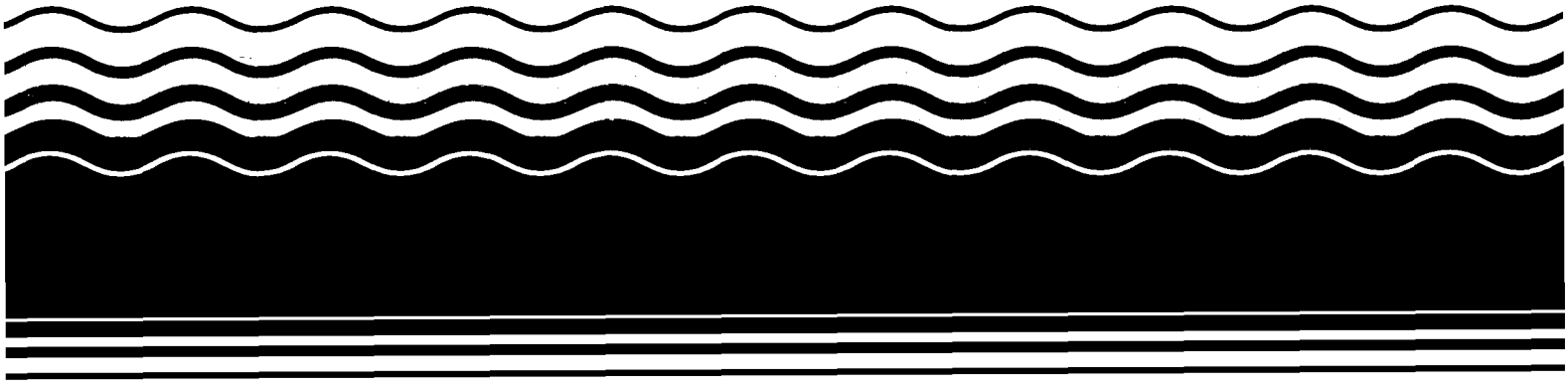
PB95-963116
EPA/ESD/R10-94/089
March 1995

EPA Superfund Explanation of Significant Difference for the Record of Decision:

Yakima Plating Superfund Site, Yakima, WA 4/22/1994



Explanation of Significant Difference

Yakima Plating Superfund Site
Yakima, Washington

I. INTRODUCTION

The Yakima Plating Superfund site has met all groundwater remedial action objectives specified in the Record of Decision (ROD). This Explanation of Significant Difference (ESD) documents a change in the post-remedial groundwater monitoring plan specified in the ROD, as required by the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 117(c), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Section 300.435 (c)(2)(i). EPA and the State of Washington Department of Ecology (Ecology) agree that groundwater concentrations of plating constituents meet health-based standards and that the site is now eligible for deletion from the National Priorities List (NPL).

II. SUMMARY OF SITE CONDITIONS

SITE LOCATION AND HISTORY

The Yakima Plating site is located in Yakima, Washington. The Yakima Plating facility occupied the western 0.94 acres of a 2-acre parcel shared with a separate auto repair business. The site is located approximately 3 miles northeast of the Yakima Municipal airport in central Yakima County, Washington in a mixed light commercial and residential neighborhood, as seen in **Figure 1** on the next page.

The facility conducted electroplating operations of automobile bumpers from the early 1960's until 1990. Yakima Plating operated from three buildings including a concrete block structure used for plating operations, a corrugated metal-sided structure used as an office and for storage, and a wood-frame, plywood-sided structure also used for storage. During its operation, the facility discharged plating wastes to an on-site sedimentation tank and drain field. These wastes contained a variety of metals including nickel, cadmium, and chromium.

REMEDIAL PLANNING/PRE-RECORD OF DECISION (ROD) ACTIVITIES:

A Preliminary Assessment (PA) was completed at the Yakima Plating facility by 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. This investigation indicated that the drain field likely contained elevated concentrations of several inorganic substances, particularly chromium, copper, nickel, zinc, and cyanide, which had the potential to migrate from the drain

