United States Environmental Protection Agency
Office of Emergency and Remedial Response
EPA/ROD/R10-91/030
September 1991

EPA

Superfund Record of Decision:

Yakima Plating, WA

50272-101

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15. Supplementary Notes

16. Abstract (Limit: 200 words)

The 0.94-acre Yakima Plating site is an inactive nickel-chrome automobile bumper replating facility in Yakima, Yakima County, Washington. The site lies within a mixed light commercial and residential area, and there are four schools within 1 mile of the site. Ground water from the shallow alluvium aquifer supplies much of the domestic and irrigation water in the Yakima Basin, and many residences adjacent to the site utilize private ground water wells for their water supply. Yakima Plating began operations in 1965 utilizing 20 to 30 above-ground holding tanks, which were stored within the plating building. These tanks were used during the electroplating operation cleaning, plating, and rinsing processes. Rinse water and spent plating tank solutions were disposed into a floor drain within the plating room. The floor drain was connected to an underground sedimentation tank and drain field line that collected the sedimentation tank overflow and distributed the wastewater to subsurface soil. The wastewater system operated from 1965 until plating operations ceased in 1990. Site assessments and investigations conducted by EPA contractors in 1984 and 1990 determined that the sludge and effluent from the settling tank were a dangerous waste under State regulations and that the potential exists for public exposure to

(See Attached Page)

17. Document Analysis a. Descriptors

Record of Decision - Yakima Plating, WA
First Remedial Action - Final
Contaminated Media: soil, debris, sludge
Key Contaminants: metals (arsenic, chromium, lead), other organics (pesticides)

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

18. Availability Statement	19. Security Class (This Report) None	21. No. of Pages 92
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(See ANSI-Z39.18) *See Instructions on Reverse* OPTIONAL FORM 272 (4-77) (Formerly NTIS-35) Department of Commerce

Abstract (Continued)

metals from contact with contaminated surface and subsurface soil. This Record of Decision (ROD) addresses remediation of contaminated onsite soil, debris, and sludge. The primary contaminants of concern affecting the soil, debris, and sludge are organics including pesticides; and metals including arsenic, chromium, copper, lead, and nickel.

The selected remedial action for this site includes removing 1,500 gallons of liquid and 6.5 cubic yards of sludge currently in tanks and containers, and treating and disposing of these materials at an offsite facility; excavating, treating, and disposing of contaminated soil at an offsite landfill; excavating and decontaminating underground tanks using a solvent or water-based solution; abandoning the tanks in place, and covering the tank areas with clean fill; treating and disposing of any liquids or sludges generated during the decontamination process at an offsite facility; and excavating and disposing of 540 cubic yards of soil and underground drain lines at an offsite facility; ground water monitoring; and implementing institutional controls including land and ground water use restrictions. The estimated present worth cost for this remedial action ranges from $310,000 to $377,000, depending on the type of solution used for debris decontamination. There are no O&M costs associated with this remedial action.

PERFORMANCE STANDARDS OR GOALS: Clean-up levels for soil and ground water are set at the more stringent of NCP and State standards. Chemical-specific soil remediation goals include arsenic 20 mg/kg, chromium 400 mg/kg, lead 50 mg/kg, and DDT 2.9 mg/kg.

RECORD OF DECISION

DECLARATION, DECISION SUMMARY,
AND RESPONSIVENESS SUMMARY

FOR

REMEDIAL ACTION
AT
YAKIMA PLATING
YAKIMA, WASHINGTON

SEPTEMBER 1991

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 SIXTH AVENUE
SEATTLE, WASHINGTON

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Yakima Plating
Superfund Site

SITE NAME AND LOCATION

Yakima Plating Facility
Yakima, Washington

STATEMENT OF PURPOSE

This decision document presents the remedial action selected by the U.S. Environmental Protection Agency (EPA) for the Yakima Plating Superfund Site in Yakima, Washington. The selected action was developed in accordance with the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP).

This decision is based on the Administrative Record for this site. The attached index identifies the items that comprise the Administrative Record upon which the selection of the remedial action is based.

The State of Washington concurs with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances at and from this site, if not addressed by implementing the response action selected in this Record of Decision (ROD), may present an imminent and substantial endangerment to public, health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The selected remedy for the Yakima Plating site addresses contaminant threats at the site by removing liquids and sludges, decontaminating tanks and pipes, and excavating and disposing of contaminated soils. The remedy is designed to significantly reduce exposure to the liquids/sludges and contaminated soils. The goal of the selected remedy is to remove liquids and sludges and remediate soils to levels that are protective of human health and the environment.

<u>The major components of the selected remedy include</u>:

- Liquids and sludges that are currently in tanks and containers would be removed and treated and disposed off-site at a permitted RCRA hazardous waste facility.

- Underground tanks (sedimentation and septic tanks) would be excavated and decontaminated using either a solvent or water wash solution. Upon decontamination the tanks would be abandoned in place. Liquids/sludges generated during the decontamination would be treated and disposed at an off-site hazardous waste facility. Underground pipes would be excavated and disposed of with contaminated site soils.

- Contaminated soils above cleanup levels would be excavated, treated, and disposed of at a Resource Conservation Recovery Act (RCRA) permitted hazardous waste landfill.

- Institutional controls would be implemented for potential groundwater contamination, worker safety, and building contaminants.

- A groundwater monitoring program would be implemented until contaminant levels in all wells allow for unlimited use and unrestricted exposure.

STATUTORY DETERMINATIONS

The selected remedy is protective of human health and the environment; complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action; and is cost-effective. This remedy utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable and satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element.

Signature sheet for the Yakima Plating Record of Decision by the U.S. Environmental Protection Agency.

Dana A. Rasmussen — 9-30-91

DANA A. RASMUSSEN
Regional Administrator, Region 10
U.S. Environmental Protection Agency

Date

DECISION SUMMARY

INTRODUCTION

The Yakima Plating site was nominated to the National Priorities List (NPL) in June 1988. The nomination was based on a Hazard Ranking System (HRS) score for the site resulting from a site assessment performed by EPA in 1986. The site was placed on the NPL in March 1989 (54 Federal Register 13296, March 31, 1989) under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. §9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 (CERCLA or Superfund).

Pursuant to Executive Order 12580 (Superfund Implementation) and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), the EPA performed a Remedial Investigation/Feasibility Study (RI/FS) for the Yakima Plating site. The Remedial Investigation (RI), completed August 1, 1991, characterized contamination in liquids/sludges, soils, and groundwater. The Baseline Risk Assessment, completed on August 1, 1991, evaluated potential effects of the contamination on human health and the environment. The Feasibility Study (FS), completed on August 1, 1991 evaluated alternatives for remediating contamination.

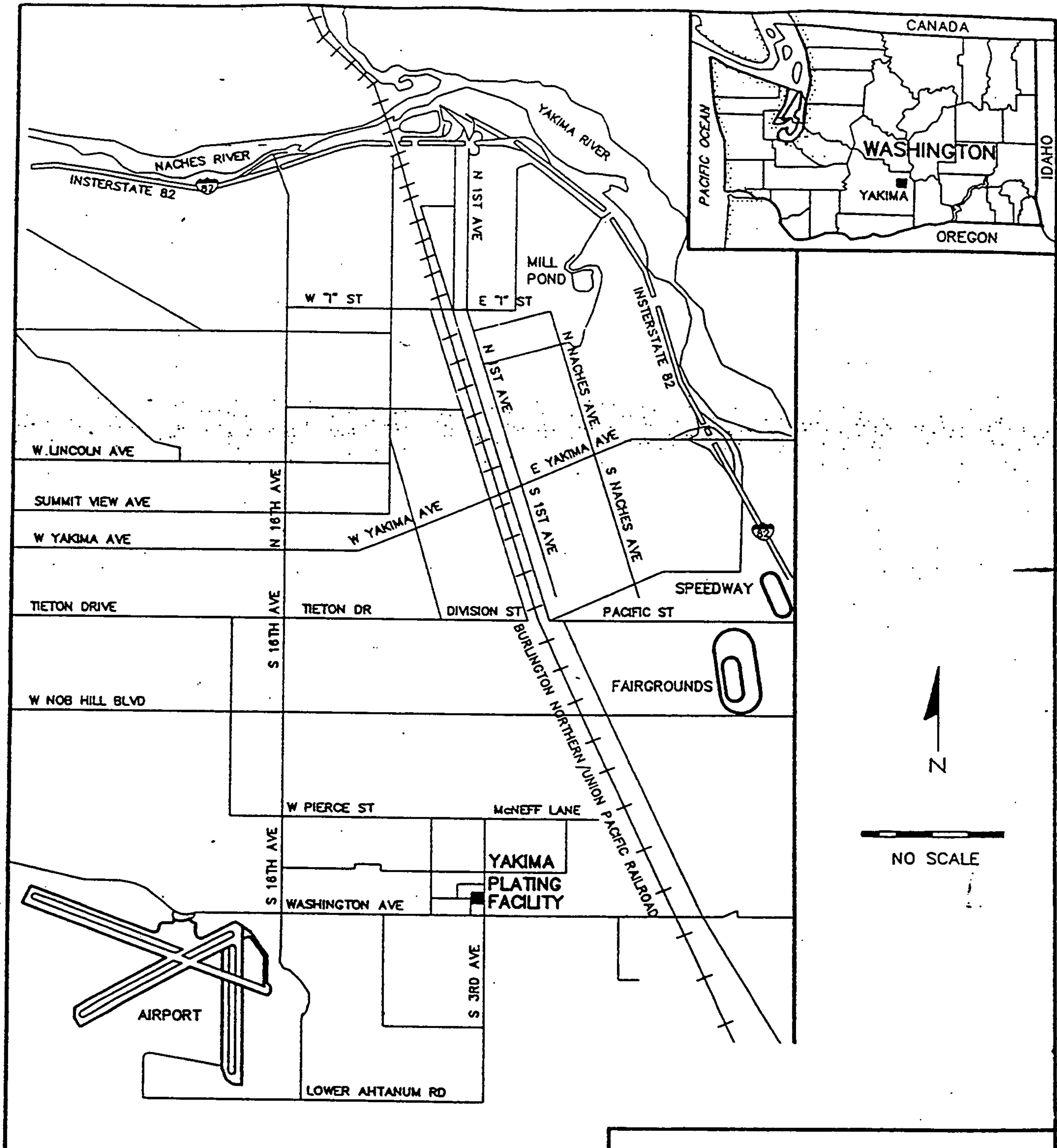
I. SITE DESCRIPTION

Name and Location

The Yakima Plating site is located at 1804 1\2 South Third Avenue in Yakima, Washington (see Figure 1). The Yakima Plating facility occupies the western 0.94 acres of a 2-acre parcel shared with a separate business, Autocraft Paint & Bodyworks Inc. The site is located approximately 3 miles northeast of the Yakima Municipal airport in central Yakima County, Washington. The Yakima plating facility operates from three buildings on the site.

Topography and Vegetation

A majority of the site, which encompasses the adjoining grounds around the Yakima Plating and Autocraft buildings and the vacant area north of these buildings, has been disturbed and little vegetation currently exists. Prior to development of the property for plating operations, the area was dominated by orchards. The vegetation existing currently consists of a few



LOCATION MAP

YAKIMA PLATING
YAKIMA, WA

Figure 1

specimens of big leaf maple, paper birch, red alder, and various grasses. The western portion of the site consists of native soils and is covered with automobile bumpers. The remaining portions of the site are covered with gravel or asphalt paving.

The site is relatively flat, with a gentle slope (approximate 0.6% grade) toward the southeast. The site is at an elevation of 1,030 feet above sea level. Surface runoff from the site flows toward Wide Hollow Creek, which is located approximately 0.8 miles south of the site. The property is outside the 500-year flood plain of Wide Hollow Creek. There are no wetlands on the site. The prevailing winds in Yakima are from the west to northwest.

Adjacent Land Uses

The Yakima Plating site is located two blocks south of the city limits of Yakima in a mixed light commercial and residential neighborhood. The businesses and residences which are adjacent to the site are located approximately 50 feet east and 200 feet southeast, respectively. There are four schools within one mile of the site. The closest of these is the Broadway Elementary School which is located approximately 1,000 feet west of the site. The population of Yakima County was 188,823 in 1990. Yakima is the main population center of the county with an estimated population of 54,827 in 1990.

Surface Water and Groundwater Resources

There are no surface water bodies on the site. Groundwater from the shallow Alluvium aquifer supplies much of the domestic and irrigation water in the Yakima Basin. In general, there is an upward movement of groundwater into the alluvium from underlying aquifers. The water table is generally 10-15 feet below the ground surface. The groundwater flows in a east northeast direction. The results from pump tests indicate that the site is underlain by an aquifer with almost instantaneous recovery. The water quality is usually considered satisfactory for most purposes.

The City of Yakima uses surface water as the primary water source for municipal supply. The intake for the supply is located approximately 4.6 miles north of the site on the Naches River. Yakima Plating lies within a block of land under county jurisdiction that has limited hook-up rights to the municipal utilities (water and sewer). Many of the residences adjacent to Yakima Plating use private groundwater wells for their water supply, which are at depths of 10 to 40 feet below ground surface. There are approximately 410 private wells and 54,200 residents within 1 mile of the site.

II. SITE HISTORY AND ENFORCEMENT ACTIVITIES

History of Site Activities

Yakima Plating, a nickel-chrome automobile bumper replating operation is co-owned by Jack Stanton and Michael Schliep and has been in operation since 1965. The property on which Yakima Plating is located is owned by Mr. Robert Mastell, who leases a section of the 3-acre parcel to Yakima Plating. Also on the 3-acre parcel is the Autocraft Paint and Bodyworks, which is owned and operated by Mr. Mastell. Prior to 1962, an orchard existed on the property.

Yakima Plating, when operating, utilized approximately 20 to 30 aboveground holding tanks, ranging in volume from 200 to 400 gallons, which were stored within the plating building. These tanks were used for cleaning, plating, and rinsing during the electroplating process. Rinse water and plating tank spent solutions commonly were disposed to a floor drain within the plating room. The floor drain connects to an underground sedimentation tank and drainfield line that collected the sedimentation tank overflow and distributed the wastewater to subsurface soils. This system was installed in the early 60's when operations first began at the site. This system operated up until 1990 when plating operations ceased. Sampling results indicate that the site septic tank may also be physically connected to the sedimentation tank.

History of Federal and State Site Investigations and Removal and Remedial Actions Conducted Under CERCLA or Other Authorities.

A Preliminary Assessment (PA) was completed at the Yakima Plating facility by the Washington Department of Ecology (Ecology) in 1984. The PA indicated that there was a fairly high potential that shallow groundwater was contaminated with some metals. As a result of this determination a site investigation was conducted in June 1986 by Ecology and Environment (E&E), an EPA contractor. The investigation included a file review; installation of four monitoring wells around the on-site drainfield; collection of composite soil samples during well drilling; collection of groundwater samples from the four new monitoring wells and five private residential wells located around the site; a determination of groundwater flow direction; and sampling of the influent and effluent from plating rinse water tanks. Findings of this investigation were presented in a report dated October 29, 1986 (Site Inspection Report for Yakima Plating Company, Inc.). As a result of this study, the Yakima Plating site was placed on the National Priority List (NPL) on June 21, 1988.

On May 7, 1990, E & E initiated field work for the Remedial Investigation/Feasibility Study (RI/FS) at the site. E & E completed two RI/FS field events. The first field event was conducted in June 1990 and consisted of a geophysical survey, a soil investigation program, and a groundwater investigation. The second field event occurred in December 1990 and included installation of additional monitoring wells, collection of additional background samples, trenching around the drainfield and tanks, and completion of seven additional soil borings.

On March 2, 1990, Ecology conducted a site investigation at Yakima Plating. The sludge and effluent from the settling tank both met the definition of a dangerous waste under Washington State Dangerous Waste Regulations. On June 25, 1990, Ecology issued an order to Yakima Plating under the authority of the State of Washington's Model Toxics Control Act. This order required Yakima Plating to stop all discharges to the drainfield, submit a schedule for cleanout of the settling tank, and contain and manage all dangerous waste on the site. Except for management and disposal of dangerous waste the facility complied with this order. On September 4, 1991, Ecology issued a letter to the operators of Yakima Plating requiring that a plan and schedule be submitted for removal of all sludges and waste plating solutions to a Dangerous Waste Management Facility.

The EPA completed a search of Potentially Responsible Parties (PRPs) on August 30, 1989. This document identified Yakima Plating and the site property owner as the only PRPs. On December 14, 1990, Special Notice Letters pursuant to Section 104 of CERCLA were issued to the property owner and corporate officers of Yakima Plating. To date none of the PRP's have indicated a willingness to participate or contribute to the RI/FS. In addition to the special notice, an information request pursuant to section 104(e) of CERCLA was issued to the property owner to determine his financial ability to contribute to the RI/FS or the remediation.

III. COMMUNITY RELATIONS HISTORY

CERCLA requirements, under Sections 113(k)((2)(B)(i-v) and 117, for public participation include releasing the Remedial Investigation and Feasibility Study Reports and the proposed plan to the public and providing a public comment period on the feasibility study and proposed plan. EPA met these requirements in August 1991 by placing both documents in the public information repositories for the site and mailing copies of the proposed plan to individuals on the mailing list. The public repository is located at the Yakima Valley Regional Library in Yakima, Washington. EPA published a notice of the release of the RI/FS and proposed plan in the Yakima Herald Republic on August 12 and September 1, 1991. Notice of the 30 day public comment period and the public meeting discussing the proposed plan were included in the newspaper notice. The public meeting was held on August 21, 1991, at the Cascade Natural Gas Building Meeting Room. The public comment period ended on September 11, 1991, with comments only from the property owner.

To date, the following community relations activities have been conducted by EPA at the Yakima Plating site:

March 1990	EPA distributed a fact sheet inviting citizens to an open house, to develop a Community Relations Plan.
May 1990	Community Relations Plan was published, which included interviews from members of the community and local officials.
May 1990	EPA released a fact sheet announcing the beginning of the RI/FS and the availability of the Community Relations Plan.
February 1991	EPA released a Yakima area fact sheet, which included all the sites in the Yakima area. The Yakima Plating section contained history of the site activities and provided an update on the RI/FS activities.
August 8, 1991	EPA mailed the proposed plan fact sheet, which explained the results of the RI/FS and EPA's preferred plan for public comment. The fact sheet announced a public meeting for August 21, 1991, and gave the dates of the public comment period.
August 12, 1991	A public notice in the Yakima Herald Republic described the availability of the proposed plan and the RI/FS, and announced the dates of the public meeting and public comment period.
August 13 - September 11, 1991	Public comment period for proposed plan and RI/FS.
August 21, 1991	EPA conducted a public meeting for interested community members.
September, 1991	Responsiveness Summary prepared.

IV. SCOPE AND ROLE OF THE RESPONSE ACTION WITHIN THE SITE STRATEGY

The primary threat at the Yakima Plating site is the potential for exposure to metals resulting from contact with contaminated surface soils. The site is located close to several residences, with several schools within one mile. This response action is designed to remove the threat to public health by significantly reducing the volume of the contaminated soil, and removing liquids/sludges which could serve as a continued source of contamination and exposure risk to humans.

In addition, this response action will reduce the potential for the contaminated soil to act as a source for groundwater contamination. Although low levels of metals above MCLs were detected in two groundwater monitoring wells at this site, these concentrations are believed to have been sampling induced. All other on-site and off-site wells tested were below health based levels. Therefore the current levels of metals in the groundwater at the site are not believed to pose a significant public health threat. Removal of on-site sources of soil contamination and containers of liquids and sludges, which could serve as continued sources if unaddressed, should reduce the levels of metals in groundwater further over time. Groundwater monitoring will be continued for several years after implementation of the remedy to confirm that contaminant levels are decreasing and that groundwater supplies remain safe for human consumption.

Currently there are no on-site residents. Levels of metal contaminants in all off-site domestic wells sampled and in the on-site domestic well do not currently exceed applicable federal or state health based levels. If the levels of metal contaminants exceed these health-based levels, as determined by the groundwater monitoring program, appropriate measures would be taken by EPA under a separate response action.

A limited number of soil samples were collected under the Yakima Plating building during the RI. The results indicate that some contamination may exist beneath this structure. However these contaminants do not appear to pose a health risk as long as the building acts as a cap, preventing infiltration of rainwater into soils. Future site use will be restricted, if the building is removed, until the nature and extent of these contaminants are better known.

V. SUMMARY OF SITE CHARACTERISTICS

The following discussion summarizes data from the sampling and analyses performed as part of the RI. The scope of the RI includes studies for all media that may be contaminated. Figure 2 identifies the general locations of samples for the site.

