9513347.0692

START

0041373

DOE/RL-93-64
Rev. 3

Sodium Dichromate Expedited Response Action Assessment

United States
Department of Energy
Richland, Washington

JUN 1995
RECEIVED
EDMC

Approved for Public Release

START

TRADEMARK DISCLAIMER

Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

This report has been reproduced from the best available copy. Available in paper copy and microfiche.

Available to the U.S. Department of Energy
and its contractors from
Office of Scientific and Technical Information
P.O. Box 62
Oak Ridge, TN 37831
(615) 576-8401

Available to the public from the U.S. Department of Commerce
National Technical Information Service
5285 Port Royal Road
Springfield, VA 22161
(703) 487-4650

Printed in the United States of America

DISCLM-5.CHP (8-91)

9513347.0693

DOE/RL-93-64

Rev. 3

Sodium Dichromate Expedited Response Action Assessment

Date Published
June 1995

United States
Department of Energy
P.O. Box 550
Richland, Washington 99352

Approved for Public Release

THIS PAGE INTENTIONALLY
LEFT BLANK

EXECUTIVE SUMMARY

The Washington State Department of Ecology (lead agency) and the U.S. Environmental Protection Agency (support agency) recommended that the U.S. Department of Energy perform an expedited response action (ERA) for the Sodium Dichromate Barrel Disposal Landfill.

The ERA goal is to reduce the potential for any contaminant migration from the landfill to the soil column, groundwater, and the Columbia River. Because the Sodium Dichromate Barrel Disposal Landfill is the only waste site within the operable unit, this removal action is the final remediation of the 100-IU-4 Operable Unit.

The Sodium Dichromate Barrel Disposal Landfill is located in a small depression between the 100-D and 100-H Areas. The landfill was used in 1945 for disposal of crushed, empty, sodium dichromate barrels. The 100-IU-4 Operable Unit is a source operable unit; the groundwater beneath it is included in the 100-HR-3 Operable Unit.

This ERA process started in March 1992. The ERA proposal went through a parallel review process with Westinghouse Hanford Company; the U.S. Department of Energy, Richland Operations Office; the Environmental Protection Agency; Washington State Department of Ecology; and a 30-day public comment period. The Washington State Department of Ecology and Environmental Protection Agency issued an Action Memorandum in March 1993. The memorandum directed excavation of all anomalies and disposal of the collected

materials at the Hanford Site Central Landfill. Primary field activities were completed by the end of April 1993. Final waste disposal of a minor quantity of hazardous waste was completed in July 1993.

A total of 144 anomalies and 11 subsurface zones were inspected and excavated. Various homestead debris (wire fencing, wooden posts, and other miscellaneous debris) and about 5,000 crushed barrels were removed and transported to the Hanford Central Landfill.

Besides containing crushed drums, four zones included some loose asbestos, one crushed drum full of asbestos, two 5-gal roofing tar cans, a 12-volt vehicle battery, one empty paint can, and used oil and grease containers (about 0.5 gal total). These materials were placed in three 55-gal drums and sent to an offsite hazardous waste disposal facility permitted to receive hazardous materials. The loose asbestos and asbestos drum went to the Hanford Central Landfill asbestos disposal section. Because the cleanup activities removed all hazardous substances, the site is clean and available for unrestricted land use.

The field screening and offsite laboratory results did not identify any chromium(VI) and total chromium levels that constituted a hazardous condition.

The "Model Toxics Control Act" (*Washington Administrative Code* 173-340-740) Method A chromium cleanup level for soils is 100 mg/kg or 100 ppm. Because sample results are below regulatory cleanup limits, a risk assessment is not necessary. All suspected hazardous substances above cleanup standars have been removed from the site and there is no

significant risk to the public health or the environment. This meets the requirement for "No Further Action" under *Comprehensive Environmental Response, Compensation, and Liability Act* guidance.

9513347.0696

ACRONYMS

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act*
CLP	Contract Laboratory Program
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EE/CA	engineering evaluation and cost analysis
EPA	U.S. Environmental Protection Agency
ERA	Expedited Response Action
ICP	inductively coupled plasma
MTCA	*Washington Model Toxics Control Act*
RCRA	*Resource Conservation and Recovery Act*
RL	Richland Operations Office
WHC	Westinghouse Hanford Company
WIDS	Waste Information Data System
XRF	x-ray fluorescence

9513347.0697

CONTENTS

1.0 INTRODUCTION 1

2.0 REMEDIATION DESCRIPTION 1
2.1 LOCATION AND PHYSICAL DESCRIPTION 1
2.2 CONTAMINANTS OF CONCERN 3
2.3 ACTION MEMORANDUM 3
2.4 HAZARD REMOVAL ACTIVITIES 3

3.0 SAMPLE RESULTS 5
3.1 FIELD SCREENING 5
3.1.1 Screening Method A: Fast Turnaround for Chromium(VI) 6
3.1.2 Screening Method B: Fast Turnaround for Chromium(VI) 9
3.1.3 Screening Method C: Water Leach for Soluble Chromium(VI) in Soil 9
3.1.4 Screening Method D: Chromium(VI) 9
3.1.5 Screening Method E: Total Chromium 14
3.2 OFFSITE LABORATORY ANALYSIS 14
3.3 SAMPLING CONCLUSIONS 14

4.0 COST ANALYSIS 14

5.0 RECOMMENDATION 14

6.0 REFERENCES 16

CONTENTS (continued)

FIGURES:

1 Sodium Dichromate Barrel Landfill Site Map 2
2 Geophysical Anomoly (Zone) Locations 4
3 Field Screening Chromium(VI) Sample Results 9
4 Chromium(VI) Sample Results 10
5 Field Screening Chromium(VI) Spiked Sample Results 11
6 Total Chromium Sampling Comparison 12

TABLES:

1 Sodium Dichromate Expedited Response Action Cleanup Activity Sample Data . . . 7
2 Sodium Dichromate ERA Cleanup Activity QA Spike Data Table 9
3 Field Screening Chromium(IV) Sample Results 10
4 Chromium(VI) Sample Results 11
5 Field Screening Chromium(VI) Spiked Sample Results 12
6 Total Chromium Sampling Comparison 13

1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) and the Washington State Department of Ecology (Ecology) recommended that the U.S. Department of Energy (DOE) perform an expedited response action (ERA) for the Sodium Dichromate Barrel Disposal Landfill. The ERA lead regulatory agency is Ecology and EPA is the support agency. The ERA was conducted in accordance with the applicable sections of Title 40, *Code of Federal Regulations*, Part 300, Subpart E (EPA 1990), the *Hanford Federal Facility Agreement and Consent Order* (Part 3, Article XIII, Section 38) (Ecology et al. 1991), the *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA), the *Resource Conservation and Recovery Act* (RCRA), and the *Washington Model Toxics Control Act* (MTCA).