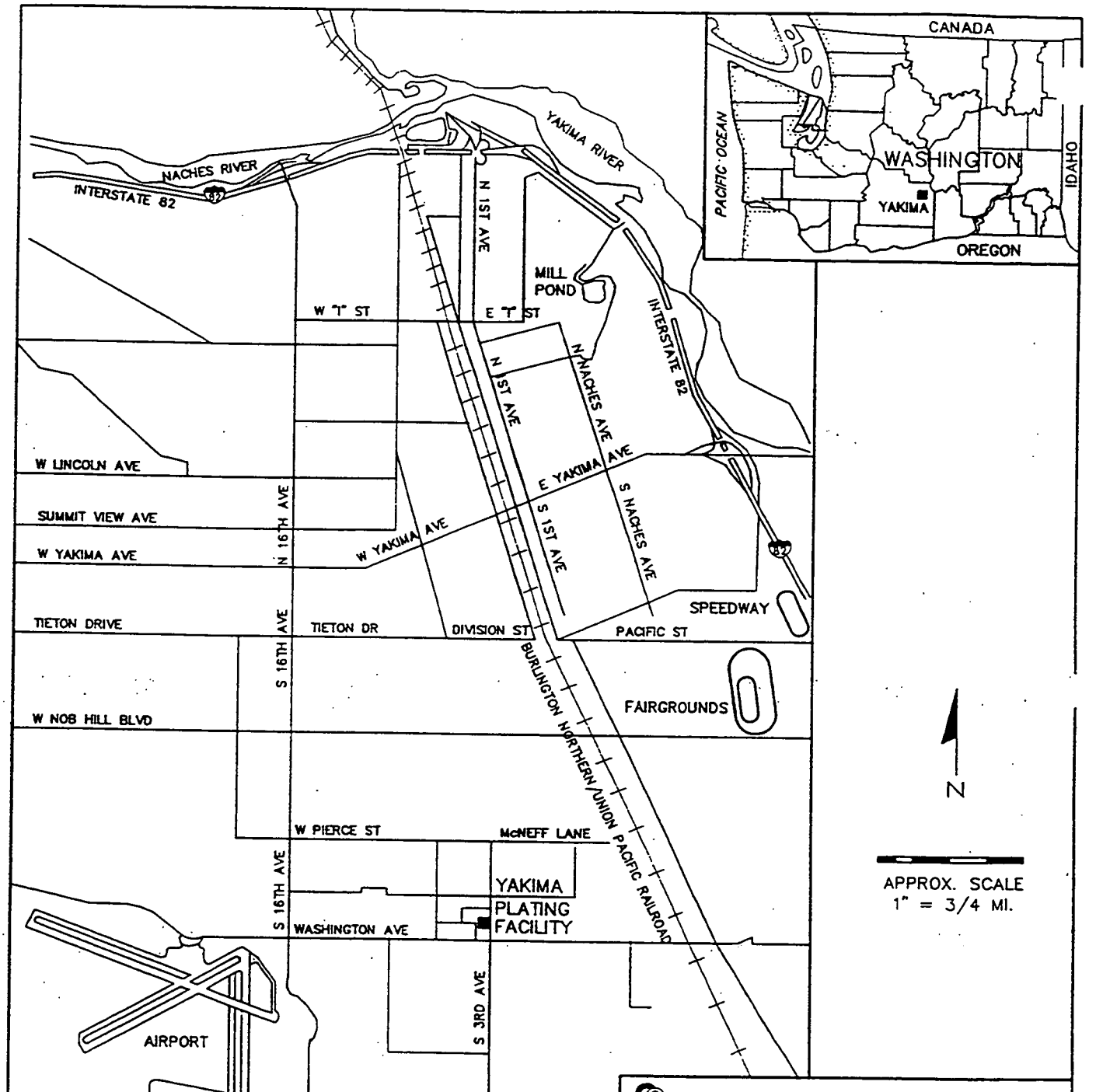


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FIGURE 1
LOCATION MAP

YAKIMA PLATING
YAKIMA, WASHINGTON

PRJCT MGR:	APPROVED BY:	PRJCT/JOB NO.	PAN NO.
LD	LD	ZP 6000	CORP

DRAWN BY:	DATE:	DIR NO.	CAD DWG NO.	REV.
EGM	07-28-92	CORP.ZP6000	0121LM.DWG	1

field into the surrounding soils and groundwater. Findings of this investigation were presented in the Site Inspection Report for Yakima Plating Company, Inc., dated October 29, 1986. As a result of the findings of this study, the Yakima Plating site was proposed to the NPL on June 24, 1988 (53 FR 23978), and was added to the final list on March 31, 1989 (54 FR 13296).

On May 7, 1990, E&E initiated field work for the Remedial Investigation/Feasibility Study (RI/FS) at the site. The results of this investigation indicated elevated levels of metals in surface and subsurface soils, elevated levels of metals in two groundwater monitoring wells, the presence of a variety of containerized plating related wastes, and plating related wastes associated with the drain field system. The soil contaminants posed the greatest risk to human health through possible direct contact and as a continuing potential source of groundwater contamination. With the exception of two wells[1], all on-site and off-site monitoring wells had relatively low levels of organics and inorganics and were below federal and state drinking water standards.

RECORD OF DECISION:

A Record of Decision for the site was issued on September 30, 1991, which selected the following remedy:

- Liquids and sludges that were in tanks and containers would be removed to be treated and disposed of at a permitted hazardous waste facility, off-site.

- Underground tanks would be uncovered and decontaminated using either a solvent or water wash solution, and abandoned in place.

- Contaminated soils above cleanup levels would be excavated and disposed of at a permitted hazardous waste landfill.

- Institutional controls would be implemented to minimize potential exposure to the release of hazardous substances, since contaminated soils above Washington Model Toxics Control Act (MTCA) cleanup levels could remain beneath the Yakima Plating building.

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[1] Analytical results from MW-2 indicated elevated levels above the State of Washington Model Toxics Control Act (MTCA) method B groundwater levels. MW-7 had elevated levels of chromium, above federal and state standards, during one sampling round. Both wells exhibited an insurgence of silt, which may have affected the results.

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

The ROD specified that the soil and groundwater cleanup levels would be based upon the more stringent of NCP and MTCA standards, at the time the ROD was signed. The EPA established the following cleanup levels consistent with the MTCA Method B regulatory requirements:

Table 1: Cleanup levels

Constituent	Soil [mg/kg]	Groundwater [µg/L]
Arsenic*	20	5
Barium	4,600	800
Cadmium	40	8
Chromium	400	80
Lead	250	50
Nickel	1,600	320
Selenium	240	48
Cyanide	1,600	320
DDT[2]	2.9	0.26

The selected remedy eliminated the primary threat posed by the conditions at the site by reducing the potential for human exposure to metals in the site soils.

REMOVAL ACTIVITIES:

Because the RI/FS indicated that the extent of site contaminants was clearly defined and that excavation and off-site disposal would be straightforward, site remediation, as outlined in the ROD, was accomplished through the EPA removal program, as a Superfund Accelerated Cleanup Model (SACM) pilot project. The specific factors considered in coming to the decision to use removal authorities included the following:

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[2] As discussed in the ROD, orchard contaminants appear to be an area wide problem and therefore these contaminants would be removed only if they co-occurred with soil contaminated above cleanup goals for plating associated wastes.

- The remedy primarily involved excavation and off-site disposal of soils, which could be easily and quickly implemented.

- There were no requirements for design of treatment systems and no long term operation and maintenance for the site.

- Standard EPA protocols existed for sampling and analysis of metal contaminated soils, which would enable the use of field screening techniques and rapid turnaround of laboratory analysis.

- Action levels for site cleanup were outlined in the Record of Decision for the site.

- The costs and delays associated with a remedial design could be minimized. In addition, a "removal approach" offered more flexibility in handling changes in site conditions, which are typically encountered during soil excavation work.

The Removal was formally initiated on June 15, 1992, upon approval of the Action Memorandum.

EPA and Ecology conducted a final inspection on September 30, 1992. Removal activities included:

- Excavating 2,567 cubic yards of contaminated soil, gravels, and the drain field pipe to the cleanup levels specified in the ROD, followed by off-site disposal.

- Excavation and removal to a hazardous waste landfill of three sedimentation tanks.

- Demolition and removal of three on-site buildings.

- Neutralization and containerization of approximately 34 drums of miscellaneous plating-derived waste for off-site disposal.

During the above removal actions, three significant differences from the ROD occurred as a result of a greater degree of subsurface contamination being discovered than indicated in the RI. These were: 1) a higher excavated soil volume, 2) building demolition, and 3) the absence of institutional controls. These differences were a result of further contamination being discovered during the removal, and were documented in the Preliminary Closeout Report (PCOR)/Explanation of Significant Differences (ESD), dated September 30, 1992.

During soil excavation, appropriate measures were taken, including air monitoring for total particulates and respirable particulates and dust suppression, to ensure that contaminated materials did not become airborne.

Confirmatory sampling verified that the ROD soil cleanup objectives were achieved. Backfilling of the site with clean soil provided further assurance that the soil no longer posed any threat to human health or the environment.

SACM PILOT EVALUATION:

Measurement of SACM pilot success used two primary indicators: 1) timeliness and 2) cost. The goal of the SACM program was to help minimize the above two factors by substituting the Remedial Design/Remedial Action (RD/RA) process with a more expedited approach.

