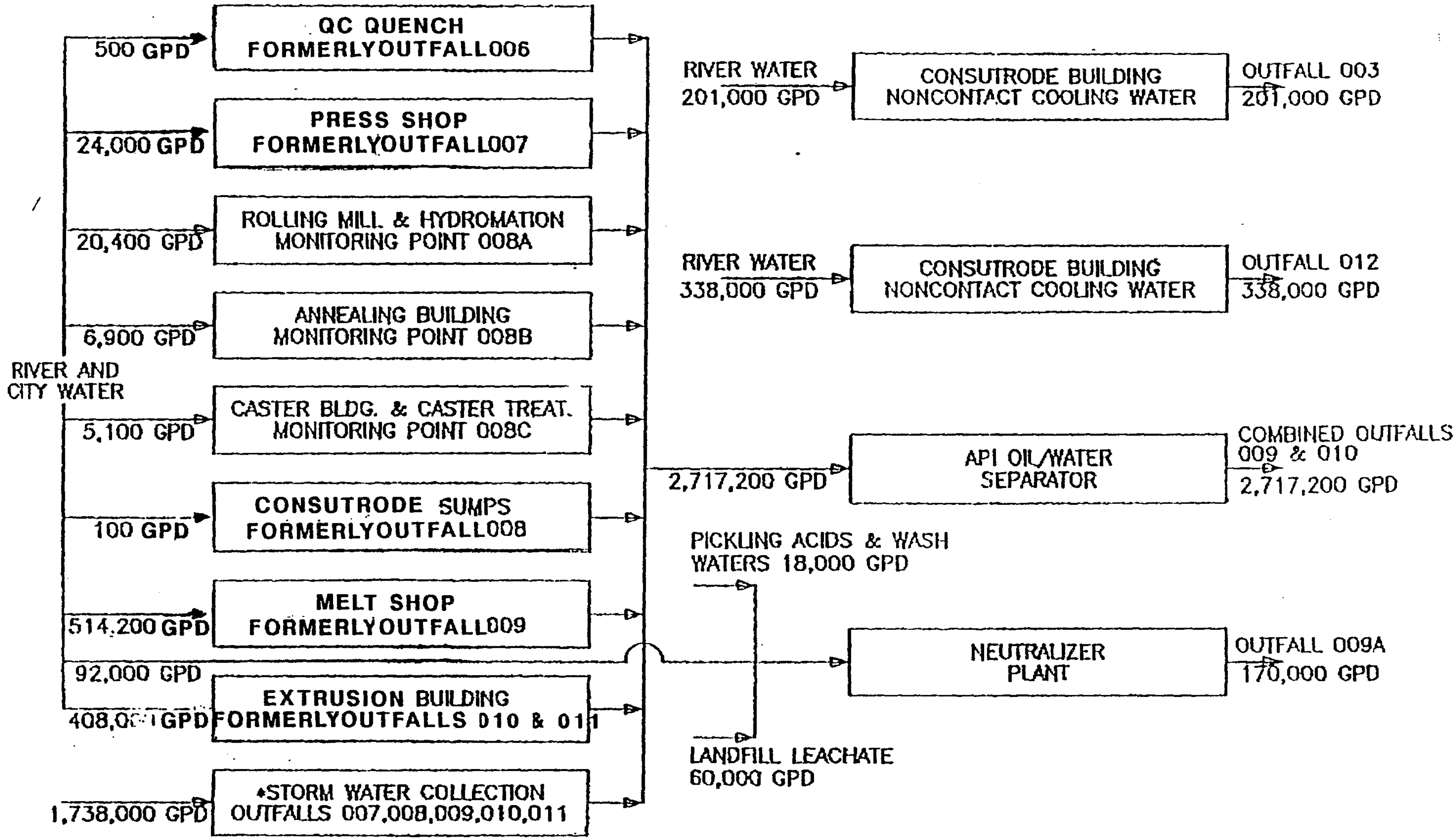
The plant site relief is much more constant at an elevation of 50 feet MSL across most of the parcel with the exception of a sharp embankment along the western property line which rises to approximately 130 feet MSL.

3.3 Surface Water

The principal surface body in the vicinity of the landfill and plant sites is the Kromma Kill which is a perennial stream. The Kromma Kill forms the northern property boundary of the landfill while an unnamed tributary forms part of the southern landfill boundary. The confluence of these streams occurs just east of the landfill, from where the Kromma Kill flows beneath Spring Street and through the plant site. Flow through the plant site begins just south of Spring Street where the water is ponded in a small reservoir, located just west of the administration office, before bending southward along the southern plant property boundary where the creek exits the site just east of the Main Gate. Within the plant site the stream receives NYSDEC-permitted treated wastewater discharges and stormwater before it flows off-site towards its eventual discharge to the Hudson River approximately two miles downstream. The discharge outfalls are illustrated on Drawing Nºs 2 and 3 and are illustrated as Figure 3-3.

AL TECH SPECIALTY STEEL CORP.

SCHEMATIC OF WASTE WATER FLOWS



*NOTE : FLOW BASED UPON A 10 YEAR RETURN, 24 HOUR DURATION STORM

FIGURE 3-3

The AL Tech Specialty Steel facility is located within the 100 year flood plain of the Kromma Kill.

Storm drainage on the plant site is via a storm sewer collection system which discharges to the API separator and the Kromma Kill and is shown on Drawing Nº 4.

The landfill leachate collection system, used to handle run-off and leachate, consists of a french drain piping system and two 350,000 gallon steel storage tanks enclosed in a separate building to the east of the landfill (refer to Drawing Nº 1).

It is understood that in 1978 a 24 inch diameter surface water drainage pipe was installed in the natural drainage swale located south of the northwest to southeast-trending ridge located beneath the landfill. The original purpose of the pipe was to direct upland drainage of the landfill to reduce leachate. Neither end of the pipe is currently visible. An additional 24 inch diameter corrugated metal pipe inlet currently exists at the northwest corner of the landfill in the same depression area. Visual observation of the pipe implies that the pipe is directed in a north or northeasterly direction from the depression area. A similarly sized discharge structure is located in a drainage swale to the north of the landfill which ultimately discharges to the Kromma Kill. It is judged that these structures are physically connected, and that surface water drainage from the depression area occurs through this pipe. However, the interconnection between these two structures has not been confirmed by field study.

Currently, a leachate collection trench/line, which was installed as a replacement to the former surface impoundment (closed in 1988), intercepts leachate from the toe of the southeastern portion of the landfill, and directs the collected leachate to a manhole. The manhole is evacuated through a gravity sewer line to a pair of steel accumulation tanks prior to discharge to the on-site wastewater treatment plant.

3.4 Geology and Groundwater

Unconsolidated deposits in the vicinity of the site are situated on the beach deposits of the fourth lowering stage of glacial Lake Albany. The construction of this glacial lake that has so effected the surficial geology of the Hudson Valley began as the Wisconsinan glacier retreated from its terminus at Long Island. This melting of the ice margin northward resulted in the formation of a large body of water referred to as Glacial Lake Albany. At its maximum, Glacial Lake Albany had an elevation of 330 feet. The lowering of this glacial lake in successive stages resulted from the breaking up of various large ice blocks to the south (LaFleur, 1965). The lowest stage of the lake at 180 feet above sea level corresponds to the elevation in the vicinity of the site. The resulting sequence is a thick layer of Lake Albany Clay overlain by a thin sand and silt veneer (Cadwell and Dineen, 1987).

The uppermost of these deposits (less than 4 feet), consist of loamy fine sand referred to as "Colonie soil" or "Colonie blow sands". This is in reference to sands deposited by the Mohawk River and reworked by prevailing winds. As the course of the river was altered over time the stranded deposits were exposed to winds which swept through the Hudson Valley. This allowed for the dispersal of the sands throughout the Albany area (LaFleur, 1965).

The geology on-site has been characterized via a number of subsurface investigations which differs somewhat from published geologic information for the surrounding area.

In the landfill it appears that unconsolidated glacial overburden deposits consisting of clay and silty clay overly a bedrock sequence composed of fractured and jointed shale. Results of field permeability testing indicate that these overburden deposits exhibit permeabilities of less than 1×10^{-5} cm/sec. It is reported that on-site investigations have not identified any substantial deposits of significantly more permeable materials (i.e. sands and/or gravels) in this layer. Underlying bedrock consists of the Middle Ordovician Snake Hill formation, which is on the order of 3,000 feet thick in the area of study. This shale is characterized at the site by bedding planes which dip at an angle of approximately 38° to 42° to the southeast.

The relatively impermeable clays (varved silts and clays) of the unconsolidated deposits are judged to generally retard the downward percolation of precipitation into the native overburden materials. It is therefore anticipated that percolation through the (apparently) more permeable waste materials with an average thickness of 25 feet, may result in perched water conditions at the waste/overburden interface. Due to the anticipated permeability of the waste in combination with the significant slope of the native materials underlying the disposal area, it is judged that most rainfall infiltration into the landfill will migrate vertically through the waste materials, and then laterally along the relatively impermeable overburden, as opposed to migrating vertically into the native material.

Within the bedrock, groundwater flow is reported to be generally associated with the fractured portion of the upper shale deposits, corresponding to the secondary porosity and permeability characteristics of this layer. Permeabilities associated with these secondary characteristics have been reported to be on the order of 0.1 gallons per day per square foot. At depths within the bedrock exceeding roughly 400 feet, the less fractured portions of the formation are reported to exhibit very low permeabilities. It is reported that groundwater flow in the water table aquifer (within the fractured bedrock zone and unconsolidated overburden) generally follows the local surficial drainage patterns. Therefore, groundwater flow beneath the northern portion of the landfill is projected to occur in a northeasterly direction, and flow beneath the southern and eastern portions of the landfill is projected to follow an easterly direction of travel. Recharge of the water table aquifer is reported to occur west of the landfill, with subsequent discharge to the Kromma Kill Creek.

Subsurface information relative to the plant site is available to a lesser degree. Available information is based on test pit activity, the installation of a caisson type free product recovery well, and the placement of soil borings, observation and monitoring wells.

In general, the soil profile encountered (based on average depths to each layer) during these activities throughout the plant site was described as follows:

- Miscellaneous Fill Materials: 0-3.5 feet
- Red-Brown Silty Sand: 3.5-10.5 feet
- Fine, Gray Shaly Gravel: 10.5-16.0 feet

Other noticeable soil types encountered during the investigations included a dense, gray, silty clay layer between the 3-13 foot depths of one observation well (OW-1) and a brown, sandy clay layer between the 3-5 foot depths of a second observation well (OW-7).

Bedrock geology is presumably characteristic of that described for the landfill discussion.

The Code of Federal Regulations identifies a number of political jurisdictions in EPA 40 CFR Part 264, Appendix VI as having a potential seismic risk due to the areas proximity to faults showing displacement in Holocene time. The subject property is not located within any of the listed political jurisdictions and is not prone to frequent destructive seismic activity.

Groundwater flow on the plant site flows from the higher elevations in the west toward the Kromma Kill channel as shown on Drawing Nº 5. The only known anomaly to this flow pattern is located at the only active recovery well, adjacent to the Annealing Building, which creates a limited cone of depression.

In general, the first water bearing zone was located within the top 1.5 feet of the shaly gravel layer. One exception was a perched water table encountered above a dense clay layer in one excavation.

3.4.1 Groundwater Use

According to the Town of Colonie and City of Watervliet water department officials, there is no potable groundwater usage within the immediate vicinity of the AL Tech site.

All potable water used at the AL Tech site is received from the Town of Colonie. This water district acquires water from the following three sources:

- Stony Brook Reservoir -- 6 MGD
- Mohawk River -- 50 MGD
- Mohawk Riverview Complex (4 wells) -- 5 MGD

The majority of active and inactive monitoring, observation and recovery wells on the plant and landfill sites are shown on Drawing Nºs 1 and 5, respectively. Five monitoring wells not shown in the vicinity of the landfill are MW-4 and MW-5 located just west of the "metal building" and MW-7, MW-13 and MW-1 located in the southeast corner of the site directly south of MW-14.

3.5 Meteorology

The entire facility, including the landfill is subject to precipitation (rainfall and snowfall) and winds of the Hudson-Mohawk Valley. Data collected at Albany, New York for the period of 1956-1990 is summarized as follows:

- Mean annual rainfall -- 35.74 inches
- Days of precipitation annually (>.01 inches) - 134.4 days
- Maximum rainfall in 24 hours -- 4.52 inches (8/71)
- Maximum snowfall in 24 hours -- 21.9 inches (11/71)

- Average daily maximum temperature -- 57.6°F
- Average daily minimum temperature -- 36.8°F
- Record high temperature -- 100°F (7/53, 9/53)
- Record low temperature -- -28°F (1/71)

- Average wind speed -- 8.9 mph
- Prevailing direction -- W-NW (January-April)
  -- S (May-December)
- Fastest windspeed -- 38 mph (3/84)
- Peak gust -- 58 mph (11/88 from the west)

The data provided above was collected at the U.S. Weather Service Station located at 42°45'N Latitude; 73°48'W Longitude. Additionally, wind rose figures are provided in Figures 3-4 and 3-5.

FREQUENCY DISTRIBUTION
HOURLY AVERAGE WIND SPEED AND DIRECTION

Station: RENSSELAER #1 Period 1 DECEMBER '72-30 NOVEMBER '73

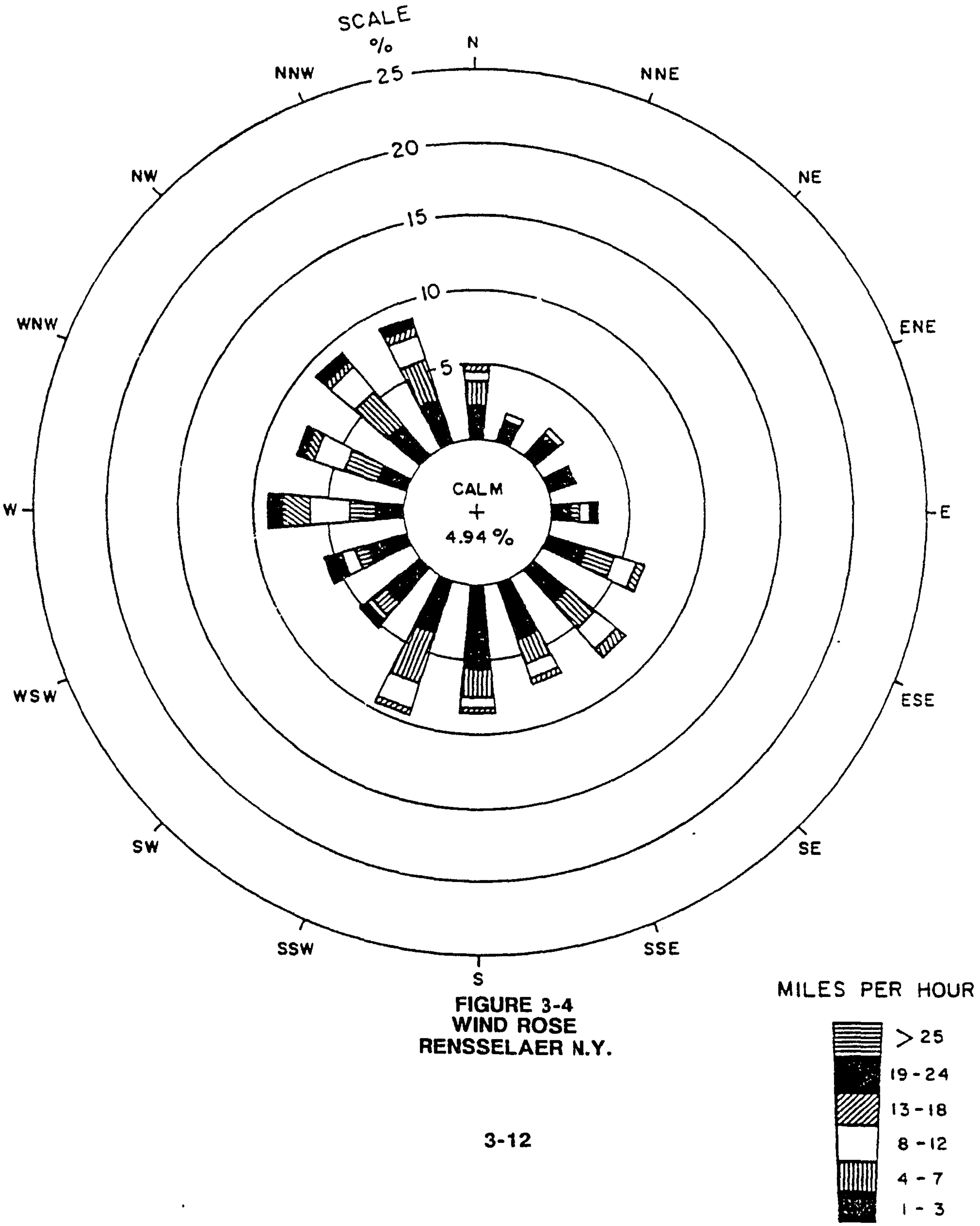


FIGURE 3-4
WIND ROSE
RENSSELAER N.Y.

FREQUENCY DISTRIBUTION
HOURLY AVERAGE WIND SPEED AND DIRECTION

Station: SCHENECTADY

Period: 1 DECEMBER '72 - 30 NOVEMBER '73

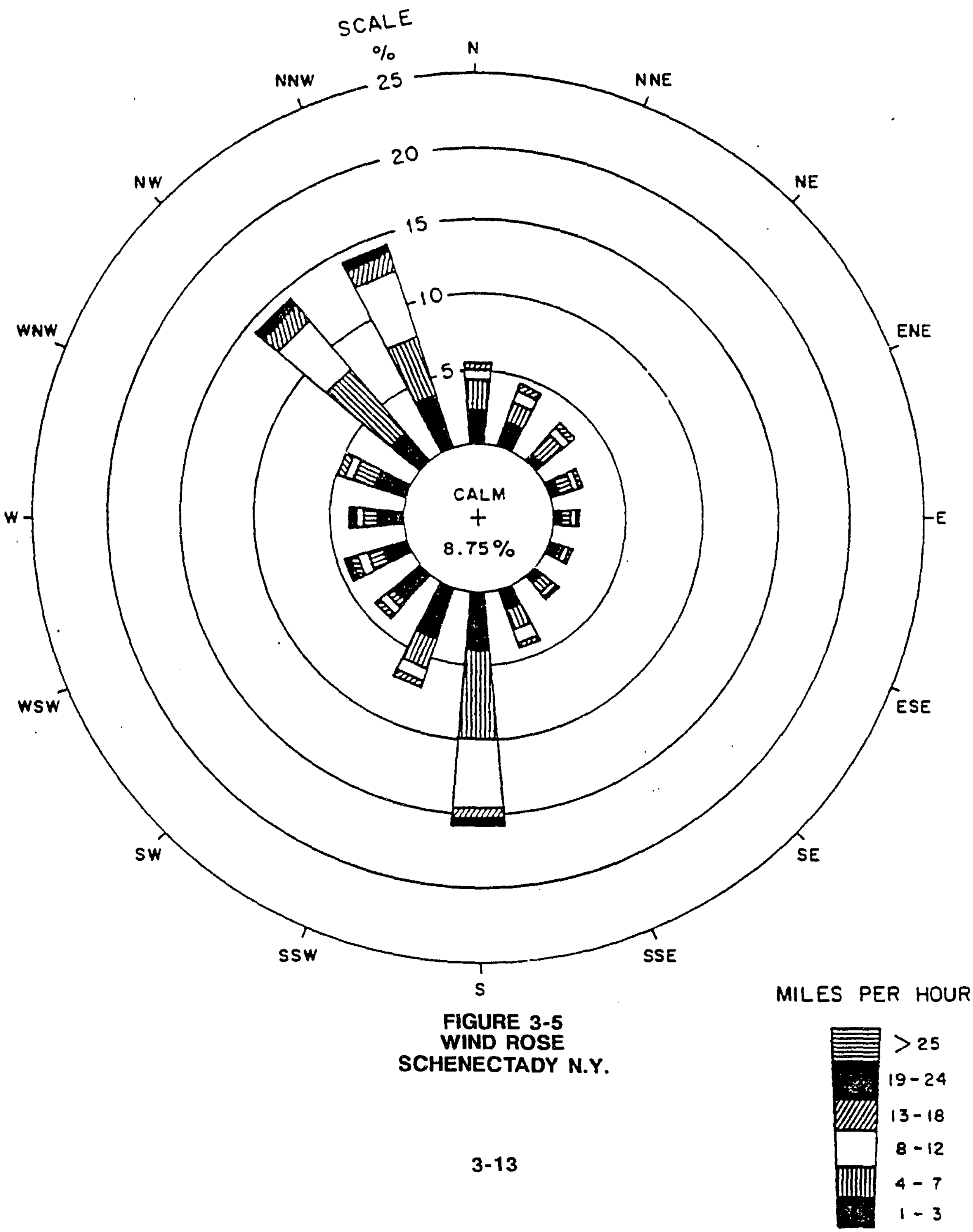


FIGURE 3-5
WIND ROSE
SCHENECTADY N.Y.

4.0 SITE PROCESS HISTORY AND FACILITY FEATURES

4.1 Current Plant Process Descriptions (1970 to Present)

The AL Tech Specialty Steel facility in Watervliet, New York manufactures specialty steel products in the form of ingots, billets, bars and extruded shapes. The current processes performed at the facility can be grouped into three categories: melting, hot finishing and cold finishing. The melting operations include electric arc furnace melting, argon oxygen decarburization melting and vacuum arc remelting. The hot finishing operations include forging, rolling, reheating, grinding and extrusion. Cold finishing at Watervliet involves cutting, grinding, finishing, straightening and shaping. Metal is further conditioned by pickling, preheating and/or annealing to accomplish the various hot and cold finishing operations. There are many support operations conducted at this facility which include product warehousing, equipment maintenance, raw material storage, and wastewater treatment. A solid waste landfill which is currently used for disposal of AL Tech's non-hazardous solid waste is located directly to the north of the main manufacturing facility

The Watervliet facility consists of ten main process buildings; melt shop, caster, rolling mills, bar finish, anneal, grinding, forge press, pickle house, extrusion, and vacuum arc remelting (Figure 4-1). Figure 4-2 provides a product process flow chart. Additional buildings house support operations such as hydromation, laboratories and material storage as well as two wastewater treatment systems located at the north end of the extrusion pickle facility (Drawing Nº 13).

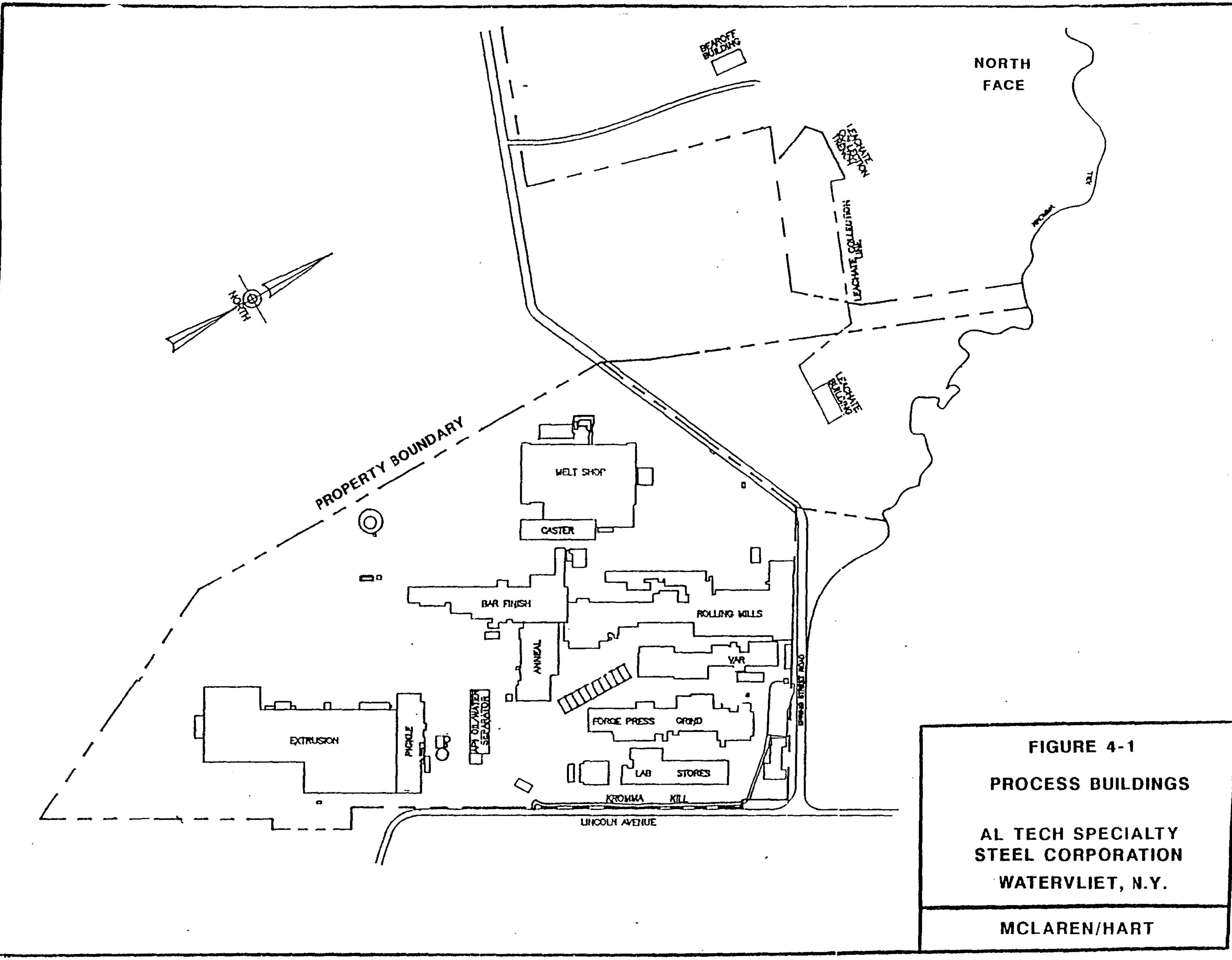


FIGURE 4-1
PROCESS BUILDINGS

AL TECH SPECIALTY STEEL CORPORATION
WATERVLIET, N.Y.