The ERA was categorized as nontime-critical (Ecology et al. 1991), which required preparation of an engineering evaluation and cost analysis (EE/CA). The EE/CA, which was included in the proposal, is a rapid, focused evaluation of available technologies using specific screening factors to assess feasibility, appropriateness, and cost.

The ERA goal is to reduce the potential for any contaminant migration from the landfill to the soil column, groundwater, and the Columbia River. Because the Sodium Dichromate Barrel Disposal Landfill is the only waste site within the operable unit, the removal action is the final remediation of the 100-IU-4 Operable Unit.

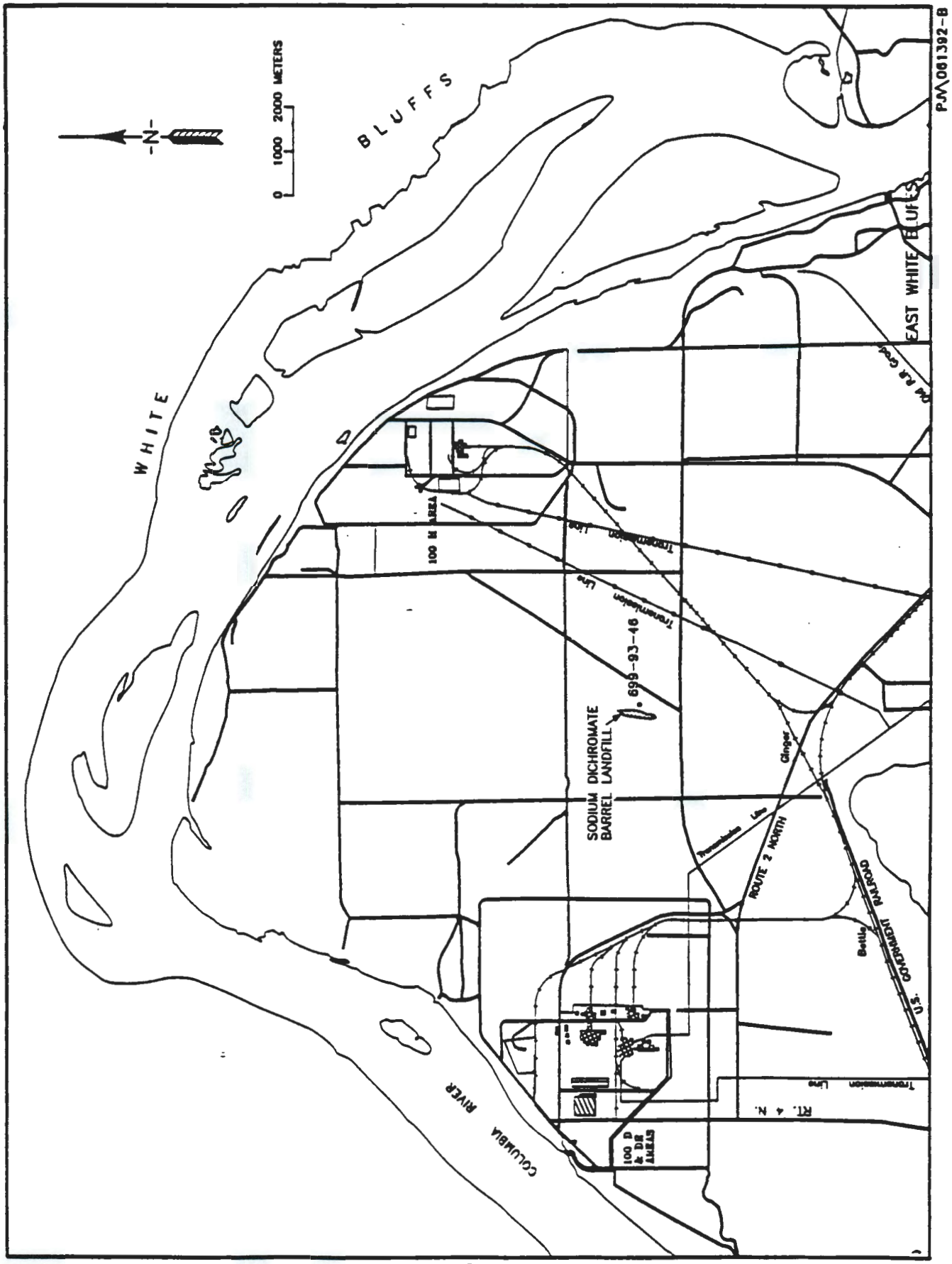
This ERA process started in March 1992. The ERA proposal went through a parallel review process with Westinghouse Hanford Company (WHC), DOE Richland Operations Office (RL), EPA, Ecology, and a 30-day public comment period. Ecology and EPA issued an Action Agreement Memorandum in March 1993 (Appendix A). The memorandum directed excavation of all anomalies and disposal of the collected materials at the Hanford Site Central Landfill. Primary field activities were completed by the end of April 1993. Final disposal of a minor quantity of hazardous waste was completed in July 1993.

2.0 REMEDIATION DESCRIPTION

2.1 LOCATION AND PHYSICAL DESCRIPTION

The 100-IU-4 Operable Unit consists of the Sodium Dichromate Barrel Disposal Landfill located in a small depression between the 100-D and 100-H Areas (Figure 1). The landfill was used in 1945 for disposal of crushed, empty, sodium dichromate barrels. The 100-IU-4 Operable Unit is a source operable unit; the groundwater beneath it is included in the 100-HR-3 Operable Unit.

Figure 1. Sodium Dichromate Barrel Landfill Site Map.



Historical documentation for the site (dimensions, disposal records, and waste volume) is not available. The Waste Information Data System (WIDS) (WHC 1991) assumes that the crushed barrels contained 1% residual sodium dichromate at burial time and that only crushed barrels are buried at the site. Burial depth is shallow; visual inspection reveals barrel debris on the surface.