Geology and Soils

The Yakima Plating site area is underlain with approximately 5 to 6 feet of unconsolidated very fine sand and silt which is a moderately permeable soil. Beneath the soil is an unconsolidated alluvium layer of sands and gravels which extend to a minimum depth of 57 feet at monitoring well MW-5A (See figure 2). The gravels in this area ranges from pea-size to at least 12 inches in diameter with little evidence of restricted pore space. Beneath this layer is an 1,800-foot deep layer of semi-consolidated clay, silt, sand, and gravel. A basalt layer forms the bedrock for the region to depths in excess of 5,000 feet.

Hydrology

The available data indicate groundwater flow patterns in the Yakima Valley are complex. This complexity is due to the distribution of ancient stream sediments, the influence of irrigation canals, and flows from the upland ridges to the Yakima Valley. The aquifers in the vicinity of the site are located in the unconfined stream alluvium, the post-basalt sediments, and the interbeds and fracture zones of the Yakima Basalt. The shallowest of these aquifers is the unconfined alluvial sediments. Water-levels in the unconfined alluvium typically fluctuate on a seasonal basis within the range of 2 to 5 feet. Water levels are generally highest in May and June and lowest in November and December. These fluctuations are related to variations in stream stages, irrigation return flows, and precipitation. In general, there is an upward movement of groundwater into the alluvium from underlying aquifers because the water table is lower than the piezometric surface of deeper aquifers.

Contaminant Characteristics

Contaminants of concern at the Yakima Plating site were introduced in two distinct phases: through the legal application of pesticides (organo-chlorine pesticides and arsenic based pesticides) to surface soils prior to 1962 when the site operated as an orchard, and through the discharge of plating wastes to surface and subsurface soils during the operation of the Yakima Plating Company. The contaminants of concern for human health at the site are:

Organochlorine Pesticides: DDD (1,1-dichloro-2,2-di-(4-chlorophenyl)ethane), DDE (1,1-dichloro-2,2-bis(p-chlorophenyl)ethene), DDT 1,1,1-trichloro-2,2-bis(p-chlorophenyl)ethane, dieldrin, endosulfan sulfate, methoxychlor.

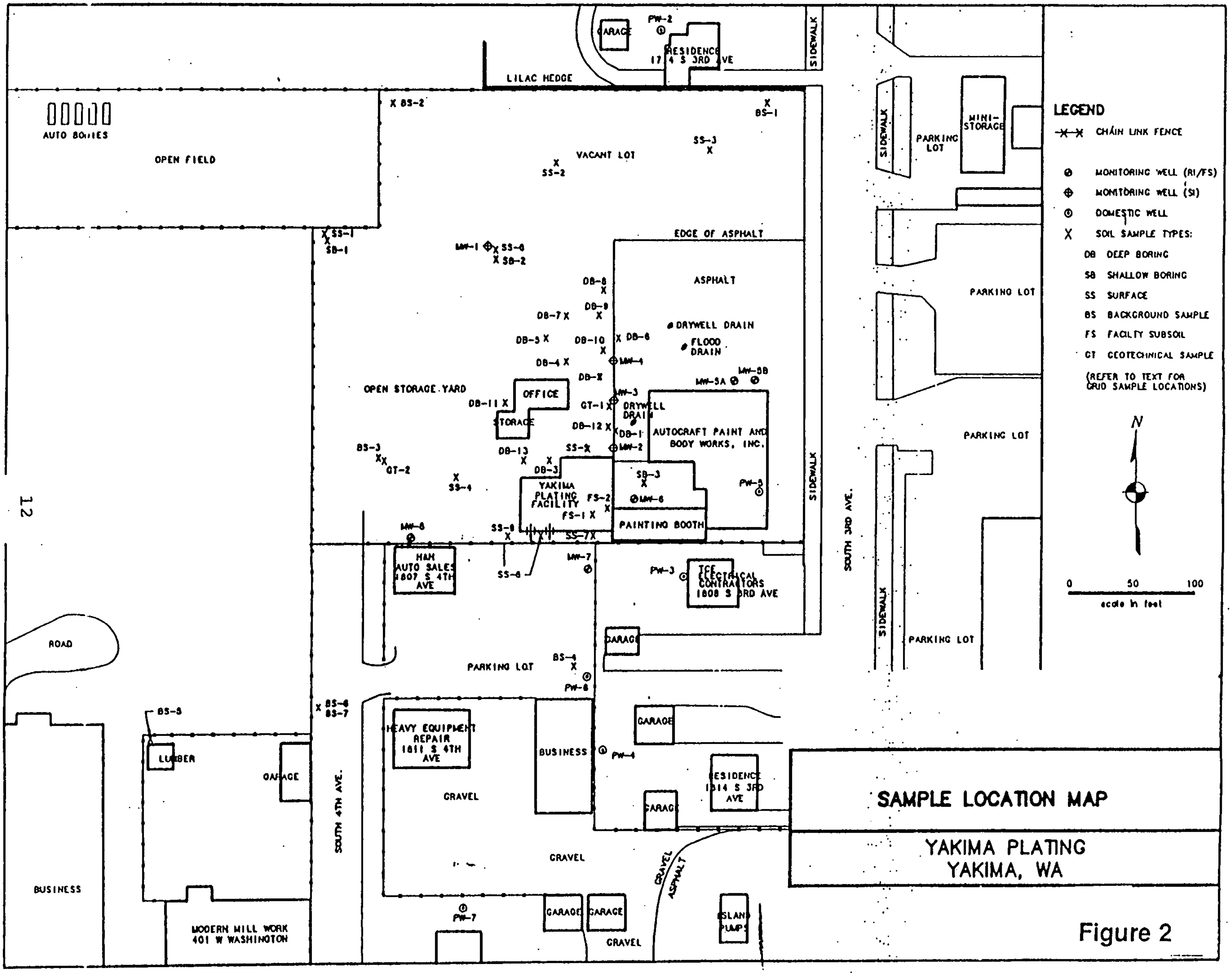

SAMPLE LOCATION MAP
YAKIMA PLATING
YAKIMA, WA
LEGEND
CHAIN LINK FENCE
MONITORING WELL (RI/FS)
MONITORING WELL (SI)
DOMESTIC WELL
SOIL SAMPLE TYPES:
DB DEEP BORING
SB SHALLOW BORING
SS SURFACE
BS BACKGROUND SAMPLE
FS FACILITY SUBSOIL
GT GEOTECHNICAL SAMPLE
(REFER TO TEXT FOR GRID SAMPLE LOCATIONS)
N
0 50 100
scale in feet
LILAC HEDGE
RESIDENCE
GARAGE
PW-2
SIDEWALK
OPEN FIELD
VACANT LOT
EDGE OF ASPHALT
ASPHALT
DRYWELL DRAIN
FLOOD DRAIN
OPEN STORAGE YARD
OFFICE
STORAGE
YAKIMA PLATING FACILITY
AUTOCRAFT PAINT AND BODY WORKS, INC.
PAINTING BOOTH
PARKING LOT
MINI-STORAGE
SOUTH 3RD AVE.
SOUTH 4TH AVE.
HAH AUTO SALES 1807 S 4TH AVE
TCE ELECTRICAL CONTRACTORS 1808 S 3RD AVE
HEAVY EQUIPMENT REPAIR 1811 S 4TH AVE
BUSINESS
LUMBER
ROAD
GRAVEL
GRAVEL ASPHALT
MODERN MILL WORK 401 W WASHINGTON
RESIDENCE 1814 S 3RD AVE
ISLAND PUMPS

Figure 2

Inorganics: antimony, arsenic, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, zinc, and cyanide.

Extent of Contamination

Containerized Wastes

In response to an Order issued by the Department of Ecology in 1990, the Yakima Plating facility operators containerized the wastes within the facility. These wastes included spent plating solutions, tank bottom sludges, crystalline materials from floors and other debris, and are summarized in Table 1. The operators also removed the contents of a subsurface sedimentation tank which was part of the waste system used during plating operations. The sample results from the sedimentation tank sludge are summarized in Table 2. Other containerized wastes include raw plating products and reusable plating solutions. The estimated volume of containerized plating-derived wastes is approximately 280 cubic feet (10 cubic yards).

All containerized wastes were sampled and analyzed for inorganic and organic analytes. Results indicate that the TCLP regulatory level was exceeded for total chromium in some of the containerized wastes and that some of the wastes contain relatively high levels of arsenic, barium, chromium, copper, vanadium, lead, nickel, zinc, and cyanide. Samples collected from the underground sedimentation tank showed relatively high levels of total chromium, copper, nickel, and cyanide. Similar constituents were detected in samples from the on-site septic tank.

Surface Soils

Prior to and during soil sampling areas both on and off-site were identified as "background locations". These locations were identified as areas that were not likely to have been affected by activities of Yakima Plating. These locations included areas on the north side of the site (a former orchard area) and off-site locations in the vicinity of Yakima Plating. These locations are identified as background samples (BS-) in Figure 2.

The levels of organic compounds detected in surface soil samples are provided in Table 3. Low levels of methylene chloride, di-n-butylphthalate, butyl benzylphthalate, acetone, benzoic acid, and toluene suggest possible laboratory contamination. The presence of 1,1,1-trichloroethane represents an isolated indication of a common degreasing solvent. No other samples contained the compound.

Table 1

INVENTORY OF CONTAINERIZED PLATING DERIVED WASTES
STORED AT YAKIMA PLATING
YAKIMA PLATING
Yakima, Washington
December 1990

No. of Containers	Estimated Total Volume (ft^3)	Composite Sample Descriptor	Container Label	Source(1)	TCLP(2) Analytical Results (µg/L) As	Ba	Cd	Cr	Pb	Hg	Se	Ag
6	45	FSPW-1	DQ, DR, DS, DT, DU, DV	1	10.0 J	320 U	310	400	59.0 UJ	0.4 J	910 J_4	80.0
1	5.4	FSPW-2	DM	2	28.7 J	790 J	40.0 U	264,000	47.1 UJ	0.5 J	10.0 UJ_4	80.0
1	5.4	FSPW-3	DJ	2	13.9 J	1,020 J	40.0 U	1,070	10.0 UJ_4	0.2 UJ	36.3J_4	80.0
4	12.6	FSPW-4	DH, DM, DK, DL	2	61.4 J	320 U	40.0 U	57,000	10.0 UJ_4	1.0 J	563 J_4	80.0
2	15	FSPW-5	DA, DB	3	10.0 UJ	320 U	120	90 J	79.2 UJ	0.5 J	490 J_4	80.0
		FSPW-6 (Duplicate of FSPW-5)			10.0 UJ_4	320 U	150	70.0 U	80.7 UJ	0.3 J	420 J_4	80.0
2	15	FSPW-7(3)	DO, DP	1								
3	22	---(4)	DD, DF, DG	2								
1	54	FSST-PTA1(3)	PT-A	4								
1	15	FS-PT1	PT-C	5	103 J_4	780	40.0 U	70.0 U	107 J	0.5 J	10.0 UJ_4	80.0
1	13	FS-PT2	PT-B	5	26.5	320 U	40.0 U	56,800	100	0.2 UJ_3	100 U	80.0
1	10	FS-PT3	PT-D	5	68.0	320 U	180	45,400	922	0.8 J_3	100 U	80.0

(1) Source Code:
1 Floor sweeping and Filtrate Wastes (Soil)
2 Plating Tank Bottom Sludges
3 Plating Solution Precipitate (Crystaline)or Raw Product
4 Sedimentation Tank Sludge from Plating Processes
5 Spent Plating Solution (Liquid)

(2) TCLP - Toxicity characteristic leaching procedure - underlined results exceed regulatory level (FR Vol. 55, No. 61, March 29, 1990).

(3) See text for inorganic results.

(4) Unable to open containers - material reportedly similar to FSPW-4.

Table 2

SEDIMENTATION (FSST-PTA1) TANK SLUDGE SAMPLE ANALYTICAL RESULTS
YAKIMA PLATING
Yakima, Washington
December 1990

Sample No. / Chemical Class	MJG 621 Inorganic (mg/kg)			JG 521 Volitile/Semivolatile (mg/kg)			JG 521 Pesticide/PCB (mg/kg)		011 AND 012 Chromium VI (mg/kg)	
Aluminum	4,550			Methylene Chloride	160		4,4'-DDE	20 J_3	0.13 U	0.12 U
Antimony	40.5	UJ_1		Acetone	4,000					
Arsenic	23.9	J_4		2-Butanone	400					
Barium	942			4-Methyl-2-Pentanone	410					
Beryllium	0.45	U		Toluene	540					
Cadmium	14.6			Ethylbenzene	110					
Calcium	12,100			Styrene	27	J				
Chromium	11,400			Xylene (Total)	640					
Cobalt	21.6	J		Phenol	9,300	J_3				
Copper	11,400	J_4		Bis(2-Ethylhexyl)phthalate	20,000.	J_3				
Iron	18,800									
Lead	3,040									
Magnesium	3,390									
Manganese	116									
Mercury	0.22	U								
Nickel	73,000	J_4								
Potassium	25,100									
Selenium	2.7	UJ								
Silver	8.5									
Sodium	180,000	J_4								
Thallium	1.3	U								
Vanadium	26.5									
Zinc	6,010									
Cyanide	9,470									

Note: Refer to Appendix F for a description of qualifers.

Site soils were analyzed for pesticides and PCBs. These results are summarized in Table 5. Detectable concentrations of the pesticides DDT/DDE/DDD and dieldrin were found in nearly all the surface soil samples taken from the former orchard area (north background locations), in some surface samples in other areas of the site, and in some samples taken from off-site areas not likely to have been impacted by contamination from Yakima Plating (off-site background locations). Chlordane, endosulfan sulfate, and methoxychlor were also found in several of these samples. These compounds were likely introduced through the legal application of lead-arsenate or other pesticide compounds to an orchard that existed on the site in the past, and are not related to plating activity at the site. No elevated metal concentrations or detectable pesticide concentrations were found in any of the subsurface soil samples collected from these areas.

Inorganic contamination related to plating activities is summarized in Table 4. Inorganics were primarily identified in the graveled areas adjacent to the plating facility and in an area south of the facility building near the facility's ventilation ducts. MTCA Method B soil cleanup levels (See Section IX) were exceeded in these areas for lead, chromium, copper, and nickel.

Lead and Arsenic were also identified in a number of locations including background areas. These locations exhibited a strong correlation with those areas that had been used as orchard areas in the past. A comparison between background soil results and orchard areas is presented in Figure 4. These chemicals were likely introduced through the legal application of lead-arsenate with other pesticides and therefore are not related to plating activity at the site.

The graveled area adjacent to the facility was separated into two areas based on inorganic results and plating activity (see figure 3). The north and west areas of the site (identified as area A), where minimal plating related activity occurred, had isolated locations that exceeded the MTCA Method B soil cleanup levels for nickel and lead. The volume of material that exceeds MTCA in the north area is estimated at approximately 1,750 cubic feet (65 cubic yards). The gravel area adjacent to the facility (Area B) exceeded MTCA cleanup levels for chromium, lead, nickel, and copper. The total volume of material in this area which exceeds MTCA is estimated at 2,900 cubic feet (107 cubic yards).

The location adjacent to the facility's ventilation ducts (See Figure 7) exceeded MTCA Method B soil cleanup levels for copper and nickel to an approximate depth of 2 feet below ground surface. The estimated volume of material in this area exceeding MTCA cleanup levels is approximately 1,300 cubic feet (48 cubic yards).

Table 4

SUMMARY OF CHEMICALS FOUND IN YAKIMA PLATING SITE SOILS – INORGANICS (mg/kg)

Chemical	95th Percentile Concentration, Western U.S. Soils	Background		Surface		Shallow Borings		Deep Borings		Trench Samples	
		Detection Frequency	Maximum Concentration	Detection Frequency	Maximum Concentration	Detection Frequency	Maximum Concentration	Detection Frequency	Maximum Concentration	Detection Frequency	Maximum Concentration
Aluminum	181,000	6/6	11,800	6/6	17,100 L	12/12	18,200 L	80/80	17,800 L	7/7	10,600
Antimony*	1.66	0/6	--	NA	--	2/12	8.0 LS	19/80	7.6 LS	1/7	13.2 LS
Arsenic*	16.9	6/6	37.3 S	25/36	32.7 S	12/12	21.7 S	80/80	29.3 S	7/7	26 S
Barium	1,415	6/6	147	6/6	181 L	12/12	189 L	80/80	225 L	7/7	595 L
Beryllium*	2.68	5/6	0.75	5/6	0.57	11/12	1.1 L	52/80	1.1 L	4/7	0.75
Cadmium*	NR	0/6	—	0/6	—	1/12	4.9 L	10/80	6.8 L	1/7	14.6
Calcium	112,700	6/6	12,900	6/6	7,680	12/12	19,100 L	80/80	21,500 L	7/7	23,900 L
Chromium (total)*	149	5/6	13.8	36/36	6,180 LS	12/12	131 L	80/80	1,560 LS	7/7	7,870 LS
Chromium (VI)*	NR	NA	--	3/15	7.04	0/3	—	1/6	1.16	0/4	—
Cobalt*	21.7	6/6	13	6/6	131 LS	12/12	402 LS	79/80	54.4 LS	7/7	91.6 LS
Copper*	69.5	6/6	91.2 S	36/36	10,300 LS	12/12	46,700 LS	77/80	1,380 LS	7/7	22,300 LS
Iron	63,000	6/6	26,400	6/6	56,500 L	12/12	261,000 LS	80/80	52,200 L	7/7	31,600 L
Lead*	44.7	6/6	701 S	35/36	7,580 LS	11/12	550 S	80/80	2,530 LS	7/7	1,430 LS
Magnesium	27,300	6/6	5,040	6/6	4,690	12/12	6,440 L	79/80	6,730 L	7/7	4,600
Manganese	1,170	6/6	677	6/6	876 L	12/12	921 L	79/80	1,150 L	7/7	608
Mercury*	0.185	2/6	0.46 S	0/6	—	3/12	0.34 S	24/80	2.2 LS	1/7	1.5 LS
Nickel*	50.8	6/6	253 S	36/36	37,400 LS	12/12	218,000 LS	73/80	2,880 LS	7/7	125,000 LS
Potassium	39,000	5/6	3,960	6/6	4,650 L	11/12	4,550 L	71/80	7,130 L	4/7	3,210
Selenium*	0.99	0/6	—	0/6	—	0/12	—	12/80	2.9 LS	4/7	10.1 LS
Silver	NR	6/6	13.5	0/6	—	6/12	77 L	27/80	8.7	6/7	9.0
Sodium	29,100	6/6	997	6/6	460	12/12	4,640 L	80/80	1,700 L	7/7	1,850 L
Thallium	17.5	0/6	—	0/6	—	0/12	—	3/80	0.32 L	0/7	—
Vanadium	210	6/6	66.7	6/6	90.8 L	11/12	114 L	80/80	111 L	7/7	129 L
Zinc*	143	6/6	85.6	36/36	1,630 LS	12/12	4,949 LS	80/80	1,120 LS	7/7	5,210 LS
Cyanide*	NR	NA	—	1/6	145 L	1/12	7.1 L	18/55	14.8 L	2/2	495 L

*Selected as a chemical of potential concern.

Key:

NR = Not reported.
NA = Not analyzed.
L = Exceeds local background.
S = Exceeds 95th percentile of Shacklette and Boerngen (1984) data for western U.S. soils.