MCLAREN/HART

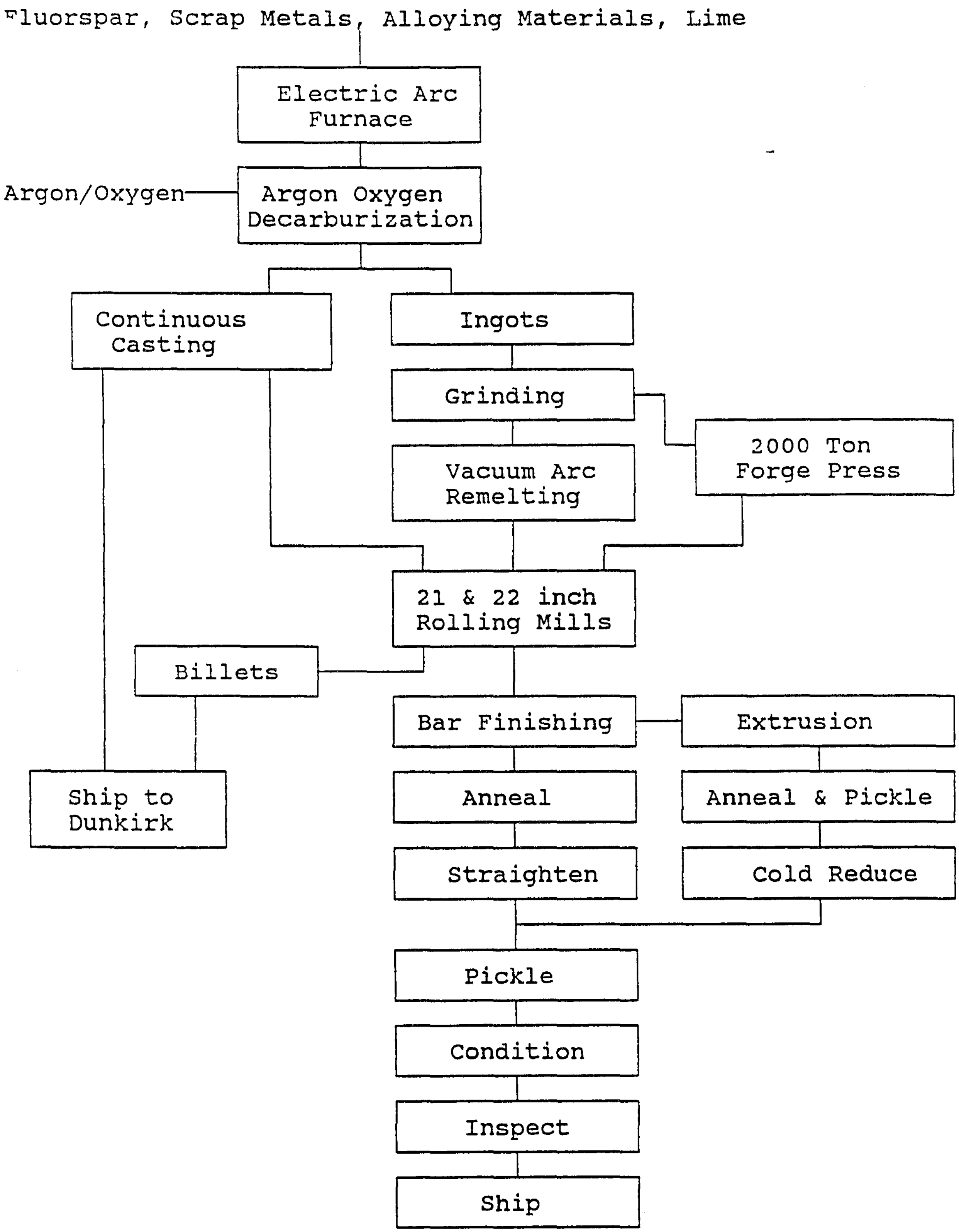


Figure 4-2 Typical Process Flow Chart--Al Tech Watervliet

The following sections describe the processes and support operations involved in the production process.

4.1.1 Melting Process

The melting process is conducted in the Melt Shop and the Vacuum Arc Remelting (VAR) building located at the north~~east~~west section of the facility. The melting processes in the melt shop transform scrap steel and alloys into specialty steel intermediates. The melted steel is cast either into ingots or continuous cast billets. The ingots are sent to hot rolling or forging or ground and sent to the VAR shop for remelting. A process flow diagram is provided in Figure 4-3.

4.1.1.1 Electric Arc Furnace (EAF). There are two EAF's currently used at the Watervliet facility. The scrap metals placed in the charge are stored on the ground along the southern boundary of the facility and alloys are stored on soil inside the melt shop in wooden bins. Lime is added to the charge to remove impurities and is stored in three silo's located at the southwest and northwest corners of the melt shop. Once the steel/alloys have melted, analysis is completed and additional alloys added, if needed, to bring the mix into the desired specification. As the electric current is applied to the charge, a fine metal dust (K061) is generated. The Melt Shop was constructed in 1951. Between 1951 and 1970 this dust was not contained. In 1970, a bag house dust collector was installed and is in operation today. The dust is high in iron oxides, chromium and nickel. The dust is collected and sent to INMETCO for recycling. The lime and impurities, called slag, will accumulate at the surface of the molten steel. This material is removed and allowed to cool prior to transport to the landfill. The molten steel is then transferred to the Argon Oxygen Decarburization (AOD) units.

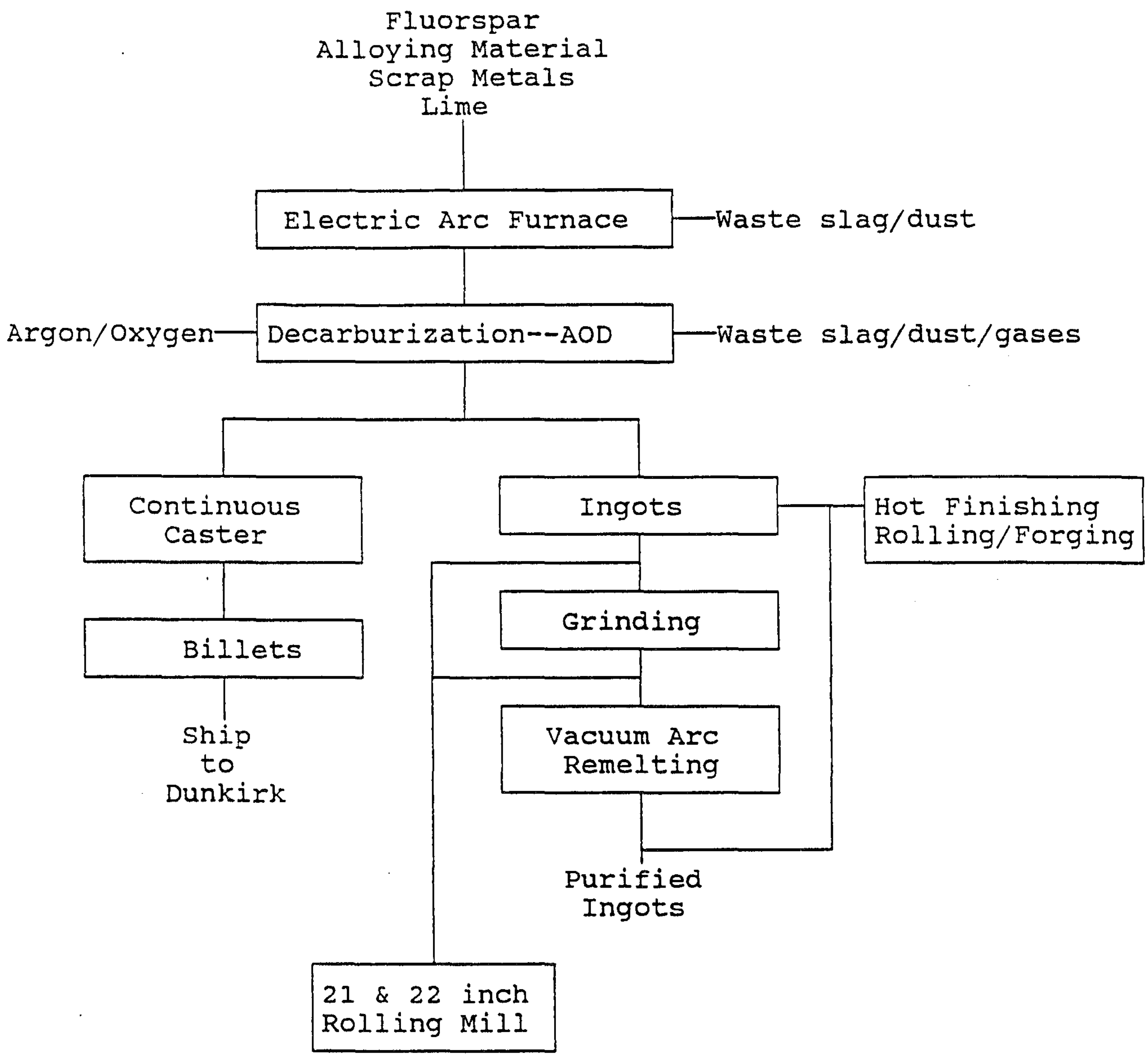


Figure 4-3 Melting Process Flow Chart

4.1.1.2 Argon Oxygen Decarburization. There are two AOD refining units utilized at the Watervliet Melt Shop facility. These units are located on either side of the EAF units and receive molten metal from the EAF's for further purification. Argon and oxygen are introduced in gaseous form to remove impurities of the melt. The molten steel is either poured into ingots or sent to the continuous caster.

4.1.1.3 Continuous Caster. The continuous caster produces a continuous strand of billet that is approximately 4.5 inches square. The molten steel is cast into the mold at the top of the caster and is gradually cooled by a continuous flow of water. This water is collected in a closed loop system and stored/treated in a building directly to the east of the caster building. Since this is a closed system, limited wastewaters are discharged (e.g., blow down). Evaporation occurs due to the elevated temperature of the molten steel.

4.1.1.4 Grinding and Cutting. The ingots produced from the melt shop are allowed to cool prior to removal from the mold. Surface imperfections and defects are ground with aluminum oxide grinding wheels. The continuous cast billets are cut to length (approximately 11 ft.) with cutting torches.

The materials used/generated in the grinding and cutting operations include scrap stainless steel swarf, particulate metal, grinding wheel grit, and metal dust.

4.1.1.5 Vacuum Arc Remelting. The ingots are sent to the VAR operation after the surface grinding operation has been completed. This process remelts the ingots using ingot as an electrode and an electrical current. The melting occurs in a closed vessel under vacuum. This process removes additional unwanted impurities from the steel ingot to obtain the desired chemical composition. The steel, when cooled, is more homogenous and with the removal of additional impurities is of higher quality.

4.1.2 Hot Finishing

The hot finishing process is used to prepare, form and condition the finished product by using a series of processes. These processes include grinding, reheating, forging or rolling, and extrusion. A hot finishing process flow chart is provided in Figure 4-4. A brief description of these processes follows.

4.1.2.1 Grinding. The ingots may be ground to remove surface imperfections to prepare the ingot for hot forming operations. This process generates base metal fines and grinding wheel dust that builds up under the grinding equipment The by-products are removed by front end loader and currently remelted (previous practices included landfilling).

4.1.2.2 Reheating, Forge Press, Rolling Mill. The ingots are placed in reheat furnaces operating at between 1800°F and 2350°F. This temperature softens the steel prior to hot forming in either the forge press or on the rolling mills. A lubricating oil is collected beneath the foundation of the forge press in a concrete enclosed area. The oil is periodically pumped from the concrete area and placed in the waste oil tanks on-site. Cooling waters, both contact and non-contact, as well as lubricating oils (from equipment leakage) are waste by-products generated during the process. Metal oxides (mill scale) are also generated during the hot forming operations.

4.1.2.3 Annealing. Since the steels manufactured are subjected to varying rates of cooling, the desired mechanical properties (hardness, ductility) may not be achieved. Annealing operations are performed by further conditioning the product via controlled heat/cooling and quenching activities. Quench oils and contact cooling waters are generated during this process. Principle fuel for heating is currently natural gas with fuel oil as an alternate fuel on a limited basis.

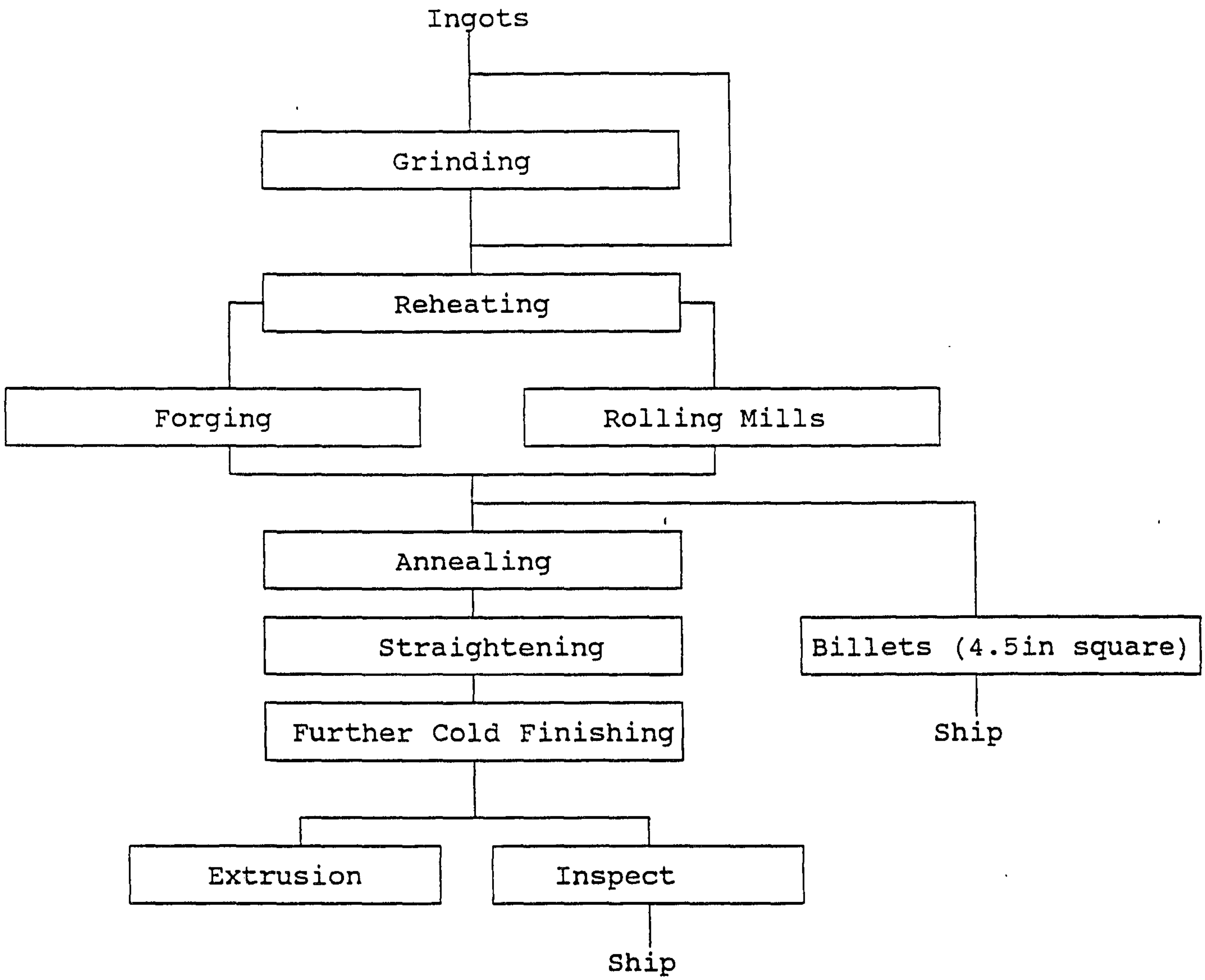


Figure 4-4 Hot Finishing Process Flow Chart

4.1.2.4 **Extrusion.** Seamless tubing and irregular complex bar shapes are manufactured by the extrusion process. There are preparatory cold finishing processes that are performed on the bar stock material prior to extrusion. These processes include turning, drilling and a chamber/radius turning operation. Upon completion of these cold finishing processes, the billet is heated at elevated temperatures, typically between 1900°F and 2100°F, to attain a plastic state. This "paste like material" (metal) is forced through an annular opening comprised of die and the elongated extruded product is formed.

Induction heating coils are currently used for heating the cold finished billet and maintaining the required temperatures for the extrusion process. Casting sands used in the production of extrusion dies potentially contain phenolic compounds. The billet is transferred to the 600 ton expansion press for the production of hollow finished products (tubing, pipe, etc.). With glass providing lubrication, the hot hollow products are forced through a die system that forms the desired product. A mandrel (steel bar) is inserted into the expanded hole of the billet to prevent collapse of the hole. The finished extrusion products include tubing, pipe, hollow bar and irregular sections, usually less than 4½ inches in diameter. Raw materials for the extrusion process are the cold finished billet, contact/non-contact cooling water, soluble oils and powdered-granular glass (quartz glass) that contains borax.

4.1.2.5 **Straightening.** Straightening is the process of straightening product distorted by prior processes through the use of mechanical equipment.

4.1.3 Cold Finishing

The purpose of cold finishing is to reduce the size of the product while providing specific final size tolerance and develop the physical properties of the material. The processes included pickling, precoating, drawing, pilger mill and annealing. A typical process flow diagram is provided as Figure 4-5.

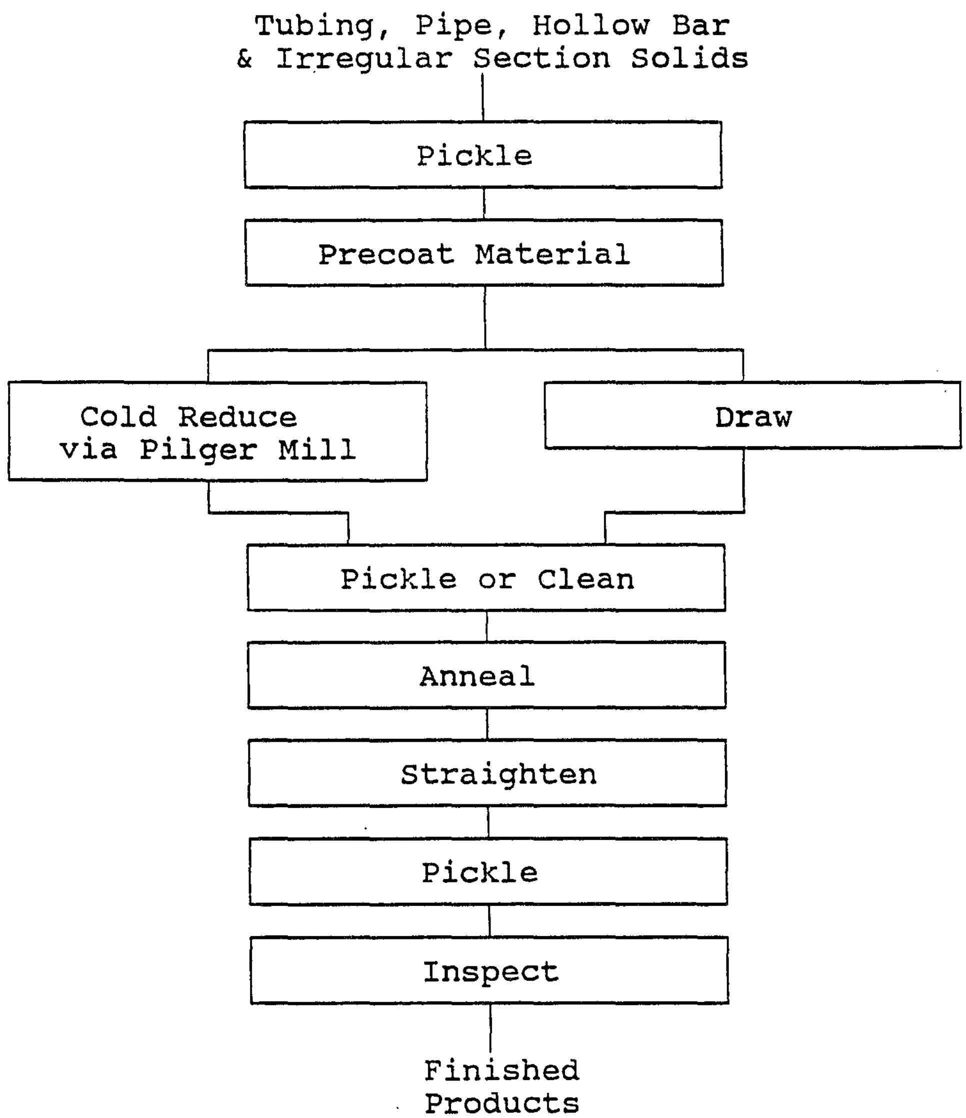


Figure 4-5 Typical Cold Finishing Process Flow Chart

4.1.3.1 **Pickling.** The pickling process chemically removes oxides from the surface of the product via an acidic reaction. Typically, sulfuric, nitric and nitric/hydrofluoric baths are used in sequence between which a water rinse operation is employed. Metallic salts, either dissolved or as a sludge, are generated via pickling operations. The result is a clean metallic product surface.

The sulfuric acid dip tanks remove scale comprised of surface oxides and other contaminants from the product. The acid penetrates into the scale and reacts with iron to form hydrogen gas. The liberation of hydrogen gas removes the scale off the surface of the metal. The virgin sulfuric acid is stored in a bulk storage tank located outside the building.

The steel stock is dipped in a hot water rinse tank to remove scale and sulfuric acid residue.

The hydrofluoric/nitric acid tank is used next in the process to accelerate the removal of iron and smut residue (black metal sulfates) remaining from the sulfuric acid descaling process. A nitric acid is used as a final process prior to shipment to passivate the product. The nitric and hydrofluoric acids are also supplied from two separate bulk storage tanks located outside the building.

An oxalic acid and sodium thiosulfate tank is used to precoat stock material that will be cold drawn. Oxalate crystals, which are deposited on the steel, as a conversion lubricant and to assist adherence of the soap or oil used in the drawing die and enhance lubrication during the cold drawing process used later.

A degreasing tank, containing solution of sodium hydroxide or phosphoric acid is used to remove grease, oil and lubricants that do not react with acids.

The final step in the pickling process is a hot water dip. This final rinse removes light contamination and heats the steel to accelerate drying. After this rinse operation, the stock is stored pending inspection and shipment to the customer and/or further finishing at the facility.

4.1.3.2 Pilger Mill. The pilger mill cold working process elongates stainless steel piping while maintaining a specified industry standard outside dimension (O.D.). Finished product is up to 120 ft. long and has a smaller diameter and wall thickness than the initial material. A chlorinated paraffin oil (aliphatic hydrocarbon) is used to lubricate the product as it is elongated. The oil is collected and pumped to a "dirty" oil tank (4,000 gallon capacity). This dirty oil is filtered and pumped to a "clean" oil storage tank (4,000 gallon capacity), which is returned to the pilger mill and used during the milling operation. The "dirty" oil tank is pumped out approximately every six months and the oil is disposed (reclaimed) at an off-site facility.