Timeliness: It actually took 4 months to complete the removal (June - September, 1992). Region 10 estimates the time to conduct a RD/RA for this site would have been approximately 16 months. This estimate of 16 months is based on FS estimates and best professional judgement considering the scope and complexity of the cleanup; it included 1 month for preparation of a remedial design scope of work, 2 months to develop the RD workplan, 3 months to develop the actual RD, 4 months for the bid process, and 6 months to implement remedial action. The estimated time saved by conducting a removal at this site was approximately 12 months.

Cost: As documented in EPA cost summaries, the actual costs incurred during the period of the pilot project were $924,758 (including removal costs, contractor costs, disposal costs, EPA personnel costs, state support, etc.). For the purpose of evaluating the cost effectiveness of the expedited action, however, only those extramural costs directly related to the removal will be compared to estimated RD/RA costs. The reason for this is that FS estimates, which are the primary basis for predicted RD/RA costs, did not consider EPA intramural expenses such as salary/benefits, travel, state support, ATSDR support, and other costs. Based on EPA cost summaries, the actual extramural costs to EPA for implementing the post-ROD removal were approximately $886,399.

Presented in Table 2, below, are National and Regional extramural remedial costs compared to the removal costs at Yakima Plating. This information was supplied to the Region by EPA Headquarters. Although this comparison may not be conclusive because site conditions and cleanup requirements at various sites can be quite diverse, the analysis does indicate that the cleanup of the Yakima Plating site was accomplished at costs well below the National and Regional average.

Table 2: RD/RA costs		
Type of Cost	National Average/$	Regional Average/$
Extramural Costs of RD	694,176	1,000,500
Extramural costs of RA	4,105,828	5,496,188
Total RD/RA costs	4,800,004	6,496,688
Total RD/RA for Yakima Plating	886,399	

Based on both timeliness and cost, the SACM pilot project was a very effective means of cleanup at the Yakima Plating Superfund site. The Final Evaluation for the Yakima Plating Site Pilot Project (December, 1993) presents further evaluation under a wider range of criteria than briefly presented here. The following sections will address the effectiveness of the remedy in terms of groundwater impact.

POST-REMOVAL GROUNDWATER MONITORING:

In order to ensure that the selected remedy of soil excavation and off-site disposal remains protective of human health and the environment, EPA conducted confirmational groundwater monitoring. The groundwater monitoring program entailed the sampling of six domestic wells and nine on-site monitoring wells[3]. To date, five sampling rounds have been conducted. All plating related constituents have been found to be at or below the established ROD remediation goals, as monitored at the locations pictured on the following page, in **Figure 2**. The ensuing discussion will describe the concentration trends for each contaminant from the RI/FS to present, comparing unfiltered sample concentrations to the ROD goals in order to establish that these goals have been attained. Pre-ROD data is included to further establish a basis for existing groundwater trends. To assure that meeting the goals set out by the ROD signifies not only project completion, but also protectiveness of the public health and the environment, current federal maximum contaminant levels (MCLs) will also be compared with groundwater data, where possible. The last groundwater sampling

[3] Of the original 15 wells on the site and nearby, 10 remain. MW-2 was abandoned as a result of the removal, and PW's 2, 3, 4, and 7 were abandoned by nearby property owners as city water became available.

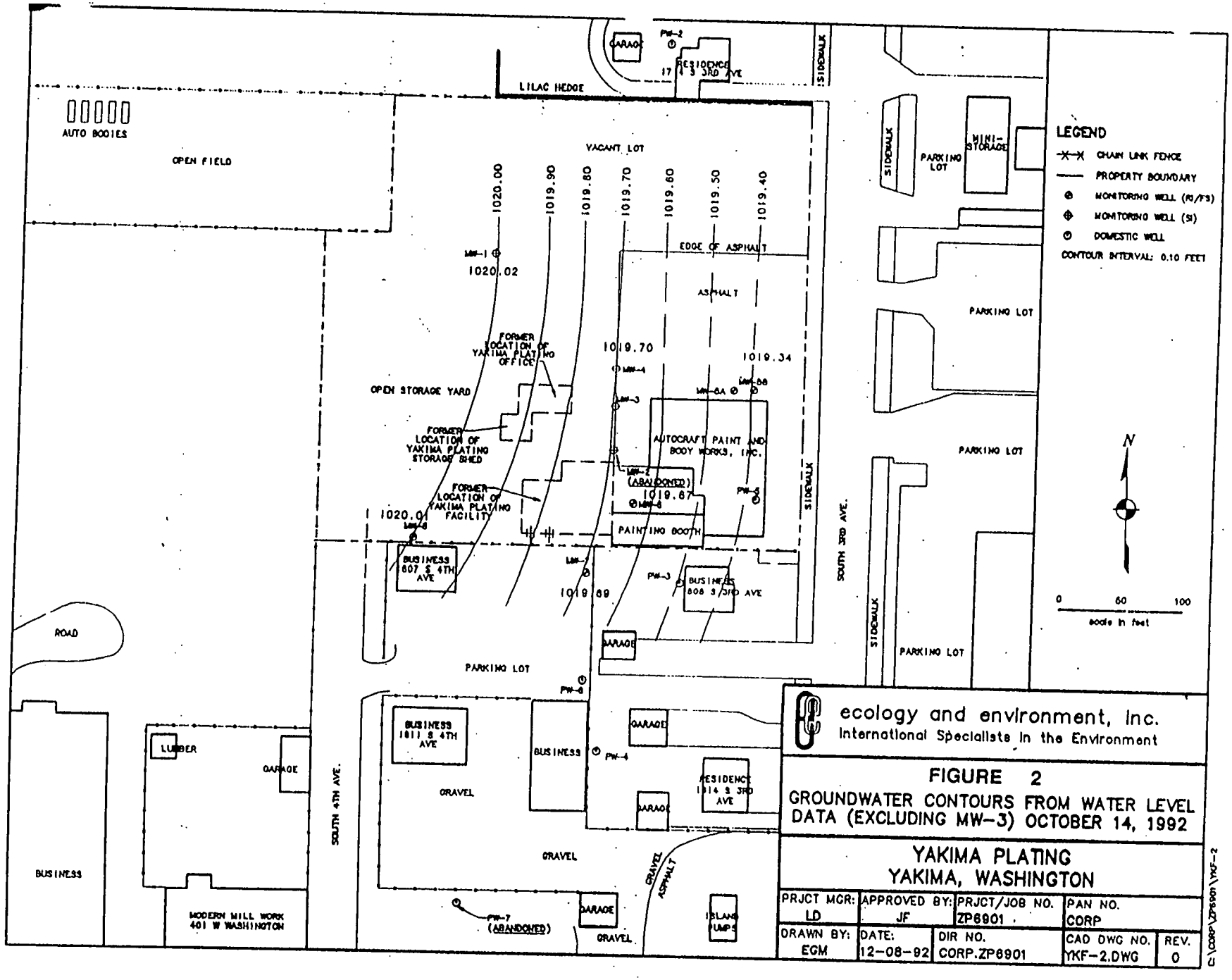

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FIGURE 2
GROUNDWATER CONTOURS FROM WATER LEVEL DATA (EXCLUDING MW-3) OCTOBER 14, 1992