Table 5

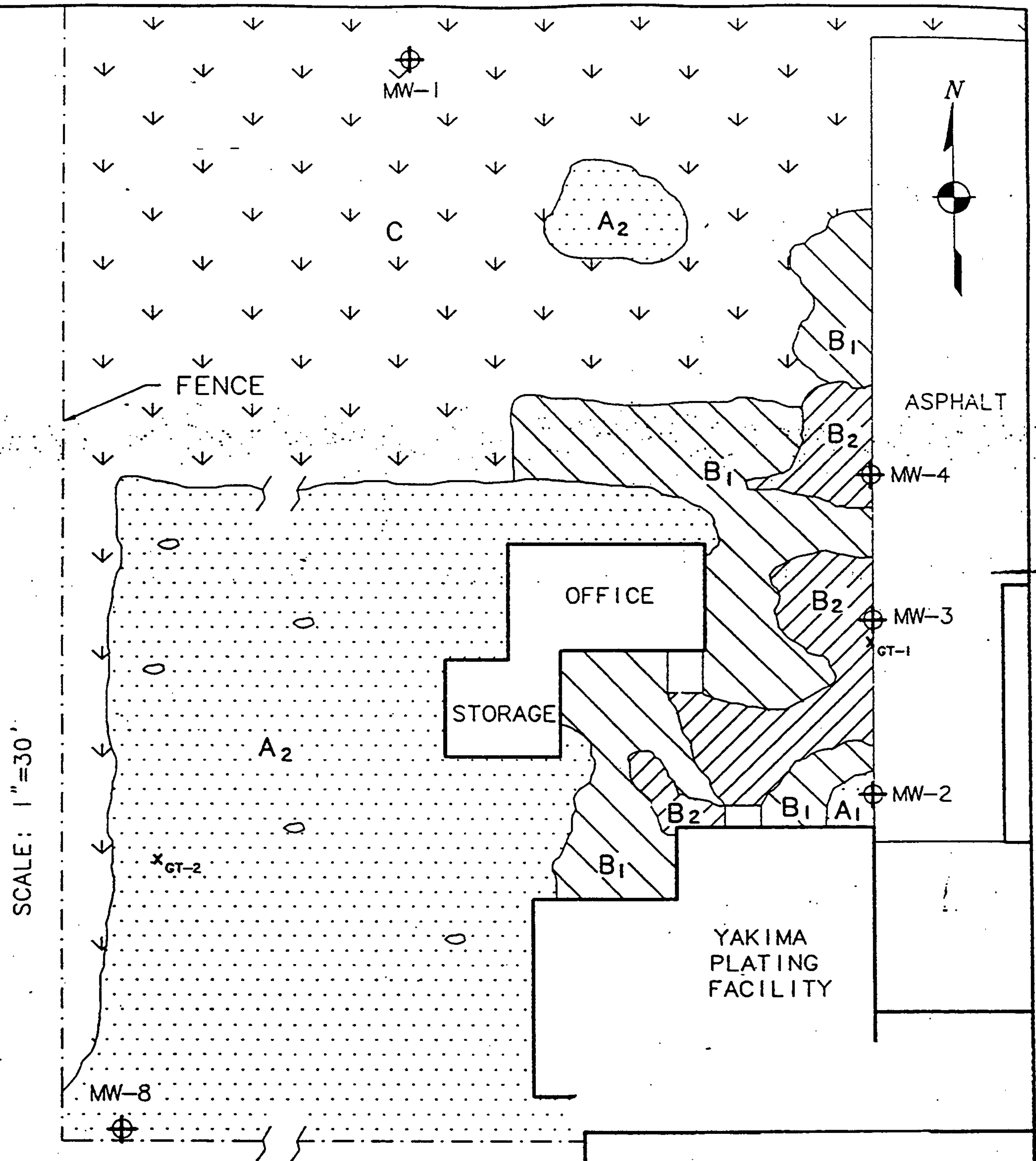
SUMMARY OF CHEMICALS FOUND IN YAKIMA PLATING SITE SOILS – PESTICIDES

Chemical	CRQL (µg/kg)	Background Soils: Detection Frequency	Background Soils: Maximum Concentration (µg/kg)	Surface Soils: Detection Frequency	Surface Soils: Maximum Concentration (µg/kg)	Shallow Borings (0 – 4 ft): Detection Frequency	Shallow Borings (0 – 4 ft): Maximum Concentration (µg/kg)	Deep Borings (0 – 13 ft): Detection Frequency	Deep Borings (0 – 13 ft): Maximum Concentration (µg/kg)	Cumulative Detection Frequency
Arochlor 1260	2.0	0/6	—	0/6	--	0/10	--	3/16	500	3/38
Alpha-chlordane	8.0	1/6	9.8	3/6	180	2/10	115	0/15	—	6/37
Gamma-chlordane	--	0/6	—	0/6	--	2/10	17	0/15	—	2/37
Chlordane	—	0/6	—	0/6	—	1/10	750	3/16	588	4/38
4,4'-DDD*	2.0	0/6	—	6/6	4,300	3/10	126	5/16	31	14/38
4,4'-DDE*	2.0	6/6	23,000	6/6	18,000	9/10	1,400	14/16	155	35/38
4,4'-DDT*	5.0	5/6	14,000	6/6	19,400	6/10	930	14/16	340	31/38
Dieldrin*	2.0	2/6	850	4/6	900	1/10	18	1/16	10	8/38
Endosulfan-I	—	0/6	—	2/6	101	0/10	—	0/16	—	2/38
Endosulfan-II	--	0/6	—	2/6	94	0/10	—	0/16	—	2/38
Endosulfan sulfate*	5.0	1/6	6.0	5/6	290	3/10	15	5/16	130	14/38
Endrin	2.0	0/6	—	2/6	102	0/10	—	0/16	—	2/38
Endrin aldehyde	5.0	0/6	—	1/6	54	0/10	—	1/13	12	2/35
Heptachlorepoxide	1.0	0/6	—	1/6	9.0	0/10	--	0/16	—	1/38
Methoxychlor*	16.0	0/6	—	4/6	180	2/10	11.5	3/15	33	9/37

*Selected as a chemical of potential concern.

Key:

CRQL = Contract required quantitation limit.



A_1 – SAND AND SILT WITH LITTLE GRAVEL
A_2 – SAND AND SILT WITH LITTLE GRAVEL ; ISOLATED SMALL AREAS OF OIL-STAINING (NOT DEPICTED ACCURATELY); 80% OF AREA COVERED WITH PALLETS AND BUMPERS
B_1 – GRAVEL WITH SOME SILT
B_2 – GRAVEL WITH SOME SILT; SLIGHTLY OIL-STAINED
C – SANDY SILT WITH VEGETATION; WELL DRAINED SOIL
X – SIEVE ANALYSIS SAMPLE LOCATION

SURFACE SOIL DISTRIBUTION

YAKIMA PLATING
YAKIMA, WA

Figure 3

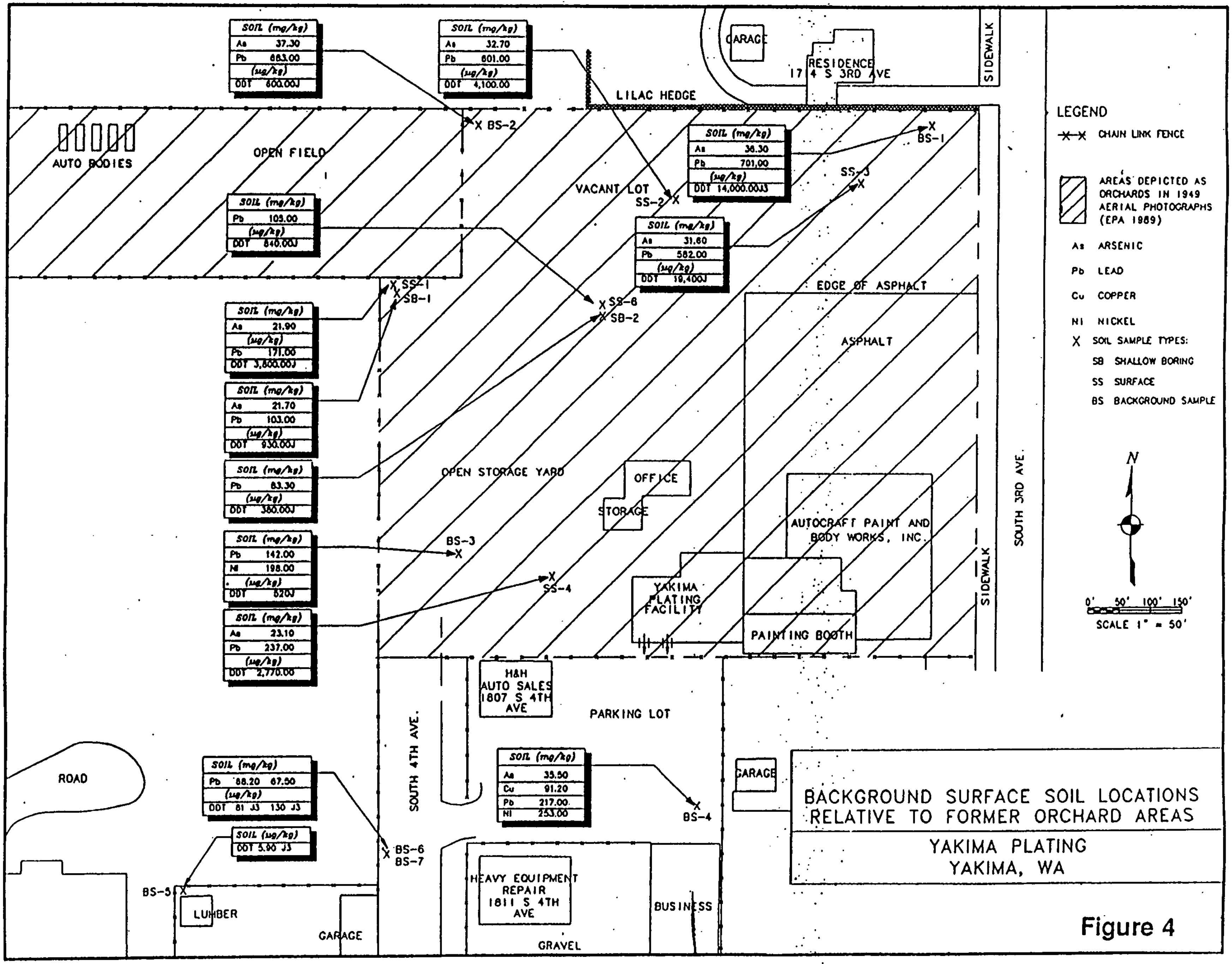

SOIL (mg/kg) As 37.30 Pb 683.00 (ug/kg) DDT 600.00J
SOIL (mg/kg) As 32.70 Pb 601.00 (ug/kg) DDT 4,100.00
GARAGE
RESIDENCE 1714 S 3RD AVE
SIDEWALK
LILAC HEDGE
X BS-2
AUTO BODIES
OPEN FIELD
VACANT LOT
SOIL (mg/kg) As 36.30 Pb 701.00 (ug/kg) DDT 14,000.00J3
X BS-1
SS-3
SS-2 X
SOIL (mg/kg) Pb 105.00 (ug/kg) DDT 840.00J
SOIL (mg/kg) As 31.60 Pb 582.00 (ug/kg) DDT 19,400J
SS-1
SB-1
EDGE OF ASPHALT
SS-6
SB-2
ASPHALT
SOIL (mg/kg) As 21.90 (ug/kg) Pb 171.00 DDT 3,600.00J
SOIL (mg/kg) As 21.70 Pb 103.00 (ug/kg) DDT 930.00J
SOIL (mg/kg) Pb 83.30 (ug/kg) DDT 380.00J
OPEN STORAGE YARD
OFFICE
STORAGE
AUTOCRAFT PAINT AND BODY WORKS, INC.
SOIL (mg/kg) Pb 142.00 Ni 198.00 (ug/kg) DDT 520J
BS-3
X SS-4
YAKIMA PLATING FACILITY
SOIL (mg/kg) As 23.10 Pb 237.00 (ug/kg) DDT 2,770.00
PAINTING BOOTH
SOUTH 3RD AVE.
SIDEWALK
LEGEND
CHAIN LINK FENCE
AREAS DEPICTED AS ORCHARDS IN 1949 AERIAL PHOTOGRAPHS (EPA 1989)
As ARSENIC
Pb LEAD
Cu COPPER
Ni NICKEL
X SOIL SAMPLE TYPES:
SB SHALLOW BORING
SS SURFACE
BS BACKGROUND SAMPLE
N
0' 50' 100' 150'
SCALE 1" = 50'
H&H AUTO SALES 1807 S 4TH AVE
PARKING LOT
SOUTH 4TH AVE.
ROAD
SOIL (mg/kg) Pb 88.20 67.50 (ug/kg) DDT 81 J3 130 J3
SOIL (ug/kg) DDT 5.90 J3
SOIL (mg/kg) As 35.50 Cu 91.20 Pb 217.00 Ni 253.00
BS-4
GARAGE
BS-6
BS-7
BS-5
LUMBER
GARAGE
HEAVY EQUIPMENT REPAIR 1811 S 4TH AVE
GRAVEL
BUSINESS
BACKGROUND SURFACE SOIL LOCATIONS RELATIVE TO FORMER ORCHARD AREAS
YAKIMA PLATING
YAKIMA, WA

Figure 4

Subsurface Soils

Inorganic contamination in subsurface soils was also related to drainfields and plating facility areas. The drainfield consists of a PVC perforated subsurface distribution line surrounded by approximately 8 inches of rounded gravels. Samples collected at soil locations along the drainfield line exhibited inorganic concentrations above MTCA Method B and the highest metal concentrations in subsurface soils at the site. All elevated concentrations appeared to be within the sand and gravel unit and within the interval of groundwater fluctuation. The total estimated volume of soil material associated with the drainfield line, gravels, and sludge material which exceeds cleanup levels is approximately 200 cubic feet (7.5 cubic yards).

Other subsurface soils that exhibited inorganic constituents above MTCA method B levels were identified at two locations: soil boring DB-1 and DB-3. These locations are identified as the monitoring well MW-2 area and the septic tank drain pit area. Soil samples collected from DB-1 exhibited concentrations of lead exceeding the MTCA cleanup levels (See Section IX) at least to a depth of 10 feet. Samples collected from an adjacent soil boring (DB-12) to a total depth of 30 feet below ground surface (bgs) did not exceed any cleanup levels. The estimated total volume of soils above cleanup levels in the vicinity of DB-1 is approximately 6,000 cubic feet (222 cubic yards). Samples collected from DB-3 in the septic drainpit area exceeded the MTCA cleanup levels for chromium (See Section IX) to a total depth of at least 9 feet below ground surface. Based on the observed configuration of the drain pit gravels in this area, the total volume of materials in this area exceeding cleanup goals is estimated to be approximately 2,025 cubic feet (75 cubic yards).

As part of the subsurface soil investigation two samples were collected beneath the Yakima Plating building. One core was located within a corroded area in the concrete floor (FS-1) and the other location was randomly selected within the plating room (FS-2) (These locations are shown in Figure 2). The results from FS-1 indicated that chromium and nickel exceeded the MTCA method B soil cleanup levels. Sample results from FS-2 were below any inorganic and organic MTCA soil cleanup levels.

The history of Yakima Plating indicates that the facility constructed the wastewater system (tank and drainfield) in the early 1960's when operations began. The RI has identified contaminants outside the building associated with this system as previously discussed. This system was in operation up until 1990 when plating operations stopped. Based on this history it appears to be unlikely that additional disposal occurred beneath the building. In addition the floor of the building was in good shape without obvious migration pathways, such as cracks and holes. Based on this information large amounts of contamination under the building are not expected to be found beneath the Yakima Plating building.

Semivolatile and volatile organic analysis indicated that there were very few organic compounds detected in the subsurface soils. Those detected were resin compounds or laboratory/decontamination compounds, such as acetone.

Soils Summary and Migration Pathways

The site soils consist primarily of silts and sands with a relatively low organic carbon content. Beneath the soil is an unconsolidated alluvium layer consisting of predominantly sand and gravel, estimated to be at least 57 feet thick.

The majority of the contamination remaining at the site is located in the surface and subsurface soils. Based on exceedance of MTCA Method B cleanup goals, an estimated 540 cubic yards of surface and subsurface soils must be remediated. This includes surface soils in the gravel area immediately north of the Yakima Plating building, surface soils along the south fence line, subsurface soils around the underground tanks and drainfields, and subsurface soils around monitoring well 2.

There are two main routes of contaminant migration from soils at the site; through the groundwater and the air. Infiltration of precipitation, and fluctuation of groundwater levels, may carry contaminants into the groundwater. Wind dispersion of contaminated soil particles is considered to be the primary route of migration through the air. Since the pesticides and metals detected at the site have relatively low vapor pressures, volatilization is not expected to be a significant pathway.

Groundwater

A summary of groundwater inorganic results is presented in Table 6 and 7. All of the off-site domestic wells sampled contained relatively low levels of inorganic and organic constituents; and no samples indicated that federal or state drinking water standards were ever exceeded. Organic compounds detected in domestic well samples consisted of very low levels of compounds ubiquitous to the environment, such as di-n-butylpthalate; potential laboratory contaminants such as methylene chloride; and industrial substances such as phenol.

With the exception of MW-2 and MW-7, all on-site monitoring wells also had relatively low levels of organics and inorganics and were below federal and state drinking water standards. Analytical results from MW-2 indicate that arsenic, nickel, chromium and lead were detected at elevated levels above MTCA

Table 6

SUMMARY OF CHEMICALS FOUND IN YAKIMA PLATING SITE GROUNDWATER – ORGANICS (µg/L)

Chemical	CRQL	SDWA MCL	Background Wells		Drinking Water Wells		Monitoring Wells	
			Detection Frequency	Maximum Concentration	Detection Frequency	Maximum Concentration	Detection Frequency	Maximum Concentration
bis(2-Ethylhexyl)-phthalate	10	4 P	0/1	—	0/5	—	1/4	2.0
Butylbenzylphthalate	10	100 P	0/1	—	0/5	—	1/4	14.0
Carbon disulfide	5	NE	0/1	—	1/5	2.0	1/4	1.0
Di-n-Butylphthalate	10	4 P	0/1	—	1/5	6.0	0/4	—
Di-n-Octylphthalate	10	4 P	0/1	—	3/5	4.0	0/4	—
Methylene chloride	5	5	0/1	—	1/5	4.0	0/4	—
Phenol	10	NE	1/1	2.0	3/5	3.0	0/4	—
Toluene	5	1,000 (40SP)	0/1	—	0/1	—	1/4	1.0
Trichloroethene	5	5	0/1	—	1/5	4.0	0/4	—
Vinyl acetate	10	NE	0/1	—	1/5	1.0	0/4	—

Key:

CRQL = Contract required quantitation limit.
NE = None established.
P = Promised value.
S = Secondary MCL based on aesthetic factors.
SDWA MCL = Safe Drinking Water Act Maximum Contaminant Level.

Table 7

SUMMARY OF CHEMICALS FOUND IN YAKIMA PLATING SITE GROUNDWATER – INORGANICS (mg/L)

Chemical	SDWA MCL	Background Wells: Detection Frequency	Background Wells: Maximum Concen-tration	Drinking Water Wells: Detection Frequency	Drinking Water Wells: Maximum Concen-tration	Monitoring Wells: Detection Frequency	Monitoring Wells: Maximum Concen-tration
Aluminum	0.05 -0.2 S	0/1	—	0/11	—	13/16	3.39 A*
Antimony	0.01 - 0.005 P	0/1	—	0/11	—	0/16	—
Arsenic	0.05	0/1	—	10/11	0.0043	14/16	0.0113
Barium	2.0	1/1	0.0191	0/11	—	13/16	0.0876
Beryllium	0.001	0/1	—	0/11	—	0/16	—
Cadmium	0.005	0/1	—	0/11	—	1/16	0.0025
Calcium	NE	1/1	20.7	11/11	46.6	16/16	45.2
Chromium (total)	0.1	0/1	—	3/11	0.0241	4/16	0.159 *
Chromium (VI)	NE	0/1	—	1/9	0.0082	1/7	0.0094
Cobalt	NE	0/1	—	0/11	—	0/16	—
Copper	1.3 - 1.05	1/1	0.0057	3/11	0.0108	11/16	0.179
Iron	0.3 S	0/1	—	0/11	—	12/16	17.25 A*
Lead	0.015	0/1	—	3/11	0.0017	6/16	0.161 A*
Magnesium	NE	1/1	9.790	11/11	14.3	16/16	13.9
Manganese	0.05 S	1/1	0.0022	6/11	0.0054	16/16	3.76 A*
Mercury	0.002	0/1	—	0/11	—	5/16	0.40 A*
Nickel	0.1 P	1/1	0.0051	1/11	0.0177	9/16	0.686 *
Potassium	NE	1/1	—	11/11	4.59	16/16	5.38
Selenium	0.01	0/1	—	0/11	—	2/16	0.0021
Silver	0.1 S	0/1	—	0/11	—	0/16	—
Sodium	NE	1/1	12.5	11/11	20.1	16/16	19.5
Thallium	0.002 - 0.09 P	0/1	—	0/11	—	0/16	—
Vanadium	NE	1/1	0.024	11/11	0.0134	16/16	0.0442
Zinc	5.0 S	1/1	0.063	6/11	1.530	5/16	0.143
Cyanide	0.2 P	0/1	—	0/6	—	0/7	—

*Concentration exceeds the MCL.