4.1.4 Support and Miscellaneous Operations

In addition to the manufacturing processes, the facility maintains other operations which support the primary facility processes or perform miscellaneous tasks. These support areas include the etching department, the metallurgical laboratory, wastewater treatment plant, landfill, caster water treatment, maintenance and stock room material storage.

The following sections provide a brief description of these processes, materials managed and wastes generated. Figure 4-6 illustrates the storage locations of hazardous materials used in conjunction with these operations.

4.1.4.1 Etching Department. Hydrochloric and nitric acids used in the metal etching area are stored in the Thompson Room. The quantity of supply acids stored at this location (thirty to forty 25-gallon containers) typically exceeds the significant quantity for these substances. Spent acids are accumulated in containers inside the south end of the building awaiting transfer to the Pickle House for use in the chromium reduction phase of landfill leachate treatment.

Both new and spent acid storage areas are located inside the building and are therefore protected from precipitation. Acid-resistant brick-lined concrete flooring will contain spilled material within the building. No receptors or pathways (drains, trenches, etc.) are present near the storage areas. For protection from collision, and to restrict access, the new acid storage area is surrounded by a chain and pipe "fence". Used acids are transferred to the Pickle House and delivered to a designated area inside the building.

4.1.4.2 Laboratories. Three laboratories are operated on-site. The laboratories are utilized to perform chemical analysis of steels melted and for physical property determination. Testing consists of metallurgical composition analysis, metallurgical grain structure, stress measurements and alloy property testing. These locations typically stock a number of listed hazardous and toxic chemicals and/or substances of concern which may be present in amounts in excess of the reportable quantities, should a spill occur.

All laboratory chemicals purchased are checked for proper product identification and warning labels and the labels are maintained on the containers at all times. Any unlabeled materials are treated as hazardous waste until sampled and proven otherwise. Wherever practicable, chemicals are purchased in containers with a capacity below the reportable quantity to prevent an accidental discharge of an amount that could cause a serious impact to state waterways. For the same reason, stock on hand is limited to less than the reportable quantity where practicable.

A small building, (approximately 8' x 16') is used for the exclusive purpose of storing acids for use in the specification laboratory. Acid containers stored in the building are one-gallon capacity, or less, therefore limiting the impact of a single container spill. The concrete floor of the building will prevent a liquid from penetrating to the soil beneath the building, although penetration of the concrete can occur.

Legend for Material Locations

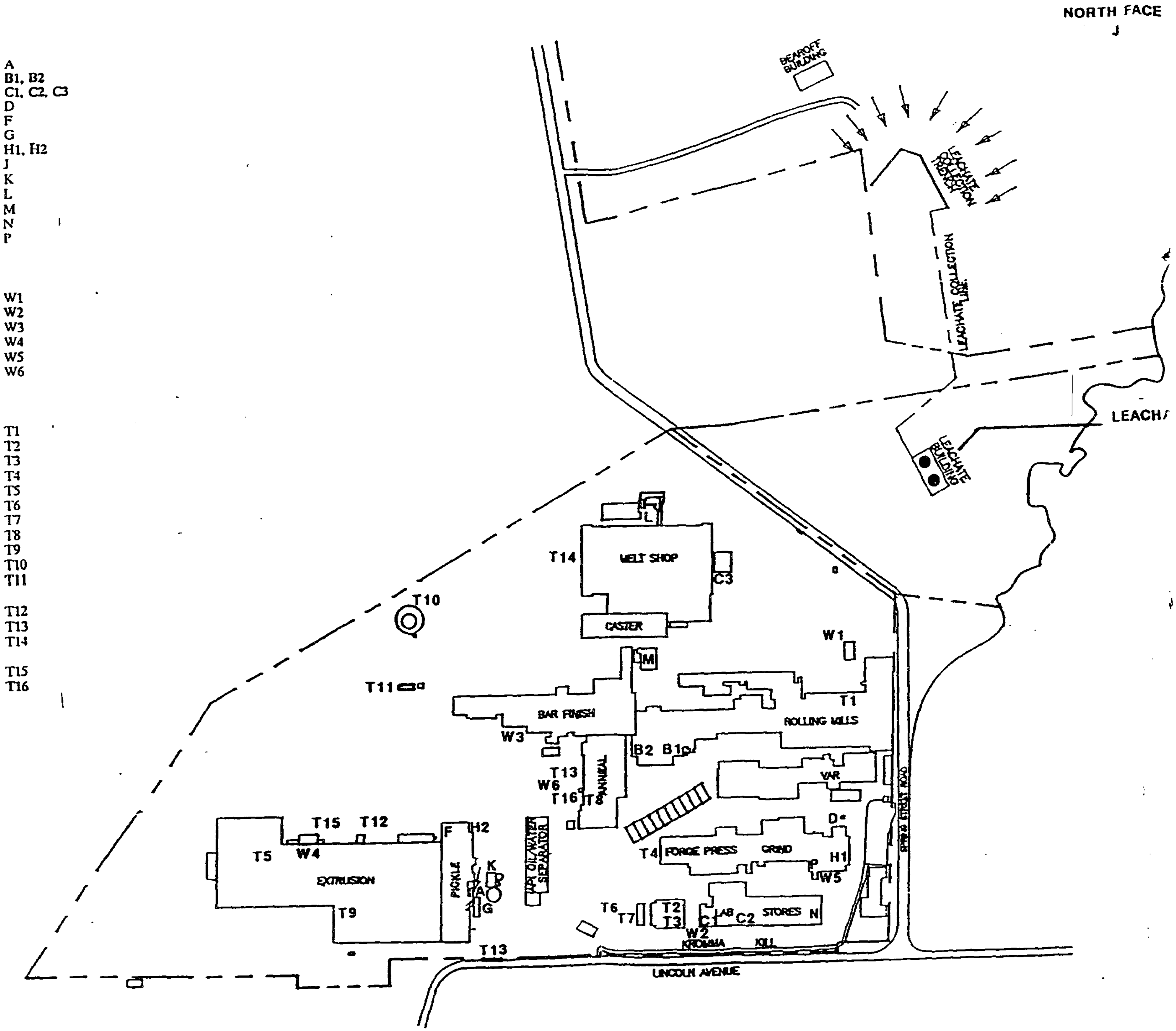
Bulk Acid Storage	A
Ethcing Department Acid Storage	B1, B2
Laboratories	C1, C2, C3
Acid Storage Building	D
Pickle House Storage	F
Waste Water Treatment Plant	G
Hazardous Waste Storage	H1, H2
Landfill	J
Sludge	K
EAF Dust	L
Caster Water Treatment Building	M
Stock Room	N
PCB Storage	P

Waste Oil:

• Hydromation	W1
• Transportation	W2
• Calow	W3
• Slippery Water	W4
• Drum Crushing	W5
• Main Storge Tank	W6

Bulk Petroleum Storage:

• 22" Mill (2 Tanks)	T1
• Garage--Motor Oil	T2
• Garage-Hydraulic	T3
• Forgepress (6 Tanks)	T4
• Oil (2 Tanks)	T5
• Regular Gas	T6
• Diesel	T7
• Annealing	T8
• Coolant (2 Tanks)	T9
• Fuel Oil Storage	T10
• Waste Fuel Oil	T11
• Underground Slippery Water Tank	T12
• Aboveground Fuel	T13
• Underground Diesel	T14
• 2 Underground Cooling Water Tanks	T15
• Anneal Quench Oil	T16



4.1.4.3 <u>Wastewater Treatment Plant</u>. Waste acids, spent pickle liquor, pickle rinse water, and landfill leachate are treated through a chrome reduction, neutralization and clarification (through sedimentation) facility located to the north of the Pickle House (Drawing Nº 14). A failure or overload of the treatment facility could lead to spills of these materials of potentially significant impact to the nearby Kromma Kill via overland flow or the normal treatment plant discharge path through outfall 009A (Drawing Nº 15).

A lime stabilized sludge is generated from the treatment of waste pickling liquors and landfill leachate. The sludge analyzed using the Extraction Procedure (EP) Toxicity Test is considered non-hazardous. Occasionally, the sludge is analyzed as hazardous for chromium (>5 ppm) using the Toxicity Characteristic Leaching Procedure (TCLP). *

The physical nature of the sludge, a dewatered clay-like solid material, reduces its accessibility to potential receptors. The sludge is generated inside the Neutralizer Building (out of the weather) and collected in a steel container. The concrete floor of the building, impervious to the sludge, provides a secondary barrier to the environment. No floor drains are located in the dewatering area. This sludge is considered hazardous due to sporadic TCLP analysis results where chromium is above 5 ppm. The sludge is currently disposed of off-site as a hazardous waste. *

4.1.4.4 <u>Landfill</u>. AL Tech operates an industrial landfill on-site for disposal of melt shop and miscellaneous non-hazardous production debris. The landfill is located north of the plant property and atop a hill overlooking the plant. Access to the landfill is restricted by partial perimeter fencing, warning signs and locked gates. The site is manned by at least one operator during normal working hours and monitored regularly by plant security personnel who ensure gates are secure and no unusual conditions are present. Studies defining the groundwater characteristics below the site have been conducted and monitoring wells placed in operation to evaluate the impact of the landfill and former surface

4.1.4.6 Maintenance Shop. The maintenance building, located to the south of the laboratory/storage building, is used to perform machine repairs, welding, electrical work and other maintenance tasks. This area stores and uses small quantities of greases, oils and solvents. A steam cleaning pad is located outside the south wall of the structure and is used for cleaning machine parts with steam. Waters, which may contain petroleum products and surfactants, are collected and potentially discharged to the plants storm sewer system and the A.P.I separator.

4.1.4.7 Stock Room--Material Storage. AL Tech utilizes several locations on-site for the storage of steel final and intermediate products as well as chemicals used in the manufacture of the specialty steel products.

The main stock room, located in the combined laboratory/storage/maintenance building, is a central receiving point for many chemical products which on occasion may contain quantities of hazardous materials. These materials would also include oils (petroleum and emulsifier).

Liquid products are stored away from any floor drains or outside receptors. Removal of products is controlled by the stock room operator under written purchase orders. Hazardous material transfers are conducted by authorized personnel only.

4.2 Process History

This section presents information on historical industrial processes conducted, including support process functions, as a means of assessing potential AOC's and/or SWMUs from historic activities at the Watervliet, New York production facility of AL Tech. Inherent in this description format is the concept that for any process or support process consideration;

RAW MATERIAL + PROCESS = FINISHED PRODUCT + BY PRODUCT/WASTE and that in such an equation, RAW MATERIAL and BY PRODUCT/WASTE exist as potential generators of AOC's and/or SWMUs.

The manufacturing of steel and basic steel products has, from the origination of such material, consisted of three (3) primary, basic processes: melting; hot finishing; and cold finishing. Since the origination of the first steels to present day the manner in which these processes have been conducted have changed primarily as a result of global economic and sociological conditions.

The historical process technology developments of the AL Tech production facility can be divided into four (4) relatively distinct time periods. The first three (3) time periods represent periods initialized by rapid change in technology and/or capability and generally reflect the periods where a change of RAW MATERIALS and/or BY PRODUCT/WASTE may have occurred. The fourth period, (current; 1970 - present) previously described, has seen minimal change and has been presented as a description of current conditions as they have essentially existed since 1970. As such, these time periods are defined as follows:

1) Early Period (Origination to 1920)
2) Post WWI (1920 to 1940)
3) WWII period and beyond (1940 to 1970)
4) current plant process description (1970 to present)

This format of presentation provides the technological and capability description of the three (3) basic steel making processes plus unique support process functions considered in chronological order of the first three (3) time periods defined above. In addition, the on-site location of the described processes is given together with the suspected on-site location of disposal areas for wastes as may have been generated by the described processes. Figure 4-7 is presented as an aid in understanding the order of significant events which have occurred throughout the plants operational history.

Early Period (1907 - 1920)

LUDLUM STEEL & SPRING COMPANY established — 1907

Produced tool steels: bar, rod & wire for springs
Melting, Hot Finishing and Cold Finishing
Cr, Ni, V, Mn, Si alloys (pre-stainless steel specialty metals)
Quench oil use suspected in heat treating processes
Sufficient commercial electricity for electric arc furnaces
Ferrotungsten manufactured
Coal is main energy source; fuel oil use suspected
Nitric/hydrofluoric acid pickling suspected
Solid wastes used as fill & for road construction
Waste waters discharged to Kromma Kill

Post WW1 (1920 - 1940)

Named changed to LUDLUM STEEL (ceased spring production) — 1925

Merged with ATLAS ALLOY STEEL CO. (Dunkirk) — 1929

Underground fuel oil tanks installed — 1937
Merged with ALLEGHENY STEEL CO. (Pittsburgh) — 1938
Coal usage discontinued; replaced by fuel oils — 1940

Expanded Melting, Hot & Cold Finishing Operations
Complete conversion to stainless steels
Pickling performed in Thompson Room
Solid wastes hauled off site; on site disposal continued

WWII Period and Beyond (1940 - 1970)

Fuel oil storage capacity increased significantly — 1941

High capacity EAF melting and VAR melting added — 1950
Hydraulic forge press and extrusion added
& Pickling House added — 1951

Commenced use of solid waste landfill — 1957
USTs decommissioned due to leakage
Uranium forged on site (verified clean by Westinghouse) — Late 1950s
Melting ops from Dunkirk added — 1961

Expanded production accompanied by construction

Current (1970 - Present)

EAF dust first added to on-site landfill — 1970
WWTP added — 1972

SPDES Permit issued — 1975
Name changed to AL TECH SPECIALTY STEEL CORP. — 1976

Disposal of chrome containing EAF dust in landfill discontinued — 1981

Oil recovery well near Annealing placed in operation
Surface impoundment closed & leachate collection facility built — 1988

API oil/water separator constructed — 1990

Figure 4-7 Timeline--Significant Events

4.2.1 <u>Early Period: (Organization to 1920)</u>

Limited documentation has been located relative to the AL Tech Watervliet, New York facility as it existed during the Early Period. The following description is developed from a combination of such documentation, "hear say" supported by observation, and knowledge of steel processing during this time period.

The site of the steel making facility prior to its construction has been described as a marsh area inter-spaced with small hillocks. Based on observations of on-site excavations which appear to provide substance to this "hear say" information, there are varying amounts of process by-product/waste (slag, brick, grinder swarf, etc.) fill across the surface of the site at estimated depths of 1 to 4 feet in thickness which overlie alluvial material. This area is generally limited to the lower lying eastern half of the primary production site property. Based upon a single photograph of the site, circa 1917, it is this low lands area which was occupied by the first primary steel making process during the Early Period. Also, based upon soil removed from excavations in this area, it is suspected that the previous course of the Kromma Kill followed an approximate line between the Kromma Kill culvert beneath the Spring Street Road and the area which is currently referred to as AL Tech's south gate. The Kromma Kill is believed to have provided the source of water for steel making operations as well as the means of discharging liquid process wastes.

Based upon references contained in Ludlum Steel stock holders reports for fiscal year 1936, it appears that the Watervliet steel making operations, which were located in a relatively urbanized area, may have had sufficient available electrical power to make the technological leap to electric arc furnace (EAF) melting at the on set of operations. As such, the Watervliet operation would have avoided the inefficient, crucible melting stage.

As referenced in such stockholders reports, the name of the organization, Ludlum Steel and Spring, suggests its finished product. Steel bar, rod and wire for spring manufacturing would have consisted of the usage of high carbon steel with potential light additions of chromium, nickel, etc. True stainless steels were unknown during this era and efforts to produce more corrosion resistant steels via chromium addition (up to 12% chromium) would be classified within the family of stainless iron.

Ludlum Steel's market position by 1936, in production of true stainless steels, and EAF melting capability, suggests that Ludlum Steel was likely developing their stainless steel processing technology during this Early Period, which enabled their early entry and certain dominance into the true stainless steel market in later years.

The Ludlum Steel and Spring Company's name also suggests that during this period the Watervliet site's market strategy may have carried the steel bar rod and wire produced one step closer to a finished product than it's competitors. It is believed that the production of finished springs occurred, perhaps for railroad car market. Spring manufacturing would have required not only spring winding equipment but extensive heat treating facilities. Heat treating of springs would likely have involved oil as a quenching media and the generation of greater volumes of oily wastes than would be expected to be found for later period heat treating requirements.

Three (3) primary production buildings suspected to have been built to house production operations during this period, which are still in use today, are identified by current use as follows:

1) Quality control, store room and carpenter shop
2) Ingot conditioning, drum crushing and storage
3) VAR operations

Melting, hot finishing, and cold finishing processes for the Early Period are described as follows:

- Melting: (Primary Operations)--

On the assumption that the Ludlum Steel and Spring Company was in a position to initiate EAF melting operations in 1907, raw materials and by-product/wastes would be as follows:

Raw Materials. The raw material, as consumables, for period melting operations consisted of:

--Steel; purchased as low sulfur, low phosphorous scrap or pigs.

--Ferro Alloys; manufactured on-site for tungsten alloying.

--Lime; CaO, purchased for melting fluxing and atmosphere shielding.

--Hot Tops; purchased, likely of clay but possibly of sand bound via organic materials.

--Refractory; purchased, fire clay brick.

--Other Alloying Elements; Mn, Si, Cr, V, Ni, purchased as high analysis ores or ferro alloys.

Process. An initial charge of scrap steel and lime would be made to the furnace and electrodes lowered to establish an electrical arc between the scrap and electrodes. The resulting electrical discharge melted the scrap steel. As the initial charge melted, additional scrap steel would be added as needed to fill the furnace with molten steel. If needed, air lancing would be done to burn off excess carbon, sulfur or phosphorus. Upon achieving the levels of carbon, sulfur and phosphorus desired, alloy materials would be added and stirred into the heat to achieve final analysis. Excess slag would be poured off the furnace and the molten steel poured into a transport ladle. The transport ladle would be positioned over previously prepared ingot molds (i.e., positioned and complete with hot tops and bottom plugs), and the molten steel poured into the ingot molds. Stripping the ingot molds from the cooled ingots completed the melting process.

Furnace capacities of the period are suspected to range from 5 to 15 tons. Ingot are expected to have been from 500 to 1,000 lbs.

Finished Product. Cast steel ingots.

By Product/Waste. Discarded materials produced by melting operations of this period are expected to be as follows:

--EAF dust
--slag
--mold hot tops and bottom plugs
--refractories; essentially spent furnace linings
--spillage; alloying ores, ferro alloys, base metals, coal/coke & lime.

Residual materials of this early period would tend to be higher in chromium than other specialty steel producers during this period, but lower than present day stainless steels.

Siting. The melting facilities for the Watervliet site, during the early period, are believed to have been located in the building ① structure now used for drum crushing and waste material drum storage immediately north and attached to the forging press/ingot conditioning buildings. A second site for melting ② operations, late in this period, is believed to be in the existing structure now used for VAR melting operations.

The disposal of by-product/waste of melting operations during this period, other than EAF dust, are believed to have been on-site and through land filling. Evidence of this practice has been noted via observations of numerous excavations which exposed these materials. Photographic evidence suggests that much of the area in the northeast quadrant of the existing site was filled by 1917.

- Hot Finishing: (Primary Operations)--

Hot finishing operations expected to have been used at the Watervliet site included ingot conditioning, reheat furnaces, rolling mills and steam hammers. Drawing references suggest the principle source of heat energy was coal.

Raw Materials. The primary raw material of hot finishing was the finished product of melting the ingot. Other consumables were:

--Fuels; coal/coke, purchased.

--Refractories; purchased fire clay brick and insulating fire clay brick for reheat furnaces.

--Borax; purchased, used as an atmosphere shield for heated product.

--Power; steam and electric for mills, hammers and furnaces.

--Water; furnace structure cooling (non-contact cooling) and rolling mill flushing and bearing lubrication (contact cooling).

--Clay & Sands; purchased, used for pack annealing.

Process. The hot finishing process is used to prepare, form and condition the finished product, and is a series of procedures or sub-processes presented in sequential order below:

1) As cast, the ingot was likely to contain surface imperfections which if left in place would carry through to the finished product. Surface conditioning (i.e. removal) of these defects via chipping hammers and/or grinding prepared the ingot for hot forming.

2) Ingots of this size were then likely coated with a solution of borax and water. The residual borax coating remained on the surface of the ingot and served as an atmosphere shield to retard surface depletion or adsorption of carbon presented by the succeeding reducing/oxidizing reheat furnace atmosphere.

3) Ingots would then be placed in reheat furnaces and heated to 1800 to 2100°F to soften the metal for forming operations. Such furnaces were box like structures with arched roofs and access doors, built primarily with fire brick backed by structural steel. Steel reinforced door lintels required water cooling to prevent heat deterioration.

4) Hot forming was conducted via forging hammers and rolling mills.

The mechanical, steam driven, piston hammer was believed to be used during this period. A heated ingot would be placed between two dies which would have a flat surface for producing rectangular product or concave surface for producing round product. The work (i.e. hot ingot) would be placed between the dies and the hammer blow directed to the dies to form the net section desired.

5) The majority of tool steel product, on a tonnage basis, during this period was sold as hot finished material. Most bar product required straightening, inspection and packaging prior to shipment. Straightening processes are discussed as part of "Cold Finishing" processes in a later section.

Finished Product. Hot finished product of bar or rod would have taken one of two paths at this stage of processing. It would either be sold as a completed hot finished material or continue as a raw material for cold finishing.

By Products/Wastes. Waste materials produced by hot finishing operations are expected to be as follows:

--Mill Scale; metal oxides generated while hot metal was exposed to atmospheric conditions during hot forming.

--Borax and borate compounds possible.

--Base metal fines.

--Grinding Dust; residuals of ingot conditioning.

--Furnace Refractories; reheat and annealing furnaces.

--NaCl and Metal Salt Complexes; presumption that salt annealing process used for coil annealing.

--Clay and Sand; bar retort annealing possible.

Siting. Steam hammers, used to form the ingot (i.e., finished product of melting, into required finished product size or billet size) were located immediately south of the melting facility in the structure now occupied by the ingot conditioning grinders. It is possible that this structure may have housed the annealing facilities as well.

Hot rolling was conducted in the existing structure now occupied by the quality control offices and central store room. The primary rolling mill is believed to have been the 10 inch rolling mill removed from the site in the late 1940's.

At least one coal handling facility, believed to have been built late in the Early Period, is known to have been located to the west of the building now occupied by the 2000 ton forging press and to the south of the building now occupied by the VAR operations.

Disposal practices for spillage and by-product/wastes are likely to have been similar to the disposal practices for period melting. That is on-site landfilling.

- Cold Finishing: (Primary Operation)--

Cold finishing operations conducted at the Watervliet facility included pickling, precoating, drawing, and annealing.

Raw Materials. The primary raw material of cold finishing is the finished product of hot finishing. Secondary raw materials (i.e. acids, cleaners, lubricants, etc.) were required for cold finishing operations. The identified and suspected secondary raw materials for this period are as follows:

--Soaps; purchased, sodium and calcium stearate based drawing lubricants.

--Greases; purchased, sulfurized lard with and without petroleum oils, drawing lubricants.

--Lime; purchased, used as a precoating prior to drawing.

--Oxalic Acid; purchased, possibly used during this period as a precoat alternative to lime.

--Sulfuric Acid; purchased, pickling operations.

--Caustic Soaps; purchased, likely NaOH based soap pickling precleaner.

--Oils; purchased, sulfurized lard, petroleum based cutting oils used for machining and grinding operations.

--Abrasives; purchased, grinding wheels.

--Energy; steam, electrical, probable fuel oil.

Process. The purpose of cold finishing is generally two fold:

a) To reduce the size of the product while providing specific final size tolerance.
b) To develop the physical properties of the material.

The typical process sequence of cold finishing for bar and coiled rod was as follows:

1) Pickle hot finished material
2) Precoat material
3) Draw
4) Anneal
5) Pickle

If the size of the material had not been reduced sufficiently, the sequence would be restarted with item 2 above. If the final size had been achieved in the last drawing sequence and the hardness of the material was desired to be something other than full soft condition resulting from annealing (occasionally required by customer specification for improved machinability) tempering at lower temperatures would replace annealing, item 4 above.

Product would typically be straightened prior to shipment. It is suspected that round bar was produced upon customer specification with a ground surface finish during this period. It is believed that such grinding would have been done with straight petroleum cutting oils of the period, to prevent material surface rehardening. It is believed that water soluble oil/coolants were not available during this time period.