YAKIMA PLATING
YAKIMA, WASHINGTON

PRJCT MGR:	APPROVED BY:	PRJCT/JOB NO.	PAN NO.
LD	JF	ZP6901	CORP
DRAWN BY:	DATE:	DIR NO.	CAD DWG NO. / REV.
EGM	12-08-92	CORP.ZP6901	YKF-2.DWG / 0

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round conducted, quarter five, occurred on November 16, 1993[4]. Table 3, below, describes fifth quarter averages and highest concentrations detected, sitewide.

Arsenic, lead, and DDT are not related to the plating process, but with the historical use of pesticides associated with the orchard that formerly occupied the site.

The arsenic goal listed in the ROD was 5 μg/L, or 5 parts per billion (ppb). To date, monitoring wells (MW) 1, 3, 5A, and 6 as well as private wells (PW) 2 and 6 have exhibited concentrations at or below the goal of 5 μg/L for every round of sampling since the RI. Among other wells, the highest level exhibited has been 17 μg/L in an unfiltered October, 1992, sample from MW-4. Arsenic concentrations have been decreasing at the site, and the average concentration[5] was 3.94 μg/L during round five, which is below the ROD goal. In addition, quarter five arsenic concentrations are below the MCL for arsenic of 5 ppb.

Lead has a ROD goal of 50 μg/L. The highest level of lead detected to date was 27.1 μg/L (MW-7, unfiltered) during the April, 1991, sampling round. Also, MW-1 detected lead at 21.6 μg/L during the May, 1993, sampling round. Currently, the highest concentration of lead is 15.4 μg/L in MW-4. All detections have been below the ROD goal to date, and the average concentration among the six detects of lead during the fifth sampling round was 5.35 μg/L. Since the ROD was signed, a federal "action level" of 15 μg/L was established for lead in drinking water. Other than the above two detections, concentrations have been consistently at or below the 50 μg/L ROD goal and the 15 μg/L federal action level.

Pesticides including 4,4'-DDT, 4,4'-DDE, Endosulfan, Aldrin, and Beta-BHC were analyzed in the first post-removal sampling round. The above contaminants were detected only once each across the site, from monitoring wells 4 and 5A only. The pesticides were found there at low levels, the highest of which was Endosulfan at 0.011 μg/L in MW-4.

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[4] Groundwater elevation is highest during the October-November period. As a result of the vadose zone flushing action, this time of year has been shown to have consistently higher concentrations of all constituents than any other sampling period.

[5] "Average concentration" is the sitewide mean among wells detecting a particular constituent. Non-detects are not included in the mean calculation as zero concentrations.

Table 3: Fifth Quarter Monitoring Well Data [μg/L]					
Constituent	**ROD Goal**	**MCL**	**Fifth Qtr. average***	**Fifth Qtr. high**	**# of hits**
Arsenic	5	50	3.94	5.78	10/10
Lead	50	15**	5.35	15.4	6/10
DDT	0.26	na	na	na	na
Barium	800	200	17.4	51.6	10/10
Cadmium	8	5	ND	ND	0/10
Chromium	80	100	5.2	5.2	1/10
Nickel	320	100	77.7	164	3/10
Selenium	48	50	ND	ND	0/10
Cyanide	320	200	na	na	na

NOTES:

* - Averages include detected concentrations only, excluding non-detects.

** - The listed value of 15 μg/L is an "action level," not an enforceable MCL.

na - Constituent was not sampled for.

ND - Constituent was not detected in any wells during the sampling round.

DDT was only found in MW-4 at a concentration of 0.0075 μg/L (estimated), which is two orders of magnitude below the risk based, ROD remediation goal of 0.26 μg/L. No MCLs have been promulgated for these pesticides, based on the low levels and frequency of detection further analysis was dropped after the first post-removal monitoring event.

Barium is a plating related constituent with a ROD goal of 800 μg/L. In all wells, barium has stayed below the ROD goal. Barium has been highest at MW-2, where it was detected at 472 and 229 μg/L on June, 1986, and September, 1988, respectively. In addition to meeting the ROD goal, all wells have stayed below the MCL of 200 μg/L, except in the above two instances. At present, the unfiltered, average concentration (see footnote number 2) is 17.4 μg/L in monitoring wells detecting barium.

Cadmium has a ROD goal of 8.0 μg/L. It has not been detected in monitoring wells 5B, 6, 7, 8, or in any private wells. In the remaining monitoring wells, the highest detection was 19.8 μg/L in MW-1 during the October, 1992, sampling round, which did exceed both the ROD goal and the MCL of 5.0 μg/L. However, cadmium was not

detected in any wells during the second, third, fourth, or fifth quarters of post-removal monitoring.

Chromium has a ROD goal of 80 µg/L in the ROD. With three exceptions, chromium has met the ROD goal historically. MW-2 had concentrations of 340 and 102 µg/L during September, 1988, and December, 1991, respectively. A chromium concentration of 150 µg/L was detected at MW-7 during the April, 1991, sampling round. In addition, the MCL of 100 µg/L has been met at all wells during all sampling events with the exception of the three instances noted above. Chrome was only detected in MW-8 at 5.2 ppb during the fifth quarter.

Nickel has met the ROD goal of 320 µg/L consistently, except in MW-2 and MW-4. Between June, 1986, and April, 1991, when MW-2 was abandoned, nickel concentrations decreased from 720 to 276 µg/L. During the same time period, concentrations at MW-4 ranged from 69 to 260 µg/L, with an abnormal spike of 1340 µg/L during the October, 1992, sampling event. This high concentration is believed to have been caused by siltation in MW-4 due to improper purging. The average concentration in monitoring wells detecting nickel from fifth quarter sampling was 77.7 µg/L, and the highest nickel detection was 164 µg/L at MW-4. This high unfiltered nickel level could be due in part to the high groundwater elevation during November. Nickel in MW-4 has been fluctuating at or near the MCL for several quarters, and continues to exhibit a decreasing trend. Even at peak fluctuations during round five, the unfiltered nickel concentration in MW-4 has a hazard index (HI) of approximately 0.1. All wells are below the ROD goal. In addition, all detections meet the MCL of 100 µg/L, with the exception of MW-4.