Limited characterization activities (DOE-RL 1993) confirmed the presence of the barrels. A variety of homestead debris (tin cans and wire) was also found on the site. The overall area of immediate concern is approximately 1,540 by 300 ft. Site geophysical characterization identified approximately 144 isolated anomalies plus 11 major anomalies referred to as zones. These zones have a potential for high concentrations of buried debris (Figure 2).

2.2 CONTAMINANTS OF CONCERN

Based on site radiological surveys, the work area is considered nonradioactive. From the WIDS, the primary hazardous constituents of concern are chromium(VI) and total chromium. Site sample data from limited characterization do not indicate elevated levels of chromium above regulatory cleanup levels.

During removal activities, small quantities of asbestos, waste oil and grease containers, a paint can, roofing tar, and a discarded battery were found. These were disposed of as hazardous waste.

2.3 ACTION MEMORANDUM

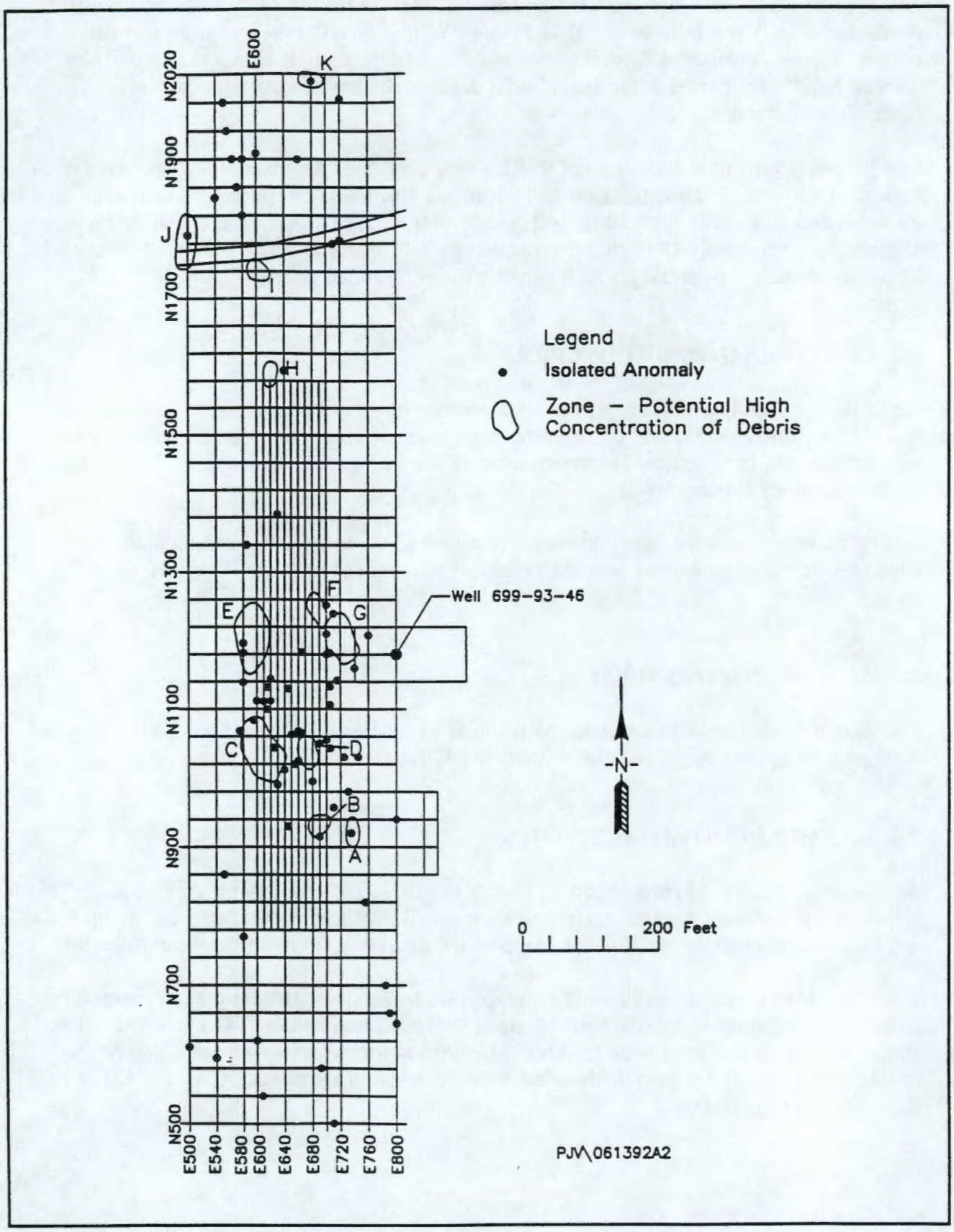
The Action Memorandum (Appendix A) required excavation of all anomalies and disposal of the materials at the Central Landfill (Alternative C).

2.4 HAZARD REMOVAL ACTIVITIES

Anomaly excavation activities began on March 17, 1993, and ended April 26, 1993. Conventional earthmoving equipment (trackhoe, small backhoe, water truck, and dump truck) were used to exhume the landfill and transport the excavated debris to the Central Landfill.

A total of 144 surface anomalies and 11 subsurface zones (identified by ground penetrating radar) were inspected and excavated. A small backhoe excavated the 144 anomalies. The 11 zones were excavated by a large trackhoe. Geological formations (compacted gravel and cobble layers) and homestead debris were found at seven of the zones (A, B, F, H, I, J and K), and at 118 anomalies.

Figure 2. Geophysical Anomaly (Zone) Locations.



Four zones (C, D, E, and G) and twenty-six anomalies contained crushed, empty sodium dichromate barrels. The zones were excavated to a 7-ft depth before undisturbed soil was found. Buried drums were scattered throughout the zones. The typical anomaly depth did not exceed 4 ft and usually consisted of one or two buried drums. Various homestead debris (wire fencing, wooden posts, and other miscellaneous debris) and about 5,000 crushed barrels were removed and transported to the Hanford Central Landfill.

Besides containing crushed drums, the four zones included some loose asbestos, one crushed drum full of asbestos, two 5-gal roofing tar cans, one empty paint can, a discarded 12-volt vehicle battery, and used oil and grease containers (about 0.5 gal total). These hazardous materials were placed in three 55-gal drums and sent to an offsite hazardous materials disposal facility. The loose asbestos and a drum of asbestos went to the Hanford Central Landfill asbestos section for disposal.

