

CHRISTINE O. GREGOIRE
Director



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Northwest Regional Office, 3190 - 160th Ave S.E. • Bellevue, Washington 98008-5452 • (206) 649-7000

June 3, 1991

RECEIVED
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DEPT. OF ECOLOGY

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ASSESSORS OFFICE

Snohomish County Assessor
Snohomish County Courthouse
3000 Rockefeller
Everett, WA 98201-4060

Re: Request for Taxpayer/Owner Information

Dear Assessor:

The Department of Ecology is investigating a report of site contamination at Lynnwood Plating, 2107 - 196th SW, Lynnwood, Washington. Any assistance you can render in determining the owner or taxpayer for that property would be appreciated. Completion of any of the questions below would be helpful.

1. Who is the taxpayer for this property?
Name: Larry & Arlene Olds
Address: 20617 28TH AVE W # C-12
City: Lynnwood State: WA Zip: 98036
2. Is that person the owner of the property? Yes [] No []
Don't know
3. Do you have records reflecting past improvements at the property (i.e. past assessment worksheets/records, photos)?
Yes No [] Years: 1991 - 19
4. What is the Tax Parcel Number? 3728-008-019-0403
5. Does your county maintain aerial photos of the area this site is located in? Yes No []
6. If the information presented is insufficient to identify the property, what other information is needed? _____

(OVER)

Snohomish County Assessor

June 3, 1991

Page 2

7. Is a local tax parcel map available to assist in property location? (Please do not send one at this time.)
Yes [] No [] Cost 1.08

Your assistance in this matter is appreciated.

Sincerely,



Mary K. O'Herron
Toxics Cleanup Program
Investigator

MO:jo

(N4246)



ecology and environment, inc.

108 SOUTH WASHINGTON, SUITE 302, SEATTLE, WASHINGTON 98104, TEL. 206-624-9537

International Specialists in the Environmental Sciences

SITE INSPECTION REPORT FOR
LYNNWOOD PLATING COMPANY, INC.
LYNNWOOD, WASHINGTON

TDD R10-8510-25B

Report Prepared By: Ecology and Environment, Inc.
Project Manager: William Carberry
Date: October 1986

Submitted To: J.E. Osborn, Regional Project Officer
Field Operations and Technical Support Branch
U.S. Environmental Protection Agency
Region X
Seattle, Washington

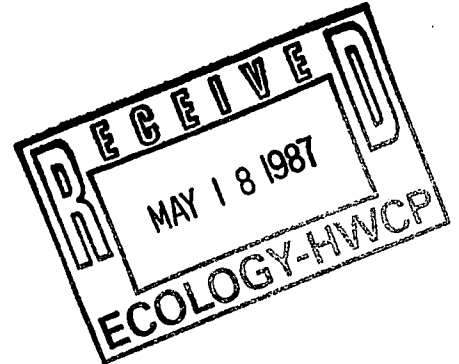
U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WASHINGTON 98101

Mika



MAY 15 1987

REPLY TO
ATTN OF: HW-113



Larry Olds
Lynnwood Plating Company, Inc.
2107 196th Street S.W.
Lynnwood, Washington 98036

Dear Mr. Olds:

The Environmental Protection Agency (EPA), through our contractor, Ecology and Environment (E&E), has completed the report of the site inspection of the Lynnwood Plating Company facility. A copy of the report is enclosed.

E&E's recommendations, with which EPA concurs, are outlined on page ii of this report. EPA is referring the site inspection to the Washington Department of Ecology. After Ecology review, a decision can be made on what further investigation is appropriate. A copy of the report is also being forwarded to Snohomish County.

If you have any questions, please telephone me at (206) 442-2712.

Sincerely,

Deborah Flood

Deborah Flood
Environmental Protection Specialist
Superfund Branch

Enclosure

cc: Emily Ray, Washington State Department of Ecology, Olympia
John Conroy, Ecology, Redmond
Snohomish County Land Development



ecology and environment, inc.

108 SOUTH WASHINGTON, SUITE 302, SEATTLE, WASHINGTON 98104, TEL. 206-624-9537

International Specialists in the Environmental Sciences

M E M O R A N D U M

DATE: October 15, 1986

TO: John Osborn, FIT-RPO, USEPA, Region X

THRU: *for* Dave Buecker, FIT-RPM, E&E, Seattle *Beuf*

FROM: William Carberry, E&E, Seattle *W/C*

SUBJ: **RECOMMENDATIONS
LYNNWOOD PLATING COMPANY, INC.**

REF: TDD R10-8510-25B

cc: Carolyn Wilson, EPA
Thomas Tobin, E&E

Based on the findings from the recently completed Site Inspection of Lynnwood Plating Company, Inc., E&E recommends that the EPA file a notice in the Snohomish County records that will advise persons requesting a title search of the property to contact the EPA for additional information.

E&E also recommends that a fence be erected along the western boundary of the property to restrict access from adjacent properties. The other three boundaries are currently fenced.

The analytical results from the E&E field project indicate that heavy metal contaminants (especially chromium, copper, and nickel) have migrated off-site, however the extent of that migration has not been investigated. E&E recommends that additional sampling be conducted downstream from the Lynnwood Plating property, along the flow path of the unnamed intermittent stream. The sampling effort should consider the possible contamination of the marshy area to the northwest of the site.

ABSTRACT

A file review and site investigation were conducted at the Lynnwood Plating Company, Inc. facility in Lynnwood, WA under EPA Technical Directive Document R10-8510-25 to evaluate the facility's status within the Agency's Uncontrolled Hazardous Waste Site Program. As part of this inspection, eleven soil samples were collected and submitted for heavy metal and cyanide analyses. Results from the analysis of these samples indicate that on-site soils have been contaminated by electroplating effluent, including chromium, copper, nickel, and cyanide, and that these contaminants have migrated off-site.

SITE INSPECTION REPORT FOR
LYNNWOOD PLATING COMPANY, INC.
TDD R10-8510-25B

Site Name/Address

Lynnwood Plating Company, Inc.
2107 196th St. SW
Lynnwood, WA 98036

Investigation Participants

William Carberry, Project Manager, E&E, Seattle, WA - (206) 624-9537
Jeff Whidden, E&E, Seattle, WA - (206) 624-9537
Jeff Defenbach, Snohomish County Health District, Everett, WA -
(206) 259-0693
Dave Murdock, Washington Department of Ecology, Redmond, WA -
(206) 885-1900

Principal Site Contact

Larry Olds, Owner of Lynnwood Plating Company, Inc., Lynnwood, WA -
(206) 778-0125

Dates of Inspections

December 11, 1985	0900 - 1200 hrs	(site inspection)
February 14, 1986	0800 - 1330 hrs	(sampling)

1.0 INTRODUCTION

Lynnwood Plating Company, Inc. (Lynnwood Plating) is an active electroplating facility, located in the Alderwood neighborhood of Lynnwood, Washington. The site was targeted for investigation as an "industry of concern" (1) which discharged electroplating wastewater directly to an on-site pond.

The site was identified by the Environmental Protection Agency (EPA) Region X, and the Washington Department of Ecology (Ecology) from preliminary assessment screening as requiring additional information to accurately profile the nature and extent of past waste disposal activity. Ecology and Environment, Inc. (E&E) has been requested by the EPA under Technical Directive Documents No. R10-8510-25, 25 A/B to conduct a site inspection to determine if contaminants were, or are migrating from the site, and to evaluate the facility's status under the Agency's Uncontrolled Hazardous Waste Program. This report summarizes the site inspection, and is divided into the following sections:

- o Owner/Operator
- o Location
- o Site Description and Surrounding Area
- o Topography and Drainage
- o Geology/Hydrology

- o Surface Water and Ground Water Uses
- o Climate
- o Overview of Facility/Site Operations
- o Characteristics of the Waste Stream
- o Site Inspection by E&E
- o Sampling Results and Discussion
- o Conclusions
- o References

2.0 OWNER/OPERATOR

Mr. Larry Olds has been the sole owner and operator of Lynnwood Plating since the company formed in 1963 (2).

3.0 LOCATION

Lynnwood Plating is located 0.8 miles east of the 196th St./I-5 overpass, at 2107 196th St. SW in the Alderwood section of Lynnwood, Washington. The facility occupies approximately 1/2 acre in the SE1/4, SW1/4, of sec. 14, T.27 N., R.4 E., at latitude 47° 49' 19.4" and longitude 120° 15' 43.8" (see Figures 1 and 2) (3).

4.0 SITE DESCRIPTION AND SURROUNDING AREA

The 37,500 sq. ft. site is situated approximately 200 feet north of 196th St. SW in the Alderwood section of Lynnwood, WA. There are two buildings on-site, a 1,950 sq.ft. warehouse and a 5,900 sq. ft. combination office and electroplating building (see Figure 3). Both buildings are primarily of wood construction on a cement slab foundation.

Land use in the vicinity is primarily commercial, with a sparse residential population within a 1/4 mile radius of the site. The nearest residence is located approximately 200 feet to the west of the site. Approximately 3,150 residents (3, 4) live within a 1 mile radius of the facility (see Table 1).

5.0 TOPOGRAPHY AND DRAINAGE

The facility is located near the top of a knoll at an elevation between 420 and 440 feet National Geodetic Vertical Datum (N.G.V.D.) (3). The site has an estimated slope of less than 2% to the west, whereas the general terrain has an 8.3% grade (125 foot vertical drop over the 1500 foot span) to the east toward Swamp Creek (3).

An intermittent stream previously existed at the site. The stream flowed from east to west across the northern portion of the facility (2) (see Figure 3). Run-off from the site drained via this stream into a marsh located approximately 0.35 miles northwest of the site. Upgradient of the site, the stream has been filled in through