Selenium has a ROD goal of 48 µg/L. This constituent has had only one detection to date in MW-7, at 2 µg/L, during an April, 1991, sampling round.

Cyanide has historically met the ROD goal of 320 µg/L. It has been detected only once in an October, 1992, sample in MW-4 at a level of 21.7 µg/L. During the fourth quarter of post-removal sampling in July, 1993, cyanide was dropped from further analysis.

As shown in the contaminant specific discussions above, site groundwater meets all ROD remediation goals. By comparing averages from unfiltered samples in monitoring wells during seasonally high groundwater elevation (October-November), site groundwater has been evaluated on a worst-case basis. Four constituents including cyanide, selenium, barium, and DDT have not been quantified above the ROD goals at any time since the RI. All other contaminants have met the ROD goals after five rounds of post-removal sampling. Since site groundwater meets both ROD goals and

current MCLs[6], it is protective of the public health and the environment, and allows for unlimited use and unrestricted exposure.

III. Explanation of Significant Difference

It is EPA's position that five quarters of post-remedial groundwater data is sufficient to show protectiveness of the public health and the environment. This represents a change from the ROD prescribed post-remedial monitoring of eight quarters. A change in the number of quarters is warranted given that:

1) Groundwater monitoring at this site was initiated as a cautionary measure and not as a result of existing contamination. Historical data has never shown significant contamination from the plating operation.

2) Several quarters of post-remedial data have continued to demonstrate concentrations consistently at or below remedial objectives. With the source of plating contamination removed, there is a negligible potential for future plating related groundwater problems.

Due to the low concentrations detected sitewide as described in the site summary, as well as the consistency in such observations, EPA deems five quarters of post-remedial monitoring to be sufficient in establishing that the ROD goals have been met.

IV. Support Agency Comments

The following is the Ecology position on the discontinuation of groundwater monitoring:

Ecology concludes that the source of metals contamination has been removed. All of the metals of concern listed in the ROD are approximately half, to less than half, of the levels for groundwater in the ROD, except for one marginal exceedence of arsenic. Arsenic appears to be somewhat endemic to the area, apparently due to its application in orchards as discussed in the Explanation of Significant Difference, dated September 30, 1992. Ecology has determined that the arsenic exceedence is not representative of a contaminant source at the site and that further monitoring is not warranted.

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[6] Or has been otherwise shown to pose minimal risk, as in the case of Nickel in MW-4, which possesses a HI of roughly 0.1.

V. Public Participation Activities

Community Relations activities for this site have included the following: development of a community relations plan, meetings with local governmental officials, public meetings during the RI and remedy selection process, a public comment period for the proposed plan, and routine publication of progress fact sheets. A fact sheet will be issued concurrently with the ESD process, summarizing the results from the groundwater monitoring as well as the decision to discontinue sampling. A second fact sheet will be prepared to solicit comments for the National Priorities List deletion of the site. In general, there has been very little public interest associated with the site.

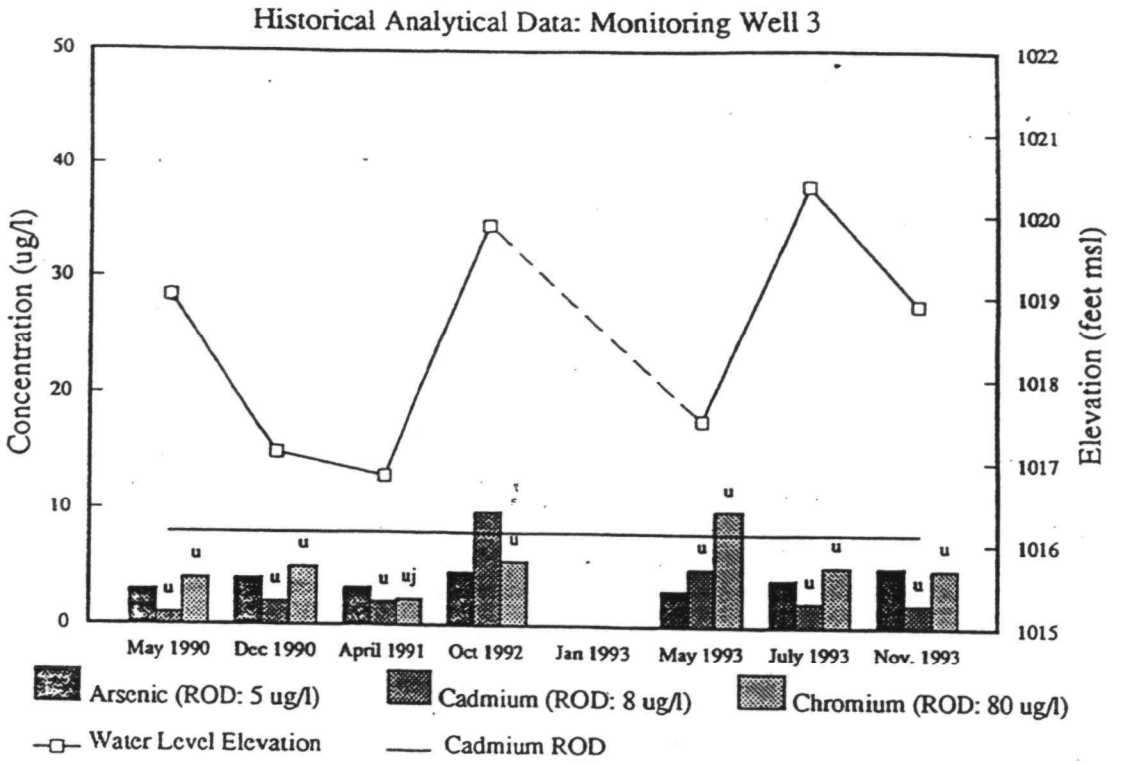
VI. Affirmation of Statutory Determinations

Five quarters of confirmational monitoring of groundwater demonstrate that the groundwater ROD goals have been consistently met. Based on the removal of contaminated equipment and excavation of contaminated soil, EPA and Ecology believe that hazardous substances have been removed from the Site so as to allow for unlimited use and unrestricted exposure within the Site, that the Site is protective of public health and the environment, and that no further remedial action or institutional controls are needed at the Site. Therefore, the five-year review requirement of Section 121(c) of SARA is not applicable. Accordingly, the ROD post-remedial monitoring plan will not be carried to its completion of eight sampling rounds.