Soil samples collected during the cleanup activities were analyzed for chromium(VI) and total chromium. The zone sample locations used a 30- by 30-ft grid with samples collected at the excavation bottom. Zone samples were collected from about the center of the backhoe bucket for excavated sites (>4 ft deep). The anomaly soil samples were collected directly underneath the barrel(s). Each soil sample collection was homogenized in a clean, stainless-steel bowl before its placement in sample bottles.

3.0 SAMPLE RESULTS

The soil samples were analyzed by a variety of screening methods and offsite laboratory methods for chromium(VI) and total chromium. The objective of using a variety of methods was to demonstrate the effectiveness and response time of screening methods relative to offsite laboratory analysis and to provide a basis for comparison of the various methods. Normally, offsite laboratory analysis results are not available for at least a month after sample collection. Demonstrating the effectiveness and accuracy of field screening methods would allow for timely field activity adjustments to changing conditions.

3.1 FIELD SCREENING

Several field screening analytical methods were used. One method was carried out onsite immediately after sample collection, and others were carried out at various onsite laboratories on a fast-turnaround basis. Each method is briefly summarized below. Results of each method are summarized in Tables 1 and 2 (QA spikes), and Figures 3 through 6.

3.1.1 Screening Method A: Fast Turnaround for Chromium(VI)

This method uses a modification of the EPA toxicity leach procedure (EPA 1986, Method 1310) followed by colorimetric determination of chromium(VI) in solution by the diphenylcarbazide method. The colorimetric determination is a modification of EPA Method 7196. First, a 10-g aliquot of soil was weighed out and added to 160-mL of water in a glass jar. The sample was agitated and the pH was checked. If the pH was >5, 0.5-N acetic acid was added dropwise to attain a pH of 5. The pH was checked at intervals for 6 hr and carefully adjusted to 5 as necessary. After a total agitation time of 16 hr, the leachate was filtered through a 0.45-μ filter, and the diphenylcarbazide reagent was added to a 25-mL aliquot. After a 5-min color development time, chromium(VI) content was determined using a spectrophotometer to measure absorbance at 540-nm, following the manufacturer's procedures.

3.1.2 Screening Method B: Fast Turnaround for Chromium(VI)

In this method, 1 g of soil was added to 100 mL of water and placed in an ultrasonic bath for 2 hr. The sample was allowed to stand for an addi-tional 2 hr before filtration with a 0.45-μ filter. Acid and diphenylcarbaz-zide were added. After a 10-min color development period, chromium(VI) concentration in the extract was determined with a spectrophotometer.

3.1.3 Screening Method C: Water Leach for Soluble Chromium(VI) in Soil

WHC developed this method specifically for onsite determination of water-soluble chromium(VI) in soils. It is intended as a field screening method for sites where sodium dichromate is listed as the contaminant of concern.

A 20-g aliquot soil sample was weighed out in "as-received" condition and added to 40-mL of water in a 2-oz, wide-mouth glass jar. A Teflon[1]-coated stir bar was added and the jar was placed on a hotplate/stirrer unit with the heat set at "low" and stir set at "high" for 15 min. At the end of the 15-min extraction period, the soil/water mixture was allowed to settle for a few minutes and then filtered with a 0.45-μ filter. In a disposable beaker, 10-mL of the resulting filtrate was added to deionized water to a total volume of 25-mL. A reagent (diphenylcarbazide with buffer) pillow was added and the mixture was stirred well with a disposable plastic stir rod. After a 10-min color development period, the solution was analyzed using a filter photometer. The result obtained with the filter photometer was corrected to account for dilution and reported as parts per million chromium(VI).

[1]Teflon is a tradename of E.I. du Pont de Nemours & Company.

Table 1. Sodium Dichromate Expedited Response Action Cleanup Activity Sample Data. (2 sheets)

Location	Sample	Chromium(VI), ppm				Total chromium, ppm	HEIS/Chromium(IV)/ Total chromium, ppm
		Method A	Method B	Method C	Method D	Method E	
33	SD-033-01	0.094	2.07	0	0.061±0.027	32.4±2.9	
23	SD-023-02	0.095	3.26	0	0.116±0.036	32.6±2.9	
36	SD-036-03	0.215	2.81	0	0.412±0.046	35.6±2.9	
35	SD-035-04	0.121	3.93	0	0.177±0.034	24.9±2.6	
37	SD-037-05	0	4.12	0	0.016±0.067	36.6±3.1	
2	SD-002-06	0.105	1.83	0	0.063	24.9±2.8	
13	SD-013-07	0	2.79	0	0.238±0.037	30.7±3.1	
141	SD-141-08	0	1.79	0	0.13±0.036	29.3±3.1	
64	SD-064-09	0.283	3.12	0	0.04	30.6±3.1	
64	SD-064-10	0.215	2.61	0	0.38	37±3.3	
53	SD-053-11	0	1.82	0	0.058±0.022	25.7±2.9	
22	SD-022-12	0.209	5.39	0	0.108±0.026	34±4.4	
31	SD-031-13	0.1	3.27	0	0.105±0.028	39.3±3.4	
138	SD-139-14	0	2.95	0	0.064±0.025	36.2±3.5	
Zone E	SD-E-15	---	---	0	---	---	
Zone E	SD-E-16	0.525	4.44	0	0.095±0.024	121.2±7.4	B01971/<0.49/86.7
Zone E	SD-E-17	0.0897	<1.53	0	0.284±0.057	35±4.4	B01972/<0.5/12.1
Zone E	SD-E-18	0.101	<1.63	0	0.253±0.056	39.3±4.4	B01973/<0.5/11.3
Zone E	SD-E-19	0	<1.63	0	0.133±0.068	34.9±4.1	B01974/<0.5/11.4
Zone E	SD-E-20	0	<1.52	0	0.092	33.9±4	B01975/<0.5/13.9
Zone E	SD-E-21	0.145	<1.65	0	0.13±0.049	46.3±4.6	B01976/<0.5/16.6
Zone E	SD-E-22	---	<1.75	0	0.176±0.067	51.2±4.7	B01977/<0.5/16.5/b
Zone E	SD-E-23	0	<1.68	0	0.092	42.2±4.6	B01978/0.11/12.1/c
Zone E	SD-E-24	0	<1.71	0	0.132±0.05	38.2±4.3	B01979/<0.5/11
a	SD-E-25	0	<1.48	0	---	---	B01980/<0.5/0.82
Zone E	SD-E-26	0	<1.56	0	0.208±0.07	39.1±4.5	
Zone E	SD-E-27	0	<1.75	0	0.103±0.05	41.3±4.5	
Zone E	SD-E-28	0	<1.59	0	0.091±0.041	49.9±4.8	
Zone E	SD-E-29	0	<1.75	0	0.105±0.046	43.1±4.7	
Zone E	SD-E-30	0.678	<1.83	0	0.24±0.058	65.3±4.9	

