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RCRA FACILITY ASSESSMENT PR/VSI REPORT

CHEMICAL PROCESSORS, INC.
EPA I.D. NO. WAD020257945

NORTHWEST PROCESSING, INC.
EPA I.D. NO. WAD980738512

SOL-PRO, INC.
EPA I.D. NO. WAD981769110

CHEMICAL PROCESSORS, PARCEL A
EPA I.D. NO. UNASSIGNED

Tacoma, Washington

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EXECUTIVE SUMMARY

The 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) provide authority to the U.S. Environmental Protection Agency (EPA) to require comprehensive corrective actions for solid waste management units (SWMUs) and other areas of concern at hazardous waste management facilities, particularly those applying for RCRA permits. These corrective actions are intended to address unregulated releases of hazardous constituents to air, soil, surface water, and ground water, as well as the generation of subsurface gas.

The three basic steps of an RFA consist of a preliminary review (PR) of existing files and other generally available or requested information; a visual site inspection (VSI) to confirm and/or obtain additional information on past or potential releases from SWMUs; and a sampling visit, when warranted, to fill information gaps by obtaining field and analytical data.

This report presents the results of a PR and VSI performed at Chemical Processors, Inc. (Chempro), Chempro Parcel A, Northwest Processing, Inc. (Northwest Processing), and Sol-Pro, Inc. (Sol-Pro) in Tacoma, Washington. The principal sources of information used include correspondence between the facilities and regulatory agencies, studies commissioned by the facilities, site maps and diagrams, the site visits, and the facilities' RCRA Part B permit applications. Files maintained by EPA Region 10 in Seattle, Washington Department of Ecology, Puget Sound Air Pollution Control Agency, and other local regulatory agencies were reviewed. A VSI was conducted on December 18, 1989 at Chempro and Chempro Parcel A, and on December 19, 1989 at Northwest Processing and Sol-Pro.

Section 1 provides an overview of the purpose of the RFA process. Section 2.0 of this report describes the four facilities, including their historical and current operations. Lists of individual SWMUs and a description of wastes managed are also included in this section. Section 3.0 provides an overview of the environmental setting at the facility including information on the meteorology, geology, and hydrology of the area. A discussion of soil and ground water contamination at the four facilities is presented in Section 4.0. Section 5.0 describes in detail each of the SWMUs identified during the PR and VSI. Conclusions and recommendations for further action are included in Section 6.0; references are listed in the final section of the report. The VSI photograph log and field notes, and summaries of analytical data are presented as appendices.

Chempro Proper

The land currently comprising Chempro Proper was historically wetlands; fill activities began between approximately 1936 and 1956. In the 1940s and early 1950s dredging occurred in the adjacent waterways and dredge spoils were used as the initial fill material. Additional fill activities occurred between 1970 and 1976, when lime sludges related to waste oil operations, lime sludges from Domtar Industries, waste sludges from Hooker Chemical, and ground-up automobile interiors (known as auto fluff) were dumped on the property.

In 1976, Chempro leased the southern portion of Chempro Proper from Don Oline, and began operating what is known as the letter tank system on Parcel B in 1979. The letter tank system is currently undergoing interim status closure. In 1982, Chempro purchased another portion of the property. In 1985, Chempro purchased the northern portion of Chempro Proper; this portion consisted of approximately eight acres. Chempro leased the northern portion and part of the southern portion of Chempro Proper to Freeway Container, Inc. beginning in 1986. In January 1987, Chempro began operation of their present tank system. The current Chempro Tacoma facility is a storage and treatment facility for hazardous wastes, and a storage facility for waste solvents and dangerous waste fuels. Treatment occurs in tanks using chemical and physical treatment methods, consisting primarily of acid/alkali neutralization and metals precipitation.

Seventy-one SWMUs were identified on the Chempro Proper parcel in the course of this RFA.

Parcel A

Parcel A was purchased in 1961 by Don Oline; the property was sold to Solidus Corporation in May 1981. The following companies leased the property and used it as the site of industrial operations between 1970 and 1986:

- 1970 to 1973 - Aero/Acology Oil operated a waste oil recycling operation on the west side of Parcel A.

- 1973 to 1974 - Puget Sound Industrial Petroleum (PSIP), purchased from Aero/Acology, operated the waste oil recycling facility.

- 1974 to 1975 - Chempro of Oregon purchased the facility from PSIP and continued the oil recycling operation.

- 1975 to 1986 - Chempro purchased the Chempro of Oregon equipment and continued the recycling operation until October 1984. Chempro continued to accept waste oil at the facility for storage in the existing equipment until August 1986. Chempro also built and operated a chemical treatment unit on the west side of the Parcel A from 1977 until December 1986 when their lease expired.

When Chempro's lease expired in December 1986, equipment containing hazardous wastes was left on the property. Subsequently, Chempro has removed the equipment and their contents. In addition, Chempro has removed some contaminated soil from the site, covered the excavated area with a membrane liner and clean soil, and reseeded the area.

A variety of fill materials have been deposited at Parcel A in a manner similar to Chempro Proper, as discussed above. Between 1969 and 1975, dredge spoils, lime wastes, spent lime catalyst from TCE and perchloroethylene production, auto fluff, and gravel were deposited on the property. An oil holding pond constructed in 1970 was reportedly filled with auto fluff around 1975.

Twenty-five SWMUs were identified on Parcel A in the course of this review.

Northwest Processing

The Northwest Processing (also known as Lilyblad Petroleum - Poligen Site) facility is located within a former tidal marsh of Commencement Bay. Historical photos indicate that prior to the 1960s, much of the property was a swampy area. As portions of the wetlands were filled, ponds were formed in various locations.

These were later filled in. The fill materials are estimated to be about 8 to 10 feet thick and composed of various materials including sand and gravel, dredge sand, lime sludge waste, wood chips, and auto fluff.

Filling of the area occurred during the 1960s and 1970s. By 1975, a small tank farm consisting of two tanks was being operated by Lilyblad in the northwest corner of the property. In 1978, three smaller tanks were also present. Poligen/Northwest Processing began leasing the Northwest portion of the property in 1974 and purchased it in 1981 along with Parcel A. Shortly thereafter, Poligen/Northwest Processing purchased the two adjacent parcels to the east and southeast. Currently, Northwest Processing operates on all parcels except Parcel A.

Poligen/Northwest Processing has been processing mixtures of gasoline, diesel fuel, and water since 1983. Sources of materials to be processed include barges, pipelines, petroleum service stations, wholesale outlets for mixed gas/diesel combinations, and large facilities. The gasoline (for naphtha) and water fractions are separated from the residual diesel fraction. The recovered naphtha is sold to a local refinery as a blending stock for regular gasoline or reformer feedstock. The residual diesel or cutter stock is sold to fuel blenders as a blending stock for marine and industrial fuels. Waste oils containing less than 1,000 ppm halogenated hydrocarbons and less than 1 ppm PCB were processed at this facility between 1983 and 1987. The light fraction separated from waste oils contaminated with water, gasoline, and solvents was used as a fuel source for the facility's boiler.

In 1987, Northwest Processing installed a centrifuge system to reduce the solids content of residual fuels to less than 0.2% by weight. This process generates an oily sludge waste, which is disposed of through incineration or land disposal.

Materials are stored in bulk in tanks in bermed areas. Lubricants (bulk, drummed, and packaged) are stored on-site in enclosed buildings. Small packaging of solvents also occurs on the Northwest Processing site in an enclosed building. Other activities include laboratory analyses, process wastewater collection and treatment, and stormwater runoff management. According to facility personnel, Northwest Processing does not currently accept dangerous wastes regulated under WAC 173-303 for treatment, storage, or disposal (51). Gasoline and diesel reprocessing throughput is about 50,000 to 100,000 gallons per month (39).

Northwest Processing generates about 5,000 to 15,000 gallons per month of process wastewater from the centrifuge and fractionation processes. It is stored in tanks prior to transport to a licensed off-site disposal facility. Process wastewater is treated through an oily water treatment system or drummed for subsequent disposal off-site.

The facility currently has four tank farms which contain four, ten, eight, and two tanks, respectively. The site has five buildings: a main warehouse, two drum storage buildings, and two shops. There are two primary loading docks for bulk loading/unloading of trucks and trailers.

Forty-eight SWMUs were identified at Northwest Processing in the course of this RFA.

Sol-Pro

The location of the Sol-Pro property was formerly a portion of the Puyallup River delta drainage and tideflats. According to historical records, the property was undeveloped and generally unfilled prior to 1950. Some incidental filling associated with construction of the waterway and development of the adjacent Buffelen Lumber Company may have occurred at this time. The Buffelen Lumber Company may have used the property for storage of finished lumber or disposal of mill sawdust waste. Aerial photos from 1967 to 1974 also indicate no development of the property, although there may have been some incidental use of the northern corner. This corner was adjacent to Acology Oil and a slate milling operation.

The Sol-Pro Alexander Avenue facility was constructed in 1987; operations began in 1988. The facility currently reclaims solvent from blended or dirty waste solvent. The reclaimed solvent is returned to the generator or sold; any treatment residual is shipped off-site for use as a hazardous waste fuel. Evaporation/condensation units are used to recover purified solvents. Chlorinated waste solvents and non-chlorinated waste solvents are processed at the facility. Currently, chlorinated solvents are processed infrequently. The two types of solvents are handled separately. The facility is operated for two shifts per day, five days per week.

Waste solvents are received on-site in drums or tank trucks. Materials in tank trucks are pumped directly to feed tanks. Drummed wastes are stored for less than 24 hours prior to being emptied into the feed tanks. Waste solvents are distilled using the Luwa Thin Film Evaporator, the Brighton Solvent Reclaiming System, and/or a horizontal evaporator. Liquid solvents are recycled in the Luwa or Brighton stills; waste solvent sludges are reclaimed in the horizontal evaporator.

Reclaimed solvent is returned to the generator or resold. Processed non-chlorinated solvent blends are shipped to a licensed off-site facility (a cement kiln) for use as a hazardous waste fuel. Processed chlorinated solvent blends are shipped to a licensed off-site disposal facility for incineration.

Waste materials are shipped off-site from the Sol-Pro facility in trucks and railcars. Other wastes are generated during routine plant operation and maintenance activities. Machine parts are cleaned and repaired using solvents. These solvents are recycled in the Luwa still and in the horizontal evaporator. Routine maintenance of the structures and buildings may also require paints and thinners.

Twenty-two SWMUs were identified on Sol-Pro in the course of this RFA.

<u>Soil and Groundwater Contamination</u>

Investigations of surface and subsurface contamination have been evaluated at all four facilities. The largest number of investigations have been conducted to evaluate subsurface contamination at the Chempro facilities. These include the installation of monitoring wells at Parcels A and Chempro Proper, collection of closely spaced sampling data for soils at Parcel A and less extensive soil sampling at Chempro Proper. Information available on soil and ground water investigations from Northwest Processing and Sol-Pro is limited to ground water quality data from a small number of monitoring wells at these facilities. The discussion of soil and ground water contamination at the facilities relies primarily on investigations conducted at the Chempro properties. This information is supplemented by data from Sol-Pro and Northwest Processing, where possible.

Results of the ground water laboratory data were reviewed and each analytical result verified with the laboratory analysis document provided in the investigation reports, except for the Chempro ground water sampling results that did not include laboratory analyses reports.

Significant levels of soil contamination have been encountered at the Chempro Parcel A and Chempro Proper in all of the investigations conducted to date. A variety of organic compounds and metals have been detected in soil at levels that may contribute to ground water contamination in exceedance of health-based standards and criteria. Available information indicates a continuous area of soil contamination at Parcel A that may be attributed to the former waste treatment unit and the oil pond. Additional sources of contamination at Parcel A may include auto fluff and spent lime catalyst fill materials. Contamination detected along the northern edge of Parcel A and in the northeast corner of Chempro Proper may be due to releases from Northwest Processing or unidentified sources at the Chempro facilities.

The distribution of contamination at Chempro Proper has not been adequately determined. Due to the number and distribution of sample locations, the lateral extent and relationship of contaminants can not be determined from the available information. Additional sampling is required to determine the lateral extent and distribution of contamination at Chempro Proper. The absence of soil sampling data at the Northwest Processing and Sol-Pro facilities does not allow the identification or characterization of any releases to soil that may have occurred at these facilities, or due to releases from adjacent facilities that may have migrated onto these properties.

In ground water, the major contaminants of concern exceeding MCLs include the following metals and organic compounds:

- Arsenic, cadmium, chromium, copper, and lead
- Benzene, vinyl chloride, 1,1-dichloroethene, and trichloroethene.

The shallow aquifer gradient is generally toward the south. Exceedances of MCLs and other health-based limits occurred in the shallow aquifer wells throughout the site. The lower alluvial aquifer wells have not exhibited elevated concentrations of metals or organic compounds except for slightly elevated concentrations of bis(2-ethylhexyl)phthalate in wells CTMW-7 and CTMW-9. Benzene concentrations exceeded the MCL in five out of six wells within Parcel A.

Total concentrations of arsenic, cadmium, chromium, copper, and lead exceeding MCLs reflect releases at the Chempro facilities, and possibly from Northwest Processing. While dissolved metals concentrations are significantly lower, elevated concentrations of dissolved metals also indicate contamination that may be present from a variety of sources, including plating wastes managed at Chempro, auto fluff used as fill material in the area, oily wastes disposed at Parcel A, and possibly from releases from Northwest Processing operations. The extent of metals contamination cannot be adequately evaluated from existing data, because of the paucity of data from Chempro Proper, limited sampling of downgradient wells at Parcel A, and the absence of useable data from Northwest Processing and Sol-Pro monitoring wells.

The small amount of data available from the southern portion of Parcels A and from Chempro Proper prevents a reliable evaluation of site conditions at this time. Other organic compounds, such as acetone and 4-methylphenol have been detected at high concentrations (>100 ug/L) in individual wells. It cannot be determined from the available information if these wells have encountered localized areas of contamination or a portion of a more widespread plume of contamination.

Facility-Specific Conclusions and Recommendations

Chempro Proper - Of primary concern in active operations at Chempro Proper are potential air releases from tanks which are vented directly to the atmosphere and which may contain acid fumes or volatile organic compounds. The letter tanks are being closed under interim status. Recommendations have been made to ensure that the closure investigation activities for these tanks meet the needs of the comprehensive soil and ground water investigations to be conducted elsewhere. The parking lot used by Resource Recovery Trucks is a potential source of spills to soil, and possibly ground water. The Freeway container SWMUs appear to be a housekeeping problem; recommendations have been made to upgrade the management of these areas.

Parcel A - No specific recommendations have been made with regard to individual SWMUs at Parcel A. Recommendations made for the comprehensive soil and ground water investigations apply to this area.

As at Chempro, potential air releases from tanks vented directly to the atmosphere are of concern at this facility. Air sampling and/or provisions for release controls has been recommended. In Tank Farm 1, soil sampling has been recommended due to known past releases from units within the tank farm. Soil sampling has also been recommended in a variety of areas where wastes have been inappropriately managed over the years. These recommendations apply to those areas identified in the 1988 Ecology inspection, and the loading/unloading areas, as well as to the areas where horizontal tanks were located in the 1970s.

Sol-Pro - Of the four facilities, operations at Sol-Pro are of the least concern. This facility is newer than the others, and was originally constructed with secondary containment for tankage, and containers. Recommendations include air sampling for the Brighton Solvent Reclaiming System and the Railcar Loading Rack. Stormwater sampling has also been recommended for this facility.

Comprehensive Soil and Ground Water Recommendations

At Chempro Parcel A, Chempro Proper, Northwest Processing, and at Sol-Pro, additional activities have been identified to fully characterize the releases that have been detected in soils. Several types of investigative actions need to be carried out in order to determine the nature and extent of these releases, including:

- Performance of a soil gas survey to identify subsurface contamination patterns for the placement of soil borings and monitoring wells

- Collection of soil samples at specified intervals from ground surface to the bottom of the uppermost aquifer to determine the vertical distribution of contamination, identify preferential migration pathways and delimit the volume of soil that may require corrective measures

- Installation of additional soil borings to determine the lateral extent and interrelationship of contaminated areas at the facilities, including installation of soil borings at the Chempro, Northwest Processing, and Sol-Pro facilities at locations that may have been impacted by any releases that have occurred at these facilities

- Identification of Appendix VIII hazardous constituents in the releases in addition to those compounds previously identified at the facilities

- Determination of the mobility of hazardous constituents in contaminated soil that may contribute to ground water contamination (e.g. determination of leachate compositions and adsorption coefficients of contaminated soils and fill materials).

In order to determine the nature and extent of ground water contamination at the Chempro Proper, Chempro Parcel A, Northwest Processing, and Sol-Pro facilities, the following recommendations have been made:

- Continue quarterly ground water sampling of wells CTMW-6, CTMW-7, CTMW-8, CTMW-9, CTMW-10, CTMW-11, and CTMW-12. Start quarterly sampling of wells CTMW-1, CTMW-2, CTMW-3, CTMW-4, CTMW-5, wells A-1, A-2, A-3, L-1, L-2, L-3, L-4, L-5, and wells 1, 2, and 3 on the Sol-Pro property for VOCs, BNAs, metals, and petroleum hydrocarbons listed in Appendix B. All analytical procedures should be implemented with appropriate detection limits and QA/QC measures as per EPA SW-846.

- Water level measurements for all existing wells should be performed to assist in confirming ground water flow direction.

- Evaluate sample quality (turbidity) from wells and ensure proper development to assure representative samples are obtained from each monitoring well. Replace any wells that can not yield representative samples.

- Based on results of the soil gas survey, sample existing wells, and install and sample additional wells as needed to fully characterize ground water contamination at the facilities and affected areas.

- Characterize the relationship between ground water and surface discharges. Hydraulic connection between ground water and surface water must occur either at Blair Waterway or at other surface locations. If discharge areas are identified, sediment and surface water sampling should be conducted to delineate the surface contamination due to discharges of contaminated ground water

- Install monitoring wells in the fill and alluvial aquifers and conduct pumping tests to determine hydraulic interconnections in areas of possible intercommunication based on site stratigraphy.

- Use experienced field geologists and/or hydrologists to conduct ground water sampling. This will help to ensure proper sampling techniques by trained personnel.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF FIGURES (Continued)

1.0 INTRODUCTION

1.1 PURPOSE AND SCOPE OF THE RFA PROGRAM

The 1984 Hazardous and Solid Waste Amendments (HSWA) to the Resource Conservation and Recovery Act (RCRA) provide authority to the U.S. Environmental Protection Agency (EPA) to require comprehensive corrective actions for solid waste management units (SWMUs) and other areas of concern at hazardous waste management facilities, particularly those applying for RCRA permits. These corrective actions are intended to address unregulated releases of hazardous constituents to air, soil, surface water, and ground water, as well as the generation of subsurface gas.

A major activity in EPA's corrective action program consists of a RCRA Facility Assessment (RFA). According to the EPA's RFA guidance document (October 1986), the purposes of an RFA are to:

1. Identify and gather information on releases at RCRA-regulated facilities.
2. Evaluate solid waste management units and other areas of concern for releases to all environmental media and regulated units for releases other than to ground water.
3. Make preliminary determinations regarding releases of concern and the need for further actions and interim measures at the facility.
4. Screen from further investigation those SWMUs which do not pose a threat to human health and the environment.

The three basic steps of an RFA consist of a preliminary review (PR) of existing files and other generally available or requested information; a visual site inspection (VSI) to confirm and/or obtain additional information on past or potential releases from SWMUs; and a sampling visit, when warranted, to fill information gaps by obtaining field and analytical data.

1.2 REPORT CONTENTS

This report presents the results of a PR and VSI performed at Chemical Processors, Inc. (Chempro), Chempro Parcel A, Northwest Processing, Inc. (Northwest Processing), and Sol-Pro, Inc. (Sol-Pro) in Tacoma, Washington. The principal sources of information used include correspondence between the facilities and regulatory agencies, studies commissioned by the facilities, site maps and diagrams, the site visits, and the facilities' RCRA Part B permit applications. Files maintained by EPA Region 10 in Seattle, Washington Department of Ecology, Puget Sound Air Pollution Control Agency, and other local regulatory agencies were reviewed.

A VSI was conducted on December 18, 1989 at Chempro and Chempro Parcel A, and on December 19, 1989 at Northwest Processing and Sol-Pro by Barbara Morson and Kathryn Gladden, both of Science Applications International Corporation (SAIC). Dave Polivka, Rick Renaud, Kirk Cook, and Paul Stasch of the Washington Department of Ecology participated in the inspections.

Section 2.0 of this report describes the four facilities, including their historical and current operations. Lists of individual SWMUs and a description of wastes managed are also included in this section. Section 3.0 provides an overview of the environmental setting at the facility including information on the meteorology, geology, and hydrology of the area. A discussion of soil and ground water contamination at the four facilities is presented in Section 4.0. Section 5.0 describes in detail each of the SWMUs identified during the PR and VSI. Conclusions and recommendations for further action are included in Section 6.0; references are listed in the final section of the report. The VSI photograph log and field notes, and summaries of analytical data are presented as appendices.

2.0 FACILITY DESCRIPTIONS

The four facilities are located in the tideflats of Commencement Bay in the City of Tacoma, Washington (Figure 1). These facilities are located in a tidal marsh where extensive dredge and fill activities have occurred since the early 1900s. The four facilities are contiguous (Figure 2). Owners and operators of each facility are not extensively dealt with in this report; brief histories are given only to assist in tracing industrial activities at each facility. An extensive search of potentially responsible parties has been conducted for the parcels which are owned by Chempro (24). Historical and current operations, and regulatory history identified in the course of this RFA are described below, along with a list of SWMUs identified for each facility.

2.1 CHEMPRO PROPER

"Chempro Proper" refers to those portions of the Chempro property which are described in some references as Chempro Parcels B (the former Letter Tank Farm), C, D, and E. Chempro Proper also includes those portions of Chempro property being leased by other entities (i.e., Freeway Container, Resource Recovery parking lot) (Figure 2).

2.1.1 Identification of Solid Waste Management Units

Seventy-one Solid Waste Managements Units (SWMUs) have been identified at Chempro Proper as a result of the PR and VSI. SWMUs identified at the facility are listed in Table 1, and are designated throughout this report by the letter "C". Locations of these SWMUs are shown on Figures 3 and 4. Detailed descriptions of these SWMUs may be found in Section 5.1.

2.1.2 Historical Operations

The land currently comprising Chempro Proper was historically wetlands; fill activities began between approximately 1936 and 1956. In the 1940s and early 1950s dredging occurred in the adjacent waterways and dredge spoils were used as the initial fill material. Additional fill activities occurred between 1970 and 1976, when lime sludges related to waste oil operations, lime sludges from Domtar Industries, waste sludges from Hooker Reserve for Chemical, and ground-up automobile interiors (known as auto fluff) were dumped on the property.

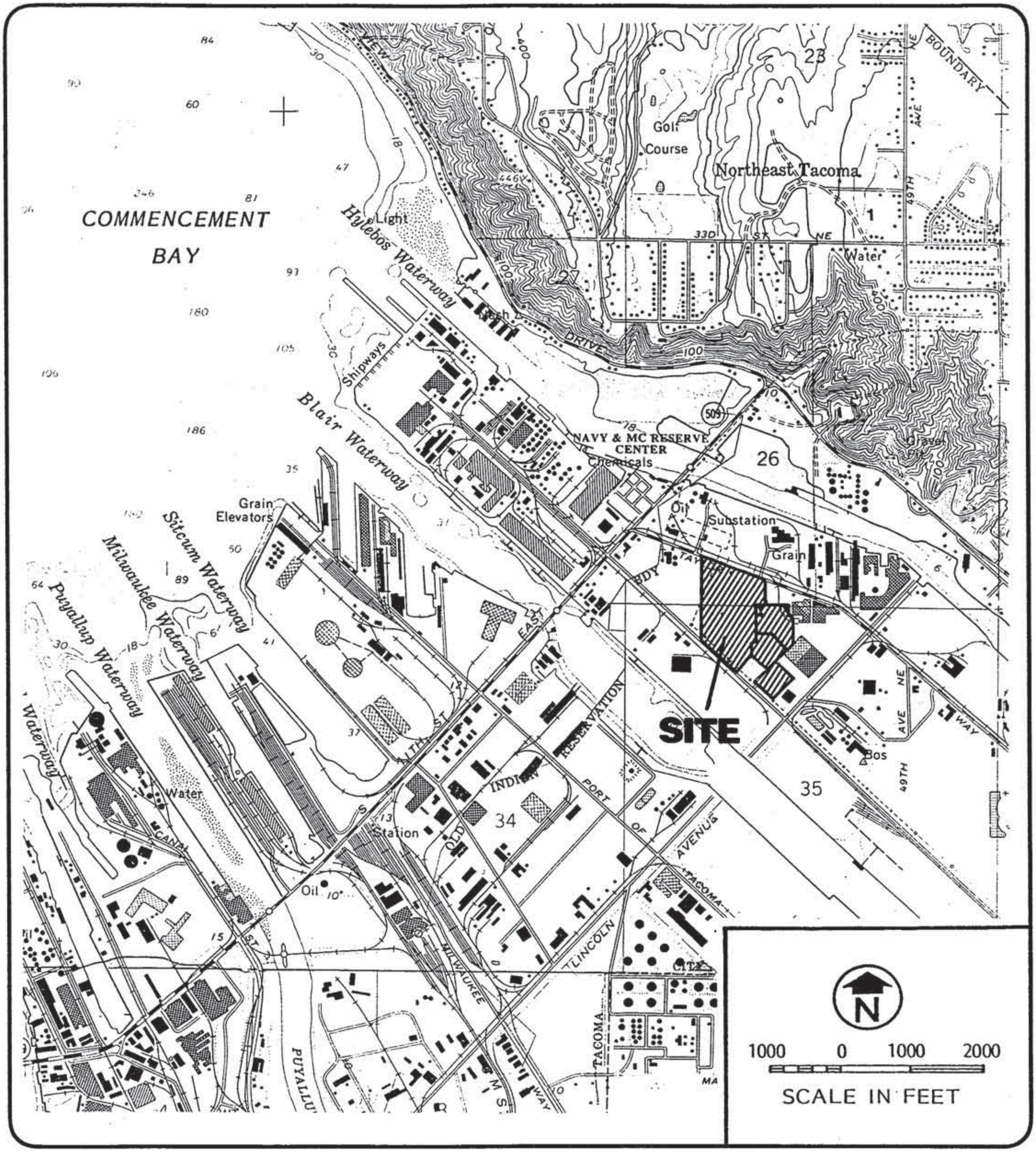


Figure 1

AREA MAP
Source: USGS 7.5' Topo. Map,
Tacoma North, WA Quad, 1981

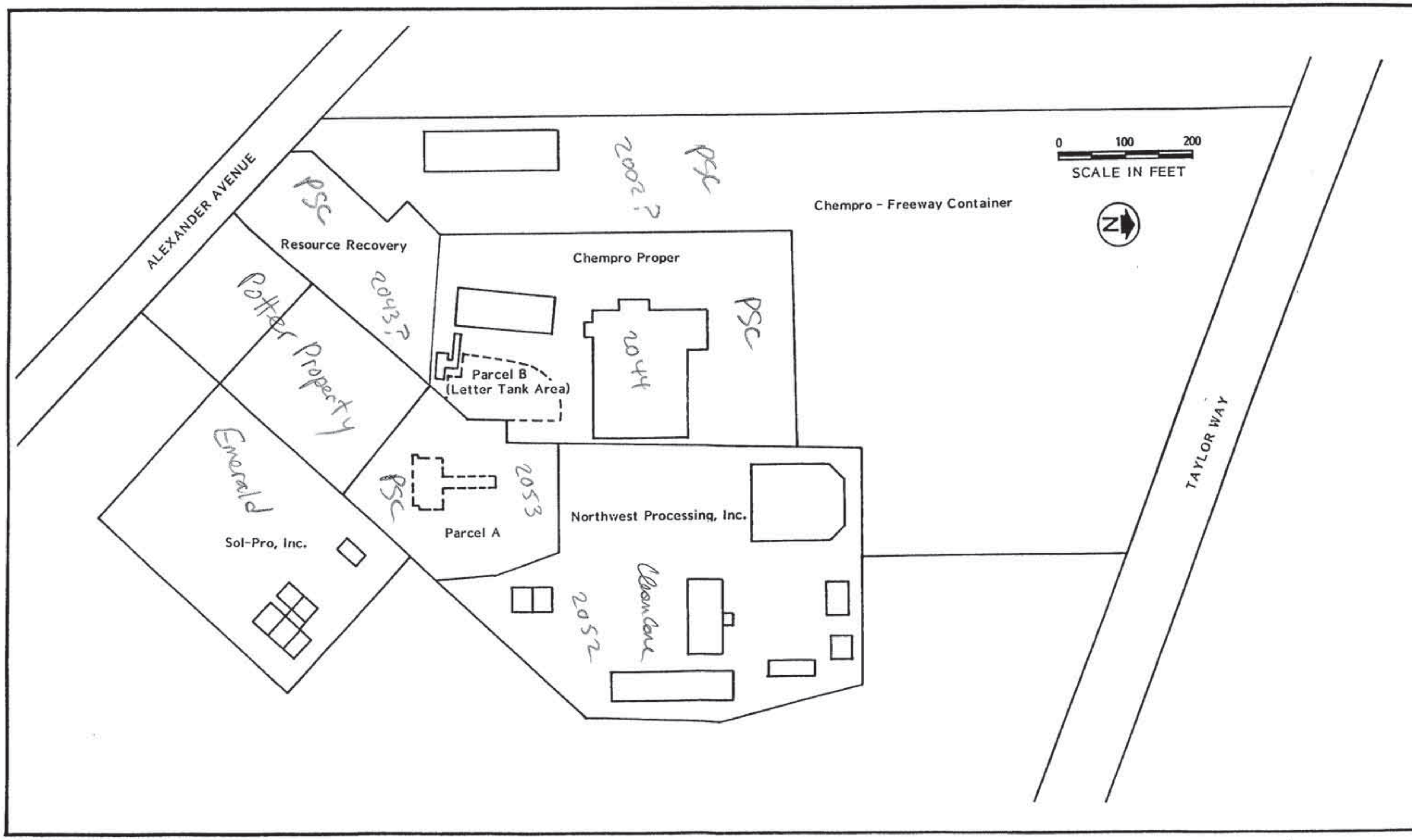
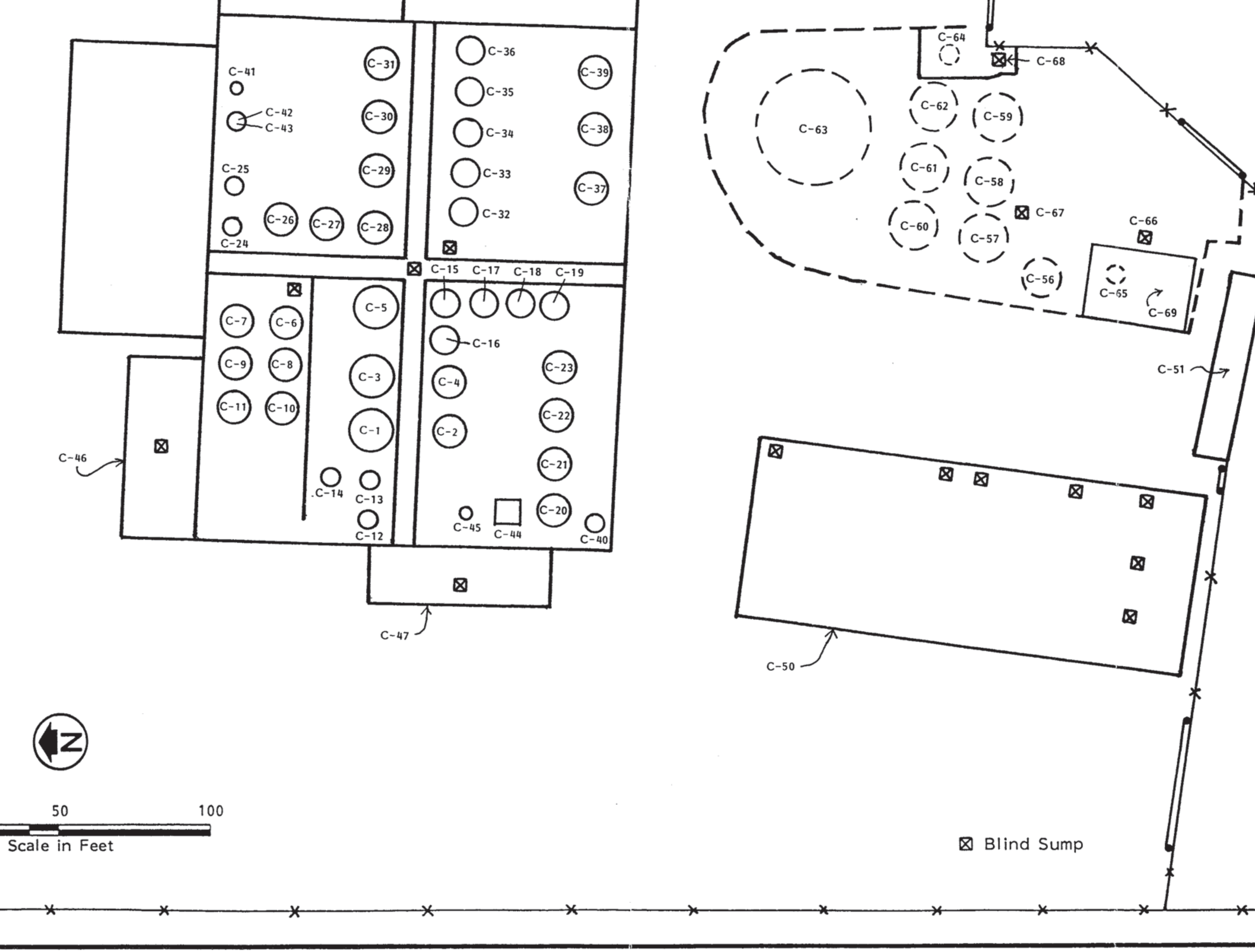


Figure 2

SITE MAP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Scale in Feet
Blind Sump

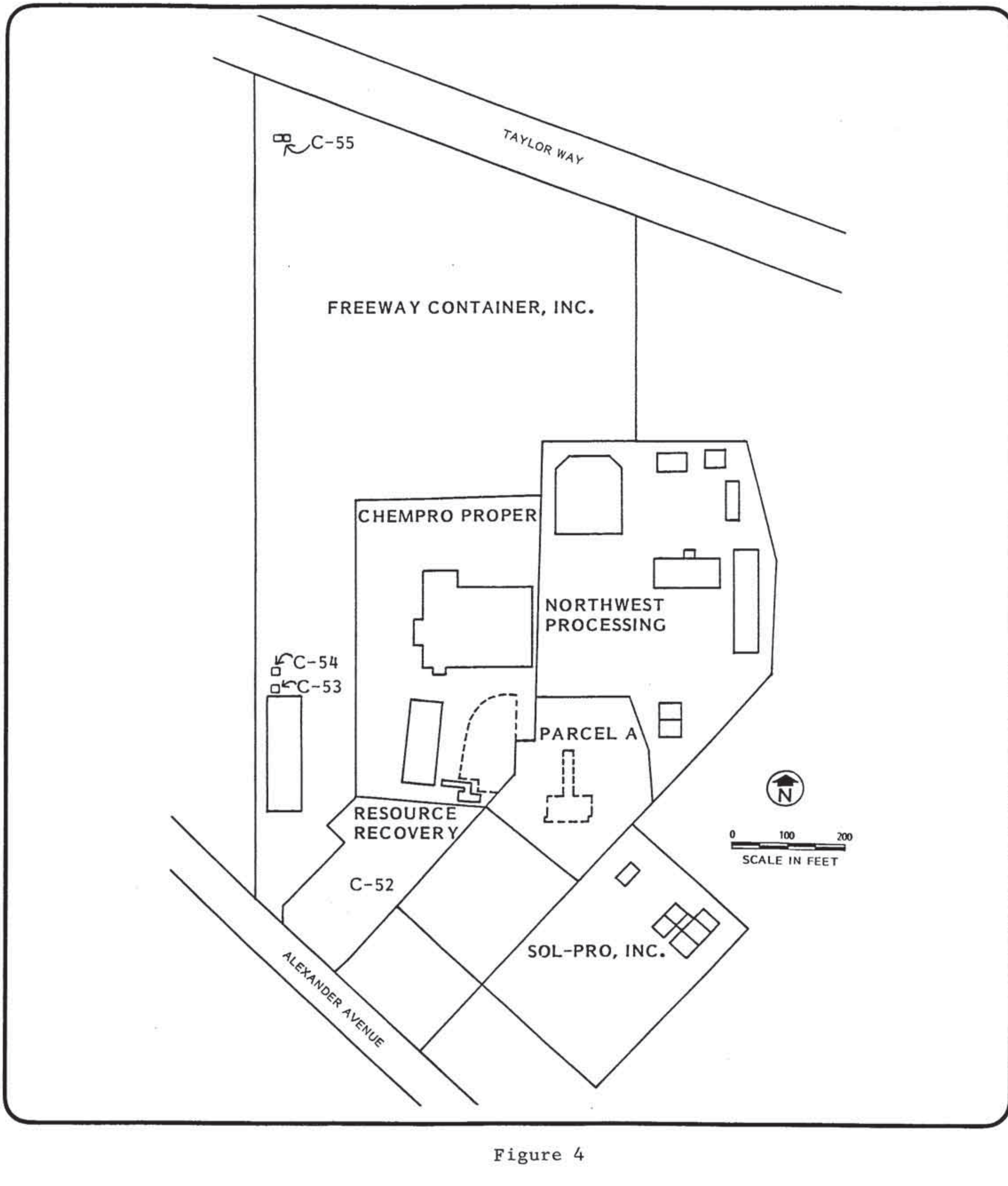


Figure 4

SOLID WASTE MANAGEMENT UNIT LOCATIONS
FREEWAY CONTAINER AND RESOURCE RECOVERY

Table 1

SOLID WASTE MANAGEMENT UNITS
CHEMPRO PROPER

SWMU NO.	DESCRIPTION
C-1	Treatment Tank 51
C-2	Treatment Tank 52
C-3	Treatment Tank 53
C-4	Treatment Tank 54
C-5	Treatment Tank 55
C-6	Acid Waste Storage Tank 101
C-7	Acid Waste Storage Tank 102
C-8	Acid Waste Storage Tank 103
C-9	Acid Waste Storage Tank 104
C-10	Acid Waste Storage Tank 105
C-11	Acid Waste Storage Tank 106
C-12	Chemical Milling Waste Storage Tank 201
C-13	Chemical Milling Waste Storage Tank 202
C-14	Chemical Milling Waste Storage Tank 203
C-15	Sludge Settling Tank 301
C-16	Sludge Settling Tank 302
C-17	Sludge Settling Tank 303
C-18	Sludge Settling Tank 304
C-19	Sludge Settling Tank 305
C-20	Sewer Discharge Tank 401
C-21	Sewer Discharge Tank 402
C-22	Sewer Discharge Tank 403
C-23	Sewer Discharge Tank 404
C-24	Isolation Tank 501
C-25	Isolation Tank 502
C-26	Alkaline Waste Storage Tank 601
C-27	Alkaline Waste Storage Tank 602
C-28	Alkaline Waste Storage Tank 603
C-29	Alkaline Waste Storage Tank 604
C-30	Non-Process Sludge Storage Tank 701
C-31	Non-Process Sludge Storage Tank 702
C-32	Dangerous Waste Fuel Storage Tank 801
C-33	Dangerous Waste Fuel Storage Tank 802
C-34	Dangerous Waste Fuel Storage Tank 803
C-35	Dangerous Waste Fuel Storage Tank 804

Table 1 (Continued)

SWMU NO.	DESCRIPTION
C-36	Dangerous Waste Fuel Storage Tank 805
C-37	Dangerous Waste Fuel Storage Tank 901
C-38	Dangerous Waste Fuel Storage Tank 902
C-39	Dangerous Waste Fuel Storage Tank 903
C-40	Air Stripper
C-41	Cement Mixer Stabilization Feed Tank
C-42	Cement Mixer Stabilization Unit
C-43	Stabilization Unit Receiving Tank
C-44	Oberlin Filter Press
C-45	Filtrate Collection Tank
C-46	North Acid Area Loading/Unloading Pad
C-47	West Process Area Loading/Unloading Pad
C-48	NE Alkaline Area Loading/unloading Pad
C-49	SE Dangerous Waste Fuel Area Loading/Unloading Pad
C-50	Container Storage Pad
C-51	Laboratory Drain Collection Tank
C-52	Resource Recovery Parking Lot
C-53	Freeway Container, Inc. Solvent Storage Shed
C-54	Freeway Container, Inc. Waste Paint Shed
C-55	Piles of Excavated Soil in NW Corner of Freeway Container, Inc.
C-56	Stormwater Storage Tank S
C-57	Treatment Storage Tank A
C-58	Treatment Storage Tank B
C-59	Treatment, Storage, and Isolation Tank C
C-60	Treatment, Storage, and Isolation Tank D
C-61	Treatment, Storage, and Isolation Tank E
C-62	Treatment, Storage, and Isolation Tank F
C-63	Treatment and Storage Tank BB
C-64	Filtrate Collection Tank
C-65	Soil Solidification/Stabilization Tank
C-66	Solidification/Stabilization Unit Sump
C-67	Sump Between A and B
C-68	Filter Press Sump
C-69	Parcel B Solidification/Stabilization Area
C-70	Areas of Auto Fluff and Lime Fill
C-71	Storm Drainage System

In 1976, Chempro leased the southern portion of Chempro Proper from Don Oline, who owned the land at that time and began operating what is known as the letter tank system (SWMUs C-56 through C-63) in 1979. The letter tank system area is currently undergoing interim status closure. In 1982, Chempro purchased a portion of the property from D. Gorden, Virginia Potter, Wallace and Edna Clark, and Emmerson and Lillian Potter (17). In 1985, Chempro purchased the northern portion of Chempro Proper from John Brazier. This portion consisted of approximately eight acres. Chempro leased the northern portion and part of the southern portion of Chempro Proper to Freeway Container, Inc. beginning in 1986. In January 1987, Chempro began operation of its present tank system (SWMUs C-1 to C-51) (17).

2.1.3 Current Operations

The Chempro Tacoma facility is a storage and treatment facility for hazardous wastes. Treatment occurs in tanks using chemical and physical methods, consisting primarily of acid/alkali neutralization and metals precipitation.

Wastes Managed at the Facility - Wastes processed at the facility consist of acids, caustics, and metal-contaminated wastes. The majority of these wastes are spent plating baths and other industrial wastewater streams. Waste solvents and oil are accepted for storage and testing for their suitability for blending into dangerous waste fuels.

Wastes accepted for treatment at the facility, volumes and regulatory classifications are listed in Table 2. Wastes generated by facility operations are listed in Table 3. Units and processes used for management of these wastes are presented in Table 4. Twenty-three of these wastes are acid or alkaline industrial wastes that exhibit the characteristics of corrosivity and/or EP toxicity. The characteristic of corrosivity is eliminated by neutralization of the wastes. EP toxic wastes in these groups are regulated due to the concentrations of cadmium, chromium, and lead. Because these wastes are corrosive industrial wastes used in metal treating operations, significant amounts of other hazardous metals may be present in these wastes, including arsenic, barium, mercury, selenium, silver, copper, and nickel. In addition,

Table 2

REGULATED WASTES RECEIVED AT CHEMPRO PROPER FROM OFF-SITE SOURCES

Waste ID Numbers	Estimated Volume (gal/month)	Possible Dangerous Waste Number	Designation
Waste Alkalis/Chelated Alkalis			
1	50,000	D007, WT01, WT02	DW/EHW
2	5,000	WT01, WT02	DW/EHW
3	1,300	D006, D007, WT01, WT02	DW/EHW
4	2,000	D002, D007, WT01, WT02	DW/EHW
5	400	D002, WT01, WT02	DW/EHW
6	4,000	WT01, WT02	DW/EHW
7	1,500	WT01, WT02, D007	DW/EHW
8	4,000	D002, D007, D006, D008	DW/EHW
9	3,000	D002, D008	DW/EHW
Waste Acids/Chelated Acids			
10	15,000	D002, D007, WT01, WT02	DW/EHW
11	5,000	D007, D008, D006, WT01, WT02	DW/EHW
12	5,000	D007, D004, D010, D011, WT01, WT02	DW/EHW
13	15,000	D002, D007, D008, D006	DW/EHW
14	6,000	D002	DW
15	15,000	D002, D007, WT01, WT02	DW/EHW
16	2,200	D002, D007	DW/EHW
17	12,000	D002, D007, WT01, WT02	DW/EHW
18	3,000	D002, D007, WT01, WT02	DW/EHW
19	2,000	D006, D007, D008, WT01, WT02	DW/EHW
20	1,200	D002, D006, D007, D008, WT01, WT02	DW/EHW
21	21,000	D002, D007	DW/EHW
22	6,000	D002, D008	DW/EHW
23	6,000	D002, D007	DW/EHW
Wastewater Treatment Sludges			
24	30,000	F006	DW
Chemical Milling Wastes			
25	9,000	D002	DW
Waste Solvents or Oils to be Used as Dangerous Waste Fuels			
26	3,000	F001	DW/EHW
27	3,000	F002, F003, F005, WP01, WT01 WT02	DW/EHW
28	1,300	D001, F002, F003	DW/EHW

Reference: Chempro Part B Permit Application, (17)

Table 3

REGULATED WASTES GENERATED ON-SITE
AT CHEMPRO PROPER

Waste ID Number	Description	Estimated Volume Generated Per Year	Possible Dangerous Waste Numbers	Designation
Acid/Alkaline and Wastewater Sludge Process Wastes				
29	Wastewater Treatment Sludge	1,500,000 gal	F001, WT01, WT02, D004-D011	DW/EHW
30	Wastewater Treatment Solid	4,000 tons	F006, WT01, WT02, D004-D011	DW/EHW
Chelated Materials Process Waste				
31	Waste Mixed Acid	250,000 gal	D002, D004-D011	DW/EHW
Chemical Milling Solution Process Waste				
32	Aluminum Chemical Milling Solution	200,000 gal	D002, WT01, WT02, F019, D004-D011	DW/EHW
Phenolic Materials				
33	Neutralized Acid	200,000 gal	WT01, WT02, D004-D011	DW/EHW
Miscellaneous Cleanup Debris				
34	Cleanup Debris	1,000 yd^3	WT01, WT02, D004-D011	DW/EHW
Dangerous Waste Fuel Tank Cleaning Waste				
35	Dangerous Waste Fuel Cleaning Waste	200 tons	WT01, WT02, D004-D011	DW/EHW

Reference: Chempro Part B Permit Application, (17)

Table 4

TYPICAL WASTES MANAGED IN TANK SYSTEMS
AT CHEMPRO PROPER

Tanks	Process	Possible Wastes Managed (Waste Identification Number) [a]
50 Series	Treatment	1-25
100 Series	Storage	10-23
200 Series	Storage	25
300 Series	Sludge Settling	1-25
400 Series	Sewer Discharge	Treated Wastewater
500 Series	Isolation Storage	1-9, 25
600 Series	Storage	1-9
700 Series	Storage	24
800 and 900 Series	Storage	26-28
Filter Press	Filtration	1-25
Chelated Material Treatment Unit	Treatment	1-25
Solidification/ Stabilization	Treatment	Not provided; variable sources
Sludge Dryer	Treatment	1-25

[a] Refer to Table 1 for waste identification number description

Adapted from: Chempro Part B Permit Application, (17) if these wastes are generated in metal working operations where solvents are used in parts cleaning or degreasing, the wastes may contain solvent constituents such as tetrachloroethene, trichloroethene, phenolic compounds, and 1,1,1-trichloroethane.