Finished Product. The finished products resulting from cold finishing operations were tool steel bar, rod, and wire. Aside from potential railway car spring manufacturing, there is no evidence that marketing strategies of the period attempted to take the product closer to end use condition.

By Product/Waste. The discarded materials resulting from cold finishing operations are identified as follows:

--Pickling Wastes; inorganic and organic metal salts, soaps and acidic residues.

--Grinding; swarf (metal fines, abrasive grit, oil laden), spent grinding wheels.

--Refractories; furnace linings.

--Spillage; any of the above listed raw materials.

If the understanding of the Ludlum Steel's involvement in railroad spring manufacturing is correct, spring winding equipment and oil quench heat treating would have been required for the high carbon steel springs. Oil quenching normally will leave the structure in which the process is conducted, indelibly coated with oil/soot residues. No such building can be identified as currently existing on-site which is believed to have been constructed prior to 1920.

Pickling operations would have been required as part of cold finishing. High carbon steel pickling would have required the use of sulfuric acid. If, as believed, Ludlum Steel and Spring was developing their technology for the production of stainless steels. Nitric and possibly hydrofluoric would have been in use during the latter portion of this period as well.

Siting. The location of primary bar, rod and wire processing is believed to have been in the structure currently occupied by the carpenter and sheet metal shop. The location of pickling operations has not been identified for this period.

Disposal practices for solid materials would likely have been as land filling operations on-site. Liquid wastes, including spent acids, would have been discharged to the Kromma Kill.

4.2.2 Post World War I: (1920 to 1940)

As with the Early Period, Post WWI Period documented information is limited. Much of the following description is deduced from approximately 20 drawings from the engineering files at AL Tech and a stock holders report noted in the description of the early period.

This period is characterized by the expansion of the primary production facility which more than doubled in size during this period. Starting with the initial core of a building structure currently occupied by a portion of the bar annealing facility and bar cold finishing, this building complex was enlarged several times during the next 20 years. Ultimately all annealing, hot rolling and cold finishing processes were conducted within this structure. Based on the size of the facility under roof, the period productive capacity of the Watervliet plant more than doubled as well.

Although pickling operations are believed to have existed elsewhere on-site during the Early Period, the first identified location of pickling operations at the Watervliet site has been determined to have been located in what is now called the Thompson Etch room, and likely included the area adjacent to this room as well.

A shift of primary fuel from coal to fuel oil occurred during this period as well. The use of coal was discontinued by 1940, basically due to the availability of bunker C fuel (#6) in the early 20's for use as boiler fuel, and the availability of #2 fuel oil in the 30's for use as furnace oil. Buried #2 fuel oil tanks totalling 175,000 gallons were installed in 1937 in the extreme northwest sector of the existing plant site. During the late 1930's this facility is believed to have provided complete independence from coal burning requirements. This storage facility has been closed and is no longer in use.

The metallurgical developments of stainless steels, as we know them today, were nearly completed by the end of this period. Concurrent wide acceptance and use in the market place, suggests that much of the productive effort at the Watervliet site during the latter portion of this period was devoted to the production of stainless steel. This shift to the production of stainless steels also suggests that the production of low alloy, high carbon steels and associated spring production declined during this period. As such, the change of the organizations name from Ludlum Steel and Spring to Ludlum Steel in 1925 suggests the cessation of spring production early in this period.

- Melting: (Primary Operations)--

The progressive shift to the melting of proportionately more stainless steels suggests an increase in the amounts of chromium and nickel that were used at the Watervliet site. As a result, residuals of production, associated with this period, can be expected to contain higher levels of chromium and nickel than those described for the Early Period. The EAF melting furnaces at the Watervliet site are expected to have been in the 3 to 10 tons range.

Ferrochromium and potentially other ferroalloys manufactured on-site were supplied to the primary melting operation by continued use of the Early Period melting facilities. Ferroalloy manufacturing is known to have continued on-site well into the 1950's at the site of the original Early Period melting facility.

Melting, raw materials, process, finished product and by product/wastes, except as noted above, remain the same as that noted for the early period. Total volumes of materials processed are expected to have significantly increased.

Siting. The location of the primary melting operations during this period is the current location of the VAR melting operations.

The location of the ferroalloy manufacturing process is the structure currently used for drum crushing and spent oil accumulation.

Disposal practices during this period are believed to have been a combination of continued on-site and off-site landfilling with the majority of such materials being disposed of off-site. On-site disposal, as may have occurred, are likely to have utilized the area which could now be viewed as the southeast quadrant of the existing production site.

- Hot Finishing: (Primary Operations)--

Hot Finishing processes during this period are believed to have consisted of steam forging hammers and hot rolling mills.

Steam driven forging hammers continued in use during this period with the size reaching 15 impact tons by the end of the period. In addition, a compressed air forging press is understood to have been installed late in the period. The operation of this compressed air driven press is understood to have met with limited success. The high pressure air was later replaced by steam. Forging operations were conducted in the structure now occupied by the 2000 ton forging press and ingot conditioning operations.

The installation of larger rolling mills was concurrent with the progressive expansion of the structure now housing the existing 22 inch rolling mill at its northern end. By the end of this period it is believed that the Watervliet facility was equipped with 18, 14 and 10 inch rolling mills.

Late in this period, ingot and billet conditioning operations are known to have been conducted, via grinding. Billet and ingot conditioning were conducted in the concrete block structure, located to the west, and parallel to the structure housing the rolling mill operations. Ingot and billet conditioning operations previous to the construction are believed to have remained as identified in the Watervliet, Early Period.

The 10 inch rolling mill, was relocated from its location defined in the Early Period, to the newly constructed rolling mill area defined as that structure extending from a point south of the current 22 inch mill location to near the building intersection with the existing annealing structure.

Excepting the trend to stainless steel production and attendant material variations, raw material, process, finished product and by product/wastes of this period would remain essentially the same as the early period, but in greater volume.

Siting. The disposal practices for hot finishing by product/wastes are assumed to have been as described for melting operations. The exception to this practice is that of grinding residues of conditioning low alloy, non-stainless steels. Such residues, found wide use as road paving material and can still be identified in certain areas on-site.

- Cold Finishing: (Primary Operation)--

The cold finishing operations of this period included annealing, drawing, turning, centerless grinding, straightening, and pickling.

Acid pickling operations would have been more reliant upon the nitric and nitric/ hydrofluoric acid solutions due to the more corrosion resistant stainless steels being produced.

Siting. The location of cold finishing are identified as follows:

- Annealing; west end of current bar annealing facilities.
- Pickling; as noted in above introduction; that structure and adjacent area now identified as the Thompson Etch room.
- Turning, Drawing, Grinding, etc.; the area to the west of current annealing operations and to the south of previously identified period hot rolling operations. It cannot be verified if all of the cold finishing operations had been moved to this area during this period. Some cold finishing processes may have continued operations in the area identified during the Early Period, during most of this time period.

No evidence has been uncovered to establish or discount, whether preliminary neutralization of acidic waste streams occurred during this period prior to discharge to the Kromma Kill.

Disposal practices associated with cold finishing operations are believed to have been similar to that previously described for melting and hot finishing during this period. Liquid wastes would have been discharged to the Kromma Kill.

4.2.3 WWII Period and Beyond: (1940 to 1970)

The period of time just prior to and during WWII resulted in further increased production capacity at the Watervliet site in terms of enlargement of the existing process complexes. This accelerated capacity increase is likely associated with the war production efforts. The areas of noted expansion all occurred during the 1940's, and represent an expansion of existing production capability based upon existing process technology. These areas are listed and defined as follows:

a) Cold finishing operations were extended south and west of the existing structural intersection of the bar mill and annealing complexes.

b) Forging operations were extended to the south within a structural addition.

c) Rolling mill operations were extended to the north of the previous complex.

Facility electrical service systems were also increased in size with the initial installations of the current main electrical power substation.

Fuel oil storage capacity also increased with the installation of the 300,000 gallon storage tank in 1941 located in the southwest quadrant of the production site. Total fuel oil storage capacity was thus increased to 475,000 gallons during the 1940's which remained the functional on-site fuel storage capacity until the 1950's. The underground tanks installed in 1937 were progressively decommissioned due to leakage. The leakage of these tanks, combined with buried distribution line leakage, resulted in the majority of fuel oil contaminations now in evidence on-site.

Technology developments during and after WWII represent the additional changes of significance at the Watervliet site during this period. As such, the balance of this period's historical development description will focus on these changes and attendant considerations. Other operations were conducted at the Watervliet site during this period but these operations have either been previously described or are readily observed as current conditions. These changes are listed below and are further defined in their respective process section which follows:

a) EAF melting, high capacity, 1950

b) VAR melting, 1950

c) Extrusion, 1951

d) Forging via hydraulic systems, 1951

- Melting: (Primary Operations)--

Basic melting operations continued in the facility, now occupied by VAR operations, with little functional change until 1950.

Melting at high capacity has been noted only due to the high rates of consumption of raw materials, finished product created, and by product/wastes generated over the previous time period. EAF furnaces of this period operated at an arc current of 15,000 amps, producing 15 to 25 tons of steel, which enabled far greater production output. The basic equation of raw material, process, finished product and by product/waste, however, remained the same as previous time periods (see Post WWI--Melting).

Siting. In 1950, the current melting facility was constructed. Melting furnaces, previously installed at AL Tech's Dunkirk facility, were relocated to the Watervliet site in 1961 to further increase the melting capacity.

The newly created high production rates, coupled with the high generation rate of by product/wastes, ultimately required an alternate disposal location and the purchase of additional lands for disposal of melting by product/waste materials. In 1957, several parcels of land north of Spring St. Road (north and west of the primary production site), were purchased essentially for the creation of a solid waste landfill. It is this landfill which is in operation for such wastes today.

- Melting: (Secondary Operation--VAR Process)--

The need for metals of greater consistency and/or more reliable strength evolved during this period. Applications for such metals typically involved jet aircraft engines, nuclear applications, space exploration, and petrochemical requirements. Metallurgically, the EAF melting process could not assure sufficient homogenization of alloying elements to meet these new product specifications. The EAF process could also not provide the non-reactive conditions for the more exotic metals required. To meet higher quality standards a second melting process was developed known as Vacuum Arc Remelting (VAR). The Watervliet site was one of the world fore runners in the development of this process.

Raw Materials. During the process development phase, the Watervliet facility melted the following materials on a quasi experiential/production basis.

a) titanium

b) zirconium

c) uranium (classed as depleted U238)

d) molybdenum

e) steels (high grade, this is not verified, but suspected)

Process. The VAR process is not unlike the process of electric welding, in that an electrode of a specific metal is melted and deposited as the result of the intense heat of a discharging electrical arc. The significant difference is that the electrode is of relatively massive proportion and the discharge and melting of the metal is contained within a vacuum retort.

The electrode for the process is the finished product of the EAF process (i.e., ingot), or other process capable of generating an electrode of proportion to VAR processing. In the case of titanium, molybdenum and zirconium, the alternate process to EAF melting and casting is known to have been a process conducted off-site in order to form "bricks". Titanium, molybdenum and zirconium, known to be atmospheric reactive metals at melting temperatures, are understood to have been fabricated into VAR electrodes. This was accomplished via a gas shielded, arc welding process, from "bricks" formed off-site. Uranium 238 is understood to have been provided, in electrode form, via Westinghouse, Inc., a federal government subcontractor. Steel, as may have been melted, would likely have been initially melted via the EAF process and cast into an electrode form for VAR melting.

The VAR process essentially consists of an electrical power supply, an electrode (i.e., raw material), a water cooled copper crucible, and a vacuum pump system. The electrode is connected to the power supply and is lowered into a water cooled and electrically grounded, copper crucible, under vacuum conditions. An arc is stuck to the bottom of the crucible which results in the progressive melting of the electrode. The result of the remelting process is the removal of gasses and volatile materials which are drawn off into the vacuum. Homogenization is attained via rapid chilling and alloy solidification.

Finished Product. The finished product of the VAR process is a refined and homogenous, high quality metal in ingot form.

By Product/Waste. The VAR process produces little waste in comparison to the EAF melting process. Under vacuum conditions and operating with metals previously refined by the primary processes, by product/wastes consist of gasses, metallic particles and limited metal compounds. These items are either captured by the filtration devices used to protect the vacuum pump system, discharged to the atmosphere by the vacuum system, or lost through spillage (i.e., losses of raw material).

Siting. The experimental/production melting facility for VAR development was located in what is now the maintenance facility for mobile equipment at the Watervliet site. This structure was ultimately used for processing the other materials noted above. The relocation of VAR processing to the site, previously occupied by EAF melting and currently occupied by VAR processing, occurred during the early 1960's. It is understood that the equipment used for U238 melting, still resides within the structure now used for mobile equipment maintenance.

Due to the nature of uranium, it is understood that Westinghouse, Inc. conducted a final site assessment during the late 1950's to assure that no residual uranium materials remained on-site after the completion of contracted experimental/production processing of U238.

■ Hot Finishing: (Primary Operations)--

Three (3) significant changes in hot finishing practices are known to have occurred at the Watervliet site during this period. These are:

a) 22 inch rolling mill installation, 1948

b) 2000 ton forging press installation, 1950

c) extrusion process installation, 1951

In addition, the more exotic VAR and other source processed materials (titanium, molybdenum, uranium, and zirconium) are understood to have been processed via hot finishing operations during this period. A description of the limited processing of these more exotic materials is described as follows:

--U238:

After the VAR melting process, U238 is known to have been forged on the "air driven" forging press described during the Post WWI Period. This forging press is no longer on-site. Due to the low strength of U238, heating of the material was not required as part of the process. The VAR U238 ingot formed on the forging press, resulted in a rectangular billet, suitable for rolling operations planned by Westinghouse, Inc. The forging operation was the last operation conducted on-site for U238 prior to shipment.

--Titanium:

VAR ingots of titanium were forged to a size designated by the customer as a finished product, or to a size acceptable for rolling mill processing. Beyond this stage of processing, titanium was potentially processed through all succeeding processes normally used for steel at the Watervliet site. Such processing required little adjustment from steel processing to processing titanium. Due to the inconsequential process differences, titanium processing will not be discussed further.

--Molybdenum & Zirconium:

VAR ingots of molybdenum and zirconium were forged to that size designated by the customer as finished product or to that size suited for rolling mill processing. Rolling of molybdenum is known to have occurred. The rolling and/or forging of zirconium is suspected but has not been confirmed.

The changes brought about by the installation of the 22-inch rolling mill and 2000 ton forging press suggest that only the volumes of materials handled and generated increased significantly via their installation while the nature of materials handled and generated remained constant as those previously described and typical HOT FINISHING processes.

- Extrusion: (Primary Operations)--

The extrusion and attendant processes, as conducted by AL Tech, were installed at the Watervliet site in 1951 in the southern most building complex on-site. As constructed the complex provided all necessary hot and cold finishing processes necessary to manufacture and ship extruded product. As such, the extrusion complex can be considered a stand alone, manufacturing facility and is described accordingly.

The actual extrusion process was based upon process developments by the French. This facility is believed to have been the first such process facility, for alloy steel, installed on the North American Continent.

The extrusion process is a process by which seamless tubing and complex, often irregular, bar shapes are manufactured. This process often represents the only process by which such products can be economically manufactured and represents an anomaly to the normal steel manufacturing process sequence of Melting, Hot Finishing, and Cold Finishing to produce a finished product. Extrusion's anomaly is that the process requires a Cold Finished bar as a Raw Material for the subsequent Hot Finishing extrusion process.

Preparatory cold finishing processes prior to the extrusion process both historic and to an extent, current are described as follows:

- Turning--

Raw Material.

--Hot rolled and straightened, alloy steel bar, up to 22 ft. long, and having nominal diameters of 5, 6, 7, and 8 inches.

--Soluble oils and semisynthetic, water based coolants.

--Consumable carbide tooling.

Process.

--Turning, originally via lathe and later by special centerless turning machine. Turning essentially removes surface defects and imperfections from the metal.

Finished Product.

--Turned surface alloy steel bar.

By Product/Waste.

--Coolants, steel turnings, expendable tooling.

Siting. Bar turning operations for extrusion operations have historically and currently been conducted at the south end of the bar finishing structure.

Disposal practices for coolant wetted turnings has been that of recycling back to melting operations. Residuals may be encountered throughout the southern portion of production site designated as staging areas for scrap metals prior to melting.

- Sawing--

Raw Material.

--Turned surface bar, up to 22 ft. long, having nominal diameters of 5, 6, 7, and 8 inches.

--Soluble oil and semisynthetic water based coolants.

Process. The first process sawing is believed to have been conducted via power hack saw. During the early 1960's, the power hack sawing equipment was replaced by more modern circular saws. The sawing process cuts the turned bar into precut lengths varying from 15 to 26 inches long. The specific length is determined by the subsequent, required length of the extruded product.

Finished Product. The finished product of the sawing process is commonly referred to as an extrusion slug or billet.

By Product/Waste.

--Coolant wetted metal chips.

Siting. Sawing operations both current and historical have been conducted in the south end of the east bay of the extrusion complex.

Disposal practices of By Product/Wastes created by sawing generally have been that of recycling of the metal chips back to the melting operations. Residuals may be encountered throughout the southern portion of the site in staging areas designated for scrap metals prior to melting.

- Drilling--

Drilling operations are conducted as part of the preparatory, Cold Finishing operations prior to extrusion, only if the finished extruded product is intended to have a hollow section, (i.e., a hole) in the finished product, which by example are tube, pipe, or other "hollow bar" forms. If the finished extruded product is an irregular form of solid bar, the drilling operations are deleted from the process sequence.

Raw Material.

--Billet

--Water based soluble oil may have been used for the original drilling operations.

--Cutting oil; base petroleum oil with chlorinated and sulfurized petroleum compounds added. Chlorinated compounds would be classed as non-purgeable.

--Expendable tooling

Process. The drilling process provides an on center, axial hole through the length of the extrusion billet. This hole, typically 1 and 3/16 inch diameter, is provided to establish the initial opening in the billet which will ultimately form the hollow (i.e., hole) in the finished extruded product.

Finished Product.

--A center drilled extrusion billet.

Siting. Drilling operations have historically been conducted in the south end of the east bay of the extrusion complex.

Disposal practices have historically recycled the metal chips created by the drilling process back to melting. Residuals are likely to be found in those areas designated staging of scrap metal prior to melting.

- Chamfer/Radius--

The chamfer/radius operations is a turning process which contours one end of the billet so as to present billet end surfaces suited for plastic deformation and flow during the extrusion process.

Process considerations are essentially identical to those presented in Turning operations above. Only the physical location of the process as conducted varies and is defined as north and adjacent to sawing and drilling operations.

- Extrusion--

Raw Material.

--Billet; preformed via cold finishing.

--Water; contact and non-contact cooling water.

--Water; water hydraulic system. Water was treated with soluble oils to provide hydraulic lubricity and reduced corrosion potential for hydraulic system components.

--Barium Chloride. Used for salt bath, billet preheat furnaces. Use of these furnaces continued until approximately 1961 when the method of billet preheat was converted to induction heating. Two of these molten salt furnaces existed. Each having the equivalent liquid salt volume of approximately 1200 gallons.

--Glass; powdered, granular, preform, and fiber. Generally described as "quartz glass" and believed to contain borax as a wetting agent. Glass is and has been the hot metal lubricant for the extrusion process.

--Electrical Power; substantial.

Process. The extrusion process is a hot process in which the metal is heated to a state at which it is described as plastic. Two (2) generic descriptions can be used to assist in the formation of a mental picture of this process.

1) At elevated temperatures, typically 1900°F to 2100°F, the metal has the consistency of stiff modeling clay.

2) The actual process of extrusion can be likened to a tube of "tooth paste". That is, with pressure applied to the tube, the paste (metal) is forced through an annular opening (the die) and an elongated form (extruded product) results.

The actual process conducted at AL Tech, subjects the billet to the following process sequences:

A) Preheating

B) Heating

C) Expansion

D) Heating

E) Extrusion

A) Preheating; the original method of preheating the billet to approximately 1600 °F, was via barium chloride salt bath furnace. In 1961, the barium chloride furnaces were replaced by a system of induction heating coils which were more easily maintained and controlled. This induction, preheating system is essentially intact and in use today with limited revision. These furnaces were located in the basement area of the extrusion system, over which the control pulpit for induction heating is now located.

B) Heating; Heating to the temperature range of 1900°F to 2100°F, required the use of induction heating for controlled and assured billet temperature to achieve successful expansion and extrusion of the billet without physical or metallurgical damage to the billet.

(NOTE: Induction heating systems required the use of capacitors to achieve electrical tuning of the induction heating coils to achieve maximum heating efficiency. Capacitors in use from 1951 to the mid 1970's contained PCBs. Upon failure, ruptured capacitor cases permitted PCBs to drain into the basement area of the extrusion system, where sump pumping resulted in their discharge to what is now referred to as the South Lagoon or outfall 011 at the Watervliet site.)

C) Expansion; Upon achieving the desired temperature, the billet is transferred to the 600 ton expansion press where given surfaces are coated with glass. A ram then expands the predrilled billet hole to a size slightly larger than that required in the finished product. Note that the expansion process is used only for finished products which are hollow, such as tubing, pipe and other hollow sections. Finished product of solid section bypasses the expansion process.

D) (See item B above.)

E) Extrusion; Envisioning the "tooth paste" analogy given above, and considering that glass provides the lubrication, the hot billet is forced though a die which defines the external surface of the product to that form given by the die. If a hollow product is being formed (i.e. tubing, pipe, etc.), a mandrel (steel bar), is inserted into the expanded hole within the billet. As the billet is extruded, it is the mandrel which prevents the total collapse of the expanded hole and defines the shape of the internal surface of the finished product.

Finished Product. The by product/wastes of extrusion process are identified as:

--Barium chloride.

--Lubricating glass.

--Soluble oils from initial operations and later biodegradable lubricant/corrosion inhibitors were added to the water hydraulic system.

--Miscellaneous oils due to losses of machine hydraulic and lubricating systems.

--PCBs lost due to electrical system failures.

--Metal oxides resulting from hot finishing operations.

--Contact and non-contact cooling water.

--Expendable tooling not recycled to melting operations.

Siting. The siting of extrusion operations is defined as the center, east bay of the extrusion complex as currently sited.

Historic disposal practices indicate liquid materials were ducted to outfall 011 and the Kromma Kill.

Cold Finishing. Cold finishing operations conducted on extruded product were essentially the same as those conducted on bar product and the same by product/wastes can be assumed for the processes conducted for bar product of this period.

Support Processes. Expendable tooling required for the extrusion process included mainly expanding rams, extrusion mandrels and dies which have historically been manufactured on-site via machine shop, heat treating, and/or the melting/casting operations.

The melting/casting operation represents the only significant process conducted which may pose environmental concern today. Casting sands with phenol based binding compounds were used to form the tooling molds for extrusion dies. After casting operations, spent casting sands are known to have been disposed of in areas to the south of the extrusion complex as well as transported to the landfill.

■ Cold Finishing: (Extruded Products)--

All cold finishing processes and support functions, as currently observed, were essentially intact with construction of the original facility or within this specific period, with exception to the following items:

A) Pickling operations included in the use of sodium hydride salt bath with attendant ammonia system for bath regeneration.

B) Elementary neutralization of waste pickle liquor, without clarification, was provided prior to discharge to the Kromma Kill. The current treatment plant was constructed in 1972.

C) Cold reduction of extruded material was accomplished via drawing. The existing Pilger Mill and now removed, equivalent tube reducing equipment was not available during this time period.

- Cold Finishing: (Except Extrusion)--

Cold finishing operations, other than extrusion related processes, generally declined during this period as the primary function of the Watervliet site began to concentrate on primary melting operations and large section material which generally requires more limited cold finishing.

Identified cold finishing processes of this period consisted of:

A) Straightening

B) Turning

C) Centerless grinding

Siting--

Cold finishing operations during this period were conducted in the same area as current operations (i.e., Bar Finishing).

Disposal practices; see cold finishing extrusion.

4.3 Buildings, Utilities, Paved Areas, Easements, Right-of-Ways and Other Features

The Watervliet plant site consists of approximately 130 acres of land with approximately 660,000 square feet under roof. The landfill site encompasses 52 acres of land, of which nearly 30 acres are currently in active use. Leachate from the landfill is collected by a leachate collection trench system and temporarily accumulated within two housed holding tanks on this parcel prior to treatment at the facility's wastewater treatment plant.

Drawing Nº 24 illustrates the plant and landfill site property boundaries, building locations, roadways and adjacent properties.