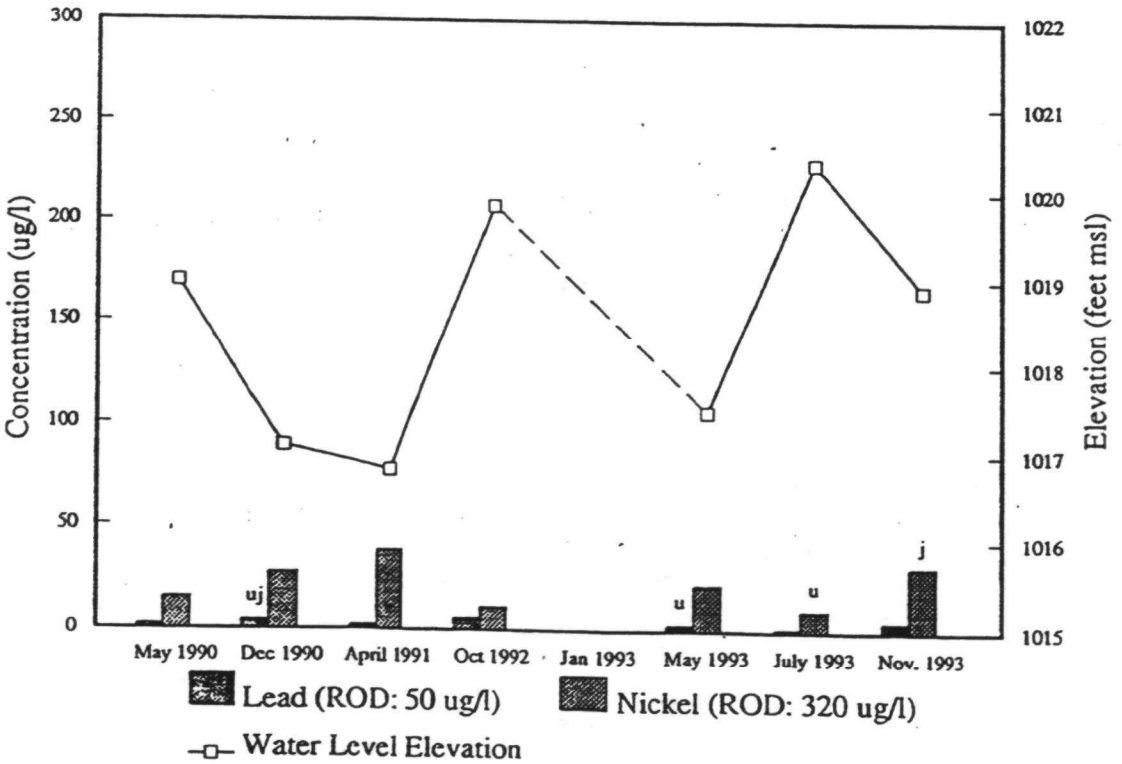
Randall F. Smith, Director
Hazardous Waste Division

4/22/94
Date

APPENDIX A



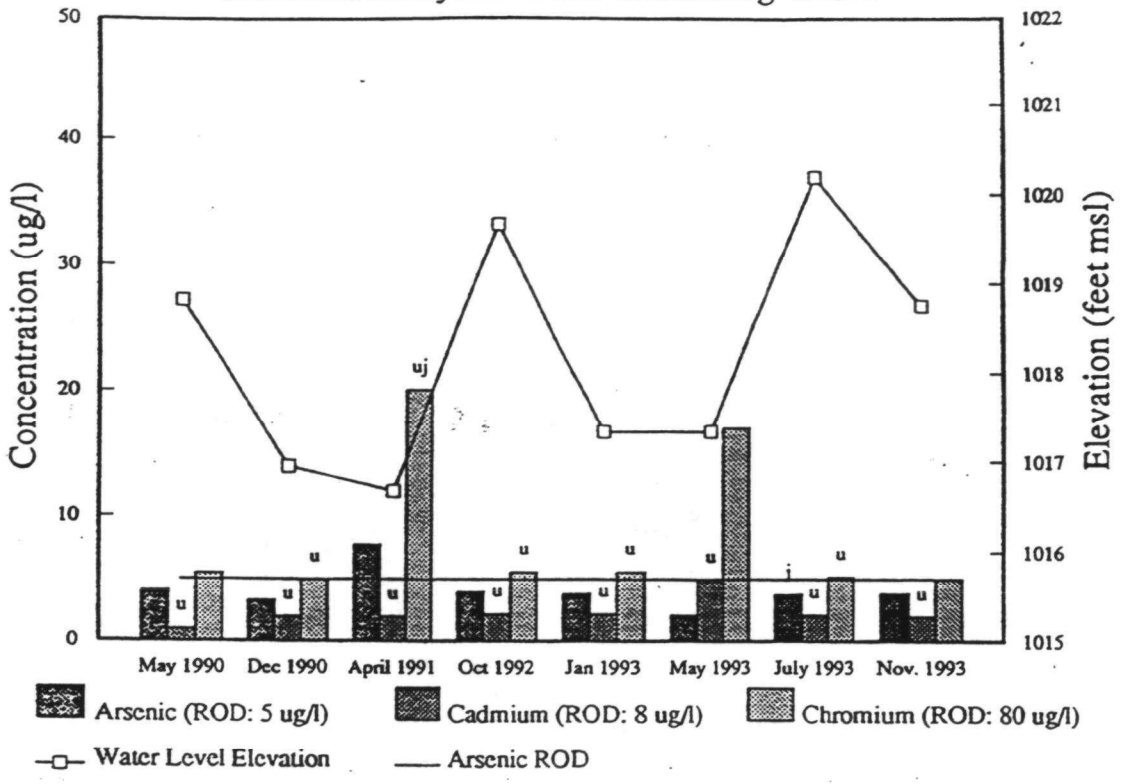
j: analyte positively identified but value may not be consistent with amount present