Chelated wastes managed at the facility may also exhibit corrosivity and EP toxicity due to properties and compositions similar to those waste streams described above. If the chelated wastes are paint-related waste materials, they may contain volatile organic compounds including toluene, xylenes, and methylene chloride.

Wastewater treatment sludges from electroplating operations may contain a variety of hazardous constituents, including the hazardous metals present in the acid and alkaline waste streams. Solvent contamination of the wastes due to degreasing and parts cleaning operations associated with electroplating may also be present. Cyanides may also be present if used in the plating process.

Waste solvents and oils stored at the facility prior to transfer off-site for fuel blending may also contain a wide variety of hazardous constituents. Halogenated and non-halogenated solvents may contain the solvent constituents present in the waste definitions (F001-F005) including halogenated hydrocarbons, aromatic hydrocarbons, ketones, alcohols, cresylic acids, and nitrobenzene. In addition, 1,4-dioxane is often added to solvents as a stabilizer. Waste oils may also contain a variety of hazardous constituents. Aromatic hydrocarbons may be a component of waste oils. Chlorinated solvent compounds are commonly present as contaminants in used oils. Heavy metals may also be present in used oils in significant concentrations. Polynuclear aromatic hydrocarbons (PAHs) are typically important components of used oils. PAHs present in oils include naphthalene, 2-methylnaphthalene, pyrene, chrysene, and benzo(a)anthracene. A wide variety of PAHs with physical and chemical properties similar to these compounds may also be significant components of used oils.

Operations at the facility occur on approximately 3.5 acres. The facility currently consists of a 60-foot by 150-foot concrete container storage pad and a 170-foot by 140-foot concrete tank containment system constructed over a high density polyethylene (HDPE) liner. Fill materials excavated to construct the containment pad have been placed in the northwest portion of the property (SWMU C-55). The containment system consists of four operational areas: the process area, the acid area, the alkaline area, and the dangerous waste fuel area. Wastes intended for storage in the tank containment system enter the facility in tankers. After an initial analytical screening, the tanks are unloaded within one of the four truck loading/unloading pads (SWMUs C-46 to C-49) located adjacent to the containment pad.

Processes currently conducted in the Chempro tank system include:

- Chemical Oxidation
- Chemical Precipitation
- Chemical Reduction
- Neutralization
- Decanting
- Filtration
- Flocculation
- Sedimentation
- Solidification/Stabilization

A description of how these processes apply to the five waste streams most typically treated at the facility is presented below.

Acid/Alkaline Waste Process Flow - Figure 5 depicts the general process flow for acid and alkaline wastes at Chempro. Incoming acids are stored in the 100-series tanks (SWMUs C-6 to C-11) and alkaline wastes are stored in the 600-series tanks (SWMUs C-26 to C-29). They are tested for pH, chromium, phenolics, sulfide (alkaline wastes only), and cyanide. Following testing they are pumped to the appropriate 50-series tank (SWMUs C-1 to C-5) for treatment. If phenolics are detected, treatment by pH adjustment and oxidation is performed. Waste streams containing chromium are treated by use of a reducing agent in an alkaline medium. For waste streams containing cyanide, additional treatment through alkaline chlorination is necessary. The waste stream then undergoes neutralization and metals precipitation followed by flocculation in the 50-series tanks.

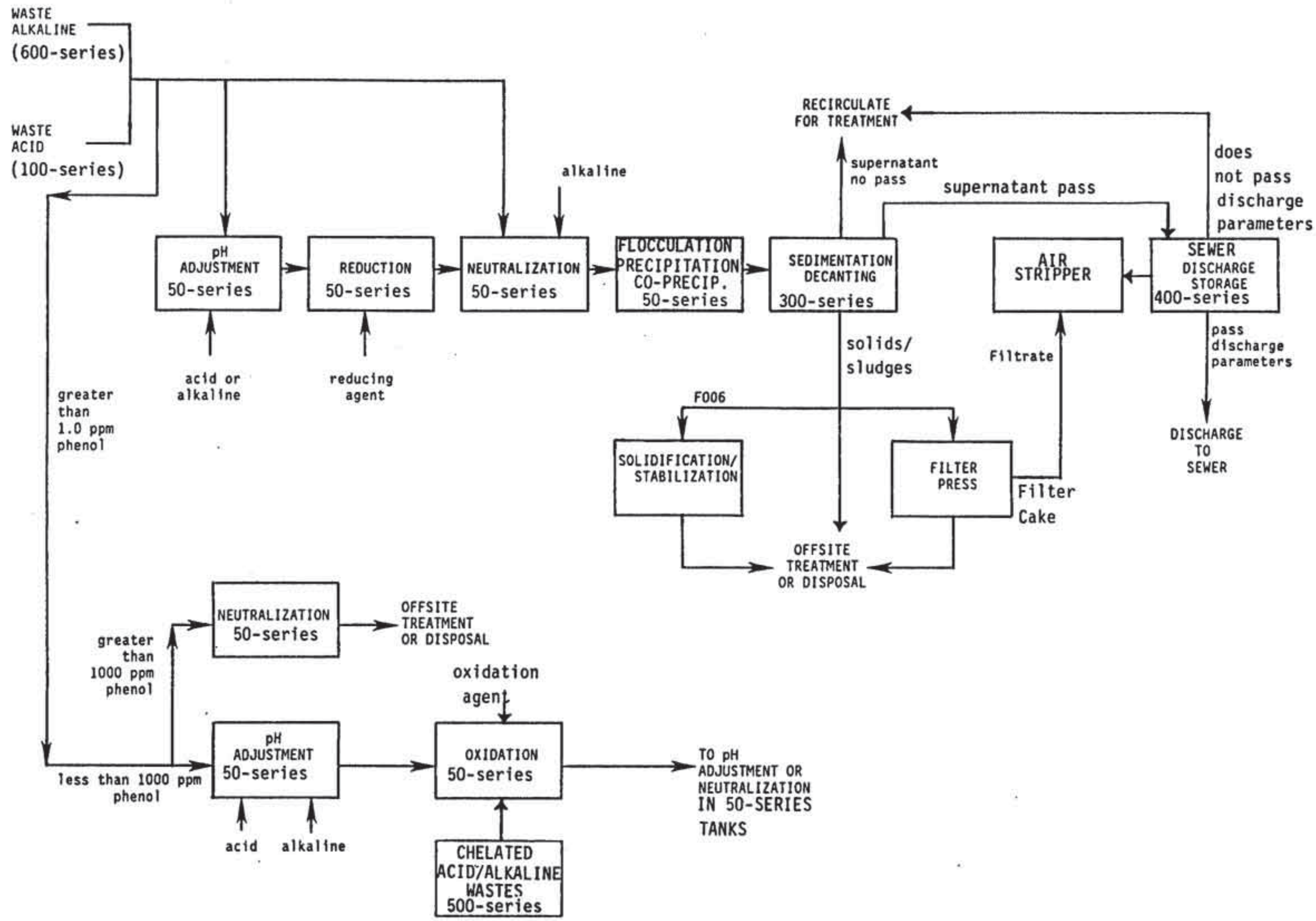


Figure 5

CHEMPRO PROCESS FLOW DIAGRAM
FOR ACID AND ALKALINE WASTES

Wastes are then pumped to the 300-series settling tanks (SWMUs C-15 to C-19) for sedimentation and decanting. Supernatant from the decanting step is pumped to the 400-series sewer discharge tanks (SWMUs C-20 to C-23). From there, it is pumped to the air stripper (SWMU C-40) for removal of organic contaminants. Wastewater is then returned to the 400-series tanks for storage and testing to determine if it meets the discharge parameters. Wastewater meeting the discharge parameters is discharged to the sewer. Sludge from the sedimentation/decanting step conducted in the 300-series tanks not classifiable as a F006 listed waste is pumped to the Oberlin filter press (SWMU C-44) for dewatering, or is sent off-site for disposal without further treatment. Sludge meeting the F006 classification is pumped to the cement mixer stabilization unit (SWMU C-4) for further treatment. Filtered solids from the Oberlin filter press and stabilized solids from the cement mixer stabilization unit are sent off-site to a RCRA permitted facility for disposal (17).

Chelated Acid/Alkaline Waste - Waste streams entering the facility that are known to be chelated are isolated in a 500-series acid storage tank (SWMUs C-24 or C-25) prior to transfer to a 50-series treatment tank. Treatment for removal of chelating agents is performed by oxidation at an acidic pH or co-precipitation at a pH of 7.5 or 8.5. The waste stream then undergoes metals precipitation in the 50-series tanks followed by sedimentation and decanting in the 300-series tanks as described above for non-chelated wastes (17).

Wastewater Treatment Sludge - Wastewater treatment sludges received at the Chempro facility that are F006 listed wastes are generally from the aerospace industry. They are initially stored in the 700-series non-process sludge tanks (SWMUs C-30 and C-31). The sludges are then pumped to the 300-series sludge settling tanks and are handled as described above for F006 sludges generated on-site in the treatment of waste acids and waste alkalis (17, 29).

Chemical Milling Waste - Chemical milling waste received at the facility is stored in one of the 200-series tanks (SWMUs C-12 to C-14). Chemical milling waste is then treated by sulfide oxidation in one of the 50-series tanks. The waste stream is then neutralized and sent off-site for further treatment or disposal (17).

Solvent and Oil Dangerous Waste Fuels - Incoming solvent and oils to be used for dangerous waste fuels are tested to determine their acceptability for use as a dangerous waste fuel. These materials are pumped to the 800 or 900-series dangerous waste fuel storage tanks (SWMUs C-32 to C-39). Currently, the Chempro Tacoma facility is not blending fuels for the dangerous waste fuels burner program. They are acting only as a receiving and storage facility for waste petroleum products that are blended to customer specifications at other Chempro facilities (17, 29).

2.1.4 Chempro Proper Regulatory History

Chempro submitted its Part A RCRA permit application in November 1980 and qualified for interim status as an owner/operator of a TSD facility. The Part A application identified its operations on Parcels A and B. When the company began operating on Parcel C in 1987, it extended this interim status to the new facility. Chempro submitted its Part B Application to Ecology in March 1988 for operation of the Chempro Proper. The letter tank system area is undergoing closure under interim status.

In June 1988, EPA issued a RCRA 3013 Order to Chempro requiring the company to conduct an assessment of soil and ground water contamination caused by the facility's releases of hazardous wastes and hazardous constituents (30).

2.1.5 Freeway Container, Inc. Operations

Freeway Container, Inc. has leased the western and northern portions of Chempro Proper since 1986. This company repairs containers used on tractor-trailer trucks. Operations generally include cleaning, cutting, sheet metal work, some fiberglass replacement, spot welding, and spot or hand-painting. A large portion of the property is used to store containers; repair operations occur in a single building at the facility. Three SWMUs were identified at this facility: a solvent storage shed (SWMU C-53); a shed holding new, used and waste paints (SWMU C-54); and piles of excavated soil on the northwestern corner of the Freeway Container, Inc. property. These are shown on Figure 4.

2.1.6 Resource Recovery Parking Lot

Resource Recovery, a Chempro subsidiary which operates as the transportation provider for Chempro operations, uses an area to the south of the Chempro tank farm to park trucks (Figure 4). Because this area may be used to park trucks which contain waste materials, it has been identified as a SWMU (C-52).

2.2 CHEMPRO PARCEL A

"Chempro Parcel A" refers to the property owned by Northwest Processing, Inc. and formerly leased by Chempro. It is located to the southeast of Chempro Proper (Figure 2).

2.2.1 Identification of Solid Waste Management Units

Twenty-five Solid Waste Management Units (SWMUs) have been identified on Chempro Parcel A as a result of the PR and VSI. SWMUs identified at the facility are listed in Table 5 and are designated throughout this report by the letter "A." In addition to the SWMUs listed in Table 5, SWMUs C-9 (Tank 104) to C-10 (Tank 105) and SWMUs C-15 to C-19 (300-series tanks) were active on Parcel A until late 1986. These SWMUs are listed in Table 1. Locations of most SWMUs are shown on Figures 6 and 7; the location of SWMU A-25, the Auto Fluff and Lime Fill Area, is discussed in more detail in Section 3.4 and depicted in Figures 15 and 16. Detailed descriptions of these SWMUs may be found in Section 5.2.

2.2.2 Historical Operations

Parcel A was purchased in 1961 by Don Oline; the property was sold to Solidus Corporation in May 1981. The following companies leased the property and used it as the site of industrial operations between 1970 and 1986 (24, 29):

- 1970 to 1973 - Aero/Acology Oil operated a waste oil recycling operation on the west side of Parcel A.
- 1973 to 1974 - Puget Sound Industrial Petroleum (PSIP), purchased the property from Aero/Acology, operated the waste oil recycling facility.
- 1974 to 1975 - Chempro of Oregon purchased the facility from PSIP and continued the oil recycling operation.

Table 5

SOLID WASTE MANAGEMENT UNITS
AT CHEMPRO PARCEL A

SWMU NO.	DESCRIPTION
A-1	Alkaline Storage and Treatment Tank 6
A-2	Alkaline Storage and Treatment Tank 7
A-3	Paint Waste Storage Tank 8S
A-4	Acid Storage Tank 9N
A-5	Acid Storage Tank 9E
A-6	Acid Storage Tank 9W
A-7	Sludge Treatment and Storage Tank 10
A-8	Sludge Treatment and Storage Tank 11
A-9	Alkaline Storage and Treatment Tank 12
A-10	Acid/Alkaline Storage and Treatment Tank SS1
A-11	Acid/Alkaline Storage and Treatment Tank SS2
A-12	Acid/Alkaline Storage and Treatment Tank SS3
A-13	Former Waste Oil Pond
A-14	Tank NT1
A-15	Tank NT2
A-16	Tank NT3
A-17	Tank NT4
A-18	Tank NT5
A-19	Poly 1
A-20	Poly 2
A-21	Poly 3
A-22	Sumps
A-23	Rinse Pit
A-24	Acology/Aero/PSIP/Chempro Waste Oil Recycling Facility
A-25	Area of Auto Fluff and Lime Fill

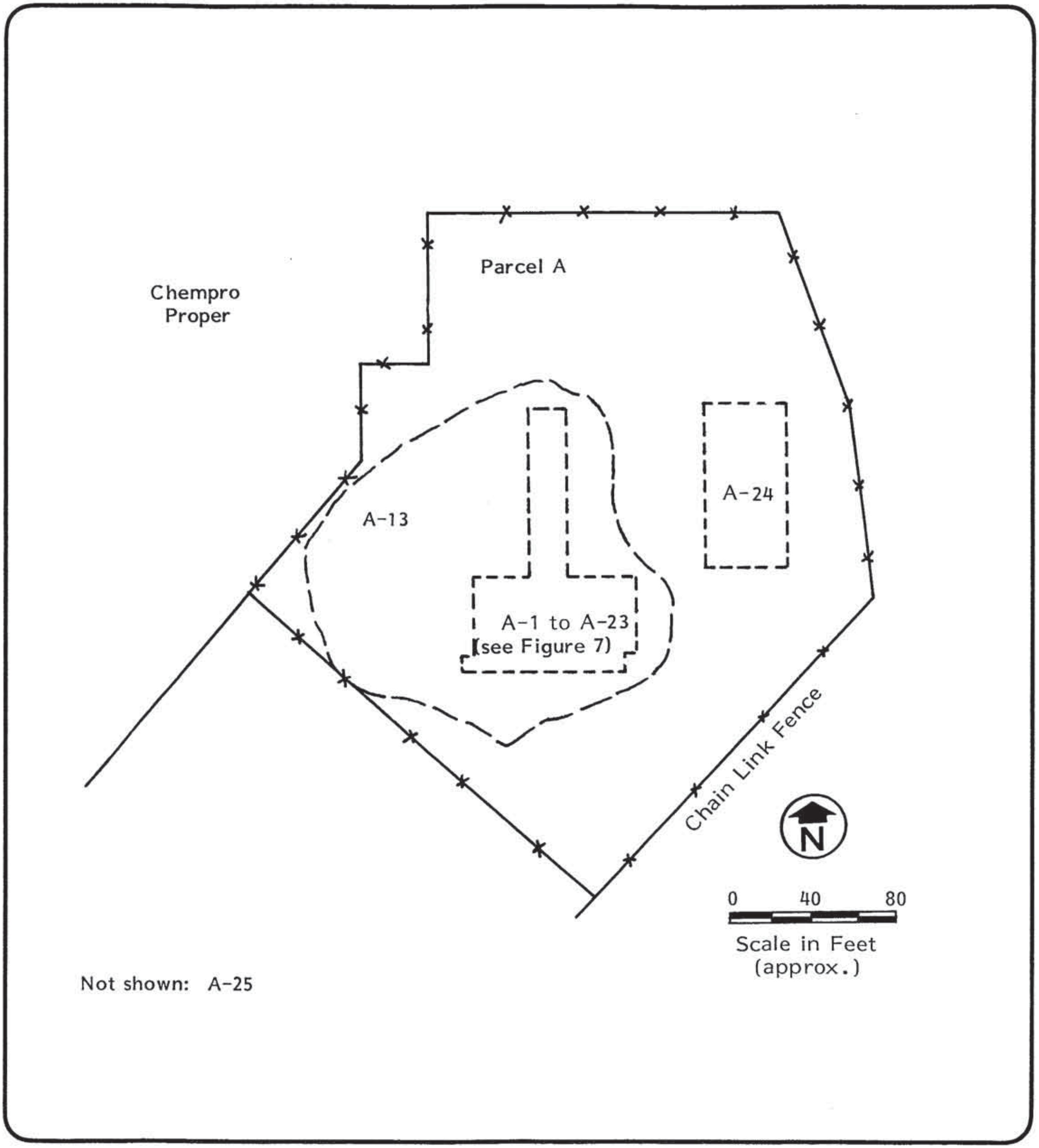


Figure 6

SOLID WASTE MANAGEMENT UNIT LOCATIONS
PARCEL A

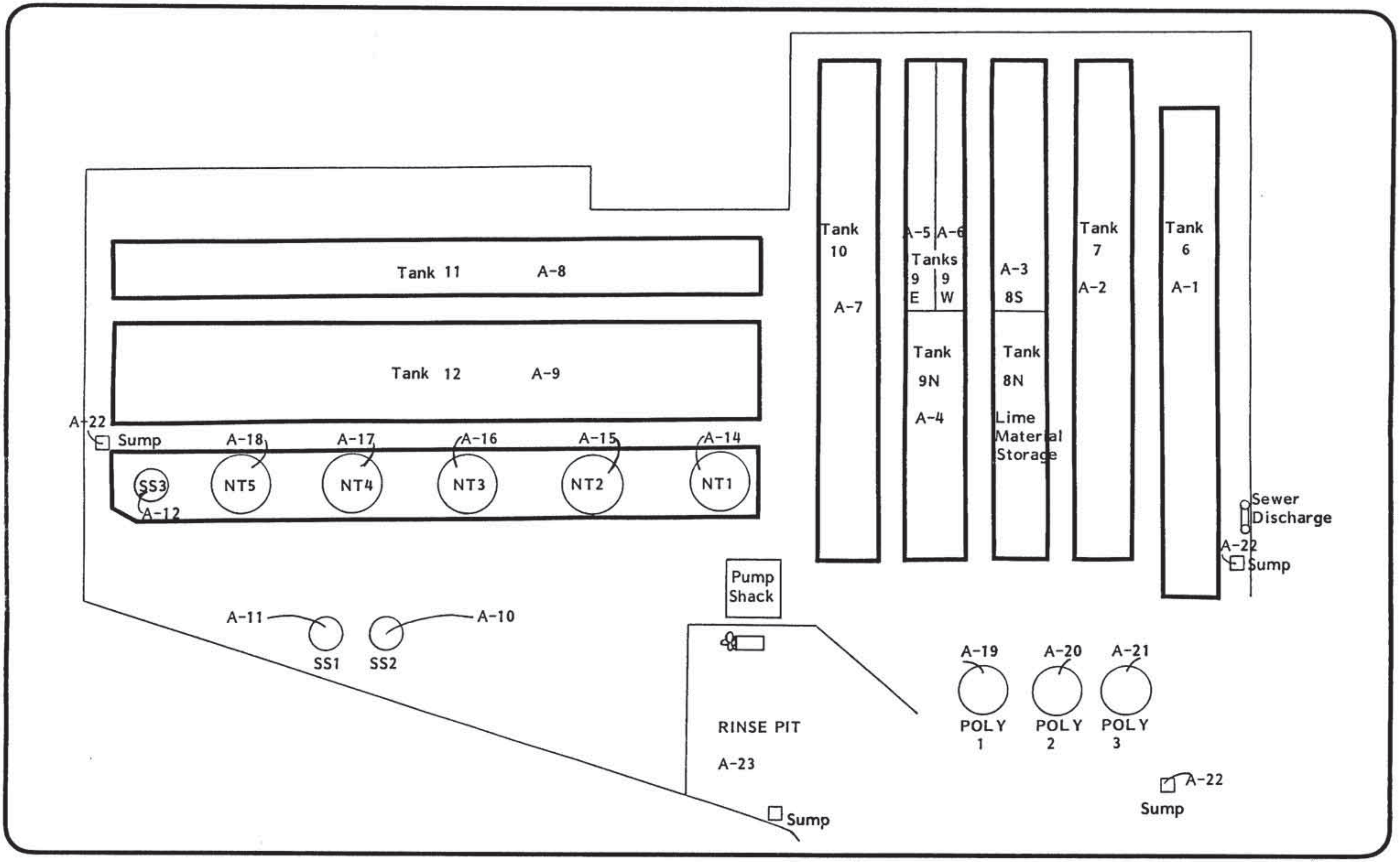


Figure 7

SOLID WASTE MANAGEMENT UNITS A-1 TO A-23
AT PARCEL A

- 1975 to 1986 - Chempro purchased the Chempro of Oregon equipment and continued the recycling operation until October 1984. Chempro continued to accept waste oil at the facility for storage in the existing equipment until August 1986. Chempro also built and operated a chemical treatment unit on the west side of the Parcel A from 1977 until December 1986 when their lease expired.

When Chempro's lease expired in December 1986, equipment containing hazardous wastes was left on the property. Subsequently, Chempro removed the equipment. In addition, Chempro has removed some contaminated soil from the site, covered the excavated area with a 6-mil PVC cover and clean soil, and reseeded the area (27).

A variety of fill materials have been deposited at Parcel A in a manner similar to Chempro Proper, as discussed in Section 2.1 and described in more detail in Section 3.4. Between 1969 and 1975, dredge spoils, lime wastes, spent lime catalyst from TCE and perchloroethylene production, auto fluff, and gravel were deposited on the property. An oil holding pond constructed in 1970 (SWMU A-26) was reportedly filled with auto fluff around 1975 (24).

2.2.3 Parcel A Regulatory History

As discussed in Section 2.1.3, Chempro obtained interim status for the activities on Parcel A in 1980. After a spill of nitric acid in 1985, Ecology issued an order requiring Chempro to submit a plan for upgraded secondary containment at the Parcel A facility (24).

Chempro submitted a closure plan for Parcel A in September 1987 (20) and has conducted closure activities on the property. The Department of Ecology submitted a Proposed Consent Decree in December 1987 to both Chempro and Solidus, the owner of Parcel A, for further remedial action on the property (24). Ecology has not yet accepted final closure on the site. Civil legal action is also pending between Chempro and Solidus regarding determination of responsibility for the remaining contamination on the property (24).

2.3 NORTHWEST PROCESSING, INC.

For the purposes of this report, "Northwest Processing" refers to the property east of Chempro Proper owned by Northwest Processing, Inc., except for Parcel A (Figure 2).

2.3.1 Identification of Solid Waste Management Units

Forty-eight solid waste management units were identified at Northwest Processing as a result of the PR and VSI. These units are listed in Table 6 and are designated throughout this report by the letter "N." Locations of these SWMUs are depicted in Figure 8. Detailed descriptions of the SWMUs are presented in Section 5.3.

2.3.2 Historical Operations

The Northwest Processing (also known as the Lilyblad Petroleum - Poligen Site) facility is located within a former tidal marsh of Commencement Bay. Historical photos indicate that prior to the 1960s, much of the property was a swampy area. As portions of the wetlands were filled, ponds were formed in various locations. These were later filled in. The fill materials are estimated to be about 8 to 10 feet thick and composed of various materials including sand and gravel, dredge sand, lime sludge waste, wood chips, and auto fluff. Chemically contaminated and potentially hazardous materials were reportedly used as fill (19); this is described in more detail in Section 3.4.

Filling of the area occurred during the 1960s and 1970s. By 1975, a small tank farm consisting of two tanks was being operated by Lilyblad in the northwest corner of the property. Between 1977 and 1980, three smaller tanks located in front (west) of the two larger tanks were established. Records indicate that these tanks contained a variety of materials including mineral spirits, used oil, and solvents.

Table 6

SOLID WASTE MANAGEMENT UNITS AT
NORTHWEST PROCESSING INC.

SWMU NO.	DESCRIPTION
N-1	Tank Farm 1, Tank 1
N-2	Tank Farm 1, Former Tank
N-3	Tank Farm 1, Tank 3
N-4	Tank Farm 1, Tank 4
N-5	Tank Farm 1, Tank 5
N-6	Tank Farm 2, Tank 6
N-7	Tank Farm 2, Tank 7
N-8	Tank Farm 2, Tank 8
N-9	Tank Farm 2, Tank 9
N-10	Tank Farm 2, Tank 10
N-11	Tank Farm 2, Tank 11
N-12	Tank Farm 2, Tank 12
N-13	Tank Farm 2, Tank 13
N-14	Tank Farm 2, Tank 14
N-15	Tank Farm 2, Tank 15
N-16	Tank 16, Centrifuge Feed Tank
N-17	Decanter Centrifuge
N-18	Disk Centrifuge
N-19	Waste Accumulation Area in Centrifuge Room
N-20	Tank 17, Holding Tank
N-21	Fractionation System
N-22	Anti-Freeze Recycling System
N-23	Solvent Recovery Unit
N-24	Tank 26, Stormwater Accumulation Tank
N-25	Tank 27, Process Wastewater Holding Tank
N-26	Oily Water Sewer System
N-27	API Preseparator
N-28	Coalescing Separator
N-29	Skim Tank
N-30	Biotower
N-31	Treated Wastewater Holding Tank
N-32	Sewer Discharge Tank
N-33	Generated Waste Storage Area
N-34	Auxiliary Waste Storage Area
N-35	Drum Rinsing Area

Table 6 (Continued)

SWMU NO.	DESCRIPTION
N-36	Tank 21, Boiler Feed Tank
N-37	Hot Oil Heater (Boiler)
N-38	Loading/Unloading Area #1
N-39	Loading/Unloading Area #2
N-40	Tire Pyrolysis Unit
N-41	Portable 500-gallon Tanks
N-42	Fill Areas
N-43	Former Drum Storage Area Near Western Boundary
N-44	Former Portable Tank Area #1
N-45	Former Portable Tank Area #2
N-46	Former Drum Storage Area East of Main Warehouse
N-47	Former Drum Storage Building
N-48	Former Horizontal Tanks South of Tank Farm 1

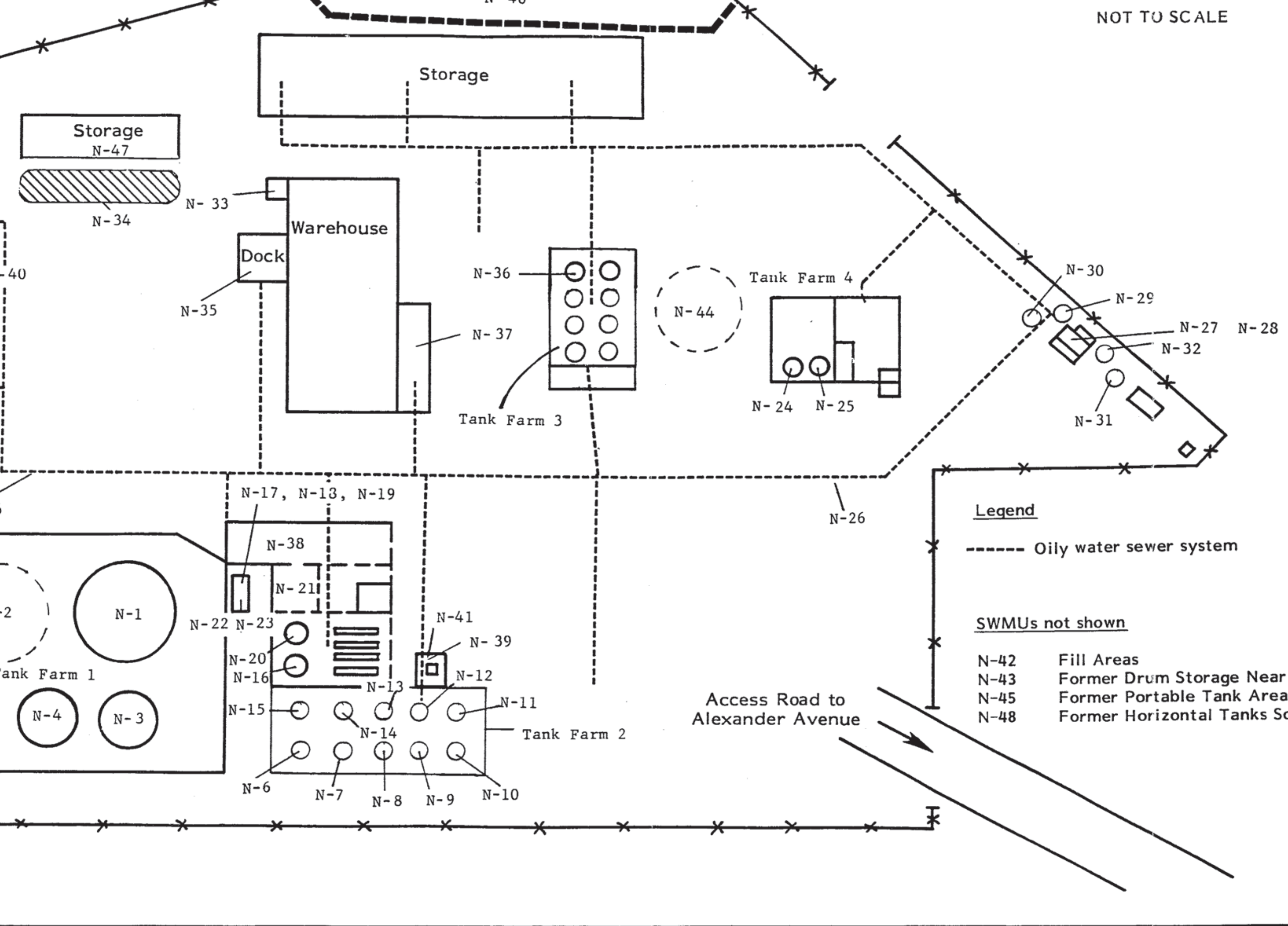


Figure 8

SOLID WASTE MANAGEMENT UNIT LOCATIONS

Solidus Corporation/Poligen/Northwest Processing began leasing the northwest portion of the property in 1974 and purchased it in 1981 along with Parcel A. Shortly thereafter, Poligen/Northwest Processing purchased the two adjacent parcels to the east and southeast (32). Currently, Northwest Processing operates in all areas of the property except Parcel A.

2.3.3 Current Operations

Numerous facility documents were reviewed during preparation of this report. In many cases, discrepancies were identified in the information presented. Information supplied in the most recent submittal was used whenever possible; discrepancies are noted where appropriate.

Poligen/Northwest Processing has been processing mixtures of gasoline, diesel fuel, and water since 1983. Sources of materials to be processed include barges, pipelines, petroleum service stations, wholesale outlets for mixed gas/diesel combinations, and large facilities (39). The gasoline (or naphtha) and water fractions are separated from the residual diesel fraction (37). The recovered naphtha is sold to a local refinery as a blending stock for regular gasoline or reformer feedstock. The residual diesel or cutter stock is sold to fuel blenders as a blending stock for marine and industrial fuels (37). According to facility personnel, Northwest Processing does not currently accept dangerous wastes regulated under WAC 173-303 for treatment, storage, or disposal (51). Gasoline and diesel reprocessing throughput is about 50,000 to 100,000 gallons per month (39).

Waste oils containing less than 1,000 ppm halogenated hydrocarbons and less than 1 ppm PCB were processed at this facility between 1983 and 1987. The light fraction separated from waste oils contaminated with water, gasoline, and solvents was used as a fuel source for the facility's boiler.

In 1987, Northwest Processing installed a centrifuge system to reduce the solids content of residual fuels to less than 0.2% by weight. This process generates an oily sludge waste, which is disposed of through incineration or land disposal.

Other materials which are purchased and sold by Northwest Processing are stored in bulk in tanks in bermed areas. Lubricants (bulk, drummed, and packaged) are stored on-site in enclosed buildings. Repackaging of solvents also occurs on the Northwest Processing site in an enclosed building. Other activities occurring on-site include laboratory analyses, process wastewater collection and treatment, and stormwater runoff management (39).

Northwest Processing generates about 5,000 to 15,000 gallons per month of process wastewater from the centrifuge and fractionation processes. This wastewater contains phenols (156 ppm), small concentrations of metals (As, Cr, Cu, Pb, Ni, Zn), and oil and grease (31). It is stored in tanks prior to transport to a licensed off-site disposal facility (39, 51). Process wastewater is treated through an oily water treatment system or drummed for subsequent disposal off-site.

The centrifuge system generates about 50 gallons per month of sludges when it is operating; this waste contains halogenated organics (164 ppm) and small concentrations of metals (As, Ba, Cd, Cr, Pb, Ag) (31). The sludges are designated as a waste flammable liquid (EPA hazardous waste number D001); they are stored on-site prior to shipment to a licensed off-site disposal facility (51).

The facility currently has four tank farms which contain four, ten, eight, and two tanks, respectively (51). The site has five buildings: a main warehouse, two drum storage buildings, and two shops. There are two primary loading docks for bulk loading/unloading of trucks and trailers.

Surface drainage on the site collects in storm drains and catch basins. Roof drainage is directed to the Lincoln Avenue ditch (between Taylor Way and Alexander Avenue) or is discharged to the City of Tacoma's sanitary sewer. Other surface water drainage (including water from process area sumps) is treated through the oily water treatment system. Effluent from this treatment system can be directed to a storm sewer or the city sanitary sewer (77). Prior to 1988, this water was discharged to the storm sewer (and therefore the Lincoln

Avenue Ditch) (77). Samples of stormwater were collected by the Tacoma-Pierce County Health Department in June 1987 from the final discharge tank (SWMU N-26) and from the first off property in-line catch basin. Results indicated 500 mg/l and 1400 mg/l oil and grease, respectively, which is significantly higher than the NPDES limit of 15 mg/l (75). Also detected in the discharge tank sample were chloroform, 1,2-dichloroethane, methylene chloride, 1,1,1-trichloroethane, trichloroethene, and xylene (75). Northwest Processing has received temporary discharge permits from the City of Tacoma to discharge stormwater to the sanitary sewer on several occasions (31, 46). Violations of the discharge permits have been noted (45). At the time of the VSI, Northwest Processing was not collecting the treated effluent in tanks for subsequent off-site disposal at a licensed facility. Northwest Processing currently does not have a stormwater discharge permit.

2.3.4 Northwest Processing Regulatory History

Extensive filling activities have occurred on this site over the years, including potentially contaminated lime sludge wastes. These filling activities are discussed in detail in Section 3.4. In a June 11, 1982 letter to Mr. Glen Tegen, owner of Northwest Processing (then Lilyblad Petroleum, Inc.), Ecology suggested that construction of the main process area proceed, and encouraged development which would provide a tight, impervious cap with an impervious side seal, installation of shallow monitoring wells with french drain laterals, and a tightly lined stormwater system away from the area to provide entombment of lime sludge and other fill materials with monitoring access and potential limited pumping accessibility (51).

A July 1981 site visit by Ecology personnel indicated that a large tank containing dirty solvent had expanded due to warm temperatures causing solvent to spill out of a vent at the top of the tank. Ecology personnel provided a drip pan which was placed under the leak, and drained approximately 100 gallons out of the tank, which stopped the leak (51). Subsequent to this event, Ecology recommended several actions, including numbering of tanks, pressure testing of tanks, additional inspections, and better gauging.

During a January 1982 Ecology inspection, an oil sheen was observed in a pond located in the center of the facility (19). This oil appeared to be due to drainage from the tank farm.

Part A applications were submitted on February 15, 1985, September 30, 1987, January 6, 1988, and November 8, 1988. The most recent Part A lists storage of K049, K051, D001, and D008 wastes and treatment of K049 wastes. In June 1988, EPA determined that Northwest Processing did not qualify for interim status. A Part B permit application for hazardous waste storage was submitted by Northwest Processing on November 8, 1988, although correspondence in EPA's files indicates that a draft Part B application may also have been submitted in December 1984.

A September 1988 Ecology inspection noted numerous dangerous waste violations. At the time of the inspection, 432 55-gallon drums of waste were being stored on-site, of which drums, 236 contained dangerous waste. One hundred seventy drums contained Safety-Kleen process sludges and still bottoms; 54 drums were labeled as dangerous wastes generated in 1987 by Lilyblad on Port of Tacoma Road; 12 drums contained centrifuge sludge generated at Northwest Processing; and 196 drums contained unknown wastes. Most of the drums were unlabeled and 150 of the Safety-Kleen drums were without lids. Many drums were in poor condition; several dangerous waste drums were leaking to the environment. In addition, a tank containing 72,000 gallons of spent Safety-Kleen solvents was noted to be leaking to the ground during the inspection (80).

As a result of this inspection, Ecology issued Order No. DE 88-8334 on January 10, 1989. Due to a procedural defect, this order was rescinded on August 15, 1989 and was reissued as Order No. DE 89-8193 on September 22, 1989 (79, 80). This order stated that Northwest Processing is acting as an unpermitted dangerous waste storage facility and handling dangerous waste and other unknown materials in a manner which constitutes a threat to public health and/or the environment (80).

The order required Northwest Processing to cease discharge of hazardous substances, including contact stormwater runoff or process water discharges to an unpermitted ditch outfall. In addition, the order required that all leaking drums and tanks be repaired, overpacked, or emptied; that all sumps in the dangerous waste and product storage areas be sealed; that Northwest Processing cease accepting dangerous wastes; that unknown wastes be sampled and designated; and that all Safety-Kleen and other dangerous wastes be removed from the property.

2.4 SOL-PRO, INC.

"Sol-Pro" refers to the property located southeast of Chempro Proper and south of Northwest Processing (Figure 2). It is owned and operated by Sol-Pro, Inc.

2.4.1 Identification of Solid Waste Management Units

Twenty-two solid waste management units (SWMUs) were identified during this RCRA Facility Assessment. These units are listed in Table 7 and are designated throughout this report by the letter "S." Locations of these SWMUs are depicted in Figure 9. Detailed descriptions of the SWMUs may be found in Section 5.4.

2.4.2 Historical Operations

The location of the Sol-Pro property was formerly a portion of the Puyallup River delta drainage and tideflats. According to historical records, the property was undeveloped and generally unfilled prior to 1950. Some incidental filling associated with construction of the waterway and development of the adjacent Buffelen Lumber Company may have occurred at this time, but a 1948 aerial photograph indicates that the property was still a low land area with poor drainage. The Buffelen Lumber Company may have used the property for storage of finished lumber or disposal of mill sawdust waste. Aerial photos from 1967 to 1974 also indicate no development of the property, although there may have been some incidental use of the northern corner. This corner was adjacent to Acology Oil and a slate milling operation. These facilities are no longer in existence. The 1967 photo shows a maintained drainage ditch originating near a warehousing and manufacturing facility to the northeast. The ditch crossed the Sol-Pro property and terminated immediately to the southwest (55).

Table 7

SOLID WASTE MANAGEMENT UNITS AT SOL-PRO, INC.

SWMU NO.	DESCRIPTION
S-1	Tank 704, Luwa Feed Tank
S-2	Tank 535, Dirty Wash Solvent Tank
S-3	Tank 536, Dirty Wash Solvent Tank
S-4	Luwa Thin Film Evaporator System
S-5	Tank 705, Recycled Solvent Tank
S-6	Tank 706, Recycled Solvent Tank
S-7	Tank D-1, Brighton Feed Tank
S-8	Tank D-2, Brighton Feed Tank
S-9	Brighton Solvent Reclaiming System
S-10	Tank C-1, Recycled Solvent Tank
S-11	Tank C-2, Recycled Solvent Tank
S-12	Pump Hopper
S-13	Horizontal Evaporator
S-14	Vacuum System
S-15	Tank 901, Wastewater Holding Tank
S-16	Generated Waste Storage Area
S-17	Drum Rinsing Area
S-18	Drum Crusher
S-19	Rail Car Loading Rack
S-20	Incoming Waste Area
S-21	Stormwater Holding Tank
S-22	Storm Drainage System

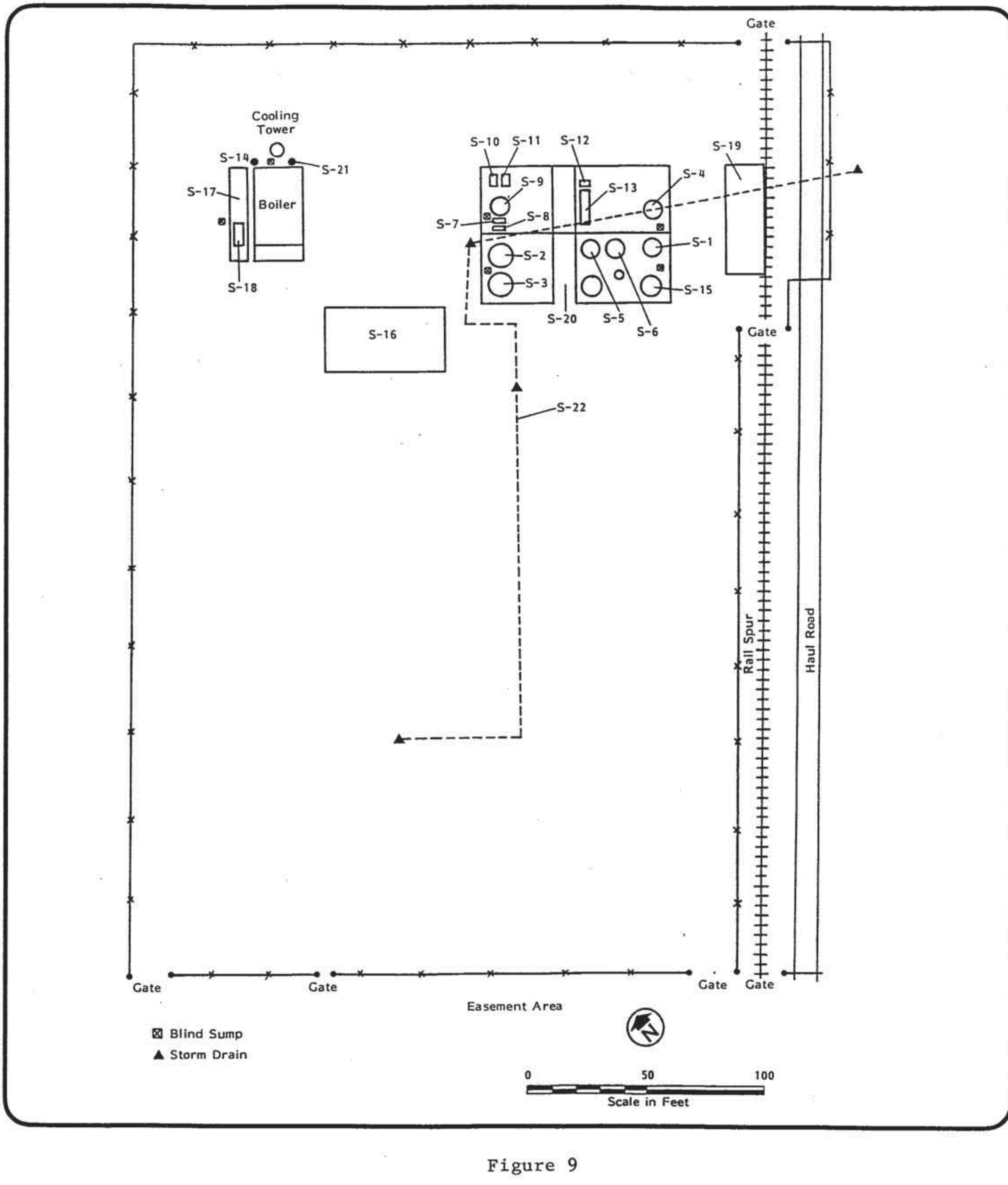


Figure 9

SOLID WASTE MANAGEMENT UNIT LOCATIONS
SOL-PRO

A March 1987 site visit prior to construction of the Sol-Pro facility identified new and used empty barrels and several full salvage and recovery drums on pallets along the back fence of the property. Labels on the drums indicated that they contained hazardous waste. One of the drums was open and contained rainwater; however, no soil staining was observed (55). These drums were subsequently removed.