Current and historic utility schematics including electric power routing, storm and sanitary sewers, city water lines, and natural gas lines and other site features are provided on Drawing Nºs 2, 3, 4, 5, 6, and 7. Steam and oil pipe systems are shown on Drawing Nºs 8 and 9, respectively.

The only easement/Right-of-Way associated with either the plant or landfill sites is a Niagara Mohawk Power Corporation overland transmission line which extends in a north-south direction just east of the eastern-most landfill limits, crosses Spring Street and roughly follows the plant sites western property boundary (refer to Drawing Nº 24).

4.4 Past and Present Product and Waste Tanks

Current locations of above ground and underground bulk storage (product and waste) tanks are shown on Drawing Nºs 11 and 12. The inventory of these tanks is as follows:

TANK STORAGE

Construction/ Tank Type	Product	Capacity (gal.)	Location/ Drawing Ref.Code	Secondary Containment	Active/ Inactive
• Steel/Above-ground	Ammonia	13,000	North of Pickle House/001	No	Inactive
• SSA/Above-ground	Hydrofluoric Acid	13,300	North of Pickle House/002	No	Active
• SSA/Above-ground	Nitric Acid	9,000	North of Pickle House/003	No	Active
• Bare Steel/ Aboveground	Sulfuric Acid	7,000	North of Pickle House/004	No	Active
• "Other"/ Aboveground	Liquid Nitrogen	1,500	South of Extru-sion/005	Yes	Active
• "Other" Aboveground	Liquid Oxygen	9,000	Northwest of Meltshop/006	Yes	Active
• "Other" Aboveground	Liquid Nitrogen	9,000	Northwest of Meltshop/007	Yes	Active
• "Other" Aboveground	Liquid Argon	9,000	Northwest of Meltshop/008	Yes	Active
• Bare Steel/ Aboveground	Emission Control Dust	17,000	West of Melt Shop/009	No	Active
• Bare Steel/ Aboveground	Lime	17,000	Southwest of Melt Shop/010	No	Active
• Bare Steel/ Aboveground	Lime	32,000	Southwest of Melt Shop/011	No	Active
• Bare Steel/ Aboveground	Lime Slurry	25,000	North of WWTP/ 012	No	Active
• Bare Steel/ Aboveground	Landfill Leachate	350,000	North of Spring Street/013	Yes	Active
• Bare Steel/ Aboveground	Landfill Leachate	350,000	North of Spring Street/014	Yes	Active
• SSA/Above-ground	Sulfuric Acid	7,000	North of Pickle House/015	No	Inactive
• Bare Steel/ Aboveground	Gear 634	600	22" Mill/T1	Yes	Active
• Bare Steel/ Aboveground	Gear 634	600	22" Mill/T1	Yes	Active
• Bare Steel/ Aboveground	Motor Oil	1,500	Garage/T2	No	Active
• Bare Steel/ Aboveground	Hydraulic	1,500	Garage/T3	No	Active

SSA = Stainless Steel Alloy

TANK STORAGE
(continued)

Construction/ Tank Type	Product	Capacity (gal.)	Location/ Drawing Ref.Code	Secondary Containment	Active/ Inactive
• Bare Steel/ Aboveground	Waste Oil/ Water	4,000	Forgepress/T4	Yes	Active
• Bare Steel/ Aboveground	Hydraulic	1,500	Forgepress/T4	Yes	Active
• Bare Steel/ Aboveground	Hydraulic	1,500	Forgepress/T4	Yes	Active
• Bare Steel/ Aboveground	AW-68	1,000	Forgepress/T4	Yes	Active
• Bare Steel/ Aboveground	AW-68	1,000	Forgepress/T4	Yes	Active
• Bare Steel/ Aboveground	AW-68	1,000	Forgepress/T4	Yes	Active
• Bare Steel/ Aboveground	Mobil Alpha	2,000	Extrusion/T5	Yes	Active
• Bare Steel/ Aboveground	Hydraulic AW-68	2,000	Extrusion/T5	Yes	Active
• Bare Steel/ Aboveground	Regular Gas	1,000	Trans./T6	Yes	Active
• Bare Steel/ Aboveground	Diesel	5,000	Trans./T7	Yes	Active
• Bare Steel/ Aboveground	Quench Oil	12,000	Annealing/T8	Yes	Active
• Bare Steel/ Aboveground	Paraffin Oil	4,000	Extrusion/T9	Yes	Active
• Bare Steel/ Aboveground	Waste Paraffin Oil	4,000	Extrusion/T9	Yes	Active
• Bare Steel/ Aboveground	Fuel Oil	300,000	Hill/T10	No	Inactive
• Bare Steel/ Aboveground	Waste Fuel Oil	10,000	Down the Hill/ T11	No	Active
• Steel/Under-ground	Coolant	11,650	Extrusion/T12	No	Active
• Bare Steel/ Aboveground	Fuel Oil	10,000	South of Anneal/T13	Yes	Active
• Steel/Under-ground	Diesel	5,000	South of Meltshop/T14	Yes	Active
• SSA/Under-ground	Cooling Water	7,600	Extrusion/T15	No	Active
• SSA/Under-ground	Cooling Water	5,200	Extrusion/T15	No	Active
• Bare Steel/ Aboveground	Anneal Quench Oil	6,000	South of Anneal/ T16	Yes	Active
• Bare Steel/ Aboveground	Central Waste Oil	8,000	South of Anneal/ W6	Yes	Active

SSA = Stainless Steel Alloy

Historically, the following tanks were utilized on-site.

Construction/ Tank Type	Product	Capacity (gal.)	Location	Secondary Containment	Closure Method
• Bare Steel/ Underground	Gasoline	6,000	Southeast of Main Office	No	Removed 1981
• Concrete/Steel Underground	Anneal Oil	1,000	South of Anneal	No	Filled in Place 4/88
• Bare Steel/ Underground	Fuel Oil	9,400	Southwest of North Gate	No	Filled in Place 6/87
• Bare Steel/ Underground	Fuel Oil	9,400	Southwest of North Gate	No	Filled in Place 6/87
• Bare Steel/ Underground	Fuel Oil	25,588	Southwest of North Gate	No	Filled in Place 6/87
• Bare Steel/ Underground	Fuel Oil	14,690	Southwest of North Gate	No	Filled in Place 6/87
• Bare Steel/ Underground	Fuel Oil	14,690	Southwest of North Gate	No	Filled in Place 6/87
• Bare Steel/ Underground	Fuel Oil	9,780	Southwest of North Gate	No	Filled in Place 6/87
• Bare Steel/ Underground	Fuel Oil	10,152	Southwest of North Gate	No	Filled in Place 6/87

5.0 SOLID WASTE MANAGEMENT UNITS

There are a total of fifteen (15) solid waste management units (SWMUs) at the AL Tech Watervliet, New York facility. The SWMUs are listed in Table 5-1 and are located on Drawing Nº 13. These solid waste management units are separated into four categories based on the process from which the wastes are generated. The categories include melting operations, hot forming, cold finishing and operations in support of the main manufacturing processes. The SWMUs discussed below include all active and inactive units known to have been used by AL Tech (and previous owners) during the facility's operation.

5.1 Melting Operations

Various steel melting operations have been used at the Watervliet facility as described in Section 4.2. Specifically, electric arc furnace (EAF), argon-oxygen decarburization (AOD), vacuum arc remelting (VAR) and crucible melting may have been used in the formation of specialty steel products. The following provides a brief discussion of the SWMUs resulting from melting operations.

5.1.1 Lime Storage Vessels (SWMU Nºs 1A and 1B)

Hydrated lime is stored in two above ground storage vessels located at the southwest corner of the melt shop (SWMU 1A). The vessels, with approximately 6,500 cubic feet capacity, were installed in 1951 during the original construction of the melt shop. A third storage vessel installed in 1975 is located at the north end of the melt shop (SWMU 1B). Lime is delivered in bulk (rail car and tanker) and blown into the storage vessels using compressed air. A baghouse system is installed on the north vessel to capture any particulate discharged during loading operations. An additional baghouse is proposed for installation in 1991 for one of the southwest vessels. The lime is discharged via piping into

Table 5-1

SWMU Inventory

Al Tech Specialty Steel
Watervliet, New York Facility

ID No.	Identification	Locations	Material Handled/ Suspected Contaminants	Description/ (Period of Operation)
1*	Lime Storage Vessels	2	Lime	Spilled lime around storage vessels. *(1952-)*
2	Electric Arc Furnace Baghouse	1	Heavy metals	EAF dust spillage under baghouse. *(1970-)*
3	Extrusion Slippery Water	1	Oils, coolants, metals, PCB's	Potential spillage of cooling water in the Slippery Water Room and potential for release from UST. *(1951-)*
4*	Waste Acid Pit(s)	1	Waste acids, heavy metals	Releases from extrusion pickle house waste acid pit(s). *(1951-)*
5	Extrusion Pit	1	Oil, PCB's, metals	Pit beneath the extrusion press known to have collected PCB's from capacitor case rupture. *(1951-)*
6	API-Type Oil/ Water Separator	1	Oil	Gravity oil/water separator for process and storm waters. *(1990-)*
7*	Waste Disposal Facilities	3	Heavy metals	On-site landfill, leachate management facilities and northeast quadrant fill area for facility generated wastes including slag, metal scrap, electric arc furnace dust, wastewater treatment sludge, and demolition debris. *(1957-; 1979-1988; 1907-1917)*
8	South Lagoon	1	PCB's	A release of PCB contaminated wastewater entered the lagoon from the Extrusion Building. *(1973-1990)*
9	Maintenance Steam Cleaning Pad	1	Oils, metals, degreasers	Outdoor vehicle and equipment cleaning pad. *(1979-1985)*

*Denotes CAMU

Table 5-1
(continued)

SWMU Inventory

Al Tech Specialty Steel
Watervliet, New York Facility

ID No.	Identification	Locations	Material Handled/ Suspected Contaminants	Description/ (Period of Operation)
10	Hydromation Plant	1	Oil, metals	Oil staining around drum accumulation area. *(1976-)*
11*	Scrap Steel/Metal Storage Areas	7	Oil, metals	Oil ladened scrap steel/metal storage piles at the southern portion of the site. *(1951-)*
12*	Waste Oil Accumulation and Storage	7	Oils, metals, halogenated organics	Waste oil generated from vehicle maintenance and process oil and prior water treatment accumulation and storage areas. *(Pre 1970-)*
13*	Container Storage Area	3	Oils/acids, chrome or nickel sludges, PCB's, expired chemicals, spent cleaning solvent	Hazardous wastes generated on-site for disposal off-site and used acid stored on-site for reuse in the wastewater treatment/neutralization system. *(1951-)*
14	Calow	1	Coolant/emulsified oils, halogenated organics	Coolant recirculation/oil separation unit associated with bar finishing operation. *(1966-)*
15	Wastewater Treatment Plant	1	Landfill leachate, waste pickling acids, boiler condensate, pickling process wash water/ metals, oils, solvents	Wastewater treatment plant used exclusively for site related activities. *(1972-)*
16**	Process Discharge Piping		Contact, non-contact cooling water, oils, metals	Pipelines used to convey wastewaters to API-Type oil/water separator and wastewater treatment plant. *(1935-)*

*Denotes CAMU
**Several locations throughout facility

a tote bin within the building. The amount discharged is controlled by a manually operated valve located near the tote bin. The lime, added to the melting vessel containing scrap steel and alloy, is used to remove impurities in the steel as it melts. The collected impurities, known as slag, is removed from the vessel prior to pouring of the molten steel.

Releases of lime were noted on the soil surrounding the base of the storage vessels. Lime or calcium hydroxide ($Ca(OH)_2$) has a high percent hydronium ion (pH value of around 12). The material is considered caustic and can cause burns or skin irritation.

Lime powder can be relocated naturally via prevailing winds, or dissolution in and transport by surface runoff. The characteristics of lime transported by the wind will not change and movement will be limited due to the moisture absorptive capabilities of lime. Windborne lime is most likely to be transported to the south or northeast, as determined by prevailing winds, which are from the north in winter and south-southwest in spring, summer and fall. The nearest receptor to the northeast is a residential area east of Spring Street Road, located approximately 1200 feet from the lime storage area. The nearest receptor to the south is a residential area located near First Street approximately one-half mile from the lime storage area. Precipitation, which is generally slightly acidic (pH 5.6-6), will partially neutralize the high-pH of surface runoff containing dissolved lime. Surface soils will absorb considerable quantities of runoff. Runoff that is not absorbed in soils will enter stormwater drainage systems and adjacent creeks. A stormwater transport ditch located just south of the lime storage area is the most readily available surface water transport pathway. This ditch flows first south then east, generally parallel to the property boundary, and eventually discharges into the Kromma Kill. The high rate of dilution provided by the creek would minimize the impact of dissolved lime on receiving waters.

5.1.2 Electric Arc Furnace Baghouse (SWMU Nº 2)

During the melting process in an electric arc furnace (EAF), considerable quantities of a finely dispersed dust are generated. A baghouse and dust collection system was constructed in 1970 to collect the dust as it was generated. Following collection in the baghouse the dust is placed in containers for eventual disposal.

The collection system, a series of metal conduits, is used to transport the dust generated from the EAF to the baghouse located outside the north wall of the melt shop. The dust is separated from the air by in-line filter bags. These bags were periodically disposed of through on-site incineration in the EAF when cleaning was impractical, but are now sent to a hazardous waste TSDF (IMETCO). There were no leaks observed in the collection system.

Prior to the baghouse installation (1951-1970), EAF dust was not collected, but was dispersed in and around the melt shop building. Some of this material has been landfilled, although some residual dust has remained on building components and the soil base floor.

The dust is dark brown in color and light in weight. It contains a wide variety and variable concentrations of metals depending on the alloys present in the melted steel. Typically, the dust will contain iron, nickel, cadmium, manganese, and carbon, all of which are relatively insoluble in water. Hexavalent chromium is also present and very soluble. Hexavalent chromium can be reduced to trivalent chromium in the presence of iron, dissolved sulfides, and certain organics. Slightly acidic water (<6 pH) will tend to leach out some of the chromium from trivalent chromium within the dust after contact, especially if saturation occurs. Usually, the lower the pH the more the metals can be leached.

If dry, the dust can be relocated by high winds and transported by surface water runoff during heavy rainfall events. Exposure to the elements of large volumes of EAF dust is not expected, as it is collected in the baghouse. Minor spillage has occurred immediately under the baghouse, where the dust is collected in containers. Entrainment of dust into the wind or precipitation is anticipated to be minimal and has been observed to be a very localized occurrence.

Windborne EAF dust will most likely be transported to the south or north/northeast as dictated by prevailing winds, which are generally from the north in winter and south/southwest in spring, summer and fall. The nearest residential receptors are: a neighborhood located on the north side of Spring Street Road, approximately 1000 feet northeast of the baghouse; and a neighborhood located approximately one-half mile south-east of the baghouse in the vicinity of First Street. Storm drainage ditches located to the north and east of the baghouse that receive dust carried by the wind or precipitation runoff eventually discharge into the Kromma Kill, most via the API separator.

5.2 Hot Finishing

The hot finishing operations performed at the Watervliet facility were described in Section 4. The operations have included forging, extrusion, rolling mills and annealing. The by products and wastes of these operations are mill scale, metal fines, grinding dust, and furnace refractories. These materials were used as fill for the plant site and later disposed at the landfill site. Grinding dust was used as a road topping material within the plant.

The current hot finishing operations consist of rolling mills, extrusion, and annealing furnaces. The main waste streams generated are mill scale, coolants and hydraulic oils are contained in cooling waters from these operations and are discussed under the support operations section of the SWMU descriptions (section 5.4).

The following provides a brief discussion of the SWMUs as a result of hot finishing operations.

5.2.1 Extrusion Slippery Water (SWMU Nº 3)

Hydraulic system water from the extrusion press is treated to remove oils in the Slippery Water Room, an adjunct of the Extrusion Building. The system consists of underground and aboveground storage/holding tanks, a series of settling tanks, surface skimmers, and ancillary piping, valves and pumps. Oil skimmed from the surface of the settling tanks is collected in a 250 gallon container. When filled, the container is transported to the central waste oil collection tank. The treated water is recycled to the extrusion press (i.e.; this is a closed loop coolant system). An UST located to the west of the Extrusion Building is used to increase the holding capacity of the coolant system. Sludge that accumulated at the bottom of the UST was tested in July of 1990 and found to contain PCBs. Heavy metals are also expected to be present in the sludge.

The Slippery Water operation is contained within a small concrete-floored room accessible only from the outside (i.e.; not accessible from the Extrusion Department). A metal containment dike that surrounds the skimming tanks prevents the release of any spilled oil to the environment.

No evidence of spills was noted during previous site inspections. No significant spills are reported to have occurred in this area. In the event of a spill of oil and/or coolant, the primary contaminants of concern are heavy metals and PCBs. Based on the observed integrity of the concrete and the absence of drains in the vicinity, the potential for migration of a release is minimal.

The integrity of the UST system is unknown. Any leakage from this tank could allow release of oils, heavy metals, and/or PCBs to surrounding soils and, potentially, groundwater. Groundwater transport presents the only potential pathway for contaminants that may have been released via tank leakage. Natural groundwater gradient is known to occur in an easterly direction. No direct users of groundwater are known to be present in the vicinity.

5.3 Cold Finishing

Historic cold finishing operations performed at the Watervliet facility were described in Section 4 - Process History. The following section describes SWMUs associated with both historic and current cold finishing processes.

5.3.1 Pickling House Waste Acid Pits (SWMU Nº 4)

Spent pickling liquors were ~~are~~ pumped into a waste acid pit located outside the Pickle Room. The waste acid pit is comprised of two 8' x 15' x 15' deep sections (one no longer used) constructed of acid brick and bituminum-coated concrete walls 24" thick. The pit currently has a usable capacity of 18,000 gallons. The pit discharges into the waste water treatment plant.

The pits contain spent acids, which are highly corrosive, and contain heavy metal impurities. The concentrated acid causes a breakdown of the alkaline concrete mixture. Absent of periodic preventative maintenance, the concrete deterioration eventually can result in an acid release to the environment. An investigation performed in 1989 by HART revealed that the exterior walls of these pits are in direct contact with the local groundwater. During the investigation, elevated metals concentrations were identified in three soil borings

(Cd, Cr, Hg, and Ni) and in two monitoring wells (Ar, Cd, Cr, Be, Pb, An, and Ni) adjacent to the waste acid pit. The source of the contamination appears to have been a leaking acid pit. Groundwater transport presents the only potential pathway for contaminants that may have been released via tank leakage. Natural groundwater gradient is known to occur in an easterly direction. No direct users of groundwater are known to be present in the vicinity.

5.3.2 Extrusion Pit (SWMU Nº 5)

The extrusion press and associated equipment is situated above an in-ground concrete pit that collects process cooling water. Any oils that leak from the equipment are also collected in this pit. The integrity of the pit is unknown due to inaccessibility presented by the extrusion press. Due to the electrical requirements of the equipment, many capacitors are utilized in the immediate area of the press. In the past, capacitors have occasionally exploded, leaking the dielectric fluid (previously containing PCBs) from the capacitors into the sump.

The capacitor cabinets and sludges under the extrusion press have been sampled on numerous occasions. Samples collected from these areas show concentrations of PCBs, verifying the release(s). Process waters generated from the extrusion press were previously discharged to the south lagoon. Nine samples collected on September 18, 1989 from soils surrounding the south lagoon (discussed in section 5.4) were shown to contain between 1 and 17 ppm PCBs. The south lagoon was closed off in October 1990. Since this date, all wastewaters from the extrusion building have been discharged to the new oil/water separator.

As discussed above, there have been confirmed releases to the soils and surface waters from this SWMU. No contamination associated with these releases has been identified outside the property boundaries. Groundwater transport presents the only potential pathway for contaminants that may have been released via tank leakage. Natural groundwater gradient is known to occur in an easterly direction. No direct users of groundwater are known to be present in the vicinity.

5.4 Support Operations

Various operations exist in support of the three primary steel making processes. The following section describes SWMUs associated with past and current support functions.

5.4.1 Oil/Water Separator (SWMU Nº 6)

An API-type gravity oil/water separator accepts process and stormwater discharge flow. The separator, constructed in 1990, consists of a holding/settling chamber, an oil skimming and collection unit, transfer connecting piping and ancillary equipment. The unit is located northwest of Lincoln Avenue parallel to the pickle house and is designed to provide a 24-hour hydraulic retention time for a flow of 700,000 gallons/day. Free oil present in the wastewater rises to the water surface and is skimmed from the top of the process tanks for collection. The oil is disposed in the central waste oil storage tank. After separation the water is discharged into the Kromma Kill.

The API separator was constructed in response to frequently observed oil discharges into the Kromma Kill that were attributed in part to contaminated process water. Since the construction, there have been no reported releases from the oil/water separator. No evidence of releases to the environment were noted during the site inspection.

5.4.2 Waste Disposal Facilities (SWMU Nºs 7A, 7B and 7C)

Information pertaining to waste disposal facility components and appurtenances has been identified through research of past reports. The two major components of the disposal facility operation include the landfill and leachate management facilities which are described in detail below. The former surface impoundment is a hazardous waste TSDF as defined by NYSDEC and EPA. The third fill/disposal area was an area used in the northeast quadrant of the manufacturing facility prior to usage of the landfill and leachate management facilities.

5.4.2.1 Landfill - 7A. In conjunction with AL Tech's manufacturing operations, the facility has utilized its own solid waste landfill for the disposal of waste products since 1957. This landfill is currently being used as a non-hazardous solid waste disposal facility. The AL Tech landfill, located north of Spring Street Road, has received a variety of wastes since its inception including slag, casting sand, metal scrap, electric arc furnace dust, wastewater treatment sludge and demolition debris.

The landfill was developed on native soil materials located within the watershed of the Kromma Kill Creek. Over the years, waste disposal operations have encompassed roughly 30 acres of land. During its operation, the landfill has expanded along a topographically high ridge which runs northwest to southeast, roughly parallel to the Kromma Kill Creek. These disposal operations are reported to have resulted in filling on each side of this natural watershed divide.

A clay-lined basin (hereinafter referred to as the Northwest Basin--defined as a hazardous waste TSDF by New York State and EPA) was constructed at the landfill site in early 1979 for the disposal of wastewater treatment sludge and electric arc furnace dust. It is reported that the lining system of this basin was ultimately damaged during operation, and subsequent leakage of contained liquids occurred through the containment dike. Leakage was confirmed with a biodegradable tracer. As a result, it is understood that the basin was emptied, filled with soil and ultimately capped with clay. Waste materials taken from the Northwest Basin were transferred to a new containment basin. This second basin, understood to have been located in the southeastern portion of the landfill (hereinafter referred to as the Southeast Basin), was reported to be constructed of clay. The Southeast Basin was capped with clay after receipt of wastewater treatment sludge, electric arc furnace dust and extrusion induction melting casting sands (potentially containing phenols) was completed.

5.4.2.2 Leachate Management Facilities - 7B. The primary mechanism of leachate collection and management for the landfill facility was a surface impoundment which was reported to be in existence prior to 1979. The impoundment, which intercepted leachate from the southeastern portion of the landfill, was reported to have a capacity of up to 745,000 gallons. A "french drain" of unidentified source and capacity was also reported to contribute to this impoundment. It is understood that initially there was no method available for direct removal of leachate from this containment, but that at a later time leachate was conveyed to the facility's wastewater treatment plant via a force main. The surface impoundment was reported to be constructed of a natural clay bottom, with a compacted clay dike forming the southeastern boundary of the impoundment, and the landfill disposal area sideslopes forming the rest of the containment walls. It is reported that the results of analytical testing conducted on the collected leachate in 1982 were in excess of EP Toxicity limits for chromium. Accordingly, it is understood that the New York State Department of Environmental Conservation (NYSDEC) and the United States Environmental Protection Agency (USEPA) considered this surface impoundment to be subject to applicable hazardous waste transportation, storage and disposal facility (TDSF) regulations, thus subjecting it to the requirements of RCRA 40 CFR Parts 264 and 265, and 6NYCRR Part 373 regulations. Therefore, AL Tech negotiated a closure plan with the agencies, and it is reported that the impoundment was closed in 1988 by pumping stored liquids to the existing treatment facility and backfilling the surface impoundment with clean earth fill, while leaving the liner soils, sediments and associated structures within the surface impoundment. With closure, a leachate collection trench/line was installed downgradient of the surface impoundment to replace the impoundment's collection ability. The line intercepts leachate from the toe of the southeastern portion of the landfill and directs the collected leachate to a manhole. The manhole is evacuated through a gravity sewer line to a pair of steel collection tanks. Discharge to the on-site wastewater treatment plant is through buried transport lines from the collection tanks. Leaks from these lines have occurred due to pipe failures (freezing).