Key:

A = Markedly elevated levels of aluminum, iron, and manganese in monitoring well water samples are often indicative of suspended sediment in the samples, in which case the elevated metal concentrations are attributable, at least in large part, to soil minerals comprising the sediment rather than dissolved (mobile) concentrations.

NE = None established.

P = Proposed value, not yet finalized.

S = Secondary standard based on aesthetic factors.

SDWA MCL = Safe Drinking Water Act Maximum Contaminant Level.

method B groundwater levels. This contamination may be due to the insurgence of silt at the bottom of the well's sump during field sampling. Unfiltered samples collected from MW-2 exhibited significantly higher levels of chromium, lead, and nickel as compared with the filtered samples. In addition the screened interval and depth of this well are likely to have contributed to the collection of silt in the well sump. MW-7 had elevated levels of chromium, above state and federal standards, during one sampling round. This sample exhibited similar siltation problems as found at MW-2.

Arsenic was detected in several monitoring wells on-site including the background private well PW-2 and on-site background well MW-1. Both PW-2 and MW-1 are located within the former orchard areas and elevated arsenic concentration have been found in surface soils near these locations as previously discussed. The arsenic concentrations in the groundwater seem more likely to be related to the use of arsenic-containing pesticides in the orchard that formerly occupied the site than, to the recent plating operation. Although arsenic in groundwater has been detected, the levels in groundwater do not exceed the federal drinking water standard.

Surface Water

There are no surface water bodies on the Yakima Plating site. The unpaved portions of the site are covered with gravel or highly permeable soil, and the site has a slope of less than one percent. Because of these conditions, the potential for migration of contaminants by precipitation runoff is minimal.

Regulatory Requirements for Addressing Site Risks

EPA's National Oil and Hazardous Substance Contingency Plan (NCP), found in 40 C.F.R. Part 300, requires that the site's remediation goals are protective of human health and the environment. Initially, contaminant concentrations are compared to existing criteria such as Safe Drinking Water Act Maximum Contaminant Level Goals (MCLGs) and Maximum Contaminant Levels (MCLs), State of Washington cleanup levels under MTCA method B, and Clean Water Act Water Quality Criteria (WQC). However, there are no corresponding criteria for soils and structures. Federal remediation standards for soils and structures are usually established by setting contaminant concentrations for cancer-causing chemicals at levels that represent cancer risks between one-in-ten-thousand (10^{-4}) and one-in-one-million (10^{-6}). For toxic compounds not identified as carcinogens, the contaminant concentrations shall be protective of sensitive human subpopulations over a lifetime. Noncarcinogenic effects are expressed in terms of a "hazard index,".

VI. SUMMARY OF SITE RISKS

The risks to human health and the environment at the Yakima Plating Superfund Site are described in the site-specific Human Health Risk Assessment, which was prepared by Ecology & Environment, inc. for EPA using EPA guidance. The Risk Assessment followed a four step process: 1) identification of contaminants which are of significant concern at the site, 2) an exposure assessment which identified current and potential exposure pathways and exposure estimates, 3) toxicity assessments for the chemicals of potential concern at the site, and 4) a risk characterization, which integrated the three earlier steps to summarize the potential and current risks posed by hazardous substances at the site. The results of the Human Health Risk Assessment are discussed below.

Contaminants of Concern

The groundwater, soils, and tanks and containers were sampled during the Remedial Investigation for many potential contaminants, including volatile and semi-volatile organics, metals, inorganics, Total Suspended Solids (TSS) and Total Organic Carbon (TOC), pesticides, and PCBs. The chemicals detected in various environmental media in the RI are summarized in Tables 3 through 7. Results of these analyses were used to select contaminants of concern that were used to quantify potential risks to human health and the environment. A number of substances, primarily inorganic chemicals, were not considered for the risk assessment because there were present in background samples at similar concentrations.

Most metals are natural constituents of soils and groundwater at some concentrations. Therefore, when evaluating metals data for the risk assessment it was necessary to distinguish samples containing naturally occurring concentrations of metals from those that may actually be contaminated, as well as distinguishing concentrations due to on-site activities from those attributable to off-site activities. Initially, the 95th percentile for literature values of background metals in surficial soils of the Western United States were used as reference points, since only 5% of naturally occurring concentrations would exceed these values (does not represent "natural background" as defined by Ecology). This information in combination with a chemicals pattern of occurrence throughout the site was used to designate the chemicals of potential concern for the site.

The human health contaminants of concern included in the risk assessment include the following: The DDT series (DDD, DDE, and DDT), Dieldrin, Endosulfan sulfate, methoxychlor, and antimony, arsenic, beryllium , cadmium, chromium, cobalt, copper, lead, mercury, nickel, selenium, zinc, and cyanide.

Exposure Assessment

The objective of the exposure assessment is to estimate the type and magnitude of exposures from the site. This includes identifying exposure routes (ingestion, inhalation, and direct contact), land use scenarios, potentially exposed populations, estimating exposure point concentrations, and describing assumptions about exposure frequency and duration. The risk assessment calculates exposure point concentrations based on average and maximum contaminant concentrations. The following is a brief summary of exposure pathways evaluated and assumptions used in the assessment. A more thorough description can be found in Section 7.3 of the Human Health Risk Assessment for this site.

A conceptual site model was prepared and is presented in Figures 5 and 6. As shown in the figure, there are three primary exposure pathways:

- Direct contact with contaminated soils, including dermal contact and ingestion via hand-to-mouth contact;
- Inhalation of airborne soil particles from the site; and
- Ingestion of contaminated groundwater as drinking water.

There are four groups of potential receptors under existing land use conditions: site workers, site visitors, nearby residents, and employees of nearby businesses. In addition, if the site were to be converted to residential use in the future, the future site residents would be another group of potential receptors.

Exposure point concentrations for surface soils were estimated by using sampling and modeling results to calculate intake of contaminants in mg/kg-day. Details on these models are found in Appendix G of the RI/FS. The parameter values were all selected to correspond to the average and reasonable maximum exposure (RME) an individual in the receptor population might experience. Intakes are inversely related to body weights and averaging times (the period over which the exposure is averaged). The exposure point concentrations used to calculate risks are summarized in tables 7-11 through 7-25 in the Risk Assessment for this site.

Direct Contact with surface soils

The surface soil contaminant concentrations found in Areas A and B shown in Figure 3 were used for evaluating potential direct contact exposure for site workers and adult site visitors. This represents the area where the specified receptors would be expected to spend the most time while on the site. All surface

Figure 5

CONCEPTUAL SITE MODEL FOR YAKIMA PLATING

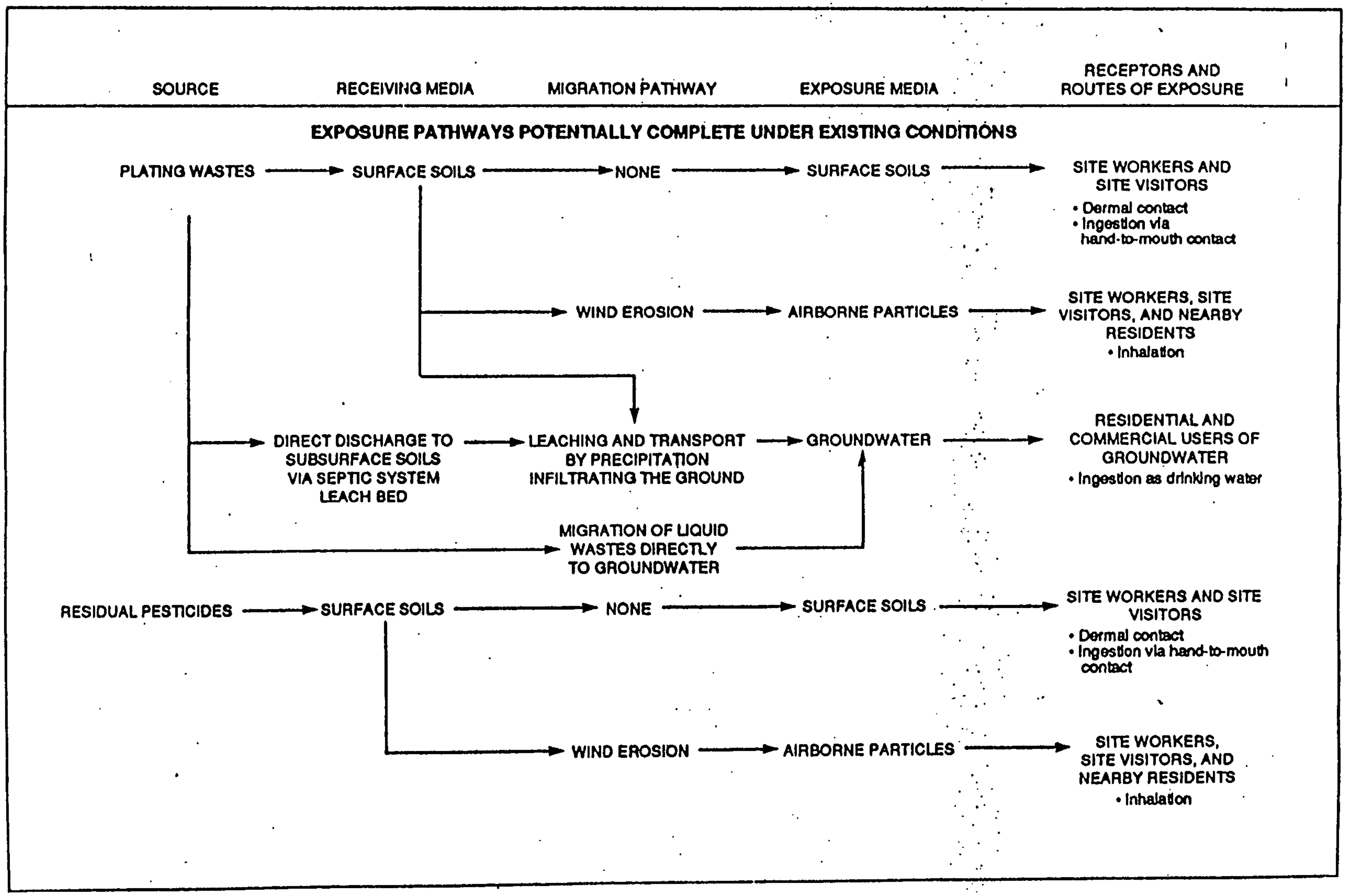
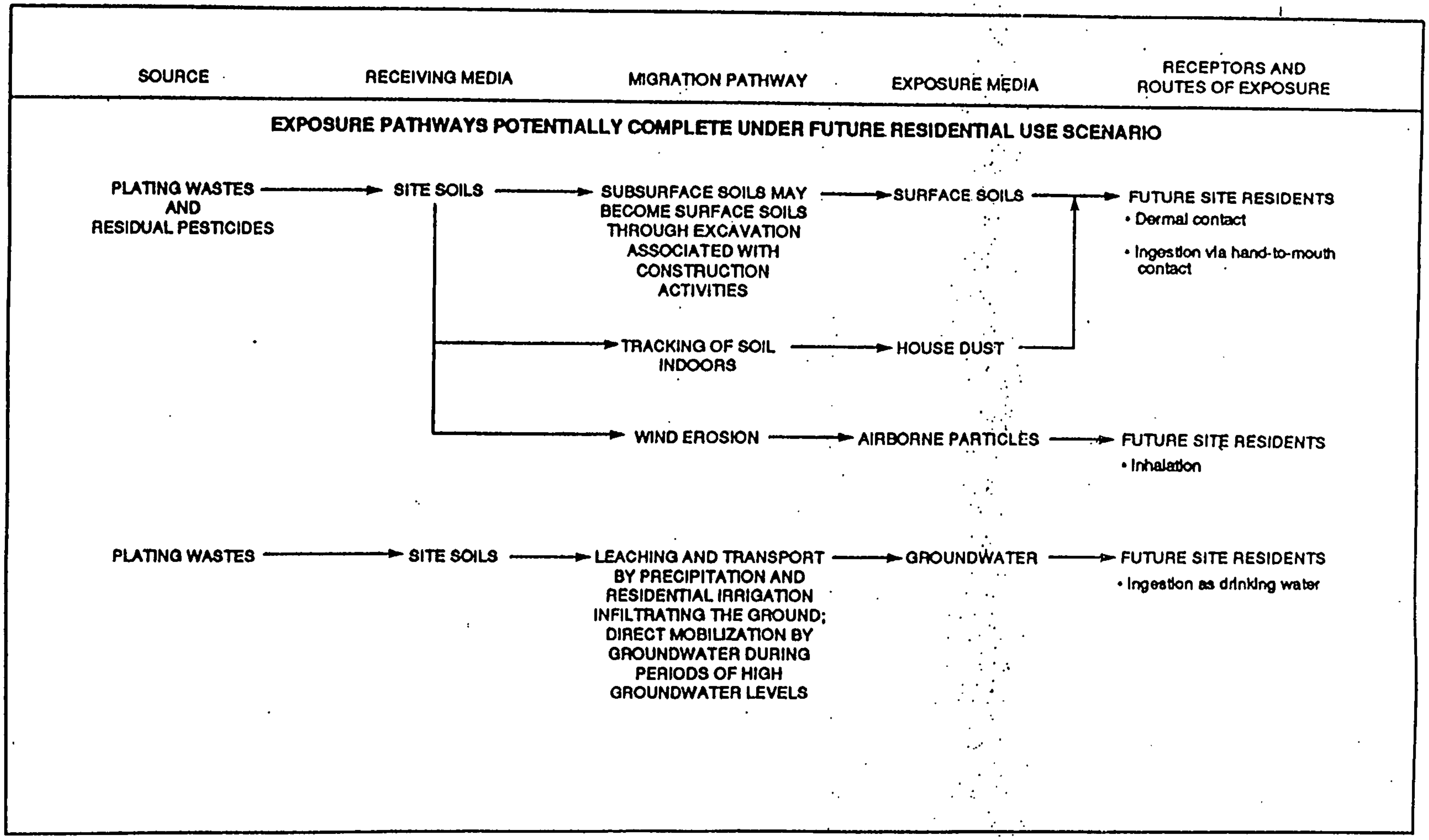


Figure 6

CONCEPTUAL SITE MODEL FOR YAKIMA PLATING



soils site-wide were used as the source area for evaluating potential direct contact exposure to adolescent site visitors (trespassers) and for potential future residents, both adults and children. The average and upper 95th percent confidence limit contaminant concentration for these areas were used for the risk assessment and are presented in Table 8.

Inhalation of Airborne Soil Particles

The surface soil contaminant concentration in Areas A and B were used as the source term for all of the potential inhalation pathways (site workers, site visitors, nearby residents and workers, and future site residents) because these were the only areas of the site that are not either substantially vegetated or paved, and therefore they are the only areas that could be subject to significant wind erosion.

Two types of models were used in developing exposure estimates. The first model concerned the emission of soil particles from the ground surface to the ambient air "mechanical resuspension". The second model was an air dispersion model, which was used to estimate ambient air concentration downwind from the source areas to determine the breathing-zone particle concentrations. These models are discussed in detail in Appendix G of the RI/FS.

Ingestion of Groundwater as Drinking Water

The Yakima Plating and Autocraft buildings obtain their drinking water from private well PW-5; therefore, the contaminant concentrations (Average concentrations and Upper Confidence Limit (UCL) levels) found in this well were used to evaluate potential exposure to site workers via this pathway. The contaminant concentrations (Average and UCL for private wells) in all of the downgradient private wells sampled were used to evaluate potential exposures to nearby residents and workers at nearby businesses. The contaminant concentration in the site-monitoring wells were used to assess potential exposure to future site residents.

Toxicity Assessment

The first step of the toxicity assessment, hazard identification, weighs the available evidence regarding the potential for contaminants of concern to cause adverse effects in exposed individuals. The second step of the toxicity assessment, dose-response evaluation, quantitatively evaluates the toxicity information and characterizes the relationship between the dose (in mg/kg-day) and the incidence of adverse health effects in the exposed population. This is done for carcinogenic and noncarcinogenic effects. Estimates of the probability of

Table 8

CONTAMINANT CONCENTRATIONS IN SURFACE SOILS
USED IN THE RISK ESTIMATE CALCULATIONS
(mg/kg)

	Area A		Area B		Areas A and B		Site-Wide	
Chemical	Average	UCL	Average	UCL	Average	UCL	Average	UCL
Inorganics								
Antimony	—	—	1.71	3.15	0.86	1.64	0.87	1.50
Arsenic	15.0	20.6	5.79	7.25	7.38	9.12	10.0	12.1
Beryllium	0.29	0.49	0.26	0.45	0.28	0.41	0.36	0.44
Cadmium	0.61	1.62	1.31	2.70	0.96	1.80	0.48	0.90
Chromium III	46.8	77.1	451	749	381	629	298	483
Cobalt	61.5	142	31.1	54.8	46.3	87.1	30.8	50.9
Copper	6,112	15,653	1,389	1,998	2,210	3,915	1,659	2,915
Lead	152	203	465	801	409	689	412	624
Mercury	0.04	0.11	0.12	0.24	0.08	0.15	0.06	0.10
Nickel	28,293	72,883	6,305	8,937	10,129	18,045	7,509	13,343
Selenium	0.12	0.32	0.62	1.24	0.37	0.70	0.20	0.36
Zinc	728	1,721	407	510	462	649	383	525
Cyanide	1.57	3.49	22.7	56.3	13.0	31.1	7.85	17.7

Key at end of table.

Table 8

Chemical	Area A		Area B		Areas A and B		Site-Wide	
	Average	UCL	Average	UCL	Average	UCL	Average	UCL
Organics								
DDD	0.0441	0.112	0.0219	0.0376	0.0356	0.0766	0.240	0.496
DDE	1.220	2.618	0.108	0.174	0.792	1.67	2.414	4.132
DDT	0.511	1.057	0.232	0.406	0.403	0.742	1.793	3.164
Dieldrin	—	—	0.002	0.00529	0.00077	0.00203	0.0684	0.140
Endosulfan Sulfate	0.0188	0.0496	0.0338	0.0741	0.0245	0.0483	0.028	0.0481
Methoxychlor	0.00588	0.0155	0.00826	0.0188	0.00679	0.0137	0.0136	0.0249

Key:

UCL = Upper 95% confidence limit on the arithmetic mean

Source: Ecology and Environment, Inc. 1991.

carcinogenic effects are based on slope factors. Estimates of noncarcinogenic effects are not based on probabilities, but are based on "reference doses."

Cancer Risks. Excess lifetime cancer risks were determined for each exposure pathway by multiplying the exposure level by the chemical-specific cancer slope factor. Chemical-specific cancer potency (slope) factors have been developed by EPA from human epidemiological or animal studies. This information was obtained from EPA's Integrated Risk Information System (IRIS) and the Health Effects Assessment Summary Tables (HEAST). Risk estimates calculated from these potency factors reflect a conservative "upper bound" estimate of the risk posed by potentially carcinogenic compounds. That is, the true risk is very unlikely to be greater than the risk predicted and could be substantially lower. The resulting risk estimates are expressed in scientific notation (i.e. 1×10^{-6} for 1/1,000,000; indicating that, in this example, an individual is not likely to have greater than a one in one million chance of developing cancer over his/her lifetime as a result of site-related exposure). Current EPA practice assumes carcinogenic risks are additive between chemicals when assessing exposure to a mixture of hazardous substances. Therefore, cancer risks have been summed across chemicals and across exposure pathways.

Noncancer risks. Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as the hazard index. A hazard index is calculated by dividing the human dose by the reference dose (RfD) or other suitable benchmark for noncarcinogenic health effects. RfDs, expressed in units of mg/kg-day, are estimates of lifetime daily exposure levels for humans, including sensitive individuals, that are not expected to cause an appreciable risk of harmful effects during a lifetime. Estimated intakes of chemicals from environmental media (e.g., the amount of a chemical ingested from contaminated drinking water), can be compared to the RfDs. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). RfDs used in this risk assessment are from IRIS. The hazard index is often expressed as a single value indicating the ratio of the estimated human exposure to the reference dose values. Adverse health effects are not expected to occur if the hazard index is less than 1. As the hazard index increases above 1, adverse effects become more likely.