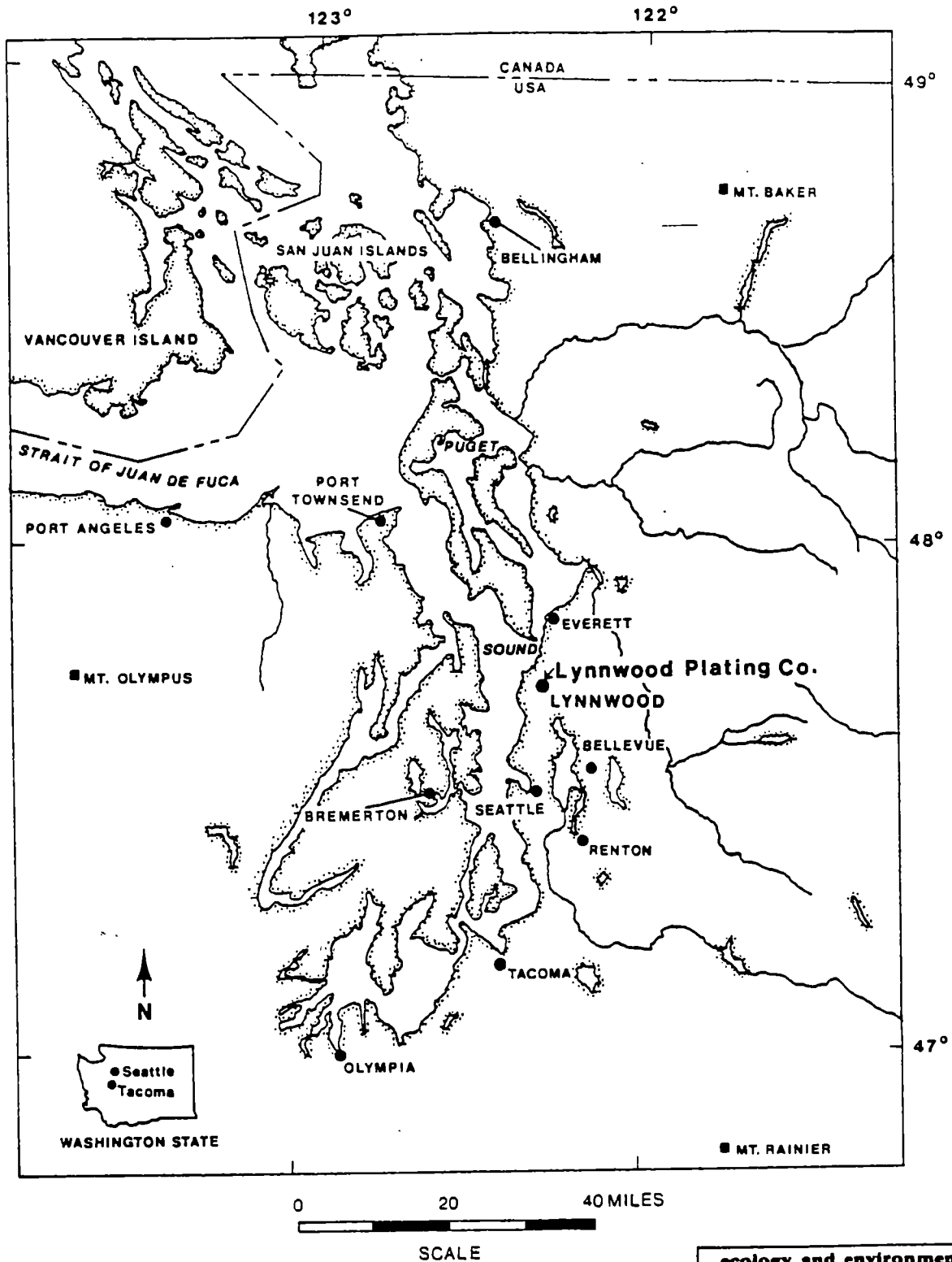
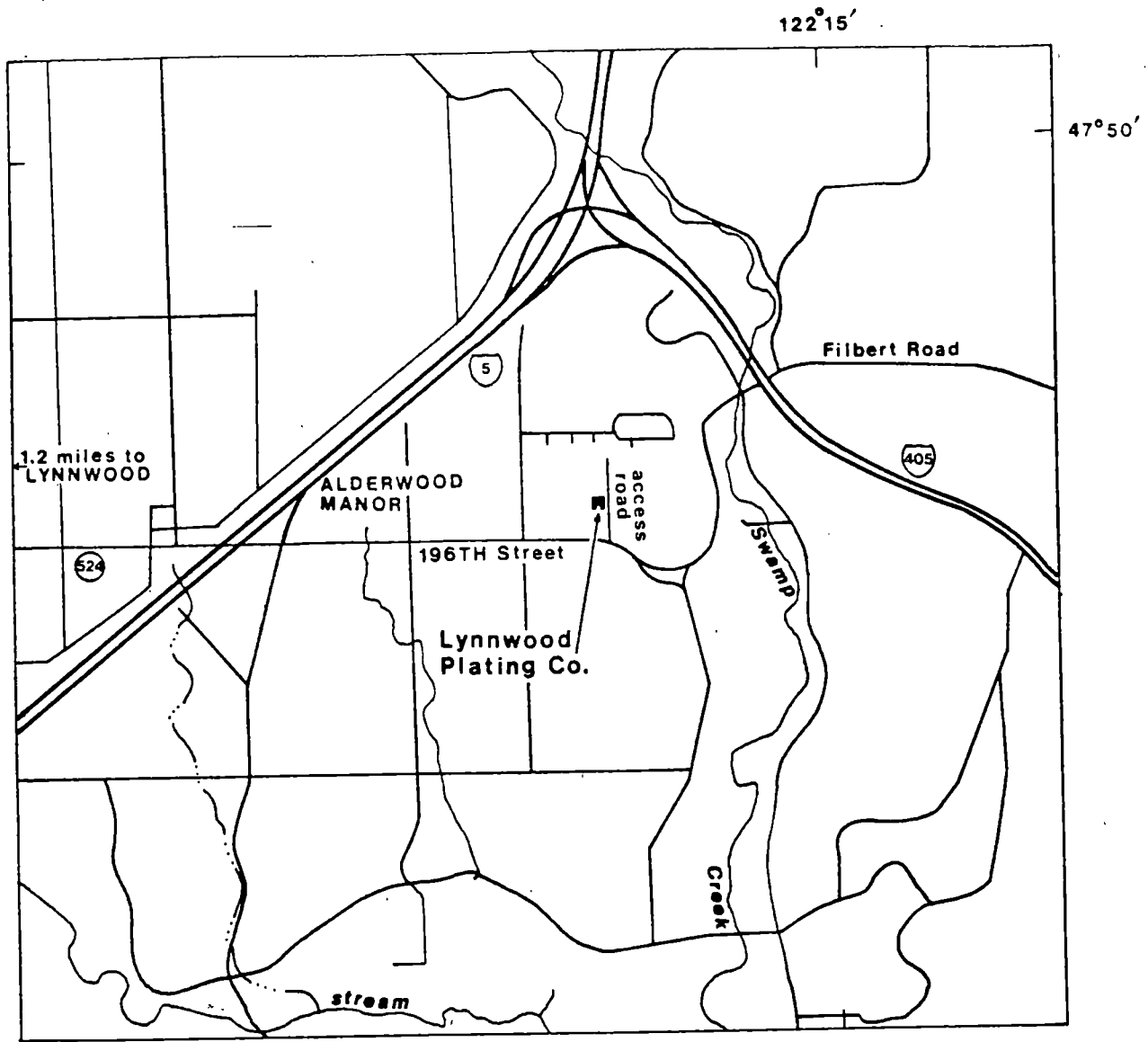



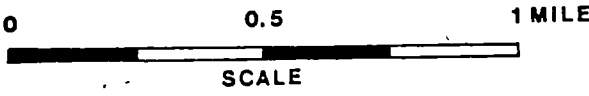


Figure 1. Location map of Lynnwood Plating Company, Lynnwood, Washington.



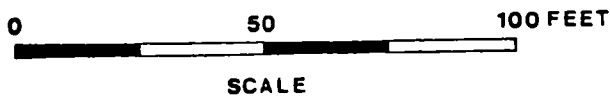
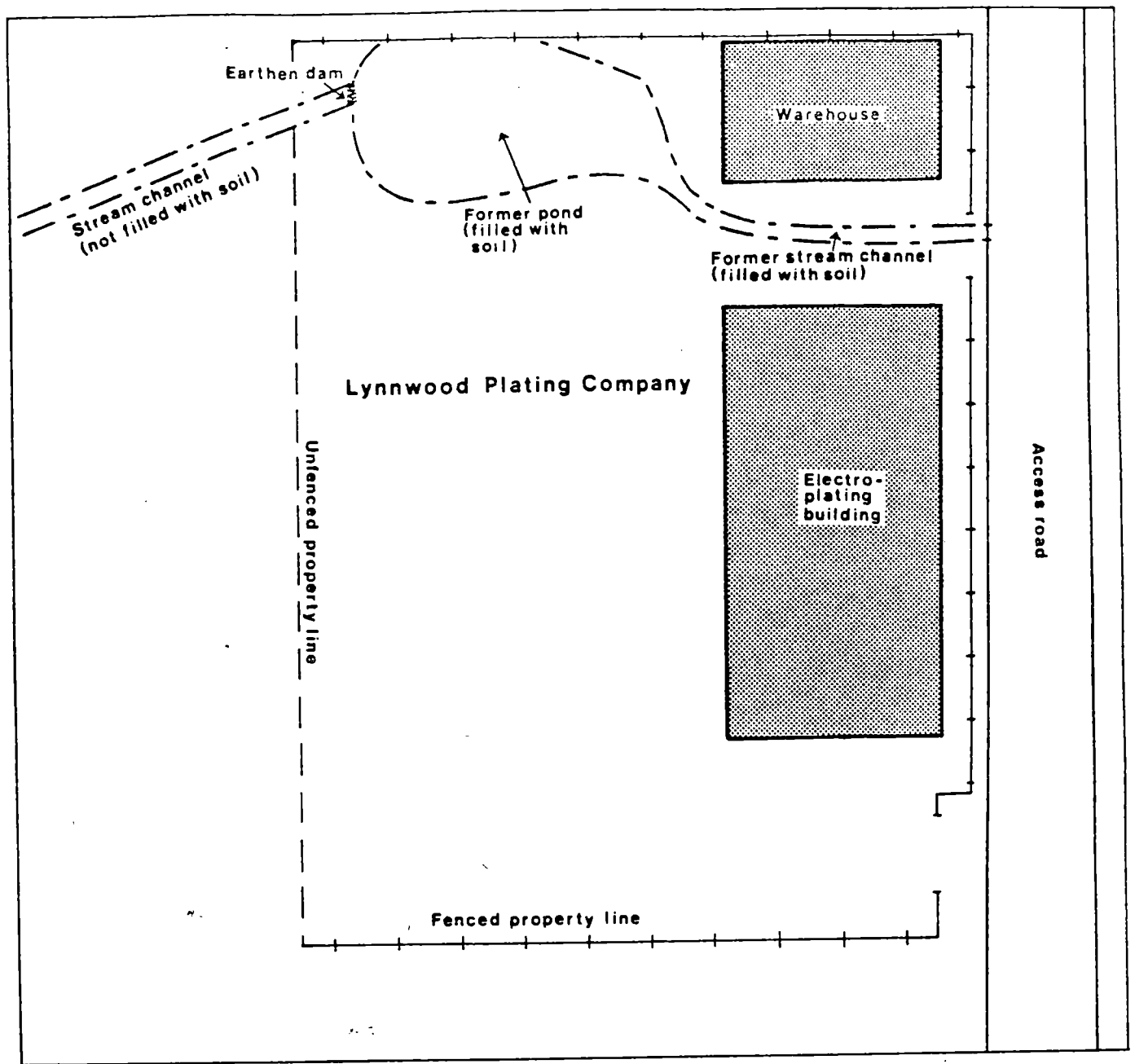
LEGEND

-  Interstate route and number
-  State route and number
-  Lynnwood Plating Co. study area



ecology and environment, inc. SEATTLE, WA	
JOB #: R10-8510-25B	
Drawn by: L. Jowise	Date: 4-22-86

Figure 2. Vicinity map of Lynnwood Plating Company, Lynnwood, Washington.



ecology and environment, inc. SEATTLE, WA	
JOB # R10-8510-25	
by L. Jowise	4-21-86

Figure 3. Site map of Lynnwood Plating Company, Lynnwood, Washington.

construction in the neighborhood and the storm water from the neighborhood is now removed by recently installed municipal sewers. The site itself continues to drain via the intermittent stream.