Leachate transported by surface drainage that has escaped collection is likely to have discharged into tributaries of the Kromma Kill.

As a result of several subsurface investigations which have resulted in semi-annual groundwater monitoring since 1982, leachate from the landfill and/or basin have shown localized impact on the groundwater with elevated concentrations of metals, sulfate and halogens. Previous studies have shown groundwater to be moving in an easterly or northwesterly direction. The magnitude and distribution of the constituents has not yet been fully characterized. No known users (i.e., receptors) of groundwater are known to be present in the immediate vicinity.

5.4.2.3 Northeast Quadrant Fill Area - 7C. Prior to the usage of the on-site landfill an area in the northeast quadrant of the main manufacturing facility was utilized for the disposal of by-product waste, during the Early Period.

Photographic evidence indicates that filling of this area continued until around 1917. Visual observations of excavations in this area indicates that by-products from the melting operations is present. Such by-products include slag, mold hot taps and bottom plugs, furnace lining refractory and metal components. Additional materials suspected to be in the area include hot finishing by-products such as grinding dust clay and sand, mill scale and hose metal fines. By-product waste generated from cold finishing operations (drawing, precoating and annealing) such as grinding, refractory and inorganic salt wastes may have also been disposed in this area. Only solid wastes are believed to have been landfilled, and all liquid wastes would have been discharged to the Kromma Kill.

5.4.3 South Lagoon SWMU Nº 8

Prior to being directed to the API oil/water separator (see above discussion), wastewater from the Extrusion Building was discharged to the South Lagoon for the collection of oil prior to creek discharge via outfall 011. The system, consisting of an 18' x 40' x 6' deep clay lined and steel, side-walled lagoon, was designed for gravity separation. Two skimming pumps collected floating oil and transferred the oil to a collection tank. Water ultimately flowed over a weir to a pipe that discharged to the Kromma Kill. The system was closed in September, 1990, with the process water rerouted to the oil/water separator.

Capacitors near the extrusion press have leaked as a result of case failures. Polychlorinated biphenyls (PCBs) spilled into the concrete pit beneath the press. Wastewaters then carried this material out to the South Lagoon.

Sampling performed in the extrusion pit and the pipeline leading to the South Lagoon on March 28, 1988 by AL Tech revealed PCB concentrations ranging from <5.5 to 2,500 ppm. The highest concentrations were found in the pipeline leading to the lagoon. The storm drain and lagoon areas were cleaned by the removal of contaminated solids and oils.

A second unrelated sampling program, conducted in September of 1989 by HART, included sampling of surface soils surrounding the lagoon. PCB levels between 2 and 17 ppm were found in these samples. The origin of this contamination is unknown.

Migration pathways from the lagoon with respect to past discharges is through soil percolation to groundwater, or wastewater discharges to surface water. Due to the low solubility of PCBs in water and the low mobility of PCBs in soil, any remaining contamination is expected to be limited to the areas where oils were handled (i.e local to the lagoon system). Contaminants transported by the surface water would discharge into the Kromma Kill. Contaminants transported by groundwater would be carried in an easterly direction. No groundwater users are known to be located in the vicinity.

5.4.4 Maintenance Steam Cleaning Pad (SWMU Nº 9)

Steam cleaning operations were conducted on a concrete pad located to the east of the Transportation ~~maintenance~~ building. The concrete pad is approximately 15 feet by 15 feet and has a trench to collect wash fluids generated during cleaning operations. The trench which collects both solids and liquids, used to drain via a pipeline to the Kromma Kill Creek approximately 50 feet to the south of the pad. In the mid 1980's the trench was connected to the sanitary sewer system. The pad is not sheltered from precipitation and is slightly elevated above the surrounding grade and is sloped toward the collection trench.

There were no observed cracks in the concrete that would allow uncontrolled discharge to the soils from liquids collected on the pad. There are no dikes installed to minimize spillage over the edge.

The wastes generated from the steam cleaning operation are typically oil based, from engine degreasing. Sludge build-up, including dirt and greases, was removed from metal parts by a steam jet directed from a portable nozzle. The loosened material and wash water drops to the concrete and drains to the trench. Constituents of the waste include petroleum oils, metal fines, dirt, and potentially degreasers, which may have been used as an additive to the steam cleaning solution. These additives could have included caustics such as sodium hydroxide, solvents such as 1,1,1-trichloroethane or trichloroethylene, and engine fluids such as antifreeze (ethylene glycol).

As previously noted, the trench reportedly discharged to the Kromma Kill Creek. Fluids entering the trench would have been directly released to this receptor. Oily solids in the fluids were probably deposited onto the trench bottom and were not discharged directly to the creek in any significant quantity. There are no known reports of the line plugging up with sludges. Sludge was shoveled from the trench and may have been dumped on the soils around the pad, based on staining of the soils surrounding the pad. The staining observed may also have resulted from the splashing of oily solids from the objects being cleaned. The potential contaminants discharged to the surrounding soils would presumably be similar to those previously noted as having collected in the trench.

5.4.5 Hydromation Plant (SWMU Nº 10)

Oil-contaminated process water, primarily cooling water from the 21 inch and 22 inch mills, is treated in the Hydromation Plant to remove the oil (Drawing Nº 19). The plant consists of two aboveground storage tanks and two oil skimming units. Water/oil skimmed from the top of the storage tank(s) flows through the two oil skimming devices located inside the hydromation building. After passing through a sand filter, the effluent water discharges to the API separator for final treatment. Oil separated via the hydromation unit is collected in drums and transported to a centrally located waste oil collection tank.

The building does not have the capacity to contain a large release from these units (i.e. complete tank failure). Such an incident would result in a release to the environment. Smaller releases would be directed to a drain within the building which discharges to the API oil/water separator system. Reportedly, no such releases, however, have occurred within the plant.

During past inspections of the facility, stained soil was noted outside the building where drums of oil are accumulated. Due to the anticipated quantity of oil releases in this area (i.e. relatively small quantities from 55 gallon containers) potential effects would essentially be limited to soil contamination (e.g. oils and metals) and to a lesser extent groundwater contamination. Potentially contaminated surface runoff from affected soils would likely be directed via storm drains to the API separator for treatment.

The Kromma Kill is the primary receptor for releases that may occur at the hydromation facility. Prior to construction of the API Separator, effluent from hydromation discharged into the Kromma Kill and may have contributed to oily discharges to the creek in the past.

5.4.6 Scrap Steel Storage Areas (SWMU Nºs 11A - 11G)

Seven distinct scrap steel/metal piles are currently located at the facility. Historically, the location and volume of scrap steel/metal stored at the southern portion of the facility has changed. Due to similar characteristics these seven piles have been combined into one solid waste management unit (CAMU). Combined, the scrap piles currently contain approximately 1100 tons of scrap metals including grinding dust, bar turnings, cut-offs, and off-spec products. Residual lubricants are present on much of the scrap in the piles. The scrap turnings may be heavily contaminated with lubricants. The scrap piles are in direct contact with the ground and are exposed to the elements.

According to a previous SWMU report prepared by AL Tech's James M. Bohley, soils beneath the scrap pile were observed to be contaminated with residual lubricants that have drained off the metal scraps. The extent of oil and heavy metal contamination is unknown. Possible receptors of the residual lubricants are soils, groundwater and surface water.

Transport of contaminants that penetrate the soil and reach groundwater would be in an easterly direction. No users of groundwater are known to be present in the vicinity. Storm runoff could entrain contaminants from the waste piles. Transport would generally occur in an easterly direction and discharge ultimately into the Kromma Kill. Much of the stormwater will be diverted to the API oil/water separator for treatment prior to discharge.

5.4.7 Waste Oil Accumulation and Storage (SWMU Nºs 12A - 12G)

Waste oil, generated from vehicle maintenance, process water and oil treatment, is temporarily accumulated at seven primary points of generation in 55 to 4,000 gallon containers and is then transported to a centrally located 6,700 gallon storage tank. (Oil from the Pilger Mill tank is reclaimed off-site.) Collectively, waste oil collection and storage on-site is considered herein as a CAMU.

The nine primary generation and accumulation areas include Hydromation (previously discussed), Transportation (SWMU 12A), API-Separator (previously discussed), Slippery Water (previously discussed), Calow (discussion forthcoming), Drum-Crushing (SWMU 12B), Pilger Mill (SWMU 12C), Annealing (SWMU 12D) and the Central Waste Oil Storage Tank (SWMU 12E), Forge Press Storage Tank (SWMU 12F), and the Waste Fuel Oil Storage Tank (SWMU 12G). Evidences of releases to the environment have been identified at the hydromation plant, outside the transportation building, and to a lesser degree, at the Calow-oil accumulation area. In general, the bulk of the contamination is associated with oils, metals and, in the case of the Calow accumulation area, possibly halogenated non-purgeable organics.

Soil, and to a lesser degree groundwater, would be potential pathways of migration. Potentially contaminated stormwater run-off would likely be directed to the API separator system thus minimizing concerns associated with surface water contamination.

Prior to construction of the API separator, contaminants contained in stormwater would have ultimately discharged to the Kromma Kill. Oil contaminants that reach groundwater would be transported with groundwater movement toward the east. No groundwater users are known to be present in the vicinity. The following subsections describe conditions in those areas where oils are accumulated or stored and are not addressed under other report sections.

5.4.7.1 Transportation Building (SWMU Nº 12A). At the Transportation Building, waste oils are accumulated both within and outside of the Transportation Building in drums and a tank, respectively, as a result of vehicle maintenance. The drums are stored atop concrete away from any drains. Staining within the building was observed, however, no release to the environment has been documented nor is expected with respect to observed staining of concrete. The 275 gallon aboveground tank located outside the northeast corner of the building is also associated with vehicle maintenance activities. The tank does not have secondary containment and is stored directly atop soil. Staining of soil was observed though no drains exist in the vicinity of this tank. ?

5.4.7.2 Drum Crushing (SWMU Nº 12B). The drum crushing area is located within building 11 and adjacent to, though spatially separated from, the hazardous waste drum storage area. Waste residual oils are accumulated in this area as a result of drum crushing activities. The oil is accumulated in drums until they are transported to the centrally located waste oil tank located south of Annealing. The storage area within drum crushing is located indoors atop a concrete floor. No obvious cracks or floor drains are present in the floor, however, no diking is provided to control spilled fluids from spreading throughout the building.

To date, no reportable spills or releases have occurred in this area, however, signs of spills (staining on the floor) were evident. The extent of this staining appeared to be minimal and is not expected to have reached the subsurface.

5.4.7.3 Pilger Mill (SWMU Nº 12C). The Pilger Mill is located within the Extrusion Building. Waste paraffin oil is accumulated within a 4,000 gallon aboveground, diked, steel storage tank. The chlorinated paraffin oil is used to lubricate steel product as it undergoes the elongation process. The oil is pumped to the "dirty" oil tank, filtered, and pumped to a "clean" 4,000 gallon oil storage tank. This filtered oil is then returned to the pilger mill for reuse in the milling operation. The "dirty" oil tank is pumped out approximately every six months for off-site reclamation.

No evidence of a release from the waste oil storage tank nor documentation thereof was identified.

5.4.7.4 <u>Annealing (SWMU Nº 12D)</u>. A six thousand gallon oil tank is utilized to store quench oils used in the annealing process. The oil is used to cool the steels after exiting the annealing ovens. The tank is constructed of bare steel with secondary containment located aboveground south of the Anneal Building (Tank T16 on Drawings 10 and 11).

There was no evidence of a release from the quench oil storage tank nor documentation of a spill.

5.4.7.5 <u>Central Waste Oil Storage Tank (SWMU Nº 12E)</u>. Transfer of oil from containers collected at the various accumulation areas into the central storage tank, located south of Annealing, is carefully monitored. Level measurements taken before and after the transfer protect against overfill and possible spills. No evidence of a release from the waste oil storage tank nor documentation thereof was identified. This central waste oil storage tank is provided with secondary containment.

5.4.7.6 <u>Forge Press Oil Storage Tank (SWMU Nº 12F)</u>. The forge press operation is conducted in the south end of the Forge Press/Grinding Building. The forge press operation uses hydraulic oil to exert a compressive force on the heated steel which is forced through open or closed die. The oil is recycled within five (5) hydraulic oil tanks for reuse. The five (5) storage/recycling tanks include two (2) 1,500 gallon hydraulic tanks and three (3) 1,000 gallon AW-68 hydraulic oil tanks. A 4,000 gallon tank is utilized to store waste oil from press leakage which is collected under the Forge Press. All tanks are located inside the building and are equipped with secondary containment. There was some staining of concrete around the secondary containment, but the oils are not believed to have penetrated the concrete (i.e. through cracks). The integrity of the concrete area beneath the press is uncertain.

5.4.8.1 <u>**Hazardous Waste Accumulation Areas (SWMU Nº 13A)**</u>. Hazardous wastes generated on-site are accumulated in the southeast corner of Building 11 adjacent to the drum crushing station. The accumulation area is designated strictly for hazardous wastes. Accumulated wastes are removed by a licensed transporter on a regular basis so that no waste containers are accumulated for more than 90 days. A written management plan designates procedures for hazardous waste accumulation, handling, transport and disposal.

The accumulation area is located indoors, on a concrete floor. No obvious cracks or floor drains are present in the floor, however, no diking is provided to control spilled fluids from spreading throughout the building.

Wastes accumulated in the area include oil-contaminated acids, spill clean-up residuals, chrome or nickel contaminated sludges from pickle tank cleaning, PCB-contaminated material, expired chemicals and spent cleaning solvents. The quantity of wastes accumulated is up to 40, 55-gallon drums.

To date, no reportable spills or releases have occurred in this area, however, signs of spills (staining on the floor) were evident during previous site inspections.

5.4.8.2 <u>**Used Acid (SWMU Nºs 13B and 13C)**</u>. Hydrochloric and nitric acids used in etching processes are accumulated in 55 and 30 gallon containers adjacent to the Thompson Room where etching is conducted. The drums are periodically transported to the Pickle House, where the acids are reused in the wastewater treatment/neutralization system.

No longer done

The two used acid accumulation areas (Thompson Room [SWMU Nº 13B] and Pickle House [SWMU Nº 13C]) are located inside the respective buildings, on concrete loading platforms. The flooring is free from cracks and drains. A chain is used to segregate the drums from traffic ways in the Thompson Room storage area. Acids spilled in the Pickle House are directed to the waste acid pits. Container management and acid spill response activities are designated by written procedures referenced in the facility's BMP Plan.

Acids are corrosive and will burn if contacted with skin. The free liquid, if spilled, will travel readily into the soil and surface water. Heavy metals, potentially contained within this waste product are the contaminants of concern.

No releases are known to have occurred in these two storage areas.

5.4.9 Calow (SWMU Nº 14)

Coolant used with the Calow turning process is treated to remove oily contaminants. The process includes a storage/holding tank, a settling tank with a surface skimming device and ancillary piping, valves and pumps. Treated coolant is recycled to the Calow unit. Oil, skimmed from the surface of the settling tank, is collected in a 100 gallon tank with secondary containment located along the outer east wall of bar finishing. This oil is later transferred to the central waste oil storage tank. Minor staining was observed on the concrete surrounding the tank. Contaminants of concern are essentially waste oil, metals, and possibly halogenated non-purgeable organics. Based on field observations, the extent of releases from this unit is minimal. Vertical migration of contaminants would be hampered due to the concrete. Storm drains in the area are directed to the API oil/water separator.

The Calow oil removal unit is located in the Finishing Department on a concrete floor. A concrete dike surrounds the unit, preventing any leakage or spillage from escaping the building. Collection and transport of waste oil is controlled by a written management plan.

No signs of oil spills or releases were evident during past inspections. No significant spills have been reported from the Calow oil storage area.

5.4.10 Wastewater Treatment Plant (SWMU Nº 15)

The wastewater treatment plant is located just north of the extrusion building pickle facility and was installed in 1972. The treatment plant is used exclusively for the treatment of leachate and process wastewaters generated at the facility. The types of wastes treated include landfill leachate, waste pickling acids, boiler condensate and pickling process rinse waters. Treatment processes conducted at the treatment plant include chromium reduction, chemical neutralization, precipitation, settling and sludge dewatering (Drawing Nº 20). There are several collection pits and fluid transport pipes associated with these treatment processes (i.e., chromium reduction pit and leachate collection pit). The treated effluent from the treatment plant combines with the melt shop contact and non-contact cooling water discharge and stormwater runoff and is discharged into the Kromma Kill.

The effluent from the treatment plant is regulated in accordance with AL Tech's SPDES permit (#NY000-7081). The parameters regulated include flow, total suspended solids, oil and grease, several heavy metals, ammonia nitrogen and methylene chloride. The discharge from the treatment system has exceeded the limits for several heavy metals and total suspended solids on numerous occasions. Oil and grease has also been discharged, but usually within acceptable limits.

There have been reported releases at the wastewater treatment plant. The landfill leachate collection pit at the chromium reduction building is filled manually from the holding tanks located at the landfill. This pit has overflowed allowing the release of liquids containing chromium and other metals.

The chromium reduction pit is used in the process of reducing chrome within the landfill leachate from a hexavalent state to a trivalent state. Lime and metabisulfite are added to the leachate as precipitators followed by the addition of waste acid which acts as a neutralizer. The chromium reduction pit located east of the waste acid pit, is approximately 8 ft. x 10 ft. x 15 ft. in depth. The pit is constructed of acid brick and bituminum-coated concrete walls 24 inches thick. The exterior walls of this pit are believed to be in direct contact with the local groundwater. The integrity of this system is unknown.

The Kromma Kill presents the nearest and most accessible receptor for releases occurring at the waste treatment facility. Overflows from the leachate collection pit, or residual contaminants adsorbed on the soil transported by stormwater runoff could flow to any of several storm drains nearby that discharge to the Kromma Kill Creek. Treated water that may exceed the SPDES limitations are discharged directly to the Kromma Kill Creek. It is possible that groundwater could also be impacted by spilled fluids or leakage from the chromium reduction pit. If so, contaminants could be transported with the groundwater, which flows generally toward the east. There are no direct groundwater users in the vicinity of the facility.

5.4.11 Process Discharge Piping (SWMU № 16)

Fluid discharge piping systems associated with various process units located throughout the facility collectively comprise a SWMU. Most piping systems being considered in this SWMU currently discharge into the recently constructed API oil/water separator. Prior to construction of the API separator, these piping systems discharged into the Kromma Kill, either directly or indirectly, via outfalls 6 through 11. Portions of these piping systems have been disconnected and remain intact, although no process wastes are handled in the disconnected sections.

The fluids discharged to the API separator include contact cooling water and non-contact cooling water. Contact cooling water sources include the Anneal and Caster building quench tank wastewaters; the Rolling (sic) Mill's hammer furnace spray down wastewater; the Hydromation building's process water oil skimmer effluent (see discussion of SWMU Nº 10); the Consutrode (VAR) building's sump drain; and the Extrusion building's Selas furnace and extrusion press spray down wastewater and hydrostatic test effluent. Non-contact cooling water sources include the Press Shop furnace, Melt Shop furnace, and Extrusion's Pilger Mill.

The cooling water applications listed above do not require chemical additives, therefore, the potential contaminants of concern with regards to the SWMU are limited to oils and metal particulates that may have been introduced into the waters from contact with product or machine surfaces. If present in the wastewaters, metal particulates, which could contain toxic compounds of chromium, nickel or other metals, could deposit in low points, crevices, or bends in the piping, or could be transported to the API separator as suspended solids or dissolved ions. Contaminants that enter the separator would either deposit into the sludge or discharge into the Kromma Kill. Characterization of the wastewaters, particularly the near neutral pH, are not expected to be conducive to dissolution of metal ions. Oils that may be present in the fluid discharge piping and are transported to the API separator will be skimmed and collected, therefore, present minimal concern. Broken or leaking piping presents a potential pathway for dissolved metal or suspended metals and oils to enter the surrounding soil and/or groundwater. The concern related to release of oils via this pathway is minimal, since the magnitude of any releases is miniscule relative to the existing oil contamination beneath the site. Affected groundwater could mobilize dissolved metals, although, as discussed above, metal dissolution rate is expected to be very slow. Suspended metal particulates are expected to be filtered out by and trapped in the soil medium.

Additional piping systems included in this SWMU include landfill leachate, chromium reduction, spent acid, and buried pickling process acid piping.

6.0 AREAS OF CONCERN

There are a total of eleven areas of concern (AOC) at AL Tech's Specialty Steel facility in Watervliet, New York. These AOC's are listed in Table 6-1 and are located in Drawing Nº 13. For purposes of this section which describes these areas, an AOC is defined as follows: an area of the facility or an off-site area which is not at this time known to be a SWMU where hazardous waste and/or hazardous waste constituents are present or suspected to be present as a result of a release from the facility. AOC's shall include areas of potential or suspected contamination as well as actual contamination.

6.1 Capacitors/Transformers (AOC Nº 1)

All electrical transformers on-site have been tested for the presence of polychlorinated biphenyls (PCBs). Currently, 10 PCB transformers (>500ppm) and 25 PCB-contaminated transformers (50ppm-500ppm) remain on-site. Figure 6-1 provides the approximate locations of the capacitors and transformers currently on-site.

AL Tech is currently engaged in a program that will eventually retrofill the remaining PCB-containing units. Until retrofilling is completed on all transformers, the concern for a potential release of PCBs to the environment are addressed by appropriate transformer management practices. Such practices include installation/construction of secondary fluid containment, regular inspection of the units for leakage, and prompt containment and repair of any identified leaks. These practices are addressed in AL Tech's Best Management Plan.