Magnitude and Sources of Risks Posed by Site Contaminants

The magnitude of the potential excess cancer risk by the site contaminants are summarized in Tables 9-12. The hazard indices for potential noncarcinogenic effects are summarized in Table 11. As shown in the tables, exposure to contaminants found

Table 9

SUMMARY OF ESTIMATED EXCESS CANCER RISKS ASSOCIATED WITH THE YAKIMA PLATING SITE

Exposure Scenario	Exposure Case	Receptors: Adults	Receptors: Children 1 - 6 Years	Receptors: Adolescents 6 - 16 Years	Receptors: Composite Child/Adult 1 - 30 Years	Risk Contributions by Exposure Route* (RME Case)	Risk Contributions by Chemical* (RME Case)
Site workers	Average RME	3.0×10^{-6} 3.3×10^{-5}	-- --	-- --	-- --	Drinking water - 49% Soil inhalation - 24% Dermal - 17% Soil ingestion - 10%	Arsenic - 63% Nickel - 23% Beryllium - 6% DDE - 5% DDT - 2%
Site visitors	Average RME	1.2×10^{-6} 1.0×10^{-5}	-- --	1.8×10^{-6} 7.1×10^{-6}	-- --	Dermal - 58% Soil ingestion - 34% Soil inhalation - 8%	Arsenic - 45% Beryllium - 20% DDE - 18% Nickel - 8% DDT - 8% Dieldrin - 1%
Nearby residents	Average RME	-- --	1.5×10^{-5} 2.7×10^{-5}	-- --	1.5×10^{-5} 8.7×10^{-5}	Drinking water - 96% Soil inhalation - 4%	Arsenic - 89% Nickel - 11%
Adolescent site visitors	Average RME	-- --	-- --	-- --	1.7×10^{-5} 9.4×10^{-5}	Drinking water - 89% Soil inhalation - 4% Dermal - 4% Soil ingestion - 3%	Arsenic - 91% Nickel - 4% Dieldrin - 2% DDE - 1% DDT - 1%
Nearby workers	Average RME	3.0×10^{-6} 3.8×10^{-5}	-- --	-- --	-- --	Drinking water - 91% Soil inhalation - 9%	Arsenic - 91% Nickel - 9%
Future site residents	Average RME	-- --	5.9×10^{-5} 1.1×10^{-4}	-- --	3.7×10^{-5} 2.3×10^{-4}	Drinking water - 63% Dermal - 19% Soil ingestion - 12% Soil inhalation - 7%	Arsenic - 74% Dieldrin - 8% Nickel - 6% DDE - 5% DDT - 4% Beryllium - 3%

*these columns are independent of each other. Both refer to the total receptor risks.

Table 10

SUMMARY OF ESTIMATED EXCESS CANCER RISKS ASSOCIATED WITH THE YAKIMA PLATING SITE OTHER THAN THOSE DUE TO ARSENIC IN THE GROUNDWATER

Exposure Scenario	Exposure Case	Receptors: Adults	Receptors: Children 1-6 Years Old	Receptors: Adolescents 6-16 Years Old	Receptors: Composite Child/Adult 1-30 Years Old	Risk Contributions By Exposure Route* (RME Case)	Risk Contribution By Chemical* (RME Case)
Site Workers	Average	1.1×10^{-6}	--	--	--	Soil inhalation - 47% Dermal - 34% Soil ingestion - 20% Drinking water - 0%	Nickel - 46% Arsenic - 26% Beryllium - 12% DDE - 10% DDT - 4%
	RME	1.7×10^{-5}	--	--	--		
Site Visitors	Average	1.2×10^{-6}	--	1.8×10^{-6}	--	Dermal - 58% Soil ingestion - 34% Soil inhalation - 8%	Arsenic - 44% Beryllium -20% DDE - 18% Nickel - 8% DDT - 8% Dieldrin - 1%
	RME	9.7×10^{-6}	--	7.1×10^{-6}	--		
Nearby Residents	Average	--	8.0×10^{-7}	--	3.0×10^{-7}	Soil inhalation - 100% Drinking water - 0%	Nickel - 99% Arsenic - 1%
	RME	--	3.1×10^{-6}	--	3.6×10^{-6}		
Adolescent	Average	--	--	--	2.1×10^{-6}	Soil inhalation - 39% Dermal - 35% Soil ingestion - 26% Drinking water - 0%	Nickel - 39% Arsenic - 24% Dieldrin - 15% DDE - 9% DDT - 7% Beryllium - 5%
	RME	--	--	--	1.1×10^{-5}		

Table 11

Exposure Scenario	Exposure Case	Receptors: Adults	Receptors: Children 1-6 Years Old	Receptors: Adolescents 6-16 Years Old	Receptors: Composite Child/Adult 1-30 Years Old	Risk Contributions By Exposure Route* (RME Case)	Risk Contribution By Chemical* (RME Case)
Nearby Workers	Average	9.0×10^{-8}	—	--	--	Soil inhalation - 99%	Nickel - 99%
	RME	3.4×10^{-6}	—	--	—	Drinking water - 1%	Arsenic - 1%
Future Site Residents	Average	--	3.6×10^{-5}	—	1.3×10^{-5}	Dermal - 50%	Arsenic - 31%
	RME	—	6.5×10^{-5}	—	8.6×10^{-5}	Soil ingestion - 33%	Dieldrin - 21%
						Soil inhalation - 18%	Nickel - 17%
						Drinking water - 0%	DDE - 13%
							DDT - 10%
						Beryllium - 7%	

*These columns are independent of each other. Both refer to the total receptor risks.

Table 12

SUMMARY OF ESTIMATED HAZARD INDICES FOR NONCARCINOGENIC EFFECTS ASSOCIATED WITH THE YAKIMA PLATING SITE

		Receptors					
Exposure Scenario	Exposure Case	Adults	Children 1 - 6 Years (Subchronic)	Adolescents 6 - 16 Years	Composite Child/Adult 1 - 30 Years	Hazard Index Contributions by Exposure Route* (RME Case)	Hazard Index Contributions by Chemical* (RME Case)
Site workers	Average RME	0.55 3.7	— —	— —	— —	Dermal - 80% Soil ingestion - 13% Soil inhalation - 6% Drinking water - 1%	Nickel - 76% Copper - 16% Chromium (III) - 6% Arsenic - 1%
Site visitors	Average RME	0.23 3.5	— —	0.39 1.8	— —	Dermal - 85% Soil ingestion - 14% Soil inhalation - 1%	Nickel - 80% Copper - 17%
Nearby residents	Average RME	— —	0.14 0.27	— —	0.12 0.24	Drinking water - 89% Soil inhalation - 11%	Arsenic - 56% Zinc - 25% Chromium (III) - 10% Nickel - 6% Copper - 2%
Adolescent site visitors living nearby	Average RME	— —	— —	— —	0.51 2.0	Dermal - 60% Soil ingestion - 26% Drinking water - 9% Soil inhalation - 5%	Nickel - 69% Copper - 14% Arsenic - 6% Chromium - 5% Zinc - 3% DDT - 2%
Nearby workers	Average RME	0.023 0.17	— —	— —	— —	Drinking water - 52% Soil inhalation - 48%	Chromium (III) - 48% Arsenic - 33% Zinc - 14% Nickel - 4%
Future site residents	Average RME	— —	11 23	— —	3.4 7.8	Dermal - 50% Soil ingestion - 44% Drinking water - 6% Soil inhalation - 1%	Nickel - 80% Copper - 14% Arsenic - 2% DDT - 2%

*These columns are independent of each other. Both refer to the total receptor risks.

in soils at the Yakima Plating site appear to pose some increased risk of developing cancer and an increased risk of experiencing adverse noncarcinogenic health effects.

Under existing site conditions, the estimated potential cancer risk to all of the receptors exposed to site contaminants by all of the exposure scenarios evaluated fell between 10^{-6} and 10^{-4}, which is within EPA's acceptable risk range; The bulk of these risks for most of the exposure scenarios were due to arsenic in the groundwater. The occurrence of arsenic in groundwater and most site soils is believed to be due primarily to the area wide legal pesticide application and was discussed earlier in Section V. Since the groundwater arsenic risk dominated the estimated cancer risk and may mask risk that could be more clearly related to plating operations arsenic is excluded from groundwater risks summarized in Table 10. However with or without Arsenic the estimated potential cancer risk to all of the receptors exposed to site contaminants, under both current and potential future site conditions, fall between 10^{-6} and 10^{-4}, which is within EPA's acceptable risk range. For the site workers, adult site visitors, and nearby residents and workers, the most important exposure route for cancer risks appears to be inhalation of airborne soil particles and the most important contaminant is nickel. For adolescent site visitors and future site residents who could be exposed to soils anywhere on site, the most important exposure route for cancer risks appear to be dermal contact with soils and ingestion of soils via hand-to-mouth contact and the most important contaminants are arsenic, beryllium, DDE, nickel, and dieldrin.

The greatest risks associated with the site are due to noncarcinogenic effects from contaminants in surface soils. As shown in Table 11, increased risks of adverse noncarcinogenic health effects (Hazard Index greater than 1) associated with exposure to site contaminants appears to be greater for site workers, site visitors, and future site residents. Nearby residents and workers who do not enter the site and thus would not contact site soils would not be expected to experience adverse noncarcinogenic effects from their estimated exposure to site contaminants. Dermal contact with soils and ingestion of soil by hand-to-mouth contact appear to be the exposure routes that account for the bulk of the potential noncarcinogenic effects while nickel is one of the most important chemicals.

Lead was not included in the quantitative risk assessment because a reference dose or slope factor has not been developed for lead. Various reference values were used to assess the lead concentrations in groundwater and soil. Concentrations in groundwater were compared to MCLs and concentrations in soil were compared to the interim guidance soil cleanup levels specified in OSWER Directive 9355.4-02 and to a potentially acceptable concentration derived using EPA's biokinetic model for lead. The comparisons for groundwater suggest that the lead concentrations in groundwater from the site monitoring wells could pose a risk if the groundwater from on-site monitoring wells were to be used as drinking water without treating it to remove the lead. The comparisons for soils suggest that the lead concentrations site-wide and particularly in Area B could pose a risk to young children who might play in the area or reside on site in the future. As stated in the OSWER directive this, risk appears to increase above acceptable levels when the lead concentration in the soil or dust exceeds 500-1000 ppm, therefore lead is a contaminant of potential concern.

Ecological Assessment

A majority of the site, which encompasses the adjoining ground around the Yakima Plating and Autocraft buildings and the vacant lot north of these buildings, has been disturbed and little vegetation currently exists. Prior to development of the property for plating operations, the area was dominated by an orchard. The current vegetation consists of a few specimens of big leaf maple, paper birch, red alder, and various grasses. The native vegetation for this area is mainly forbs, shrubs, and grasses.

The sparse vegetation in the study area provides limited cover and little food source, which are both important aspects for sustaining wildlife habitats. Wildlife in the vicinity of the site may include species of pocket gophers, field and house mice, voles, rats, rabbits, and skunks and species of common perching birds, such as sparrows and starlings. The high level of human activity discourages most other species from establishing residence.

The potential impacts of site contaminants on wildlife and domestic animals in the site vicinity was qualitatively assessed. Based on this assessment, no endangered species or critical habitats in the site vicinity have been impacted or would be threatened by site contaminants, and the ecological effects due to releases from Yakima Plating are not expected to be significant.

Exposure Assessment Uncertainties

The accuracy of the risk characterization depends in large part on the accuracy and representativeness of the sampling, exposure, and toxicological data. Most assumptions are intentionally conservative, so the risk assessment will be more likely to overestimate risk than to underestimate it.

Several of the factors adding uncertainty to the estimates tend to result in overestimation of the exposure. These include:

the directed nature of the sampling program; the use of upper 95th percent confidence limits or the reasonable maximum exposures (RME) for the source concentrations; the use of many 90th-percentile values in the exposure estimation calculations; and the use of the steady state assumption for source concentration estimates. One factor that could lead to underestimation of the exposures is the use of sample quantitation limits that could result in missing low concentrations of some compounds that might pose significant risks. The cumulative effect of all exposure uncertainties most likely is to overestimate rather than underestimate the true potential exposures.

Toxicity Assessment Uncertainties.

The basic uncertainties underlying the assessment of the toxicity of a chemical include:

Uncertainties arising from the design, execution or relevance of the scientific studies that form the basis of the assessment; and

Uncertainties involved in extrapolating from the underlying scientific studies to the exposure situation being evaluated, including variable responses to chemical exposures within human and animal populations, between species, and between routes of exposure.

Risk Characterization Uncertainties

The risk characterization combines and integrates the information developed in the exposure and toxicity assessments; therefore, uncertainties associated with these assessments also affect the degree of confidence that can be placed in risk characterization results. The primary factors contributing to exposure and toxicity uncertainties were outlined above. Two additional uncertainty factors are the cumulative effect of using conservative assumptions throughout the process, and the likelihood of the actual exposures postulated occurring and estimated in the exposure assessment. Overall, the nature of the risk estimation process virtually ensures that the true risks will be overestimated in order to err on the side of protecting human health.

Conclusions for Human Health Risk Assessment

The major factors involved in estimating the site risks are:

- The presence of elevated concentrations of metals and pesticides in the surface soil combined with the continued use of the site for commercial purposes, unrestricted access to the site which allows entry by potential adolescent trespassers, and the possibility of future residential use of the site.

- The presence of arsenic in the groundwater coupled with the current and probable future use of groundwater for drinking water supply purposes;

- The presence of arsenic in surface soils which may be responsible for the elevated arsenic concentrations in the groundwater;

- The presence of nickel and other metals in site groundwater which could be used as a drinking water source by potential future site residents; and

- The presence of elevated metals concentration in subsurface soils which could serve as a source of groundwater contamination. In addition, subsurface soils could become surface soils in the future as a result of regrading and excavation activities associated with conversion of the site to other uses.

- The presence of elevated levels of arsenic, lead, and pesticide compounds due to the past pesticide applications in the area tends to increase overall risk even at off-site background locations. However risk associated with this compounds are still within EPA's acceptable risk range.

Conclusions

The greatest risk at the site is due to noncarinogenic effects from surface soils. Site workers, site visitors, and future site residents are at risk primarily from dermal contact with soils and ingestion of soils. Overall, the receptors at greatest risk of experiencing both carcinogenic and noncarcinogenic adverse health effects are potential future site residents, and nickel appears to be one of the chemicals posing the greatest health concerns.

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this ROD, may present an imminent and substantial endangerment to public health, welfare, or the environment.

VII. DESCRIPTION OF ALTERNATIVES

This section presents a narrative summary of each alternative considered for remediation of this site. Additionally, a description of the major applicable or relevant and appropriate requirements (ARARs) and other standards to be considered (TBCs) utilized for the specific components of the waste management process is provided.

Soil, debris, and liquids/sludges were considered independently, and separate cleanup alternatives were developed for each. Several alternatives were eliminated in the screening process because they would not effectively address contamination, were essentially the same as other alternatives, could not be implemented, or would have had excessive cost compared to an alternative that would achieve the same degree of protection and level of effectiveness. A detailed assessment of each alternative can be found in Section 4 of the Feasibility Study (FS).

Alternatives for groundwater cleanup in the FS were developed due to the presence of contaminants above federal and state drinking water standards at one on-site groundwater monitoring well. Since this contamination may be associated with localized groundwater turbidity, and all other wells are below standards, EPA has determined that a response action for the groundwater medium is not warranted at this time. Therefore, further discussion of groundwater alternatives is not included in the following analysis.

Regarding the contamination under the Yakima Plating building an evaluation was done comparing the cost for removal of contamination versus use of institutional controls. Based on the concrete block construction of the building any removal of soils beneath the building would likely compromise the overall building structure. In addition any deep core sampling beneath the building would require removal of the roof and walls to accommodate drilling equipment. Demolition and removal costs for the building were estimated to be approximately $137,000. This assumes that all soils down to two feet under the entire building would require excavation and disposal at a hazardous waste disposal facility. However, the history of waste disposal practices to the sedimentation tank and drainfield, and the apparent effectiveness of the building as a cap would indicate that institutional controls are the most appropriate alternative that is protective of human health and the environment. In the event that removal of subsurface soils in the area of the septic tank drain pit and the area of MW-2, which are adjacent to the building, require extensive subsurface excavation then building demolition will be re-considered. In such a case the costs to support the building during this excavation could quickly become greater than building demolition costs.

Finally, in regards to the orchard contaminants on the site a determination has been made to not address these contaminants in the site remediation unless they co-occur with other plating related contaminants. Ecology has determined that these contaminants were legally applied and the conditions under RCW 70.105D (3)(b) have been established and the responsible parties are not liable for these compounds. EPA's primary rationale for not addressing these contaminants is based upon the following two reasons: First, as outlined in Section V the orchard contaminants are considered to be present area-wide due to the legal application of pesticides on orchards in the area (similar to Ecology's rationale). It is EPA's policy not to clean up areas the exceed the site boundaries and are associated with an uncontrollable source. Secondly, and more important, based upon EPA's risk assessment the presence of the orchard contaminants alone in surface soils on the site does not present an unacceptable risk to human health. Even the levels of these contaminants identified in groundwater are within EPA's acceptable risk range.

A table and summary of the alternatives that were considered for site remediation is presented below.

Liquids/Sludges

L/S 1 Off-Site Treatment and Disposal
L/S 2 Neutralization, De-Tox, Off-site treatment/Disposal

Debris

D1 Decontamination, Abandon in-place

Soil

S1 Excavation, Off-Site treatment/disposal
S2 Excavation, Soil Washing, on-site disposal
S3 In-situ solidification/stabilization

No Action Alternative

The No-Action Alternative is required by law to be developed and acts as a baseline for comparison with the cleanup alternatives. Under this alternative, no action would be taken to remove liquids and sludges or cleanup debris and soils, although a long-term groundwater monitoring program would be implemented to monitor groundwater quality. Since this alternative does not change contaminant concentration or exposure, the risk remaining at the site after remedial activities have been completed would be equivalent to the current, estimated site risks based on the risk assessment results. Consequently, this alternative is not protective of human health and the environment and does not meet ARARs.

Liquids/Sludges Alternatives

Alternative L/S 1: Off-site treatment and disposal

All Hazardous Waste liquids and sludges would be transported to an EPA approved treatment/disposal facility for either physical or chemical treatment. The liquids are listed hazardous wastes under the code designations F007, F008, and F009. Treatment will be conducted to achieve ARARs such as discharge requirements for liquids and land ban restriction requirements for sludges. Residues from the treatment process would, if necessary, be disposed of at an approved hazardous waste disposal facility. The total volume of containerized sludges is 6.5 cubic yards (1,309 gallons). The total volume of liquids is approximately 7.5 cubic yards (1500 gallons). All liquids and sludges would be placed in drums for transportation by a licensed hauler to a treatment facility. Removal of approximately 40 containers of waste would require 1 flatbed truck. Total capital costs associated with this alternative are estimated to be $20,000 for the sludges and $10,000 for the liquids. There are no operation and maintenance (O&M) costs associated with this alternative. This alternative could be completed in approximately one week.

Alternative L/S 2: On-site treatment and disposal

Under this alternative liquids and sludges would be treated on-site using either thermal, chemical, or physical treatment processes. These liquids and sludges contain listed hazardous wastes and must be disposed in compliance with RCRA. The land disposal restrictions for non-wastewater provides the treatment standards. Residual sludges from the treatment process would be disposed of at an approved hazardous waste disposal facility. The treatment processes would require treatment equipment to be transported to the site and assembled. This alternative would take 1-2 months to complete and have an estimated capital cost of $32,000 for the sludge treatment and $17,000 for the liquid treatment. These costs do not include treatability testing which would be required prior to final treatment on site. Treatability testing would require additional time on the order of months and significant additional costs that could more than double the current cost estimate. There are no O&M costs associated with this alternative since proven technology would be used for a short period of time.

Debris Alternative

Alternative D1: Excavate around tanks and open, On-site washing, and abandonment of tanks in-place.

Tanks would be uncovered and cleaned out using either water or solvent washing solutions, and abandoned in place. 40 CFR 264.197(a) defines closure and post-closure requirements for tank systems and are applicable requirements for decontamination of the debris. In addition, 40 CFR 261.7 is also applicable and provides guidance on how to render a container "empty" and consequently exempted from being considered a hazardous waste.

The most effective washing solutions would be determined during the remedial design for the site. Associated pipes would be excavated, and disposed of with the contaminated soils, since full decontamination would be difficult. The two tanks are estimated to hold approximately 500-gallons each. A vacuum truck would remove all washwater for disposal at an approved hazardous waste treatment/disposal facility or a municipal wastewater treatment facility depending on the levels of contaminants. Upon completion of tank washing, the tanks would be abandoned in place in a manner to prevent future use, and covered to grade with clean fill material. This alternative has an estimated capital cost between $15,000 to $17,000. The higher cost is for the use of solvent as the wash solution. There are no O&M costs associated with this alternative.