2.4.3 Current Operations

The Sol-Pro Alexander Avenue facility was constructed in 1987; operations began in 1988. The facility currently reclaims solvent from blended or dirty waste solvent. The reclaimed solvent is returned to the generator or sold; any treatment residual is shipped off-site for use as a hazardous waste fuel (55). Evaporation/condensation units are used to recover purified solvents. Chlorinated waste solvents and non-chlorinated waste solvents are processed at the facility. Currently, chlorinated solvents are processed infrequently. The two types of solvents are handled separately. The facility is operated for two shifts per day, five days per week (71).

Waste solvents are received on-site in drums or tank trucks. Materials in tank trucks are pumped directly to feed tanks (SWMUs S-1, S-2, S-3, S-7, S-8). Drummed wastes are stored for less than 24 hours prior to being emptied into the feed tanks. Waste solvents are distilled using the Luwa Thin Film Evaporator (Luwa) (SWMU S-4), the Brighton Solvent Reclaiming System (Brighton) (SWMU S-9), and/or a horizontal evaporator (SWMU S-13). Liquid solvents are recycled in the Luwa or Brighton stills; waste solvent sludges are reclaimed in the horizontal evaporator (55). A process flow diagram representing general operations at Sol-Pro is presented in Figure 10.

Wastes produced during the treatment processes include:

- Spent filters from the Luwa unit: Spent filters are removed from the Luwa unit and are treated in the horizontal evaporator to remove residual solvents (55, 71).

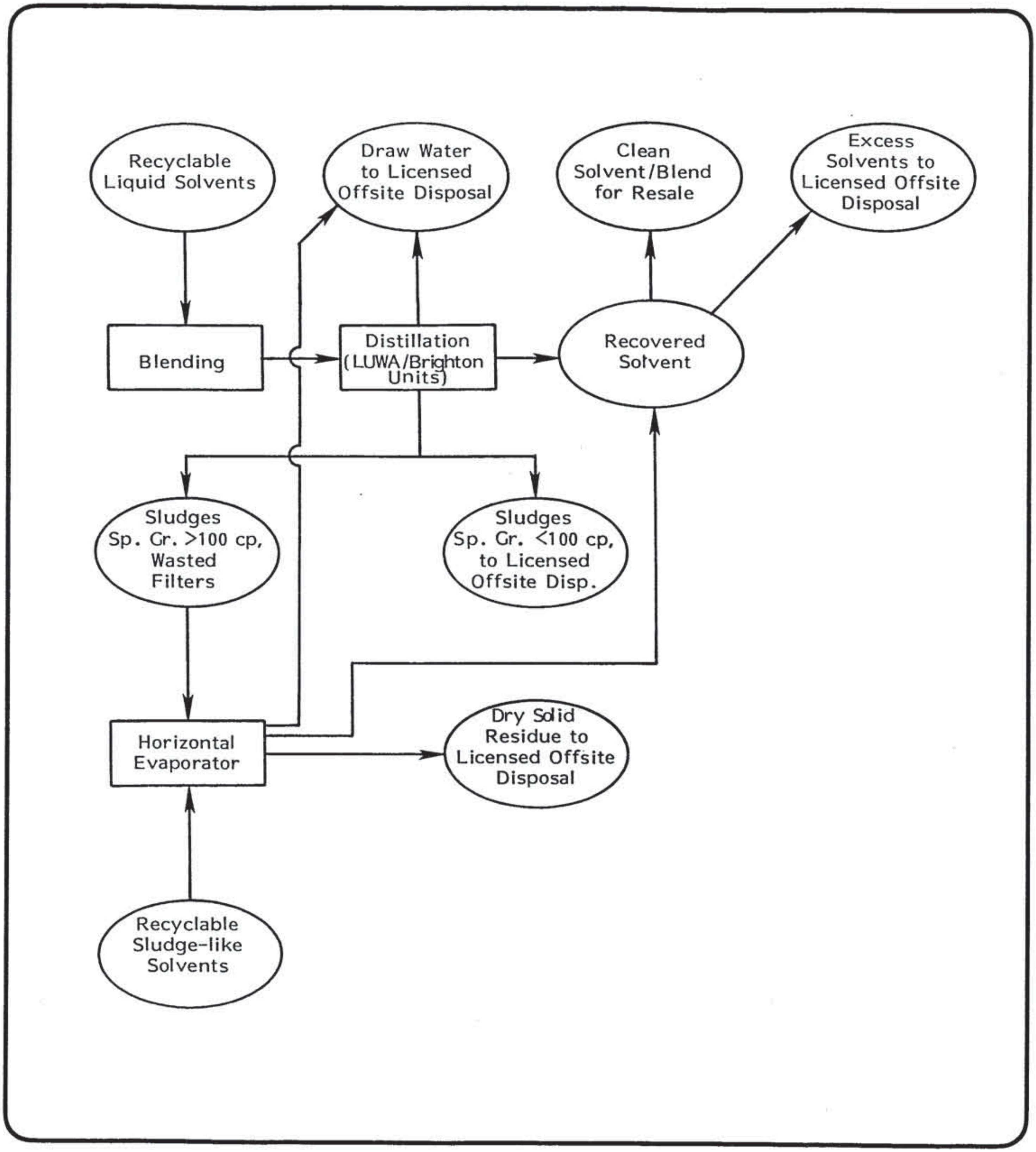


Figure 10

PROCESS FLOW DIAGRAM
SOL-PRO, INC.
Adapated from: Reference 55

- Sludges from the Luwa and Brighton units: Chlorinated sludges are treated in the horizontal evaporator. Non-chlorinated sludges may vary in viscosity depending on the waste's composition and operating efficiency of the distillation unit. If the viscosity of non-chlorinated sludge is 100 centipoise or less, then the sludge is shipped to an off-site licensed facility for use as a hazardous waste fuel. If the viscosity of the sludge is greater than 100 centipoise, then the sludge is treated in the horizontal evaporator (55).

- Draw water from the distillation units: Draw waters from the distillation of chlorinated and non-chlorinated solvents are stored in Tank 901 (SWMU S-15); these waters are shipped to a licensed off-site treatment facility (55, 71).

- Bottoms from the horizontal evaporator: These are stored for less than 90 days in "super bags" in the generated waste storage area (SWMU S-16); they are shipped off-site to a licensed facility for disposal. If the non-chlorinated solvent content is less than the Toxic Characteristic Leaching Procedure (TCLP) standard and the solids pass the paint filter liquid test, they are sent to a licensed landfill. If these criteria are not met, the evaporator bottoms are sent to an incineration facility (55).

Reclaimed solvent is returned to the generator or resold. Processed non-chlorinated solvent blends are shipped to a licensed off-site facility (a cement kiln) for use as a hazardous waste fuel. Processed chlorinated solvent blends are shipped to a licensed off-site disposal facility for incineration (55, 72).

Waste materials are shipped off-site from the Sol-Pro facility in trucks and railcars. The railcars are serviced by Burlington Northern and move from Sol-Pro to the railroad's main yard by the Belt Line, usually at night.

Other wastes are generated during routine plant operation and maintenance activities. Machine parts are cleaned and repaired using solvents. These solvents are recycled in the Luwa still and in the horizontal evaporator. Routine maintenance of the structures and buildings may also require paints and thinners (55).

According to facility personnel, no major spills from process units or piping have occurred at Sol-Pro (71).

Currently, stormwater is collected in holding tanks. If the water is contaminated with solvents, it is shipped off-site for use as a hazardous waste fuel. If contaminated, it is used as makeup to the boiler (72). Sol-Pro has submitted an NPDES permit application for a storm drain which discharges to the Lincoln Avenue Ditch. No permit has been granted to date. According to Ecology correspondence, illegal discharges to this storm drain from the Sol-Pro facility have occured as recently as 1989 (74).

2.4.4 Regulatory History

Sol-Pro, Inc. submitted a generator, transporter, and recycler notification on August 20, 1987 for mixtures of F003 and F005 solvent wastes and D001 ignitable wastes, and for mixtures of F001 and F002 solvent wastes. Additional Dangerous Waste Notifications were submitted on December 31, 1987 and May 24, 1989 (65, 56). The May 1989 notification lists used halogenated solvents and organic compounds with water and grease (F001, F002, WP01, WP02, WC01, WC02) and non-halogenated solvents and paint waste containing metals and water (D004 through D010, F003, F004, F005, WT01, WT02).

RCRA Part A applications were submitted on December 31, 1987 and July 29, 1989. The current Part A lists capacities of 143,000 gallons of container storage and 126,500 gallons of tank storage (55). On May 6, 1988, EPA notified Sol-Pro that the requirements for interim status had not been met (66). On July 29, 1989, Sol-Pro submitted a RCRA Part B application for container and tank storage.

A RCRA inspection was conducted at Sol-Pro by Ecology personnel on November 4, 1988. Accumulated precipitation and "spilled substance" were observed inside the process containment areas; in addition, a number of unlabeled and uncovered drums of contaminated water were observed (59).

3.0 ENVIRONMENTAL SETTING

3.1 LOCATION, TOPOGRAPHY, AND SURROUNDING LAND USE

The Chempro, Northwest Processing, and Sol-Pro facilities are located in the "Tacoma Tideflats" area about 3 miles northeast of downtown Tacoma (see Figure 1). The site is situated on a man-made peninsula, with Blair Waterway to the southwest, Hylebos Waterway to the northeast, and Commencement Bay to the northwest. The Puyallup River and Waterway drain into Commencement Bay about 2 miles to the west. The Tideflat area is quite low and flat, typically ranging up to 20 feet above mean sea level (MSL).

The facilities are located northeast of Alexander Avenue on nearly flat ground that generally ranges from 10 to 17 feet above MSL. A few mounds of material on the west-central portion of the Freeway Container area reach up to 35 feet above MSL. A very subdued topographic divide trends NW-SE through the properties. Drainage is to the northeast in the northern third of Chempro Proper, the large northern area of the Freeway Container parcel, and the northern half of Northwest Processing. All other areas on-site generally drain to the southwest or south (17).

The surrounding land use is zoned as heavy industrial. Several heavy industries surround the facilities. South of Parcel A and west of Sol-Pro is Unico, a boat manufacturer. East of the properties is Gateway Consolidators. The Reichhold Chemical plant is east of the facilities, across Lincoln Avenue. The Port of Tacoma owns land to the south of the facilities, along Alexander Avenue; the City of Tacoma owns the open brushy area to the west of the Chempro facility. Pacific (Domtar/Continental) Lime Company occupies land to the south, between Alexander Avenue and Blair Waterway.

3.2 METEOROLOGY

The climate of the Tacoma area is classified as a mid-latitude, west-coast, marine type, with a dry summer having mild temperatures, and a mild but rainy winter. The Olympic and Coastal Mountains afford a partial rain shadow effect from severe winter storms that approach from the ocean (25).

Average annual precipitation is 35.2 inches, with 76 percent falling from October through March. The potential evapotranspiration is 27.3 inches per year; the actual evapotranspiration is 19.9 inches per year. The average annual temperature is about 51.0°F, with January being the coldest month (average = 39°F) and July being the warmest (average = 64°F). The area in general receives about 45 percent of the maximum possible sunshine each year. The average humidity in the area ranges from 86 percent (4 a.m.) to 81 percent (4 p.m.) in January, and from 85 percent (4 a.m.) to 48 percent (4 p.m.) in July. The prevailing winds are out of the northwest and southeast (Figure 11) (55). The strongest winds are generally from the southwest direction and occur during winter. Winds are light during most of summer (25).

3.3 SURFACE WATER

No waterways, ponds, or marshy areas currently exist on the site. This area is located in flood zone C (areas of minimal flooding). The 100-year flood level for the adjacent waterways is +9 feet MSL (55). The area has been filled and graded at various intervals during the past 60 years. The site is generally covered by gravel road base, concrete pads, or asphalt. The generalized surface water flow pattern is radial from the center of the Chempro facility. Surface drainage flow direction from Northwest Processing and Sol-Pro is not documented. Stormwater and sewer water lines are located within the site boundaries at the Chempro, Northwest Processing, and Sol-Pro facilities. Six storm sewer catch basins were identified in the Part B permit application for the Chempro facility, but the direction of flow was not documented. Another catch basin leading to an underground storm drain is located in the northwest portion of Chempro property. The storm drain flows north to Taylor Way, turns west, and flows parallel to Taylor Way as an open drainage ditch leading to 11th Street and draining into the Hylebos Waterway. Two catch basins are located to the east of the Northwest Processing facility. These basins discharge to the storm drain that flows east to Lincoln Avenue, turns south, and flows parallel to Lincoln

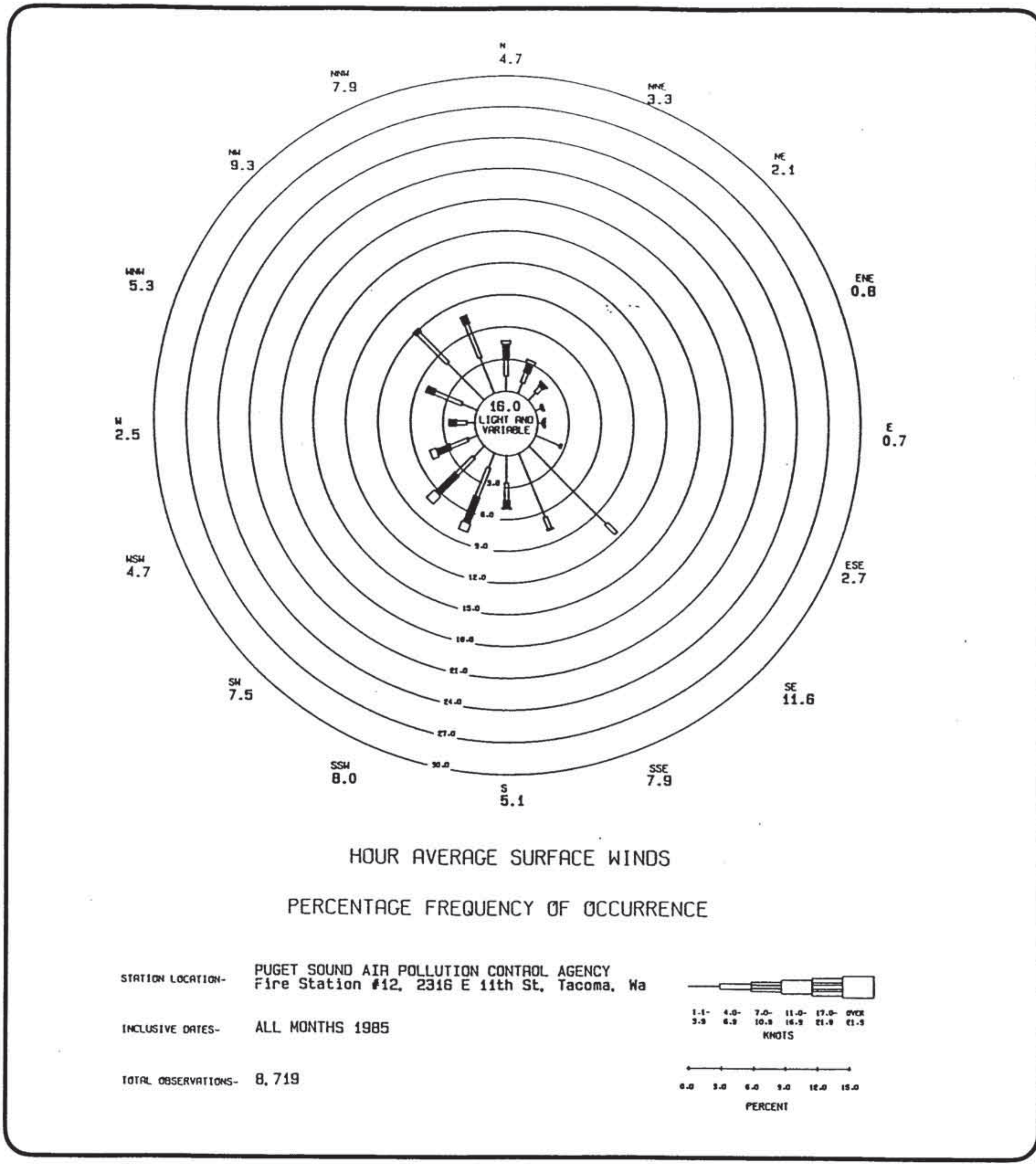


Figure 11

WIND ROSE
Source: Reference 55

Avenue partly as an open drainage ditch and underground storm drain, eventually draining into the Blair Waterway. A manhole located in the southeastern section of the Northwest Processing site provides access to this storm drain.

3.4 SOILS, GEOLOGY AND HYDROLOGY

3.4.1 Regional Geology

The facilities are located in a topographic depression within the Puget Lowland. Most of the surface deposits and topographic morphology of the Lowland resulted from repeated periods of continental glaciation during the past 3 million years. The last glacial episode in this area climaxed about 15,000 years ago and essentially ended by 12,000 years ago. The low area now occupied by the Puyallup River valley and Commencement Bay may have been the site of a glacial meltwater channel during the last glaciation. During glacial retreat, the waters of Puget Sound reoccupied the area, and rivers flowing into the Sound formed large deltas. The resulting deltaic deposits consist of interbedded alluvial and marine sediments (8).

In the area of the former channeled marshlands of the Puyallup River Delta (the "Tacoma Tideflats"), thick deposits of marine and alluvial sediments mainly consist of sand, silt, clay, and lesser amounts of gravel and peat layers. Underlying these strata are glacial and interglacial deposits that are unconsolidated or semiconsolidated and range to over 2,000 feet in depth (8).

3.4.2 Site Stratigraphy and Fill History

The stratigraphy of natural and man-made units at the facilities has been determined from numerous borings that have been drilled on-site. These borings, wells, and test pits were drilled or excavated by several different firms beginning in 1982 (1, 2, 4, 8, 16, 51, 52, 54, 57). Monitoring wells installed on-site are listed in Table 8.

The following discussion emphasizes disposal of industrial wastes that may contain hazardous constituents, although there has been considerable dumping of natural materials (silt, sand, gravel). The facilities were built on fill

Table 8

LISTING OF MONITORING WELLS AT TSD ALLEY

WELL	DATE COMPLETED	TOTAL DEPTH OF BORING (ft BLS)	SCREENED DEPTHS (ft BLS)	LOCATION	REFERENCE
MW-1	2-18-86	9.0	3.0-8.0	SW of Parcel A	21
MW-2	2-18-86	10.0	2.5-7.5	SW of Parcel A	21
MW-3	2-18-86	11.5	4.5-9.5	Parcel A	21
MW-4	2-18-86	11.5	4.5-9.5	Parcel A & NW Proc.	21
A-1	1-6-87	19.5	17.0-19.5[b]	Parcel A & NW Proc.	31
A-2	1-8-87	10.5	6.5-9.0	NW Processing	31
A-3	1-8-87	10.5	6.0-8.5	Parcel A	31
C-1(AGI-1)[a]	1-9-87	10.5	7.4-9.9	Parcel A	31
C-2(AGI-2)[a]	1-9-87	10.5	6.4-8.9	Parcel A	31
C-3(AGI-3)[a]	1-9-87	10.5	6.5-9.0	Parcel A	31
L-1	1-7-87	10.5	7.0-9.5	NW Processing	52
L-2	1-7-87	12.0	7.5-10.0	NW Processing	52
L-3	1-6-87	12.0	6.6-8.6	NW Processing	52
L-4	1-6-87	13.4	3.5-8.5	NW Processing	52
L-5	1-8-87	10.5	6.0-8.5	NW Processing	52
CTMW-1[a]	6-3-87	11.2	3.0-10.0	Parcel A	1
CTMW-2	5-28-87	10.3	2.8-10.1	Parcel A	1
CTMW-3	5-29-87	11.2	2.9-10.0	Parcel A	1
CTMW-4	5-28-87	12.0	3.5-11.5	Parcel A	1
CTMW-5	5-29-87	13.0	3.0-9.4	Parcel A	1
CTMW-6	6-1-87	13.0	3.6-10.4	Parcels A & B	1
CTMW-7	11-25-87	32.5	18.5-28.5[b]	Parcels A & B	2
CTMW-8	11-27-87	10.0	3.0-10.0	Chempro Proper	2
CTMW-9	11-28-87	31.5	18.5-28.5[b]	Chempro Proper	2
CTMW-10	11-27-87	10.0	3.0-10.0	Chempro Proper	2
CTMW-11	11-27-87	14.3	3.0-13.0	Chempro Proper	2
CTMW-12	1-27-87	35.5	21.5-31.5[b]	Chempro Proper	2
CTMW-13	5-9-89	12.2	4.0-11.6	Chempro Proper	8
CTMW-14	5-12-89	10.0	4.5-9.0	Chempro Proper	8
CTMW-15	5-16-89	7.7	5.1-7.5	SW of Sol-Pro	8
T-1[a] to T-12[a]	7-26-82	6.7 to 12.0	upper 3 ft of water table	Chempro Proper & Parcel A	16
Well #1	1989	N/A	N/A	Sol-Pro	70
Well #2	1989	N/A	N/A	Sol-Pro	70
Well #3	1989	N/A	N/A	Sol-Pro	70

[a] Wells have been abandoned
[b] Wells intercept the deep (alluvial) aquifer
BLS = Below Land Surface

material that was placed on the former Puyallup River Delta. Prior to 1924, this area was a tidal marsh/tideflat environment before dredging of the adjacent waterways (Blair and Hylebos) and filling of the intervening land. Filling continued into the 1960s and 1970s at and near the facility (4). By the late 1960s, the facilities had been partially filled with dredge spoils from the nearby waterways, leaving some low, swampy land with local ponded water. Filling with various wastes continued in the low areas (1).

Some time during the early phase of filling in the area, a sawmill existed in the area of Northwest Processing, and wood waste with silty sand was used for fill (52). The sand may have originated as dredge spoils from the waterways. It is unknown if the wood was treated with preservative before it was disposed of as fill.

Lime waste, waste sludges, and dredge spoils (described below) were dumped in marsh, pond, or other areas at Northwest Processing, Parcel A, and Chempro facilities by Hooker (now Occidental) Chemical Company and Domtar Industries beginning in 1969 and continuing until 1975 or 1976 (1, 6, 24). Petroleum tank-cleaning scales and sludges also were reportedly dumped at this time to the north and west of Parcel A (1). Some lime waste or waste sludge reportedly contained chlorinated hydrocarbons, heavy metals, and asbestos (24, 33).

From 1970 to 1975, oil-reclaiming wastewater and petroleum sludges and emulsions were placed in a pond in the center of Parcel A (SWMU A-15) (1). This oil pond was filled with fragmented automobile interiors (auto fluff) from General Metals scrap metal operation, as well as small amounts of lime, silty sand, and other materials (24, 33).

The fill material throughout the properties is from 7 to 15 feet thick, with its base at 1 to 5 feet above MSL. Table 9 summarizes features of the geologic and man-made deposits (units) that have been recognized. These units also are depicted on two cross sections (see map, Figure 12) in Figures 13 and 14, which are meant to complement the cross sections in previous reports (1, 4, 8).

Table 9

GEOLOGIC AND FILL UNITS IDENTIFIED AT THE FOUR FACILITIES
(Listed most recent at top to oldest at bottom)

GEOLOGIC OR FILL UNIT	TYPICAL THICKNESS	TYPICAL DEPTH TO TOP	LOCATION/COMMENTS
■ Artificial Fill (Significant units only)			
• Sand and Gravel (with some silty or clayey gravel)	0.5 to 4 ft	0 ft	• Widespread for use as road and foundation base • With various waste debris at Northwest Processing • With some auto debris at Parcel A and Chempro
• Silty Sand, Sandy Silt, Clean Sand (with some auto & waste debris)	1 to 4.5 ft	1 to 4 ft	• Widespread but scattered below Sand & Gravel • With auto debris and oily waste at Parcel A • With waste debris at borings L-1, L-3, L-4
• Lime Waste and Sludge (with some silt)	2 to 10 ft	0.5 to 5 ft	• Two main periods of infilling, first is widespread • Silt- or clay-like material • Includes soft sludge with solvent odor and some oil at Northwest Processing and adjacent sites
• Auto Fluff (with sand, gravel, silt)	1.5 to 7 ft	1.5 to 10 ft	• At least two periods of infilling, both widespread • Fragmented autobody parts
• Sand and Sandy Gravel	~3 to 9 ft	0.5 to 6 ft	• In borings F, CB-1, CB-3, CB-4
• Silt	0.5 to 2.5 ft	3 to 8 ft	• In borings CTMW-10, CTMW-14, CB-7, CB-8, and test pit TR-7
• Silty Sand with Woodchips (and local debris)	2.5 to 6 ft	1.5 to 4 ft	• In borings L-2 and L-5
• Sand with trace Silt	1 to 8.5 ft	1 to 9 ft	• Fine to medium sand, with trace shell fragments • Widespread unit on top of tideflat deposits • Hydraulic dredge fill from waterways
■ Organic-rich Silt and Clay (with some silty sand)	1 to 7 ft	6.5 to 14.5 ft	• Widespread, possibly continuous unit • Tideflat deposits
■ Sand with some/trace Silt	11 to 14 ft	12 to 21 ft	• Widespread, continuous unit • Alluvial deposits
■ Interbedded Silt and Sand	>4.5 to >6.5 ft	26 to 31 ft	• Widespread, continuous unit • Alluvial deposits

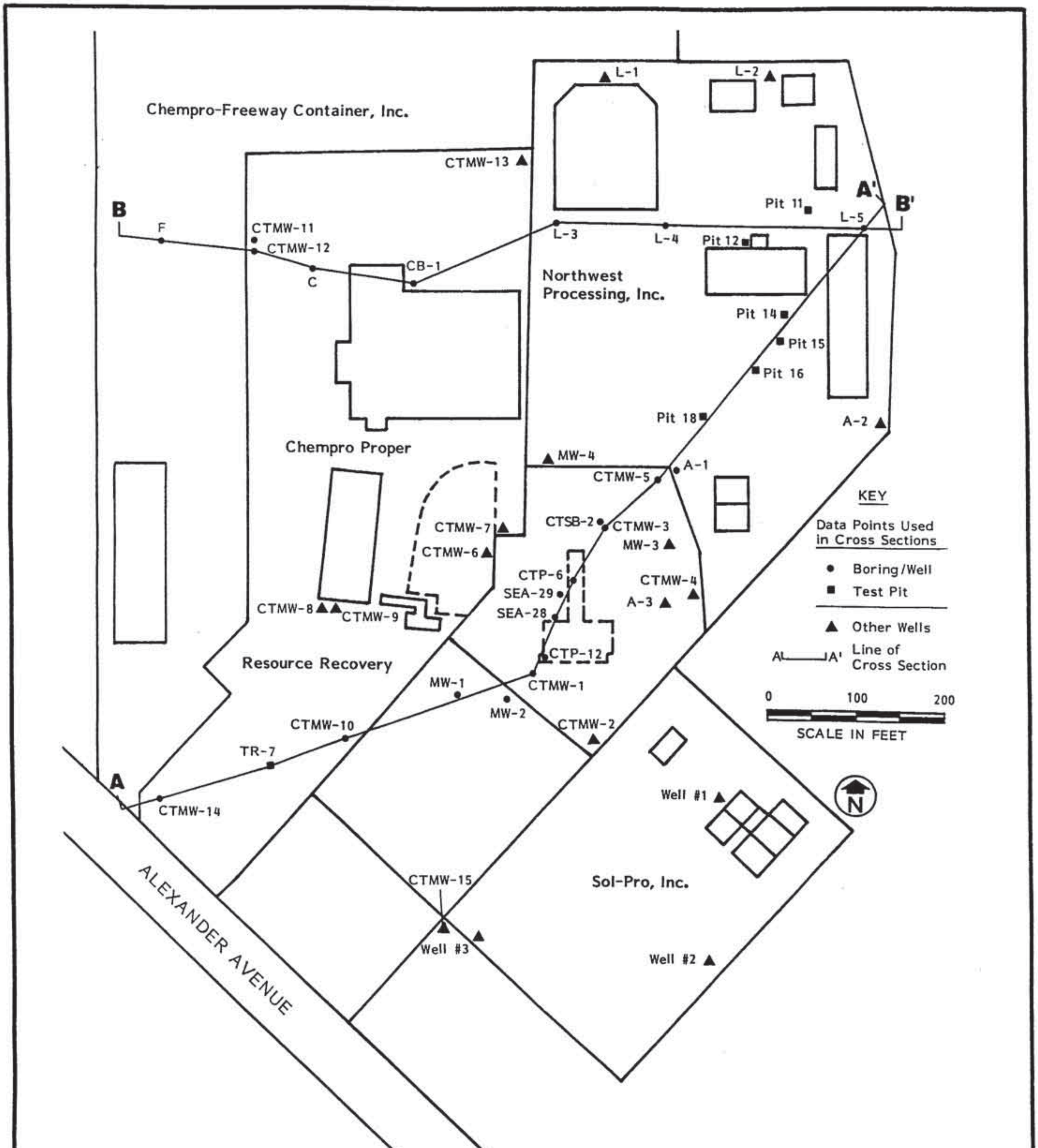


Figure 12

LOCATION OF LINES OF CROSS SECTIONS
AND BORINGS/WELLS AND TEST PITS

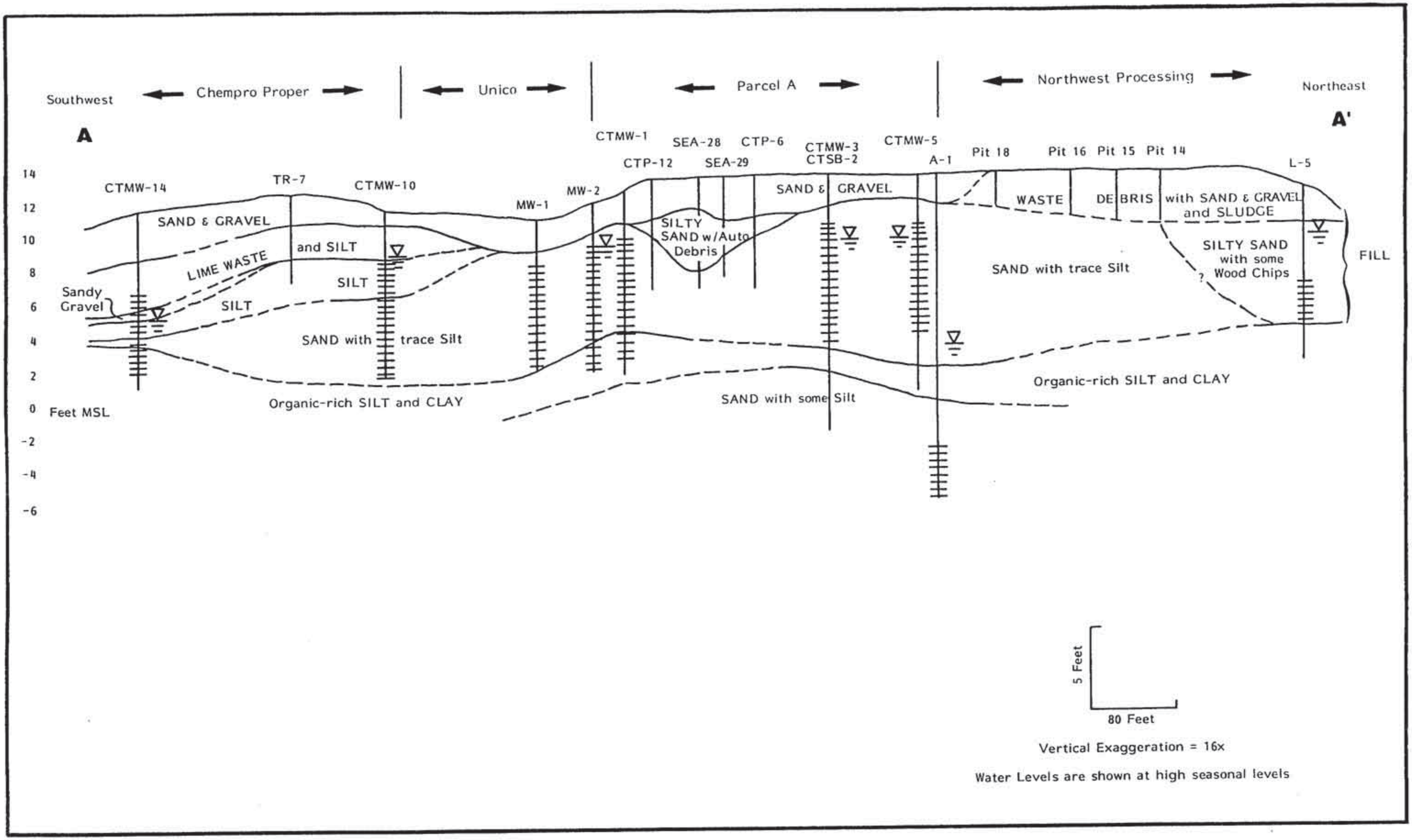


Figure 13

GEOLOGIC CROSS SECTION

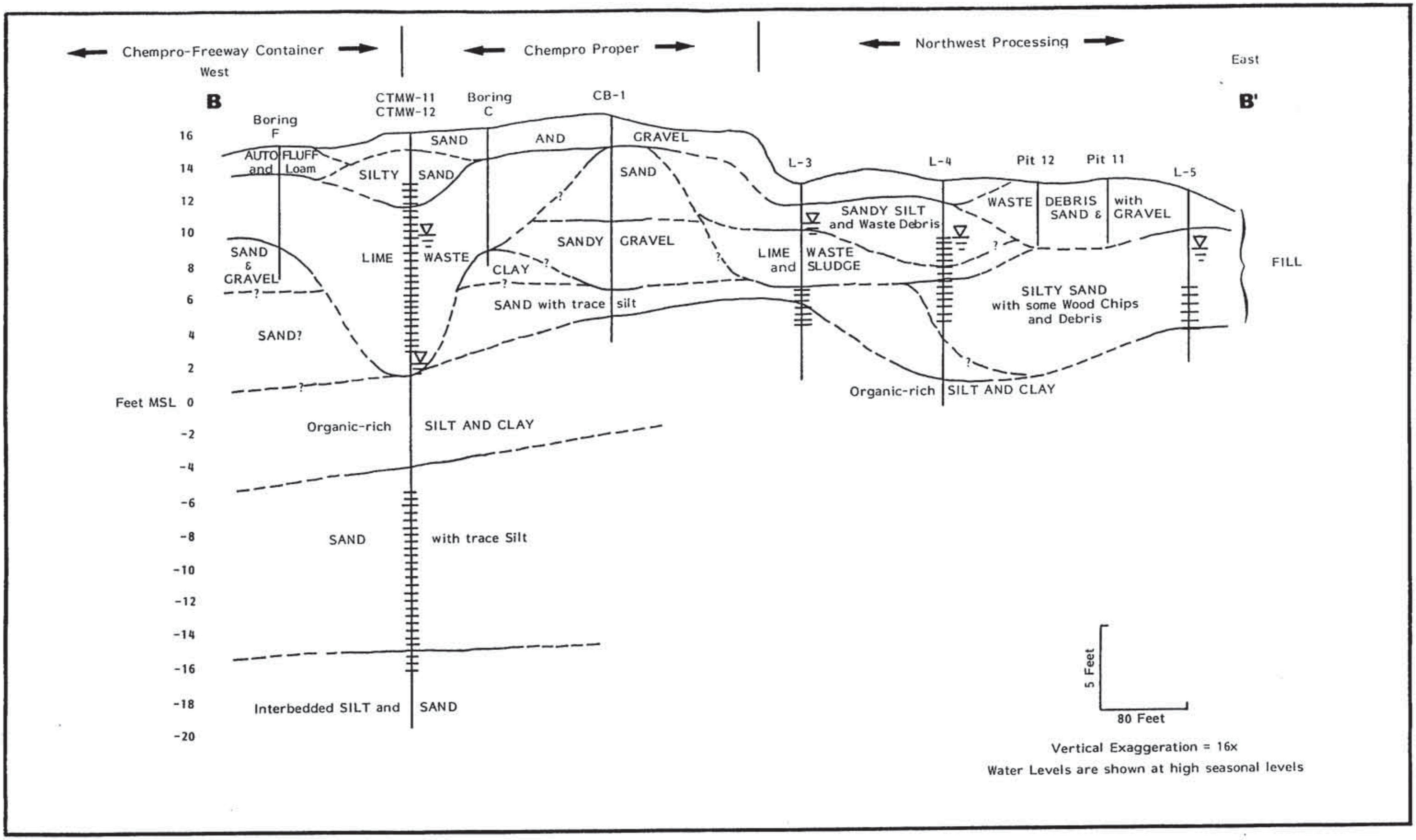


Figure 14

GEOLOGIC CROSS SECTION

Three units resulting from industrial activities are included in the fill material and will be described here: lime waste, auto body fluff (auto debris), and silty sand with woodchips. An outline of the known areal distribution of these wastes is depicted in Figures 15, 16, and 17. Data in these figures were compiled from a variety of sources, which include information from boring logs and historical photographs and drawings in previous reports. The greatest weight was given to boring logs, and secondarily to historic information.

There appear to be two periods of filling with lime waste, with the first episode being the most volumetrically significant, occurring primarily during the period 1972 to 1976 (22). Lime waste fill is typically a white to gray, firm, clay- or silt-like, chalky material. It may occur in sand to cobble size fragments and is commonly admixed with silt. Apparently, all or most of the lime waste dumped by Domtar Industries consists of powdered hydrated limestone that is free of solvent contamination. Most of the lime waste from Hooker Chemical is spent catalyst from the production of chlorinated solvents, and it is referred to as "lime solvent sludge." In boring logs, this lime waste is described as being soft, clay-like, sludge-like, and with a solvent odor. It apparently contains chlorinated hydrocarbons, heavy metals, and asbestos (22). This solvent sludge material is known from at least the following areas: throughout much of the Northwest Processing property and extending into Parcel A, plus an area in the center of Parcel B, and possibly some areas within Chempro Proper (Figure 15) (22, 52, 16). All of this material apparently originated as solvent sludge waste at Hooker Chemical (33, 24, 6, 22). A less significant period of lime waste infilling took place later, as evidenced by near-surface sand, gravel, and lime in the southern part of Parcel A and at scattered areas of the Chempro facility (locations of borings are shown in Section 4.0).