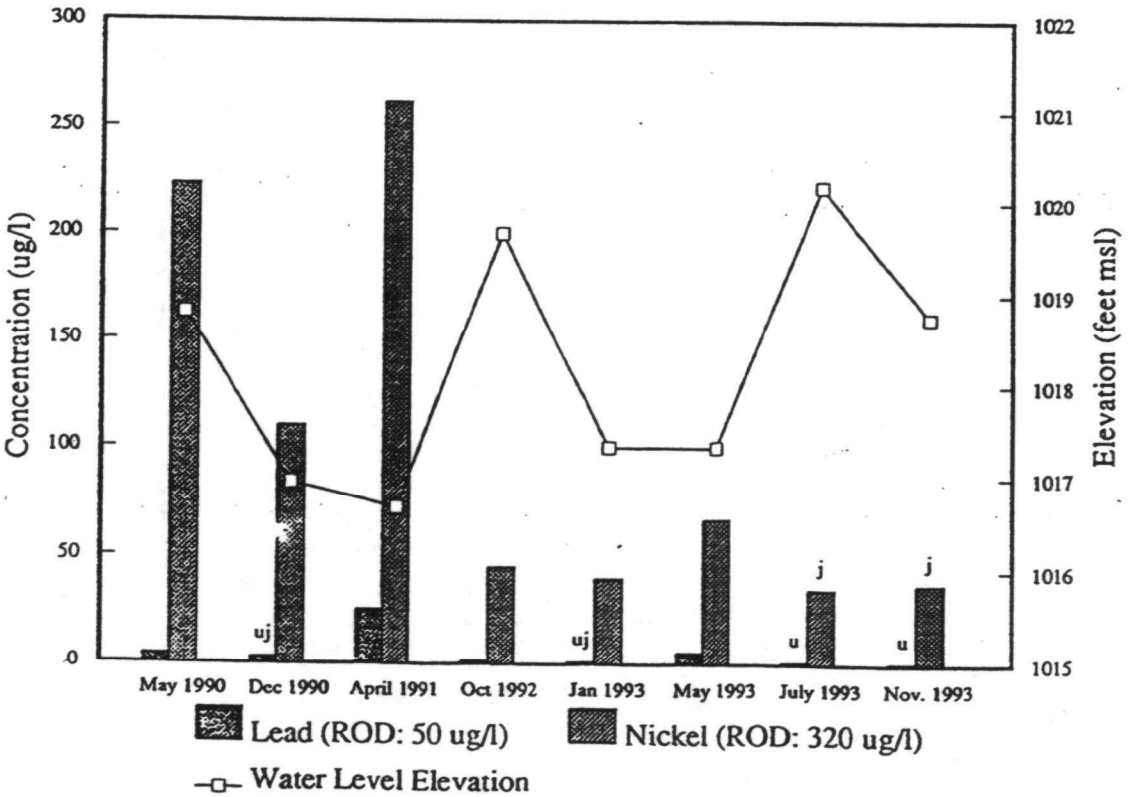


Jan 93: not sampled Dashed Line: inferred

u: indicates analyte not detected at quantitation limit, uj: indicates analyte not detected at estimated quantitation limit

Historical Analytical Data: Monitoring Well 6





u: indicates analyte not detected at detection limit, uj: indicates analyte not detected at estimated quantitation limit

Manchester Environmental Laboratory
Final Report

Project Code : TEC-2961
Project Name : YAKIMA PLATING QUARTERLY SAMP.
Project Officer : BILL ADAMS
Account Code : 4TFA10PUE2

Collected : 11/16/93
Matrix : Liquid-Diss.
Sample Number : 93474171
Type : Reg sample
Station Description: PW-6

Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
MET							
Hg							
Mercury	0.2	ug/L	U				
ICP							
Aluminum	20	ug/L	U	Antimony	20	ug/L	U
Barium	11.5	ug/L		Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U	Calcium	42200	ug/L	
Chromium	5.0	ug/L	U	Cobalt	5.0	ug/L	U
Copper	7.3	ug/L	J	Iron	5.0	ug/L	U
Magnesium	13000	ug/L		Manganese	5.32	ug/L	
Nickel	10	ug/L	U	Potassium	4610	ug/L	
Silver	3.0	ug/L	U	Sodium	17200	ug/L	
Vanadium	10.9	ug/L		Zinc	908	ug/L	
ICP/MS							
Arsenic	2.1	ug/L		Lead	1.0	ug/L	U
Selenium	1.0	ug/L	U	Thallium	0.05	ug/L	U

1/17/93

Manchester Environmental Laboratory
Final Report

Project Code : TEC-2961
Project Name : YAKIMA PLATING QUARTERLY SAMP.
Project Officer : BILL ADAMS
Account Code : 4TFA10PUE2

Collected : 11/16/93
Matrix : Liquid-Diss.
Sample Number : 93474175
Type : Reg sample
Station Description: PW-5 QA/QC

Analyte	Result	Units	Qlfr
MET			
Hg			
Mercury	0.2	ug/L	U
ICP			
Aluminum	20	ug/L	U
Barium	10.0	ug/L	
Cadmium	2.0	ug/L	U
Chromium	5.0	ug/L	U
Copper	3.0	ug/L	U
Magnesium	12800	ug/L	
Nickel	10	ug/L	U
Silver	3.0	ug/L	U
Vanadium	12.3	ug/L	
ICP/MS			
Arsenic	2.22	ug/L	
Selenium	1.0	ug/L	U
Antimony	20	ug/L	U
Beryllium	0.50	ug/L	U
Calcium	40300	ug/L	
Cobalt	5.0	ug/L	U
Iron	28.9	ug/L	
Manganese	0.50	ug/L	U
Potassium	4220	ug/L	
Sodium	16400	ug/L	
Zinc	4.6	ug/L	J
Lead	1.0	ug/L	U
Thallium	0.05	ug/L	U

1
12/7/93

Manchester Environmental Laboratory
Final Report

Project Code : TEC-2961
Project Name : YAKIMA PLATING QUARTERLY SAMP.
Project Officer : BILL ADAMS
Account Code : 4TFA10PUE2

Collected :
Matrix : Liquid-Diss.
Sample Number : 93474175S1
Type : Matrix Spike
Station Description:

Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
MET							
ICP							
Aluminum	115	%		Antimony	98	%	
Barium	110	%		Beryllium	114	%	
Cadmium	104	%		Calcium	NAF		
Chromium	106	%		Cobalt	110	%	
Copper	110	%		Iron	110	%	
Magnesium	NAF			Manganese	109	%	
Nickel	108	%		Potassium	NAF		
Silver	95	%		Sodium	NAF		
Vanadium	113	%		Zinc	112	%	
ICP/MS							
Arsenic	113	%		Lead	105	%	
Selenium	106	%		Thallium	105	%	

Manchester Environmental Laboratory
Final Report

Project Code : TEC-2961
Project Name : YAKIMA PLATING QUARTERLY SAMP.
Project Officer : BILL ADAMS
Account Code : 4TFA10PUE2

Collected : 11/16/93
Matrix : Liquid-Diss.
Sample Number : 93474181
Type : Reg sample
Station Description: DW-F

Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
MET							
Hg							
Mercury	0.2	ug/L	U				
ICP							
Aluminum	20	ug/L	U	Antimony	20	ug/L	U
Barium	1.0	ug/L	U	Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U	Calcium	40.2	ug/L	
Chromium	5.0	ug/L	U	Cobalt	5.0	ug/L	U
Copper	3.0	ug/L	U	Iron	5.0	ug/L	U
Magnesium	20	ug/L	U	Manganese	0.50	ug/L	U
Nickel	10	ug/L	U	Potassium	400	ug/L	U
Silver	3.0	ug/L	U	Sodium	186	ug/L	
Vanadium	3.0	ug/L	U	Zinc	4.0	ug/L	U
ICP/MS							
Arsenic	0.5	ug/L	U	Lead	1.0	ug/L	U
Selenium	1.0	ug/L	U	Thallium	0.05	ug/L	U