TABLE 1

**DEMOGRAPHIC CHARACTERIZATION OF THE AREA
PROXIMAL TO LYNNWOOD PLATING COMPANY, INC.
LYNNWOOD, WASHINGTON (3, 4, 5, 6)**

Radial Distance	Demographic Descriptor
50 feet 200 feet	Nearest Building Nearest Population
0.3 miles 0.8 miles	Nearest Surface Water Nearest Well
0 - 1 mile	3150 Residents 1100 Buildings 20 Private Wells 2 Schools
0 - 2 miles	7530 Residents 7529 Buildings 20 Private Wells 8 Schools
0 - 3 miles	33000+ Residents 9500+ Buildings 27 Private Wells 14 Schools 0 Municipal Water Sources

The surface soils at the site are classified as the Alderwood - Urban Land Complex (7). The unit is made up of approximately 60% Alderwood gravelly sandy loam and about 25% urban land that is intricately intermingled throughout the Lynnwood area. The remaining 15% is made of a mixture of soil complexes. The topsoil formed in glacial till and is composed of a gravelly sandy loam (about seven inches thick) overlaying a very gravelly sandy loam and hardpan. Depth to hardpan ranges from 20 to 40 inches below the ground surface (7).

The Alderwood soil group is moderately well drained with a moderate permeability above the hardpan layer and slow permeability through the hardpan. The Alderwood soil tends to saturate during periods of heavy rainfall because of the low permeability of the substratum making it a poor soil group for septic tank and settling pond absorption fields (7).

In 1970 percolation tests were conducted in three test holes on the Lynnwood Plating site as part of an application for an on-site sewage disposal system permit (8). The mean percolation rate in the three test holes was four inches/min. (bottom of six-inch test hole) which converts to 1.7×10^{-3} cm/sec.

6.0 GEOLOGY/HYDROLOGY

6.1 Regional Geology

The site is located within the Puget Sound lowland: a broad, rolling, glacial drift plain of low relief which is bordered by the Olympic and Cascade Mountain Ranges.

The physiographic features of the lowland are primarily the results of the Fraser Glaciation of approximately 15,000 years ago. The sediments deposited during this period are collectively termed Vashon Drift. Four lithologic units are recognized within the Vashon Drift. These are, from upper to lower: the till layer, the advanced outwash layer, the Esperance Sand Member, and the Lawton Clay Member (9).

The lowermost, and oldest unit is the Lawton Clay, which is composed of silts and clays. These sediments were deposited into a large post-glacial lake that filled much of the region when the glacier blocked the natural drainage of the Puget Lowland (10).

Overlaying the Lawton Clay is the Esperance Sand Member. The Esperance Sand consists of fine- to medium-grained fluvial and lacustrine sands which were deposited onto the plain created after the lake had filled with silt and clay (10).

The last two units are the Vashon Outwash and the Vashon Till. The Vashon Outwash is comprised of coarse-grained sand and gravel deposited by glacial melt-water streams, with advanced outwash deposited during glacial advance and recessional outwashes deposited during glacial retreat. In between the outwash deposits is the Vashon Till. Vashon Till mantles much of the Puget Lowland. The till is a compact, unsorted, heterogeneous mixture of sand, silt, clay and cobbles deposited directly from glacial ice (10).

The combined thickness of the four units can reach several hundreds of feet, although nondeposition or erosion has left an incomplete or thinned stratigraphic sections in many locations.

Vashon Drift was laid down on sediments deposited during the preceding interglacial and glacial periods, and onto bedrock. Bedrock, consisting of tertiary volcanic rock and sedimentary rocks is rarely exposed in the Lowland. Depth to bedrock is highly variable and can be as deep as 4,000 feet in places (11).

The retreating glacier resulted in a carved landscape of north-south trending hills and deep valleys. Many valleys were filled with marine waters following global sea level rise. This created the characteristic marine inlets of Puget Sound. Other valleys filled with fresh water, forming lakes, or alluvial floodplain deposits.

6.2 Site Geology

The underlying Vashon Till extends to a depth of approximately 190 feet below ground surface in the vicinity of the Lynnwood Plating site. The last six feet of this layer have the sandy characteristics of glacial outwash. Underlying the till layer is the water-bearing Esperance Sand Member, which extends to an approximate depth of 320 feet below ground surface. The Lawton Clay Unit underlies the Esperance Sand to a depth greater than 547 feet below ground surface (12).

6.3 Hydrology

The Esperance Sand Aquifer is the most wide-spread and important source of ground water in Snohomish County. Recharge to the Esperance Sand Aquifer is primarily a result of infiltrating precipitation (7). The Lynnwood Plating facility is located near the top of a small knoll; precipitation that falls at the site most likely drains toward the west and into the partially buried, unnamed creek before it can penetrate the hardpan layer.

The aquifer generally has a flat base and an upper surface that slopes outward at an average of approximately 25 feet per mile toward the nearest surface water body. The aquifer is in hydraulic connection with local streams and rivers, and in the vicinity of these surface waters, the water table rises into the till layer (12). In places, the water table is seasonally perched and occurs at depths of 18 to 36 inches below ground surface from January to March (7).

7.0 SURFACE WATER AND GROUND WATER USES

The probable run-off path from the site is west via an unnamed intermittent stream, which drains into a small (less than 1 acre) marshy area located 0.35 miles northwest of the facility (3). There are no surface water rights along this run-off pathway (13).

The only streets within the three mile radius of the site which do not have municipal water mains are Larch Way, west of Locust Way, and Seattle Hill Rd, east of State Route 527 (3,5,6) (see Figure 2). There are approximately 28 houses on these sections of road (3) that are within the three mile radius of the site (14) and which rely on private wells for their drinking water supplies. There are probably other houses within the three mile radius, especially within the Alderwood Water District (east of I-5) which have not hooked up to the municipal water system (5).

8.0 CLIMATE

The Lynnwood area has a mild and moderately moist climate due to the prevailing westerly winds which advance inland from the Pacific Ocean and the shielding effects of the Olympic and Cascade Mountains. The western, or windward slopes of the Olympic Mountains cause the prevailing winds to rise and cool, with heavy precipitation on the seaward slopes and diminished rainfall on the leeward side of the summits. The Cascade Mountains generally deflect the cold Canadian air masses to the east. The coldest winter and warmest summer days come with north or east winds which have been influenced by the large land masses of British Columbia or Eastern Washington (15).

The area has a mean annual precipitation of 38.85 inches (15) and a mean lake evaporation of 23 inches per year (16) for a water surplus (net precipitation) of 15.85 inches per year. The area has a maximum recorded 24-hour precipitation of 3.48 inches (15) and a 1-year, 24-hour precipitation of less than 2 inches (16).

9.0 OVERVIEW OF FACILITY/SITE OPERATION

The principle process at the Lynnwood Plating facility has always been the rechroming of automobile bumpers. The owner estimates that the company refinishes 7,000 bumpers per year. Lynnwood Plating also has the capabilities for copper (brass) and nickel plating (2).

Lynnwood Plating has a very limited machine parts clientele, and, consequently, does not maintain a solvent rinse system for the degreasing of parts. Surface preparation consists of mechanical grinding, followed by scrubbing in a caustic pretreatment bath located between the warehouse and the plating office building (see Figure 3). Parts are then treated in an acid "pickling bath" to remove oxides (2,17).

In all the plating processes, metal ions are reduced onto the part being plated, which is made to act as a cathodic surface by the application of an electric current (17). To accomplish this, the part is attached to an electrically grounded jig and immersed in the electroplating tank.

Following the electroplating process, the part is transferred by hand through one or two rinse tanks to remove excess salts from the part's surface. This rinsing process is referred to in the industry as "drag-out" (17). The plated parts are transferred from the plating solution and

through the rinses manually, with a certain degree of dripping between baths. This dripping falls directly on the wooden walkways and on the floor (see Appendix A) (2).

The floor of the electroplating room is pitched toward a culvert which runs down the center of the floor. The culvert drains toward the north side of the building. The cement foundation is raised approximately six inches above the floor and acts as a berm around the entire plating room. The company feels that the entire floor area can be used in the calculation for spill volume containment. Because of the slope of the floor, however, and because the culvert would direct spills toward the north end of the building where the berm is lowest, it is not certain that spilled contents of even one plating tank would be contained inside the building.

When Lynnwood Plating moved to its current location in July 1967 (2), an intermittent stream passed through the property (see Figure 3). The firm constructed an earthen dike across the stream channel and used the resulting pond as an evaporation/seepage pond for their electroplating wastewater. The wastewater was allowed to drain onto the floor of the electroplating room and then flowed toward the north end of the building via the floor culvert. The culvert emptied directly into the stream bed and the wastewater flowed into the pond. During periods of prolonged or heavy rain, the pond overflowed its dike and plating wastewater flowed further down-stream (2).

In 1983, Metro began constructing sewers in the Alderwood area. Lynnwood Plating used excavated soils from the sewer construction to fill in the pond. During the period when the pond was being filled, and before the sewers were hooked up, the company discharged the plating wastewater directly onto the ground outside the southern side of the plating building (2).

10.0 CHARACTERIZATION OF THE WASTE STREAM

Electroplating baths have a long useful life (17), and are periodically filtered to remove suspended particles. Contamination of a plating bath by metal salts other than those intended to be in the solution would ruin the solution for further plating uses, forcing the firm to dispose of, and subsequently replace, the contaminated solution. The main source of wastewater from Lynnwood Plating processes appears to be the overflow from the rinse (dragout) tanks, and from the surface preparation process.

Liquid is lost from the plating tanks primarily by evaporation, but also by dripping and minor spilling during the transfer of parts from the plating to the rinse tank. The water lost to evaporation is replaced from the first dragout tank, consequently transferring some of the rinsed salts back into the plating tank. Occasionally some salts must be added to the plating tank to replace those that are lost through the final rinse and through spillage/dripping.

The final rinse bath is generally a running water bath. In the past, it has been a standard operating procedure of the industry to allow this bath to overflow onto the floor or to a drain. This is typically the

largest source of process wastewater. As this wastewater is predominately running water, it would not be expected to have a high metal content. It is likely, however, that as this relatively uncontaminated effluent (see Appendix B) flowed over the plating room floor it would pick up the spilled drippings from the carryover of the parts between tanks and consequently become more heavily contaminated.

The firm uses about 1200 gallons of water per day, of which an estimated 300 gallons is lost to evaporation and an estimated 900 gallons is discharged as wastewater (2). Wastewater from the facility would be expected to have elevated concentrations of chromium, copper, iron, nickel, and cyanide.

In that it is desirable to keep plating solutions as clean as possible, they are filtered as necessary to remove suspended particles. Depending on the work load, the baths are usually filtered on a monthly basis at Lynnwood Plating (2). The company disposed of these filters in an on-site dumpster.

The dragout (rinse) tanks are not filtered, but their purity is not as important as with the plating tanks. Sediments, in the form of a heavy metal-laden sludge, do collect in the bottom of these rinse tanks and they are periodically cleaned. Lynnwood Plating estimates that it generates 200 pounds of high water-content sludges per year (2). These were disposed of in the same on-site dumpster. The company began using an evaporator in November 1985 to concentrate their sludge waste for disposal. As yet, the company has not generated enough concentrated sludge to arrange for disposal (2).