<u>Soil Alternatives</u>

Alternative S1: Excavation and Off-site treatment and disposal of Soils

Contaminated soils and drainfield pipe would be excavated to achieve MTCA soil cleanup standards and transported to an off-site permitted RCRA facility for treatment to Land Disposal Restriction Standards and disposal. No site-specific stabilization treatability studies have been conducted; however, similar wastes from other sites have been successfully stabilized. The disposal facility would conduct treatability testing to determine the optimum treatment formulation prior to the commencement of the remedial action. There is approximately 100 feet of 4-inch diameter contaminated drainfield pipe. The total volume of surface and sub-surface soil requiring excavation, treatment, and disposal is estimated to be 14,500 cubic feet (540 cubic yards). The total capital cost associated with this alternative is approximately $221,000. This alternative would take approximately 2-4 weeks to complete.

Alternative S2: Excavation, On-site Soil Washing, and On-site Disposal of treated soils/ off-site treatment and disposal of fines and washwater.

Contaminated soils, which contain RCRA listed hazardous wastes, would be excavated and would undergo soil washing as a volume reduction, or fraction segregation process using a mobile treatment system. Since the contaminants tend to adhere to fine particles, these would be separated out, resulting in a volume reduction of 80 to 95 percent. Treated soils would be backfilled on site and must comply with the RCRA Land disposal restriction requirements, unless treatment reduces contaminants to below MTCA levels and the soils are reclassified as nonhazardous. The rinsate sidestream containing solubilized metals would be recycled through the system and eventually disposed of at a RCRA treatment facility. In addition a smaller volume of soil fines and drainfield pipe would also require disposal at a RCRA treatment facility. A pilot scale study would be required to develop the best process, choose the correct washing solutions, and calculate the number of process stages required. The total capital cost associated with this alternative is approximately $213,000, not including bench and pilot scale studies which could increase costs by at least one third. There is no O&M associated with this alternative. Since this is a relatively new technology an estimate of time to complete this alternative is not available.

Alternative S3: On site and in-place treatment of soils to achieve LDR standards using solidification/stabilization techniques.

In this alternative contaminated soils would be treated with stabilization agents such as lime, fly ash or portland cement to immobilize metals. The LDR requirements would not apply to in-situ treatment. Bench scale testing of soils would be required to optimize the solidification procedures. Stabilized soils would remain on site. Contaminated drainfield pipe would be disposed of at a RCRA treatment disposal facility. Long term groundwater monitoring and deed restrictions would be required beyond that required for the other alternatives. A multi-layer cap may be required depending on the results from the stabilization work. A cap would also require additional institutional controls beyond that for the other alternatives, in order to insure the cap is not disturbed in the future. The estimated capital cost for this alternative is approximately $99,000, not including the necessary stabilization studies and a potential cap, which could more than double overall costs (current treatability studies average $75,000). O&M costs would vary depending on the length of groundwater monitoring and whether a cap would be required. This alternative would take approximately 2-4 weeks to complete, unless a cap is required in which case the completion time could increase by months.

Common Elements

All of the alternatives include the following features: (1) groundwater monitoring to evaluate the effectiveness of the soil and debris cleanup alternatives (present worth cost for groundwater monitoring at the site, ranges from $44,000 to $109,000 for a 5 to 30 year time period); and (2) institutional controls to ensure restricted use of the groundwater at the site, and ensure notification to future property owners of potential contamination beneath the Yakima Plating building. Agreements to implement this control will be negotiated with the property owner to ensure that the control is implemented. These controls will be implemented at the time of the remedial action for the site.

Summary of Comparative Analysis of Alternatives

For the purpose of remedy selection, the relative performance of each remedial alternative was evaluated in relation to three categories of criteria: (1) threshold criteria [a required level of performance]; (2) primary balancing criteria; and, (3) modifying criteria. The nine evaluation criteria and the results of the evaluation are discussed below.

A. Threshold Criteria

The remedial alternatives were first evaluated in relation to the threshold criteria: overall protection of human health and the environment, and compliance with ARARs. The threshold criteria are statutory requirements and must be met by all alternatives that remain for final consideration as remedies for the site.

1. Overall Protection of Human Health and the Environment. This criteria addresses whether or not a remedial alternative provides adequate protection and describes how risks are eliminated, reduced, or controlled through treatment and engineering or institutional controls.

All of the alternatives except the No Action Alternative are protective of human health and the environment.

The alternatives for liquids/sludges are both considered to be fully protective of public health and the environment. The significant difference between the two alternatives is defined by how the containerized waste are treated and disposed. The removal and off-site treatment, or on-site treatment and off-site treatment of all containers of liquids and sludges completely eliminates the potential for migration of contaminants or exposure.

Alternative D1 for debris is considered to be fully protective of public health and the environment by eliminating the residue of contaminants from the site and preventing a potential source of contamination to groundwater.

Overall protection of human health and the environment at the site is increased substantially by all soil alternatives. All alternatives either treat off-site or treat on-site soils to reduce the overall Hazard Index for site soils and ultimate risk to human health posed by the site. Alternative S1 off-site treatment and disposal at a permitted hazardous waste landfill, would be fully protective if soils were removed down to health based levels or MTCA soil cleanup levels as proposed. Alternative S2 offers an additional degree of protection, assuming that successful soil washing processes can be identified during treatability studies, since the contaminants would be removed from the site soils without the risks associated with transporting a large volume of contaminated materials over long distances. Alternative S3, in-situ stabilization, would also provide adequate protection as long as the stabilized soils, which remain on-site in an encapsulated form, remain undisturbed and maintain their structure without leaching.

2. **Compliance with ARARs.** This criteria addresses whether or not a remedial alternative will meet all of the applicable or relevant and appropriate requirements or provide grounds for invoking a waiver. See Section X for a discussion of specific ARARs considered in this analysis.

The No Action alternative would not comply with the MTCA cleanup levels for soil (WAC 173-340-700 through 760), which is an ARAR for the site.

Alternatives L/S 1 and L/S 2 would both meet their respective Federal and State ARARs by using well established regulated technologies and regulated disposal facilities. The liquids are listed hazardous wastes under the code designations F007, F008, and F009. Compliance with all LDR requirements (40 C.F.R. Part 268), hazardous waste generator and transporter requirements at 40 C.F.R. Parts 262 and 263, and requirements for treatment storage and disposal facilities (40 C.F.R. Parts 264 and 265) would apply to these wastes and could be achieved by removal of waste to a licensed RCRA treatment and disposal facility. The sludges and liquids would be treated to meet the concentration -based LDRs prior to being placed in an off-site RCRA permitted landfill.

40 CFR 264.197(a) for closure and post-closure requirements for tank systems and 40 CFR 261.7 in emptying and decontaminating the tanks are ARARs for the Debris. These requirements require that all waste residues and contaminated containment system components and structures, must be "removed" or "decontaminated". Alternative D1 complies with these requirements by removing wastes and decontaminating the tanks.

Alternatives S1, S2, and S3 could be designed to comply with ARARs by using regulated procedures and technologies. S1 and S2 would require removal of soils to achieve compliance with MTCA soil cleanup levels. RCRA Land Disposal Restrictions (LDRS) would apply to S1 and S2 where wastes are treated and disposed of either on or off-site. The contaminated soils will have to be treated to meet the concentration-based LDRs outlined in 40

C.F.R. Part 268 prior to being placed in an off-site landfill. These requirements will be met through the use of a RCRA treatment disposal facility. RCRA LDRs would not apply to alternative S3 where wastes remain in-place on-site. However, certain land treatment facility requirements (40 C.F.R. 264.270-283) may be relevant and appropriate. If the treated soils in alternative S3 remain contaminated with hazardous substances at levels that exceed MTCA cleanup levels, MTCA compliance monitoring (WAC 173-340-410) and institutional control requirements (WAC 173-340-440) will apply.

B. Primary Balancing Criteria

Once an alternative satisfies the threshold criteria, five primary balancing criteria are used to evaluate the technical and engineering aspects of the remedial alternatives.

3. Long-Term Effectiveness and Permanence. This criteria refers to the ability of a remedial alternative to maintain reliable protection of human health and the environment once remediation goals have been achieved. The magnitude of residual risk is considered as well as the adequacy and reliability of controls.

Alternatives L/S 1 and L/S 2 effectively and permanently reduce the risk associated with the liquids and sludges in that the wastes are removed from the site and treated to reduce their hazardous nature.

Alternative D1 has little long-term residual risk associated with it. The technology used to control the wastes is reliable, permanent and readily available.

All soil alternatives are effective in reducing the long-term risks at the site. In alternative S1 treatment occurs at an approved off-site treatment disposal facility thereby removing contaminants from the site. Alternative S2 is the only alternative examined that provides decontamination of the majority of the site soils which also reduces risks at the site. In alternative S2 the volume of contaminated soil on the site would be reduced by 80 to 95 percent. The remaining contaminated soils (5 to 20 percent) would require disposal at a off-site RCRA disposal facility where it would be treated. In S3 treatment occurs in place at the site. The effectiveness of S3 in the long term is not well known and depends on the efficiency of the in-place blending of chemical reagents with the soil and the performance of the stabilized materials with respect to leachate release and the effects of freeze-thaw cycles. A long term groundwater monitoring program would be necessary with S3 to ensure protection of the groundwater.

4. Reduction of Toxicity, Mobility, or Volume. This criteria refers to the anticipated performance of treatment technologies which will be used in the various remedial alternatives, such as solidification and incineration, etc.

Alternative L/S 1 and L/S 2 both employ treatment in the remedy to reduce toxicity, mobility, and volume. L/S 2 accomplishes treatment at the site where the toxicity and mobility of the wastes are reduced prior to off-site shipment for disposal.

Alternative S1, off site solidification and disposal, would further restrict contaminant mobility by placing the wastes within an approved RCRA landfill. Contaminant toxicity or volume is not reduced in the off-site disposal alternative. Alternatives S2 and S3 meet the preference for treatment to reduce the toxicity, mobility, and volume of the contamination at the site more effectively than S1. Alternative S3 would reduce mobility, and perhaps toxicity, by immobilizing the contaminated soils. However, the waste volume may increase substantially, depending on the types of fixation agents used. Assuming successful treatability testing results alternative S2 is effective in reducing the toxicity, mobility, and volume of contaminated soils.

5. Short-term Effectiveness. This criteria refers to the period of time needed to achieve protection, and any adverse impacts on human health and the environment, specifically site workers and community residents, that may be posed during the construction and implementation period until cleanup goals are achieved.

Alternative L/S 1 provides the greatest short-term effectiveness in that the waste is disposed of quickly and completely with minimal risk during waste transport. The effectiveness of L/S 2 is reduced due to on-site short term human health risks associated with waste handling and the treatment process. The significant difference between the two alternatives involves the potential for evolution of cyanide gas during on-site pretreatment and the possible impact on remediation workers and the surrounding community. In addition Alternative L/S 1 is superior to L/S 2 in that pretreatment is performed at an off-site facility where equipment and the reliability of controls is greater. In addition, cyanide detoxification would occur at a controlled industrial site, rather than the Yakima Plating site in a residential area.

The short term effectiveness of D1 is immediate as the cleaning of the tanks and pipes would take less than one week. The effect of the alternative on the surrounding community and to on-site workers would be negligible. Environmental impacts would be minimal.

It is estimated that all the soil alternatives could be accomplished within one construction season after commencement of remediation. However, if extensive treatability testing, pilot scale work, or cap installation is required the time estimated to accomplish alternative S2 or S3 could increase significantly. A potential for worker and community exposure by inhalation of contaminated dust during excavation exists for all of the alternatives involving excavation of soils and/or decontamination of debris. This would be particularly prevalent with Alternative S2, which would require additional soil handling as compared to the other two alternatives. All soil alternatives would require strict air pollution engineering controls to reduce the exposure potential. Alternative S1 involves transporting soils which would increase potential community exposure and increase traffic congestion and the risk of an accident. However, the total volume of soils could be removed from the site with 30 truck loads, which would not cause a significant impact to the community. Alternative S3 probably is the most protective on a short-term basis, because the contaminated soils would only be minimally disturbed during the remedial process. Some dust and would be created during the stabilization process, but that could be minimized through dust-control practices. All alternatives have the potential to mobilize contaminants to groundwater as excavation approaches the groundwater table. This effect could be minimized by conducting soil removal at the seasonally low groundwater level.

6. **Implementability.** This criteria refers to the technical and administrative feasibility of a remedial alternative, including the availability of goods and services needed to implement the selected remedy.

Alternatives L/S 1 and L/S 2 are readily implementable using existing available technology. Alternative L/S 1 allows a "one-stop" contract process as opposed to working with several separate contractors/subcontractors to perform the neutralization cyanide detoxification pretreatment.

The equipment required to perform the tank and pipe cleaning is readily available, mobile, and reliable. Excavation of only the drainfield pipe and tanks would be required for this alternative. There would be no maintenance of the equipment.

Off-site disposal, S1, could be readily implementable. There are two suitable landfill sites in the Pacific Northwest and licensed haulers are readily available for transport of the waste. Controls would be necessary to minimize fugitive dust emissions during excavation, transport and disposal.

Alternative S2 would be the most difficult soil alternative to implement. The technology requires that mobile equipment be transported and set up on site. In addition, the reliability of this process is not well known. A full-scale study has never been completed for this technology and it is not considered widely available for use. The equipment and personnel would have to be highly specialized.

Alternative S3 would be more difficult to implement due to uncertainties associated with the reliability and effectiveness of solidification and the potential for an increase in volume that occurs during solidification. None of these uncertainties can be fully addressed until after treatability studies are conducted. If the in-situ process was not successful, stabilized soils would have to be removed to an off-site disposal facility or covered with a multi-layer cap. In addition the future use of the site would have to be severely restricted, since contaminants would remain on site.

7. **Cost.** This criteria refers to the cost of implementing a remedial alternative, including operation and maintenance costs.

Alternative L/S 1 is the least expensive of the liquid/sludge alternatives. The cost for this alternative is roughly two thirds the cost of L/S 2. This primarily is due to the additional mobilization costs and equipment operating expense associated with alternative L/S 2.

The total cost of the debris alternative is $15,000. This includes costs for excavation, cleaning, disposal of rinsate and decontaminated pipe, and backfilling.

The costs of Alternatives S1 are the most certain at $221,000. The costs for S2 are less certain. Capital costs for S2 are $213,000 but treatability studies could increase costs by at least one third. The costs for S3 are even less certain. Capital costs for S3 are $99,000 but treatability testing, a potential requirement for a cap, and groundwater monitoring would increase costs for this alternative significantly above S1 and S2.

C. Modifying Criteria

Modifying criteria are used in the final evaluation of the remedial alternatives after the formal comment period, and may be used to modify the preferred alternative that was discussed in the proposed plan.

8. **State Acceptance.** This criteria refers to whether the state agrees with the preferred remedial alternative.

Ecology concurred with the selection of the preferred remedial alternative as presented in the proposed plan. Ecology has been involved with the development and review of the Remedial Investigation/Feasibility study, the Proposed Plan, and the Record of Decision.

9. Community Acceptance. This criteria refers to the public support of a given remedial alternative.

Written comments were received during the public comment period from the property owner. These comments were made regarding the contaminants identified beneath the Yakima Plating building and are addressed in the Responsiveness Summary in Appendix A.

Yakima residents present at the public meeting on August 21, 1991, did not express a preference for a particular alternative, nor was there any opposition to the EPA preferred alternative. Community response is presented in the Responsiveness Summary, which addresses questions received during the public meeting and the comment period.

IX. THE SELECTED REMEDY

The selected remedy is off-site treatment and disposal of liquids and sludges, decontamination of debris, and off-site treatment and disposal of soils. The selected remedy also includes institutional controls for contaminants remaining on site and monitoring of on-site groundwater.

The selected remedy is protective of human health and the environment, complies with state and federal laws, and is cost effective. It utilizes readily available technology for treatment and disposal of liquids/sludges and soils to prevent groundwater contamination. Promulgated state rules and regulations which are more stringent that federal requirements are included as ARARs.

Major Components of the Selected Remedy

Liquids and sludges that are currently in tanks and containers would be removed and treated and disposed off-site at a permitted RCRA hazardous waste facility. Remaining empty tanks/containers would either be decontaminated with other debris or disposed of with soils and pipes. This procedure would remove a potential sources of contamination to soil and groundwater using demonstrated, reliable technologies to treat and permanently dispose of these materials.

Underground tanks would be uncovered and decontaminated using either a solvent or water wash solution. Upon decontamination the tanks would be abandoned in place, in a manner to prevent future use, and covered to grade. Drainfield pipes would be excavated and disposed of along with other site soils, unless decontamination on-site can be achieved. Conformational sampling would be conducted to insure that decontamination of debris was successful. Liquids/sludges generated during the decontamination would be treated and disposed at an off-site hazardous waste facility. This procedure would eliminate a possible future source of contamination to soils and groundwater.

Contaminated soils above cleanup standards would be excavated, treated, and disposed of at a RCRA permitted hazardous waste landfill. Conformational sampling would be conducted to insure that removal of soils to cleanup levels has been achieved. This procedure would reduce contamination to levels that are protective of human health by lowering EPA's Hazard Index in surface soils and subsoils. Excavation and removal of these soils would achieve MTCA Method B cleanup levels, and remove a large proportion of the site contaminants that could, if remain untreated on-site, ultimately impact groundwater.

Institutional controls would be implemented to minimize potential exposure to release of hazardous substances during and following remedial activities. The purpose of these controls is to restrict groundwater use at the site, protect future workers in the Yakima Plating building from residual contamination on walls and floors, and require conformational sampling under the building when it is eventually demolished (either during or after the remedial action). These controls would remain in effect until building contaminants are characterized and remediated, if necessary, and until the groundwater monitoring program demonstrates that groundwater is below applicable federal and state standards and allows for unlimited groundwater use.

A groundwater monitoring program would be implemented to insure that the selected response action remains protective of human health and the environment. This program will specify which wells are to be sampled, how often, sampling procedures, and analytical methodology. In addition the number and locations of existing wells will be evaluated for their effectiveness in the groundwater monitoring program. Additional wells will be installed, by EPA, if EPA determines in consultation with Ecology, that the existing network is not adequate. Monitoring will generally consist of quarterly samples for the first two years following completion of remedial activities, at a minimum. If deemed appropriate, the sampling rate will be reduced to a lesser frequency for an additional 3 years. This program and well network will be evaluated periodically, by EPA, until contaminant levels in all wells indicate that no further action is required at the site.

To the extent required by law, EPA will review the site at least once every five years after the initiation of the remedial action. This review assures that the remedial action continues to protect human health and the environment and assesses the need for additional remediation by, EPA, for any hazardous substances, pollutants or contaminants remaining at the site. EPA will also evaluate risk posed by the site at the completion of the remedial action (i.e. before the site is proposed for deletion from the NPL). EPA will continually monitor groundwater to insure that the remedy is protective of public health.

Remediation Goals

By utilizing the results of the EPA risk assessment, reviewing site ARARs, considering factors related to technical limitations such as detection/quantitation limits, past history of the site, uncertainties and other pertinent information, chemical-specific remediation levels have been developed to mitigate existing and future threats to human health and the environment. Cleanup levels in soil and groundwater are set at the more stringent of NCP and MTCA standards.