1/12/95

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Project Code : TEC-2961
Project Name : YAKIMA PLATING QUARTERLY SAMP.
Project Officer : BILL ADAMS
Account Code : 4TFA10PUE2

Collected : 11/16/93
Matrix : Liquid-Diss.
Sample Number : 93474177
Type : Reg sample
Station Description: MW-5B

Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
MET							
ICP							
Aluminum	20	ug/L	U	Antimony	20	ug/L	U
Barium	9.27	ug/L		Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U	Calcium	37600.	ug/L	
Chromium	5.0	ug/L	U	Cobalt	5.0	ug/L	U
Copper	3.0	ug/L	U	Iron	5.0	ug/L	U
Magnesium	10500	ug/L		Manganese	0.50	ug/L	U
Nickel	10	ug/L	U	Potassium	4450	ug/L	
Silver	3.0	ug/L	U	Sodium	14200.	ug/L	
Vanadium	7.9	ug/L	J	Zinc	4.0	ug/L	U
ICP/MS							
Arsenic	5.05	ug/L		Lead	1.0	ug/L	U
Selenium	1.0	ug/L	U	Thallium	0.05	ug/L	U

1 12/9/93

93474177 Reg sample

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Project Code : TEC-2961
Project Name : YAKIMA PLATING QUARTERLY SAMP.
Project Officer : BILL ADAMS
Account Code : 4TFA10PUE2

Collected : 11/16/93
Matrix : Liquid-Diss.
Sample Number : 93474185
Type : Reg sample
Station Description: MW-3

Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
MET							
Hg							
Mercury	0.2	ug/L	U				
ICP							
Aluminum	20	ug/L	U	Antimony	20	ug/L	U
Barium	10.3	ug/L		Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U	Calcium	39000	ug/L	
Chromium	5.0	ug/L	U	Cobalt	5.0	ug/L	U
Copper	3.0	ug/L	U	Iron	5.0	ug/L	U
Magnesium	10700	ug/L		Manganese	1.3	ug/L	J
Nickel	10	ug/L	U	Potassium	4410	ug/L	
Silver	3.0	ug/L	U	Sodium	14500	ug/L	
Vanadium	8.0	ug/L	J	Zinc	4.0	ug/L	U
ICP/MS							
Arsenic	4.45	ug/L		Lead	1.0	ug/L	U
Selenium	1.0	ug/L	U	Thallium	0.05	ug/L	U

93474185 Reg sample

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Project Code : TEC-2961
Project Name : YAKIMA PLATING QUARTERLY SAMP.
Project Officer : BILL ADAMS
Account Code : 4TFA10PUE2

Collected : 11/20/93
Matrix : Liquid-Diss.
Sample Number : 93474189
Type : Reg sample
Station Description: MW-7D

Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
MET							
Hg							
Mercury	0.2	ug/L	U				
ICP							
Aluminum	20	ug/L	U	Antimony	20	ug/L	U
Barium	10.5	ug/L		Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U	Calcium	40600	ug/L	
Chromium	5.0	ug/L	U	Cobalt	5.0	ug/L	U
Copper	3.0	ug/L	U	Iron	5.0	ug/L	U
Magnesium	11600	ug/L		Manganese	0.50	ug/L	U
Nickel	10	ug/L	U	Potassium	4270	ug/L	
Silver	3.0	ug/L	U	Sodium	15800	ug/L	
Vanadium	6.7	ug/L	J	Zinc	4.0	ug/L	U
ICP/MS							
Arsenic	3.82	ug/L		Lead	1.0	ug/L	U
Selenium	1.0	ug/L	U	Thallium	0.05	ug/L	U

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Project Code : TEC-2961
Project Name : YAKIMA PLATING QUARTERLY SAMP.
Project Officer : BILL ADAMS
Account Code : 4TFA10PUE2

Collected : 11/17/93
Matrix : Liquid-Diss.
Sample Number : 93474193
Type : Reg sample
Station Description: MW-1

Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
MET							
Hg							
Mercury	0.2	ug/L	U				
ICP							
Aluminum	20	ug/L	U	Antimony	20	ug/L	U
Barium	10.6	ug/L		Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U	Calcium	40800	ug/L	
Chromium	5.0	ug/L	U	Cobalt	5.0	ug/L	U
Copper	3.0	ug/L	U	Iron	5.0	ug/L	U
Magnesium	11400	ug/L		Manganese	0.50	ug/L	U
Nickel	10	ug/L	U	Potassium	4760	ug/L	
Silver	3.0	ug/L	U	Sodium	15400	ug/L	
Vanadium	9.2	ug/L	J	Zinc	4.0	ug/L	U
ICP/MS							
Arsenic	4.10	ug/L		Lead	1.0	ug/L	U
Selenium	1.0	ug/L	U	Thallium	0.05	ug/L	U

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Project Code : TEC-2961
Project Name : YAKIMA PLATING QUARTERLY SAMP.
Project Officer : BILL ADAMS
Account Code : 4TFA10PUE2

Collected :
Matrix : Liquid-Diss.
Sample Number : W931129ABL
Type : Blank
Station Description:

Analyte	Result	Units	Qlfr	Analyte	Result	Units	Qlfr
MET							
ICP							
Aluminum	20	ug/L	U	Antimony	20	ug/L	U
Barium	1.0	ug/L	U	Beryllium	0.50	ug/L	U
Cadmium	2.0	ug/L	U	Calcium	2.0	ug/L	U
Chromium	5.0	ug/L	U	Cobalt	5.0	ug/L	U
Copper	3.0	ug/L	U	Iron	5.0	ug/L	U
Magnesium	20	ug/L	U	Manganese	0.50	ug/L	U
Nickel	10	ug/L	U	Potassium	400	ug/L	U
Silver	3.0	ug/L	U	Sodium	20	ug/L	U
Vanadium	3.0	ug/L	U	Zinc	4.0	ug/L	U
ICP/MS							
Arsenic	0.5	ug/L	U	Lead	1.0	ug/L	U
Selenium	1.0	ug/L	U	Thallium	0.05	ug/L	U

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Project Code : TEC-2961
Project Name : YAKIMA PLATING QUARTERLY SAMP.
Project Officer : BILL ADAMS
Account Code : 4TFA10PUE2

Collected :
Matrix :
Sample Number : W931203CBL
Type : Blank
Station Description:

	Analyte	Result	Units	Qlfr
MET				
Hg	Mercury	0.2	ug/L	U