Auto fluff is pulverized or fragmented auto debris, including wire, glass shards, upholstery, tire shreds, paint chips, metal, string, plastic, and rubber, intermixed with sand, gravel, or silt. There were at least two periods of auto debris filling. The first period of disposal occurred prior to the main lime waste fill and included a sandy gravel or silty matrix in the eastern part of Chempro Proper. A second generation of auto fluff disposal occurs in near-surface silty sand, sandy silt, or clean sand on the Chempro property and in

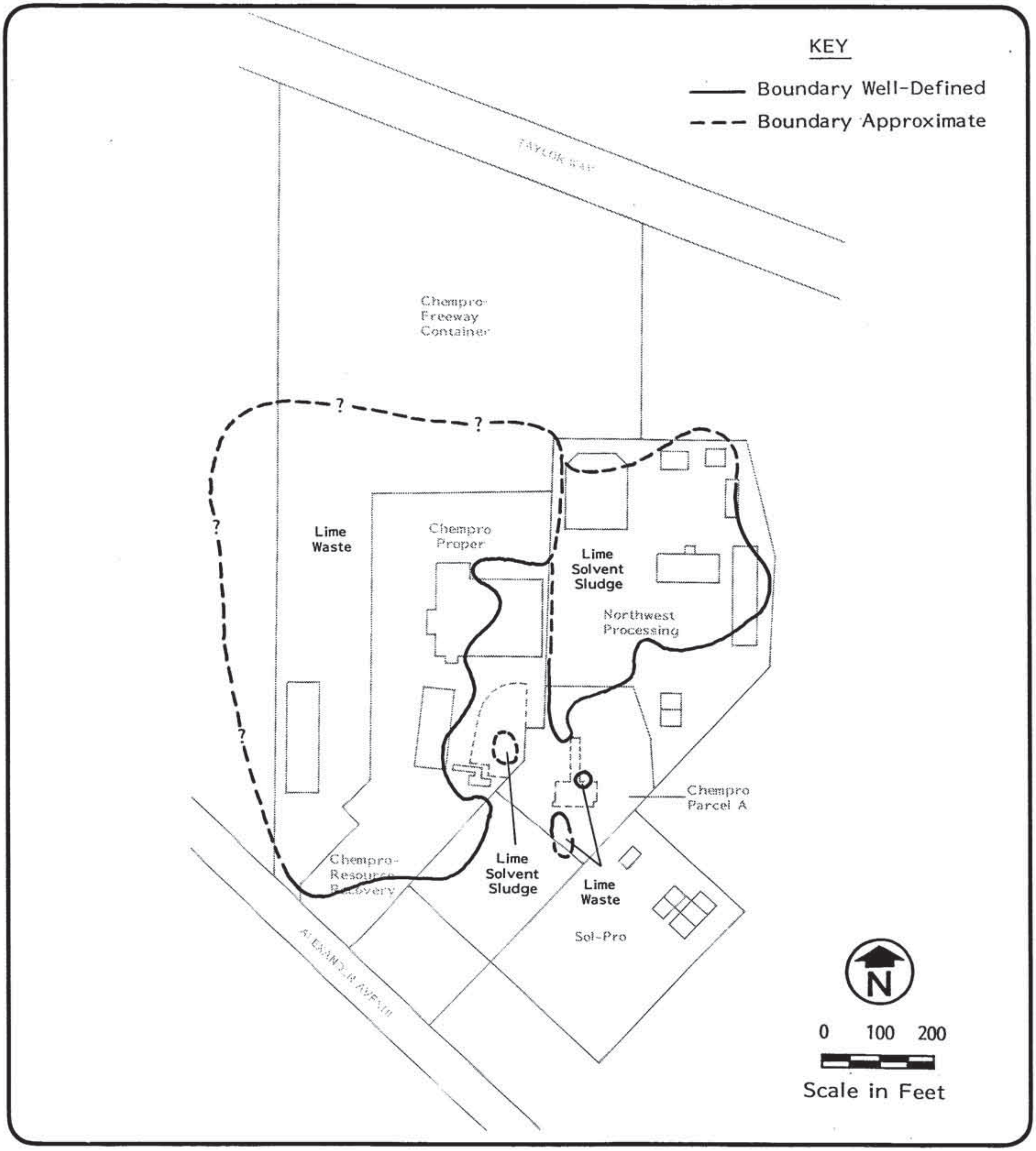


Figure 15

AREAL EXTENT OF LIME WASTE FILL

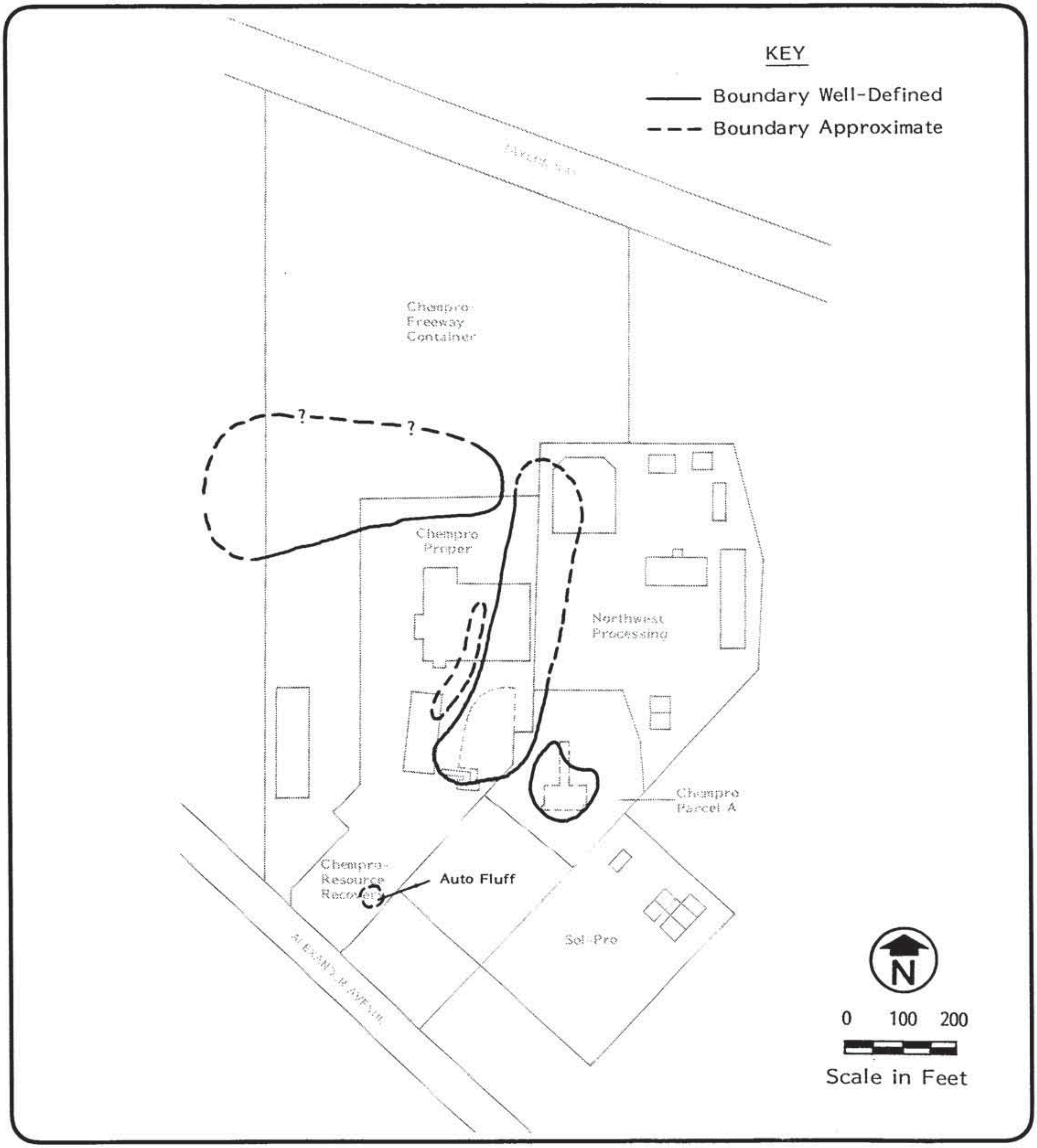


Figure 16

AREAL EXTENT OF AUTO FLUFF FILL

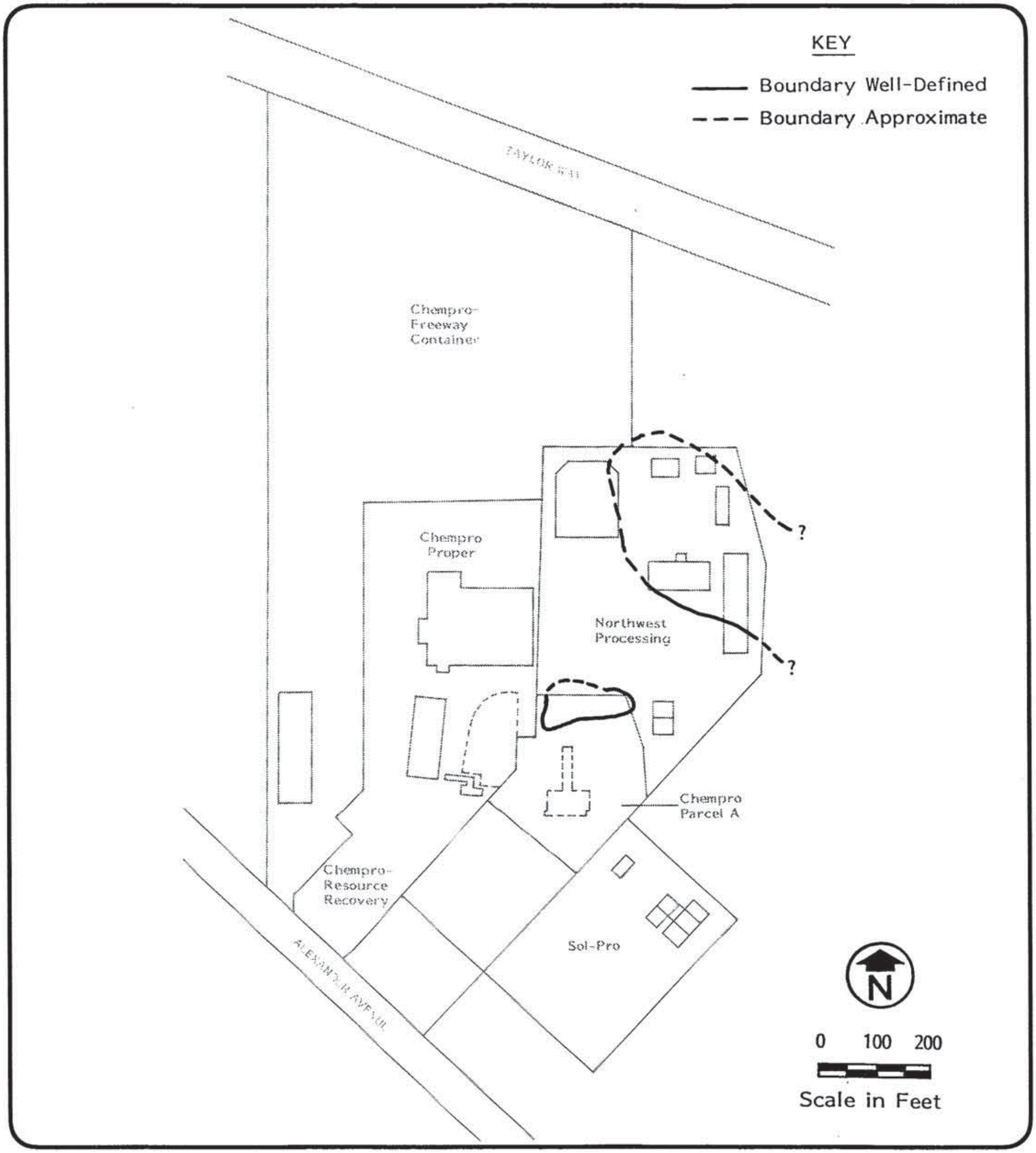


Figure 17

AREAL EXTENT OF WOOD WASTE FILL

the center of Parcel A. The silty to clean sand with auto debris and oily material in the central portion of Parcel A is the filled waste oil pond (Figures 13, 16).

The unit labeled silty sand with woodchips is located on the Northwest Processing site and adjacent property. Some woodwaste is also found in near-surface sand and gravel with rubble at Northwest Processing and Parcel A (Figure 17) (1, 52, 54).

Overall, most fill units are not very continuous laterally, although similar materials apparently were used as fill in various areas at roughly synchronous times. The oldest fill unit (fine to medium sand with trace silt) is the most continuous, forming a layer on top of the tide flat deposits across most of the properties. This sand is composed of the hydraulic dredge spoils from the nearby waterways used for fill on the intervening land.

Three natural geologic units have been recognized at the facilities underlying fill material. The uppermost unit is organic-rich silt and clay with some silty sand and some peat. This unit may be continuous throughout the area, ranging from 1 to 7 feet thick; however, the presence of this unit in former channels of the tideflat area has not been determined. This deposit formed in a tideflat environment before infilling occurred (8).

Below this is a unit of sand with some silt, underlain by interbedded silt and sand. These two geologic units are fairly thick and continuous under the site. They formed in an alluvial environment prior to development of the tideflats (8).

Although the cross sections do not trend through the Sol-Pro property, the stratigraphy in that area appears to be fairly simple (57). It typically consists of (top to bottom): 1 foot of dense, silty, sandy gravel (road and foundation base); 4 to 8 feet of loose sand and silty sand (hydraulic dredge fill); 5 to 7 feet of soft, organic-rich, clayey silt (tideflat deposits); and dense sand to over 12 feet thick (alluvial deposits) (57).

3.4.3 Hydrogeology

Two distinct aquifers have been identified on-site: an upper saturated zone (shallow aquifer) within the various fill units, and a lower alluvial aquifer (deep aquifer) within natural sand and some silt (8). These two water-bearing zones are separated by an organic-rich silt/clay unit that may be continuous across the site. Some local areas of perched water on clay or silt layers within the fill also have been identified.

The upper saturated zone is an unconfined (water table) aquifer, and the alluvial aquifer is confined. Water levels for the shallow aquifer are typically 1.5 to 7 feet below land surface (BLS) and 5 to 10.5 feet above MSL. Off-site well CTMW-15 appears to be either perched or laterally separated from the regional water table, although data are not conclusive. This well is screened in clayey silt, sandy silt, and silty sand, with the water level at 1.5 feet BLS (9 feet above MSL). All other shallow wells, with the possible exception of CTMW-14, appear to be in hydraulic connection with each other (Figures 13, 14). The deep aquifer potentiometric water levels are 10 to 14 feet BLS (2 to 3 feet above MSL), which constitutes a head rise of 1 to 7 feet above the top of the sand aquifer (above the base of the silt confining layer) (8).

Determination of ground water flow directions has been somewhat problematic since the first water levels were measured in 1982. Problems may have resulted from floating oil on the ground water, possible critical local recharge or discharge, and typographical errors for water levels. Efforts to measure water levels and determine flow directions for the shallow aquifer include the following:

- Twelve wells were installed by Harper-Owes throughout parts of the Chempro facility and Parcel A. Water levels suggested ground water flow was generally toward the southwest (August 1982), although one well had an anomalously depressed water level (16).
- Four wells surrounding Parcel A (installed by Hart-Crowser) showed ground water flow generally southward (21).
- Five wells were installed by Applied Geotechnology Inc. in the shallow aquifer at the north end of Northwest Processing, and water levels were measured on January 19, 1987 (52). Although these wells were not surveyed, their location on the detailed topographic map, together with the water depths, suggest that ground water flows generally eastward

(17). This direction is in agreement with the data collected at Chempro and Parcel A, as discussed below (8, 43).

- Water levels taken by Sweet-Edwards/EMCON (SE/E) on three existing and six new wells at Parcel A in early June 1987 suggest flow to the southeast and southwest, with a hydraulic ridge trending about north-south through the parcel (1). Measurements taken on June 30, 1987, suggest flow to the southeast (1). Measurements taken on August 6, 1987, at low tide (for Commencement Bay) suggest flow generally to the south (1). Measurements taken at high tide on the same day are not significantly different but reveal a very irregular contour pattern.

- Measurements taken on six wells by SE/E at the Chempro facility and Parcel A in late November and early December of 1987 suggest flow generally to the southeast (2).

- Measurements taken on ten wells by SE/E at the Chempro Proper facility and Parcel A on April 28, May 23, and June 2, 1989, all indicate flow to the south, southwest, and southeast, with a hydraulic ridge trending north-south through the center of the area. These water levels are considered the most accurate measurements taken to date. Tidal measurements taken over 26 hours in well CTMW-8 in the shallow aquifer revealed no significant tidal or other short-term fluctuations (8).

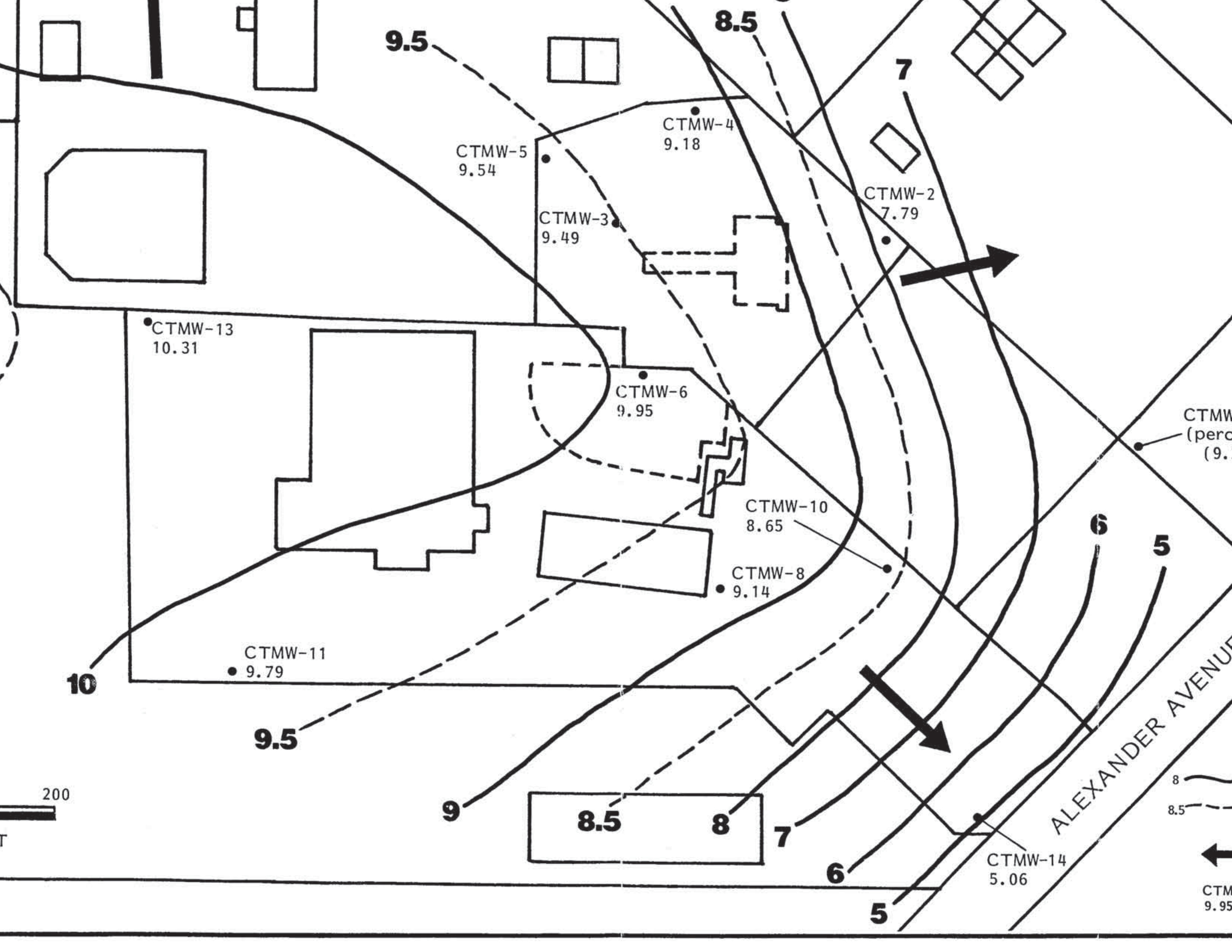
The water elevation in well CTMW-14 appears to be anomalously low, although it is partly screened in the same sand aquifer as adjacent wells (Figure 13) (8). However, this well screen also intercepts a perched zone above a thin silt layer, thereby connecting the water table and this perched zone. The position of the screen and the low water level in CTMW-14 suggest that this perched zone does not significantly affect the water table elevation in this well. However, the anomalous water level leaves doubt as to the hydrogeologic relationship between CTMW-14 and other wells.

SE/E did not utilize the water level data from well CTMW-10 because water elevations appeared to be too high (8). SE/E suggested that this well screen potentially intercepts perched water, or that a nearby source of artificial recharge may be elevating the water level (8). However, the cross section in Figure 13 reveals that the screen mostly intercepts the same sand aquifer as adjacent wells, although it also partly lies within silt. The problem appears to originate in a typographical error recorded for the well survey elevation, which was inadvertently listed as being 2.00 feet too high (2, 8).

During evaluation of the gradient of the water table, well CTMW-15 has been excluded because it does not appear to be in close hydraulic connection with other shallow wells. The water elevation in CTMW-15 appears to be 2 to 3 feet higher than the projected water table for that area. Until more borings or wells are installed in the vicinity of CTMW-1 and CTMW-14, the usefulness of water levels in these wells is unclear. The water table contours depicted in Figure 18 utilize data from all usable wells in the shallow aquifer, with water elevations corrected and on a single survey datum. The water level in CTMW-14 was included in Figure 18 and the resultant gradient increases in that area. As stated above, ground water does appear to generally flow southward, with a hydraulic ridge that approximately follows the eastern boundary of Chempro Proper. Ground water at Northwest Processing generally flows east to southeast. Using extrapolation and depths to water in borings on the Sol-Pro property, it appears that ground water flows to the south or southeast (57). Therefore, it appears that the shallow aquifer discharges to Blair Waterway or possibly to other surface features such as local drainage ditches. If the water table follows the topographic trend in the Freeway Container property, it is possible that the shallow aquifer would flow to the northeast toward Hylebos Waterway.

The hydraulic conductivity of the shallow aquifer as determined from slug tests in shallow wells (excluding CTMW-15) ranges from 1×10^{-5} to 3×10^{-3} cm/sec (8). Using a geometrically averaged hydraulic conductivity of $K = 2 \times 10^{-4}$ cm/sec, a gradient of 0.0040 (for Parcel A and Chempro Proper north of CTMW-10), and an effective porosity of 0.25, produces a calculated flow rate of 0.009 feet/day (3 feet/year).

In contrast to the shallow aquifer, the alluvial aquifer is confined and is reported to show a strong response to tidal cycles (8). Over a 25-hour period (May 8-9, 1989), the water level in deep well CTMW-9 (¼ mile from Blair Waterway) deviated up to 1.0 feet (8). However, only one high and one low peak were recorded during this period, unlike the pronounced twice-daily schedule of the tidal cycles for those two days. Furthermore, the frequency of the measured fluctuations in the well do not correspond to the tidal frequencies for Commencement Bay for those days. It is possible that other factors in addition to tides may be responsible for the observed fluctuations: barometric changes


CTMW-2
7.79
CTMW-3
9.49
CTMW-4
9.18
CTMW-5
9.54
CTMW-6
9.95
CTMW-8
9.14
CTMW-10
8.65
CTMW-11
9.79
CTMW-13
10.31
CTMW-14
5.06
ALEXANDER AVENUE
10
9.5
9
8.5
8
7
6
5
200

and/or artificial discharge (pumping) or recharge. A longer hydrographic analysis is necessary to answer these questions.

Flow direction determination in the alluvial aquifer is highly sensitive to this observed fluctuation of 1.0 foot; maximum head differences at one time for reported water levels between the three measured deep wells is only 0.40 feet. Water levels in the deep wells were measured once in 1987 (12/4) and five times in 1989 (4/28, 5/4, 5/12, 5/23, and 6/2) (8). Of these six measurements, four produced northeastward flow vectors. The remaining two measurements (6/2 and 5/12) produced southwest and westward vectors; however, one elevation within each set of measurements is suspect due to tidal fluctuations, artificial recharge/discharge, and/or transcription errors. Therefore, ground water within the alluvial aquifer appears to flow northeastward most or all of the time, probably discharging to Hylebos Waterway. The installation of additional deep wells is necessary to confirm the flow direction in this aquifer.

The hydraulic conductivity of the alluvial aquifer as determined from slug tests in the three deep wells yields values of greater than or equal to 1×10^{-2} cm/sec (8). This uncertainty is due to the high permeability of the sand, resulting in overly rapid recovery of water levels during slug tests (8). A value of $K = 1 \times 10^{-2}$ cm/sec is an expected average conductivity for fine to medium sand. Using this value, a northeastward gradient of 0.00072, and an effective porosity of 0.3, results in an approximate flow rate of 0.07 feet/day (25 feet/year).

Three water supply wells have been identified within a 0.5 mile radius of the site (8). Two of these wells were in use as of May 1988: 1) the City of Tacoma Tideflats well located about 1/4 mile north of the site, and 2) the Buffelen Woodworking Company well about 1/3 mile northeast of the site. A third well located about 1/3 mile east of the site has been inactive for 20 years. The Tacoma Tideflats well has a depth of 788 feet and the Buffelen Woodworking well is about 300 feet deep. Neither of these wells would be affected by the generally southward flowing ground water of the shallow aquifer. The Buffelen well may be downgradient from the alluvial aquifer on-site, but this well taps water at a much greater depth than the alluvial aquifer, which reaches to about 20 feet below MSL (8).

4.0 SOIL AND GROUND WATER CONTAMINATION

Investigations to identify and evaluate investigations of surface and subsurface contamination have been conducted at all four facilities. The largest number of investigations have been conducted to evaluate subsurface contamination at the Chempro facilities. These include the installation of monitoring wells at Parcels A and Chempro Proper, collection of closely spaced sampling data for soils at Parcel A, and less extensive soil sampling at Chempro Proper. Information available on soil and ground water investigations from Northwest Processing and Sol-Pro is limited to ground water quality data from a small number of monitoring wells at these facilities. This discussion of soil and ground water contamination relies primarily on investigations conducted at the Chempro properties. This information is supplemented by data from Sol-Pro and Northwest Processing, where possible.

A comprehensive list of soil contaminant sampling data may be found in Appendix C; ground water sampling data may be found in Appendix D.

4.1 SOIL CONTAMINATION

4.1.1 Previous Investigations

At least seven investigations of soil and ground water contamination have been performed at the Chempro facilities. Soil sampling and analysis have been conducted to meet a variety of requirements, including reconnaissance evaluations, equipment closure reports and a RCRA 3013 enforcement order to assess releases from facility operations. Each of these investigations has utilized different methods for determining the number and locations of samples, sample depth intervals, use of discrete and composite sampling, and analytical methods for identifying soil contamination. The different objectives and methods used in these studies determined the type and quantity of data generated. The following discussion reviews the adequacy of existing data for determining the distribution of soil and ground water contamination from all SWMUs at the four facilities. The locations of soil samples from the investigations are shown on Figure 19.

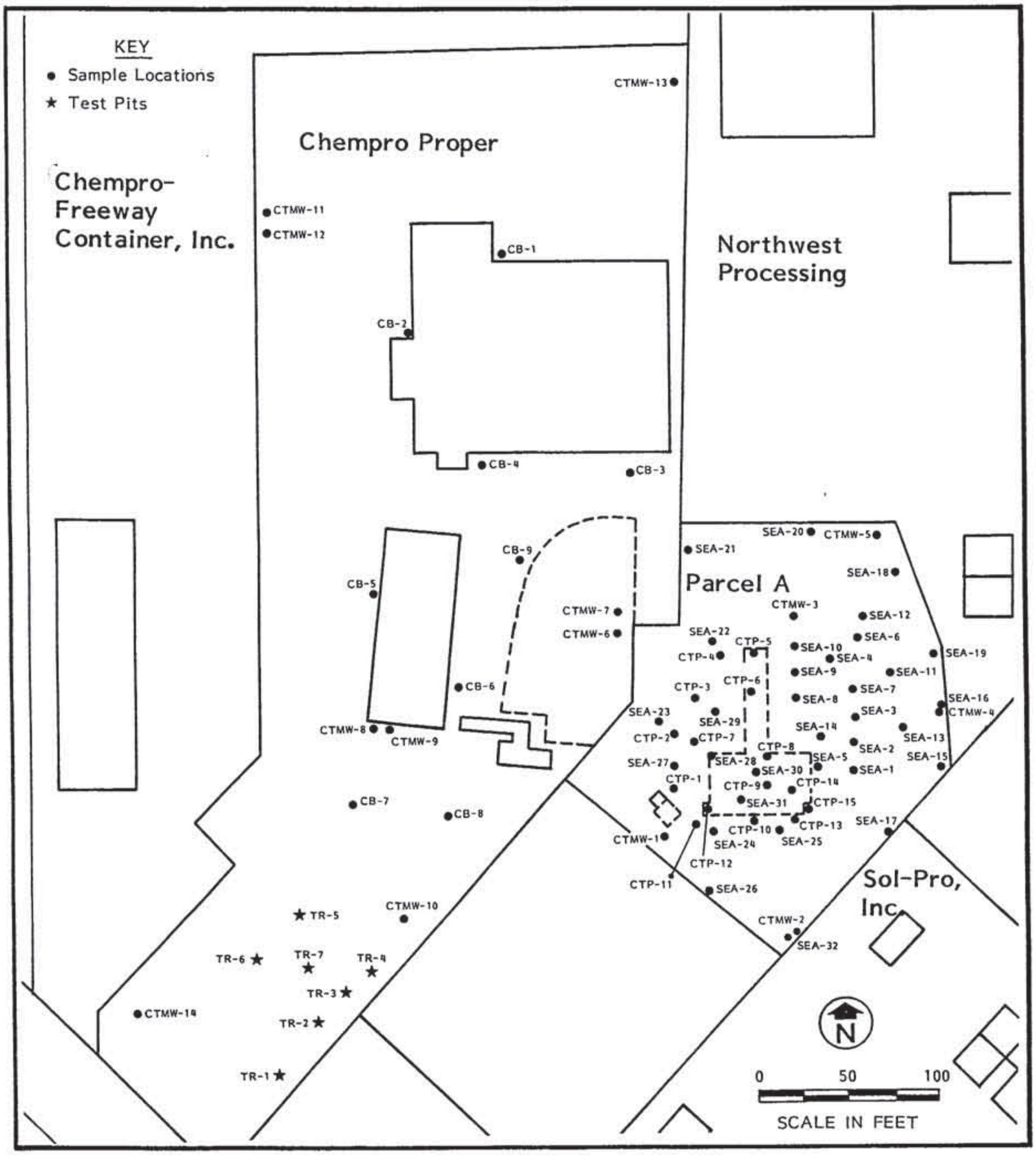


Figure 19

LOCATIONS OF BORINGS AND TEST PITS
USED FOR SOIL ANALYSES

At parcels A and B of Chempro, investigations have included Phase I and II Hydrogeologic Investigations (1, 2, 4, 8), and Equipment Closure Soil Sampling and Analysis reports (5, 53). Additional reports on analysis of auto fluff fill materials and statistical evaluation of Parcel A soil data for closure activities were also prepared (7, 14). During the Parcel A Phase I investigation, 32 soil borings and six monitoring wells were installed at the property (numbered SEA-1 through SEA-32 and CTMW-1 through CTMW-6, respectively). Twenty-two soil borings were placed to the east and northeast of the former treatment units. Three soil borings were placed along the southern edge of the former treatment facility and seven borings were placed in the west and northwest portions of the parcel. Five of the monitoring wells were placed around the border of Parcel A, with one well located west of the units near the center of Parcel A. Two different depth intervals were used to sample at each location. Samples were collected from the deeper interval at six borings, both intervals at two borings and the shallow interval at 24 borings. All of the studies conducted at the Chempro parcels have shown increasing concentrations of contaminants with depth (excluding selected metals concentrations in soils above contaminated fill layers). Therefore, the majority of samples from the Phase I investigation at Parcel A may under-represent concentrations of contaminants in soil for those locations. Samples were analyzed for total metals, EP toxicity, volatile organics, base neutral/acid extractables, oil and grease, cyanides and total PAHs. The analytical results for selected compounds from these investigations are tabulated in Appendix C.

For the Phase II investigation at Parcel A, a total of 15 soil borings (numbered CTP-1 through CTP-15) were installed. Three depth intervals were considered for sampling at each boring. Between two and four samples were collected at each location from the depth intervals of 0.5 to 2.5 feet below land surface (BLS), 2.5 to 3.5 feet BLS and 3.5 feet BLS to the total depth of the boring (maximum of 8.2 feet). It was unclear if samples from the deepest interval were collected from a discrete depth within this interval or if the entire interval was sampled and composited. Auto fluff was encountered in all but five of the boring locations and oily fill and/or sediments were encountered in all but two boring locations (See Figure 16). Six borings were placed at the location of the former treatment units; three borings were located adjacent to the former units to the south and three were located to the west of the units. Samples were analyzed for total metals, EP toxicity, volatile organics, base neutral/acid extractables, oil and grease, cyanides and total PAHs.

The Parcel A closure report was based on 41 soil sample locations at the location of the former treatment facility and adjacent areas on the parcel (5). (Note: these were closely spaced sampling locations not shown on Figure 19.) The sample locations were reportedly selected based on a random grid selection method specified in EPA SW-846 for waste characterization. Surface soil samples were collected at each location and at successive depths during excavation. Soil excavation was carried out to depths of up to 36 inches below the pre-existing grade at the site. Samples were collected at selected locations below the depth of excavation for evaluation of remaining levels of regulated waste constituents.

The Parcel A closure report was supplemented by the report on Parcel A Closure Auto Fluff Testing and Analysis (7), and on Statistical Evaluation of Parcel A Closure (14). Eight samples from four test pits were used to evaluate the composition of auto fluff fill in the northwest corner of the Chempro property occupied by Freeway Container. These reports attempted to demonstrate the contribution of auto fluff to metals and cyanide in soils at the site as a separate source from the waste treatment activities conducted by Chempro at Parcel A.

Chempro Proper Phase I and Phase II Investigations included soil sampling at nine monitoring well and nine soil boring locations (numbered CTMW-7 through CTMW-15 and CB-1 through CB-9, respectively). Of 50 soil samples collected from these locations, 24 were composited over large depth intervals (3 to 8 feet BLS). The composited samples may not properly reflect contaminant concentrations due to dilution of more highly contaminated intervals in the soil column. If volatiles were sampled from a discrete location, this may not reflect average or maximum concentrations for the reported sample interval; if these were composited, significant losses of constituents may have occurred during sampling. The locations of these sampling points are dispersed across this area.

During the Phase I investigation, seven test pits (TR-1 through TR-7) were excavated and soils visibly contaminated with oily wastes were removed for off-site disposal. No documentation or description of any analytical results for these locations were presented in the Phase I report.

The letter tank area Equipment Closure Soil Sampling and Analysis report (53) contains the results for soil sampling and analysis at seven locations in the area of the former "Letter Tank Farm" (SWMUs C-56 to C-63) operated by Chempro. Samples were collected from the ground surface to a depth of up to 1.5 feet. Four sample locations were selected to assess potential release sources from the closed tank farm, two each from former sump and tank valve locations. Three additional locations were based on randomly selected coordinates from a grid pattern. All samples collected were analyzed for total metals, EP toxicity, total cyanide and cyanide amenable to chlorination, oil and grease, volatile organic compounds, and total PAHs. A total of 15 soil samples were analyzed during the closure investigation.

4.1.2 Contaminant Distributions

A variety of potential sources exist for the hazardous constituents detected at the Chempro facilities. Oily wastes managed at Parcel A prior to Chempro operations have resulted in significant soil and ground water contamination, primarily due to storage and disposal of oily wastes in an unlined surface impoundment and spills from oily waste storage, treatment and transfer operations. Oily wastes have provided the primary contributions of PAHs detected in soil and ground water. These wastes may also have contributed to the soil contamination by aromatic compounds (benzene, ethyl benzene, toluene and xylenes) and by purgeable halocarbons (trichloroethene, methylene chloride and others). The lime sludges disposed of at the Chempro facilities by Hooker Chemical are a documented source of trichloroethene, tetrachloroethene, ethylene dichloride, 1,1,1-trichloroethane and methylene chloride, and a potential source of dichloroethenes and vinyl chloride. Paint booth wastes are a potential source of aromatic compounds (especially toluene and xylenes) and metals. Metals and cyanides present at the facilities are present primarily due to releases of plating wastes from the treatment facility and constituents present in the auto fluff used as fill material at the site. The following section reviews the distribution of the major types of contaminants found in soils at the facilities.

Base Neutral Compounds - Oily Waste Constituents

A variety of base neutral organic compounds were detected in subsurface soils at the Chempro facilities. The predominant species in this group are polynuclear aromatic hydrocarbons (PAHs) that are usually associated with oily wastes or coal tar. High concentrations of PAHs (>100,000 μg/kg) were detected at a number of locations at Parcel A (SEA-14; CTP-3,7,9,11,12,14) (Figure 20). Currently available information indicates soils most highly contaminated by PAHs occur in an elongate pattern located in the area of the former oily waste pond and in the southern portion of the former plating waste treatment area. Two "hot spots" of significant contamination were also detected to the west of the former treatment facility and are probably related to releases from the oily waste pond. In most of the area contaminated by oily wastes at Parcel A, naphthalene and 2-methylnaphthalene predominate over other PAHs, usually comprising 50 to 80 percent of the total PAHs detected in the base neutral scan. Lower levels of PAH contamination extend to the east and west from the former oil pond at Parcel A. Significant concentrations of PAHs (>1000 μg/kg) were detected in the vicinity of the former letter tank farm (CB-6,8,9; CTMW-6). Based on the density of sampling data, it can not be determined if these results indicate discrete areas of contamination or more widespread contamination in the letter tank area. One sample from the northeast corner of Chempro Proper contained >2000 μg/kg PAHs (CTMW-13); this may reflect the influence of Northwest Processing operations on soil composition, as the sample was not taken from an area associated with units or processes of Chempro. Higher molecular weight PAHs that have been found to contribute to contamination at the Chempro facilities include fluorene, phenanthrene, pyrene, chrysene, benzo(a)anthracene and related compounds.

Base Neutral Compounds - Phthalate Esters

The other class of base neutral organic compounds detected at a large number of locations are the phthalate esters (Figure 21). These compounds are used as plasticizers and are commonly detected in the environment due to anthropogenic

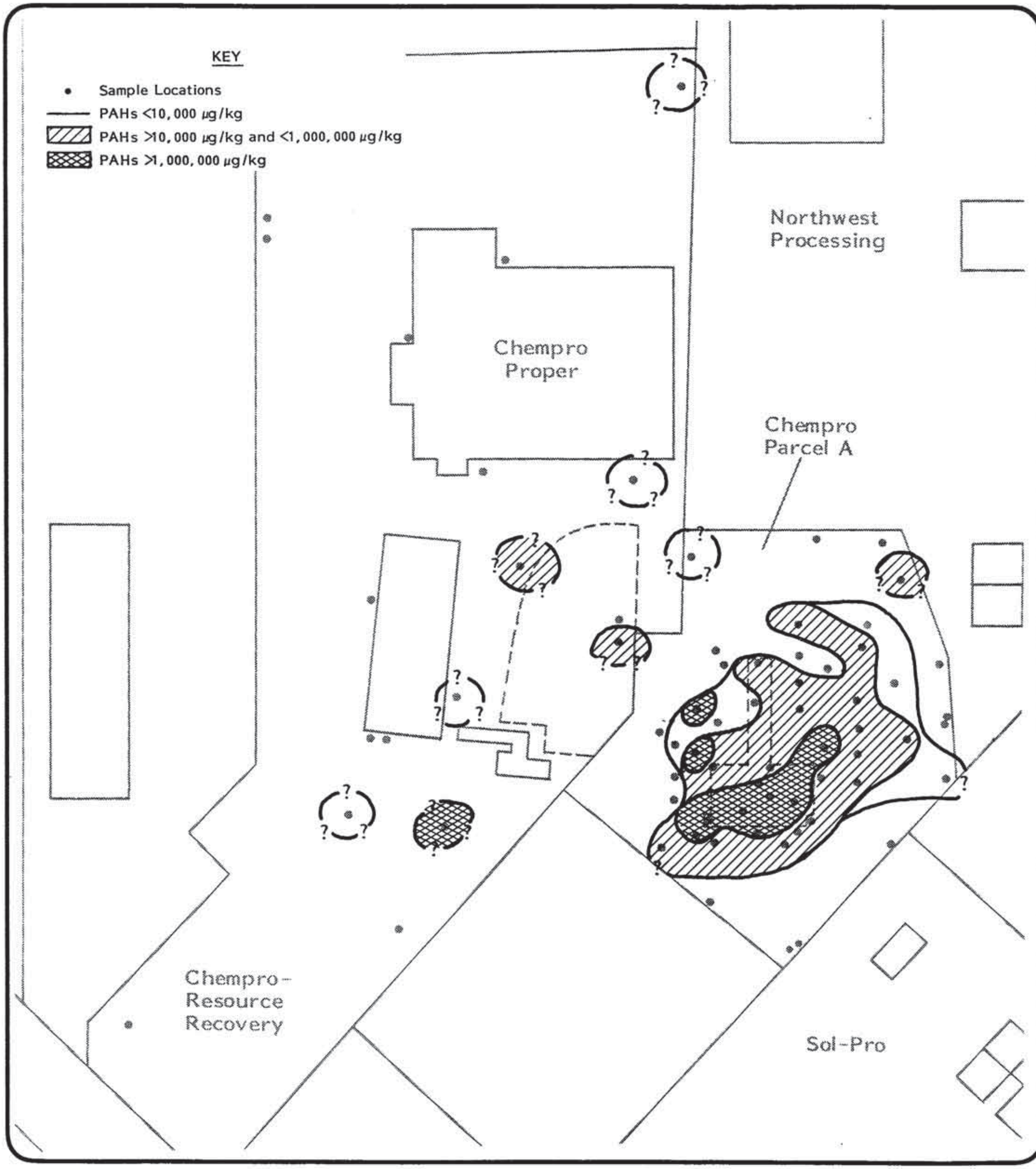


Figure 20

CONCENTRATIONS OF PAHs IN SOIL

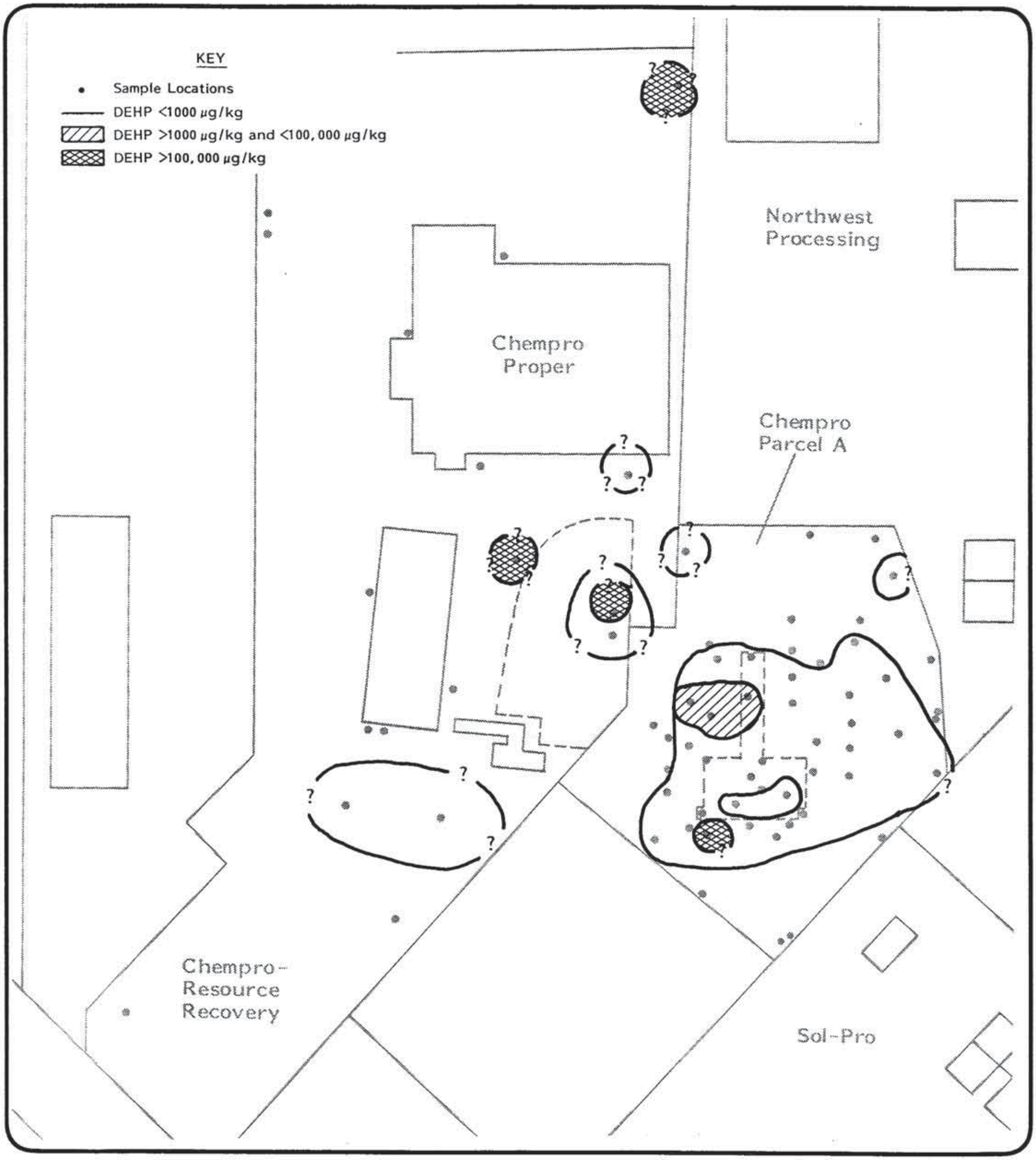


Figure 21

CONCENTRATIONS OF DEHP IN SOIL

sources. Four species of phthalate esters have been detected in soils at the Chempro facilities, with bis(2-ethylhexyl)phthalate being the predominant component. Di-n-octyl phthalate, butylbenzyl phthalate and di-n-butyl phthalate are also present in areas south and east of the former waste treatment units at Parcel A (SEA-24,29; CTP-3,4,6). These compounds also contribute to the contamination observed at borings placed in the area around the former letter tank farm on Chempro Proper (CTMW-6,7; CB-6,9). High levels of phthalate ester contamination are also found in the northeast corner of Chempro Proper (CTMW-13). This distribution is generally similar to the observed distribution of PAHs. While the area of contamination at Parcel A generally occurs in the area of the former oil pond, contamination at Chempro Proper may represent isolated or more widespread contamination in that area. As with PAHs, the contamination detected in the northeast corner of Chempro Proper may reflect the influence of Northwest Processing on conditions at the Chempro site. The phthalate esters present in soils may be present as oily waste constituents and as components of the plastic materials present in the auto fluff. Phthalate esters present in oily waste will be more mobile in the environment due to their occurrence as constituents in a complex organic liquid, while phthalate esters in auto fluff are present in a solid matrix that are not as available to migrate in the subsurface flow system. The contribution of each of these sources to the observed concentrations of phthalate esters in soil cannot be determined from available information.

Volatile Organic Compounds

Significant concentrations of aromatic hydrocarbons and purgeable halocarbons were detected in soils at several areas of the Chempro facilities. Figures 22 and 23 show the distribution of these two groups of contaminants detected at the site. Aromatic hydrocarbons found in soils include benzene, ethyl benzene, toluene and xylenes. Xylenes are the predominant aromatic compounds in the samples, occurring at concentrations up to 240,000 μg/kg. Toluene and ethylbenzene are significant components of the aromatic compounds present in soils. Benzene occurs less frequently and is usually present in lower concentrations (up to 16,000 μg/kg) in subsurface soils.