11.0 SITE INSPECTION BY E&E

The following information was collected during the inspection of the Lynnwood Plating Company:

- o The contents of the on-site dumpster have been transported by Northwest Disposal Service to the Cathcart Landfill in Clearview, Washington (2).
- o In November 1985, the firm purchased an evaporator (see Appendix A) and began concentrating the sludges on-site. Since the evaporator was set up, the firm has concentrated a net estimated total of 20 gallons of sludge.
- o The area where the company states that the pond was located has been leveled and is used to store racks of bumpers (see Appendix A). The soil on the south side of the plating building was stained.
- o The wastewater generated by the facility is currently held on-site in a tank and batch-discharged to the Metro sewer system (weekly) following the receipt of results for cadmium, chromium, copper, lead, nickel, zinc, cyanide and pH analyses (see Appendix B) (2).

Photographs were taken (see Appendix A) and a site inspection report was completed (see Appendix B).

12.0 SAMPLING RESULTS AND DISCUSSION

12.1 On-going Waste Stream Monitoring

Prior to discharge to the municipal sewer system, batches of plating wastewater are analyzed by B&P Laboratories for six metal elements, cyanide, and for pH for compliance with METRO industrial effluent permit requirements. At the time of the E&E site visit (December 11, 1985) the company states to have had no compliance problems. The laboratory reports for the two months prior to E&E's inspection have been included in Appendix C.

12.2 E&E Sampling Program

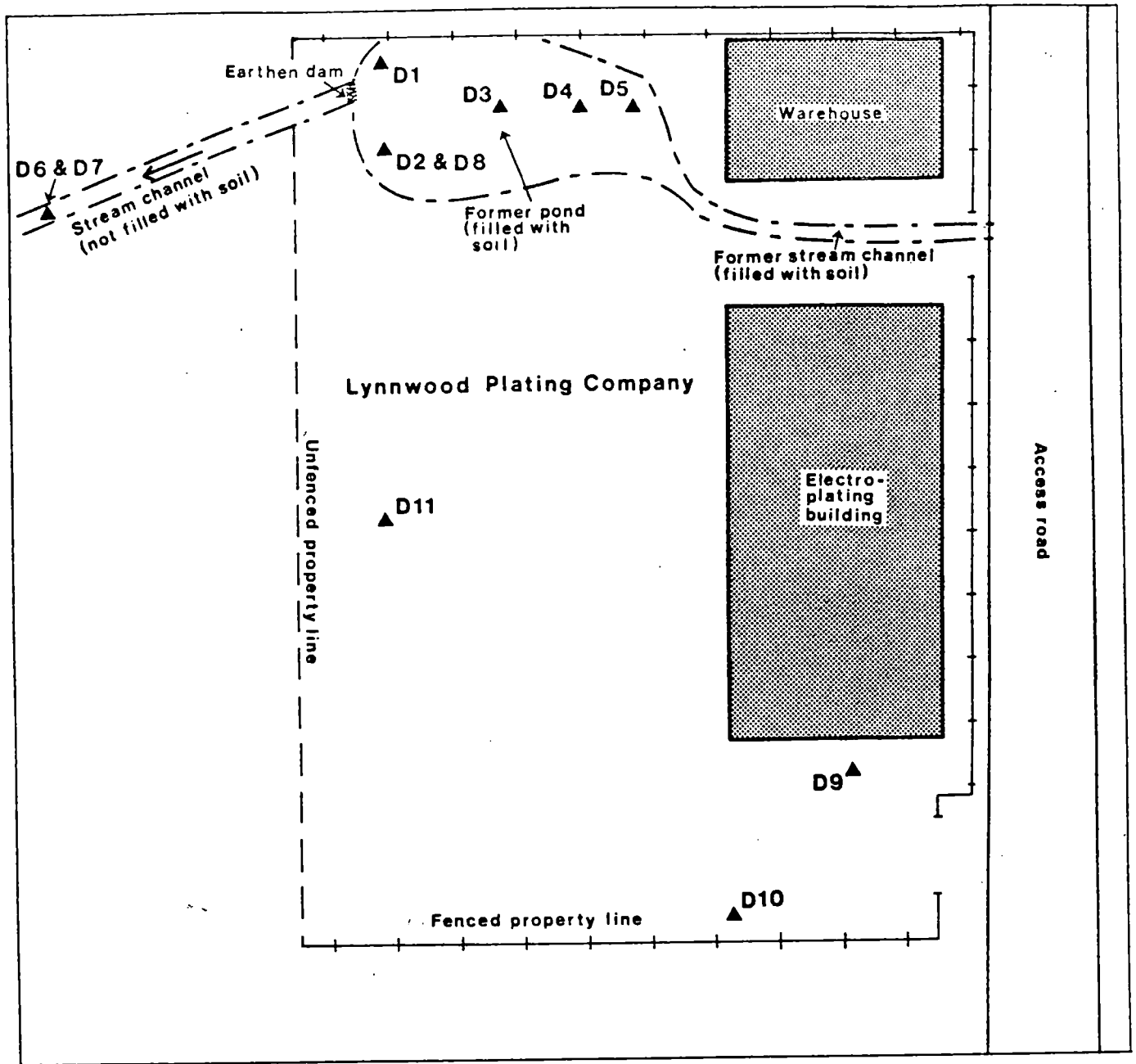
Based on the information obtained during the site inspection and after discussions with the EPA Region X, it was decided to collect samples at the site.

The objectives of the site investigation sampling program were to:

- o determine if contaminants have migrated off-site;
- o determine if emergency or remedial action was required; and
- o determine if the site posed a public or environmental health threat.

To accomplish these goals, a sampling plan was developed (18) and implemented. Eleven soil and sediment samples (including background and duplicate samples) were collected from the vicinity of the plating facility, including surface and subsurface samples from the pond area and down-gradient of the pond. Samples of the pond sediments were collected by drilling through the cover soil until a noticeable change in soil texture and/or color was detected (see Appendix A). Sample locations are shown in Figure 4. All samples were analyzed to determine the concentration of those heavy metals included on the EPA Hazardous Substance List (HSL) and cyanide (see Appendix D).

Samples D1 to D5, D7, and D8 were collected from borehole drill cuttings at depths of two to three feet below ground surface. The remaining samples (D6 and D9 to D11) were surface soil samples collected from the upper six inches of the soil column. As the entire surface of the site was covered by fill, sample D11 is considered to be a background sample only in that it was collected away from any areas of known wastewater disposal.



LEGEND

▲ D2 Location and number of sampling site



ecology and environment, inc. SEATTLE, WA	
JOB #: R10-8510-25	
by L. Jowise	4-21-86

Figure 4. Map showing locations of sampling sites at Lynnwood Plating Company study area.

12.2.1 Sampling Results

Eight heavy metals and cyanide were detected in the Lynnwood Plating Company soils in concentrations at least 10-fold greater than that of the background sample (sample D11). Those results have been summarized in Table 2. Sample results which did not conform to EPA quality control criteria (19) are presented as estimated concentrations.

Sample locations D1 through D5 were selected within the alleged borders of the buried wastewater disposal pond (see Figure 4). These sediment samples had the highest concentrations of heavy metals and cyanide. Of these five samples, sample D2, which was collected in the southwest corner of the pond, had the highest concentration of contaminants with nickel (145,000 mg/kg-estimated) and chromium (17,100 mg/kg), and cyanide (4,510 mg/kg-estimated) being particularly evident. Each of these was more than 250 times the background concentrations for these metals (138 mg/kg-estimated, 22 mg/kg, and 0.57 mg/kg-estimated, respectively).

Two samples were collected approximately 85 feet downstream of the former on-site pond in what appeared to be the old stream channel. Surface sample (sample D6) had levels of chromium (1,490 mg/kg) and nickel (6,880 mg/kg-estimated) that were more than fifty times the background concentrations. The subsurface soil sample collected at this point (sample D7) was collected at the estimated water table level (based on standing surface water located ten feet from the sampling location, and the moisture content of the soil when sampled). Chromium (281 mg/kg) and nickel (691 mg/kg-estimated) reported from the analysis of this sample were 13 and 5 times their respective background concentrations.

Two samples were collected from the soil area on the south side of the electroplating building, where the wastewater effluent was dumped in 1984. Sample D9, collected seven feet south of the large door had elevated levels of five metals, including nickel (6,050 mg/kg-estimated) and copper (967 mg/kg), cyanide (31 mg/kg-estimated), and the only reported recovery of mercury (0.27 mg/kg). Sample D10, located approximately 35 feet downgradient (south) of location D9, also had elevated levels of nickel (3,880 mg/kg-estimated), copper (698 mg/kg), and cyanide (28 mg/kg-estimated).

12.2.2 Discussion

The Alderwood soil group, which predominates in that area of Lynnwood, is poorly suited to on-site disposal systems (11) due to the shallow depth of the hardpan and the seasonally high perched water table. As a result of unsuitability of this soil group, the on-site containment system failed, allowing contaminants to be carried off site when the pond overflowed.

The areas which have received electroplating wastewater have elevated concentrations of several metals, including nickel, chromium, copper, and cyanide. The subsurface concentrations of these compounds, as well as arsenic, cadmium, cobalt, tin, and zinc, are highest in the downgradient side of the pond. The only subsurface soil sample collected away from the perimeter of the pond was one of a pair of samples collected in the stream bed (samples D6 & D7). The analytical results from the deeper sample (sample D7) indicate that chromium and nickel (at roughly 10 and 5 times

TABLE 2

CLP ANALYTICAL RESULTS FOR SOIL/SEDIMENT SAMPLES COLLECTED AT
LYNWOOD PLATING COMPANY, INC., LYNWOOD, WASHINGTON
(results in mg/kg (dry weight))

Sample Location	Element										
	As	Cd	Cr	Co	Cu	Pb	Hg	Ni	Sn	Zn	CN ⁻
D1 (NW corner of pond)	6.5	3J	1260	28	332	67	0.06U	6430J	11U	263	58J
D2 (SW corner of pond)	190	38J	17100	363	5710	721	0.17U	145000J	169	5990	4510J
D3 (center of pond)	8.7	2.9U	2000	58	315	16	0.072U	10800J	13U	166	109J
D4 (E end of pond)	75	15J	5440	190	659	340	0.069U	20700J	27	849	33J
D5 (E end of pond)	69	2.5U	2580	87	794	2260	0.063U	13000J	15	215	114J
D6 (downstream surface)	20	3.2J	1490	68	387	57	0.063U	6880J	11U	286	2.5J
D7 (downstream subsurface)	18	2.5U	281	13	26	8.1	0.063U	691J	11U	56	0.63U
D8 (duplicate of D2)	140	16J	16700	184	7680	729	0.12U	91600J	112	4910	6090J
D9 (S side of plating building)	8.8	2.2U	178	197	967	137	0.27	6050J	9.9U	318	31J
D10 (S side of plating building)	13	2.3U	140	35	689	110	0.058U	3880J	10U	314	28J
D11 (background)	16	2.3U	22	9.6	39	188	0.057U	138J	10U	188	0.57U
STLC *	15	1	5	20	25	5	0.2	20	NA	250	NA
TTLIC *	500	100	500	8000	250	1000	20	2000	NA	2500	NA

J = Concentrations are estimated values based on laboratory quality assurance criteria (19).

U = Compound not detected at listed detection limit (19).