9513547.0701

Table 1. Sodium Dichromate Expedited Response Action Cleanup Activity Sample Data. (2 sheets)

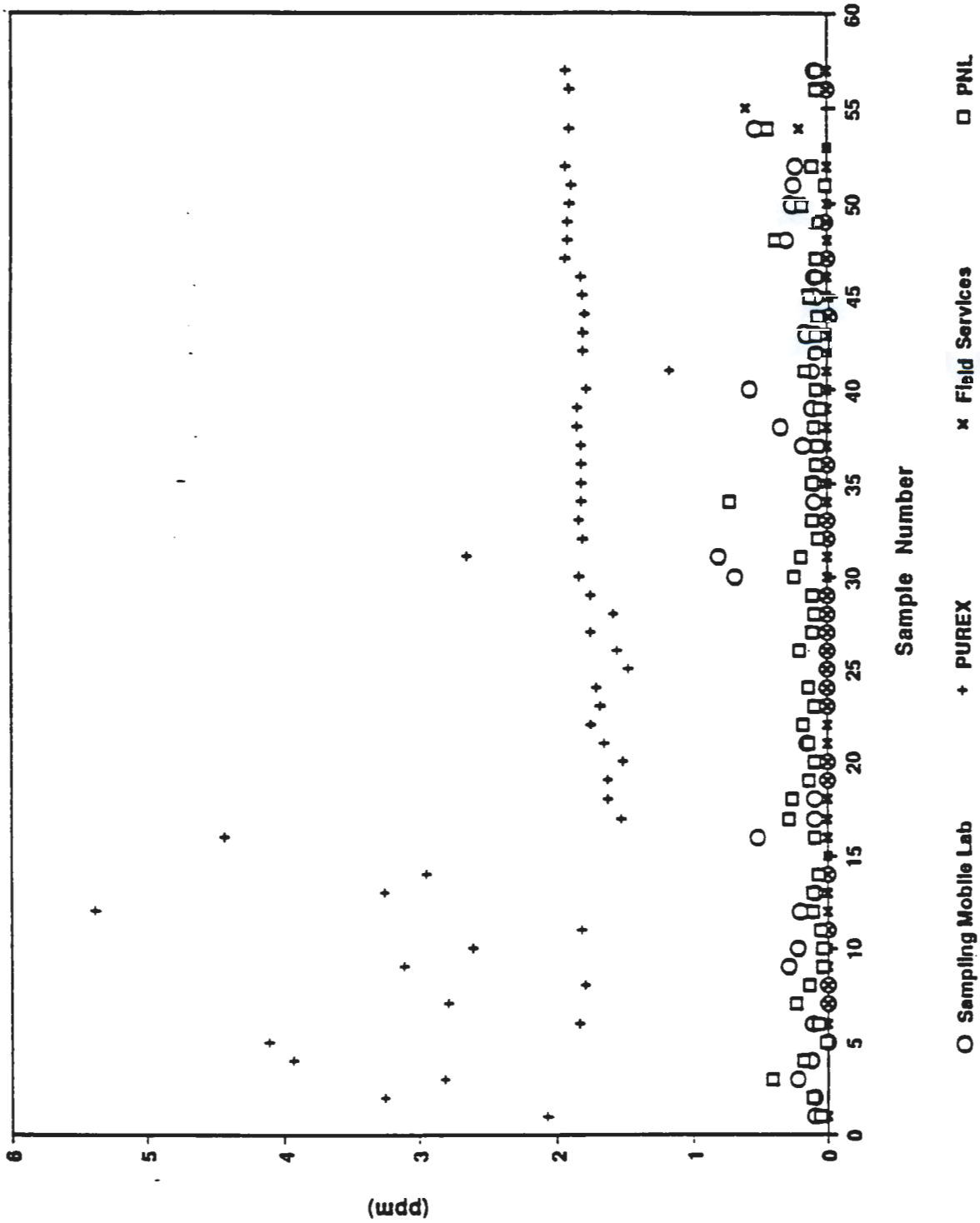
Location	Sample	Chromium(VI), ppm				Total chromium, ppm	HEIS/Chromium(IV)/ Total chromium, ppm
		Method A	Method B	Method C	Method D	Method E	
Zone E	SD-E-31	0.813	2.65	0	0.188±0.05	92.6±6.1	
a	SD-E-32	0	<1.81	0	0.066	3.8±1.3	B01993/<0.5/0.68
Zone D	SD-D-33	0	<1.83	0	0.108±0.038	71.5±5.3	B01981/<0.5/29.6
Zone D	SD-D-34	0	<1.82	0	0.72±0.038	52.3±4.6	B01982/<0.5/16.4
Zone C	SD-C-35	0	<1.82	0	0.115±0.038	42.8±4.1	B01983/<0.5/16.8
Zone C	SD-C-36	0	<1.82	0	0.084±0.039	66.8±5	B01984/<0.5/16.5
Zone C	SD-C-37	0.1788	<1.82	0	0.069	40.7±4	
Zone C	SD-C-38	0.366	<1.84	0	0.09	53.2±4.5	B01985/<0.5/16.2
Zone C	SD-C-39	0.106	<1.84	0	0.056	34.6±4.1	B01986/<0.5/11.6
Zone C	SD-C-40	0.575	<1.78	0	0.077	49.5±4.4	B01987/<0.5/15.6
Zone C	SD-C-41	0.108	<1.18	0	0.159±0.05	54±4.6	B01988/<0.5/17.1
Zone C	SD-C-42	0.092	<1.8	0	0.098±0.037	43.4±4.3	B01989/<0.5/17.7/b
Zone C	SD-C-43	0.163	<1.8	0	0.098±0.032	37.3±3.9	B01990/<0.11/12.5/c
Zone C	SD-C-44	0	<1.79	0	0.077	33.4±3.6	B01991/<0.5/10
Zone C	SD-C-45	0.096	<1.8	0	0.134±0.053	34.9±4	
Zone C	SD-C-46	0.09	<1.82	0	0.085	40.2±4.2	B01992/<0.5/12.3
a	SD-G-49	0	<1.93	0	0.077	7.1±1.8	B01994/<0.5/1.1
Zone G	SD-G-50	0.296	<1.92	0	0.38±0.054	33.3±4.4	B01995/<0.49/15.1
Zone G	SD-G-51	0.1	<1.92	0	0.08	37.2±4.2	B01996/<0.5/18.8
Zone G	SD-G-52	0.27	<1.9	0	0.202±0.047	231±12	B01997/<0.5/13.2
Zone G	SD-G-53	0.246	<1.89	0	0.012±0.044	74±5.6	B01998/<0.49/23
Zone G	SD-G-54	0.228	<1.93	0	0.115±0.044	55.7±5	B01999/<0.5/31.2/b
Zone G							B019B0/0.11/32.3/c
Zone G	SD-G-55	0.537	<1.9	0.2	0.438±0.067	43.1±4.6	B019B1/<0.49/16.9
Zone G	SD-G-55			0.6/d			
Zone G	SD-G-56	0	<1.9	0	0.078	33.1±4.3	B019B2/<0.5/15.2
Zone G	SD-G-57	0.098	<1.93	0	0.083	35.2±4.4	B019B3/<0.49/10.2