PCBs affinity for soil phase minimizes the possibility that PCBs released to the soil will contaminate the groundwater or surface water. Transport of contaminated surface soils via storm runoff or high winds could occur. The ultimate off-site receptor of stormwater transported PCBs is the Kromma Kill. Deposition could also occur in storm drainage as dictated by prevailing winds, which occur from the north in winter and from the

Table 6-1

AOC INVENTORY

AL Tech Specialty Steel
Watervliet, New York

I.D. No.	Identification	Suspected Contaminants	Description/ (Period of Operation)
1	Capacitors/transformers	PCB's, oils	Releases from the various units facility-wide. *(1950-)*
2	Portable wastewater sludge roll-offs	Hexavalent chrome	Spilled LNWPLS in roll-off storage area. *(1972-)*
3	Former coal storage	Base neutral extractable aromatic hydrocarbon compounds	Former location of stock-piled coal for firing furnaces. *(1920-1938)*
4	Process pits	Oils, metals, PCB's	Potential releases from units facility-wide. *(1930's-)*
5	Kromma Kill Creek	Oils, metals, PCB's, sewage	Receiving stream of various contaminant sources including the landfill, capacitors, fuel oil contaminated groundwater, septic tanks, etc. *(1907-)*
6	Oiled roads	PCB's, aromatic and halogenated compounds	Oil laid on roads as a means of dust control. *(1940-1972)*
7	Cooling towers	Coolants, oils	Overspray releases from cooling towers and potential release from UST's associated with the cooling tower system. *(1951-)*
8	Septic tanks	Sewage, oils, metals, aromatic and halogenated compounds	Discharge of sanitary sewage to Kromma Kill Creek and dry wells. *(1940-1973)*
9	Extrusion Pickling Facility and Thompson Etch Room	Metals, acids, caustics	Lined concrete pits containing process tanks. *(1951-; 1920-1951)*
10	Closed Underground Storage Tanks	Oils, gasoline	Closed UST's. *(1940-1988)*
11	Fuel Oil Storage and Distribution	Fuel oil	300,000 gallon fuel oil tank and piping system for furnace/boilers facility-wide. *(1937-1991)*

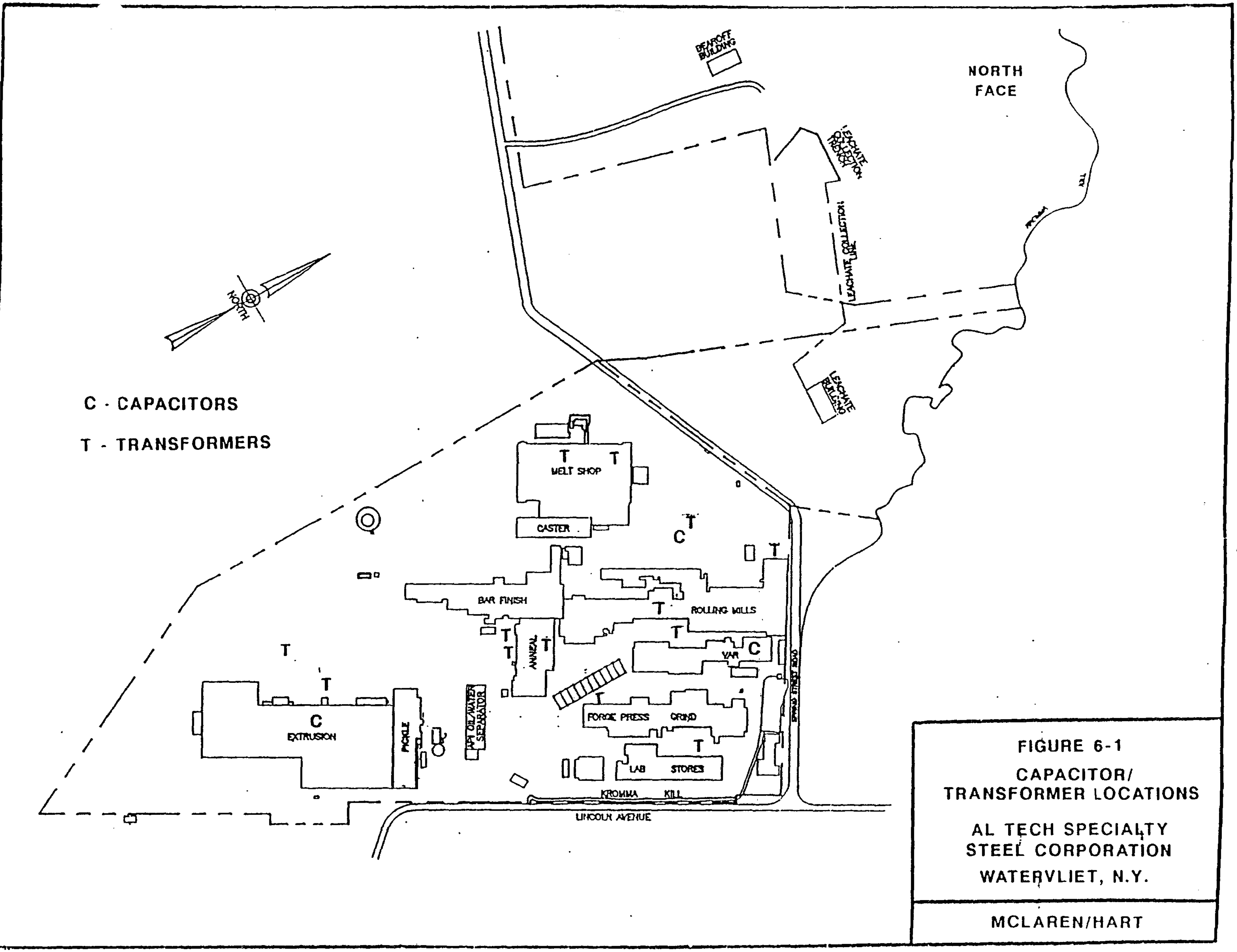


FIGURE 6-1
CAPACITOR/ TRANSFORMER LOCATIONS
AL TECH SPECIALTY STEEL CORPORATION
WATERVLIET, N.Y.

MCLAREN/HART

south/southwest in spring, summer and fall. The nearest residential receptors are located on the north side of the Spring Street Road, approximately 100 feet north of the AL Tech property line, and in the vicinity of First Street, approximately one-quarter mile south/southeast of the facility.

Possible releases of PCBs in the past from leaking or damaged transformers and capacitors present concerns. PCB-containing devices (capacitors) are known to have sustained enough damage to cause releases of dielectric fluid to a culvert on-site. (Refer to Section 5 for details concerning this incident.) A transformer located in the area known as the courtyard of the Rolling Mill building sustained major damage during failure and a subsequent fire in 1988. Soil samples were collected around the concrete pad and analyzed for PCBs, dioxins and dibenzofurans. Limited contamination was noted at this location.

In a previous site assessment oil staining was noted in the vicinity of certain transformers raising concerns that there may have been PCB releases to soil in the past. Inventory, labelling, repair and storage inadequacies were noted during this previous study. AL Tech has corrected these inadequacies since they were brought to their attention, however, these past management deficiencies substantiates concerns regarding potential PCB releases in the past.

6.2 Portable Wastewater Sludge Roll-Offs (AOC Nº 2)

Lime neutralized waste pickle liquor sludge (LNWPLS) is collected from the dewatering press in metal roll-offs and staged outside the sludge processing building to await pick-up for disposal. Presently, disposal is performed off-site at a hazardous waste landfill. Prior to the LNWPLS being designated a hazardous waste (via TCLP testing), the sludge was picked up and transported by AL Tech trucks for disposal at the landfill on-site. The waste is comprised of dewatered settled sludge from the wastewater treatment plant (see discussion in Section 5) and may contain elevated levels of TCLP leachable chrome.

Spills of the sludge during transfer from roll-off to truck is not uncommon and has occurred in the past as evidenced by a spill that was reported to the NYSDEC on April 30, 1990 (see Section 7). The consistency of the sludge, a dried cake, allows spilled material to be readily recovered, however, when contacted with water the sludge may mobilize and enter the environment through surface run-off. This property of the waste raises concerns that spill residues or material spilled during a rain event could be transported by surface runoff to the Kromma Kill.

6.3 Former Coal Storage (AOC № 3)

Until 1930-1940 large quantities of coal for use in firing furnaces was stockpiled south of the VAR Shop. Visual inspection of the area indicates that stockpiling of this material no longer exists. The coal was stored uncovered, outdoors on the bare earth and may have released base neutral extractable aromatic hydrocarbon compounds into the soil, surface waters and/or groundwater. While the potential for such contamination exists, the extent and concentration of such contamination is anticipated to be relatively minor. Actual delineation of contaminants in this area could be difficult and relatively insignificant in light of the established larger scale and similar contaminant problem associated with confirmed fuel oil contamination on-site.

6.4 Process Pits Containing Liquids (AOC № 4)

Numerous subsurface liquid containment pits constructed from concrete are located throughout the facility. These pits are generally below grade concrete structures which collect and recirculate coolants and lubricants. These pits may allow leakage to the surrounding soil through cracks in the concrete, unsealed seams and the semi-porous concrete walls. The liquids stored in the process pits may contain emulsified oils, chemical coolant residuals, chlorinated hydrocarbons and other contaminants. Historical records do not indicate whether spills or leaks have occurred at the pits. Visual inspections of these units were inconclusive since the collected liquids are below grade. If releases have occurred at sometime during operations, it is possible that soils, and to a lesser extent groundwater, in the vicinity of these process pits have been impacted. Any impact to groundwater could result in transport of contaminants. Groundwater has been shown to be moving toward the east. No groundwater users are known to be present in the vicinity of the facility.

6.5 Kromma Kill Creek (AOC № 5)

Numerous unpermitted releases to the Kromma Kill from various sources at the facility have been documented (see Sections 6 and 7). The potential primary contaminants of concern and sources include hexavalent chrome from landfill leachate, PCBs, fuel oil from the contaminated groundwater, waste lubricating oil from process wastewater, and metals from the waste water treatment plant. Each of these sources is being or has been addressed to prevent future releases, however, contaminants may have accumulated in the sediments and soils that form the bed and banks of the creek.

A limited sampling program of Kromma Kill sediments was conducted in 1989. The survey evaluated TPH and PCB concentrations in stream sediments at six locations from upgradient of the landfill to outfall 008, where the Kromma Kill departs from the AL Tech plant property. TPH was detected in concentrations ranging from 18-456 parts per million (ppm). No detectable PCB concentrations were identified.

It should also be noted that, based upon soil removed from excavations in the northeast quadrant of the site, it is suspected that the previous course of the Kromma Kill followed an approximate line between the Kromma Kill culvert beneath the Spring Street Road and the area which is currently referred to as AL Tech's south gate. The Kromma Kill is believed to have provided the source of water for steel making operations as well as the means of discharging liquid process wastes.

6.6 Facility Roads Oiled for Dust Control (AOC Nº 6)

In the past, until the mid 1970's, oils collected from on-site operations were applied as a means of controlling dust rising from the facility's vehicular roadways. Based on historical documentation it appears that most of the roadways that could have been oiled are located in similar locations to those roadways which exist today. This common method of dust control was ultimately prohibited by the NYSDEC. Since considerable oil contamination of the site's groundwater has already been established, the relatively minor amounts of oil involved in dust control with respect to petroleum hydrocarbons should be of little concern. Since the exact origin of these waste oils is uncertain, however, it is possible that they could have contained PCBs or halogenated aromatic compounds thus increasing the level of concern. While any PCBs would likely be contained within relatively shallow soils, any halogenated compounds could have readily migrated to groundwater and possibly the Kromma Kill.

6.7 Cooling Towers Containing Liquids (AOC Nºs 7A and 7B)

There are several cooling towers located at the AL Tech Watervliet facility. Two large aboveground towers, associated with the Extrusion process and the continuous steel casting operation, are of prime concern.

The type of chemical additives associated with these towers varies somewhat. Additives such as fungicides, herbicides and corrosion inhibitors are introduced into the systems to control bacterial growth and aggressiveness of the process waters. Two underground tanks, believed to be manifolded (12,800 gallons total capacity), add to the holding capacity of the extrusion system. The continuous casting cooling tower (aboveground tank inside building) is used to temporarily store cooling waters from the casting operation. The water is collected in concrete sumps located to the south of the building. Water is pumped into the tank for return to the continuous caster for reuse after cooling.

Historical records do not indicate whether spills or leaks have occurred at these cooling towers. Visual inspections of the towers were inconclusive since the liquid is generally colorless and staining is difficult to ascertain. The integrity of the extrusion UST's and caster sumps are unknown. Despite the absence of spill documentation there remains the potential that soils and groundwater, in the vicinity of these towers/UST's could contain metal compounds and fungicides as a result of overflow and overspray, or leakage. Any contaminants in the groundwater would be transported by the groundwater which has been shown to be moving in an easterly direction. No users of groundwater are known to be present in the vicinity.

6.8 Septic Tanks (AOC Nº 8)

There were ten septic tanks utilized at the Watervliet facility that were used to collect sanitary sewage. Seven tanks discharged to the Kromma Kill Creek at six separate locations and three tanks acted as dry wells. These locations are identified on Drawing Nº 4. Most of the septic tanks were disconnected during the early 1970's. The few tanks that many remain in service are connected to the city sanitary system.

The septic tanks have been used for the collection of sanitary wastes generated at the restrooms at several locations around the facility. Sanitary wastes are the only known wastes discharged to these systems.

Historical records reviewed do not indicate that improper disposal has occurred. Visual observations of restroom facilities were inconclusive but the facilities did not have empty chemical containers or stained fixtures.

6.9 Extrusion Pickling Facility and Thompson Etch Room (AOC Nºs 9A and 9B)

The pickling process which occurs within the Extrusion Building (AOC 9A) and formerly in the Thompson Etch Room (AOC 9B) involves dipping of bar stock into various acid and rinse tanks. There have been known releases of pickling acids from these process tanks which are typically contained within lined concrete sumps located beneath these tanks (Drawing Nºs 21, 22 and 23--former Etch Room tank not shown). The Extrusion tanks have been periodically replaced over the years of AL Tech's operations. Inspection of the sumps during tank replacements have revealed, on occasion, that spilled acids from these tanks have breached the containment sumps. These sumps have been repaired via concrete filling.

Concerns associated with these releases are essentially limited to heavy metal contamination and pH impacts. No subsurface investigations focusing specifically on this issue have been conducted to date. Migration pathways of concern are primarily limited to direct releases to soil potentially leading to impacts on groundwater. Contaminants in the groundwater would be transported with the groundwater, which flows in an easterly direction. No users of groundwater are known to be present in the vicinity.

6.10 Closed Underground Storage Tanks (AOC Nºs 10A - 10C)

AL Tech reports that there are nine (9) bare steel underground storage tanks, formerly used to store fuel oil, anneal oil (concrete and steel construction) and gasoline. The 6,000 gallon gasoline tank was removed in 1981 (AOC Nº 10A), the 1,000 gallon anneal oil tank was closed in place in 1988 (AOC Nº 10B), and the remaining seven (7) fuel oil tanks were closed in place in 1987 (AOC Nº 10C). One (1) tank is located southeast of the Main Office, one (1) near the Anneal Building and seven (7) in a cluster southwest of the North Gate.

The eight tanks that remain in-place were reportedly filled with a concrete slurry as part of closure and therefore, should pose no threat to cause contamination in the future. However, the tanks are suspected of having leaked prior to closure. An investigation conducted by HART in 1989 confirmed that contamination is present in the soil and groundwater in the vicinity of the seven tank cluster. Petroleum hydrocarbons were identified in twelve out of fourteen soil samples (12 to 3,480 ppm TPH), and in one monitoring well (1.1 ppm TPH). No sampling was conducted near the two separate tanks.

The contamination is not known to have caused any off-site impact and is expected to be minor relative to the larger fuel oil release described below. Any groundwater contamination will be transported to the east, the established direction of groundwater flow. No groundwater users are known to be present in the vicinity.

6.11 Fuel Oil Storage and Distribution (AOC Nº 11)

AL Tech utilized a 300,000 gallon aboveground steel tank for the storage of fuel oil once used in boilers and furnaces throughout the facility. The tank, installed in the 1940's, is located on the western edge of the plant on a steep slope cut. Oil was piped to the tank from a pumphouse located at the bottom of the slope, where a fuel truck dispensing station is located. Prior to installation of the current pumping facility, the oil was delivered to a pumping facility located near the main gate.

In 1988, during an investigation of potential sources of oil contamination at Outfall 008, test pits were dug revealing a significant free petroleum product layer floating on the groundwater surface. Subsequent groundwater observation, via monitoring wells, established that an area approximately 11 acres in size was contaminated. A recovery well was installed in 1989. This well continues to remove fuel oil from the groundwater. According to an AL Tech report, over 11,000 gallons had been recovered as of August, 1990. This oil is transported to furnaces on-site as a fuel source. AL Tech attributes the release to leaks in the original oil supply pipelines, the main tank, and closed buried tanks.

On-going monitoring indicates that the oil plume is migrating to the southeast with local groundwater flow. Oil has appeared at Outfall 008 and along the banks of the Kromma Kill, prompting DEC recommendations for remediation measures to be put in place in addition to the existing recovery well.

A study performed by Hazard Evaluations in 1989 determined that the greatest concentration of oil was in observation wells OW-1 and OW-2 and in recovery well RW-2, located between the Rolling Mill and Outfall 008. This study also confirmed that the free product layer was comprised of fuel oil. Gasoline, kerosene and lube oil were not detected.

A study conducted by HART in 1989, in the vicinity of the 300,000 gallon tank and the pump house found elevated levels of petroleum hydrocarbons (116 to 3,920 ppm) in the soil. Also, groundwater near the active pump house was found to contain detectable levels of semi-volatile compounds (the compounds detected can be correlated with fuel oil constituents) and 18 ppm total petroleum hydrocarbons.

7.0 SPILL INCIDENTS

The following is a summary of reportable and non-reportable spill incidents as revealed through review of records filed with the New York State Department of Environmental Conservation (NYSDEC) and AL Tech. Reportable incidents discussed herein are based on the definition(s) presented under NYCRR Part 613.8 (petroleum), USEPA CERCLA, 40 CFR Part 312--SARA, Part 372--RCRA, and 49 CFR Part 371--DOT (hazardous materials). Where applicable, the spill incidents are addressed in the SWMU or AOC sections of this report (sections 5 and 6).

7.1 Liquid/Solid Waste Releases

- On March 16, 1983 AL Tech's landfill leachate collection pond overflowed into the Kromma Kill. The condition was caused by an abnormal stormwater runoff during a 3-day rain/snow storm. The overflow lasted 2.5 hours and resulted in release of an unknown quantity of hexavalent chromium into the stream. AL Tech modified the overflow piping to stop the release and placed the wastewater treatment plant on 24-hour operation to reduce freeboard in the pond. The incident was reported to the Albany County Health Department.

- On February 20, 1984 a NYSDEC inspector reported a heavy sheen of oil at AL Tech's outfalls 7 and 8. NYSDEC assigned the release spill Nº 8302353. The source of the spill was later identified as a leaking four (4) inch line from AL Tech's 300,000 gallon fuel oil storage tank. An estimated 6,000 gallons of #2 fuel oil spilled into the Kromma Kill due to the leak. AL Tech repaired the leaking pipe and installed an oil/water separator on the outfall to collect remaining spilled product prior to its reaching the Kromma Kill.

- On October 11, 1984 a pickling house sling broke dropping three bundles of shapes into the nitric-hydrofluoric and pickle tank. The bundles could not be retrieved, thereby allowing excessive reaction time between the steel and acid and the creation of a brown fume cloud in the pickling room. As a result, the pickle tank was drained and fumes were dampened with a spray of water. The Albany County Health Department and Schuylerville Fire Department were notified and assisted in the incident response.

- On July 30, 1986 a valve malfunction led to the release of 500 to 1000 gallons of calcium oxide (quick lime), causing a minor discoloration of the Kromma Kill. The spill was reported to the NYSDEC who assigned the incident spill No. 8602813. The valve was subsequently repaired. No further action was requested by the NYSDEC. This material is non-hazardous, therefore, EPA hazardous material release reporting requirements did not apply.

- On March 12, 1987 a leaking valve on a hydrofluoric acid storage tank resulted in a release of approximately 50 gallons of acid. The spill was reported to the NYSDEC, who assigned the incident spill No. 8607550. The spilled acid was contained in the immediate area and neutralized with lime. Spill clean up refuse was treated on site in the waste water treatment plant. The HF acid tank was emptied into the secondary containment and the valve repaired. The NYSDEC concurred with actions taken and required no further action. Since this spill was completely contained within the facility, no additional emergency notifications were made.

- On March 26, 1987 a steel dust fire occurred. Water was used to extinguish the blaze. AL Tech reported the spill of water contaminated with steel fines to the NYSDEC who assigned the incident spill No. 8700025. The NYSDEC required no further action regarding this incident since no impact to the environment was evidenced.

- On May 19, 1987 an unknown quantity of petroleum was released into the Kromma Kill. The oil had apparently been released from an oil/water separator unit. The spill was reported to the NYSDEC, who assigned the incident spill No. 8701474. AL Tech placed an oil absorbent boom over the release area. This incident was recorded as a violation of AL Tech's SPDES permit, and contributed to the eventual installation of a larger on-site oil/water separator system.

- On July 30, 1987 a broken underground pipeline resulted in the release of an unknown quantity of pickling acids to the soil, and possibly, the groundwater. The spill was reported to the NYSDEC, who assigned the incident spill No. 8703527. Flow in the pipe was diverted to another pipe and the leak repaired. AL Tech determined that the leak had not caused any significant impact to the environment and that the quantity of acid released was less than the federal reportable quantity.

- On November 11, 1987 approximately one (1) cubic yard of KO61 emission control dust (hazardous) was spilled to the ground during cleanout of the Melt Shop baghouse. The spill was reported to the NYSDEC who assigned the incident spill No. 8706824. The spill area was barricaded to prevent the spread of dust. An environmental contractor vacuumed the dust up and transported the spill refuse to a TSDF. The NYSDEC inspected the area and noted that the dust had not reached any waterways. AL Tech reported no injuries or environmental impact due to the incident, and determined that federal reporting was not required.

- On April 13, 1988 an unknown amount of fugitive oil/tramp oil/fuel oil was being discharged into the Kromma Kill, exceeding the capacity of absorbent booms placed on the water to contain and collect the oil. The spill was reported to the NYSDEC, who assigned the incident spill No. 8800821. The source of the release was determined to be contaminated plant process water, for which an oil/water separator has since been constructed. The investigation of the source of the oil led to the discovery of extensive groundwater contamination. (See spill #8807945 below and further discussion in Section 7).

- On December 6, 1988 a test pit excavation performed as part of an investigation related to the continual oil discharges into the Kromma Kill revealed free product floating on groundwater beneath the site. The spill was reported to the NYSDEC who assigned the incident spill No. 8801945. The source of the contamination was determined to be leaking pipelines associated with delivery of fuel oil from a 300,000 gallon aboveground storage tank located on site. A recovery well has been installed (operational since February 1989) to recover the spilled oil.

- On April 26, 1989 the Albany County Health Department reported to the NYSDEC that an unknown quantity of fuel oil from the AL Tech facility had entered its sewer lines. NYSDEC assigned the incident spill No. 8902249. An investigation determined that a loose sewer pipe fitting was allowing leakage of oil-contaminated groundwater from beneath the AL Tech site into the sewer system. The pipe was sealed to cease seepage. Actions needed to prevent a recurrence of such an incident (i.e.; removal of the oil source) are included in the site cleanup being conducted in response to spill No. 8801945 as discussed above.

- On May 31, 1989 an unknown quantity of waste oil was released from outfall 003 into AL Tech's pond, which is a part of the Kromma Kill. The spill was reported to the NYSDEC who assigned the incident spill No. 8902248. AL Tech raised the gate on their dam (outlet of pond) to prevent any carry over into the Kromma Kill. Oil absorbent booms were deployed in the pond and on the Kromma Kill to contain and collect the oil. An environmental contractor was retained to complete the cleanup and dispose of the spill refuse. The NYSDEC determined that no additional response was needed.
- On January 25, 1990 a release of pickling liquor (4% hydrofluoric acid/20% nitric acid) from pickling tank #10 was discovered. The spill was reported to the NYSDEC, who assigned the incident spill No. 8910736. Investigation by AL Tech determined that up to 5900 gallons of acid mixture had leaked from the tank, but had all been contained in the secondary containment sump surrounding the brick-lined vessel. Two holes discovered in the tank were plugged, the affected area relined with acid brick, and the tank returned to service. Since no release to the environment occurred, this was a non-reportable incident, however, AL Tech assured the NYSDEC that they would report all spills that present a potential threat to human health or the environment to the appropriate regulatory agency(s).
- On April 28, 1990 a truck transporting metals along Spring Street Road to the AL Tech landfill tipped over resulting in a spill of approximately three (3) gallons of fuel oil. The spill was discovered by a NYSDEC representative on-site at the time for an unrelated matter. NYSDEC assigned the incident spill No. 9001542. AL Tech had placed an oil absorbent boom around the spilled oil, but had not considered the small spill significant enough to report. No further action was required by the NYSDEC.

• On April 30, 1990 a tank was overfilled during the transfer of stabilized waste water treatment plant sludge (lime neutralized waste pickle liquor sludge) causing release to the ground of 188 gallons of material. The spill was reported to the NYSDEC, who assigned the incident spill No. 9001186. The sludge, a non-hazardous dried cake material, presented no threat to the environment and did not require notification of federal authorities. The spilled material was manually transferred from the ground into the sludge container for ultimate disposal.

7.2 Air Releases

• On April 27, 1989 a yellow-brown cloud was observed emanating from the pickle house. The cloud dispersed after approximately 20 minutes. No on-site or off-site injuries were reported as a result of the gaseous release. The NYSDEC Region 4 Air Quality Division was informed of the incident. No formal release report was filed. The source of the cloud was found to be an accidental mixing of nitric and sulfuric acids. The release was determined to be less than the federal reportable quantity of the two acids, therefore, no EPA notifications were made.

8.0 SUMMARY OF REGULATORY ENFORCEMENT ACTIONS

State and Federal agencies regulate activities at the AL Tech facility through various permits. Regulatory agency enforcement actions or violations related to these permits, discussed below, are based on information supplied through agency file reviews.

8.1 SPDES

AL Tech discharges treated wastewater, non-contact cooling water, and stormwater run-off from the site grounds into the Kromma Kill via various outfalls located on the facility. Discharge of these waters into the Kromma Kill is regulated by the NYSDEC via State Pollution Discharge Elimination (SPDES) permit No.0007081, issued in 1975. The Kromma Kill, a class D stream (fish survival, no drinking or bathing), eventually discharges into the Hudson River. The following is a summary.

- In October 1979 an inspection by NYSDEC noted that landfill leachate was being pumped to the Kromma Kill from a holding pond. This was recorded as a violation of the site's SPDES permit.

- In November 1980 a high level of chromium was reported in the wastewater treatment plant effluent. No further information was available.

- A Notice of Non-compliance was issued to AL Tech in April 1983 for excessive concentrations of hexavalent chromium at an outfall.

- In June 1983 US EPA issued the NYSDEC a Notice of Violation of the Clean Water Act regarding violations of AL Tech's SPDES permit terms. This notification identified 45 instances in 1981 and 1982 regarding exceedances of permit limitations for chromium, nickel, iron, TSS, oil & grease and pH, and requested that NYSDEC take enforcement actions with AL Tech. No further information was available.