* = Soluble Threshold Limit Concentration (STLC) and Total Threshold Limit Concentrations (TTLIC) for Designation as a Toxic Substance (in mg/kg (wet weight)) (24).

their respective background concentrations) are migrating downward through the soil. This observation is supported by a laboratory simulation (20) in which both chromium and nickel were found to be among the most mobile metals in a sandy loam, such as the Alderwood - Urban Land Complex (11). By comparison, zinc had a moderate mobility, and copper had low mobility (20).

There are currently no federal standards for the evaluation of the hazardous nature of concentrations of heavy metals in soil samples without EP Toxicity analysis (21). Further, EP Toxicity results are only reported for compounds included in the federal drinking water standards (22, 23).

As an alternative comparative tool, the State of California has developed a set of qualitative criteria for the evaluation of the hazardous nature of contaminated materials (24) which expand on the principles of the EP Toxicity test. Based on the sample matrix and contaminant concentration, the California method utilizes two sets of criteria: the Soluble Threshold Limit Concentration (STLC) and the Total Threshold Limit Concentration (TTLC). The STLC is the concentration of solubilized and extractable contaminants which, if equaled or exceeded in a liquid (or in an extract attained through the prescribed "WET" procedure (24)), renders the waste hazardous. The TTLC is the concentration of solubilized, extractable or non-extractable contaminants which, if equaled or exceeded, renders the waste hazardous (with no extraction requirement). The hazard evaluation of these criteria take into consideration acute oral and dermal LD₅₀ (Lethal Dose 50% = the dose at which 50% of the test population dies) and acute inhalation and aquatic LC₅₀ (Lethal Concentration) data.

Samples collected from the pond area (samples D1 to D5) exceed the TTLC criteria (24) (see Table 2) and would be classified as a "Persistent and Bioaccumulative Toxic Substance (24)" based on the concentrations of chromium, copper, lead, nickel, and zinc. Surface soils on the south side of the electroplating building (samples D9 & D10) would also be so classified based on the levels of copper and nickel. The downstream surface soil (sample D6) would also be so classified based on the concentrations of chromium and nickel.

No extraction procedures were performed on any of the soil samples collected during the E&E investigation. The subsurface soil outside of the perimeter of the pond (sample D7) did not have contaminant levels in excess of the TTLCs, and consequently requires extraction before the California Criteria can be used. These soils would be classified as a "Persistent and Bioaccumulative Toxic Substance", however, if 1.8% of the chromium and/or 2.9% of the nickel were extractable through the "WET" acid extraction procedure (24).

13.0 CONCLUSIONS

There is analytical evidence of on-site soil contamination with heavy metals and cyanide as a result of the Lynnwood Plating Company's past disposal of electroplating wastewater. In addition, there is analytical evidence that these contaminants have migrated off-site via the overflow of the disposal pond, and that at least some of the contaminants are migrating downward toward the water table.

The nearest known ground water target population is located 0.8 miles to the southwest of the site. The nearest suspected surface water target population is located 1.5 miles down stream on Swamp Creek. The E&E sampling program was not designed to assess the impact of the Lynnwood Plating contamination on these targets.

There are no federal standards for a hazard classification of contaminated soils for a situation such as the one that exists at the Lynnwood Plating facility. Consequently, the site has been evaluated based on criteria that have been adopted by the State of California, not in the supposition that these criteria have legal implications in EPA Region 10, but because they are scientifically based and simply expand upon the same principles as the federally adopted EP Toxicity criteria. With this qualification in mind, the soils on and adjacent to the Lynnwood Plating facility could be classified as a persistent and bioaccumulative toxic substance.

REFERENCES

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23. 40 CFR 140: 143.1-143.4 (July 19, 1975). National Secondary Drinking Water Regulations.
24. California Administrative Code; Title 22: Social Security; Division 4: Environmental Health; Chapter 30: Minimum Standards for Management of Hazardous and Extremely Hazardous Wastes. October 13, 1984. Criteria for Identification of Hazardous and Extremely Hazardous Wastes.

APPENDIX A
PHOTOGRAPHIC DOCUMENTATION

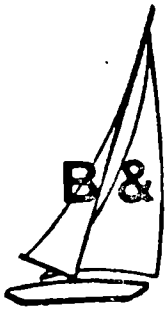
TABLE A1
PHOTO IDENTIFICATION SHEET

Type of Camera: Cannon AE-1
Type of Film: Kodacolor 400

TDD No.: R10-8510-25
Site Name: Lynnwood Plating Company

Frame No.	Roll No.	Date	Time	Taken By	Description
1	1	12/11/85	1000	W. Carberry	Evaporator (wrapped in insulation) used to concentrate dragout sludges.
2	1	12/11/85	1005	W. Carberry	Nickel plating tank. Note staining on tank side and walkway from dripping during dragout.
3	1	12/11/85	1005	W. Carberry	Chrome plating tank. Note ventilation hood.
4	1	12/11/85	1010	W. Carberry	Submerged wooden pallet on plating room floor. Note dried salts from spilled plating solutions. Photo taken at the head of the floor culvert that drains toward the north end of the plating building.
5	1	12/11/85	1005	W. Carberry	View across plating room.
6	1	12/11/85	1010	W. Carberry	Ventilation fans in ceiling of the plating room.
7	1	12/11/85	1015	W. Carberry	Filter system currently in place to remove chromium from the waste effluent.

APPENDIX B
LYNNWOOD PLATING COMPLIANCE MONITORING RESULTS
(OCTOBER AND NOVEMBER 1985)



B & P LABORATORIES, Inc.

5635 Delridge Way S.W. Seattle, WA 98103 (206) 937-3644

LYNNWOOD ELECTROPLATING
2107 - 196th Avenue SW
Lynnwood, WA 98036
Attn: Larry Olds

Date: October 8, 1985
Test Report:
EFFLUENT WATER ANALYSIS for
METRO Self Monitoring Report

The following water sample is a constant rate composite representing the month's industrial discharges collected from the effluent sump located in the northwest corner of the polishing room.

Methods of analysis are as specified by the US Environmental Protection Agency in 'Methods for Chemical Analysis of Water and Wastes', document EPA-600/4-79-020 and meet all requirements of the Federal Clean Water Act, 40 CFR part 136, the EPA, and Metro's 'Industrial Data Quality Assurance Program'.

RESULTS

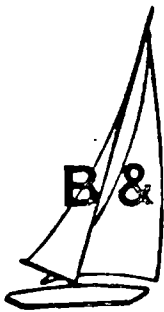
Limits reflect the maximum contamination allowed in effluent discharge set in the facility water permit.

Data and limits expressed as milligrams/liter.

Element	Composite Limit	September 1985 Effluent Water Composite
Cadmium	0.70	<0.05
Chromium	4.00	<0.10
Copper	2.70	1.95
Lead	0.40	<0.10
Nickel	2.60	2.05
Zinc	2.60	0.75
Compounds		
Cyanide	1.0	<0.10
Electrometric		
pH	5.5 to 12.5	6.9

B & P Laboratories, Inc. certifies the accuracy of these results.

W. P. Olds



B & P LABORATORIES, Inc.

5635 Delridge Way S.W. Seattle, WA 98103 (206) 937-3644

LYNNWOOD ELECTROPLATING
P.O. Box 2518
Lynnwood, WA 98036
Attn: Larry Olds

Date: November 1, 1985
Test Report:
EFFLUENT WATER ANALYSIS for
METRO Self Monitoring Report

The following water sample is a constant rate composite representing the month's industrial discharges collected from the effluent sump located in the northwest corner of the polishing room.

Methods of analysis are as specified by the U.S. Environmental Protection Agency in 'Methods for Chemical Analysis of Water and Wastes', document EPA-600/4-79-020 and meet all requirements of the Federal Clean Water Act, 40 CFR part 136, the EPA, and Metro's 'Industrial Data Quality Assurance Program'.

RESULTS

Limits reflect the maximum contamination allowed in effluent discharge set in the facility water permit.

Data and limits expressed as milligrams/liter

Element	Composite Limit	October 1985 Effluent Water Composite
Cadmium	0.70	<0.05
Chromium	4.00	0.20
Copper	2.70	1.50
Lead	0.40	<0.10
Nickel	2.60	2.50
Zinc	2.60	2.10
Compounds		
Cyanide	1.0	<0.10
Electrometric		
pH	5.5 to 12.5	10.1

B & P Laboratories, Inc. certifies the accuracy of these results.

W. A. Olds

APPENDIX C
EPA FORM 2070-13

Purpose: Site Inspection Form
EPA Form 2070-13

Site: Lynnwood Plating Company, Inc.
Lynnwood, Washington

Date of Inspection: December 11, 1985 (site visit)
February 14, 1986 (sampling)

TDD Number: R10-8510-25B

FIT Investigators: William Carberry
Jeff Whidden

Report Prepared By: William Carberry

Report Date: July 30, 1986

Submitted to: J.E. Osborn, RPO
Field Operations and Technical Support Branch
U.S. Environmental Protection Agency
Region X
Seattle, Washington

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 1 - SITE LOCATION AND INSPECTION INFORMATION

I. IDENTIFICATION
01 State WA 02 Site Number D009488651

II. SITE NAME AND LOCATION

01 Site Name (Legal, common, or descriptive name of site) Lynnwood Plating Company Inc.		02 Street, Route No., or Specific Location Identifier 2107 196th St. SW				
03 City Lynnwood		04 State WA	05 Zip Code 98036	06 County Snohomish	07 County Code 061	08 Cong Dist 02
09 Coordinates Latitude Longitude 4 7° 4 9' 1 9.4" 1 2 0° 1 5' 4 3.8"		10 Type of Ownership (Check one) <input checked="" type="checkbox"/> A. Private <input type="checkbox"/> B. Federal <input type="checkbox"/> C. State <input type="checkbox"/> D. County <input type="checkbox"/> E. Municipal <input type="checkbox"/> F. Other <input type="checkbox"/> G. Unknown				

III. INSPECTION INFORMATION

01 Date of Inspection 12 / 11 / 85 Month Day Year		02 Site Status <input checked="" type="checkbox"/> Active <input type="checkbox"/> Inactive	03 Years of Operation 1963 Present Beginning Year Ending Year		Unknown
04 Agency Performing Inspection (Check all that apply) <input type="checkbox"/> A. EPA <input checked="" type="checkbox"/> B. EPA Contractor Ecology & Environment, Inc. (Name of firm) <input type="checkbox"/> C. Municipal <input type="checkbox"/> D. Municipal Contractor (Name of firm) <input type="checkbox"/> E. State <input type="checkbox"/> F. State Contractor (Name of firm) <input type="checkbox"/> G. Other (Specify)					

05 Chief Inspector William Carberry		06 Title Project Manager	07 Organization E&E	08 Telephone No. (206)624-9537
09 Other Inspectors Jeff Whidden		10 Title FIT	11 Organization E&E	12 Telephone No. (206) 624-9537
Jeff Defenbach		Sanitarian	Snohomish County Health Department	(206) 259-0693
Dave Murdoch			WDOE	(206)885-1900
13 Site Representatives Interviewed		14 Title	15 Address	
Larry Olds		President/Owner	2107 196th St. SW Lynnwood, WA 98036	
			()	
			()	
			()	
			()	

17 Access Gained By (Check one) <input checked="" type="checkbox"/> Permission <input type="checkbox"/> Warrant		18 Time of Inspection 12/11/86 0900 02/14/86 0800	19 Weather Conditions Cold, fair
---	--	---	-------------------------------------