a = equipment blank.
b = QA duplicate.
c = QA split.
d = reanalysis of sample SD-G-55.

Table 2. Sodium Dichromate ERA Cleanup Activity
QA Spike Data Table.

Sample	Chromium(VI), ppm			
	Sample Value	Method A	Method B	Method C
S10	0.5	0.49	0.24	0.2
S11	0	0	0.146	0
S12	0.25	0.21	0.273	0.2
S13	2.50	2.3	0.788	1.2
S14	1.00	0.98	0.433	0.6
S15	5.00	4.7	1.67	4.0

Figure 3. Field Screening Chromium(VI) Sample Results.



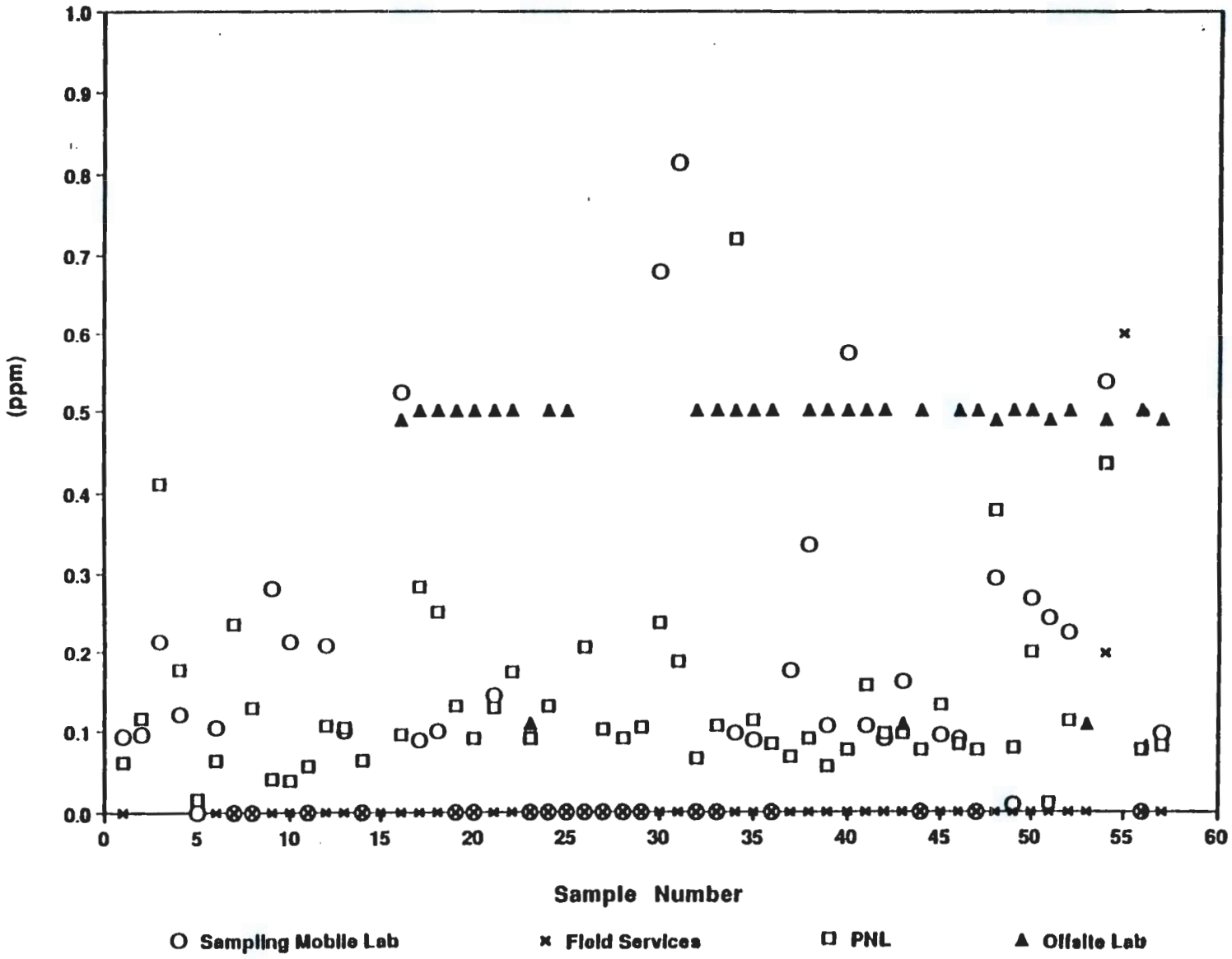


Figure 4. Chromium(VI) Sample Results.