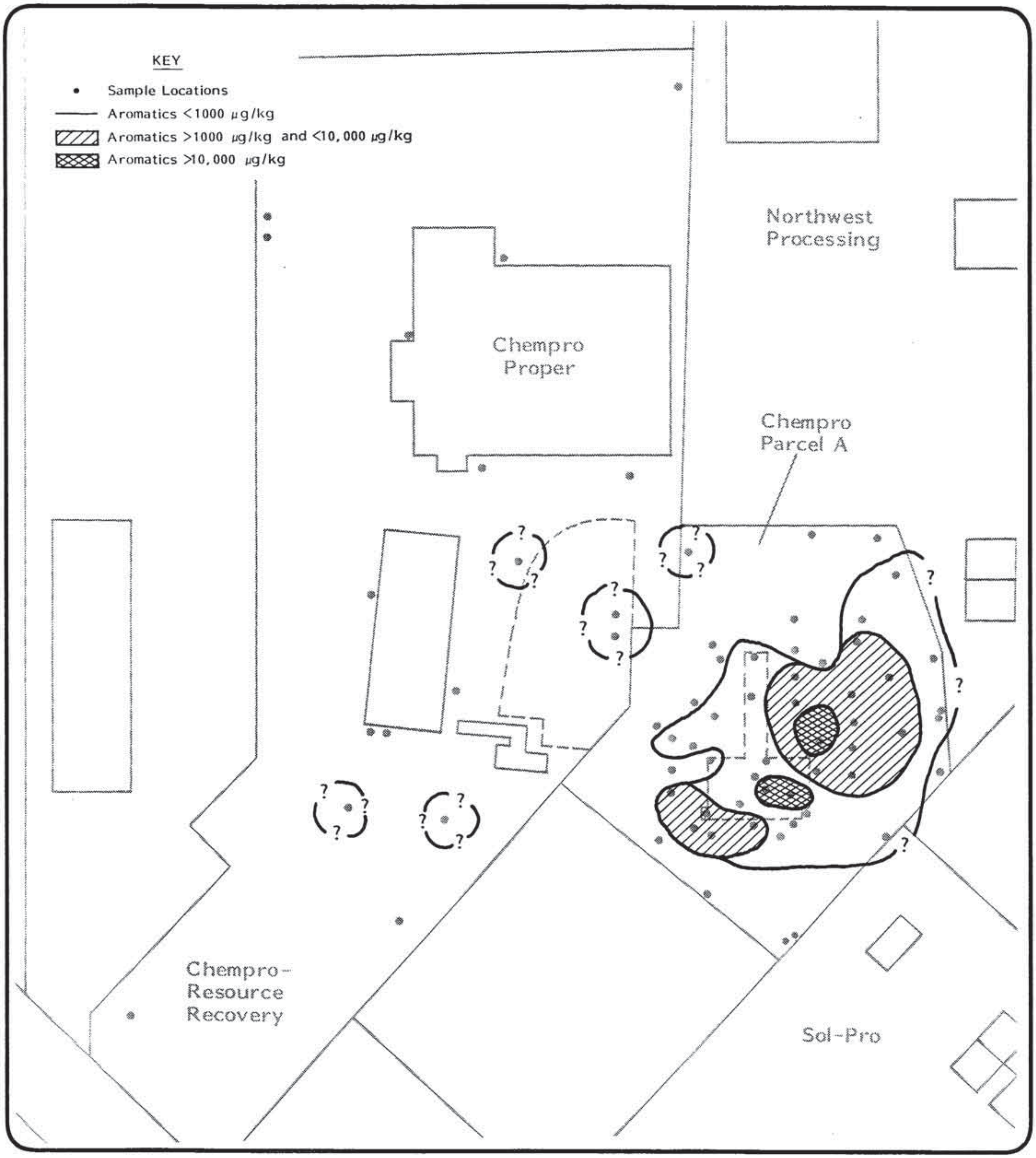


Figure 22

CONCENTRATIONS OF AROMATICS IN SOIL

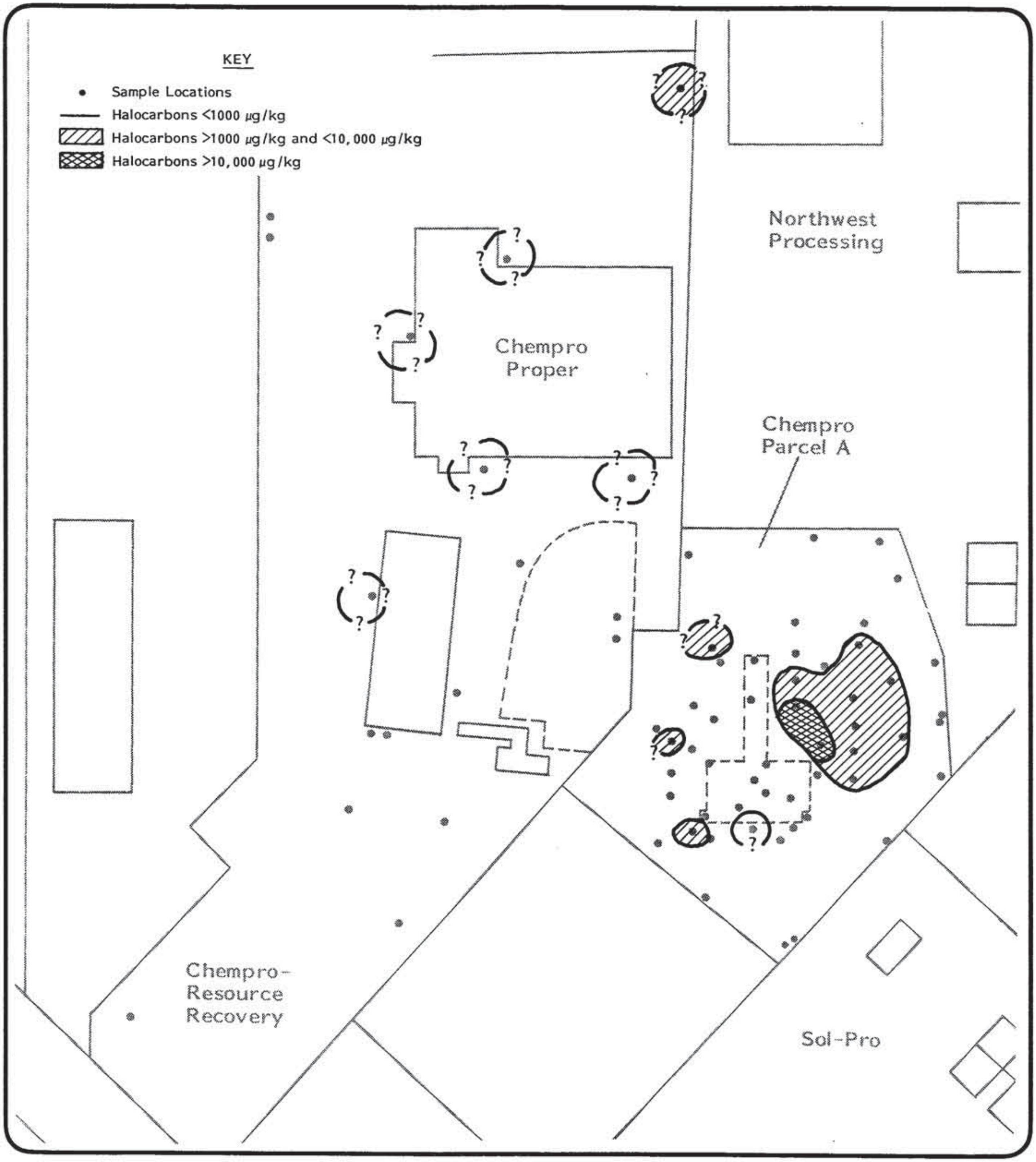


Figure 23

CONCENTRATIONS OF HALOCARBONS IN SOIL

The distribution of aromatic hydrocarbons generally occurs in the same pattern as that observed for PAHs at the site. A widespread area of contamination is present in the former location of the oily waste pond at Parcel A (Figure 22). In the central and eastern portions of this contaminated area, xylenes are the only aromatic compounds present in soil. Within the broader area of contamination, higher concentrations of aromatics occur in localized areas in the immediate area of the former waste treatment units on Parcel A (SEA-14; CTP-1,2,7,9,10,11,12,14). High concentrations (>200,000 μg/kg) of aromatics occur at Chempro Proper in the area of the former letter tank farm. Contamination detected in one boring (CB-9) at the former tank farm may be due to isolated contamination or may reflect a contiguous area of contamination in the vicinity of the former letter tank farm. An apparently isolated area of contamination at the northwest corner of Parcel A (SEA-21) may also be due to the influence of Northwest Processing.

Purgeable halocarbons detected in soils at the Chempro facilities include trichloroethene, tetrachloroethene, 1,1,1-trichloroethane, vinyl chloride and methylene chloride. These chlorinated compounds may be present due to several potential sources, including spent lime catalyst used as fill, solvent constituents present in used oil managed in the former oil pond and other units at Parcel A, solvents present in plating wastes treated at the former waste treatment area in Parcel A, and waste solvents stored and treated at Chempro Proper. The occurrence of halogenated compounds in the two areas east and south of the former treatment facility at Parcel A may reflect the impact of spent lime catalyst fill, waste oils and plating waste containing solvents managed in these areas (SEA-1,2,3,6,8,9,11,13,14; CTP-11). Because virtually all of the Northwest Processing property is underlain by lime fill, the concentrations observed in borings adjacent to that facility (CTMW-13) may be due to the lime fill.

Other volatile organic compounds were detected at significant levels (up to 100,000 μg/kg) in soils at the Chempro facilities, including acetone and 2-butanone. Volatile organic compounds other than those discussed above occurred in spatially isolated samples that could not be used to infer any distribution of contamination at the site. Where these compounds have been detected, sampling at a closer spacing interval will be required to determine the extent of contamination due to these compounds.

Metals and Inorganic Compounds

A number of metals and inorganic compounds have been detected in soil samples at levels that may reflect contamination due to releases from solid waste management units. These compounds include chromium, lead, copper, zinc, arsenic, mercury, and silver. Metals may occur in soils at the site in several different states. Metals occur as trace elements in soil minerals, and are often found in soils at levels of up to several mg/kg. Because of the low concentrations of metals and their presence in the crystal structure of mineral grains in this mode of occurrence, metals from this source are usually not available for subsurface transport.

Metals present in this form are naturally occurring and are referred to as background concentrations. Metals may also be present as major constituents of solids in auto fluff. Because of the higher concentrations of metals in these materials and the occurrence of the waste as finely ground particulates, significant concentrations of metals may be present in EP toxicity extracts from auto fluff (e.g. up to 1.5 mg/l in EP extracts) (7).

Metals may also be present in soils as constituents in pore fluids (ground water, soil moisture and waste present in soils). Metals present in this form are part of the subsurface flow system and provide the sources for ground water contamination by metals. Sources for metals in this method of occurrence are plating wastes managed at Parcel A, metals present as constituents in used oil, and metals leached from auto fluff. Other soil and waste properties may affect the mobility of metals and their potential contribution to ground water contamination. These include decreased metal solubilities due to the elevated pH in areas of lime waste fill, enhanced solubility of metals due to the presence of cyanide that may act as a complexing agent, and possible increased solubility of metals due to ligand formation with oily waste components.

The distribution of lead and chromium in soils was evaluated to provide an overall assessment of the distribution of contamination at the site due to metal-bearing wastes and the potential for environmental impacts due to lead contamination. Figure 24 and 25 illustrate the distribution of lead and chromium contamination detected at the facilities. While chromium and lead contamination are somewhat distributed across Parcel A, there are apparently three separate areas of contamination in the vicinity of the former treatment area on Parcel A. The occurrence of these areas immediately east, west and south of the former treatment area generally coincides with the locations of sumps present at the former treatment facility.

The values shown on Figures 24 and 25 represent the maximum value for these metals at each location from the Phase I and II studies for Parcels A and Chempro Proper. Additional sampling conducted for the closure of Parcel A provided additional information on the distribution of metals with depth in the upper 3 feet of soils in the former waste treatment area of Parcel A. Chromium was found to decrease with depth in soil until auto fluff was encountered. Cadmium and copper were present in very low levels in soil until auto fluff was encountered, where concentrations increased significantly. The trend of decreasing chromium concentration with depth was attributed to limited depth of impact due to releases from the facility, while elevated concentrations at depth were attributed to auto fluff. These depth distributions may reflect the contributions of different sources to the metals concentrations in soils; however, an attempt to determine the contributions of metals in different forms to the total concentrations was not attempted. The Parcel A closure excavation did result in the removal of shallow contaminated soils, but elevated metals concentrations remain that Chempro attributes to auto fluff beneath the site.

Significant chromium and lead contamination (up to 284 and 6720 mg/kg, respectively) was encountered at Chempro Proper. Shallow soil samples were collected in the location of the former letter tank farm during Parcel B closure activities. These results may indicate two separate areas of contamination at either side of the tank farm (SEA-24; CTMW-7; CB-9). This distribution may reflect releases that ran off the pad or escaped containment at the letter tank

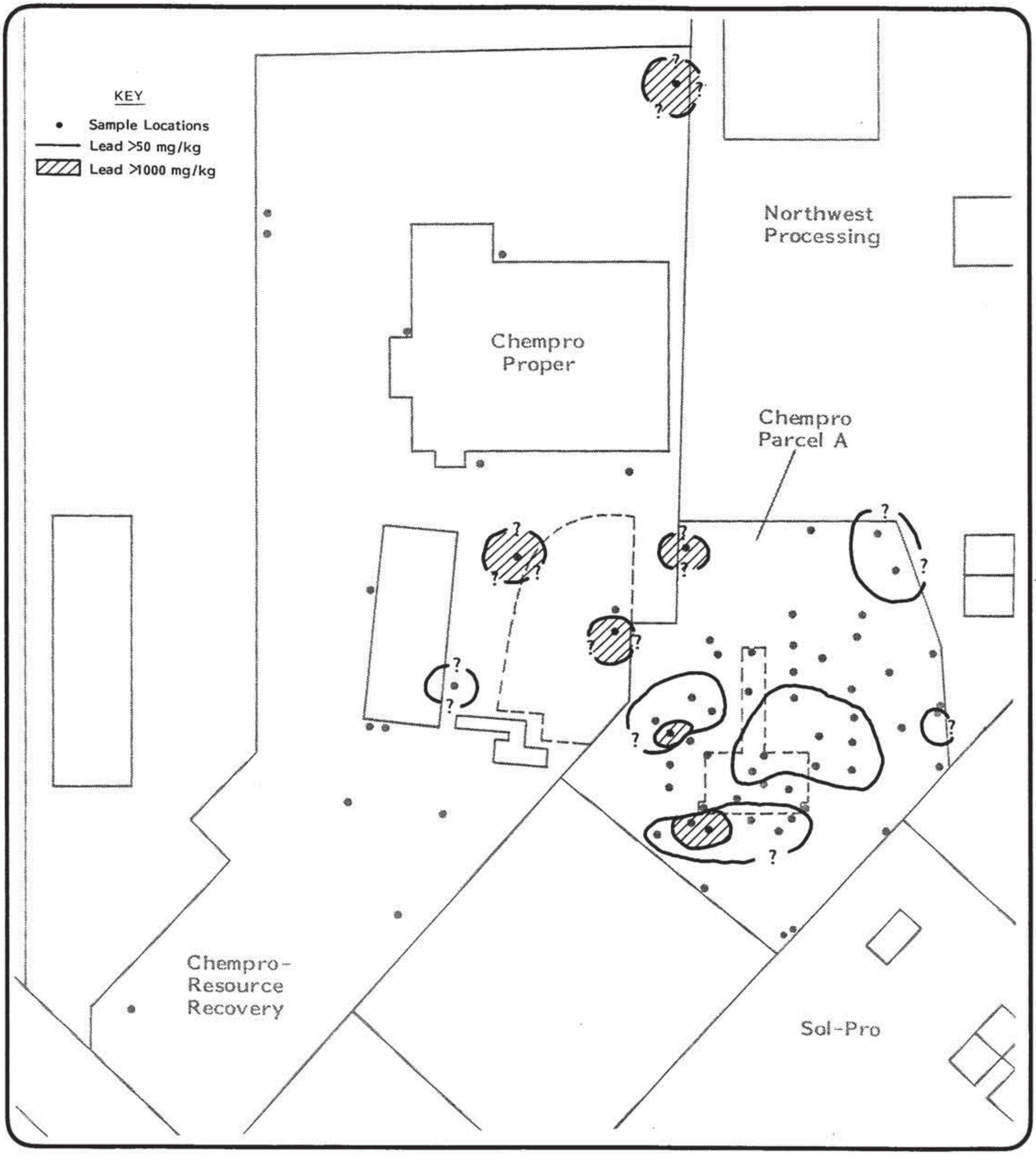


Figure 24

CONCENTRATIONS OF LEAD IN SOIL

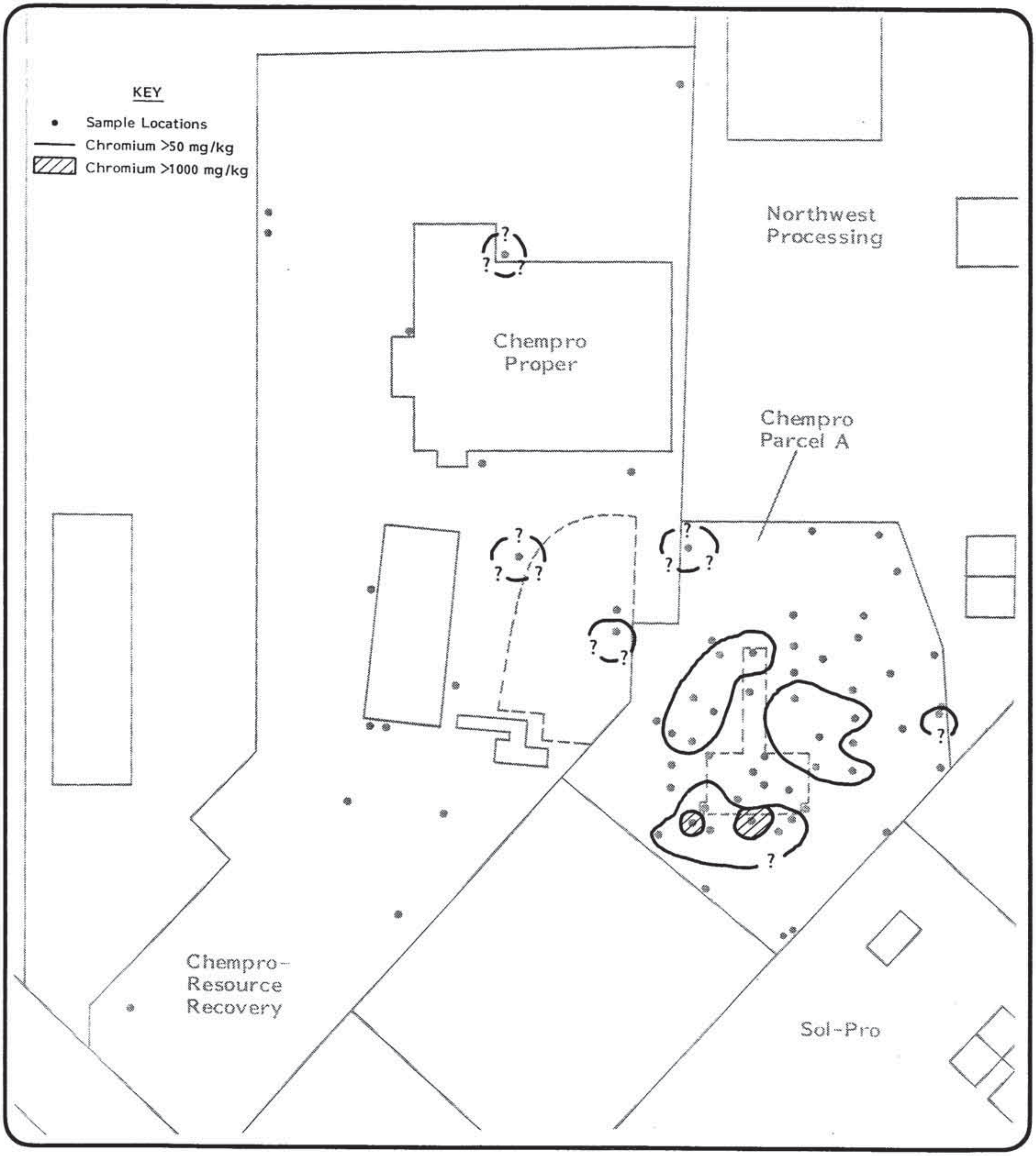


Figure 25

CONCENTRATIONS OF CHROMIUM IN SOIL

farm; but additional sampling is required to obtain a representative distribution of metal contamination in this area. Similar to the occurrence of other contaminants, elevated levels of metals in soil at the northern edge of Parcel A and in the northeastern corner of Chempro Proper (SEA-24, CTMW-13) may be due to unidentified releases from Northwest Processing.

4.1.3 Summary

Significant levels of soil contamination have been encountered at Chempro Parcel A and Chempro Proper in all of the investigations conducted to date. A variety of organic compounds and metals have been detected in soil at levels that may contribute to ground water contamination in exceedance of health-based standards and criteria. Available information indicates a continuous area of soil contamination at Parcel A that may be attributed to the former waste treatment unit and the oil pond. Additional sources of contamination at Parcel A may include auto fluff and spent lime catalyst fill materials. Contamination detected along the northern edge of Parcel A and in the northeast corner of Chempro Proper may be due to releases from Northwest Processing or unidentified sources at the Chempro facilities.

The distribution of contamination at Chempro Proper has not been adequately determined. Due to the number and distribution of sample locations, the lateral extent and relationship of contaminants can not be determined from the available information. Additional sampling is required to determine the lateral extent and distribution of contamination at Chempro Proper. The absence of soil sampling data at the Northwest Processing and Sol-Pro facilities does not allow the identification or characterization of any releases to soil that may have occurred at these facilities, or due to releases from adjacent facilities that may have migrated onto these properties.

Recommendations for additional investigation of soil contamination are discussed in Section 6.0 to determine the nature and extent of soil and ground water contamination at the Chempro, Northwest Processing, and Sol-Pro facilities.

4.2 GROUND WATER CONTAMINATION

4.2.1 Previous Investigations

Seven separate hydrogeologic investigations have been conducted between 1982 and 1989 at the Chempro site. In addition to those reports discussed in the soil contamination section of this report, the following hydrogeologic investigations have been conducted at the Chempro, Northwest Processing, and Sol-Pro facilities:

- Harper Owes, Inc. installed 12 ground water monitoring wells in 1982. All twelve wells have been abandoned (16).
- Hart-Crowser installed four monitoring wells on the Poligen (Northwest Processing) site in March 1986 for a preliminary nitric acid spill residual impact evaluation (21).
- Applied Geotechnology, Inc. installed eight monitoring wells on the Northwest Processing site in February, 1987 (52).
- Three wells were installed on the Sol-Pro site by Hart-Crowser between 1987 and 1989 (57).

Results of the ground water laboratory data were reviewed and each analytical result verified with the laboratory analysis document provided in the investigation reports, except for the Chempro quarterly ground water monitoring results that did not include laboratory analysis reports. Data omitted in the reports have been noted in the tables in Appendix D.

Ground water monitoring activities have detected a variety of hazardous constituents in ground water at the facilities. The existing health and environmental water quality criteria and standards for compounds detected in ground water are listed in Table 10.

4.2.2 Contaminant Distributions

Metals

Figure 26 shows total metals concentrations exceeding Maximum Contaminant Levels (MCLs) at wells CTMW-6 (June 1987, May 1989), CTMW-13 (May 1989), CTMW-14 (May 1989), and CTMW-15 (May 1989). MCLs for these compounds are listed in Table 10. Total lead concentrations at CTMW-6 exceeded the MCL of 50 ug/L in 1987 and 1989. Total arsenic concentrations also exceeded the MCL at well CTMW-6 in

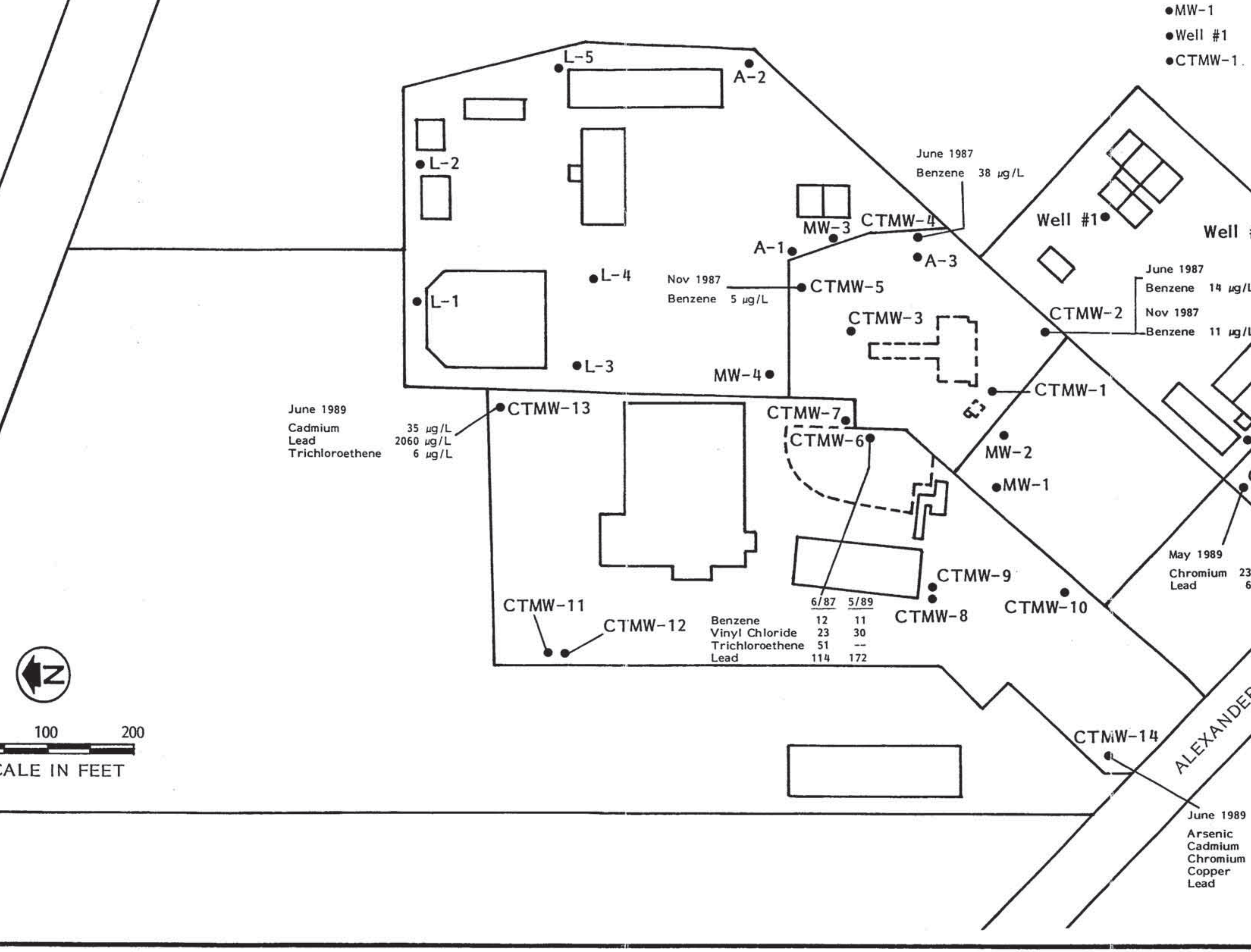

MW-1
Well #1
CTMW-1
L-5
A-2
L-2
June 1987
Benzene 38 µg/L
MW-3
CTMW-4
Well #1
A-1
A-3
L-4
Nov 1987
Benzene 5 µg/L
CTMW-5
June 1987
Benzene 14 µg/L
Nov 1987
Benzene 11 µg/L
L-1
CTMW-3
CTMW-2
L-3
MW-4
CTMW-1
June 1989
Cadmium 35 µg/L
Lead 2060 µg/L
Trichloroethene 6 µg/L
CTMW-13
CTMW-7
CTMW-6
MW-2
MW-1
May 1989
Chromium
Lead
CTMW-9
6/87 5/89
Benzene 12 11
Vinyl Chloride 23 30
Trichloroethene 51 --
Lead 114 172
CTMW-11
CTMW-12
CTMW-8
CTMW-10
N
100 200
SCALE IN FEET
CTMW-14
ALEXANDER
June 1989
Arsenic
Cadmium
Chromium
Copper
Lead

Table 10

HEALTH AND ENVIRONMENTAL BASED WATER QUALITY STANDARDS AND CRITERIA FOR COMPOUNDS DETECTED IN GROUND WATER AT CHEMPRO PROPER, CHEMPRO PARCEL A, NORTHWEST PROCESSING, AND SOL-PRO

Compound	Concentration Limit (ug/l)	Basis for Concentration Limit
Acetone	2,000	Verified Reference Dose (RfD)
Benzene	5	MCL
Styrene	5	proposed MCL
Toluene	2,000	proposed MCL
Xylenes, total	10,000	proposed MCL
Methyl isobutyl ketone	2,000	RfD
Methyl ethyl ketone	2,000	RfD
Methylene chloride	5	Risk Specific Dose (RSD)
Chloroform	0.2	RSD
Tetrachloroethene	5	proposed MCL
Trichloroethene	5	MCL
cis 1,2-dichloroethene	70	proposed MCL
trans 1,2-dichloroethene	100	proposed MCL
Vinyl Chloride	5	MCL
Carbon disulfide	4,000	RfD
4-methyl phenol	2,000	RfD
Phenol	1,000	RfD
Naphthalene	10,000	Health Affects Assessment for Naphthalene
Acenapthene	520	Fresh water LOEL
Hexachlorbutadiene	0.5	RSD
Benzo(a)anthracene	0.01	RSD
Fluoranthene	200	Ambient Water Quality Criteria
Pyrene	4,000	White, 1939
Bis (2-ethylhexyl) phthalate	3	RSD
Butylbenzyl phthalate	950	Health Affects Assessment for Phthalic Acid Esters
Di-n-butyl phthalate	4,000	RfD
Nickel	0.7	RfD
Copper	2.9	Water Quality Criteria for Chronic Effects on Marine Life
Lead	50	MCL
Cadmium	10	MCL
Chromium	50	MCL
Arsenic	50	MCL

1989. An elevated concentration of total barium was found in well CTMW-6 in 1987. Total metals concentrations exceeded MCLs for cadmium and lead at well CTMW-13; arsenic, cadmium, chromium, copper, and lead at well CTMW-14; and chromium and lead at well CTMW-15.

Wells CTMW-1, CTMW-5, CTMW-6, CTMW-10, CTMW-13, CTMW-14, and CTMW-15 also exhibited elevated concentrations of total metals in ground water samples not exceeding MCLs. The metals of concern include arsenic, barium, copper, lead, nickel, and zinc. These values are provided in Appendix D.

Elevated concentrations of dissolved metals in well CTMW-6 have included chromium (14 ug/L, 1989), lead (13 ug/L, 1989), arsenic (32 ug/L, 1989), nickel (180 ug/L, 1989), and zinc (15 ug/L, 1989). (Concentrations are reported as the maximum values if duplicate samples were analyzed).

The large differences observed between total and dissolved metals concentrations in samples may reflect excessive solids present in samples. Monitoring wells may need to be redeveloped or replaced to provide representative samples.

<u>Organic Compounds</u>

A variety of organic compounds were detected in ground water at the Chempro facilities. Floating petroleum has been observed in wells CTMW-1, CTMW-2, CTMW-3, CTMW-4, CTMW-5, and CTMW-6 during sampling in 1987. The MCLs were exceeded for benzene, vinyl chloride, 1,1-dichloroethane, and trichloroethene. The ground water wells and sampling results where these exceedances have been observed are shown in Figure 26.

Benzene exceeded the MCL ($5 \mu g/l$) at wells CTMW-1, CTMW-2, CTMW-4, and CTMW-6. Vinyl chloride concentrations exceeded the MCL in well CTMW-1, and CTMW-6. The MCL for 1,1-dichloroethene was exceeded only at well CTMW-1; trichloroethene exceeded the MCL at wells CTMW-1, CTMW-6, and CTMW-13. Quarterly ground water monitoring by Chempro personnel resulted in exceedance of MCLs for benzene and vinyl chloride in well CTMW-6 in June and September 1988 and May 1989. Elevated concentrations of other volatiles and phenols are also listed in Appendix D.

Benzene and vinyl chloride concentrations show a similar distribution in wells CTMW-1, CTMW-2 and CTMW-6. CTMW-6 shows the highest contaminant levels with lower but significant contamination present in CTMW-1, and concentrations in CTMW-2 lower than the other two wells. Water level measurements indicate ground water flows in a south-southwesterly direction. This may explain the observed distribution of these contaminants, but additional information is needed to determine the extent of ground water contamination at the site. At least two explanations could be applied to the observed distribution of contaminants:

- CTMW-2 may not be fully hydraulically connected with CTMW-1 and CTMW-6 because of discontinuities in the fill material
- Preferential flow pathways may be diverting contamination in a more southerly direction toward CTMW-1

Other Contaminants of Concern

Other volatile and semi-volatile organic compounds have been found in wells CTMW-4, CTMW-6, CTMW-10, CTMW-11, and CTMW-13. Well CTMW-4 had an elevated concentration of acetone (210 ug/L, 1987). Well CTMW-6 included elevated concentrations of acetone (390 ug/L, 1987; 160 ug/L, 1987), 4-methyl-2-pentanone (300 ug/L; 270,000 ug/L, 1987), bis(2-ethylhexyl)phthalate (110 ug/L, 1987), and 4-methylphenol (540 ug/L). Well CTMW-10 had elevated concentrations of 2-methylnaphthalene (15 ug/L, 1987; 29 ug/L, 1989) and acenaphthene (23 ug/L, 1987). Well CTMW-11 had elevated concentrations of acetone (140 ug/L, 1987; 190 ug/L, 1989) and phenol (220 ug/L, 1987). Well CTMW-13 had elevated concentrations of bis(2-ethylhexyl)phthalate (11 ug/L and 19 ug/L, 1989) and toluene (10 ug/L and 9.2 ug/L, 1989).

Exceedance of Health and Environmental Water Quality Criteria and Standards

A number of the compounds present in ground water at the facilities have been detected at levels that exceed the health or environmental water quality limits listed in Table 10. Because of inconsistencies and the ground water sampling conducted at the facilities to date, an overall evaluation of ground water quality at the facilities can not be presented. The sampling frequency and analytical parameters for the wells have varied considerably in the past investigations. Table 11 summarizes the frequency of exceedance of water

Table 11

FREQUENCY DISTRIBUTION OF CONTAMINANTS
EXCEEDING HEALTH BASED LIMITS IN GROUND WATER AT
CHEMPRO AND NORTHWEST PROCESSING

COMPOUND	Well No. CTMW-1	Well No. CTMW-2	Well No. CTMW-3	Well No. CTMW-4	Well No. CTMW-5	Well No. CTMW-6	Well No. CTMW-7	Well No. CTMW-8	Well No. CTMW-9	Well No. CTMW-10	Well No. CTMW-11	Well No. CTMW-12	Well No. CTMW-13	Well No. CTMW-14	Well No. CTMW-15	Well No. L-5
Acetone	--	--	--	--	--	--	--	--	--	--	1/5	--	--	--	--	--
Benzene	2/2	2/2	--	1/1	1/2	6/6	--	--	--	--	--	--	--	--	--	--
Methylene chloride	1/1	--	--	--	--	4/6	--	--	--	2/5	--	--	--	--	2/3	--
Styrene	--	--	--	--	--	1/6	--	--	--	--	--	--	--	--	--	--
Vinyl chloride	1/2	--	--	--	--	6/6	--	--	--	--	--	--	--	--	--	--
Methyl isobutyl ketone	--	--	--	--	--	1/6	--	--	--	--	--	--	--	--	--	--
Chloroform	--	--	--	--	--	--	--	--	--	--	1/5	--	--	--	--	--
Trichloroethene	1/2	--	--	--	--	2/6	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene	--	--	--	--	--	1/6	--	--	--	--	--	--	1/2	--	--	--
2-methylphenol	1/5	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Hexachlorobutadiene	--	--	--	--	--	--	--	--	--	--	--	--	1/2	--	--	--
Benzo(a)anthracene	--	--	--	--	--	1/6	--	--	--	2/3	--	--	--	--	--	--
Bis(2-ethylhexyl)phthalate	1/2	1/1	1/1	1/1	1/2	2/3	2/2	2/2	2/2	2/2	2/2	1/2	1/3	2/3	--	--
Arsenic	--	--	--	--	--	--	--	--	--	--	--	--	--	2/5	--	1/1
Cadmium	--	--	--	--	--	--	--	--	--	--	--	--	2/6	--	--	--
Chromium	--	--	--	--	--	--	--	--	--	--	--	--	--	2/4	2/5	--
Lead	--	--	--	--	--	2/3	--	--	--	--	--	--	2/7	2/6	1/6	--
Copper	--	--	--	--	--	2/4	1/3	--	1/2	1/2	1/1	1/2	5/7	4/6	3/6	--
Nickel	2/2	--	--	--	--	4/4	1/2	--	--	--	--	--	3/3	2/3	2/3	--

(Note: the first number in each entry is the frequency of exceedances, the second number is the total number of sampling events.)

quality limits and sampling events at the facilities. This table shows certain compounds exceed water quality limits at a number of wells, including bis(2-ethylhexyl) phthalate, benzene, copper, and nickel. In addition, certain wells are highly contaminated due to a wide variety of hazardous constituents, including CTMW-1, CTMW-6, and CTMW-13 through 15.

4.2.3 Additional Ground Water Investigations at Sol-Pro and Northwest Processing

Data for the Sol-Pro and Northwest Processing sites are tabulated in Appendix D. Three monitoring wells were installed and sampled in the upper aquifer on the Sol-Pro property (57). VOCs and total or dissolved metals were not detected in samples from the wells. However, oil and grease were detected at well No. 1 (8 mg/L) and well No. 2 (6 mg/L).

Eight ground water monitoring wells were installed in the shallow aquifer by Applied Geotechnology, Inc. at the Northwest Processing site in February, 1987 (52). Ground water samples were analyzed for some organics and total metals, and resulted with concentrations below MCLs. However, detection limits established by the testing laboratory were above the MCL for some metals (chromium: detection limit = 100 ug/L, MCL = 50 ug/L; lead: detection limit = 100 ug/L, MCL = 50 ug/L). These data are insufficient to evaluate potential ground water contamination or identification of contaminant source(s) at the Northwest Processing site.

4.2.4 Summary

The major contaminants of concern exceeding MCLs include the following total metals and organic compounds:

- Arsenic, cadmium, chromium, copper, and lead
- Benzene, vinyl chloride, 1,1-dichloroethene, and trichloroethene.

The shallow aquifer gradient is generally toward the south. Exceedances of MCLs occurred in the shallow aquifer wells throughout the site. Benzene concentrations exceeded the MCL in five out of six wells within Parcel A. The lower alluvial aquifer wells have not exhibited elevated concentrations of total or dissolved metals or organic compounds except for slightly elevated concentrations of bis(2-ethylhexyl)phthalate in wells CTMW-7 (7.9 ug/L, 1989) and CTMW-9 (25 ug/L, 1989).

Total concentrations of arsenic, cadmium, chromium, copper, and lead exceeding MCLs reflect releases from the Chempro facilities, and possibly from Northwest Processing. While dissolved metals concentrations are significantly lower, elevated concentrations of dissolved metals also indicate contamination that may be present from a variety of sources, including plating wastes managed at Chempro, auto fluff used as fill material in the area, oily wastes disposed at Parcel A, and possibly releases from Northwest Processing operations. The extent of metals contamination cannot be adequately evaluated from existing data, because of the lack of data from Chempro Proper, limited sampling of downgradient wells at Parcel A, and the absence of useable data from Northwest Processing and Sol-Pro monitoring wells.

The small amount of data available from the southern portion of Parcels A and from Chempro Proper prevents a reliable evaluation of site conditions at this time. Other organic compounds, such as acetone and 4-methylphenol have been detected at high concentrations (>100 ug/L) in individual wells. It cannot be determined from the available information if these wells have encountered localized areas of contamination or a portion of a more widespread plume of contamination.

Recommendations for further ground water sampling to determine the nature and extent of ground water contamination at the Chempro, Northwest Processing, and Sol-Pro facilities are discussed in Section 6.0.

5.0 DESCRIPTIONS OF SOLID WASTE MANAGEMENT UNITS

5.1 CHEMPRO PROPER

Fifty-eight active and 13 inactive SWMUs were identified during the VSI. The following sections provide descriptive and historical information on each SWMU.

5.1.1 SWMUs C-1 through C-5: Treatment Tanks 51 through 55 (Photos 11, 12)

Information Summary

The 50-series treatment tanks are located on the west side of the process area within the main containment pad (see Figure 3). They are used for treatment of materials pumped from the 100-series tanks (SWMUs C-6 to C-11), 200-series tanks (SWMUs C-12 to C-14), and 600-series tanks (SWMUsC-26 to C-29). The 100, 200, and 600-series tanks manage acid and alkaline wastes which contain heavy metals and potentially contain cyanides and phenol compounds. Treatment processes occurring within these tanks include acid/base neutralization, precipitation, oxidation, reduction, flocculation, sedimentation, and decanting. After treatment in the 50-series tanks, wastes are pumped to the 300-series tanks (SWMUs C-15 to C-19). The secondary containment structure where these tanks are located is sloped to facilitate drainage of any spilled materials to the process area main sump. For dates of operation of these SWMUs, capacity, structural information, and release controls, see Table 12.

The only known release to the environment from the 50-series tanks was a release of nitrogen dioxide gas to the atmosphere on June 23, 1987 from Tank 51, SWMU C-1. The release occurred after a mixture of air-nitric hydrofluoric acid was added to alkaline paint wastes. Water spray was applied to the gas plume to dissipate it within the containment area. After this incident Chempro reported that they revised operating procedures at the facility to insure better mixing of treatment materials with wastes (17). No evidence of releases was noted at the time of the VSI.

Table 12

SOLID WASTE MANAGEMENT UNITS INFORMATION SUMMARY
CHEMPRO PROPER

SWMU No.	Description	Wastes Managed	Dates of Operation	Capacity (gal)	Structure Type	Release Controls
C-1 to C-5	Treatment Tanks 51 through 55	▪ Waste alkalis/chelated alkalis ▪ Waste acids/chelated acids ▪ Wastewater treatment sludges ▪ Chemical milling wastes	1/87 to Present	22,000 (each)	Steel cone bottom tanks	Main sump within secondary containment(1)
C-6 to C-11	Acid Waste Storage Tanks 101 through 106	▪ Waste acids/chelated acids	1/87 to Present	11,000 (each)	Polyethylene above-ground tanks	Acid sump within secondary containment(1)
C-12 to C-14	Chemical Milling Waste Storage Tanks 201 through 203	▪ Chemical milling wastes	1/87 to Present	9,500 (each)	Steel above-ground tanks	Main sump within secondary containment(1)

Table 12 (Continued)

SWMU No.	Description	Wastes Managed	Dates of Operation	Capacity (gal)	Structure Type	Release Controls
C-15 to C-19	Sludge Settling Tanks 301 through 305	▪ Waste acids/chelated alkalis ▪ Waste acids/chelated acids ▪ Wastewater treatment sludges ▪ Chemical milling wastes	1/87 to Present	11,000 (each)	Steel above-ground tanks	Main sump within secondary containment[1]
C-20 to C-23	Sewer Discharge Tanks 401 through 404	▪ Wastewater from decanting	1/87 to Present	25,000 (each)	Steel above-ground tanks	Main sump within secondary containment[1]
C-24 & C-25	Isolation Tanks 501 and 502	▪ Waste alkalis/chelated alkalis ▪ Chemical milling wastes	1/87 to Present	9,500 (each)	Steel above-ground tanks	Main sump within secondary containment[1]
C-26 to C-29	Alkaline Waste Storage Tanks 601 through 604	▪ Waste acids/chelated alkalis	1/87 to Present	25,000 (each)	Steel above-ground tanks	Main sump within secondary containment[1]

Table 12 (Continued)

SWMU No.	Description	Wastes Managed	Dates of Operation	Capacity (gal)	Structure Type	Release Controls
C-30 and C-31	Non-Process Sludge Storate Tanks 701 and 702	▪ Wastewater treatment sludges	1/87 to Present	22,000 (each)	Steel above-ground cone bottom tanks	Main sump within secondary containment[1]
C-32 to C-36	Dangerous Waste Fuel Storage Tanks 801 through 805	▪ Waste solvents and oils	1/87 to Present	9,500 (each)	Steel above-ground tanks	Dangerous waste fuel storage area sump within secondary containment[1]
C-37 to C-39	Dangerous Waste Fuel Storage Tanks 901 through 903	▪ Waste solvents and oils	1/87 to Present	22,000 (each)	Steel above-ground cone bottom tanks	Dangerous waste fuel storage area sump within secondary containment[1]

1 All sumps are blind. The secondary containment system consists of a bermed concrete base constructed over a flexible HDPE membrane. All liquids collected in the sump are analyzed for contamination prior to discharges. If contaminated, the contents are pumped to the appropriate storage vessel.

Conclusions

These units appear to be in good condition and have adequate secondary containment. Therefore, the potential for releases to soil, surface water, and ground water is low. Since they are above-ground and are within secondary containment, the potential for subsurface gas generation is low. These tanks vent directly to the atmosphere. Therefore, the potential for release of acid vapors and nitrogen oxides generated by chemical reduction is high. The potential for release of volatile organics through tank vents is moderate.

5.1.2 SWMUs C-6 through C-11: Acid Waste Storage Tanks 101 through 106 (Photos 13, 14, 15)

Information Summary

The 100-series acid tanks are located within a bermed area on the northwest corner of the containment pad. Acid wastes which contain heavy metals, and possibly cyanides, phenolic compounds, and volatile organics, are stored in these tanks after they are unloaded from tankers at the north acid area loading/unloading pad (SWMU C-46). Wastes are pumped from the 100-series tanks to the 50-series tanks (SWMUs C-1 to C-5) where treatment takes place. The secondary containment where these tanks are located is sloped to facilitate drainage of any spilled materials to the acid area sump. For dates of operation of these SWMUs, capacity, structural information, and release controls, see Table 12.

Tanks 104 (SWMU C-9) and Tank 105 (SWMU C-10) were located and operated on Parcel A prior to being moved to Chempro Proper (20), and were used for acid storage at that location.

An inspection conducted by Ecology on June 19, 1988 noted excessive corrosion and wear on the sump in the acid storage area secondary containment. Chempro was required to repair the corrosion protection coating on the containment pad. There is no evidence that releases occurred through the sump or the secondary containment pad at the time this problem was noted. No evidence of releases was observed during the VSI (90, 91).

Conclusions

These units appear to be in good condition and have adequate secondary containment. Therefore, the potential for releases to surface water, ground water, and soil is low. The units are above-ground and within secondary containment, therefore the potential for subsurface gas generation is low. These tanks are vented directly to the atmosphere, therefore the potential for release of acid vapors is high.