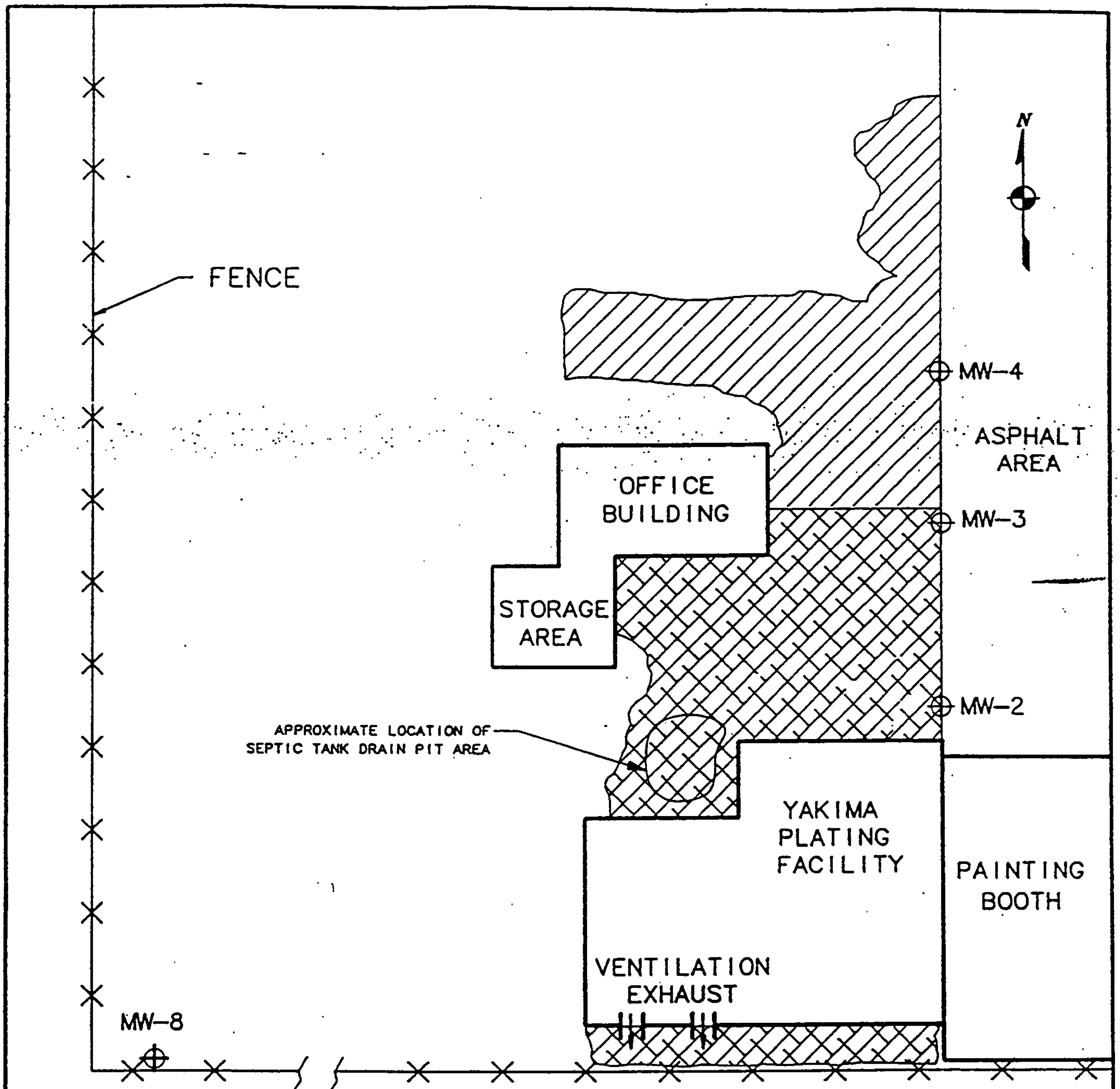
Soils and Groundwater

The MTCA cleanup standards at WAC 173-340-700 through 760 are relevant and appropriate requirements for the site. Ecology has indicated that the MTCA Method B cleanup standards for residential sites should be applied to Yakima Plating. These standards for soil and groundwater have been calculated by Ecology according to WAC 173-340-720, and are as follows:

Constituent	Soil (mg/kg)	Groundwater (ug/l)
Arsenic	20.0	5
Barium	4,600.0	800
Cadmium	40.0	8
Chromium	400.0	80
Lead	250.0	50
Nickel	1,600.0	320
Selenium	240.0	48
Cyanide	1,600.0	320
DDT	2.9	.26

These concentrations are estimated, by Ecology, to result in no acute or chronic toxic effects on human health via direct contact with contaminated soil by ingestion and inhalation and ingestion of groundwater. Arsenic levels were set at natural background for Washington State as determined under MTCA Method A; thus, arsenic was not included in Ecology's risk calculations. DDT, as an orchard contaminant was also not included in Ecology's risk calculations. Lead cleanup levels are based on MTCA Method A values, because no reference doses or slope factors are available.

Based on the sampling results from the Remedial Investigation these levels will apply to the locations identified in figure 7 and discussed in Section V, and correspond to those areas impacted by plating activities at Yakima Plating. These areas are as follows: Area B surface soils (those identified in figure 7), limited locations in Area A, South Ventilation Area surface soils, MW-2 subsurface soils, Septic tank Drainpit subsurface soils, and Drainline/Drainfield subsurface soils (those soils associated with the drainline). Excavation will occur in these areas and soils will be removed to the MTCA Method B levels identified above (volume estimates for these areas were presented in section VII.). Conformational sampling will be used to identify locations and insure that all soils in these locations, above MTCA cleanup levels, are removed. As previously discussed orchard contaminants (arsenic, lead, DDT etc) in Area A, Area B and the ventilation area will be remediated only if they co-occur with soil contaminated above clean up goals for plating associated wastes.



LEGEND

AREA OF CONTAMINATION FOR FACILITY SURFACE SOILS

AREA OF CONTAMINATION FOR DRAINFIELD SURFACE SOILS

MW-8 ⊕ MONITORING WELL

SCALE: 1"=30'

DEFINED AREAS OF SURFACE SOIL CONTAMINATION

YAKIMA PLATING
YAKIMA, WA

Figure 7

X. STATUTORY DETERMINATION

The procedures and standards for responding to release of hazardous substances, pollutants and contaminants at the site shall be in accordance with CERCLA, as amended by SARA, and to the maximum extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR Part 300 (1990), promulgated in the Federal Register on March 8, 1990.

EPA's primary responsibility at Superfund sites is to undertake remedial actions that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences, including: a requirement that EPA's remedial action, when complete, must comply with applicable or relevant and appropriate environmental standards established under federal laws and promulgated state laws, unless a statutory waiver is invoked; a requirement that EPA select a remedial action that is cost-effective and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a statutory preference for remedies that permanently and significantly reduce the volume, toxicity or mobility of hazardous substances over remedies that do not achieve such results through treatment. Remedial alternatives at the site were developed to the maximum extent practicable to be consistent with these Congressional mandates.

The selected remedy meets statutory requirements of Section 121 of CERCLA, as amended by SARA, and to the maximum extent practicable, the National Contingency Plan. The evaluation criteria are discussed below.

A. Protection of Human Health and the Environment

The selected remedy will provide long-term protection of human health and the environment by removing the contaminated soil and eliminating it as a potential source of groundwater contamination. These measures will also eliminate the exposure routes of inhalation and ingestion of contaminated soil particles, dermal contact with contaminated soil, and ingestion of contaminated groundwater.

No unacceptable short-term risks or cross-media impacts will be caused by implementation of the remedy. Soil excavation and debris decontamination could involve short-term exposure through inhalation of contaminated soil particles by site workers and nearby residents and dermal contact with contaminated soils by site workers. These exposures can be eliminated through the use of air monitoring and proper dust control measures during remedial activities, and by implementing a strict site-specific health and safety plan.

Institutional controls will also assist in controlling land and ground water uses.

B. Compliance with ARARs

The selected remedy will comply with all applicable, relevant, and appropriate requirements. No waiver of any ARAR is being sought or invoked for any component of the selected remedy. The laws and regulations of concern include but are not limited to the following:

Chemical-Specific ARARs

Chemical-specific requirements are usually health-or risk-based numerical vales or methodologies that establish the acceptable amount or concentration of a chemical in the ambient environment. The following are the chemical specific requirements for Yakima Plating.

Cleanup standards from the Washington State Model Toxics Control Act (MTCA) Method B (WAC 173-340-740(3) will be the primary "applicable" chemical specific ARAR. Cleanup standards were calculated using MTCA Method B using the "residential" site scenario. Electroplating related substances in the soil and groundwater that exceed MTCA cleanup standards include cadmium, lead, chromium, and nickel.

Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs) (40 C.F.R. 141-147) are relevant and appropriate to the groundwater at the site as well as MTCA Level B groundwater cleanup levels (WAC 173-340-740(2). For Yakima Plating, the SDWA MCLs are important ARARs for groundwater cleanup only to the extent that the method B cleanup standards calculated under MTCA must be at least as stringent as the MCLs. None of the contaminants of concern have been detected at levels exceeding their MCLs, except for MW-2 and one sample from MW-7, which was discussed in Section V.

Location specific ARARs

No location-specific ARARs affect the remedial action to be implemented at the Yakima Plating site.

Action-Specific ARARs.

Action-specific ARARs are technology-or activity-based requirements or limitations on actions affecting hazardous wastes. These requirements are triggered by the particular remedial activities selected to cleanup the site.

Liquids and Sludges contaminated with listed wastes must be handled as hazardous wastes, according to the requirements under RCRA at 40 C.F.R. Parts 260-265, when these materials are transported, treated, and disposed of. The spent plating solutions and sludges have been identified as RCRA listed hazardous wastes. Septic and sedimentation tank sludges are also listed RCRA hazardous waste. Contaminated soil and groundwater must be managed as hazardous waste until they no longer "contain" hazardous waste (i.e., have been treated to below risk-based levels). Sludges and soils will have to be treated to meet the concentration-based LDRs prior to being placed in an off-site RCRA permitted landfill. These requirements will be achieved through use of a RCRA approved treatment and disposal facility.

40 CFR 264.197(a) defines closure and post-closure requirements for tank systems and are applicable requirements for decontamination of the debris. In addition, 40 CFR 261.7 is also applicable and provides guidance on how to render a container "empty" and consequently exempted from being considered a hazardous waste. These requirements apply to the debris and will be achieved through the decontamination procedures.

Since contaminated soils above MTCA cleanup levels could remain beneath the Yakima Plating building MTCA compliance monitoring and institutional control requirements (WAC 173-340-360(8)(b) will be applicable. These requirements will be achieved through the use of institutional controls on the property and the groundwater monitoring program.

Federal and State air standards are administered at the local level. Emissions (dusts) from the soil excavation and removal activities will comply with these standards by using standard and best engineering practices for dust control.

C. Cost-Effectiveness

The selected remedy is cost-effective when the degree of protectiveness it provides is compared to the overall protectiveness provided by the on-site treatment technologies. Given the uncertainties associated with the costs for the on-site treatment options they do not offer significant savings over the selected remedy and in fact could ultimately be substantially more costly.

D. Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

In selecting a remedy consideration was given to the total volumes of material to be remediated, the long term effectiveness and permanence, reduction in toxicity mobility or volume, short-term effectiveness; implementability; and cost. In addition consideration was given to the current and potential future use of the property. The selected remedy provides the best balance of tradeoffs in addressing these considerations.

The selected remedy provides a permanent solution with a proven technology to meet the land disposal restriction requirements. The selected remedy provides minimal uncertainty, and minimal long term-and short term risk. The selected remedy is more reliable, is cost-effective, and can be implement with less difficulty and no greater short term impacts than the other treatment alternatives. It is therefore considered to be the most appropriate solution to contamination at the site and represents the maximum extent to which permanent solutions and treatment are practicable.

E. Preference for Treatment as a Principal Element

The selected remedy satisfies, in part, the statutory preference for treatment as a principal element. The principal threat to human health is from ingestion of and direct contact with contaminated soils. Soils will be treated prior to disposal at an approved RCRA landfill. This remedy employs treatment technologies as required by the RCRA land disposal restriction requirements.

XI. Documentation of Significant Changes

The proposed Plan for the Yakima Plating site was released for public comment on August 13, 1991. The proposed plan identified Alternatives L/S 1, D1, and S1 as the preferred alternatives. Written comments from the Yakima Plating property owner and the Washington Department of Ecology were received during the public comment period and are addressed in the attached responsiveness summary. Based upon the response to these comments no significant changes to the remedy, as it was originally identified in the Proposed Plan, were made.

APPENDICES

RECORD OF DECISION
YAKIMA PLATING
YAKIMA, WASHINGTON

YAKIMA PLATING SITE RESPONSIVENESS SUMMARY

I. Community Relations History

CERCLA requirements for public participation include releasing the Remedial Investigation and Feasibility Study Reports and the Proposed Plan to the public and providing a public comment period on the Feasibility Study and Proposed Plan. EPA met these requirements in August 1991 by placing both documents in the public information repositories for the site and mailing copies of the proposed plan to individuals on the mailing list. EPA published a notice of the release of the RI/FS and proposed plan in the Yakima Herald on August 12 and September 1, 1991. Notice of the 30 day public comment period and the public meeting discussing the proposed plan were included in the newspaper notice. A public meeting was held on August 21, 1991, at the Cascade Natural Gas Building. The public comment period ended on September 11, 1991, with one letter from the public.

To date, the following community relations activities have been conducted by EPA at the Yakima Plating site:

March 1990	EPA distributed a fact sheet inviting citizens to an open house, with the purpose of developing a Community Relations Plan.
May 1990	EPA released a Community Relations Plan, which included interviews from members of the community and local officials.
May 1990	EPA released a fact sheet announcing the beginning of the RI/FS and the availability of the Community Relations Plan.
February 1991	EPA released a Yakima area fact sheet, which included all the sites in the Yakima area. Yakima Plating section contained history of the site activities.
August 8, 1991	EPA mailed the proposed plan fact sheet, which explained the results of the RI/FS and EPA's preferred plan for public comment. The fact sheet announced a public meeting for August 21, 1991, and gave the dates of the public comment period.
August 12, 1991	A public notice in the Yakima Herald described the availability of the proposed plan and the RI/FS, and announced the dates of the public meeting and public comment period.

August 13 - September 11, 1991	Public comment period for proposed plan and RI/FS.
September 1, 1991	Additional public notice in the Yakima Herald announcing the end of the comment period on September 11, 1991.
August 21, 1991	EPA conducted a public meeting for interested community members.
September 20, 1991	Responsiveness Summary prepared.

II. Overview

Yakima Plating is a plating facility located within the southern city limits of Yakima, at 1804 1\2 South Third Avenue. The area surrounding the site is primarily mixed residential and light commercial property.

The facility conducted electroplating operations of automobile bumpers from the early 1960's until 1990. During its operation, the facility discharged a number of plating wastes to an on-site sedimentation tank and drain field. These wastes contained a variety of metals including nickel, cadmium and chromium.

In 1986, an EPA site investigation found evidence of heavy metals in the ground water at Yakima Plating. On March 31, 1989, the site was placed on EPA's National Priorities List of sites requiring further investigation.

EPA recently completed the RI/FS and the Human Health Risk Assessment for the site. These reports may be reviewed at the information repository.

On August 12, 1991 EPA published it's preferred alternative for cleaning up the site, in a document called a Proposed Plan. The Proposed Plan, as well as the reports of the investigation, were released for public comment. EPA's preferred alternative included:

- Excavation and decontamination of underground tanks on-site.
- Removal of liquids currently stored in containers.
- Excavation of contaminated soils.
- Disposal of contaminated materials at a hazardous waste disposal facility.
- Monitoring of groundwater until it is determined that the remedy has been successful.

- Institutional controls to restrict site use.

The remainder of this document discusses the comments received during the comment period from August 12 to September 11, 1991.

III. Summary of Comments Received and Lead Agency Response

EPA held a public meeting on August 21, 1991 at the Cascade Natural Gas Building. Approximately seven people attended the meeting. At this meeting representatives of EPA provided information on the history and the RI/FS including the risk assessment and a summary of the proposed plan. A question and answer period followed the EPA presentations. Questions included the timing of the proposed remedial action, contamination associated with the building, dust control, sampling procedures, use of institutional controls, the role of the state, and general technical questions regarding the findings of the RI/FS.

A copy of the meeting transcript, which includes all questions and answers, is available at the Yakima Valley Regional Library.

The following is a summary of the questions posed to EPA during the public comment period and EPA's response to those questions:

Comments From the Yakima Plating Property Owner

1. One comment stated that the removal of the debris from the site was not fully considered and that institutional controls would still be required for these materials.

Response: The debris alternative will decontaminate the two underground tanks with either a water or solvent rinse. Contaminated wastewater will be removed for off-site treatment and disposal. The underground drainfield pipe will either be decontaminated or removed from the site with the contaminated soils. After completion of these steps there will not be any contamination associated with the debris and therefore institutional controls will not be required for these materials.

2. Another comment requested that EPA fully consider additional sampling under the Yakima Plating building and removal of contamination if warranted, even if building demolition would be required.

Response: The presence of the building, as a cap, in combination with the current information on potential contamination under the building appears to be adequately protective of public health. The building floor currently protects individuals from direct contact with soils and reduces the potential for rainwater to infiltrate through soils to groundwater. In addition, as part of the overall remedy for the site groundwater monitoring will be conducted to insure that the site remedy continues to be protective. Institutional controls related to the building will also be required until additional sampling is conducted and appropriate action, if necessary, is taken.

There is the possibility that excavation of soils in the area of the septic tank drain pit and MW-2 could impact at least a portion of the building. If this is the case EPA will have to re-evaluate the alternatives associated with the building. Language to this effect will be included in the ROD. If it became apparent that building demolition would be required in order to remove all contaminants in these areas the ROD would be amended by an Explanation of Significant Difference. In such a case EPA would conduct additional sampling under the building and take appropriate action based upon the results.

Comments from the Washington Department of Ecology

1. Filtered groundwater samples are not acceptable for demonstrating compliance after source removal.

Response: EPA's goal in sampling is to collect samples which accurately represent the groundwater quality. The actual type of sampling (filtered vs. unfiltered) as well as other groundwater monitoring details will be developed during the remedial design and remedial action phases for the site. This program will be developed by EPA, in consultation with Ecology.

2. Language in the ROD should completely discuss rationale for the orchard contaminants remaining on site.

Response: Based upon the sampling information collected during the RI/FS, historical aerial photographs for the site, and our knowledge of pesticide use in the area in the past it is apparent that the orchard contaminants (lead, arsenic, DDT) are not related to the activities of Yakima Plating. It is EPA's policy not to clean up an area that exceeds the site boundarys and is associated with an uncontrollable source. In addition the presence of the orchard contaminants alone in surface soils on the site does not present an unacceptable risk to human health. Even the presence of these contaminants in groundwater are within EPA's acceptable risk range. This justification will be included in the ROD.

3. Request to see Method B soil volume calculations.

Response: These calculations were provided to Ecology

4. Discussions in the ROD should use consistent scientific units.

Response: - An attempt will be made in the ROD to insure that units are consistent in tables and the overall discussion.

5. Cleanup levels are set at the more stringent of NCP and MTCA standards. The ROD should state so explicitly.

Response: This statement will be included in the discussion of remediation goals in the ROD.

6. The discussion of alternatives is difficult to follow. A table of the various alternatives would be helpful.

Response: In the ROD each alternative will be given a self-explanatory name and a table of all alternatives will be provided.

7. Stating that orchard contaminants remain on site in the Notice to Deed should be part of the institutional controls.

Response: These contaminants have been identified in a number of areas both on and off the site and are considered to be area wide. For this reason EPA feels that it is inappropriate to restrict use of the Yakima Plating property with a deed restriction for orchard contaminants. If this restriction was applied to the Yakima Plating Site it would also have to be applied to all other properties where these contaminants were identified during the RI FS. In addition, based on the site risk assessment, EPA believes that the presence of these contaminants alone in surface soil, do not present an unacceptable human health risk.

8. The sedimentation and septic tanks should be abandoned in a way that prevents future use.

Response: EPA agrees and language stating this will be put into the ROD.

9. The contamination under the Yakima Plating building deserves discussion prior to being mentioned under institutional controls.

Response: The section in the ROD on site contaminants will include a complete discussion of building contamination. Additional discussion of building contamination will also be provided in the ROD prior to the full alternatives analysis.