IV. INFORMATION AVAILABLE FROM

01 Contact Deborah Flood		02 Of (Agency/Organization) U.S. Environmental Protection Agency		03 Telephone No. (206) 442-2722
04 Person Responsible for Site Inspection Form William Carberry		05 Agency EPA/FIT	06 Organization E&E	07 Telephone No. (206)624-9537
				08 Date 5 / 1 / 86 Month Day Year

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 2 - WASTE INFORMATION

I. IDENTIFICATION

01 State WA 02 Site Number D009488651

II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS

01 Physical States (Check all that apply):
 A. Solid
 B. Powder, Fines
 C. Sludge
 D. Other _____ (Specify)
 E. Slurry
 F. Liquid
 G. Gas

02 Waste Quantity at Site (Measure of waste quantities must be independent)
 Tons _____
 Cubic Yards _____
 No. of Drums 4 dr/yr

03 Waste Characteristics (Check all that apply)
 A. Toxic
 B. Corrosive
 C. Radioactive
 D. Persistent
 E. Soluble
 F. Infectious
 G. Flammable
 H. Ignitable
 I. Highly Volatile
 J. Explosive
 K. Reactive
 L. Incompatible
 M. Not Applicable

III. WASTE TYPE

Category	Substance Name	01 Gross Amount	02 Unit of Measure	03 Comments
SLU	Sludge	200 lbs/yr		
OLW	Oily Waste			
SOL	Solvents			
PSD	Pesticides			
OCC	Other Organic Chemicals			
IOC	Inorganic Chemicals	unknown		
ACD	Acids			
BAS	Bases			
MES	Heavy Metals	unknown		

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

01 Category	02 Substance Name	03 CAS Number	04 Storage/Disposal Method	05 Concentration	06 Measure of Concentration
SLU	Electroplating Dragout	--	Cathcart Landfill	unknown	
IOC	Cyanide	5712-5	Onsite pond & surface	unknown	
MES	Chromium	7440-47-3	Onsite pond & surface	unknown	
MES	Cobalt	--	Onsite pond & surface	unknown	
MES	Copper	7440-50-8	Onsite pond & surface	unknown	
MES	Lead	7439-92-1	Onsite pond & surface	unknown	
MES	Mercury	7439-97-6	Onsite pond & surface	unknown	
MES	Nickel	7440-02-0	Onsite pond & surface	unknown	
MES	Tin	7410-31-5	Onsite pond & surface	unknown	
MES	Zinc	7440-66-6	Onsite pond & surface	unknown	

V. FEEDSTOCKS (See Appendix for CAS Numbers)

Category	01 Feedstock Name	02 CAS Number	Category	01 Feedstock Name	02 CAS Number
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

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

E&E site inspection - 12/11/85 & 02/14/86
 E&E site inspection report - TDD R10-8510-258

POTENTIAL HAZARDOUS WASTE SITE
 SITE INSPECTION REPORT
 PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION	
01 State WA	02 Site Number D009488651

II. HAZARDOUS CONDITIONS AND INCIDENTS

01 A. Groundwater Contamination
 03 Population Potentially Affected: 100 02 Observed (Date: _____) Potential Alleged
 04 Narrative Description

There is documented contamination of the subsurface soils, but no ground water data has been collected. The nearest known wells are 0.8 miles to the south of the site on Locust Way. Wells are also located on Seattle Hill Road, 2.9 miles to the northeast of the site.

01 B. Surface Water Contamination
 03 Population Potentially Affected: _____ 02 Observed (Date: 2/14/86) Potential Alleged
 04 Narrative Description

Sediment from the old stream bed, which drained the site toward the northwest, were found to be contaminated with chromium and nickel.

01 C. Contamination of Air
 03 Population Potentially Affected: _____ 02 Observed (Date: _____) Potential Alleged
 04 Narrative Description

None observed/reported/documented.

01 D. Fire/Explosive Conditions
 03 Population Potentially Affected: _____ 02 Observed (Date: _____) Potential Alleged
 04 Narrative Description

None observed/reported/documented.

01 E. Direct Contact
 03 Population Potentially Affected: 3,150 02 Observed (Date: _____) Potential Alleged
 04 Narrative Description

The site is secured by a fence on three sides, but not on the west side of the property. Contaminants have migrated off-site via an intermittent stream, though the extent of off-site contamination has not been evaluated. There are 3,150 residents within a one-mile radius of the site.

01 F. Contamination of Soil
 03 Area Potentially Affected (Acres: >0.5) 02 Observed (Date: 2/14/85) Potential Alleged
 04 Narrative Description

There is documented evidence of heavy metal contamination of on-site and off-site soils. The extent of off-site contamination has not been documented.

01 G. Drinking Water Contamination
 03 Population Potentially Affected: 100 02 Observed (Date: _____) Potential Alleged
 04 Narrative Description

There is documented contamination of subsurface soils off-site, but no ground water data has been collected.

01 H. Worker Exposure/Injury
 03 Workers Potentially Affected: _____ 02 Observed (Date: _____) Potential Alleged
 04 Narrative Description

None observed/reported/documented.

01 I. Population Exposure/Injury
 03 Population Potentially Affected: _____ 02 Observed (Date: _____) Potential Alleged
 04 Narrative Description

None observed/reported/documented.

POTENTIAL HAZARDOUS WASTE SITE
 SITE INSPECTION REPORT
 PART 3. - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS

I. IDENTIFICATION

01 State WA	02 Site Number D009488651
----------------	------------------------------

II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)

01 J. Damage to Flora
 04 Narrative Description
 None observed/reported/documented.

02 Observed (Date: _____) Potential Alleged

01 K. Damage to Fauna
 04 Narrative Description
 None observed/reported/documented.

02 Observed (Date: _____) Potential Alleged

01 L. Contamination of Food Chain
 04 Narrative Description
 None observed/reported/documented.

02 Observed (Date: _____) Potential Alleged

01 M. Unstable Containment of Wastes
 (Spills/Runoff/Standing liquids, Leaking drums)
 03 Population Potentially Affected: _____
 04 Narrative Description
 Off-site migration of heavy metals were detected downgradient from the location of the former on-site (now buried) pond.

02 Observed (Date: 2/14/86) Potential Alleged

01 N. Damage to Offsite Property
 04 Narrative Description
 Off-site migration of heavy metal contaminants on the property immediately west of the facility has been documented.

02 Observed (Date: 2/14/86) Potential Alleged

01 O. Contamination of Sewers, Storm/Drains, WWTPs
 04 Narrative Description.
 None observed/reported/documented. Currently monitored.

02 Observed (Date: _____) Potential Alleged

01 P. Illegal/Unauthorized Dumping
 04 Narrative Description
 After the on-site pond was abandoned and filled in 1984, electroplating waste water was disposed of onto the ground surface south of the electroplating building. This waste water flowed off-site onto property west of the facility.

02 Observed (Date: _____) Potential Alleged

05 Description of Any Other Known, Potential, or Alleged Hazards
 None known.

III. TOTAL POPULATION POTENTIALLY AFFECTED: Approximately 3,250

IV. COMMENTS

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

E&E Site Inspection Report TDD R10-8510-25B
 E&E Site Inspections - 12/11/85 & 2/14/86

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION

I. IDENTIFICATION	
01 State WA	02 Site Number D009488651

II. PERMIT INFORMATION

01 Type of Permit Issued (Check all that apply)	02 Permit Number	03 Date Issued	04 Expiration Date	05 Comments
<input type="checkbox"/> A. NPDES				
<input type="checkbox"/> B. UIC				
<input type="checkbox"/> C. AIR				
<input type="checkbox"/> D. RCRA				
<input type="checkbox"/> E. RCRA INTERIM STATUS				
<input type="checkbox"/> F. SPCC PLAN				
<input type="checkbox"/> G. STATE (Specify)				
<input type="checkbox"/> H. Local (Specify)				
<input checked="" type="checkbox"/> I. Other (METRO)	7241			
<input type="checkbox"/> J. None				

III. SITE DESCRIPTION

01 Storage/Disposal (Check all that apply)	02 Amount	03 Unit of Measure	04 Treatment (Check all that apply)	05 Other
<input checked="" type="checkbox"/> A. Surface Impoundment	approx. 3,750	cubic yards	<input type="checkbox"/> A. Incineration	<input type="checkbox"/> A. Buildings On Site
<input type="checkbox"/> B. Piles			<input type="checkbox"/> B. Underground Injection	Two
<input type="checkbox"/> C. Drums, Above Ground			<input type="checkbox"/> C. Chemical/Physical	
<input type="checkbox"/> D. Tank, Above Ground			<input type="checkbox"/> D. Biological	
<input type="checkbox"/> E. Tank, Below Ground			<input type="checkbox"/> E. Waste Oil Processing	06 Area of Site
<input type="checkbox"/> F. Landfill			<input type="checkbox"/> F. Solvent Recovery	0.5 (Acres)
<input type="checkbox"/> G. Landfarm			<input type="checkbox"/> G. Other Recycling/ Recovery	
<input type="checkbox"/> H. Open Dump			<input type="checkbox"/> H. Other (Specify)	
<input type="checkbox"/> I. Other (Specify)				

07 Comments

The abandoned and buried on-site waste water pond had estimated dimensions of 50' X 25' X 3'.

IV. CONTAINMENT

01 Containment of Wastes (Check one)
 A. Adequate, Secure B. Moderate C. Inadequate, Poor D. Insecure, Unsound, Dangerous

02 Description of Drums, Diking, Liners, Barriers, etc.

The pond was formed simply by damming an intermittent stream that ran through the site. No liner was installed. The pond overflowed during periods of heavy rain. The possibility for further migration from the pond is reduced since its been filled in, but contaminated soils remain.

V. ACCESSIBILITY

01 Waste Easily Accessible: Yes No

02 Comments
Contaminants have migrated off-site, but the extent of migration is not known. Site is accessible from its western boundary.

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

E&E Site Inspection Report TDD R10-8510-25B
E&E Site Inspections - 12/11/85 & 2/14/86

POTENTIAL HAZARDOUS WASTE SITE
 SITE INSPECTION REPORT
 PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION
 01 State WA 02 Site Number D009488651

II. DRINKING WATER SUPPLY

01 Type of Drinking Supply (Check as applicable)		02 Status			03 Distance to Site	
Community	SURFACE A. <input checked="" type="checkbox"/> WELL B. <input type="checkbox"/>	ENDANGERED A. <input type="checkbox"/>	AFFECTED B. <input type="checkbox"/>	MONITORED C. <input checked="" type="checkbox"/>	A. >50 (mi)	
Non-Community	C. <input type="checkbox"/> D. <input checked="" type="checkbox"/>	D. <input checked="" type="checkbox"/>	E. <input type="checkbox"/>	F. <input type="checkbox"/>	B. 0.8 (mi)	

III. GROUNDWATER

01 Groundwater Use in Vicinity (Check one)

A. Only Source for Drinking
 B. Drinking (Other sources available) Commercial, Industrial, Irrigation (No other water sources available)
 C. Commercial, Industrial, Irrigation (Limited other sources available)
 D. Not Used, Unuseable

02 Population Served by Ground Water 100		03 Distance to Nearest Drinking Water Well 0.8 (mi)			
04 Depth to Groundwater 1.5-3.0 (ft)	05 Direction of Groundwater Flow easterly	06 Depth to Aquifer of Concern 1.5-3.0 (ft)	07 Potential Yield of Aquifer unknown (gpd)	08 Sole Source Aquifer <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	

09 Description of Wells (Including usage, depth, and location relative to population and buildings)

Wells in the area are listed as being for domestic use and are normally 30-100 feet deep. The current utility of most wells is unknown. Local utility officials think there is a very small reliance on ground water in the area except for a small section of Larch Way west of Locust Way, and Seattle Hill Road.