5.1.3 SWMUs C-12 through C-14: Chemical Milling Waste Storage Tanks 201 Through 203 (Photos 7, 43)

Information Summary

The 200-series chemical milling waste storage tank are located within the bermed process area on the northwest corner of the containment pad (Figure 3). They receive incoming waste, containing heavy metals, and are unloaded at the west process area loading/unloading pad (SWMU C-47). Wastes are transferred from these tanks to the 50-series tanks (SWMUs C-1 to C-5) for treatment. Secondary containment where these tanks are located is sloped to facilitate drainage of any spilled material to the main process area sump. For dates of operation of these SWMUs, capacity, structural information, and release controls, see Table 12.

There is no information indicating that releases from these units have occurred. No evidence of releases was observed during the VSI.

Conclusions

Since these units appear to be in good condition and have adequate secondary containment, the potential for releases to soil, ground water, and surface water is low. Since they are above-ground and within adequate secondary containment, the potential for subsurface gas generation is low. These units are vented to the atmosphere, therefore the potential for release of reaction products or volatile compounds is moderate.

5.1.4 SWMUs C-15 through C-19: Sludge Settling Tanks 301 through 305 (Photo 26)

Information Summary

The 300-series sludge settling tanks are located within the bermed main process area on the south side of the containment pad (Figure 3). These tanks were formerly located and operated on Parcel A prior to its closure, and were known as Tanks NT1 through NT5 (SWMUs A-14 to A-18) (20). Sedimentation and liquid/solid phase separation are performed in these tanks on wastes pumped from the 50-series tanks (SWMUs C-1 to C-5). Solids from these tanks that are classifiable as F006 listed wastes are pumped to the cement stabilization unit feed tank (SWMUC-42). Solids not listed as F006 wastes are pumped to the Oberlin Filter Press (SWMU C-44) for dewatering or are sent off-site for disposal without further treatment. Supernatant from non-chelated wastes from the 300-series tanks is pumped to the 400-series tanks (SWMUs C-20-23) prior to treatment in the air stripper (SWMU C-40) for removal of volatile organic contaminants. Supernatant from chelated wastes treated in these tanks is pumped to the 500-series tanks (SWMUs C-24 and C-25).

Secondary containment where the 50-series tanks are located is sloped to facilitate drainage of any spilled material to the main process area sump. For dates of operation of these SWMUs, capacity, structural information, and release controls, see Table 12.

There is no information indicating that releases from these units have occurred. No evidence of releases was observed during the VSI.

Conclusions

Since these units appear to be in good condition and have adequate secondary containment, the potential for releases to soil, surface water, or ground water is low. These units are above-ground and within secondary containment, therefore the potential for subsurface gas generation is low. These tanks are vented to the atmosphere, therefore the potential for releases of any volatile compounds remaining after treatment is moderate.

5.1.5 SWMUS No.s C-20 through C-23: Sewer Discharge Tanks 401 Through 404: (Photos 44, 45, 46)

Information Summary

The 400-series discharge tanks are located within the main process area of the secondary containment pad. Wastewater from the decanting process performed in the 300-series tanks (SWMUs C-15 to C-19) is pumped to the 400-series tanks prior to treatment in the air stripper (SWMU C-40). After treatment in the air stripper for removal of volatile organics, wastewater is pumped back to the 400-series tanks. These tanks also receive filtrate from the Oberlin Filter Press (SWMU C-44). The wastewater is tested for compliance with discharge parameters (heavy metals, Total Toxic Organics (TTO), cyanide, and phenolics). Wastewater meeting discharge parameters is discharged to the sewer using portable hoses; if the wastewater does not meet discharge parameters it is retreated in the appropriate tank prior to discharge. Wastewater discharge from this SWMU to the City of Tacoma sewer system for November 1989 shows that the discharge contains the following level of organic contaminants; methylene chloride (0.08 to 0.32 ppm), toluene (0.11 to 0.64 ppm), 1,1-trichloroethane (0.01 to 0.06 ppm), and trichloroethylene (0.04 ppm) (93). For dates of operation of these SWMUs, capacity, structural information, and release controls, see Table 12.

There is no information indicating that releases from these units have occurred. No evidence of releases was observed during the VSI.

Conclusions

Since these units appear to be in good condition and have adequate secondary containment, the potential for releases to ground water, surface water, and soil is low. The potential for subsurface gas generation is low since they are above-ground and within secondary containment. These tanks are vented to the atmosphere, therefore the potential for releases to the air of volatile compounds, such as methylene chloride is moderate.

5.1.6 SWMUs C-24 and C-25: Isolation Tanks 501 and 502 (No Photo)

Information Summary

The 500-series isolation tanks are located on the northeast corner of the containment area (Figure 3). They are used to store wastes (primarily chelated waste streams) subjected to additional treatment prior to being pumped to the 50-series treatment tanks (SWMUs C-1 to C-5). Waste streams are pumped to the isolation tanks directly from incoming tankers if wastes are known to be chelated, or from the 100-series acid storage tanks (SWMUs C-6 to C-11) and the alkaline storage tanks (SWMUs C-26 to C-29) if they are determined to be chelated by analytical testing. In addition, the 500-series tanks are used to store wastewater that has been separated from chelated waste streams in the sedimentation/decanting step conducted in the 300-series sludge settling tanks (SWMUs C-15 to C-19). The secondary containment where these tanks are located is sloped to facilitate drainage of any spilled materials to the main process area sump. For dates of operation of these SWMUs, capacity, structural information, and release controls, see Table 12.

There is no information indicating that releases from these units have occurred. No evidence of releases was observed during the VSI.

Conclusions

Since these units are in good condition and have adequate secondary containment, the potential for releases to surface water, ground water, and soil is low. The potential for subsurface gas generation is also low because they are above-ground and within secondary containment. The potential for release of volatile compounds is moderate because these units are vented directly to the atmosphere.

5.1.7 SWMUS Nos. C-26 through C-29: Alkaline Waste Storage Tanks 601 through 604 (Photos 18, 48)

Information Summary

The 600-series alkaline storage tanks are located within the bermed main process area on the southwest side of the main containment area (Figure 3). Alkaline wastes containing heavy metals received at the facility are stored in these tanks after they are unloaded from tankers at the alkaline area loading/unloading pad (SWMU C-48). Wastes are pumped from the 600-series tanks to the 50-series tanks (SWMUs C-1 to C-5) for treatment. The secondary containment for these tanks is sloped so drainage of any spilled materials or rainwater will be diverted to the process area main sump. For dates of operation of these units, capacity, structural information, and release controls, see Table 12.

There is no information indicating that releases from these units have occurred. No evidence of releases was observed during the VSI.

Conclusions

These units appear to be in good condition and have adequate secondary containment. Therefore, the potential for releases to soil, surface water, and ground water is low. The potential for subsurface gas generation is low because the tanks are above-ground and within secondary containment. The potential for air release of volatile compounds is moderate, because the tanks are vented directly to the atmosphere.

5.1.8 SWMUS Nos. C-30 and C-31: Non-Process Sludge Storage Tanks 701 and 702 (No Photo)

Information Summary

The non-process sludge storage tanks receive wastewater treatment sludges generated off-site, primarily by the aerospace industry. The majority of these wastes are F006 listed wastes, which are treated by settling and decantation for volume reduction. Wastes are pumped from the 700-series tanks to the 300 series sludge settling tanks (SWMUs C-15 to C-19). For dates of operation of these SWMUs, capacity, structural information, and release controls, see Table 12.

There is no information indicating that releases from these units have occurred. No evidence of releases was observed during the VSI.

Conclusions

Since these units are in good condition and have adequate secondary containment, the potential for releases to surface water, ground water, and soil is low. The potential for subsurface gas generation is also low because the units are above-ground and within secondary containment. Although these units are vented directly to the atmosphere, the potential for release of hazardous constituents is low. Few, if any, volatile organic constituents are expected to occur in this wastestream.

5.1.9 SWMUS Nos. C-32 through C-36: Dangerous Waste Fuel Storage Tanks 801 through 805 (Photo 22)

Information Summary

The 800-series dangerous waste fuel tanks store waste solvents and oils that are brought into the Chempro facility by tankers. These wastes are tested for suitability for use in blending of dangerous fuels. Currently, Chempro is not conducting blending at this facility. After the wastes have been tested for suitability, they are transferred to another Chempro facility to be blended to customer specifications. For dates of operation of these SWMUs, capacity, structural information, and release controls, see Table 12.

There is no information indicating that releases from these units have occurred. No evidence of releases was observed during the VSI.

Conclusions

These units appear to be in good condition and have adequate secondary containment. Therefore, the potential for releases to soil, surface water, and ground water is low. The potential for air releases is high because these tanks are vented directly to the atmosphere and the wastes managed in these tanks may be highly volatile. These tanks are above-ground and within adequate secondary containment, therefore the potential for subsurface gas generation is low.

5.1.10 SWMUS Nos. C-37 through C-39: Dangerous Waste Fuel Storage Tanks 901 through 903 (Photos 21, 26, 27, 28)

Information Summary

The 900-series dangerous waste fuel storage tanks are used for storage in the same manner described above for the 800-series tanks (SWMUs C-32 to C-36). For dates of operation of these SWMUs, capacity, structural information, and release controls, see Table 12.

There is no information indicating that releases from these units have occurred. No evidence of releases was observed during the VSI.

Conclusions

These units appear to be in good condition and have adequate secondary containment. Therefore the potential for releases to soil, ground water, and surface water are judged to be low. The potential for release of volatile organics is high because the units are vented directly to the atmosphere and the wastes in them may be highly volatile. The tanks are above-ground and within adequate secondary containment, therefore the potential for subsurface gas generation is low.

5.1.11 SWMU C-40: Air Stripper (Photo 45)

Information Summary

The air stripper (located in the southwest corner of the containment pad is used for removal of volatile organic contaminants from the decanting/sedimentation supernatant and filter press filtrate stored in the 400-series sewer discharge tanks (SWMUs C-26 to C-29). The unit went on-line in February 1988. The stripper is a 200 gpm packed bed unit. Discharge water is introduced to the top of the unit while air is passed through it countercurrently. Treated liquid is returned to the 400-series tanks for storage and testing prior to discharge to the sewer. The unit has a permit from the Puget Sound Air Pollution Control Agency (PSAPCA); PSAPCA inspects the unit annually, but does not sample. Any aqueous releases from the unit would be collected in the main process area sump.

There is no information indicating that releases from this unit have occurred. No evidence of releases was observed during the VSI.

Conclusions

This unit appears to be in good condition and has adequate secondary containment, therefore the potential for releases to soil ground water, and surface water is low. Under normal operating conditions, the potential for air emissions is high because of the unit's designed performance.

5.1.12 SWMU C-41: Cement Unit Stabilization Feed Tank (Photos 18, 48)

Information Summary

The cement unit stabilization unit feed tank is a 800-gallon polyethylene storage tank used to hold sludge from the 300-series sludge settling tanks (SWMUs C-15 to C-19) and the 700-series non-process sludge storage tanks (SWMUs C-30 and C-31) prior to stabilization. Sludge is pumped from the bottom of the feed tank to the cement mixer stabilization unit (SWMU C-42) where it is mixed with cement in the stabilization process. The feed tank is located on the east side of the stabilization unit. The tank is mounted on stilts. It has been active since August 1988. Any spills from the feed tank would be collected in the main process area sump.

There is no information indicating that releases from this unit have occurred. No evidence of releases was observed during the VSI.

Conclusions

This unit appears to be in good condition and has adequate secondary containment, therefore the potential for releases to soil, ground water and surface water is low. The unit is above-ground and within adequate secondary containment, therefore the potential for subsurface gas generation is low. The potential for release of hazardous constituents is low based on the expected composition of wastes entering this unit.

5.1.13 SWMUs C-42 and C-43: Cement Mixer Stabilization Unit and Stabilization Unit Receiving Tank (Photos 18, 48)

Information Summary

The cement mixer stabilization unit is used to stabilize F006 listed sludges generated as a result of on-site treatment processes and F006 listed sludges received at the facility from industrial customers. The cement stabilization process is used for wastewater treatment solids with low solids content that are not suitable for filtration in the Oberlin Filter press (SWMU C-44). Sludge is batched to the cement mixer unit from the stabilization unit feed tank (SWMU C-41). Cement is weighed in a hopper and fed to the unit. Stabilized sludge is pumped into the stabilization unit receiving tank (SWMU C-43) and then pumped into metal containers (tipplers) which are stored in the NE Alkaline Area Loading/Unloading Pad (SWMU C-48). Once the material is solidified, the tipplers are taken to the Parcel B solidification/stabilization area (SWMU C-69), where the solids are removed from the tipplers and broken up prior to transfer off-site.

The receiving tank is a cylindrical open top steel shell fifteen feet in height and five feet in diameter. It is top loaded from the cement mixer. The capacity of the cement mixer is 4.5 cubic yards. These units have been active since August 1988. Any liquid releases from these units would be collected by the main process area sump.

There is no information indicating that releases from these units have occurred. No evidence of releases was observed during the VSI.

Conclusions

These units appear to be in good condition and have adequate secondary containment. Therefore the potential for releases to soil, ground water, and surface water is low. The potential for subsurface gas generation is low because the unit is above ground and adequately contained. Air release potential from the these units is also expected to be low, because of the stabilization process.

5.1.14 SWMU C-44: Oberlin Filter Press (Photos 9, 10)

Information Summary

Sludges from the 300-series sludge settling tanks (SWMUs C-15 to C-19) with high solids content are pumped to the Oberlin filter press for treatment. The filtration and drying procedures conducted in this unit produce a dried cake that is automatically discharged into tub skids, which are taken to the Container storage pad (SWMU C-50) prior to off-site disposal. This unit has been active at the current location since 1987 (see Figure 3) when it was moved from the letter tank area. It was an active unit in the letter tank area from 1985 to 1987. Any releases from this unit would be collected in the main process sump.

There is no information indicating that releases from this unit have occurred either from its location in the letter tank area or its current location. No evidence of releases was observed during the VSI.

Conclusions

This unit appears to be in good condition and has adequate secondary containment. Therefore, the potential for releases to soil, surface water, and ground water is low. The potential for subsurface gas generation is low because the tank is above-ground and within secondary containment. The potential for release of hazardous constituents from dried filter cake is low. The potential for past releases to all media from this unit appears to be low, based on the unit's design and the presence of paving under its former location in the letter tank area.

5.1.15 SWMU C-45: Filtrate Collection Tank (Photos 9, 10)

Information Summary

The filtrate collection tank is a 1500 gallon polyethylene tank that receives filtrate from the Oberlin Filter Press (SWMU C-44). Filtrate collected from this unit is pumped to the 400-series sewer discharges tanks (SWMUs C-20 to C-23) where it is held for further treatment prior to discharge. It is located adjacent to the filter press within the main process area of the containment pad

(See Figure 3). This unit has been active since January 1987. Any spills or discharges from this tank would be collected in the main process sump.

There is no information indicating that releases from this unit have occurred. No evidence of releases was observed during the VSI.

Conclusions

This unit appears to be in good condition and has adequate secondary containment. Therefore, the potential for release to the soil, ground water, and surface water is low. Since the unit is above-ground and is within secondary containment, the potential for subsurface gas generation is minimal. The potential for air releases is low even though this tank is vented to the atmosphere, because the wastes are expected to contain few, if any, volatile organic constituents.

5.1.16 SWMU C-46: North Acid Area Loading/Unloading Pad (No Photo)

Information Summary

The north acid area loading/unloading pad is used for transfer of wastes from trucks to the acid waste storage tanks (SWMUs C-6 to C-11); full Resource Recovery tankers which must remain overnight at the facility are also reportedly parked here (rather than being parked overnight in the Resource Recovery parking lot). The pad is constructed of concrete and measures 25 feet by 60 feet. Wastes are piped from tankers to the storage tanks using hoses. Any spills or discharges occurring on the pad would be collected to the blind sump located on the pad.

There is no information indicating that releases from this unit have occurred. No evidence of releases was observed during the VSI. The concrete appeared to be in good condition, and the sump is lined with hardstone, a material which resists acid corrosion.

Conclusions

Since this unit appears to be in good condition and has adequate secondary containment, the potential for releases to soil, ground water, and surface water is low. The unit is above-ground and primarily handles inorganic wastes; therefore, the potential for subsurface gas generation is low. Under normal operating conditions, the potential for air release of hazardous constituents is low. Should an accident occur, such as a hose break, there could potentially be releases to the atmosphere.

5.1.17 SWMU C-47: West Process Area Loading/Unloading Pad (Photo 7)

Information Summary

The west area process loading/unloading pad is used for transfer of wastes from trucks to the chemical milling waste storage tanks (SWMUs C-12 to C-14); full Resource Recovery tankers which must remain overnight at the facility are also reportedly parked here (rather than being parked overnight in the Resource Recovery parking lot). The pad is constructed of concrete and measures 18 feet by 60 feet. Wastes are pumped from trucks to the storage tanks using hoses. Any spills or discharges occurring on the pad would be collected to the blind sump located on the pad.

There is no information indicating that releases from this unit have occurred. No evidence of releases was observed during the VSI. The concrete appeared to be in good condition, and the sump did not appear to be corroded.

Conclusions

Since this unit appears to be in good condition and has adequate secondary containment, the potential for releases to soil, ground water, and surface water is low. The unit is above-ground and primarily handles inorganic wastes; therefore, the potential for subsurface gas generation is low. Under normal operating conditions, the potential for release of volatile organics is low. Should an accident occur, such as a hose break, there could potentially be releases to the atmosphere.

5.1.18 SWMU C-48: NE Alkaline Area Loading/Unloading Pad (Photo 20)

Information Summary

The northeast alkaline area loading/unloading pad is used for transfer of wastes from trucks to the alkaline waste storage tanks (SWMUs C-6 to C-11), and for storage of the tipplers which hold solidified waste from the cement mixer stabilization unit (SWMU C-41); full Resource Recovery tankers which must remain overnight at the facility are also reportedly parked here (rather than being parked overnight in the Resource Recovery parking lot). The pad is constructed of concrete and measures 25 feet by 60 feet. Wastes are pumped from trucks to the storage tanks using hoses. Any spills or discharges occurring on the pad would be collected to the blind sump located on the pad. At the time of the VSI, approximately 20 tipplers were located in this area.

There is no information that discharges from this unit have occurred. No evidence of releases was observed during the VSI.

Conclusions

Since this unit appears to be in good condition and has adequate secondary containment, the potential for releases to soil, ground water, and surface water is low. The unit is above-ground and primarily handles inorganic wastes; therefore, the potential for subsurface gas generation is low. Under normal operating condition, the potential for release of volatile organics is low. Should an accident occur, such as a hose break, there could potentially be air releases.

5.1.19 SWMU C-49: SE Dangerous Waste Fuel Area Loading/Unloading Pad (Photo 28)

Information Summary

The southeast area dangerous waste fuel loading/unloading pad is used for transfer of wastes from trucks to the 800 and 900-series dangerous waste storage tanks (SWMUs C-32 to C-39); full Resource Recovery tankers which must remain overnight at the facility are also reportedly parked here (rather than being parked overnight in the Resource Recovery parking lot). Wastes are pumped from trucks to the storage tanks using hoses. The pad is constructed of concrete and measures 25 feet by 75 feet. Any spills or discharges occurring on the pad would be collected to the blind sump located on the pad. During the VSI, approximately five tipplers were located in this area.

There is no information indicating that releases from this unit have occurred. No evidence of releases was observed during the VSI.

Conclusions

Since this unit appears to be in good condition and has adequate secondary containment, the potential for releases to soil, ground water, and surface water is low. The unit is above-ground and within secondary containment, therefore the potential for subsurface gas generation is low. Under normal operating conditions, the potential for release of volatile organics is low. Should an accident occur, such as hose break, there could potentially be air releases.

5.1.20 SWMU C-50: Container Storage Pad (Photos 4, 5, 6, 39, 40)

Information Summary

The container storage pad is a 60 foot x 150 foot unroofed concrete pad located west of Parcel B at the south end of Chempro Proper (Figure 3). The pad has been used since 1986. The container storage pad is used to store filter cake from the Oberlin Filter Press (SWMU C-44), stabilized solids from sludge treatment, and 55-gallon drums containing solid and semi-solid wastes. Raw materials, such as treatment chemicals, are also stored on this pad in separate bermed area at the south end of the pad. Until approximately September, 1989, tank cleaning of excavated petroleum storage tanks also occurred on the container storage pad. Ecology noted in their report on the February 14, 1989 inspection that such activities were not indicated in Chempro's Part B Permit Application, and that Ecology was not aware they were occurring. This activity has ceased, and is not expected to re-occur until a separate unit has been built for that activity.

The container pad is sloped to the east with concrete curbs on the north, south, and east sides. Seven blind concrete sumps located on the eastern and southern edges of the pad collect any rainwater or spilled materials on the pad. The sumps are inspected daily, and pumped as needed. Some of the sumps in this area are pumped to Tank S (SWMU C-56); others are hard-piped to the 400-series tanks and can be pumped as needed.

There is no information indicating that releases from this unit have occurred. No evidence of releases was observed during the VSI. The concrete coating was chipped and stained in some places, but generally appeared to be in good condition, with no evidence of corrosion.

Conclusions

This unit appears to be in good condition. The west side of the pad does not have any curbing, thus there is a moderate potential for releases to soil from any spills which might occur on this side of the pad. Potential for releases to ground water and surface water is low. Because the wastes primarily handled in the unit are solids and semi-solids with little if any organic constituents present, the potential for subsurface gas generation is low. Containers with waste in them are closed during storage, therefore the potential for air releases is low.

5.1.21 SWMU C-51: Laboratory Drain Collection Tank (Photo 49)

Information Summary

SWMU C-51 is a 30-gallon polyethylene carboy that collects acidic and basic waste samples discharged through the sink drains in the facility laboratory. Wastes are neutralized prior to discharge through the drains. The carboy is located in a small shed adjacent to the laboratory (Figure 3). Secondary containment is provided by a metal drip pan. Liquids accumulated in the carboy are disposed of by transfer to one of the 100-series acid storage tanks (SWMUs C-6 to SWMU C-11) or 600-series alkaline storage tanks (SWMUs C-26 to C-29). This unit has been active since at least 1986.

There is no information indicating that releases from the carboys have occurred. No evidence of releases was observed during the VSI.

Conclusions

This unit appears to be in good condition, handles small amounts of waste and appears to have adequate containment. Therefore, the potential for release to the soil, ground water, and surface water is low. Since the unit is above-ground and is within secondary containment, the potential for subsurface gas generation is minimal. The potential for air releases is low because this unit in an enclosed shed and primarily handles inorganic wastes.

5.1.22 SWMU C-52: Resource Recovery Parking Lot (No Photo)

Information Summary

Resource Recovery is a wholly-owned subsidiary of Chempro that transports waste materials to and from this and other Chempro facilities. The parking lot occupies the southwestern corner of the Chempro property (see Figure 4). It is a graveled parking lot where typically empty tanker trucks park while waiting to be loaded with treated wastes or fuels. Occasionally, loaded or partially loaded tankers are also reportedly parked on the lot for less than twenty-four hours. Chempro personnel estimate that this occurs approximately once or twice per week. The size of the parking lot is approximately 150 feet by 100 feet. There is no secondary containment for this SWMU. Any releases from this unit would enter the storm sewer system or soil.

Sampling data from CTMW-14 located near the southwest corner of the parking lot exceeds MCLs for arsenic, cadmium, chromium, copper, and lead. It is not known if this contamination is due to releases from this SWMU. In addition, test pits excavated in the southern end of the parking area showed visible contamination by oily material (2). Again, it is not known if this contamination is due to releases from trucks in this parking lot. No evidence of releases was observed during the VSI.

Conclusions

The potential for release of hazardous constituents to soil is moderate because of lack of paving. However, the potential for ground water contamination is low because of the small quantities of contaminants that are expected to be released. The potential for surface water releases is low due to the distance from the Lincoln Avenue Ditch. The potential for subsurface gas generation is low because the unit is above-ground.

5.1.23 SWMU C-53: Freeway Container, Inc. Solvent Storage Shed (Photo 31)

Information Summary

SWMU C-53 is a trailer (approximately 30 feet by 10 feet) used for the storage of 55-gallon drums of virgin and spent solvent. Three drums of spent solvent and one drum of used one solvent were in the shed at the time of the VSI. The trailer door was open. No spillage from the drums was observed. There is no information on how long this unit has been active. The location of this SWMU is shown in Figure 4.

There is no information indicating that releases from this unit have occurred. No evidence of releases was observed during the VSI.

Conclusions

Due to the possibility of spillage from open drums, the potential for soil contamination is moderate. Since the quantities of materials which could be spilled is small and the unit is semi-enclosed, the potential for ground water releases is low. The potential for surface water contamination is low due to distance from nearest surface water body. The potential for subsurface gas generation is low, because the unit is above-ground. The potential for air releases is moderate because some of the containers are open to the atmosphere.

5.1.24 SWMU C-54: Freeway Container, Inc. Waste Paint Shed (Photos 32, 33, 34)

Information Summary

SWMU C-54 is a trailer approximately 12 feet by 20 feet used by Freeway Container for the storage of waste paints and thinners (Figure 4). Approximately 50 containers, in sizes ranging from 5 to 55-gallon, were in the shed at the time of the VSI. The drums were in poor condition, some without lids. The door of the trailer was open. Waste paints are collected from the trailer by Lilyblad on an irregular basis. There is no information on how long this unit has been active.

There is no information indicating that releases from this unit have occurred. Although evidence of spillage was present inside the trailer at the time of the VSI, there was no evidence of releases to the soil around the trailer.

Conclusions

Due to the possibility of spillage from open drums, the potential for soil contamination is moderate. Due to the small quantities of free liquids in the containers, the potential for ground water releases is low. The potential for surface water contamination is low due to distance to the nearest surface water body. The potential for subsurface gas generation is low, because the unit is above-ground and semi-enclosed. The potential for air emissions is moderate, due the presence of open drums in the trailer.

5.1.25 SWMU C-55: Piles of Excavated Soil in NW Corner of Freeway Container, Inc. (Photo 35)

Information Summary

During the VSI performed on December 18, 1989, two mounds of excavated soil were observed on the northwest corner of the property currently leased to Freeway Container, Inc. The mounds were approximately 50 yards from Taylor Way (see Figure 4). The mounds of soil were removed from Parcel C during construction of the containment pad in 1985. The volume of soil is estimated to be less than 150 cubic yards. The soil contained a whitish discoloration which may be due to the presence of lime. Ecology personnel present on the VSI measured a pH of 6.5 in a small puddle between the two mounds (see Photo 35). There is no containment for this SWMU (27).

Conclusions

The potential for releases of hazardous constituents from this unit cannot be determined, due to the unknown composition of the material. Based on the location from which the soil was excavated, it is likely to contain either lime sludges or auto fluff. Further investigation is needed to determine the potential environmental hazard associated with this material.

5.1.26 SWMU C-56: Stormwater Storage Tank S (Photos 25, 26, 41)

Information Summary

Stormwater Tank S is the only unit from the former letter tank system that was not removed during the letter tank closure process. Its location is shown on Figure 3. Information regarding wastes managed in this unit, dates of operation active, structural details, and release controls is summarized in Table 13 (17). Tank S was used for the storage of surface water run-on; at one time it was used for storage of runon in the letter tank area, and now stores stormwater from the blind sumps in the container storage pad (SWMU C-50). This wastewater is expected to contain very low levels of hazardous constituents, such as heavy metals and potentially some organic constituents. Water from Tank S is transferred to the 400-series tanks (SWMUs C-20 to C-23) for eventual discharge to the sewer, or sent to Chempro's Pier 91 facility (90).

Tank S is constructed on an asphalt pad; presently, there is no curb or berm surrounding this unit. When the rest of the letter tank area was active, the asphalt pad on which this unit is located was sealed with hot tar, and surrounded by an asphalt berm.

There is no information indicating that releases from this unit have occurred. No evidence of releases was observed during the VSI.

Conclusions

This unit appears to be in good condition. The past and ongoing potential for releases to soil, ground water and surface water is low. The unit is above-ground and handles wastes with little if any organic constituents, therefore the potential for subsurface gas generation is low. The potential for air releases is low due to the expected low concentration of any volatile compounds in the tank contents.

5.1.27 SWMUs C-57 through C-68: Inactive Units in the Letter Tank Area of Chempro Proper (Photos 24, 25, 42)

Information Summary

These inactive units on Chempro Proper included a series of treatment and storage tanks, filter press and associated equipment and sumps. All tanks, equipment and sumps (other than Tank S) have been removed as part of the closure process. Information regarding wastes managed in these units, dates they were active, structural details, and release controls is presented in Table 13 (17). Tanks A through F were installed on a bermed asphalt pad (17). Tank BB was already installed when the asphalt was laid, so asphalt was sealed around its base. Figure 3 shows the location of these SWMUs.

Department of Ecology files indicate that there were releases from these SWMUs due to spills and poor operating practices. A February 1981 inspection conducted by Ecology found that air bubbles were escaping around the base of tank BB. Samples taken from the area by Ecology contained high concentrations of chromium (18). Chempro states that small quantities of sludge were released around the base of this tank between approximately 1979 and February 1981, when the Ecology inspection took place, due to poor in-plant transfer operations. Corrective measures consisted of removal of the sludge down to the preexisting fill earth at the base of the tank (17). At the time the spills occurred, the tank was not on a pad and did not have secondary containment (28).

At the time of the VSI, the area where tanks and equipment had been removed was covered with plastic. Rainwater was ponded on top of the plastic cover.

Conclusions

Sampling performed as part of the closure process has confirmed soil contamination (see Section 4). Therefore, the potential for releases to soil and ground water is high. The potential for releases to air from the closure site in its current condition is low to moderate, due to the excavation being conducted on the site and possible exposure of contaminants. There is little if any potential for past or ongoing releases to surface water, but confirmed ground water contamination could be releasing to surface water. Because the

Table 13

SOLID WASTE MANAGEMENT UNITS INFORMATION SUMMARY
LETTER TANK AREA - CHEMPRO PROPER

SWMU No.	Description	Wastes Managed	Dates of Operation	Capacity (gal)	Structure Type	Release Controls
C-56	Stormwater Storage Tank S	▪ Surface water runoff	1986 - Present	20,000	Steel aboveground tank	None
C-57	Treatment and Storage Tank A	▪ Surface water runoff ▪ Chemical milling wastes ▪ Wastewater from chemical treating decanting	1980 - 1988	23,700	Steel aboveground tank	Discharged to SWMU No. C-66[(2)]
C-58	Treatment and Storage Tank B	▪ Paint booth waste ▪ Wastewater from chemical treatment decanting ▪ Chemical milling wastes	1980 - 1988	23,700	Steel aboveground tank	Discharged to SWMU No. C-66[2]
C-59	Treatment and Storage Tank C	▪ Paint booth wastes ▪ Wastewater from chemical treatment decanting ▪ Chemical milling wastes	1980 - 1988	23,700	Steel aboveground tank	Discharged to SWMU No. C-66[(2)]

Table 13 (Continued)

SWMU No.	Description	Wastes Managed	Dates of Operation	Capacity (gal)	Structure Type	Release Controls
C-60	Treatment and Storage Tank D	▪ Paint booth waste ▪ Surface water runoff ▪ Wastewater from chemical treatment decanting	1980 - 1988	23,700	Steel above-ground tank	Discharged to SWMU No. C-66[2]
C-61	Treatment, Storage, and Isolation Tank E	▪ Surface water runoff ▪ Wastewater from chemical treatment decanting	1980 - 1988	23,700	Steel above-ground tank	Discharges to SWMU No. C-66[2]
C-62	Treatment, Storage, and Isolation Tank F	▪ Surface water runoff ▪ Wastewater from chemical treatment decanting ▪ Filter press sludge	1980 - 1988	23,700	Steel above-ground tank	Discharged to SWMU No. C-66[2]
C-63	Treatment and Storage Tank BB	▪ Wastewater from chemical treatment decanting	1979 - 1988	220,000	Steel above-ground tank	Discharged to SWMU No. C-66[2]
C-64	Soil Solidification/ Stabilization Tank	▪ Contaminated soil, sludge, & debris	1985 - 1988	142 (cubic yards)	Above-ground tank (open top and side)	Discharged to SWMU No. C-65

Table 13 (Continued)

SWMU No.	Description	Wastes Managed	Dates of Operation	Capacity (gal)	Structure Type	Release Controls
C-65	Soil Solidification/ Stabilization Unit Sump	▪ Rain water and spills from letter tank system	1987 - 1988	7.5	Below-ground concrete tank	None
C-66	Sump between Tanks A and B	▪ Rain water and spills from letter tank system	1987 - 1988	7.5	Below-ground concrete tank	None
C-67	Filter Press Sump	▪ Rain water and spills from letter tank system	1987 - 1988	7.5	Below-ground concrete tank	None

(1) Source: Chemical Processors, Inc., Part B Permit Application, November 1988 (17)

(2) All sumps were blind. Tanks were on asphalt pad with secondary containment.

wastes handled in this area were primarily inorganic, there is little potential for generation of subsurface gas.

5.1.28 SWMU C-69: Solidification/Stabilization Area (Photo 29)

Information Summary

This area consists of three three-sided metal containers with a concrete floor which is used for breaking up and recontainerizing stabilized solids from the stabilization unit (SWMU C-40) in preparation for off-site disposal. The dimensions of the unit are 40 feet (length), by 24 feet (width), by 8 feet (height). The unit is covered with a plastic sheet, which was weighted at the corners at the time of the VSI. Tipplers containing stabilized solids are brought to this area from the northeast loading/unloading area (SWMU C-48). They are emptied and the contents are broken up with a backhoe.

At the time of the VSI, conditions were rainy and wet. Particulates from this unit were present on the concrete within and around the unit. No other evidence of release was noted at the time of the VSI.

Conclusions

The potential for ground water, surface water, and soil releases from the stabilized solids area is low. During dry and dusty conditions, the potential for air emissions is moderate because of the dust generated by the action of the backhoe. Since the unit is above-ground and handles stabilized solids, the potential for subsurface gas generation is low.

5.1.29 SWMU C-70: Areas of Auto Fluff and Lime Fill (No Photo)

Information Summary

The history of deposit of lime wastes and auto fluff on Chempro Proper and the sampling data confirming these deposits is discussed elsewhere in the report (Sections 2 and 3). Figures 15 and 16 shows the areas of fill deposits on the Chempro Proper parcel.

Conclusions

The potential for releases to soil and ground water from these fill materials is high. The fill deposits can generate caustic and heavy metal containing leachates. Spent catalyst lime wastes from Hooker Chemical contain chlorinated volatile organic compounds. The placement of lime wastes and auto fluff in the ground without containment and the hazardous constituents present in these wastes has probably caused these units to contribute to the soil and ground water contamination observed at Chempro Proper (see discussion in Sections 2.0 and 4.0). There is some potential for air releases from the spent lime catalysts; however, the release potential to air is probably low due to the subsurface location of the wastes and the placement of a synthetic liner at least in the area of the active portion of the facility. There is a moderate potential for generation of subsurface gases due to the volatile organic compound content and subsurface location of spent lime catalysts. There is a low potential for direct releases to surface water from the unit, due to its subsurface location; however, contaminated ground water from the unit may discharge to the surface, resulting in surface water and sediment contamination.

5.1.30 SWMU C-71: Storm Drainage System (No Photo)

Information Summary

The storm drainage system at Chempro Proper (the active facility, the letter tank area and Resource Recovery) consists of drains, catch basins and underground piping which discharges to a ditch paralleling Alexander Avenue. Drainage from the northwestern section of the property drain into a ditch adjacent to Taylor Avenue. Storm water in this system is expected to potentially contain low concentrations of heavy metals, and potentially organic contaminants from contaminated fill material or minor releases of wastes containing organic constituents. Runon which is collected in the containment pad at the active facility is not included in this SWMU as it is collected and treated in the 400-series tanks (SWMUs C-20 to C-23). Rainwater at the container storage pad (SWMU C-48) is collected in Tank S (SWMU C-56) or the 400-series tanks (SWMUs C-20 to C-23).

Conclusions

There is a moderate potential for releases to surface water from the northwestern section of the property draining to the Taylor Avenue ditch because this run-off has come in contact with surficial deposits of fill materials containing hazardous constituents. The potential for releases to the Alexander Street Ditch is also moderate because this run-off from the Resource Recovery Parking Lot (SWMU C-52) could be contaminated if spills are occurring from vehicles parked in this area (see Section 5.1.22). The potential for releases to air or subsurface gas formation is expected to be low because of the low concentration of volatile organics constituents in the surface water. There is a low potential for ongoing releases to soil and ground water from this unit, due to the expected low concentrations of contaminants present in the storm water and depth to the upper aquifer. The potential for generation of subsurface gas is also very low, due to the expected low concentrations (if any) of volatile organics present in the stormwater at these facilities.

5.2 CHEMPRO PARCEL A (Photos 1, 2 ,3, 37, 38)

5.2.1 SWMUs A-1 through A-12, A-14 to A-23: Inactive Chemical Treatment Unit Equipment

Information Summary

Chemical treatment equipment on Parcel A associated with the Chempro operation at the facility, consisted of a series of wing tanks (from Boeing) and 10 cylindrical tanks of various sizes. Seven of the cylindrical tanks (SWMUs A-14 through A-18, A-19, and A-20) were moved to Chempro's current operation following Parcel A closure, and are also described as SWMUs C-9, C-10, and C-15 to C-19 in this report. All other tanks were removed from the west side of Parcel A during Chempro's closure activities. Wastes managed in these units at the time of the Parcel A Closure, capacity, and structural details are summarized in Table 14 (20). Although first located directly on the ground, these tanks were eventually sealed in an asphalt pad with concrete curbing.

Table 14

SOLID WASTE MANAGEMENT UNITS
INFORMATION SUMMARY [(1)] [(2)]
PARCEL A

SWMU No.	Description/Usage	Capacity (gal)	Structure Type
A-1	Alkaline Storage and Treatment Tank 6	38,700	Steel open-top wing tank
A-2	Alkaline Storage and Treatment Tank 7	38,700	Steel open-top wing tank
A-3	Paint Waste Storage Tank 8 S	17,700	Steel open-top wing tank
A-4	Acid Storage Tank 9 N	17,700	Steel open-top wing tank
A-5	Acid Storage Tank 9 E	5,600	Steel open-top wing tank
A-6	Acid Storage Tank 9 W	5,600	Steel open-top wing tank
A-7	Sludge Treatment and Storage Tank 10	38,700	Steel open-top wing tank
A-8	Sludge Treatment and Storage Tank 11	33,500	Steel open-top wing tank
A-9	Alkaline Treatment and Storage Tank 12	55,100	Steel open-top wing top
A-10	Acid/Alkaline Storage and Treatment Tank SS1	7,800	Above-ground steel
A-11	Acid/Alkaline Storage and Treatment Tank SS2	3,000	Above-ground steel
A-12	Acid/Alkaline Storage and Treatment Tank SS3	3,000	Above-ground steel
A-13	Former Waste Oil Pond	Unknown	Natural depression
A-14	Wastewater Treatment Sludge Tank NT1	11,000	Above-ground steel
A-15	Wastewater Treatment Sludge Tanks NT2	11,000	Above-ground steel

Table 14 (Continued)

SWMU No.	Description/Usage	Capacity (gal)	Structure Type
A-16	Wastewater Treatment Sludge Tank NT3	11,000	Above-ground steel
A-17	Wastewater Treatment Sludge Tank NT4	11,000	Above-ground steel
A-18	Wastewater Treatment Sludge Tank NT5	11,000	Above-ground steel
A-19	Acid Storage Tank Poly 1	11,000	Above-ground poly
A-20	Acid Storage Tank Poly 2	11,000	Above-ground poly
A-21	Acid Storage Tank Poly 3	11,000	Above-ground poly
A-22	Sumps	Unknown	Concrete
A-23	Rinse Pit	Unknown	Unknown

(1) Source: Chemical Processors, Inc., Closure Plan For Parcel A Acid/Base Storage and Treatment Unit, September 4, 1987 (20).

(2) In addition to the SWMUs listed in this table, SWMUs C-9 and C-10 and SWMUs C-15 to C-19 were also active on Parcel A until late 1986. See Table 8 for further information on these units.

Documents reviewed indicate that several releases occurred from this facility:

- June 1981 - A 3,500 gallon chromic acid spilled occurred when acid was pumped into an unlined tank that subsequently developed a leak. The acid flowed southeast beyond Chempro's containment system. Approximately 3,300 gallons of liquid was recovered in the subsequent cleanup effort (24).

- October 1985 - Approximately 3,700 gallons from a 10,100 gallon nitric acid tank (with chromic acid and heavy metals) went outside of the secondary containment system. The spill was neutralized with lime and approximately 560 cubic yards of contaminated soil were removed (17, 24).

Most activities ceased on this Parcel in 1986. When Chempro's lease expired on Parcel A in December 1986, operations were moved to the adjacent property. An inspection performed in January 1987 of the Parcel A facility noted that nine tanks were still on the property containing approximately 50,000 gallons of hazardous sludges and liquids. These tanks were open and uncovered. The tanks were in poor condition and there were indications that liquids were seeping from them. There were also signs of oil contaminated soil and contamination on concrete slabs and berm walls (23, 24).

Sludge samples taken by Chempro from SWMU A-3 and A-8 in 1979, show maximum copper concentrations of 17 ppm and 20 ppm, respectively (83). Samples from SWMU A-9 taken in 1979 show the following maximum metals concentrations; copper (9.3 ppm), nickel (2.0 ppm), zinc (2.3 ppm), lead (0.4 ppm), iron (10.6 ppm), and cadmium (0.4 ppm) (82). Samples taken by Ecology in 1979 from the rinse pit (SWMU A-23) were analyzed for metals showing the following maximum concentrations; copper (14.7 ppm), chromium (80 ppm), lead (0.2 ppm), zinc (3.6 ppm), cadmium (1.7 ppm), and nickel (3.3 ppm) (77).

Conclusions

There is documented soil and ground water contamination at this site (19, 24). The potential for air releases from the site in its inactive state is low, because of the installation of the membrane and soil cover. There is a moderate potential for surface water releases from the site due to the proximity of a surface water body (Lincoln Avenue Ditch) and possible discharges of contaminated ground water from the facility. The potential for subsurface gas formation is low because these SWMUs had at least partial secondary containment and the wastes treated in the units did not have high concentrations of volatile organic constituents.

5.2.2 SWMU No A-13: Former Waste Oil Pond

Information Summary

A waste oil pond was present on Parcel A from approximately 1972 to 1975. Figure 6 shows the location of this SWMU as identified by historical records and sampling data. The pond was built in 1972 by Acology Oil, the original operator of the Parcel A oil recycling facility. The pond was reportedly used for storage of wastewaters generated during the reclamation process, petroleum sludges, and oil to be reclaimed at the facility (17, 19, 24). It was reported to be approximately 60 feet by 100 feet, unlined, and held about 500 gallons of oil (24). Oil from the pond may have migrated west onto the adjacent property, Chempro Parcels B and C (17, 18). In 1975, Ecology issued an order requiring that Puget Sound Industrial Petroleum, then the operator of the oil recycling facility, close the pond. By this time it was one-half of its original size (24). The pond was reportedly filled with auto fluff and gravel and became the site of Chempro's Parcel A chemical treatment facility (SWMUs A-1 to A-23) (18).

Conclusions

There is documented soil and ground water contamination at this site (19, 24). The potential for air releases from the site in its inactive state is low, because of the installation of the liner and soil cover. There is a moderate potential for surface water releases from the site due to the proximity of a surface water body (Lincoln Avenue Ditch) and possible discharges of contaminated ground water from the facility. Residual contamination from this unit may result in the generation of subsurface gas due to the volatile organic constituents present in the oily waste materials; therefore, the potential for subsurface gas formation is moderate.

5.2.3 SWMU A-24: Acology/Aero/PSIP/Chempro Waste Oil Recycling Equipment

Information Summary

As discussed in Section 2.2.2, four companies operated in succession a waste oil recycling and storage facility on the east side of Parcel A from 1970 to 1986. SWMU A-13 includes the inactive equipment associated with this facility and the property in the immediate vicinity; this equipment is discussed as a single SWMU because of the lack of specific information available regarding each piece of equipment, and the documented releases present throughout this area. Figure 6 shows the location of this SWMU. Available information indicates that at least the following process units were present at the facility over the life of its operation (24, 29):

- Three carbon steel processing tanks with a total combined capacity of 70,000 gallons
- One 10,000 gallon carbon steel sodium silicate storage tank
- Two 10,000 gallon carbon steel storage tanks
- One rail car used for the storage of emulsified asphalt
- A truck loading/unloading facility
- One API oil/water separator

There is no information indicating the specific configuration of these units on the property.

The oil recycling process at the facility consisted of pumping waste oil from the storage tanks to the processing tanks, where it was dehydrated and treated with sodium silicate for precipitation of water and dirt to the bottom of the processing tanks (24). Aerial photos do not indicate the presence of paved secondary containment around these units at any time.

Review of available documents indicates that there were at least the following observed releases of oil to the ground from the facility equipment:

- 1970 - A Department of Ecology inspection report states that the site was messy and oil was allowed to spill to the ground (19).

- 1972 - An Ecology inspection report indicates that Bruce Smith (Acology Oil) believed that considerable dumping of oil on the property was occurring when no one was around (19).