- In March 1984 the Atlantic States Legal Foundation brought a civil suit against AL Tech for violations of their SPDES permit. The lawsuit, eventually settled in March 1988, specified discharge exceedances on oil & grease, TSS, nickel, iron, chrome, arsenic, ammonia, chloroform and pH from 1983 - 1987. AL Tech was fined $30,000.
- In January 1987 the NYSDEC informed AL Tech that permit exceedances for TSS, zinc, iron, and chloroform would result in a meeting to discuss necessary enforcement actions, however, satisfactory corrective action was taken by AL Tech and no enforcement actions were required.
- In June 1986 AL Tech was notified of two incidences discovered by NYSDEC regarding oil released into the water at Outfall 8.
- In July 1987, citing incidences of excessive discharge of oil in October and December, 1986 and February, March, and May, 1987 the NYSDEC issued AL Tech a Notice of Violation.
- In October, 1988 extensive underground oil contamination was discovered and determined to be the cause of the persistent oil discharges from the plant into the creek.
- In December, 1989 Consent Orders were entered into by AL Tech and NYSDEC specifying the construction of a new waste water treatment plant and an oil/water separator at Outfall 8.
- Since 1988 AL Tech has been required to conduct annual biological toxicity testing of their wastewater as a condition of their SPDES permit. AL Tech has exceeded toxicity limitations since testing began.
- In November, 1990 the Consent Orders were updated and AL Tech was instructed by the NYSDEC to resolve a condition of excessive ammonia in the plant effluent.

8.2 RCRA

Hazardous waste activities at AL Tech are regulated by the NYSDEC and USEPA under hazardous waste permit No. NYD060545209. Hazardous wastes generated or managed as such on site include electric arc furnace (EAF) dust, lime neutralized waste pickling liquor sludge (LNWPLS), spent pickling liquor (acids), and landfill leachate. Hazardous wastes treated on site include the landfill leachate and waste pickling liquor. The LNWPLS was not considered a hazardous waste until September 1990 when RCRA instituted Toxic Characteristics Leachate Procedure (TCLP) test, which redefined a hazardous waste. Previously, LNWPLS was disposed on site, in the landfill.

- In October 1985 the NYSDEC listed AL Tech on its Inactive Hazardous Waste Disposal Site directory, assigning it site code No. 4-01-003. According to the NYSDEC site summaries, landfill leachate containing hexavalent chromium is contaminating surface and groundwater. The leachate is being collected and treated on site. As part of the site evaluation, groundwater data is being collected from nine (9) monitoring wells located on site. To date, no Phase 2 remedial program has been required by the NYSDEC. Closure of the landfill is expected in the near future.

- Annual RCRA inspections conducted by the NYSDEC from 1984 - 1989 resulted in limited violations that were corrected by the facility. The 1990 inspection resulted in a more extensive list of violations. To date, the NYSDEC has sought no enforcement actions against AL Tech regarding RCRA hazardous waste management regulations.

• In conjunction with its manufacturing facility, AL Tech has operated a solid waste landfill on-site since approximately 1957. Waste materials deposited in the landfill include slag, metal scrap, electric arc furnace dust, wastewater treatment sludge, and demolition debris. The landfill operation was regulated by the NYSDEC under solid waste management facility permit No. 0807 until 1985 when the permit expired and was not renewed by NYSDEC. Since 1985 operation of the landfill has fallen under RCRA interim status and has been overseen by the NYSDEC Hazardous Waste Division. According to Ms. Debby Christian, NYSDEC Attorney's office, a consent order and/or enforcement action has been issued that designates terms for future operation and closure of the landfill.

An interim corrective measure has been approved by NYSDEC which addresses a slope stability problem along the north face of the landfill. The corrective measure includes fill removal, materials separation and slope regrading (3 vertical to 1 horizontal). Field activities commenced at the north face in mid September 1991 with completion projected for early 1992.

In 1979 a surface impoundment was constructed to collect the leachate seeping from the landfill. In October 1979 the Albany County Department of Health informed AL Tech that landfill leachate was entering the Kromma Kill and apparently causing discoloration of the stream. On October 24, 1979, during an inspection of the site, the NYSDEC noted that retention of leachate in the surface impoundment was a violation of Condition 9 of AL Tech's permit. In 1980 the leachate was found to contain elevated concentrations of chromium. In 1987 the leachate was classified as a hazardous waste. The surface impoundment was closed in 1988 and a new system installed to collect the leachate for treatment. Groundwater monitoring beneath the site commenced in 1982. Previous studies conducted by various engineering firms have generally concluded, based on, monitoring well data, that the landfill has had little impact on groundwater quality within the unconsolidated overburden or bedrock. More recent studies have indicated there has been a slight change in the groundwater quality.

Details concerning management of the landfill are discussed in the SWMU section of this report.

8.3 Air Permits

AL Tech operates numerous air emissions sources regulated by the NYSDEC under Certificate to Operate Nos. 012600-0546-00009 through -00026. Regular inspections of the facility's air emission sources are conducted by the NYSDEC. Any past violations generated from these compliance inspections have been promptly corrected by AL Tech. No enforcement actions have been issued to AL Tech regarding their air emissions permits.

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10.0 GLOSSARY

Alloy Steel - a steel made by adding metal elements (e.g. nickel, chromium, etc.) to the basic steel components (iron and carbon) to yield a product with enhanced physical properties (eg; strength, hardness or corrosion resistance.

Annealing - process of slow heating and cooling which removes stresses in steel.

Areas of Concern (AOC) - an area at the facility or an off-site area which is not at this time known to be a solid waste management unit (SWMU) where hazardous waste and/or hazardous waste constituents are present or suspected to be present as a result of a release from the facility. The term shall include areas of potential or suspected contamination as well as actual contamination. Such areas may require study and a determination of what, if any, corrective action may be necessary.

Argon-Oxygen Decarburization - A process whereby oxygen and argon are introduced into the molten steel to improve melting efficiency. Argon, an inert gas, is used to dilute the carbon-oxygen atmosphere. This process increases the affinity and minimizes the usage of chromium. The molten steel is stirred, promoting rapid equilibrium between the waste slag and the molten metal. The process features reduced operating time and lower temperatures compared to the arc furnace process.

Billet - an intermediate steel product formed by forging or rolling an ingot after it is taken out of the furnace.

Carbon Steel - steel that has its mechanical properties determined by the carbon content.

Charge of Steel/Charging - filling an oven or furnace with raw material(s).

Chelating Agents - a chemical which promotes the production of a type of coordination compound in which a central metal ion is attached by coordinate links to two or more nonmetal atoms in the same molecule, called ligands.

Cold Drawing - the process of drawing previously hot rolled, heat treated bars through dies that are smaller in section than the rolled cross section. The steel is stretched throughout providing a smooth surface with a reduced cross section.

Cold Finishing - processes such as rolling, straightening, machining, grinding, polishing, or drawing through dies, which impart desirable surfaces or shapes or mechanical characteristics to hot-rolled products.

Consumable Electrode Melting (Vacuum Arc Remelting--VAR) - the process of remelting the previously manufactured steel ingots to improve the purity and uniformity of the metal. The steel produced by other methods is lowered on a control rod into a vertical vacuum chamber. An electrical current is applied to the control rod which passes into the steel. When the current is turned on, the solid steel acts like a giant electrode and melts the end of the steel. The gaseous impurities are drawn off by vacuum. The remelted product, once solidified, is almost free of center porosity and has a minimal gaseous content.

Corrective Action Management Unit (CAMU) - a contaminated area comprised of several land-based SWMUs. A CAMU can not be comprised of non-land-based units such as tanks or incinerators.

Crucible - clay or graphite pot.

Drawing Lubricants - lubricants used to facilitate the drawing of steel through dies.

Electric Arc Furnace Melting - A process in which an improved steel intermediate product is formed by melting a lesser quality steel, adding alloys and removing impurities. Electric Arc Furnaces are shallow steel cylinders lined with refractory brick. The lid of the furnace is mounted on cantilevered steel beams to allow lifting and removal from the shallow steel cylinder. The cylinder is charged with solid steel scrap and steel admixtures by overhead crane. During the charging phase, lime is added to remove impurities. The lid of the furnace is pierced so three carbon or graphite electrodes can be lowered into the charged cylinder when the lid is fastened in place. Current is applied to an electrode, which arcs from the metallic charge to the next electrode thus evolving intense heat causing the steel inside to melt. Once the steel melts, it is tested for chemical concentrations (typically chromium, nickel, etc.) to verify it is within specification. Off-specification melts will require the addition of certain alloys which are stored near the furnace area. Once added, the melting process is resumed and after completion, the molten steel is retested. This process continues until the molten steel is within the desired/required specification limits.Acceptable molten steel is poured into a ladle through a tapping spout. The furnace is mounted on rockers so that it can be tilted to permit molten steel to pour through the spout. Slag waste material formed by impurities that react with lime, is removed prior to pouring. The molten steel is poured from the ladle into ingot molds. The ingot molds are made of cast iron and tapered to facilitate removal of the cooled solid steel.

__Ferrotungsten Generation__ - a process whereby tungsten ore concentrates are reduced in the presence of iron under the influence of the electric arc in small electric furnaces to generate ferrotungsten.

__Fluxing__ - a process whereby a substance is added to promote the fusion of metals by preparing the surfaces through cleaning.

__Forging Hammers__ - a process whereby steel heated to 2000° F is struck repeatedly by hammering. This process homogenizes the steel for improved pysical properties.

__Grinding__ - a cold finishing process performed to deface the product. One method for the grinding of stock is accomplished by passing the rough bar product between a work support, a regulating wheel and a grinding wheel. The process, called centerless grinding, has no centers and only straight cylindrical surfaces are effectively ground. Another method, center type grinding, creates a cylindrical surface. The stock is supported between two end pieces on centers. The piece is then rotated by power while traversing back and forth across the face of the grinding wheel which is the required distance from the center line.

Grinding wheels are typically aluminum oxide with binder, and the scrap generated may include steel grindings, grinding wheel grit, coolants and machining oils. The cutting and grinding coolants are typically water soluble petroleum based products (some of which contain halogenated organics).

__Hot Finished Steel__ - steel processed in the form of bars, plates and construction forms without cold working.

__Hot Forging__ - processes whereby forge presses use compressive force to align the liner of metal-flow in a product to maximize the strength where needed. There are two major types of hot forging; open and closed die. With open die systems, which are usually used on large products, large presses are used to squeeze the steel between two surfaces. The temperature of the parts must be maintained within a specific range, therefore frequent reheating is required.

__Hot Rolling__ - the breaking down of billets into a specified bar shape and dimension by passing the heated billet through a series of grooved rolls. Steel billets are heated to the desired temperature and introduced into mill roughing stand which rapidly reduces the steel size. Additional processes such as cleaning, straightening, heat treating and cutting is performed on the bar as required.

Hot Tops - simple insulative shells whose outside dimensions are equal to the inside dimensions of corresponding molds used in the pouring of the ingots.

Ingot - a mass of metal cast in a convenient shape for storage or transportation prior to further processing.

Parrafin Oil - an oil either pressed or dry-distilled from an aliphatic hydrocarbon (alkane) used in lubricating. Some oils have chlorine substituted for hydrogen atoms making the oil better suited for high pressure application.

Pickling - dipping processes that chemically remove metallic oxides and scales from the surface of the steel products.

Acids used during the pickling process include sulfuric, nitric and hydrofluoric, as well as acid mixtures like nitric-hydrofluoric. The dipping process used depends on the desired product specifications, i.e. descaling with sulfuric acid and whitening of the steel with nitric.

A caustic Kolene or hydride bath can also be used in the pickling process. The bath is an anhydrous molten oxidizing or reducing solution which dissolves and softens surface scale for later removal by the acid baths. The bath is primarily sodium hydroxide (kolene). Additives, such as sodium nitrate are mixed with the caustic metal oxides from the hot forming processes. Solid sludges generated from this process contain high concentrations of chromium and nickel.

A water quench\rinse tank is normally used between dip tank operations. These rinse operations remove residual acid/caustic and scale from the product, and prevents violent reactions from occurring as a result of mixing incompatible materials. The final step in the pickling process is a water dip. This final rinse removes any light contaminants prior to storage or shipment to the customer.

Pig Iron - main raw material used in the production of steel.

Quench - cooling by direct contact with water, oil or other liquid.

Rolling Mill - bars of steel are rolled into any desired size or shape. A mill is characterized by the diameter of its rolls; i.e. a 14" mill has rolls 14" in diameter.

Scrap or Steel Pigs - crude castings of steel.

Scrap Steel - steel that has been discarded, but can be re-melted.

Slag - the scum of impurities that form on the top of molten metal.

Solid Waste Management Unit (SWMU) - a SWMU according to the EPA is any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Any area of the facility at which solid waste has been routinely and systematically released.

Stainless and Heat Resisting Steels - a form of high quality steel that is highly resistent to corrosion. Corrosion resistance is enhanced through the addition of metals such as chromium and nickel. Four percent chromium is the accepted dividing line between alloy and stainless steels.

Steel - an alloy of iron containing 0.02 to 1.5% carbon. Other elements are present as impurities, or maybe added as needed to produce "specialty" or alloy steels with enhanced physical properties.

Straightening - a process whereby bars are straightened by passing through a series of rollers. The rollers are aligned depending on the bar shape (round, rectangular, hexagonal). The bar shape can become deformed as a result of mechanical stresses created during the hot forming process. Deformation usually occurs where the bar is soft or pliable (at the end or in the middle). A less severe deformation can result from cold drawing where stresses are placed on the bar beyond its elastic limit. Bar distortion caused by annealing may also require straightening.

Turning - a process used to improve the surface of a bar by removing undesirable surface defects. Turning is accomplished by passing the bar through a turning machine or lathe. One or more passes are used depending upon the amount of metal to be removed. A suitable cutting oil or coolant is fed to the cutting tool for lubrication and cooling. The fluid is collected and reused until it loses the desired characteristics. Different cutting tools are used depending on the length and type of bar to be turned. The amount of metal removed is dependent on the type and diameter of the steel.

Tool Steels - steels which are capable of being made into tools and are suitable after treatment to do work upon other steels, metals or substances. Examples of tool steels are high speed and high carbon steel.

Voluntary Corrective Action (VCA) - remediation activities accepted and planned by the company, facility, etc. without legal enforcement action.

McLaren Hart

May 29, 1992

Mr. Paul R. Counterman, P.E.
Director
Bureau of Hazardous Waste Facility Management
Division of Hazardous Substances Regulation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233

Re: Draft RFI Description of Current Conditions Report,
AL Tech Watervliet Plant
McLaren/Hart Project Nº AL379-01

Dear Mr. Counterman:

Enclosed is a summary of the responses to NYSDEC comments regarding the above-referenced draft report. The draft original report was revised and reissued on November 6, 1991. If you have any questions regarding the Final Draft Report, or this summary, please contact Mr. Scott Bryant or me at (518) 869-6192 at the McLaren/Hart Albany office.

Sincerely,

McLAREN/HART ENVIRONMENTAL ENGINEERING CORPORATION

John A. Crounse, P.E.
Senior Engineer

JAC/dan
Enclosure

cc: C. Van Guilder - NYSDEC
J. Reidy - USEPA
E. Diehl - AL Tech
D. Flynn - Phillips, Lytle, Hitchcock, Blaine & Huber
[redacted]

QUESTIONS AND ANSWERS
AL TECH - WATERVLIET
DRAFT DESCRIPTION OF CURRENT CONDITIONS REPORT
(Report dated November 6, 1991)

Section 3.1 Site Boundaries, Adjacent Property Owners and Land Use

The local meteorology should be discussed and a wind rose provided so that impacts of air emissions from the plant can be better understood.

Answer: *A meteorology section has been added (page 3-11). Figure 3-4 (Rensselaer; Windrose) and Figure 3-5 (Schenectady; Windrose) have also been added.*

Section 4.2.1 Early Period: (Organization to 1920)

The area in which the by-products and waste from the melting and hot and cold finishing operations were discarded, such as the landfilled area suspected to be in the northeast quadrant of the facility, should be considered to be a SWMU or AOC and should be addressed under Sections V or VI.

Answer: *A SWMU section has been added for the Northeast quadrant fill area (designated as "Northeast Quadrant Fill Area - 7C", (Section 5.4.2.3 on page 5-14.)*

Section 4.2.2 Post WWI: (1920 to 1940)

The on-site disposal areas for the by-products and wastes from the melting and hot and cold finishing operations conducted during this period, which are suspected to be in the southeast quadrant of the facility, should also be considered to be SWMUs and should be addressed in Section V.

Answer: *The northeast quadrant fill area includes those areas where on-site disposal occurred through the mid-1940s, including those areas on the southeast portion of the plant site.*

Section 4.2.3 WWII Period and Beyond: (1940 to 1970)

1. Were the disposal practices conducted during the Post WWI period continued until commencing operation of the solid waste landfill in 1957?

Answer: *Solid waste disposal practices, as described in the Post WWI (1920-1940) era, were continued until 1957 when additional lands were purchased and used for disposal (current landfill). The area for on-site disposal from the 1940s until approximately 1957 is unknown.*

2. The disposal area for the spent casting sands should be considered a SWMU, or part of a SWMU, and discussed in Section V.

Answer: *From approximately 1955 onward, wherever solid waste was disposed of, casting sands were also disposed.*

3. Please provide further description of the final site assessment and cleanup of the experimental/production processes utilizing U238, which were conducted by Westinghouse, Inc.

Answer: *No additional information is available regarding the final site assessment conducted by Westinghouse other than the site did not have unacceptable radioactivity levels. It is understood from NYSDEC personnel that information regarding the final site assessment has been acquired from the U.S. Department of Energy.*

Section 4.4 Past and Present Product and Waste Tanks

What is the source of the waste fuel oil contained in the 10,000 gallon tank (Reference Code T11) down the hill from the 300,000 gallon fuel oil tank? This tank should be included under SWMU 13 discussed in Section 5.4.7.

Answer: *The source of the waste fuel oil in the 10,000 gallon tank (Reference Code T11) is from tank truck off-loading spills and precipitation collected in a sump to the west of this tank and associated building. This tank is discussed in Section 5.4.7.7 (page 5-22).*

Section 5.0 Solid Waste Management Units

The period of operation of each SWMU, if known, should be specified in each subsection. An explanation should be provided if the period of operation is now known.

Answer: *Table 5.1, Description/(period of operation) column has been modified to include dates of operation, (i.e., 1976-: indicates the SWMU commenced operation in 1976 and is still operational). Pages 5-2, 5-3.*

Section 5.4.2.1 Landfill

When were the Northeast and Southeast Basins closed?

Answer: *The northeast basin was closed in approximately 1980 and the southeast basin was closed in approximately 1985. A second southeast basin for wastewater treatment plant sludge disposal was used until 1990.*

Section 5.4.8 Container Storage Areas (SWMU Nos. 13A-13C)

Please identify the SWMUs in subsections 5.4.8.1 and 5.4.8.2 by SWMU number so that they may be located readily on the site map.

Answer: *The container storage areas have been designated 13-A (Hazardous Waste Accumulation Area) 13-B (Thompson Room) and 13-C (Pickle House). The text for these three areas was modified and can be found on pages 5-23 and 5-24. The locations are identified on Drawing № 13.*

Section 6.0 Areas of Concern

The period of operation of each AOC, if known, should be specified in each subsection. An explanation should be provided if the period of operation is not known.

Answer: *Table 6.1, Description/(Period of Operation) column has been modified to include dates of operation (Page 6-2).*

Section 6.5 Kromma Kill Creek (AOC No. 5)

The suspected displacement of the stream from its original path through part of the facility to its current path around the eastern part of the facility should be discussed briefly.

Answer: *The relocation of the Kroma Kill Creek is addressed on page 6-7.*

Section 6.6 Facility Roads Oiled for Dust Control (AOC No. 6)

The application of grinding residues from conditioning the low alloy, non-stainless steels, mentioned in Section 4.2.2, to some of the roads at the facility should be briefly discussed here.

Answer: *The grinding residues placed on the roads did not contribute oil to the facility roads. These grinding operations generated a fine dust/solid that was typical across the site. There were no modifications to the text on this issue.*

Section 6.11 Fuel Oil Storage and Distribution (AOC No. 11)

To where is the fuel oil removed from the groundwater pumped? Is it to the 10,000 gallon waste fuel oil tank (Reference Code T11)?

Answer: *The fuel oil removed from the groundwater/product recovery well is placed in a portable tank at the well location, and is ultimately taken to the fuel oil storage tank for subsequent beneficial reuse. Tank T-11 was only used to store spilled oils collected during tank truck deliveries.*

Section 4.2.3 WWII Period and Beyond: (1940 to 1970)

1. Were the disposal practices conducted during the Post WWI period continued until commencing operation of the solid waste landfill in 1957?

Answer: *Solid waste disposal practices, as described in the Post WWI (1920-1940) era, were continued until 1957 when additional lands were purchased and used for disposal (current landfill). The area for on-site disposal from the 1940s until approximately 1957 is unknown.*

2. The disposal area for the spent casting sands should be considered a SWMU, or part of a SWMU, and discussed in Section V.

Answer: *From approximately 1955 onward, wherever solid waste was disposed of, casting sands were also disposed.*

3. Please provide further description of the final site assessment and cleanup of the experimental/production processes utilizing U238, which were conducted by Westinghouse, Inc.

Answer: *No additional information is available regarding the final site assessment conducted by Westinghouse other than the site did not have unacceptable radioactivity levels. It is understood from NYSDEC personnel that information regarding the final site assessment has been acquired from the U.S. Department of Energy.*

Section 4.4 Past and Present Product and Waste Tanks

What is the source of the waste fuel oil contained in the 10,000 gallon tank (Reference Code T11) down the hill from the 300,000 gallon fuel oil tank? This tank should be included under SWMU 13 discussed in Section 5.4.7.

Answer: *The source of the waste fuel oil in the 10,000 gallon tank (Reference Code T11) is from tank truck off-loading spills and precipitation collected in a sump to the west of this tank and associated building. This tank is discussed in Section 5.4.7.7 (page 5-22).*

Section 5.0 **Solid Waste Management Units**

The period of operation of each SWMU, if known, should be specified in each subsection. An explanation should be provided if the period of operation is now known.

Answer: *Table 5.1, Description/(period of operation) column has been modified to include dates of operation, (i.e., 1976-: indicates the SWMU commenced operation in 1976 and is still operational). Pages 5-2, 5-3.*

Section 5.4.2.1 **Landfill**

When were the Northeast and Southeast Basins closed?

Answer: *The northeast basin was closed in approximately 1980 and the southeast basin was closed in approximately 1985. A second southeast basin for wastewater treatment plant sludge disposal was used until 1990.*

Section 5.4.8 **Container Storage Areas (SWMU Nos. 13A-13C)**

Please identify the SWMUs in subsections 5.4.8.1 and 5.4.8.2 by SWMU number so that they may be located readily on the site map.

Answer: *The container storage areas have been designated 13-A (Hazardous Waste Accumulation Area) 13-B (Thompson Room) and 13-C (Pickle House). The text for these three areas was modified and can be found on pages 5-23 and 5-24. The locations are identified on Drawing № 13.*

Section 6.0 **Areas of Concern**

The period of operation of each AOC, if known, should be specified in each subsection. An explanation should be provided if the period of operation is not known.

Answer: *Table 6.1, Description/(Period of Operation) column has been modified to include dates of operation (Page 6-2).*

Section 6.5 Kromma Kill Creek (AOC No. 5)

The suspected displacement of the stream from its original path through part of the facility to its current path around the eastern part of the facility should be discussed briefly.

Answer: The relocation of the Kroma Kill Creek is addressed on page 6-7.

Section 6.6 Facility Roads Oiled for Dust Control (AOC No. 6)

The application of grinding residues from conditioning the low alloy, non-stainless steels, mentioned in Section 4.2.2, to some of the roads at the facility should be briefly discussed here.

Answer: The grinding residues placed on the roads did not contribute oil to the facility roads. These grinding operations generated a fine dust/solid that was typical across the site. There were no modifications to the text on this issue.

Section 6.11 Fuel Oil Storage and Distribution (AOC No. 11)

To where is the fuel oil removed from the groundwater pumped? Is it to the 10,000 gallon waste fuel oil tank (Reference Code T11)?

Answer: The fuel oil removed from the groundwater/product recovery well is placed in a portable tank at the well location, and is ultimately taken to the fuel oil storage tank for subsequent beneficial reuse. Tank T-11 was only used to store spilled oils collected during tank truck deliveries.