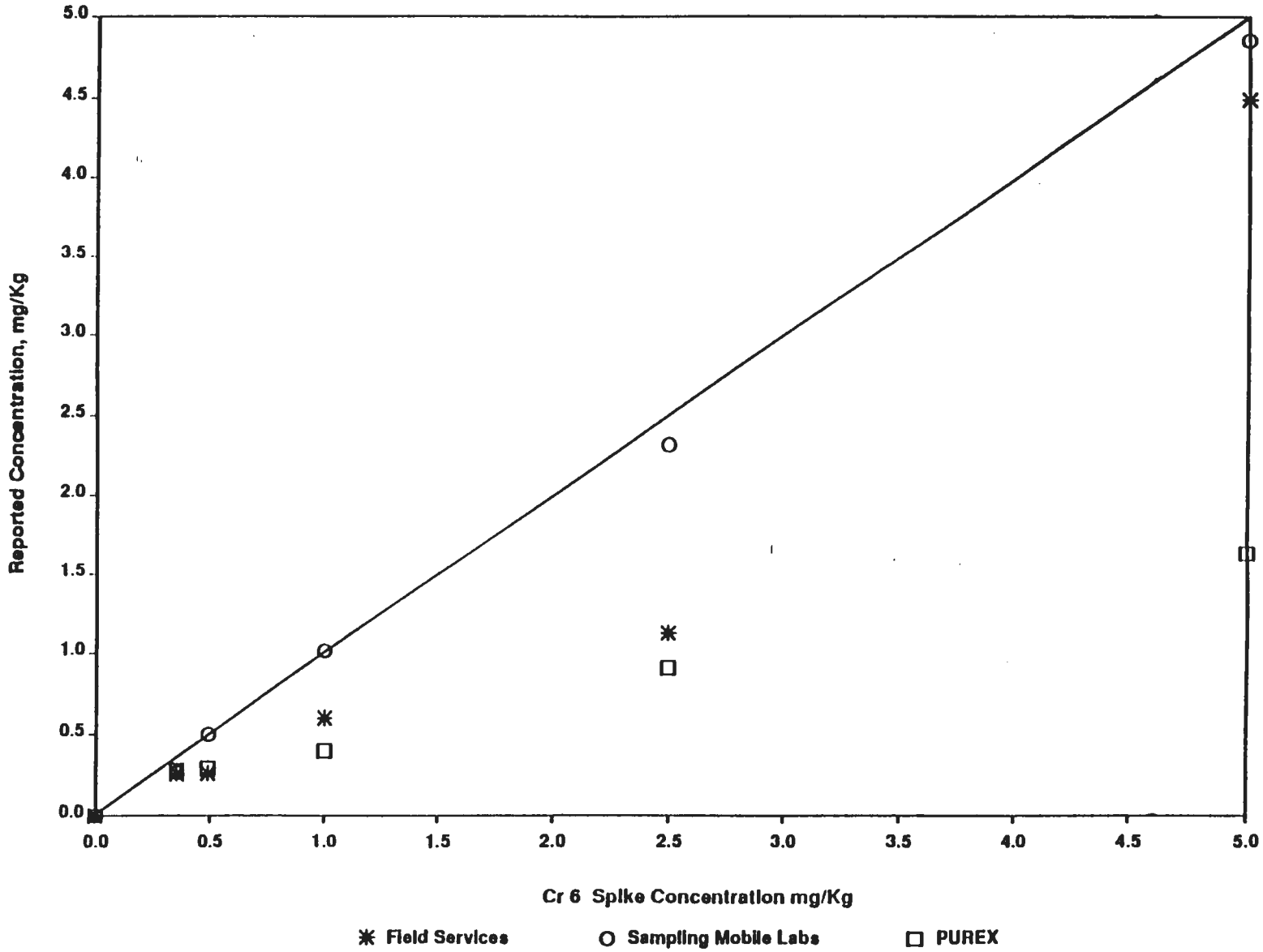


Figure 5. Field Screening Chromium(VI) Spiked Sample Results.