- 1976 - A 15,000 gallon spill of waste oil occurred from a vertical waste tank oil due to a ruptured line. The spill occurred on the weekend and it was several days before it was detected and response measures was undertaken. Oil migrated approximately 100 yards from the tank in the direction of the boiler. Chempro conducted cleanup operations using a vacuum truck. The amount of oil recovered by this operation is unknown (24).

- 1979 - Ecology conducted two site inspections in February 1979 and found that the facility was inundated with oily water and that no containment or storage areas for spills was present (24). Ecology stated that these conditions were in violation of Chempro's waste discharge permit and that enforcement action might by taken if the situation was not corrected (88).

Conclusions

There is documented soil and ground water contamination at this site (19, 24). Soil and ground water contamination has been confirmed by sampling. The potential for air releases from the site in its inactive state is low, because of soil excavation and installation of a liner and soil cover by Chempro. There is a moderate potential for surface water releases from the site due to the proximity of a surface water body (Lincoln Avenue Ditch) and possible discharges of contaminated ground water from the facility. The potential for subsurface gas formation is moderate due to the volatile organic constituents present in oily waste materials.

5.2.4 SWMU A-25: Areas of Auto Fluff and Lime Fill

Information Summary

The placement of lime wastes and auto fluff fill materials on Parcel A and the data on fill materials encountered during subsurface explorations activities are discussed elsewhere in the report (Sections 2.0 and 3.0). Figures 15 and 16 shows the extent of these identified fill deposits.

Conclusions

The potential for releases to soil and ground water from these fill materials is high. The fill deposits can generate caustic and heavy metal containing leachates. Spent catalyst lime wastes from Hooker Chemical contain chlorinated volatile organic compounds. The placement of lime wastes and auto fluff in the ground without containment and the hazardous constituents present in these wastes has probably caused these units to contribute to the soil and ground water contamination observed at Parcel A (See discussion in Sections 2.0 and 4.0). While the observed contamination cannot be solely attributed to fill and lime wastes due to the placement of wastes at the site and commingled contamination, the fill wastes may be significant sources of soil and ground water contamination by chlorinated volatile organic compounds, heavy metals and phthalate esters (1, 4, 5, 7, 22, 24). There is some potential for air releases from the spent lime catalysts; the release potential to air is probably low due to the subsurface location of the wastes and the placement of a synthetic liner and clean soil fill at Parcel A during closure activities (5). There is a moderate potential for generation of subsurface gases due to the volatile organic compound content and subsurface location of spent lime catalysts. There is a low potential for direct releases to surface water from the unit, due to its subsurface location and clean fill placement at the site; however, contaminated ground water from the unit may discharge to the surface, resulting in surface water and sediment contamination.

5.3 NORTHWEST PROCESSING, INC.

Forty-eight SWMUs have been identified at Northwest Processing. These units are described below:

5.3.1 SWMUs N-1 through N-5: Tank Farm 1, Feed Tanks 1, 3, 4, and 5 and Former Feed Tank 2 (Photo 61)

Information Summary

Four feed tanks are currently located in Tank Farm 1. A fifth tank was present in Tank Farm 1, but has been removed. Tank 1 (SWMU N-1) is a vertical steel tank with a capacity of 378,600 gallons. Tank 2 (SWMU N-2) was also a vertical steel tank with a capacity of 378,600 gallons. This tank has been removed. Tanks 3 and 4 (SWMUs N-3 and N-4) are 106,600-gallon vertical steel tanks; Tank 5 (SWMU N-5) is a 93,300-gallon capacity vertical steel tank. All five tanks are believed to have been used for storage of materials to be reclaimed (e.g., used oil, solvents, cutter stock); Tanks 1, 3, 4, and 5 are currently used to store mixtures of gasoline, oil, and water. Tanks 3 and 5 reportedly stored waste solvents in the past (51). All except Tank 2 are currently active. The date they began operation is unknown, although Tank 1 (and a second large tank which has been removed) has been in place for at least 15 years. Tank 2 was removed within the past 3 years.

The tanks are vented directly to the atmosphere. They are gauged, but do not have automatic overfilling controls. The floor of Tank Farm 1 is unpaved; the tank farm is surrounded by a concrete berm which is of fairly recent construction (within one to two years). Prior to that time, these tanks were surrounded by an earthen berm (51).

A July 2, 1981 Ecology Inspection report notes that a "dirty solvent" tank was releasing solvent through a gas vent at the top; this event occurred for at least two days. Facility operators indicated to Ecology that they intended to remove approximately 100 gallons of solvent from the tank to alleviate the problem (51). Based on photographs taken at the time, it appears that the leaking tank was Tank 3. Tank 3 was tested in February 1989; three pinhole leaks were detected in the tank (51). The pinholes were repaired and the tank, which was storing solvent at the time, is currently operating as a "feed tank" (51).

On January 27, 1982, Ecology noted stormwater and "a little oil discharge" coming from the tank farm dike (51).

During a September 1988 Ecology inspection, Tank 5 was observed to be leaking from a bottom valve. This tank contained spent Safety Kleen solvents at the time; these solvents had been in the tank for at least one and one-half years, according to facility personnel (40).

Conclusions

Releases to soil have been confirmed from Tanks 3 and 5. Since Tank Farm 1 is unpaved and all tanks are of similar age and construction, the potential for releases to soil from all five tanks is high. The potential for release to ground water from Tanks 3 and 5 is high, based on documented soil releases of unknown volume. The potential for release to ground water from Tanks 1, 2, and 4 is moderate. The tanks are vented directly to the atmosphere; tank overflow has been documented through the vent in Tank 3. Based on these considerations, the potential for air release from these units is high. The potential for direct releases to surface water is low because site topography tends to enhance entrainment in the soil column rather than runoff. Since ground water is shallow (within 5 to 10 feet of the surface), there is moderate potential for surface water releases due to ground water transfer. Because these tanks handle wastes containing volatile constituents, and secondary containment within the tank farm is unlined, there is a moderate potential for subsurface gas release.

5.3.2 SWMUs N-6 through N-14: Tank Farm 2, Feed Tanks 6 through 14 (Photos 53, 54, 62)

Information Summary

Nine feed tanks are located in Tank Farm 2. Tank 6 (SWMU N-6) is a vertical steel tank with a capacity of 18,700 gallons. Tank 7 (SWMU N-7) is an 18,300-gallon steel tank. Tank 8 (SWMU N-8) is an 18,900-gallon vertical steel tank. Tanks 9 (SWMU N-9) and 10 (SWMU N-10) are 19,700-gallon vertical steel tanks.

Tanks 11, 12, 13, and 14 (SWMUs N-11, N-12, N-13, and N-14) are 18,700-gallon steel tanks. These tanks have been used to store a variety of materials prior to recycling, including used oil; waste oil; mixtures of gas, oil, and water; cutter stock; naphtha; and other solid wastes. These tanks rest on a sealed concrete base surrounded by a 2-foot high concrete dike. Drainage from the diked area is discharged to the oily water treatment system (SWMUs N-27 through N-32) (51). A September 1988 Ecology inspection indicated that the containment wall around the tank farm is less than a foot in height and did not appear to be adequately designed to contain spills (40). There is no evidence of releases from these tanks; no evidence of release was observed during the VSI.

Conclusions

Because these tanks were constructed and are operated within secondary containment which appears to be of good integrity, the potential for releases to soil, ground water, and surface water are low. These tanks are vented to the atmosphere and contain volatile constituents; thus, the potential for release to air is high. The potential for generation of subsurface gas is low, because the units are above ground and within secondary containment.

5.3.3 SWMU N-15: Tank 15, Process Wastewater Holding Tank (Photo 57)

Information Summary

This unit is a 20,000 gallon steel tank located in Tank Farm 2 (Figure 8). It is used to store process wastewater from the centrifuge and fractionation processes. According to the facility, wastes stored in this tank are shipped off-site to a licensed disposal facility (51). This unit is currently active; the date it began operation is unknown. This unit manages oily wastewaters; laboratory analyses have shown the presence of chromium, copper, lead, nickel, and phenols (44).

Tank Farm 2 is paved with concrete, and has a 2-foot high concrete dike surrounding it. A sump within Tank Farm 2 drains to the oily water treatment system (SWMU N-27 through N-32). There is no historical evidence of release from this unit; no evidence of release was observed during the VSI.

Conclusions

Based on the location, operation and wastes managed in this tank, the potential for release to soil, ground water, and surface water is low. The potential for air releases is low, because the concentrations of volatile constituents is expected to be relatively low. The potential for subsurface gas generation is low, due to the presence of the concrete pad underlying the tank.

5.3.4 SWMU N-16: Tank 16, Centrifuge Feed Tank (Photos 53, 58, 59)

Information Summary

This unit is a 7,000-gallon vertical heated tank located in the process area (Figure 8). The tank serves as a feed tank for the decanter centrifuge (SWMU N-17). This tank has been used since processing started at the facility in 1985. This feed material consists of gasoline/water/solids, diesel/water/solids, or waste oil/water/solids. The feed materials are introduced into this unit from one of the feed tanks in tank farms 1 or 2. In this tank, the material is mixed and heated (using steam from the boiler) to reduce viscosity and enhance the centrifugation process (37). From Tank 16, the material is pumped to the centrifuge units (SWMU N-17 and N-18). This unit may generate some sludges; sludges are removed and drummed for off-site disposal. This unit is located within the secondary containment pad of the process area; it is externally gauged.

There is no historical evidence of releases from this tank. The lower portion of this tank and the containment area around it were very oily at the time of the VSI; the immediate reason for this oily material was not apparent.

Conclusions

Based on the location and operation of this tank, the potential for release to soil, ground water, and surface water is low. The potential for air releases is high, as the tank is heated and is vented directly to the atmosphere. The potential for subsurface gas release is low, due to the presence of the concrete pad underlying the tank.

5.3.5 SWMUs N-17 and N-18: Centrifuges (No Photo)

Confidential Information

Not For Release

Conclusions

These units are located in a building with a concrete floor and curbing. They are small units with little potential for release other than minor spillage to the floor of the building.

5.3.6 SWMU N-19: Waste Accumulation Area in Centrifuge Room (Photo 60)

Confidential Information

Not For Release

Conclusions

These units are located in a building with a concrete floor and curbing. They are small units with little potential for release other than minor spillage to the floor of the building.

5.3.7 SWMU N-20: Tank 17, Holding Tank (Photo 51)

Confidential Information

Not For Release

Conclusions

Based on the location and operation of this tank, the potential for release to soil, ground water, and surface water is low. The potential for air releases is high, as the tank is vented directly to the atmosphere. The potential for subsurface gas release is low, due to the presence of the concrete pad underlying the tank.

5.3.8 SWMU N-21: Fractionation System (Photos 51, 56)

Confidential Information

Not For Release

Conclusions

Based on the location and operation of this unit, the potential for release to soil, ground water, and surface water is low. The potential for air releases is low, because the overhead vapors generated from the system are returned and recondensed. The potential for subsurface gas release is low, due to the presence of the concrete pad underlying the tank.

5.3.9 SWMU N-22: Anti-Freeze Recycling System (No Photo)

Confidential Information

Not For Release

Conclusions

This unit is located in a building with a concrete floor and curbing. It is fully enclosed, with little potential for release other than minor spillage to the floor of the building. The pretreatment tank is located above an asphalt pad; any spills would flow to the concrete paved area around the centrifuge room and into a sump. Therefore, the potential for releases to all media is low.

5.3.10 SWMU N-23: Solvent Recovery Unit (No Photo)

Confidential Information

Not For Release

Conclusions

This unit is not currently active. It is located within a concrete diked area; the potential for releases to all media is considered low.

5.3.11 SWMU N-24: Tank 26, Stormwater Accumulation Tank (Photo 63)

Information Summary

This tank is a 25,000-gallon carbon steel tank, used as an accumulation tank for contact stormwater. It is located in Tank Farm 4 (Figure 8). The tank has a discharge permit from the City of Tacoma (Permit No. 0770-5260-011), but is not connected to the sewer. This unit is located on a reinforced concrete pad within a 2-foot high containment dike (51). The tanks is expected to contain low concentrations of organic constituents from minor spillage in the process area. There is no evidence of releases from this tank.

Conclusions

The potential for releases to soil, ground water, and surface water from this tank and for the generation of subsurface gas are low due to its location within a diked concrete area. The potential for air release is low due to the expected low concentration of organic contaminants in the stormwater.

5.3.12 SWMU N-25: Tank 27, Process Wastewater Holding Tank (Photos 63, 64)

Information Summary

This 20,000 gallon tank is located in Tank Farm 4 (Figure 8). It is used to store process wastewater from the centrifuge and fractionation processes (SWMUs N-17, N-18, N-21). Wastes stored in this tank are shipped off-site to a licensed disposal facility, or are processed in the oily water treatment system (SWMUs N-27 through N-32) (50, 51). This unit is located on a reinforced concrete pad within a 2-foot high containment dike (51).

Conclusions

The potential for releases to soil, ground water, and surface water from this tank and for the generation of subsurface gas are low due to its location within a diked concrete area. The potential for air release is moderate due to the expected concentrations of volatile organic contaminants in the process wastewater.

5.3.13 SWMU N-26: Oily Water Sewer System (No Photo)

Information Summary

The oily water sewer system consists of a series of pipes connecting sumps in tank farms and process areas with the oily water treatment system (SWMUs N-27 to N-32). The piping is underground; its construction details are not known. Conflicting evidence of the use of this system was obtained during the VSI; it could not be determined specifically what wastewater was entering this system.

Conclusions

The potential for releases to soil and ground water from this unit and the potential for generation of subsurface gas cannot be determined without more information regarding the construction details and wastes managed. The potential for surface water and air releases from this unit is low because it is located underground.

5.3.14 SWMUs N-27 through N-32: Oily Water Treatment System (Photos 65, 66, 67, 68)

Information Summary

The oily water treatment system is used for oil/water/solids separation for wastewaters collected in the oily water sewer system (SWMU N-26) (51). The system consists of an API preseparator (SWMU N-27), a coalescing separator (SWMU N-28), a skim tank for slop oil skimmed off the separator units (SWMU N-29), a biotower (SWMU N-30), a storage tank known as the "pink tank" (SWMU N-31), and a sewer discharge tank (SWMU N-32). The biotower is constructed of carbon steel with dimensions of 25 feet tall by 13 feet diameter, and a capacity of approximately 25,000 gallons (51). Process flow for these SWMUs is shown in Figure 27.

Oily wastewaters enter the preseparator where an oil skimmer removes free oil; this is pumped to the skim tank. The water then passes through the coalescing separator which is designed to reduce the oil content to less than 50 ppm (37). The oil collected in this unit is pumped to the skim tank. Water leaving the separators is pumped to the biotower, which is not currently operating as a biological treatment unit. The effluent is stored in a holding tank (the "pink tank") for final analysis before being discharged on a batch basis to the sanitary sewer system or shipped off-site for disposal. An earlier Tacoma City Sewer discharge permit for contact stormwater has limitations in the permit for metals, total oil and grease, pH, phenols, cyanide, PCBs, BETX and purgeable halocarbons (46).

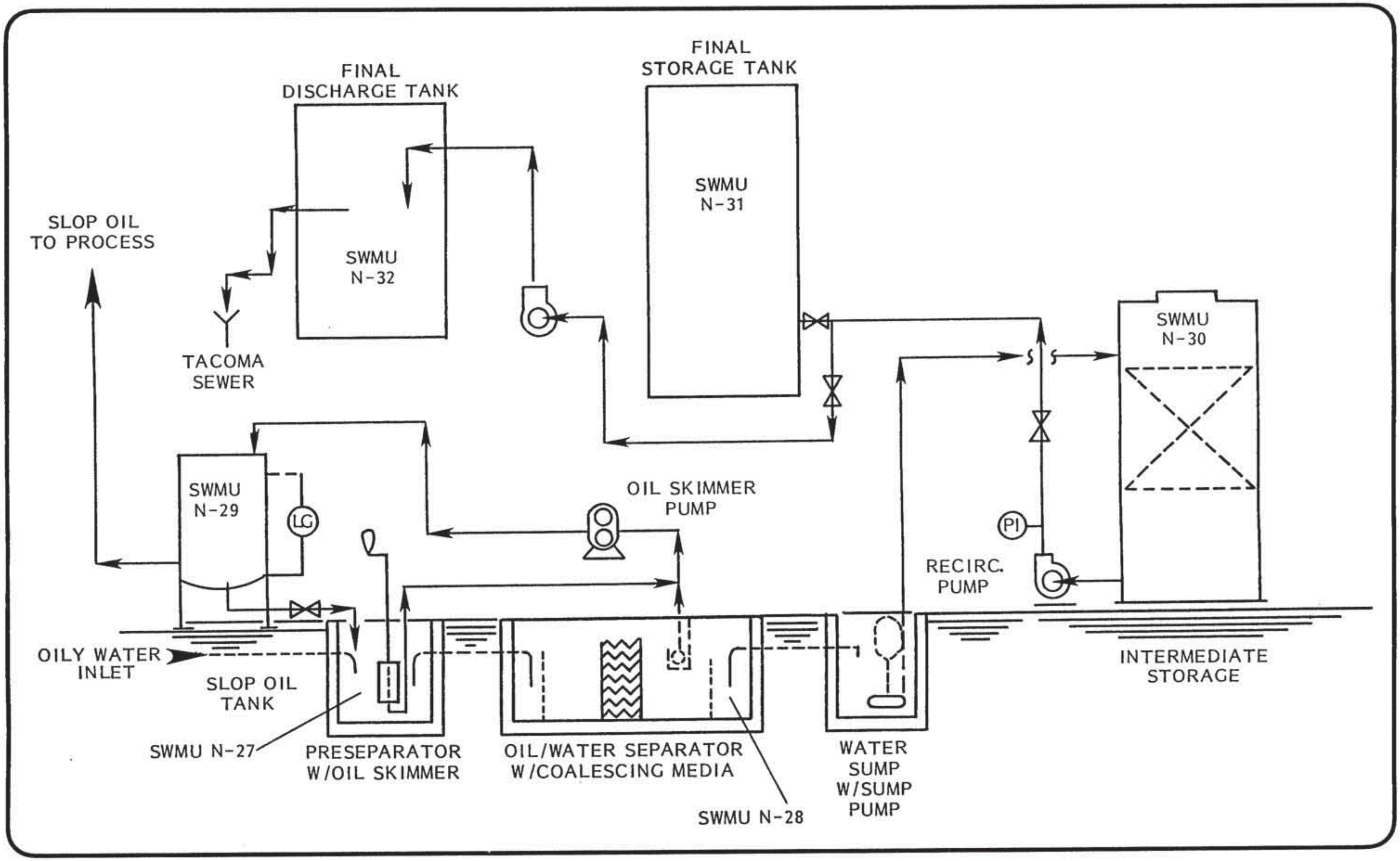


Figure 27

OILY WASTE TREATMENT SYSTEM
NORTHWEST PROCESSING

As discussed in Section 2.3, prior to 1988, treated stormwater was discharged to the City of Tacoma's storm drain system (Lincoln Avenue Ditch). Sampling conducted in 1987 indicated an oil and grease concentration of 500 mg/l (75); this is 30 times greater than the NPDES unit. A sample collected from the first off property in-line catch basin contained 1,400 mg/l oil and grease. Reportedly, no other facilities are upstream of this catch basin (75).

Conclusions

The potential for releases from these units to air, soil, or ground water is low. Because the pink tank (SWMU N-31) is resting directly on the ground, its release potential to soil may be moderate. Given the documented past releases to the Lincoln Avenue ditch, the potential for past releases to surface water is high.

5.3.15 SWMU N-33: Generated Waste Storage Area (Photo 73)

Information Summary

A small drum storage area for wastes generated on-site is located outside the northeast corner of the main warehouse (Figure 8). This unit is used to store oily sludges generated in the centrifuge building (51). It is also used to store any laboratory samples which contain regulated wastes. At the time of the VSI, one drum marked "Hazardous Waste" and eight drums marked "Unregulated Waste" were located in this unit. There is no secondary containment for this area, although it is located in a concrete paved area north of the main warehouse. No evidence of release was observed at the time of the VSI.

Conclusions

The potential for release of waste constituents to soil is low under normal operating conditions. Thus, the potential for release to ground water and surface water is also low. The potential for releases to air is low, as the drums are normally closed. Because the unit is located in a paved area, the potential for generation of subsurface gas is also low.

5.3.16 SWMU N-34: Auxiliary Waste Storage Area (Photos 75, 77)

Information Summary

A variety of drummed waste materials are stored around the solvent repackaging building (Former Drum Storage Building, SWMU N-47) (Figure 8). At the time of the VSI, about 30 empty drums awaiting cleaning were located outside the west wall of this building. These drums were being stored prior to rinsing. During a September 1988 inspection by Ecology, 438 drums were observed in this area, stacked three and four high on wooden pallets. None had labels and many were marked as Safety Kleen sludge. Many of the drums had no lids. According to facility personnel, the sludges had been on-site for up to two years. Some of the drums were marked as creosote (40). The area is a graveled surface with no secondary containment. At the time of the VSI, there was no evidence of release in this area.

Conclusions

Based on the large number of drums previously stored in an inadequate condition, there is a high potential that past releases to soil may have occurred, and a moderate potential for past release to ground water, depending on the volume of waste that may have been spilled. The ongoing potential for release to these media appear to be low. The potential for release to air and surface water appear to be low. There is a low to moderate potential for generation of subsurface gas if waste spilled from the drums previously stored in this unit.

5.3.17 SWMU N-35: Drum Rinsing Area (No Photo)

Information Summary

This unit is a concrete pad located on the north side of the main warehouse (Figure 8). It has been used for rinsing of empty drums prior to shipment off-site for recycling. The dates of operation of this unit are uncertain. A variety of petroleum and solvent-containing wastes may have been handled in this unit. The pad slopes to a sump in the center; this sump drains to the oily water sewer system (SWMU N-26).

Conclusions

The location of this unit within a paved area sloped to a sump makes the potential for release to soil, ground water, and surface water low. The potential for air release cannot be evaluated without more information regarding the wastes which were handled here. The potential for subsurface gas generation is low due to the presence of the pavement.

5.3.18 SWMU N-36: Tank 21, Boiler Feed Tank (Photo 71)

Information Summary

This tank is a 19,500-gallon vertical steel tank located in Tank Farm 3. It is used to store fuel for the boiler (SWMU N-37). This unit is currently active; the date it began operation is unknown. Reportedly, waste fuels and recycled solvents have been stored in this tank for use as boiler fuel. Tank Farm 3 is paved with concrete and is surrounded by concrete berms. Analytical data for the fuel stored in this tank shows that up to 341 ppm lead may be present (44).

Conclusions

The potential for release to soil, ground water, and surface water from this unit and the potential for generation of subsurface gas is low because the tank is located within a concrete diked area with adequate secondary containment. The potential for air release is moderate, because the tank is vented to the atmosphere.

5.3.19 SWMU N-37: Hot Oil Heater (Boiler) (No Photo)

Information Summary

The hot oil boiler is located on the south side of the main building. According to facility personnel, this unit has not been fired using regulated waste fuel. Documents reviewed during the RFA, however, indicate that waste fuels and recycled solvents may have been used to fire the boiler. Analyses of the fuel stored in Tank 21 (SWMU N-36) for use in this unit indicate the presence of lead (44).

Conclusions

This unit is fully enclosed in a building; the potential for releases to any environmental medium is low. Air releases from this unit are regulated by PSAPCA.

5.3.20 SWMUs N-38 and N-39: Loading/Unloading Areas (Photos 50, 52, 53, 55, 62)

Information Summary

Two loading/unloading areas where wastes are handled were identified at Northwest Processing: one east of the process area, and one east of Tank Farm 2. Bulk materials are loaded and unloaded at these units (39). The loading/unloading pad near the process area is also used for vacuuming sludges from tanks into tank trucks. The sludges are then transported to a licensed disposal facility.

Run-on in these units is collected in the oily water sewer system and pumped to the oily water treatment system (SWMUs N-27 through N-32) (51). A 1982 Ecology inspection report indicated that oil from the loading/unloading area (unknown which one) had discharged to a pond located on the east side of the Northwest Processing property (51). No evidence of releases other than minor spillage to the collection system was noted during the VSI.

Conclusions

Past releases to soil have occurred from one of the loading/unloading areas. There is a low to moderate potential that residual soil contamination may be present from this spillage. The ongoing potential for releases to ground water, surface water, and the potential for generation of subsurface gas is low, because these units are underlain by pavement and have adequate containment. The potential for releases to air is low under normal operating conditions.

5.3.21 SWMU N-40: Tire Pyrolysis Unit (Photo 76)

Information Summary

The tire pyrolysis unit was a pilot process for recycling tires. It is located to the west of the maintenance building (Figure 8). The unit is constructed of steel, is fully enclosed and built on metal legs on a concrete pad. It was active in 1986; it is no longer operational. When active, it managed wastes containing petroleum constituents and heavy metals.

Conclusions

The potential for past and ongoing releases from this unit to all environmental media is low.

5.3.22 SWMU N-41: Portable 500-gallon Tanks in Loading/Unloading Area #2 (Photo 52)

Information Summary

At the time of the VSI, two portable 500-gallon tanks were located in the loading area. These tanks are reportedly used to move process wastewater to Tank 27 (SWMU N-25). These tanks may be the same tanks that were reported in Ecology inspections which were stored in Portable Tank Area #1 (SWMU N-44) and Portable Tank Area #2 (SWMU N-45). The area in which these tanks were stored was paved with a drainage channel leading to the oily water sewer system.

There is no information indicating that releases have occurred from these units. No releases were noted during the VSI.

Conclusions

Based on the location and conditions of these units at the time of the VSI, the potential for releases to soil, ground water, surface water is minimal, as is the potential for the generation of subsurface gas. There is a moderate potential for releases to the air from these tanks if they are not kept closed at all times.

5.3.23 SWMU N-42: Fill Areas (No Photo)

Information Summary

The northern three-fourths of the Northwest Processing site has been filled with a variety of fill materials. Fill materials which have reportedly been used include:

- Lime sludge from Hooker Chemical and Pacific Lime
- Auto fluff
- Wood waste and construction debris
- Dredge spoils from the Hylebos Waterway

The history of fill materials in this area are discussed in more detail in Section 3.4.

Conclusions

The potential for releases to soil and ground water from these fill materials is high. The fill deposits can generate caustic and heavy metal containing leachates. Spent catalyst lime wastes from Hooker Chemical contain chlorinated volatile organic compounds. The placement of lime wastes and auto fluff in the ground without containment and the hazardous constituents present in these wastes has probably caused these units to contribute to the soil and ground water contamination observed at Northwest Processing (see discussion in Sections 2.0 and 4.0). There is some potential for air releases from the spent lime catalysts; the release potential to air is probably low due to the subsurface location of the wastes and the placement of a synthetic liner at least in the area of the active portion of the facility. There is a moderate potential for generation of subsurface gases due to the volatile organic compound content and subsurface location of spent lime catalysts. Although there is a low potential for direct releases to surface water from the unit, due to its subsurface location, there is a moderate potential for release of contaminated ground water from the unit to the surface, resulting in surface water and sediment contamination.

5.3.24 SWMU N-43: Former Drum Storage Area Near Western Boundary (No Photo)

Information Summary

In a 1973 aerial photo of the site, approximately 250 to 500 drums were observed near the western boundary of the site (east of a former 4-acre drainage pond). The contents of the drums are unknown. The owner of the property at the time was Donald Oline. The only commercial facility in the area was Aero/Acology Oil to the south (24).

Conclusions

The potential for releases from this unit cannot be determined without additional information regarding the contents of the drums.

5.3.25 SWMU N-44: Former Portable Tank Area #1 (No Photo)

Information Summary

During a September 1988 Ecology inspection, nine portable tanks were observed south of Tank Farm 3 (Figure 8). These tanks were used to collect material from Northwest Processing's oily water collection system during cleaning of sewer pipes and sumps (34, 51). According to the facility, they were pumped out and cleaned later that month (34). There was no evidence of spillage at that time; these tanks were not present at the time of the VSI.

Conclusions

The potential for past releases from these tanks cannot be evaluated. There is no ongoing potential for release as the tanks are no longer present at this location.

5.3.26 SWMU N-45: Former Portable Tank Area #2 (No Photo)

Information Summary

During a September 1988 Ecology inspection, a number of portable tanks were observed along the east fence of Northwest Processing. Eleven of these tanks contained liquids. The tanks varied in size from 500 to 2,000 gallons; at least one was observed leaking from the bottom port (40). These tanks were not present at the time of the VSI.

Conclusions

Past releases to soil occurred from this unit; the ongoing potential for releases to ground water is unknown, as it is not known how the spillage was remediated. The potential for past and ongoing releases to surface water and air is considered low. The potential for generation of subsurface gas is not known as the composition of the waste materials spilled could not be determined.

5.3.27 SWMU N-46: Former Drum Storage Area East Of Main Warehouse (No Photo)

Information Summary

About 54 drums with hazardous waste labels were observed at this location during a September 1988 Ecology inspection. Many of the labels were not filled out, although most had 1987 dates. Several drums were rusty and had holes in them and had unsecured or missing lids. An open sump is located near this area; the sump drains to the storm sewer. No other information is known about this unit; these drums were not present at the time of the VSI.

Conclusions

The potential for past releases to soil from this unit is high, due to the condition of drums at the time of the 1988 inspection. The potential for release to ground water is low, depending on the volume of waste which may have spilled from the drums. The potential for surface water release is low, while air release potential may be moderate due to the missing lids on the drums. The potential for generation of subsurface gas cannot be determined without additional information regarding the specific waste constituents.

5.3.28 SWMU N-47: Former Drum Storage Building (Solvent Repackaging Building) (Photo 74)

Information Summary

The solvent repackaging building in the northeast corner of the site was at one time used to store drummed material awaiting recycling at the facility (51).

Information regarding the waste types managed in this building has not been supplied by Northwest Processing. Product materials, including hexane and isopropyl alcohol were also stored in this building. According to documents submitted by Northwest Processing, the building was enclosed and curbed in the spring of 1988. It has a blind sump in the center of the concrete floor (51). Prior to 1988, this sump discharged to the oily water sewer system (SWMU N-26) and therefore to the Lincoln Avenue ditch.

Conclusions

Because information regarding the condition of the building floor prior to 1988 was not supplied, the potential for past releases to soil and ground water and generation of subsurface gas cannot be evaluated. The present potential for releases to these media from this building is very low, based on the presence of a blind sump. The past potential for air releases cannot be determined due to lack of information regarding the waste types managed in this unit; the present potential from the solvent packaging operations appears to be very low. The potential for release to surface water is low, based on the building's lack of proximity to local drainage channels.

5.3.29 SWMU N-48: Former Horizontal Tanks South of Tank Farm 1 (No Photo)

Information Summary

An aerial photo of the property from 1981 indicates the presence of three small horizontal tanks located south of Tank Farm 1. According to Glenn Tegen, these tanks were used for storage of waste oils. Other tanks in this area may have been used for the storage of waste and product mineral spirits, and lube oils. These tanks were located on soil, with no secondary containment evident from the photo. The actual dates of operation of these tanks could not be determined, however, Mr. Tegen recalled that the horizontal tanks were cleaned out and sent to General Metals to be recycled, possibly in 1982.

Conclusions

The potential for past releases to soil and ground water from this unit is moderate, due to its location and probable operational standards. The potential for past releases to air is unknown. The potential for release to surface water was low, due to the location of the tanks. There is a low potential for the generation of subsurface gas due to the presence of volatile constituents in the waste managed.

5.4 SOL-PRO, INC.

Twenty-two SWMUs have been identified at Sol-Pro. These units are described in detail in the following sections.

5.4.1 SWMU S-1: Tank 704, Luwa Feed Tank (Photo 100)

Information Summary

Tank 704 is a 4,000-gallon stainless steel tank used for blending of solvents to homogenize the feed stream prior to introduction to the Luwa Thin Film Evaporator (SWMU S-4). Waste solvents in batches of 1,000 gallons or more enter the Sol-Pro facility in tank trucks and/or drums which are pumped into Tank 704. Wastes may also be transferred to Tank 704 from Tanks 535 and 536, the dirty wash solvent tanks (SWMUs S-2 and S-3). From Tank 704, the blended waste solvents are pumped to the Luwa Thin Film Evaporator (SWMU S-4).

This unit is currently active; it began operation in 1988 when facility construction was completed. It manages primarily non-chlorinated liquid solvents (EPA waste numbers F003 and F005), although chlorinated liquid solvents (EPA waste numbers F001 and F002) may be handled occasionally.

Tank 704 is located in the eastern corner of the site in a concrete containment structure with approximately 3-foot concrete sides (Figure 9). The containment structure also contains several additional tanks and is approximately 30 feet by 40 feet in size. A blind sump is located within the containment; liquids in this sump are pumped out every day or as needed. Material from the sumps is pumped manually to Tank 901 (SWMU S-15) if contaminated, or to the stormwater holding tank (SWMU S-21) if strictly rainwater. The tank is not vented. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since this unit appears to be in good condition and has adequate secondary containment, the potential for releases to soil, surface water, or ground water is low. The unit is fully enclosed and is not vented, therefore the potential for releases to air is low. Since Tank 704 is above-ground and within secondary containment, the potential for subsurface gas generation is minimal.

5.4.2 SWMUs S-2 and S-3: Tanks 535 and 536, Dirty Wash Solvent Tanks (Photos 83, 92)

Information Summary

Liquid solvents which are transported to the Sol-Pro facility in small batches (e.g., less than 1,000 gallons) are placed in Tanks 535 and 536 for settling. These tanks have a capacity of 10,000 gallons each and are constructed of steel. They are located northwest of Tank 704 (SWMU S-1) in the eastern corner of the site (Figure 9). Wastes in these tanks are generally a heterogeneous mixture of different solvents generated by a variety of Sol-Pro customers (72). Settled solids are processed through the horizontal evaporator (SWMU S-13) or are shipped off-site as a hazardous waste fuel. Liquids are transferred to Tank 704 (SWMU S-1) for processing through the Luwa Thin Film Evaporator (SWMU S-4), or may be shipped off-site as a hazardous waste fuel (72). An Ecology inspection on January 27, 1990 noted that Tank 536 was reportedly being used to store material processed through the LUWA and awaiting shipment to systech (96).

These tanks are currently active; they began operation in 1988 when facility construction was completed. Wastes managed include non-chlorinated solvents (EPA waste numbers F003 and F005). Tanks 535 and 536 are located within a concrete containment structure with approximately 3-foot concrete sides. A blind sump within the containment area captures any spills; this sump is pumped out daily or as necessary. Material from the sump is pumped to Tank 901 (SWMU S-15) if contaminated, or to the stormwater holding tank (SWMU S-21) if strictly rainwater. The tanks are not vented. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since these units appear to be in good condition and have adequate secondary containment, the potential for releases to soil, surface water, or ground water is low. The units are fully enclosed and are not vented, therefore the potential for releases to air is low. Since Tank 535 and 536 are above-ground and within secondary containment, the potential for subsurface gas generation is minimal.

5.4.3 SWMU S-4: Luwa Thin Film Evaporator Unit (Photo 79)

Information Summary

Blended waste solvents from Tank 704, the Luwa Feed Tank (SWMU S-1), are passed through an in-line basket filter to remove solids from the waste solvent stream prior to treatment in the Luwa thin film evaporator. Blended solvents are passed through the basket filter until enough solids accumulate in the filter to cause excessive back pressure. The dirty basket is then replaced by a clean basket; the wasted basket filters are placed in drum storage and held for further processing in the horizontal evaporator (SWMU S-13). The basket filter also serves to further homogenize the feed materials before they are treated in the evaporator.

The blended and filtered waste solvents from the basket filter are drawn by vacuum or pump and metered to the feed inlet of the Luwa thin film evaporator. After being introduced, the solvents are immediately distributed over the internal circumference of the evaporator and kept turbulent by blades on a rotor. The waste solvents are heated to a temperature near the boiling point of the solvent being recovered by a heating jacket that surrounds the unit. The heat is provided by steam from an on-site boiler or hot oil produced by a heater. The solvents are vaporized; the distilled solvent vapors leave the evaporator and are transferred to a condenser. Vaporized water is separated from the distillate and pumped to storage. The draw water is transferred to Tank 901 (SWMU S-15); recovered solvent is transferred to stainless steel storage tanks. Solvent vapors are processed through a vacuum system (SWMU S-14).

Sludge residue from the evaporation process leaves the bottom of the unit and is placed in drums for further processing in the horizontal evaporator (SWMU S-13) or for off-site disposal as a hazardous waste fuel. The Luwa Thin Film Evaporator can process 300 to 900 gallons per hour of waste solvent for recycling (55).

The Luwa Thin Film Evaporator unit is currently active; it began operation in 1988. It processes primarily non-chlorinated liquid waste solvents (EPA waste numbers F003 and F005), although chlorinated liquid waste solvents may be processed occasionally (72).

The unit is located in the eastern corner of the site (Figure 9), just northeast of Tank 704 (SWMU S-1). It sits on a concrete platform which is surrounded by a 6-inch concrete curb. A blind sump within the curbed area captures any spills; this sump is pumped out daily or as necessary. Material from the sumps is pumped to Tank 901 (SWMU S-15) if contaminated or to the stormwater holding tank (SWMU S-21) if strictly rainwater. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since this unit appears to be in good condition and has adequate secondary containment, the potential for releases to soil, surface water, or ground water is low. The unit is fully enclosed and vapors are treated (SWMU S-14), therefore the potential for releases to air is low. Since the Luwa Thin Film Evaporator is above-ground and within secondary containment, the potential for subsurface gas generation is minimal.

5.4.4 SWMUs S-5 and S-6: Tanks 705 and 706, Recycled Solvent Tanks (Photo 100)

Information Summary

Tanks 705 and 706 are 5,200-gallon steel tanks located northwest of Tank 704 (SWMU S-1) (Figure 9). Recycled solvents from the Luwa evaporator (SWMU S-4) and from the horizontal evaporator (SWMU S-13) are placed in these tanks prior to transport off-site. In addition, water present in reclaimed solvent in these tanks is separated by settling. Prior to loading of reclaimed solvent into tank cars, water is pumped from the bottom of these tanks and placed in Tank 901 (SWMU S-15). Processed solvent is then shipped back to the generator or to a cement kiln for disposal as a hazardous waste fuel (72).

These units are currently active; they began operation in 1988 when facility construction was completed. Tanks 705 and 706 manage primarily non-chlorinated liquid solvents (EPA waste numbers F003 and F005) and water, although chlorinated liquid solvents (EPA waste numbers F001 and F002) may be handled occasionally.

The tanks are located in a concrete containment structure with approximately 3-foot concrete sides. The containment structure also contains several additional tanks and is approximately 30 feet by 40 feet in size. A blind sump is located within the containment; liquids in this sump are pumped out every day or as needed. Material from the sump is pumped to Tank 901 (SWMU S-15) if contaminated, or to the stormwater holding tank (SWMU S-21) if strictly rainwater. The tanks are not vented. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since these units appear to be in good condition and have adequate secondary containment, the potential for releases to soil, surface water, or ground water is low. The units are fully enclosed and are not vented, therefore the potential for releases to air is low. Since Tanks 705 and 706 are above-ground and within secondary containment, the potential for subsurface gas generation is minimal.

5.4.5 SWMUs S-7 and S-8: Tanks D-1 and D-2, Brighton Feed Tanks (Photos 86, 91, 92)

Information Summary

Tanks D-1 and D-2 are 500-gallon steel rectangular tanks used for blending of solvents to homogenize the feed stream prior to introduction to the Brighton Solvent Reclaiming System (SWMU S-9). Chlorinated waste solvents entering the Sol-Pro facility in tank trucks and/or drums are pumped into Tanks D-1 and D-2. From Tanks D-1 and D-2, the blended waste solvents are pumped to the Brighton system (SWMU S-9) (55).

These tanks are currently active but used only occasionally; they began operation in 1988. They manage primarily chlorinated liquid waste solvents (EPA waste numbers F001 and F002). The tanks are located within a 6-inch concrete curbed area that also contains the Brighton unit. Overflow pipes on each tank drain to 55-gallon drums (59). During a 1988 Ecology inspection, the overflow pipe for Tank D-2 was not directed into the drum (59). A blind sump within the curbed area captures any spills; this sump is pumped out daily or as necessary. Material from the sumps is pumped to Tank 901 (SWMU S-15) if contaminated, or to the stormwater holding tank (SWMU S-21) is strictly rainwater. The tanks are not vented. An Ecology inspection on January 27, 1990 noted that liquid from the containment structure around these tanks was being discharged to the storm drain immediately north of the containment area (96).

Conclusions

Since these units appear to be in good condition and have adequate secondary containment, the potential for releases to soil, surface water, or ground water is low. The potential for release to surface water is high due to the observed discharge of stormwater to the storm drain. The units are fully enclosed and not vented, therefore the potential for releases to air is low. Since the Tanks D-1 and D-2 are above-ground and within secondary containment, the potential for subsurface gas generation is minimal.

5.4.6 SWMU S-9: Brighton Solvent Reclaiming System (Photos 86, 88, 90, 91, 92)

Information Summary

From Tanks D-1 and D-2 (SWMUs S-7 and S-8), the liquid waste solvent is drawn by vacuum to the Brighton Solvent Reclaiming System. Vacuum is maintained at 3 to 9 inches Hg within the unit. Waste solvents are drawn into the evaporator until a level control valve closes. The unit is heated (120°F to 300°F) by means of a heating jacket surrounding the unit. The hot interior surface causes solvents to vaporize and suspended solids to adhere to the hot surface.

Solids are removed by a rotating scraper assembly; solids drop to the bottom of the evaporator and are removed through a cleanout door and placed in drums for later processing in the horizontal evaporator (SWMU S-13) or for disposal as a hazardous waste fuel. A float level control maintains a constant level in the evaporator by admitting as much solvent as is vaporized. Clean solvent vapors pass through a series of condenser tubes and solvent is then pumped to Tanks C-1 or C-2 (SWMUs S-10 and S-11) for storage/settling or to railcars for transport off-site. The Brighton unit can process approximately 40 to 100 gallons per hour of solvents (55).

The Brighton unit is currently active although used infrequently; it began operation in 1988. Wastes managed include primarily chlorinated liquid waste solvents, although non-chlorinated solvents may be processed through this unit as well. The unit is located on the same concrete pad as Tanks D-1 and D-2 (SWMUs S-7 and S-8). The pad has 6-inch concrete curbs. A blind sump within the curbed area captures any spills; this sump is pumped out daily or as necessary. Material from the sump is pumped to Tank 901 (SWMU S-15) if contaminated, or to the stormwater holding tank (SWMU S-21) if strictly rainwater. Although a 1988 Ecology inspection identified an accumulation of precipitation and "spilled substance" within the containment (59), there is no evidence that hazardous constituents have been released to the environment. No evidence of releases was observed during the VSI. A January 27, 1990 Ecology inspection noted that stormwater from the containment area around this unit was being discharged through a metal pipe to the storm drain directly north of the containment area (96).

Conclusions

Since this unit appears to be in good condition and has adequate secondary containment, the potential for releases to soil or ground water is low. The potential for releases to surface water is high based on the observed discharge of stormwater to the storm drain. Vapors are not treated through the vacuum system and are most likely vented to the atmosphere, therefore the potential for releases to air is high when the unit is in operation. Since the Brighton Solvent Reclaiming System is above-ground and within secondary containment, the potential for subsurface gas generation is minimal.

5.4.7 SWMUs S-10 and S-11: Tanks C-1 and C-2 (Photo 90)

Information Summary

Tanks C-1 and C-2 are 600-gallon steel tanks located near the Brighton still (SWMU S-9). Recycled solvents from the Brighton Solvent Reclaiming System are placed in these tanks prior to transport off-site. In addition, water is separated from the reclaimed solvent in these tanks by settling. Prior to loading of reclaimed solvent into tank cars, water is pumped from the bottom of these tanks and placed in Tank 901 (SWMU S-15). Clean solvent is then shipped back to the generator or to a licensed disposal facility for incineration.

These units are currently active although used infrequently; they began operation in 1988 when facility construction was completed. Tanks D-1 and D-2 manage primarily chlorinated liquid solvents (EPA waste numbers F001 and F002) and water, although non-chlorinated liquid solvents (EPA waste numbers F003 and F005) may be handled occasionally.

The tanks are located on a concrete pad with 6-inch concrete curbs. A blind sump is located within the containment; liquids in this sump are pumped out every day or as needed. Material from the sump is pumped to Tank 901 (SWMU S-15) if contaminated, or to the stormwater holding tank (SWMU S-21) if strictly rainwater. The tanks are not vented. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since these units appear to be in good condition and have adequate secondary containment, the potential for releases to soil, surface water, or ground water is low. The units are fully enclosed and are not vented, therefore the potential for releases to air is low. Since Tanks D-1 and D-2 are above-ground and within secondary containment, the potential for subsurface gas generation is minimal.

5.4.8 SWMU S-12: Pump Hopper (Photo 89)

Information Summary

The pump hopper is a stainless steel box, about 4 feet by 4 feet by 3 feet in size, which was used as a feed hopper for sludges to be processed through the horizontal evaporator (SWMU S-13). It is located northeast of the horizontal evaporator and north of the Luwa unit (SWMU S-4) (Figure 9). During the VSI, this unit was out of service for modifications. Beginning in January 1990, this unit will be used to grind and emulsify sludges to cement kiln specifications, thus allowing a larger proportion of solvent-contaminated sludges to be shipped off-site as a hazardous waste fuel rather than being processed on-site.