10 Recharge Area		11 Discharge Area	
<input checked="" type="checkbox"/> Yes	Comments By surface water percolation	<input checked="" type="checkbox"/> Yes	Comments Discharge to Swamp Creek
<input type="checkbox"/> No		<input type="checkbox"/> No	

IV. SURFACE WATER

01 Surface Water (Check one)

A. Reservoir, Recreation Drinking Water Source
 B. Irrigation, Economically Important Resources
 C. Commercial, Industrial
 D. Not Currently Used

02 Affected/Potentially Affected Bodies of Water

Name:	Affected	Distance to Site
Swamp Creek	<input type="checkbox"/>	0.3 (mi)
	<input type="checkbox"/>	(mi)
	<input type="checkbox"/>	(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 Total Population Within			02 Distance to Nearest Population	
One (1) Mile of Site A. 3,150 No. of Persons	Two (2) Miles of Site B. 7,530 No. of Persons	Three (3) Miles of Site C. 33,000+ No. of Persons	200 (ft)	
03 Number of Buildings Within Two (2) Miles of Site 7,530		04 Distance to Nearest Off-Site Building 50 (ft)		

05 Population Within Vicinity of Site (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

The Alderwood section of Lynnwood is primarily a commercial area in the vicinity of the site.

POTENTIAL HAZARDOUS WASTE SITE
 SITE INSPECTION REPORT
 PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION	
01 State WA	02 Site Number D009488651

VI. ENVIRONMENTAL INFORMATION

01 Permeability of Unsaturated Zone (Check one)

A. $10^{-6} - 10^{-8}$ cm/sec B. $10^{-4} - 10^{-6}$ cm/sec C. $10^{-4} - 10^{-3}$ cm/sec D. Greater Than 10^{-3} cm/sec

02 Permeability of Bedrock (Check one)

A. Impermeable (Less than 10^{-6} cm/sec) B. Relatively Impermeable ($10^{-4} - 10^{-6}$ cm/sec) C. Relatively Permeable ($10^{-2} - 10^{-4}$ cm/sec) D. Very Permeable (Greater Than 10^{-2} cm/sec)

03 Depth to Bedrock Unknown (ft)	04 Depth of Contaminated Soil Zone >3 (ft)	05 Soil pH unknown
-------------------------------------	---	-----------------------

06 Net Precipitation 15.85 (in)	07 One Year 24 Hour Rainfall >2 (in)	08 Slope Site Slope >2 %	Direction of Site Slope west	Terrain Average Slope 8.3 %
------------------------------------	---	--------------------------------	---------------------------------	--------------------------------

09 Flood Potential
 Site is in Zone C Year Floodplain 10 N/A Site is on Barrier Island, Coastal High Hazard Area, Riverine Floodway

11 Distance to Wetlands (5 acre minimum) ESTUARINE A. >2 (mi)	OTHER B. >2 (mi)	12 Distance to Critical Habitat (of endangered species) >1 (mi) Endangered Species: none known
---	---------------------	--

13 Land Use in Vicinity

Distance to: COMMERCIAL/INDUSTRIAL A. 50 (ft)	RESIDENTIAL AREAS; NATIONAL/STATE PARKS, FORESTS, OR WILDLIFE RESERVES B. >2 (mi)	AGRICULTURAL LANDS PRIME AG LAND C. >2 (mi)	AG LAND D. >2 (mi)
---	---	---	-----------------------

14 Description of Site in Relation to Surrounding Topography

The site is located at the top of a gentle knoll. The site drains to the west, but the general terrain drains to the east. There is an abandoned on-site intermittent stream that ran across the site. While the storm sewer upgradient of the site has been replaced by municipal sewers, site run-off would still flow into the stream channel.

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

Washington State well logs.
 W. Carberry, Personal Communication, 4/21/86. Fletcher Delap, Alderwood Water District to W. Carberry, E&E.
 1980 Census of Population & Housing.
 Newcomb, R.C., 1952. Ground Water Resources of Snohomish County, WA. U.S.G.S. Water Supply Paper 1135.

POTENTIAL HAZARDOUS WASTE SITE
 SITE INSPECTION REPORT
 PART 6 - SAMPLE AND FIELD INFORMATION

I. IDENTIFICATION	
01 State WA	02 Site Number D009488651

II. SAMPLES TAKEN			
Sample Type	01 Number of Samples Taken	02 Samples Sent To	03 Estimated Date Results Available
Groundwater			
Surface Water			
Waste			
Air			
Runoff			
Spill			
Soil	11	Rocky Mountain Analytical, Arvada, CO	Received 3/10/86
Vegetation			
Other			

III. FIELD MEASUREMENTS TAKEN	
01 Type	02 Comments

IV. PHOTOGRAPHS AND MAPS	
01 Type <input checked="" type="checkbox"/> Ground <input type="checkbox"/> Aerial	02 In Custody of <u>E&E and USEPA Region X</u> (Name of organization or individual)
03 Maps <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	04 Location of Maps <u>E&E Site Inspection Report, TDD R10-8510-25B</u>

V. OTHER FIELD DATA COLLECTED (provide narrative description of sampling activities)

A file review & site investigation was conducted at the Lynnwood Plating Co., Inc. facility in Lynnwood, WA under EPA Technical Directive Document R10-8510-25 to evaluate the facility's status within the Agency's Uncontrolled Hazardous Waste Site Program. The purpose of the investigation was to characterize contamination as a result of the past disposal of electroplating wastewater into what is currently an abandoned and buried on-site pond. As a result of this inspection, eleven soil samples were collected and submitted for heavy metal and cyanide analyses. Results from the analysis of these samples indicate that on-site soils have been contaminated with heavy metals and cyanide via the disposal of electroplating waste water, and that these contaminants have migrated off-site.

VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)
E&E Site Inspection Report, TDD R10-8510-25B

POTENTIAL HAZARDOUS WASTE SITE
 SITE INSPECTION REPORT
 PART 7 - OWNER INFORMATION

I. IDENTIFICATION	
01 State WA	02 Site Number D009488651

II. CURRENT OWNER(S)				PARENT COMPANY (if applicable)			
01 Name Larry Olds		02 D+B Number		08 Name		09 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.) 2107 196th St. SW			04 SIC Code	10 Street Address (P.O. Box, RFD #, etc.)			11 SIC Code
05 City Lynnwood	06 State WA	07 Zip Code 98036		12 City		13 State	14 Zip Code
01 Name		02 D+B Number		08 Name		09 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)			04 SIC Code	10 Street Address (P.O. Box, RFD #, etc.)			11 SIC Code
05 City	06 State	07 Zip Code		12 City		13 State	14 Zip Code
01 Name		02 D+B Number		08 Name		09 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)			04 SIC Code	10 Street Address (P.O. Box, RFD #, etc.)			11 SIC Code
05 City	06 State	07 Zip Code		12 City		13 State	14 Zip Code
III. PREVIOUS OWNER(S) (List most recent first)				IV. REALTY OWNER(S) (if applicable, list most recent first)			
01 Name Anderson Metal Fabricators		02 D+B Number		01 Name Same		02 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.) 2109 196th St. SW			04 SIC Code 3400	03 Street Address (P.O. Box, RFD #, etc.)			04 SIC Code
05 City Lynnwood	06 State WA	07 Zip Code 98036		05 City		06 State	07 Zip Code
01 Name		02 D+B Number		01 Name		02 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)			04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)			04 SIC Code
05 City	06 State	07 Zip Code		05 City		06 State	07 Zip Code
01 Name		02 D+B Number		01 Name		02 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)			04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)			04 SIC Code
05 City	06 State	07 Zip Code		05 City		06 State	07 Zip Code
01 Name		02 D+B Number		01 Name		02 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)			04 SIC Code	03 Street Address (P.O. Box, RFD #, etc.)			04 SIC Code
05 City	06 State	07 Zip Code		05 City		06 State	07 Zip Code
V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)							

E&E site inspection - 12/11/85 & 02/14/86 (bought property from Anderson's Metal Fabricators, located across street)

POTENTIAL HAZARDOUS WASTE SITE
 SITE INSPECTION REPORT
 PART 8 - OPERATOR INFORMATION

I. IDENTIFICATION	
01 State WA	02 Site Number D009488651

II. CURRENT OPERATOR (Provide if different from owner) OPERATOR'S PARENT COMPANY (If applicable)

01 Name Lynnwood Plating Co., Inc.		02 D+B Number		10 Name		11 D+B Number			
03 Street Address (P.O. Box, RFD #, etc.) 2107 196th St. SW			04 SIC Code 3471		12 Street Address (P.O. Box, RFD #, etc.)			13 SIC Code	
05 City Lynnwood		06 State WA	07 Zip Code 98036			14 City		15 State	16 Zip Code
08 Years of Operation 1963-Present		09 Name of Owner Larry Olds							

III. PREVIOUS OPERATOR(S) (List most recent first; provide only if different from owner) PREVIOUS OPERATORS' PARENT COMPANIES (If applicable)

01 Name None		02 D+B Number		10 Name		11 D+B Number			
03 Street Address (P.O. Box, RFD #, etc.)			04 SIC Code		12 Street Address (P.O. Box, RFD #, etc.)			13 SIC Code	
05 City		06 State	07 Zip Code			14 City		15 State	16 Zip Code
08 Years of Operation		09 Name of Owner During This Period							

01 Name		02 D+B Number		10 Name		11 D+B Number			
03 Street Address (P.O. Box, RFD #, etc.)			04 SIC Code		12 Street Address (P.O. Box, RFD #, etc.)			13 SIC Code	
05 City		06 State	07 Zip Code			14 City		15 State	16 Zip Code
08 Years of Operation		09 Name of Owner During This Period							

01 Name		02 D+B Number		10 Name		11 D+B Number			
03 Street Address (P.O. Box, RFD #, etc.)			04 SIC Code		12 Street Address (P.O. Box, RFD #, etc.)			13 SIC Code	
05 City		06 State	07 Zip Code			14 City		15 State	16 Zip Code
08 Years of Operation		09 Name of Owner During This Period							

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

E&E site inspections - 12/11/85 & 02/14/86

POTENTIAL HAZARDOUS WASTE SITE
 SITE INSPECTION REPORT
 PART 9 - GENERATOR/TRANSPORTER INFORMATION

I. IDENTIFICATION	
01 State WA	02 Site Number D009488651

II. ON-SITE GENERATOR

01 Name Lynnwood Plating Co., Inc.		02 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.) 2107 196th St. SW		04 SIC Code 3471	
05 City Lynnwood	06 State WA	07 Zip Code 98036	

III. OFF-SITE GENERATOR

01 Name		02 D+B Number		01 Name		02 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code		03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	
05 City	06 State	07 Zip Code		05 City	06 State	07 Zip Code	
01 Name		02 D+B Number		01 Name		02 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code		03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	
05 City	06 State	07 Zip Code		05 City	06 State	07 Zip Code	