U.S. ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

ADMINISTRATIVE RECORD INDEX
for
YAKIMA PLATING SUPERFUND SITE

Yakima, Washington

September 25, 1991

YAKIMA PLATING CO. - ADMINISTRATIVE RECORD INDEX

HEADING: 1. 0. . SITE IDENTIFICATION

SUB-HEAD: 1. 1. . Correspondence

1. 1. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 04/28/81 PAGES: 1
AUTHOR: Kenneth H. Mosbaugh/Environmental Protection Agency (EPA)
ADDRESSEE: Jack Stanton/Yakima Plating
DESCRIPTION: Letter regarding arrangement for samples to be collected and analyzed

1. 1. . - 0002 Microfilm Reel Frame Begins Ends
DATE: 10/03/84 PAGES: 1
AUTHOR: B. Morson/JRB Associates
ADDRESSEE: Bill Thompson/Yakima Sewer Utility
DESCRIPTION: Record of communication stating no sewer line within a block of Yakima Plating according to city's sewer maps

1. 1. . - 0003 Microfilm Reel Frame Begins Ends
DATE: 12/10/85 PAGES: 2
AUTHOR: William Carberry/Ecology & Environment (E & E)
ADDRESSEE: Jack Stanton/Yakima Plating
DESCRIPTION: Confirmation of visit to Yakima Plating for a site inspection

1. 1. . - 0004 Microfilm Reel Frame Begins Ends
DATE: 04/02/86 PAGES: 2
AUTHOR: Debbie Flood/EPA
ADDRESSEE: Barbara Lither/EPA
DESCRIPTION: Memorandum regarding denied access to Yakima Plating

1. 1. . - 0005 Microfilm Reel Frame Begins Ends
DATE: 10/24/86 PAGES: 1
AUTHOR: William Carberry/E & E
ADDRESSEE: John Osborn/EPA
DESCRIPTION: Memorandum regarding residential wells sampled during Yakima Plating field work

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1. 1. . - 0006 Microfilm Reel Frame Begins Ends
DATE: 01/21/87 PAGES: 1
AUTHOR: A.B. Fortier/Kirschenmann, Devine, Fortier & Raber, Inc. P.S.
ADDRESSEE: Deborah Flood/EPA
DESCRIPTION: Request for report concerning findings from the wells on the Yakima Plating property

1. 1. . - 0007 Microfilm Reel Frame Begins Ends
DATE: 02/02/87 PAGES: 1
AUTHOR: Deborah Flood/EPA
ADDRESSEE: Robert Mastel/Autocraft Paint and Body Shop
DESCRIPTION: Notice that groundwater is contaminated in the location of one of the downgradient monitoring wells installed by EPA

1. 1. . - 0008 Microfilm Reel Frame Begins Ends
DATE: 04/07/87 PAGES: 1
AUTHOR: David Bennett/EPA
ADDRESSEE: William Carberry/E & E
DESCRIPTION: Record of communication stating that surface water intakes are actually on Bachelor Creek rather than Wide Hollow Creek and Site Investigation Report and HRS Package must be corrected

1. 1. . - 0009 Microfilm Reel Frame Begins Ends
DATE: 04/29/87 PAGES: 1
AUTHOR: Deborah Flood/EPA
ADDRESSEE: Robert Mastel/Autocraft Paint & Body Shop
DESCRIPTION: Notice of corrections to be made to site inspection report

1. 1. . - 0010 Microfilm Reel Frame Begins Ends
DATE: 07/06/87 PAGES: 1
AUTHOR: Debbie Flood/EPA
ADDRESSEE: File/EPA
DESCRIPTION: Memorandum stating the Autocraft well is about 100 feet from monitoring well #2 installed by E & E

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SUB-HEAD: 1. 2. . Background

1. 2. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 01/14/72 PAGES: 6
AUTHOR: /Washington Department of Ecology (WDOE)
ADDRESSEE: /
DESCRIPTION: Various waste water permit documents regarding Yakima Plating

1. 2. . - 0002 Microfilm Reel Frame Begins Ends
DATE: 01/14/72 PAGES: 2
AUTHOR: Jack H. Stanton/Yakima Plating
ADDRESSEE: /WDOE
DESCRIPTION: Application for waste water permit

SUB-HEAD: 1. 3. . Dispositions

1. 3. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 03/21/85 PAGES: 2
AUTHOR: Robert Keivit/EPA
ADDRESSEE: /
DESCRIPTION: Potential Hazardous Waste Site Disposition for Yakima Plating

1. 3. . - 0002 Microfilm Reel Frame Begins Ends
DATE: 01/20/87 PAGES: 2
AUTHOR: Deborah Flood/EPA
ADDRESSEE: /
DESCRIPTION: Potential Hazardous Waste Site Disposition for Yakima Plating

SUB-HEAD: 1. 4. . Preliminary Assessment (PA) Report

1. 4. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 11/20/84 PAGES: 6
AUTHOR: Ned Theiren/WDOE
ADDRESSEE: /
DESCRIPTION: Potential Hazardous Waste Site Preliminary Assessment Summary Memorandum for Yakima Plating

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1. 4. . - 0002 Microfilm Reel Frame Begins Ends
DATE: / / PAGES: 3
AUTHOR: /GeoResource Consultants
ADDRESSEE: /JRB Associates
DESCRIPTION: Attachment B RCRA Section 3012 Preliminary Assessment Program Surface and Groundwater Hydrology

SUB-HEAD: 1. 5. . Site Inspection (SI) Report

1. 5. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 01/02/86 PAGES: 4
AUTHOR: William Carberry/E & E
ADDRESSEE: John Osborn/EPA
DESCRIPTION: Yakima Plating Trip Report

1. 5. . - 0002 Microfilm Reel Frame Begins Ends
DATE: 10/01/86 PAGES: 100
AUTHOR: William Carberry/E & E
ADDRESSEE: J.E. Osborn/EPA
DESCRIPTION: Site Inspection Report for Yakima Plating Company, Inc. Yakima, Washington

SUB-HEAD: 1. 6. . Sampling and Analysis Plan

1. 6. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 03/01/86 PAGES: 32
AUTHOR: William Carberry/E & E
ADDRESSEE: J.E. Osborn/EPA
DESCRIPTION: Proposed Sampling Plan QA Project Plan for: Yakima Plating Company, Inc. Yakima, Washington

SUB-HEAD: 1. 7. . Sampling and Analysis Data

1. 7. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 06/12/86 PAGES: 6
AUTHOR: John Ryding/E & E
ADDRESSEE: John Osborn/EPA
DESCRIPTION: QA of Case 5951 (inorganics) Yakima Plating, WA (Data package located at EPA Region 10 Headquarters, Seattle, WA)

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1. 7. . - 0002 Microfilm Reel Frame Begins Ends
DATE: 06/12/86 PAGES: 9
AUTHOR: John Ryding/E & E
ADDRESSEE: John Osborn/EPA
DESCRIPTION: QA of Case 5951 (inorganics) Yakima Plating, WA (Data package available at EPA Region 10 Headquarters, Seattle, WA)

1. 7. . - 0003 Microfilm Reel Frame Begins Ends
DATE: 06/17/86 PAGES: 9
AUTHOR: John Ryding/E & E
ADDRESSEE: John Osborn/EPA
DESCRIPTION: QA of Case 5951 (inorganics) Yakima Plating, WA (Data package located at EPA Region 10 Headquarters, Seattle, WA)

1. 7. . - 0004 Microfilm Reel Frame Begins Ends
DATE: 06/26/86 PAGES: 11
AUTHOR: John Ryding/E & E
ADDRESSEE: John Osborn/EPA
DESCRIPTION: QA of Case 5951 (inorganics) Yakima Plating, WA (Data package located at EPA Region 10 Headquarters, Seattle, WA)

1. 7. . - 0005 Microfilm Reel Frame Begins Ends
DATE: 06/27/86 PAGES: 13
AUTHOR: John Ryding/E & E
ADDRESSEE: John Osborn/EPA
DESCRIPTION: QA of Case 5951 (inorganics) Yakima Plating, WA (Data package located at EPA Region 10 Headquarters, Seattle, WA)

1. 7. . - 0006 Microfilm Reel Frame Begins Ends
DATE: 07/01/86 PAGES: 25
AUTHOR: Robert Stuart/E & E
ADDRESSEE: John Osborn/EPA
DESCRIPTION: QA of Case 5951 (BNAs & Pesticides) Yakima Plating, WA (Data package located at EPA Region 10 Headquarters, Seattle, WA)

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1. 7. . - 0007 Microfilm Reel Frame Begins Ends
DATE: 07/07/86 PAGES: 77
AUTHOR: John Ryding/E & E
ADDRESSEE: John Osborn/EPA
DESCRIPTION: QA of Case 5951 (inorganics) Yakima Plating, WA (Data package located at EPA Region 10 Headquarters, Seattle, WA)

1. 7. . - 0008 Microfilm Reel Frame Begins Ends
DATE: 07/16/86 PAGES: 75
AUTHOR: John Ryding/E & E
ADDRESSEE: John Osborn/EPA
DESCRIPTION: QA of Case 5951 (organics) Yakima Plating, WA (Data package located at EPA Region 10 Headquarters, Seattle, WA)

1. 7. . - 0009 Microfilm Reel Frame Begins Ends
DATE: 07/21/86 PAGES: 55
AUTHOR: John Ryding/E & E
ADDRESSEE: John Osborn/EPA
DESCRIPTION: QA of Case 5951 (organics) Yakima Plating, WA (Data package located at EPA Region 10 Headquarters, Seattle, WA)

1. 7. . - 0010 Microfilm Reel Frame Begins Ends
DATE: 09/03/86 PAGES: 10
AUTHOR: /EPA
ADDRESSEE: /
DESCRIPTION: EPA Region X Lab Management System Sample/Project Analysis Results Yakima Plating Co. - Metals EP Toxicity

1. 7. . - 0011 Microfilm Reel Frame Begins Ends
DATE: 11/23/88 PAGES: 15
AUTHOR: Robert Rau/E & E
ADDRESSEE: Richard Fullner/E & E
DESCRIPTION: Trip Report: Groundwater Monitoring at Yakima Plating

1. 7. . - 0012 Microfilm Reel Frame Begins Ends
DATE: / / PAGES: 4
AUTHOR: /
ADDRESSEE: /
DESCRIPTION: Appendix B Table B2 Sample Summary Table - Yakima Plating Company Case No: 5951

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HEADING: 2. 0. . REMEDIAL INVESTIGATION/FEASIBILITY STUDY (RI/FS)

SUB-HEAD: 2. 2. . Work Plan

2. 2. . - 0001 Microfilm Reel Frame Begins Ends
DATE: / / PAGES: 5
AUTHOR: /
ADDRESSEE: /
DESCRIPTION: Statement of Work, Yakima Plating, Yakima, Washington Remedial Investigation/Feasibility Study

2. 2. . - 0002 Microfilm Reel Frame Begins Ends
DATE: 04/12/90 PAGES: 144
AUTHOR: /E & E
ADDRESSEE: /EPA
DESCRIPTION: Work Plan Remedial Investigation and Feasibility Study (RI/FS) Yakima, Plating Yakima Washington

2. 2. . - 0003 Microfilm Reel Frame Begins 1 Ends 1
DATE: 11/13/90 PAGES: 71
AUTHOR: /E & E
ADDRESSEE: /EPA
DESCRIPTION: Work Plan Remedial Investigation and Feasibility Study (RI/FS) Yakima Plating, Yakima, WA

SUB-HEAD: 2. 3. . Quality Assurance Project Plan

2. 3. . - 0001 Microfilm Reel Frame Begins 1 Ends 1
DATE: 05/18/90 PAGES: 42
AUTHOR: /E & E
ADDRESSEE: /EPA
DESCRIPTION: Yakima Plating Remedial Investigation/Feasibility Study Quality Assurance Project Plan

2. 3. . - 0002 Microfilm Reel Frame Begins 1 Ends 1
DATE: 11/13/90 PAGES: 8
AUTHOR: /E & E
ADDRESSEE: /EPA
DESCRIPTION: Yakima Plating Remedial Investigation/Feasibility Study Quality Assurance Project Plan

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SUB-HEAD: 2. 4. . Sampling and Analysis Data

2. 4. . - 0001 Microfilm Reel Frame Begins 1 Ends 1
DATE: 09/28/90 PAGES: 26
AUTHOR: /E & E
ADDRESSEE: /EPA
DESCRIPTION: Interim Data Presentation for the Remedial Investigation at Yakima Plating, Yakima, WA

SUB-HEAD: 2. 5. . Feasibility Study (FS)

2. 5. . - 0001 Microfilm Reel Frame Begins 1 Ends 1
DATE: 08/01/91 PAGES: 132
AUTHOR: /E & E
ADDRESSEE: /EPA
DESCRIPTION: Feasibility Study Report for Yakima Plating Yakima, Washington

SUB-HEAD: 2. 6. . Applicable or Relevant and Appropriate Requirements (ARARs)

2. 6. . - 0001 Microfilm Reel Frame Begins 1 Ends 1
DATE: 08/01/91 PAGES: 47
AUTHOR: /E & E
ADDRESSEE: /
DESCRIPTION: Assessment of Applicable or Relevant and Appropriate Requirements (ARARs) Yakima Plating Yakima, Washington

SUB-HEAD: 2. 7. . Remedial Investigation (RI)

2. 7. . - 0001 Microfilm Reel Frame Begins 1 Ends 1
DATE: 08/01/91 PAGES: 520
AUTHOR: /E & E
ADDRESSEE: /EPA
DESCRIPTION: Remedial Investigation Report for Yakima Plating Yakima, Washington Volume 1

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2. 7. . - 0002 Microfilm Reel Frame Begins 1 Ends 1
DATE: 08/01/91 PAGES: 896
AUTHOR: /E & E
ADDRESSEE: /EPA
ESCRIPTION: Remedial Investigation Report for Yakima Plating Yakima, Washington Volume 2

SUB-HEAD: 2. 8. . Proposed Plan

2. 8. . - 0001 Microfilm Reel Frame Begins 1 Ends 1
DATE: 08/08/91 PAGES: 7
AUTHOR: /EPA
ADDRESSEE: /General Public
ESCRIPTION: Superfund Fact Sheet The Proposed Plan Yakima Plating, Yakima, Washington

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HEADING: 4. 0. . STATE COORDINATION

SUB-HEAD: 4. 1. . Correspondence

4. 1. . - 0001 Microfilm Reel Frame Begins 1 Ends 1
DATE: 01/22/91 PAGES: 1
AUTHOR: Bill Adams/EPA
ADDRESSEE: Bonnie Rose/WDOE
DESCRIPTION: Request for Site-Specific ARARs

4. 1. . - 0002 Microfilm Reel Frame Begins 1 Ends 1
DATE: 03/11/91 PAGES: 6
AUTHOR: Bonnie Rose/WDOE
ADDRESSEE: Bill Adams/EPA
DESCRIPTION: Letter re: Draft Site-Specific ARARs for Yakima Plating

4. 1. . - 0003 Microfilm Reel Frame Begins 1 Ends 1
DATE: 04/22/91 PAGES: 4
AUTHOR: Bonnie Rose/WDOE
ADDRESSEE: Bill Adams/EPA
DESCRIPTION: Letter re: Yakima Plating - Preliminary Assessment of ARARs

4. 1. . - 0004 Microfilm Reel Frame Begins 1 Ends 1
DATE: 06/14/91 PAGES: 24
AUTHOR: Bonnie Rose/WDOE
ADDRESSEE: Bill Adams/EPA
DESCRIPTION: Letter re: Yakima Plating - Draft Feasibility Study (FS) Report, MTCA Cleanup Levels attached

4. 1. . - 0005 Microfilm Reel Frame Begins 1 Ends 1
DATE: 07/26/91 PAGES: 3
AUTHOR: Bonnie Rose/WDOE
ADDRESSEE: Bill Adams/EPA
DESCRIPTION: Letter re: Yakima Plating - Draft Proposed Plan Comments

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HEADING: 5. 0. . ENFORCEMENT

SUB-HEAD: 5. 2. . Affidavits

5. 2. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 04/30/86 PAGES: 6
AUTHOR: /U.S. District Court
ADDRESSEE: /
DESCRIPTION: Affidavit of Deborah Flood

SUB-HEAD: 5. 3. . Notice Letters and Responses

5. 3. . - 0001 Microfilm Reel Frame Begins 1 Ends 1
DATE: 12/14/90 PAGES: 6
AUTHOR: Philip Millam/EPA
ADDRESSEE: Robert J. Mastel/
DESCRIPTION: Notification of potential liability as defined by Section 107(a) of CERCLA, notification of response activities

5. 3. . - 0002 Microfilm Reel Frame Begins 1 Ends 1
DATE: 12/17/90 PAGES: 4
AUTHOR: Philip Millam/EPA
ADDRESSEE: Fred Halverson/
DESCRIPTION: Notification of potential liability as defined by Section 107(a) of CERCLA, notification of response activities

5. 3. . - 0003 Microfilm Reel Frame Begins 1 Ends 1
DATE: 12/14/90 PAGES: 4
AUTHOR: Philip Millam/EPA
ADDRESSEE: Mike Schliep/
DESCRIPTION: Notification of potential liability as defined by Section 107(a) of CERCLA, notification of response activities

5. 3. . - 0004 Microfilm Reel Frame Begins 1 Ends 1
DATE: 12/14/90 PAGES: 4
AUTHOR: Philip Millam/EPA
ADDRESSEE: Jack Stanton/
DESCRIPTION: Notification of potential liability as defined by Section 107(a) of CERCLA, notification of response activities

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5. 3. . - 0005 Microfilm Reel Frame Begins 1 Ends 1
DATE: 01/07/91 PAGES: 2
AUTHOR: F.N. Halverson/Halverson & Applegate
ADDRESSEE: Bill Adams/EPA
DESCRIPTION: Letter confirming joint telephone conversation with Bill Adams and Mike Schliep on 1/4/91

5. 3. . - 0006 Microfilm Reel Frame Begins 1 Ends 1
DATE: 02/25/91 PAGES: 3
AUTHOR: Joseph D. Hampton/Bogle & Gates
ADDRESSEE: Bill Adams/EPA
DESCRIPTION: Response to EPA's 12/14/91 notice letter

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HEADING: 6. 0. . HEALTH ASSESSMENTS

SUB-HEAD: 6. 1. . Correspondence

6. 1. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 12/29/89 PAGES: 1
AUTHOR: Chester L. Tate, Jr./Agency for Toxic Substances and Disease Registry (ATSDR)
ADDRESSEE: Phil Millam/EPA
ESCRIPTION: Cover letter for draft ATSDR Health Assessment

6. 1. . - 0002 Microfilm Reel Frame Begins Ends
DATE: 01/23/90 PAGES: 1
AUTHOR: Philip G. Millam/EPA
ADDRESSEE: Chester L. Tate, Jr./ATSDR
ESCRIPTION: Comments on draft ATSDR Health Assessment

SUB-HEAD: 6. 2. . ATSDR Health Assessment

6. 2. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 01/02/90 PAGES: 16
AUTHOR: /ATSDR
ADDRESSEE: /EPA
ESCRIPTION: Preliminary Health Assessment for Yakima Plating Company Proposed National Priorities List (NPL) Site

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HEADING: 9. 0. . PUBLIC PARTICIPATION

SUB-HEAD: 9. 1. . Correspondence

9. 1. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 12/08/88 PAGES: 2
AUTHOR: Kathryn M. Davidson/EPA
ADDRESSEE: Ken Back/Washington Department of Community Development
DESCRIPTION: Notification of Yakima Plating as a proposed Superfund project

9. 1. . - 0002 Microfilm Reel Frame Begins Ends
DATE: 03/13/90 PAGES: 1
AUTHOR: Michelle Pirzadeh/EPA
ADDRESSEE: Richard Zais, Jr./City of Tacoma
DESCRIPTION: Confirmation of meeting to discuss city and community concerns about the Yakima Plating site

9. 1. . - 0003 Microfilm Reel Frame Begins Ends
DATE: 03/14/90 PAGES: 4
AUTHOR: Michelle Pirzadeh/EPA
ADDRESSEE: Resident/4 Addresses
DESCRIPTION: Cover letter for fact sheet and notification that residents will have the opportunity to meet with EPA to discuss private well sampling

SUB-HEAD: 9. 2. . Community Relations Plan

9. 2. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 05/16/90 PAGES: 9
AUTHOR: /EPA
ADDRESSEE: /General Public
DESCRIPTION: Community Relations Plan Yakima Plating Yakima, Washington

SUB-HEAD: 9. 3. . Fact Sheets/Press Releases

9. 3. . - 0001 Microfilm Reel Frame Begins Ends
DATE: 03/15/90 PAGES: 2
AUTHOR: /EPA
ADDRESSEE: /General Public
DESCRIPTION: Superfund Fact Sheet Yakima Plating, Yakima, Washington

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9. 3. . - 0002 Microfilm Reel Frame Begins 1 Ends 1
DATE: 05/28/90 PAGES: 2
AUTHOR: /EPA
ADDRESSEE: /General Public
DESCRIPTION: Fact sheet for Yakima Plating Superfund Site announcing the start of field work and availability of the Community Relations Plan

9. 3. . - 0003 Microfilm Reel Frame Begins 1 Ends 1
DATE: 02/13/91 PAGES: 3
AUTHOR: /EPA
ADDRESSEE: /General Public
DESCRIPTION: Superfund Fact Sheet: Yakima Area Fact Sheet, updating information regarding EPA's sites in the Yakima area (including Yakima Plating) and giving a brief explanation of the Superfund process

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HEADING: 10. 0. . TECHNICAL SOURCES AND GUIDANCE DOCUMENTS

SUB-HEAD: 10. 1. . EPA Guidance

.0. 1. . - 0001 Microfilm Reel Frame Begins 1 Ends 1
DATE: 07/03/91 PAGES: 4
AUTHOR: /EPA
ADDRESSEE: /
)ESCRIPTION: List of EPA Guidances used for Administrative Records