The pump hopper is currently inactive; it will be back in service as an emulsifier soon. The unit began operation in 1988. Wastes managed include chlorinated and non-chlorinated waste solvent sludges. The unit is located on the same concrete pad as the horizontal evaporator and Luwa units (SWMUs S-13 and S-4). The pad has 6-inch concrete curbs. A blind sump within the curbed area captures any spills; this sump is pumped out daily or as necessary. Material from the sump is pumped to Tank 901 (SWMU S-15) if contaminated, or to the stormwater holding tank (SWMU S-21) if strictly rainwater. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since this unit appears to be in good condition and has adequate secondary containment, the potential for releases to soil, surface water, or ground water is low. Since this unit is fully enclosed, the potential for releases to air is low. Since the pump hopper is above-ground and within secondary containment, the potential for subsurface gas generation is minimal.

5.4.9 SWMU S-13: Horizontal Evaporator (Photo 85)

Information Summary

The horizontal evaporator unit (also known as the "drier" unit) is used to treat sludges from off-site generators, wasted filter materials from the recycling of waste solvents in the Luwa or Brighton distillation units (SWMUs S-4 and S-9), and other waste solvents that cannot be processed through those units. Drums of sludges and other materials are emptied into the receiving bin of the horizontal evaporator. (Until recently, sludges were placed in the pump hopper prior to loading into the horizontal evaporator.) They fall by gravity into a screw-feeding mechanism which carries the materials into the body of the unit. Heat (in the form of steam from the boiler) is applied to the exterior of the evaporator. The temperature ranges from 300°F to 600°F according to the material type.

A vacuum is applied to the interior of the unit. The waste sludges are kept turbulent as they move through the body of the evaporator and vaporization of the solvents occurs. The solvent vapors then pass to a condenser. Draw water is separated from the distillate and both are pumped to storage. The draw water is pumped to Tank 901 (SWMU S-15). Solvent vapors are processed through a vacuum system (SWMU S-14). Dry granular solids are produced as a waste product during the operation of the horizontal evaporator (55). These solids are placed in plastic bags and stored at the generated waste storage area (SWMU S-16) prior to disposal in a Class I landfill. The horizontal evaporator can process about 400 to 1,400 gallons per day of waste solvent; it operates in batch mode (55).

The horizontal evaporator is currently active; it began operation in 1988. Waste managed are sludge-like solvent wastes, including still bottom sludges from the Luwa and Brighton distillation units (EPA Waste Nos. F001 through F005). This unit is located within the same containment area as the Luwa Thin Film Evaporator (SWMU S-4). A blind sump within the curbed area captures any spills; this sump is pumped out daily or as necessary. Material from the sump is pumped to Tank 901 (SWMU S-15) if contaminated, or to the stormwater holding tank (SWMU S-21) if strictly rainwater. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since this unit appears to be in good condition and has adequate secondary containment, the potential for releases to soil, surface water, or ground water is low. The unit is fully enclosed and vapors are treated (SWMU S-14), therefore the potential for releases to air is low. Since the horizontal evaporator is above-ground and within secondary containment, the potential for subsurface gas generation is minimal.

5.4.10 SWMU S-14: Vacuum System (No Photo)

Information Summary

A vacuum system is used to extract solvent from the Luwa Thin Film Evaporator (SWMU S-4) and horizontal evaporator (SWMU S-13) vapor streams. This unit is located outside behind the boiler room (Figure 9). The vacuum system consists of a vacuum pump, a fluid receiver, a carbon filter, and associated piping. The treated air stream is vented to the atmosphere. The effluent air is tested periodically; when breakthrough of solvent occurs, the carbon filter is replaced. This has occurred only once since the unit has been in operation; spent carbon was shipped off-site to a carbon recovery facility (71). Solvent-containing liquids condensed in the vacuum system are pumped to Tank 901 (SWMU S-15).

The vacuum system is currently active; it began operation in 1988. A Puget Sound Air Pollution Control Agency PSAPCA permit has been issued for this unit. Wastes managed are both chlorinated and non-chlorinated solvent-containing vapors (EPA Waste Nos. F001 through F005). A blind sump near the vacuum system captures any spills; this sump is pumped out daily or as necessary. Material from the sump is pumped to Tank 901 (SWMU S-15) if contaminated, or to the stormwater holding tank (SWMU S-21) if strictly rainwater. No other information on release controls was available. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since this unit appears to be in good condition and handles primarily vapors, the potential for releases to soil, surface water, or ground water is low. The vacuum system has an active PSAPCA permit; assuming it is operated properly, the potential for releases to air should be low. Since the unit is above-ground, the potential for subsurface gas generation is minimal.

5.4.11 SWMU S-15: Tank 901, Wastewater Holding Tank (Photos 81, 98, 99, 100)

Information Summary

Tank 901 is a 20,000-gallon steel tank used to store solvent-contaminated wastewaters, including draw water from the Luwa Thin Film Evaporator (SWMU S-4), Brighton Solvent Reclaiming System (SWMU S-9), and horizontal evaporator (SWMU S-13); solvent-contaminated sump water; water condensed in the vacuum system (SWMU S-14); tank truck, rail car, and processing tank rinseouts; and clean solvent which drips into catch buckets (71). Wastewaters in this tank are shipped off-site for use as a hazardous waste fuel (71). The tank is located southwest of Tank 704 (SWMU S-1) (Figure 9).

This tank is currently active; it began operation in 1988. Wastes managed include solvent-contaminated waters which are classified as EPA waste numbers F001 through F005.

Tank 901 is located in the eastern corner of the site in a concrete containment structure with approximately 3-foot concrete sides. The containment structure also contains several additional tanks, including Tank 704 (SWMU S-1) and is approximately 30 feet by 40 feet in size. A blind sump is located within the containment; liquids in this sump are pumped out every day or as needed. Material from the sumps is pumped back into Tank 901 if contaminated, or to the stormwater holding tank (SWMU S-21) if strictly rainwater. The tank is not vented. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since this unit appears to be in good condition and has adequate secondary containment, the potential for releases to soil, surface water, or ground water is low. The unit is fully enclosed and is not vented, therefore the potential for releases to air is low. Since Tank 901 is above-ground and within secondary containment, the potential for subsurface gas generation is minimal.

5.4.12 SWMU S-16: Generated Waste Storage Area (Photos 94, 95)

Information Summary

This unit consists of an area about 60 feet by 30 feet in size. Drums of hazardous waste generated on-site are situated on wooden pallets on a large plastic sheet; 2-inch berms separate incompatible wastes. Hazardous wastes are stored in this unit for less than 90 days. Dry granular wastes generated in the horizontal evaporator are placed in 1-cubic-yard nylon bags and stored in this unit prior to disposal in a Class I landfill. All drums and bags observed during the VSI appeared to be in good condition (71).

The unit is currently active; the date it began operation is unknown but appears to be quite recent as the plastic sheet was in very good condition. Wastes managed include dry granular solid waste material from the evaporative treatment of sludges, still bottoms, filter debris, used and soiled safety gear (e.g., Tyvek suits, gloves, etc.), and sludges from triple rinsing of drums prior to crushing. The plastic sheet serves as a release control for this unit. Small spills would be contained on the sheet; larger spills would likely flow onto the surrounding gravel and soil. The unit is uncovered.

There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

The containers of waste observed in this unit during the VSI appeared to be in good condition, and many of the wastes contained in this unit are sludges or solids. No evidence of releases has been documented, and the unit has secondary containment (although minimal), therefore the potential for releases to soil, ground water, and surface water from this unit is low. Since the containers are normally kept closed at all times, the potential for releases to air is also low. Since this unit is above-ground and has minimal secondary containment, the potential for subsurface gas generation is low.

5.4.13 SWMU S-17: Drum Rinsing Area (no photo)

Information Summary

Empty drums are triple-rinsed in this unit prior to being crushed (SWMU S-18). The unit consists of a concrete pad northwest of the boiler building (Figure 9); there is no berm around this unit. The unit is currently active; it has been in operation since 1988. Wastes managed include solvent-contaminated water. A blind sump is located within the concrete pad; liquids in this sump are pumped out every day or as needed. Material from the sumps is pumped into Tank 901 (SWMU S-15) if contaminated, or to the stormwater holding tank (SWMU S-21) if strictly rainwater. No additional information on release controls was available. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Most spills would probably be contained within the concrete pad and would drain to the sump, therefore the potential for releases to soil, surface water, and ground water is low. Minor releases of solvents to the air could occur during rinsing of drums, however the volume released would be quite low. For this reason, the potential for air releases is low. Since this unit is located above the ground surface and on a containment pad, the potential for subsurface gas generation is minimal.

5.4.14 SWMU S-18: Drum Crusher (Photo 93)

Information Summary

This unit is located northwest of the boiler building (Figure 9), and is used to crush empty drums after rinsing in the drum rinsing area (SWMU S-17). The drum crusher is constructed of steel and is about 3 feet by 3 feet by 5 feet in size. Crushed drums are placed in a dumpster next to this unit for disposal.

The unit is currently active; it has been in operation since 1988. Wastes managed include empty, rinsed drums. Although traces of solvents may remain inside the drums, it is unlikely that significant volumes of hazardous constituents are managed in this unit. The drum crusher is situated on a raised concrete pad. A blind sump is located near this unit. Liquids in the sump are pumped out every day or as needed. Material from the sumps is pumped into Tank 901 (SWMU S-15) if contaminated, or to the stormwater holding tank (SWMU S-21) if strictly rainwater. No additional information on release controls was available. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since this unit handles primarily solids (e.g., rinsed drums) and sits on a concrete pad, the potential for releases to soil, surface water, and ground water is low. Although solvent residues may be present in the drums, the volume of any air releases would be minimal. Therefore the potential for releases to air is low. Since this unit is located above the ground surface and on a containment pad, the potential for subsurface gas generation is minimal.

5.4.15 SWMU S-19: Rail Car Loading Rack (Photo 78)

Information Summary

This unit is located in the northeast corner of the facility (Figure 9). Wastes are shipped off-site from the facility in rail tank cars. The railcars are located over a containment area when they are loaded. The cars can be loaded through the loading rack or directly from a tanker truck; they are outfitted with fill pipes for top loading. A chemical hose is used to connect the plant piping on a steel platform 2 feet higher than the rail car platform to the railcar fill pipe. Each car is loaded to within 6 inches of the lid and then sealed with a bolt-down hatch and asbestos wirewoven gasket. A seal is placed on both top hatch and bottom valve.

This unit is currently active; it has been in operation since 1988. Wastes managed include solvent-contaminated sludges and liquids (EPA waste numbers F001 through F005).

The concrete containment area under the loading rack is 30 by 60 feet and 5 inches deep at its shallowest point of containment; it appears to be large enough to hold routine spillage during loading. Its volume is approximately 4,155 gallons. The containment area contains a blind sump; before beginning loading/unloading operations, facility personnel check for rainwater or other liquids and empty the sump. If contamination is present in the sump, the liquid is pumped to Tank 901 (SWMU S-15) for further processing and disposal (55).

There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since this unit appears to be in good condition and has adequate secondary containment, the potential for releases to soil, surface water, or ground water is low. If spills into the sump occur during loading (which is likely), there is a moderate potential for releases to air. Since this unit is above-ground and has adequate secondary containment, the potential for subsurface gas generation is minimal.

5.4.16 SWMU S-20: Incoming Waste Area (Photos 82, 83, 84)

Information Summary

Solvent wastes may enter the facility by truck. Drums of waste solvent are placed in this unit prior to being pumped to the distillation units. The incoming waste area is located in the main process area (Figure 9). It is paved, with a concrete curb on three sides; the paved area slopes toward the curbed end. During the VSI, approximately 30 drums were observed in this unit.

This unit is currently active; it has been in operation since 1988. Wastes managed include solvent-contaminated sludges and liquids (EPA waste numbers F001 through F005).

The paved area on which this unit sits has no sump. Spilled materials are probably pumped out as necessary; no other information on release controls was available. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since this unit appears to be in good condition and has adequate secondary containment, the potential for releases to soil, surface water, or ground water is low. Major spills could result in some air releases; however during normal operation the potential for releases to air is low. Since this unit is aboveground and has adequate secondary containment, the potential for subsurface gas generation is minimal.

5.4.17 SWMU S-21: Stormwater Holding Tank (No Photo)

Information Summary

This unit is a 20,000-gallon steel tank located near the boiler (Figure 9). It sits on a plywood platform on soil next to the cooling tower. Stormwater placed in this tank is generally uncontaminated. If contaminated with solvents, the tank contents are pumped to Tank 901 (SWMU S-15); if clean, the water is used as makeup to the boiler (72).

This unit is currently active; it has been in operation since 1988. Wastes managed include water contaminated with trace concentrations of chlorinated and non-chlorinated solvents (EPA waste numbers F001 through F005).

The ground surface under this tank is unpaved; a blind sump is located near it. Any spills would soak into the ground surface; larger spills would probably be captured in the sump. There is no documentation of releases from this unit, and no evidence of release was observed during the VSI (71).

Conclusions

Since this unit has no secondary containment, there is a moderate potential for releases to soil and ground water. Due to the distance to the nearest surface water, direct releases to surface water are considered unlikely. The tank is not vented and contains only very low concentrations of volatile hydrocarbons; the potential for releases of hazardous constituents to air is low. Since this unit is located above-ground, there is little potential for subsurface gas generation.

5.4.18 SWMU S-22: Storm Drainage System (No Photo)

Information Summary

The storm drainage system consists of a series of drains connected by underground piping (Figure 9). Yard runoff, steam overflow condensate, and other materials drain to this unit (71). An Ecology inspection on January 27, 1990 indicated that liquid from inside the containment area of the Brighton Still (SWMU S-9) (96). Stormwater flows from this unit to the Lincoln Avenue ditch (71) on the southeast side of the facility.

This unit is currently active; it has been in operation since 1988. Wastes managed include water contaminated with chlorinated and non-chlorinated solvents (EPA waste numbers F001 through F005).

The storm drainage system operates without secondary containment. There is no documentation of releases from this unit, and no evidence of releases was observed during the VSI (71).

Conclusions

The storm drainage system has no secondary containment, therefore any leakage from the underground piping would result in releases to soil and potentially to ground water. Since the facility is quite new, however, and since there is no evidence of leakage from the storm drainage system, the potential for releases to soil and ground water is low. Hazardous constituents in the stormwater are released directly to surface water via the Lincoln Avenue ditch. Therefore, the potential for releases to surface water is high. Since the unit is underground, there is low potential for air releases. Organic material is not a major component of the stormwater, and therefore the potential for subsurface gas generation is low.

6.0 CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER ACTION

A RCRA Facility Assessment, consisting of a file review and Visual Site Inspection, was conducted at four facilities in Tacoma, Washington. These four facilities included Chemical Processors, Inc., Chemical Processors, Inc. Parcel A, Northwest Processing, Inc., and Sol-Pro, Inc. A total of 166 solid waste management units (SWMUs) were identified and evaluated, including 71 SWMUs at Chempro, 25 SWMUs at Chempro Parcel A, 48 SWMUs at Northwest Processing, and 22 SWMUs at Sol-Pro. In addition, a comprehensive evaluation of soil and ground water contamination in the vicinity of the four facilities was conducted. This evaluation was designed to assist in the determination of the need for corrective actions associated with past and ongoing releases from Solid Waste Management Units at each facility.

A summary of conclusions regarding the release potentials from each of the SWMUs at each facility is shown in Tables 15, 16, 17, and 18 located in each of the following sections. SWMU-specific recommendations are listed in Section 6.1; overall recommendations based on available soil and ground water contamination information are listed in Section 6.2.

6.1 SWMU-SPECIFIC RECOMMENDATIONS

6.1.1 Chempro Proper

Based on the results of the evaluation performed at Chempro Proper (see Table 15), no further action is recommended for the following units at this time:

- SWMU C-30: Non-Process Sludge Storage Tank 701
- SWMU C-31: Non-Process Sludge Storage Tank 702
- SWMU C-40: Air Stripper
- SWMU C-41: Cement Mixer Stabilization Feed Tank
- SWMU C-42: Cement Mixer Stabilization Unit
- SWMU C-43: Stabilization Unit Receiving Tank
- SWMU C-44: Oberlin Filter Press
- SWMU C-45: Filtrate Collection Tank
- SWMU C-46: North Acid Area Loading/Unloading Pad
- SWMU C-47: West Process Area Loading/Unloading Pad
- SWMU C-48: NE Alkaline Area Loading/Unloading Pad
- SWMU C-49: SE Dangerous Waste Fuel Area Loading/Unloading Pad
- SWMU C-51: Laboratory Drain Collection Tank
- SWMU C-56: Stormwater Storage Tank S

Table 15

SUMMARY OF ONGOING RELEASE POTENTIALS FOR SWMUS AT CHEMPRO PROPER

SWMU No.	Description	Soil	Ground Water	Surface Water	Air	Subsurface Gas
C-1	Treatment Tank 51	L	L	L	H	L
C-2	Treatment Tank 52	L	L	L	H	L
C-3	Treatment Tank 53	L	L	L	H	L
C-4	Treatment Tank 54	L	L	L	H	L
C-5	Treatment Tank 55	L	L	L	H	L
C-6	Acid Waste Storage Tank 101	L	L	L	H	L
C-7	Acid Waste Storage Tank 102	L	L	L	H	L
C-8	Acid Waste Storage Tank 103	L	L	L	H	L
C-9	Acid Waste Storage Tank 104	L	L	L	H	L
C-10	Acid Waste Storage Tank 105	L	L	L	H	L
C-11	Acid Waste Storage Tank 106	L	L	L	H	L
C-12	Chemical Milling Waste Storage Tank 201	L	L	L	M	L
C-13	Chemical Milling Waste Storage Tank 202	L	L	L	M	L
C-14	Chemical Milling Waste Storage Tank 203	L	L	L	M	L
C-15	Sludge Settling Tank 301	L	L	L	M	L
C-16	Sludge Settling Tank 302	L	L	L	M	L
C-17	Sludge Settling Tank 303	L	L	L	M	L
C-18	Sludge Settling Tank 304	L	L	L	M	L
C-19	Sludge Settling Tank 305	L	L	L	M	L
C-20	Sewer Discharge Tank 401	L	L	L	M	L
C-21	Sewer Discharge Tank 402	L	L	L	M	L
C-22	Sewer Discharge Tank 403	L	L	L	M	L
C-23	Sewer Discharge Tank 404	L	L	L	M	L
C-24	Isolation Tank 501	L	L	L	M	L
C-25	Isolation Tank 502	L	L	L	M	L
C-26	Alkaline Waste Storage Tank 601	L	L	L	M	L

Table 15 (Continued)

SWMU No.	Description	Soil	Ground Water	Surface Water	Air	Subsurface Gas
C-27	Alkaline Waste Storage Tank 602	L	L	L	M	L
C-28	Alkaline Waste Storage Tank 603	L	L	L	M	L
C-29	Alkaline Waste Storage Tank 604	L	L	L	M	L
C-30	Non-Process Sludge Storage Tank 701	L	L	L	L	L
C-31	Non-Process Sludge Storage Tank 702	L	L	L	L	L
C-32	Dangerous Waste Fuel Storage Tank 801	L	L	L	H	L
C-33	Dangerous Waste Fuel Storage Tank 802	L	L	L	H	L
C-34	Dangerous Waste Fuel Storage Tank 803	L	L	L	H	L
C-35	Dangerous Waste Fuel Storage Tank 804	L	L	L	H	L
C-36	Dangerous Waste Fuel Storage Tank 805	L	L	L	H	L
C-37	Dangerous Waste Fuel Storage Tank 901	L	L	L	H	L
C-38	Dangerous Waste Fuel Storage Tank 902	L	L	L	H	L
C-39	Dangerous Waste Fuel Storage Tank 903	L	L	L	H	L
C-40	Air Stripper	L	L	L	H	L
C-41	Cement Mixer Stablization Feed Tank	L	L	L	L	L
C-42	Cement Mixer Stabilization Unit	L	L	L	L	L
C-43	Stabilization Unit Receiving Tank	L	L	L	L	L
C-44	Oberlin Filter Press	L	L	L	L	L
C-45	Filtrate Collection Tank	L	L	L	L	L
C-46	North Acid Area Loading/Unloading Pad	L	L	L	L	L
C-47	West Process Area Loading/Unloading Pad	L	L	L	L	L
C-48	NE Alkaline Area Loading/Unloading Pad	L	L	L	L	L
C-49	SE Dangerous Waste Fuel Area Loading/ Unloading Pad	L	L	L	L	L
C-50	Container Storage Pad	M	L	L	L	L
C-51	Laboratory Drain Collection Tank	L	L	L	L	L

Table 15 (Continued)

SWMU No.	Description	Soil	Ground Water	Surface Water	Air	Subsurface Gas
C-52	Resource Recovery Parking Lot	M	L	L	L	L
C-53	Freeway Container, Inc. Solvent Storage Shed	M	L	L	M	L
C-54	Freeway Container, Inc. Waste Paint Shed	M	L	L	M	L
C-55	Piles of Excavated Soil in NW Corner of Freeway Container, Inc.	U	U	U	U	U
C-56	Stormwater Storage Tank S	L	L	L	L	L
C-57	Treatment Storage Tank A	H	H	L	L/M	L
C-58	Treatment Storage Tank B	H	H	L	L/M	L
C-59	Treatment, Storage, and Isolation Tank C	H	H	L	L/M	L
C-60	Treatment, Storage, and Isolation Tank D	H	H	L	L/M	L
C-61	Treatment, Storage, and Isolation Tank E	H	H	L	L/M	L
C-62	Treatment, Storage, and Isolation Tank F	H	H	L	L/M	L
C-63	Treatment and Storage Tank BB	H	H	L	L/M	L
C-64	Filtrate Collection Tank	H	H	L	L/M	L
C-65	Soil Solidification/Stabilization Tank	H	H	L	L/M	L
C-66	Solidification/Stabilization Unit Sump	H	H	L	L/M	L
C-67	Sump Between Tanks A and B	H	H	L	L/M	L
C-68	Filter Press Sump	H	H	L	L/M	L
C-69	Solidification/Stabilization Area	L	L	L	M	L
C-70	Areas of Auto Fluff and Lime Fill	H	H	L	L	M
C-71	Storm Drainage System	L	L	L/M	L	L

L = Low H = High
M = Medium U = Unknown

Suggested actions for the remaining SWMUs at Chempro are listed below:

SWMUs C-1 THROUGH C-29, SWMU C-32 THROUGH C-39

Suggested Action: These SWMUs are tanks that vent directly to the atmosphere. Emission sampling for VOCs should be performed on all tanks. In addition, the 50-series tanks and 100-series tanks should be sampled for emissions of acid vapors, and the 100-series tanks should be sampled for emission of nitrogen dioxide, or the facility should be required to place release controls on these units.

SWMU C-50: CONTAINER STORAGE PAD

Suggested Action: In order to provide containment for loading and unloading operations occurring on the west side of the container storage pad, a berm or loading/unloading pad should be installed.

SWMU C-52: RESOURCE RECOVERY PARKING LOT

Suggested Action: A containment system (such as a bermed pad) should be installed at this facility, or the facility should consider modifying operating procedures so that all loaded or partially loaded trucks are required to park on the loading/unloading pads adjacent to the containment pad at Chempro Proper.

SWMUs C-53 AND C-54: FREEWAY CONTAINER, INC. SOLVENT AND WASTE PAINT STORAGE SHEDS

Suggested Action: Storage and management practices should be upgraded, such as providing lids for all containers, scheduling regular collection of waste materials, and providing ground cover beneath solvent dispensing area.

SWMU C-55: PILES OF EXCAVATED SOIL IN NW CORNER OF FREEWAY CONTAINER, INC.

Suggested Action: Sampling should be conducted to determine contents of the piles. Should sampling detect the presence of hazardous constituents, the material should be removed and appropriately disposed. Potential soil and ground water contamination should be determined as a part of the overall soil/ground water characterization recommended in Section 6.2.

SWMUs C-57 TO C-68: INACTIVE UNITS IN THE LETTER TANK AREA OF CHEMPRO PROPER

Suggested Action: These tanks are being closed under interim status. Soil and ground water contamination which may be present at these units should be tied into the recommendations for addressing existing soil and ground water contamination, presented in Sections 6.2.1 and 6.2.2.

SWMU C-69: PARCEL B SOLIDIFICATION/STABILIZATION UNIT

Suggested Action: A cover for this unit should be provided to contain airborne particulate emissions.

SWMU C-70: AREAS OF AUTO FLUFF AND LIME FILL

Suggested Action: On a property-wide basis, additional site characterization efforts should be conducted, as necessary, to determine the nature and extent of contamination present. See recommendations in Section 6.2.1 and 6.2.2.

SWMU C-71: STORM DRAINAGE SYSTEM

Suggested Action: Conduct sampling of stormwater in ditches paralleling Alexander Avenue and Taylor Avenue to determine if hazardous constituents are being released to surface water (the Lincoln Avenue ditch). Samples should be analyzed, at a minimum, for volatile organics and metals (As, Ba, Cd, Cr, Pb, Hg, and Se). If significant concentrations of hazardous constituents are detected, additional release controls should be required, along with any corrective measures needed to address surface water and sediment contamination.

6.1.2 Chempro Parcel A

SWMUS NOS. A-1 TO A-15

Suggested Action: Table 16 provides a summary of SWMU release potentials from this facility. Due to the overlapping of SWMUs and their potential release impact on receptors, SWMU specific recommendations for Parcel A will not be made. On a property-wide basis additional site characterization efforts should be conducted, as necessary, to determine the nature and extent of contamination present. See recommendations in Section 6.2.1 and 6.2.2.

6.1.3 Northwest Processing

Based on the results of the evaluation performed at Northwest Processing (see Table 17), no further action under corrective action authorities is recommended for the following units at this time:

- SWMU N-15: Tank 15, Process Wastewater Holding Tank
- SWMU N-17: Decanter Centrifuge

Table 16

SUMMARY OF ONGOING RELEASE POTENTIALS FOR SWMUS
AT CHEMPRO PARCEL A

SWMU No.	Description	Soil	Ground Water	Surface Water	Air	Subsurface Gas
A-1	Alkaline Storage and Treatment Tank 6	H	H	M	L	L
A-2	Alkaline Storage and Treatment Tank 7	H	H	M	L	L
A-3	Paint Waste Storage Tank 8S	H	H	M	L	L
A-4	Acid Storage Tank 9N	H	H	M	L	L
A-5	Acid Storage Tank 9E	H	H	M	L	L
A-6	Acid Storage Tank 9W	H	H	M	L	L
A-7	Sludge Treatment and Storage Tank 10	H	H	M	L	L
A-8	Sludge Treatment and Storage Tank 11	H	H	M	L	L
A-9	Alkaline Storage and Treatment Tank 12	H	H	M	L	L
A-10	Acid/Alkaline Storage and Treatment Tank SS1	H	H	M	L	L
A-11	Acid/Alkaline Storage and Treatment Tank SS2	H	H	M	L	L
A-12	Acid/Alkaline Storage and Treatment Tank SS3	H	H	M	L	L
A-13	Former Waste Oil Pond	H	H	M	L	M
A-14	Tank NT1	H	H	M	L	L
A-15	Tank NT2	H	H	M	L	L
A-16	Tank NT3	H	H	M	L	L
A-17	Tank NT4	H	H	M	L	L
A-18	Tank NT5	H	H	M	L	L
A-19	Poly 1	H	H	M	L	L
A-20	Poly 2	H	H	M	L	L
A-21	Poly 3	H	H	M	L	L
A-22	Sumps	H	H	M	L	L
A-23	Rinse Pit	H	H	M	L	L
A-24	Acology/Aero/PSIP/Chempro Waste Oil Recycling Facility	H	H	M	L	L
A-25	Area of Auto Fluff and Lime Fill	H	H	M	L	M

L = Low
M = Medium
H = High

Table 17

SUMMARY OF ONGOING RELEASE POTENTIALS FOR SWMUS
AT NORTHWEST PROCESSING

SWMU No.	Description	Soil	Ground Water	Surface Water	Air	Subsurface Gas
N-1	Tank Farm 1, Tank 1	H	M	M	H	M
N-2	Tank Farm 1, Tank 2	H	M	M	H	M
N-3	Tank Farm 1, Tank 3	H	H	M	H	M
N-4	Tank Farm 1, Tank 4	H	M	M	H	M
N-5	Tank Farm 1, Tank 5	H	H	M	H	M
N-6	Tank Farm 2, Tank 6	L	L	L	H	L
N-7	Tank Farm 2, Tank 7	L	L	L	H	L
N-8	Tank Farm 2, Tank 8	L	L	L	H	L
N-9	Tank Farm 2, Tank 9	L	L	L	H	L
N-10	Tank Farm 2, Tank 10	L	L	L	H	L
N-11	Tank Farm 2, Tank 11	L	L	L	H	L
N-12	Tank Farm 2, Tank 12	L	L	L	H	L
N-13	Tank Farm 2, Tank 13	L	L	L	H	L
N-14	Tank Farm 2, Tank 14	L	L	L	H	L
N-15	Tank Farm 2, Tank 15	L	L	L	L	L
N-16	Tank 16, Centrifuge Feed Tank	L	L	L	H	L
N-17	Decanter Centrifuge	L	L	L	L	L
N-18	Disk Centrifuge	L	L	L	L	L
N-19	Waste Accumulation Area in the Centrifuge Room	L	L	L	L	L
N-20	Tank 17, Holding Tank	L	L	L	H	L
N-21	Fractionation System	L	L	L	L	L
N-22	Anti-Freeze Recycling System	L	L	L	L	L
N-23	Solvent Recovery Unit	L	L	L	L	L
N-24	Tank 26, Stormwater Accumulation Tank	L	L	L	L	L
N-25	Tank 27, Process Wastewater Holding Tank	L	L	L	M	L
N-26	Oily Water Sewer System	U	U	L	L	U
N-27	API Preseparator	L	L	L	L	L
N-28	Coalescing Separator	L	L	L	L	L

Table 17 (Continued)

SWMU No.	Description	Soil	Ground Water	Surface Water	Air	Subsurface Gas
N-29	Skim Tank	L	L	L	L	L
N-30	Biotower	L	L	L	L	L
N-31	Treated Wastewater Holding Tank	M	L	L	L	L
N-32	Sewer Discharge Tank	L	L	H	L	L
N-33	Generated Waste Storage Area	L	L	L	L	L
N-34	Auxiliary Waste Storage Area	H	M	L	L	M
N-35	Drum Rinsing Area	L	L	L	U	L
N-36	Tank 21, Boiler Feed Tank	L	L	L	M	L
N-37	Hot Oil Heater (Boiler)	L	L	L	L	L
N-38	Loading/Unloading Area #1	M	L	L	L	L
N-39	Loading/Unloading Area #2	M	L	L	L	L
N-40	Tire Pyrolysis Unit	L	L	L	L	L
N-41	Portable 500-gallon Tanks	L	L	L	M	L
N-42	Fill Areas	H	H	M	L	M
N-43	Former Drum Storage Area Near Western Boundary	U	U	U	U	U
N-44	Former Portable Tank Area #1	U	U	U	U	U
N-45	Former Portable Tank Area #2	H	U	L	L	U
N-46	Former Drum Storage Area Northeast of Main Warehouse	H	L	L	H	U
N-47	Former Drum Storage Building	U	U	L	U	U
N-48	Horizontal Tanks S of Tank Farm 2	M	M	L	U	L

- SWMU N-18: Disk Centrifuge
- SWMU N-19: Waste Accumulation Area in the Centrifuge Room
- SWMU N-21: Fractionation System
- SWMU N-22: Anti-Freeze Recycling System
- SWMU N-23: Solvent Recovery Unit
- SWMU N-24: Tank 26, Stormwater Accumulation Tank
- SWMU N-27: API Preseparator
- SWMU N-28: Coalescing Separator
- SWMU N-29: Skim Tank
- SWMU N-30: Biotower
- SWMU N-33: Generated Waste Storage Area
- SWMU N-37: Hot Oil Heater (Boiler)
- SWMU N-40: Tire Pyrolysis Unit

Suggested actions for the remaining SWMUs at Northwest Processing are as follows:

SWMUs N-1 TO N-5: TANK FARM 1, TANKS 1, 3, 4, AND 5, AND FORMER TANK 2

Suggested Action: Soil contamination has been documented as a result of releases from at least tanks 3 and 5. In addition, oil releases have been noted from the area of the dike in this tank farm. Soil and soil gas sampling should be conducted in the vicinity of all tanks in this tank farm, as part of the overall characterization of contamination in the area. In addition, sampling of the air emissions from these tanks should be conducted to determine the concentrations of hazardous constituents being release during tank venting. Air samples should be analyzed, at a minimum, for volatile organics. If the releases of hazardous constituents to the air are found to be significant, installation of release controls or modification of processes to eliminate releases should be required.

SWMUs N-6 TO N-14, N-16, N-20: TANK FARM 2, TANKS 6, THROUGH 14; TANKS 16 AND 17

Suggested Action: Sampling of the air emissions from these tanks should be conducted to determine the concentrations of hazardous constituents which may be released from these units. Air samples should be analyzed, at a minimum, for volatile organics. If the releases of hazardous constituents to the air are found to be significant, installation of release controls or modification of processes to eliminate releases should be required.

SWMU N-25: TANK 27, PROCESS WASTEWATER HOLDING TANK

Suggested Action: Sampling of air emissions from this tank should be conducted to determine the concentrations of hazardous constituents which may be released from this unit. Air samples should be analyzed, at a minimum, for volatile organics. If the releases of hazardous constituents to the air are found to be significant, installation of release controls or modification of processes to eliminate releases should be required.

SWMU N-26: OILY WATER SEWER SYSTEM

Suggested Action: The materials of construction of this unit should be determined. The current and historical operational status should be clarified, particularly with respect to how wastes are transferred through this sewer to SWMUs N-27 to N-32, the Oily Water Treatment System, and back to one or more of the holding tanks (15 and 27). Soil sampling should be conducted in the vicinity of the hose connections of the sewer system with the oily water treatment system, and depending on the materials and dates of construction, soil sampling should be conducted in the vicinity of the sewer lines to determine whether any releases have occurred.

SWMU N-31: TREATED WASTEWATER HOLDING TANK

Suggested Action: SOil sampling should be conducted around this unit as part of overall soil and ground water characterization, to determine whether past releases from this tank have occurred, and to determine the nature and extent of contamination (if any) around this unit. In addition, secondary containment should be provided.

SWMU N-32: SEWER DISCHARGE TANK

Suggested Action: Sampling of sediments should be conducted at the discharge point to the City of Tacoma storm drainage ditches to determine if hazardous constituents have been released to surface water (the Lincoln Avenue ditch). Samples should be analyzed, at a minimum, for volatile organics and metals (As, Ba, Cd, Cr, Pb, Hg, and Se). If significant concentrations of hazardous constituents are detected, additional release controls should be required, along with any corrective measures needed to address surface water and sediment contamination.

SWMU N-34: AUXILIARY WASTE STORAGE AREA

Suggested Action: Soil sampling should be conducted in the vicinity of this unit, as part of the overall soil and ground water characterization, to determine whether past releases from drums and other containers have occurred, and to determine the nature and extent of contamination resulting from spillage at this unit.

SWMU N-35: DRUM RINSING AREA

Suggested Action: Additional information should be supplied to indicate whether drum rinsing has occurred at any locations other than north of the Main Warehouse, in a paved area with a blind sump. In addition, a list of the types of materials which have been rinsed out of drums should be submitted to determine the potential for air releases from this unit.

SWMU N-36: TANK 21, BOILER FEED TANK

Suggested Action: Sampling of air emissions from this tank should be conducted to determine the concentrations of hazardous constituents which may be released from this unit. Air samples should be analyzed, at a minimum, for volatile organics. If the releases of hazardous constituents to the air are found to be significant, installation of release controls or modification of processes to eliminate releases should be required.

SWMUs N-38 AND N-39: LOADING/UNLOADING AREAS # 1 AND 2

Suggested Action: Oily material has been noted running off of one or more of the unloading areas at the facility. Soil sampling should be conducted in the vicinity of each of these areas to determine the nature and extent of contamination by petroleum hydrocarbons, other volatile organics and metals.

SWMU N-41: PORTABLE 500-GALLON TANKS

Suggested Action: Institutional controls should be put in place to ensure that these tanks are kept closed at all times except during filling.

SWMU N-42: FILL AREAS

Suggested Action: On a property-wide basis additional site characterization efforts should be conducted, as necessary, to determine the nature and extent of contamination present. See recommendations in Section 6.2.1 and 6.2.2.

SWMU N-43: FORMER DRUM STORAGE AREA NEAR WESTERN BOUNDARY

Suggested Action: On a property-wide basis additional site characterization efforts should be conducted, as necessary, to determine the nature and extent of contamination present. See recommendations in Section 6.2.1 and 6.2.2.

SWMUs N-44 AND N-45: FORMER PORTABLE TANK AREAS #1 AND #2

Suggested Action: Soil sampling should be conducted in the vicinity of these units, as part of the overall soil and ground water characterization, to determine whether past releases from drums and other containers have occurred, and to determine the nature and extent of contamination resulting from spillage at these units.

SWMU N-46: FORMER DRUM STORAGE AREA NORTHEAST OF MAIN WAREHOUSE

Suggested Action: Soil sampling should be conducted in the vicinity of this unit, as part of the overall soil and ground water characterization, to determine whether past releases from drums and other containers have occurred, and to determine the nature and extent of contamination resulting from spillage at this unit.

SWMU N-47: FORMER DRUM STORAGE BUILDING

Suggested Action: The facility should submit information regarding the dates the building was used as a waste storage area, the type of flooring present at the time it was used for waste storage, and whether any spills or leaks occurred during that time. Based on this information, soil sampling may be required to determine whether any contamination may have occurred.

SWMU N-48: HORIZONTAL TANKS SOUTH OF TANK FARM 2

Suggested Action: Soil sampling should be conducted in the vicinity of this unit, as part of the overall soil and ground water characterization, to determine whether past releases from drums and other containers have occurred, and to determine the nature and extent of contamination resulting from spillage at this unit.

6.1.4 Sol-Pro

Based on the results of the evaluation performed at Sol-Pro (see Table 18), no further action under corrective action authorities is recommended for the following units at this time:

- SWMU S-1: Tank 704, Luwa Feed Tank
- SWMU S-2: Tank 535, Dirty Wash Solvent Tank
- SWMU S-3: Tank 536, Dirty Wash Solvent Tank
- SWMU S-4: Luwa Thin Film Evaporator System
- SWMU S-5: Tank 705, Recycled Solvent Tank
- SWMU S-6: Tank 706, Recycled Solvent Tank
- SWMU S-7: Tank D-1, Brighton Feed Tank
- SWMU S-8: Tank D-2, Brighton Feed Tank
- SWMU S-10: Tank C-1, Recycled Solvent Tank
- SWMU S-11: Tank C-2, Recycled Solvent Tank
- SWMU S-12: Pump Hopper
- SWMU S-13: Horizontal Evaporator
- SWMU S-14: Vacuum System
- SWMU S-15: Tank 901, Wastewater Holding Tank
- SWMU S-16: Generated Waste Storage Area
- SWMU S-17: Drum Rinsing Area
- SWMU S-18: Drum Crusher
- SWMU S-20: Incoming Waste Area

Recommended actions for all other units are described below.

SWMU S-9: BRIGHTON SOLVENT RECLAIMING SYSTEM

Suggested Action: Sampling of air emissions from this unit should be conducted to determine the concentrations of hazardous constituents. Air samples should be analyzed, at a minimum, for volatile organics. If the releases of hazardous constituents to air are found to be significant, installation of release controls or modification of processes to eliminate releases should be required.

SWMU S-19: RAILCAR LOADING RACK

Suggested Action: Air sampling should be conducted at this unit during railcar loading operations to determine the concentrations of hazardous constituents. Air samples should be analyzed, at a minimum, for volatile organics. If the release of hazardous constituents to the air is found to be significant, installation of release controls or modification of processes to eliminate releases should be required.

Table 18

SUMMARY OF ONGOING RELEASE POTENTIALS FOR SWMUS
AT SOL-PRO

SWMU No.	Description	Soil	Ground Water	Surface Water	Air	Subsurface Gas
S-1	Tank 704, Luwa Feed Tank	L	L	L	L	L
S-2	Tank 535, Dirty Wash Solvent Tank	L	L	L	L	L
S-3	Tank 536, Dirty Wash Solvent Tank	L	L	L	L	L
S-4	Luwa Thin Film Evaporator System	L	L	L	L	L
S-5	Tank 705, Recycled Solvent Tank	L	L	L	L	L
S-6	Tank 706, Recycled Solvent Tank	L	L	L	L	L
S-7	Tank D-1, Brighton Feed Tank	L	L	H	L	L
S-8	Tank D-2, Brighton Feed Tank	L	L	H	L	L
S-9	Brighton Solvent Reclaiming System	L	L	H	H	L
S-10	Tank C-1, Recycled Solvent Tank	L	L	L	L	L
S-11	Tank C-2, Recycled Solvent Tank	L	L	L	L	L
S-12	Pump Hopper	L	L	L	L	L
S-13	Horizontal Evaporator	L	L	L	L	L
S-14	Vacuum System	L	L	L	L	L
S-15	Tank 901, Wastewater Holding Tank	L	L	L	L	L
S-16	Generated Waste Storage Area	L	L	L	L	L
S-17	Drum Rinsing Area	L	L	L	L	L
S-18	Drum Crusher	L	L	L	L	L
S-19	Rail Car Loading Rack	L	L	L	L	L
S-20	Incoming Waste Area	L	L	L	M	L
S-21	Stormwater Holding Tank	M	L	L	L	L
S-22	Storm Drainage System	L	M	H	L	L

SWMU S-21: STORMWATER HOLDING TANK

Suggested Action: Secondary containment and an appropriately engineered base should be provided for this tank.

SWMU S-22: STORM DRAINAGE SYSTEM

Suggested Action: Stormwater sampling should be conducted in the storm drainage system at the property boundary to determine if hazardous constituents are being released to surface water (the Lincoln Avenue ditch). Samples should be analyzed, at a minimum, for volatile organics and metals (As, Ba, Cd, Cr, Pb, Hg, and Se). If significant concentrations of hazardous constituents are detected, additional release controls should be required, along with any corrective measures needed to address surface water and sediment contamination.

6.2 GENERAL RECOMMENDATIONS

6.2.1 Soil Investigation Recommendations

At Chempro Parcel A, Chempro Proper, Northwest Processing, and at Sol-Pro, additional activities are needed to fully characterize the releases that have been detected in soils. Several types of investigative actions need to be carried out in order to determine the nature and extent of these releases, including:

- Performance of a soil gas survey to identify subsurface contamination patterns. Results of the soil gas survey should be used in conjunction with additional site data to determine the placement of soil borings and monitoring wells.

- Collection of soil samples at specified intervals from ground surface to the bottom of the uppermost aquifer to determine the vertical distribution of contamination, identify preferential migration pathways and delimit the volume of soil that may require corrective measures.

- Installation of additional soil borings to determine the lateral extent and interrelationship of contaminated areas at the facilities, including installation of soil borings at the Chempro, Northwest Processing, and Sol-Pro facilities at locations that may have been impacted by any releases that have occurred at these facilities.

- Identification of Appendix VIII hazardous constituents in the releases in addition to those compounds previously identified at the facilities

- Determination of the mobility of hazardous constituents in contaminated soil that may contribute to ground water contamination (e.g.

determination of leachate compositions and adsorption coefficients of contaminated soils and fill materials).

6.2.2 Recommendations for Ground Water Investigations

The following recommendations are proposed to determine the nature and extent of ground water contamination at the Chempro Proper, Chempro Parcel A, Northwest Processing, and Sol-Pro facilities:

- Continue quarterly ground water sampling of wells CTMW-6, CTMW-7, CTMW-8, CTMW-9, CTMW-10, CTMW-11, and CTMW-12. Start quarterly sampling of wells CTMW-2, CTMW-3, CTMW-4, CTMW-5, wells A-1, A-2, A-3, L-1, L-2, L-3, L-4, L-5, and wells 1, 2, and 3 for VOCs, BNAs, metals, and petroleum hydrocarbons listed in Appendix C. All analytical procedures should be implemented with appropriate detection limits and QA/QC measures as per EPA SW-846.

- Quarterly water level measurements for all existing wells should be performed on the same day within one tidal cycle to assist in confirming ground water flow direction.

- Evaluate sample quality (turbidity) from wells and ensure proper development to assure representative samples are obtained from each monitoring well. Replace any wells that can not yield representative samples.

- Sample existing wells, and install and sample additional wells as needed to fully characterize ground water contamination at the facilities and affected areas.

- Characterize the relationship between ground water and surface discharges. Hydraulic connection between ground water and surface water must occur either at Blair Waterway or at other surface locations. If discharge areas are identified, sediment and surface water sampling should be conducted to delineate the surface contamination due to discharges of contaminated ground water.

- Install monitoring wells in the fill and alluvial aquifers and conduct pumping tests to determine hydraulic interconnections in areas of possible intercommunication based on site stratigraphy.

- Evaluate the construction integrity (materials, surface seals, screen length, etc.) of all wells to assure that representative samples can be obtained.

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