IV. TRANSPORTER(S)

01 Name None		02 D+B Number		01 Name		02 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code		03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	
05 City	06 State	07 Zip Code		05 City	06 State	07 Zip Code	
01 Name		02 D+B Number		01 Name		02 D+B Number	
03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code		03 Street Address (P.O. Box, RFD #, etc.)		04 SIC Code	
05 City	06 State	07 Zip Code		05 City	06 State	07 Zip Code	

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

E&E site inspection - 12/11/85 & 02/14/86

POTENTIAL HAZARDOUS WASTE SITE
 SITE INSPECTION REPORT
 PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 State WA	02 Site Number D009488651

II. PAST RESPONSE ACTIVITIES

01 <input type="checkbox"/> A. Water Supply Closed 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> B. Temporary Water Supply Provided 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> C. Permanent Water Supply Provided 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> D. Spilled Material Removed 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> E. Contaminated Soil Removed 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> F. Waste Repackaged 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> G. Waste Disposed Elsewhere 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> H. On Site Burial 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> I. In Situ Chemical Treatment 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> J. In Situ Biological Treatment 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> K. In Situ Physical Treatment 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> L. Encapsulation 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> M. Emergency Waste Treatment 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> N. Cutoff Walls 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> O. Emergency Diking/Surface Water Diversion 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> P. Cutoff Trenches/Sump 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> Q. Subsurface Cutoff Wall 04 Description None Reported	02 Date _____	03 Agency _____

POTENTIAL HAZARDOUS WASTE SITE
 SITE INSPECTION REPORT
 PART 10 - PAST RESPONSE ACTIVITIES

I. IDENTIFICATION	
01 State WA	02 Site Number 0009488651

II. PAST RESPONSE ACTIVITIES (Continued)

01 <input type="checkbox"/> R. Barrier Walls Constructed 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> S. Capping/Covering 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> T. Bulk Tankage Repaired 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> U. Grout Curtain Constructed 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> V. Bottom Sealed 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> W. Gas Control 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> X. Fire Control 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> Y. Leachate Treatment 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> Z. Area Evacuated 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> 1. Access to Site Restricted 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> 2. Population Relocated 04 Description None Reported	02 Date _____	03 Agency _____
01 <input type="checkbox"/> 3. Other Remedial Activities 04 Description None Reported	02 Date _____	03 Agency _____

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

E&E site inspection - 12/11/85 & 02/14/86
 EPA ERRIS File
 WDOE File
 METRO File

POTENTIAL HAZARDOUS WASTE SITE
SITE INSPECTION REPORT
PART 11 - ENFORCEMENT INFORMATION

I. IDENTIFICATION	
01 State	02 Site Number
WA	D009488561

ENFORCEMENT INFORMATION

U1 Past Regulatory/Enforcement Action Yes No

Description of Federal, State, Local Regulatory/Enforcement Action

None known

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

E&E site inspection - 12/11/85 & 02/14/86
EPA ERRIS File
WDOE File
METRO File

APPENDIX D

ANALYTICAL RESULTS QA/QC REVIEW MEMO,
SAMPLE SUMMARY SHEET, AND
EPA HAZARDOUS SUBSTANCE LIST:
INORGANIC COMPOUNDS



ecology and environment, inc.

108 SOUTH WASHINGTON, SUITE 302, SEATTLE, WASHINGTON 98104, TEL. 206-624-9537

International Specialists in the Environmental Sciences

MEMORANDUM

DATE: March 10, 1986

TO: John Osborn, FIT RPO, USEPA, Region X

FROM: *en* John Ryding, Chemist, E&E, Seattle *rum*
Andrew Hafferty, Senior Chemist, E&E, Seattle

THRU: D.A. Buecker, FIT RPM, E&E, Seattle *DB*

SUBJ: QA of Case 5608 (Inorganics)
Lynnwood Plating WA 0363

REF: TDD R10-8601-01

CC: Gerald Muth, DPO, USEPA, Region X
John Tilstra, DPO, USEPA, Region VIII
Carolyn Wilson, USEPA, Region X
Bill Carberry, E&E, Seattle

The Quality Assurance Review of eleven samples, Case 5608, collected at Lynnwood Plating has been completed. Eleven low level soil samples were analyzed for HSL inorganics by Rocky Mountain Analytical Laboratory of Arvada, Colorado. The samples were numbered:

MJ2587	MJ2591	MJ2595
MJ2588	MJ2592	MJ2596
MJ2589	MJ2593	MJ2597
MJ2590	MJ2594	

Data Qualifications

The following comments refer to the laboratory performance in meeting the Quality Control Specifications outlined in IFB WA84J091.

- 1) Timeliness - Acceptable
- 2) Initial and Continuing Calibrations - Acceptable
- 3) Detection Limits - Acceptable
- 4) Blanks - Acceptable

5) Spike Recovery

One element was out of control.

<u>Element</u>	<u>% Recovery</u>	<u>QC Limit</u>
Antimony	74%	75-125%

Antimony results may be biased low. Al, Ca, Fe, Mg, K, and Na were not included in the spike.

6) Duplicates

One compound was out of control.

<u>Compound</u>	<u>RPD</u>	<u>QC Limits</u>
Cyanide	98	<35

Cyanide results are of questionable value.

7) ICP Interference Check - Acceptable

8) Laboratory Control Sample

Two elements were out of control.

<u>Element</u>	<u>% R</u>	<u>QC Limit</u>
Cadmium	88%	90-110%
Nickel	117%	90-110%

9) Duplicate Sample Analysis - Acceptable

10) ICP Serial Diluions - Acceptable

11) Furnace AA - Acceptable

12) Mercury Analysis - Acceptable

13) Cyanide Analysis - Acceptable

14) Samples

Quarterly ICP Interelement Correction Factors and Linear Ranges were not included. Antimony data is flagged "J" due to poor spike recovery. Cyanide data is flagged "J" due to poor reproducibility. Cadmium and Nickel data are flagged "J" due to out of control laboratory control sample.

Data Use

The usefulness of the data is based on the criteria outlined in the "Laboratory Data Validation Functional Guidelines for Evaluating Inorganic Analyses" (R-582-5-5-01).

Upon consideration of the data qualifications noted above, the data are ACCEPTABLE for use except where flagged with data qualifiers which modify the usefulness of individual values.

Cyanide data is useful for LIMITED PURPOSES ONLY.

Data Qualifiers

- U - The material was analyzed for, but was not detected. The associated numerical value is estimated sample quantitation limit.
- J - The associated numerical value is an estimated quantity because quality control criteria were not met.
- R - Quality Control indicates that data are unusable (compound may or may not be present). Resampling and reanalysis is necessary for verification.
- Q - No analytical result.
- N - Presumptive evidence of presence of material (tentative identification).
- S - Indicates a value determined by method of standard addition.

JR:jkb

APPENDIX D
TABLE D2

EPA HAZARDOUS SUBSTANCE LIST:
HEAVY METAL COMPOUNDS

CHEMICAL NAME		Detection Limits *	
		Low Water	Low Soil
INORGANICS			
1	Aluminum	200	200
2	Antimony	60	60
3	Arsenic	10	10
4	Barium	200	200
5	Beryllium	5	5
6	Cadmium	5	5
7	Calcium	5000	5000
8	Chromium	10	10
9	Cobalt	50	50
10	Copper	25	25
11	Iron	100	100
12	Lead	5	5
13	Magnesium	5000	5000
14	Manganese	15	15
15	Mercury	0.2	0.2
16	Nickel	40	40
17	Potassium	5000	5000
18	Selenium	5	5
19	Silver	10	10
20	Sodium	5000	5000
21	Thallium	10	10
22	Tin	40	40
23	Vanadium	50	50
24	Zinc	20	20

* = Values in parts per billion

APPENDIX D

ANALYTICAL RESULTS QA/QC REVIEW MEMO,
SAMPLE SUMMARY SHEET, AND
EPA HAZARDOUS SUBSTANCE LIST:
INORGANIC COMPOUNDS

Appendix D
Table 1

Site Name: Lynnwood Plating Company, Inc.
Case No: 5608

TDD No: R10-8510-25
Project Code: TEC-270A
Account No: TFA-IO-PUZZ

Location Number	Lab Sample	Analysis Requested	Assumed Conc.	Date/Time Sampled	Sample Container	Sample Type	Pres.	STORET No.	Destination	Express Air Bill #
D1 *	MJ1569	Heavy Metals	Low	2/14/86 0950	1 8-oz jar	Grab	N/A	N/A	Rocky Mt. Analytical 553 Marshall St Arvada, CO 80002	463970846
D2	MJ1590	Heavy Metals	Low	2/14/86 0955	1 8-oz jar	Grab	N/A	N/A	Rocky Mt. Analytical	463970846
D3	MJ1591	Heavy Metals	Low	2/14/86 1010	1 8-oz jar	Grab	N/A	N/A	Rocky Mt. Analytical	463970846
D4	MJ1592	Heavy Metals	Low	2/14/86 1040	1 8-oz jar	Grab	N/A	N/A	Rocky Mt. Analytical	463970846
D5	MJ1593	Heavy Metals	Low	2/14/86 1120	1 8-oz jar	Grab	N/A	N/A	Rocky Mt. Analytical	463970846
D6	MJ1594	Heavy Metals	Low	2/14/86 1125	1 8-oz jar	Grab	N/A	N/A	Rocky Mt. Analytical	463970846
D7	MJ1595	Heavy Metals	Low	2/14/86 1130	1 8-oz jar	Grab	N/A	N/A	Rocky Mt. Analytical	463970846
D8	MJ1596	Heavy Metals	Low	2/14/86 1135	1 8-oz jar	Grab	N/A	N/A	Rocky Mt. Analytical	463970846
D9	MJ1597	Heavy Metals	Low	2/14/86 1150	1 8-oz jar	Grab	N/A	N/A	Rocky Mt. Analytical	463970846
D10	MJ1597	Heavy Metals	Low	2/14/86 1200	1 8-oz jar	Grab	N/A	N/A	Rocky Mt. Analytical	463970846
D11	MJ1597	Heavy Metals	Low	2/14/86 1210	1 8-oz jar	Grab	N/A	N/A	Rocky Mt. Analytical	463970846

* = "D" samples were of soil or sediment matrices.

47

APPENDIX D
TABLE D2

EPA HAZARDOUS SUBSTANCE LIST:
HEAVY METAL COMPOUNDS

CHEMICAL NAME		Detection Limits *	
		Low Water	Low Soil
INORGANICS			
1	Aluminum	200	200
2	Antimony	60	60
3	Arsenic	10	10
4	Barium	200	200
5	Beryllium	5	5
6	Cadmium	5	5
7	Calcium	5000	5000
8	Chromium	10	10
9	Cobalt	50	50
10	Copper	25	25
11	Iron	100	100
12	Lead	5	5
13	Magnesium	5000	5000
14	Manganese	15	15
15	Mercury	0.2	0.2
16	Nickel	40	40
17	Potassium	5000	5000
18	Selenium	5	5
19	Silver	10	10
20	Sodium	5000	5000
21	Thallium	10	10
22	Tin	40	40
23	Vanadium	50	50
24	Zinc	20	20

* = Values in parts per billion