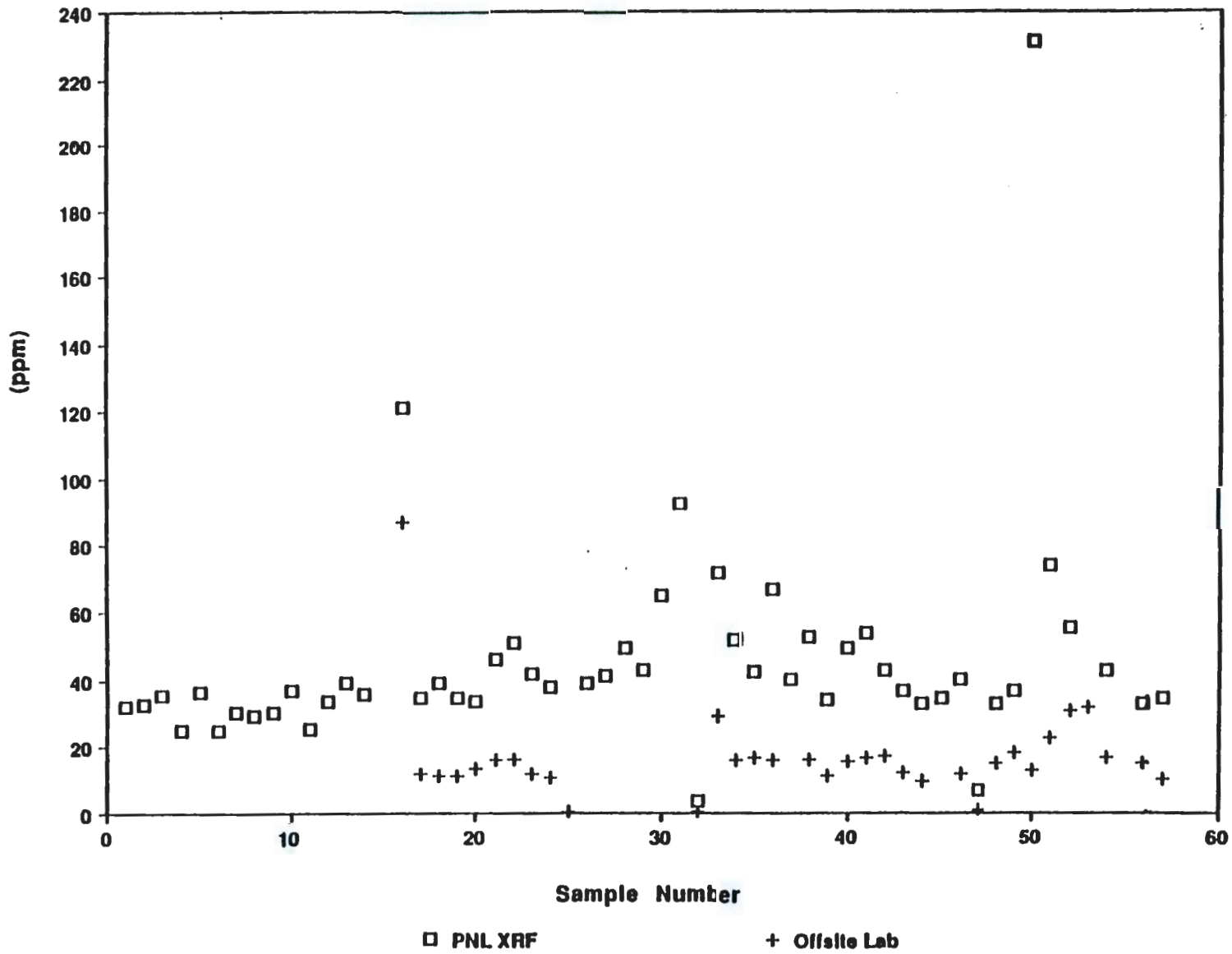


Figure 6. Total Chromium Sampling Comparison.

3.1.4 Screening Method D: Chromium(VI)

In this method, 1 g of soil and 1-mL of demineralized water were placed in an ultrasonic bath for 10 min. Following the ultrasonic mixing, the sample was centrifuged for 10 min. A 100-μL aliquot was transferred to a polypropyl-ene film and evaporated to dryness. The sample was then analyzed for total chrome by x-ray fluorescence (XRF). The assumption is that only soluble chromium(VI) will be transferred to the film.

3.1.5 Screening Method E: Total Chromium

The soil samples were processed and analyzed by XRF spectroscopy. Five hundred milligrams of the as-received sample were air dried, ground to about 300 mesh, and mounted in 35-mm slide holders between two sheets of 0.25-mil polypropylene for XRF. Total chromium was determined using iron and zirconium secondary targets.

3.2 OFFSITE LABORATORY ANALYSIS

In addition to the above chromium(VI) and total chromium field screening and rapid turnaround analyses, confirmatory samples were submitted to offsite laboratories for analysis using EPA Method 7179 for chromium(VI) and EPA Contract Laboratory Program (CLP) protocols for total chromium (see Table 1).

A composite sample of all collected waste oil was analyzed for waste designation purposes using CERCLA CLP inductively coupled plasma (ICP) metals (e.g., lead, selenium, arsenic, and mercury) and polychlorinated biphenyls.

The paint material was analyzed for ICP metals (including lead, selenium, arsenic, and mercury).

3.3 SAMPLING CONCLUSIONS

The field screening and offsite laboratory results did not identify any chromium(VI) and total chromium levels that constituted a hazardous condition.

An acceptable field screening method should be cost effective and accurate and should provide timely response in expediting cleanup actions.An accurate comparison of the various screening methods is not possible because the chromium(VI) levels were at or below instrumentation detection limits.

The MTCA Method A chromium cleanup level for soils is 100 mg/kg or 100 ppm. Because sample results are below regulatory cleanup limits, a risk assessment is not necessary; health risk at the limit is negligible.

The waste oil and paint results were used to designate the hazardous waste disposal process required to dispose of the three hazardous waste drums filled during excavation activities.

4.0 COST ANALYSIS

Table 3 compares the total ERA project budgeted costs to actual costs with net savings. The net savings is $214,000.

5.0 RECOMMENDATION

The 100-IU-4 Operable Unit is ready for unrestricted land use. This meets the requirement for "No Further Action" under CERCLA guidance.

Table 3. Sodium Dichromate ERA Cost Analysis.

ERA Activity	Budget Costs (thousands)	Actual Costs (thousands)	Net Savings (thousands)
Site Characterization			
Labor	$132.0	$102.9	$19.1
Materials and Supplies	18.5	1.7	16.8
Administration	206.4	95.0	111.4
Analytical Services	10.0	12.5	- 2.5
Subtotal	366.9	212.1	144.8
ERA Proposal			
Labor	64.5	40.3	24.2
Materials and Supplies	10.5	5.0	5.5
Administration	66.3	42.7	23.8
Subtotal	141.3	88.0	53.5
Cleanup Implementation			
Labor	146.3	138.8	7.5
Materials and Supplies	21.4	22.9	- 1.5
Administration	163.7	167.8	- 4.1
Analytical Services	72.1	57.7	14.4
Waste Disposal	18.1	18.1	0.0
Subtotal	421.6	405.3	16.3
Total	929.8	705.4	214.6

6.0 REFERENCES

Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 USC 9601 et seq.

DOE-RL, 1993, *Sodium Dichromate Barrel Landfill ERA Proposal*, DOE/RL 93-25, U.S. Department of Energy-Richland Field Office, Richland, Washington.

Ecology, EPA, and DOE, 1989 et seq., *Hanford Federal Facility Agreement and Consent Order*, Washington Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington.

EPA, 1990, "National Oil and Hazardous Substances Pollution Contingency Plan," Title 40, *Code of Federal Regulations*, Part 300, U.S. Environmental Protection Agency, Washington, D.C.

Hazardous Waste Cleanup--Model Toxics Control Act, Revised Code of Washington, Chapter 70.105D, Washington State Department of Ecology, Olympia, Washington.

Resource Conservation and Recovery Act (RCRA) of 1976, as amended, 42 USC 6901 et seq.

WHC, 1991, *WIDS Database Field Descriptions and Data*, WHC-MR-0056, Rev. 1, Westinghouse Hanford Company, Richland, Washington.

9513347.0706

APPENDIX A

ACTION AGREEMENT MEMORANDUM

DOE/RL-93-64
Rev. 3

FAX TRANSMITTAL

To: Paul Day
Dept/Agency
Fax #
From: S. Smith
Phone #
Fax # (509) 376-2396

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

7601 W. Clearwater, Suite 102 • Kennewick, Washington 99336 • (509) 546-2990

March 8, 1993

Mr. Leo E. Little, Assistant Manager
Environmental Management
U.S. Department of Energy
P.O. Box 550, A3-42
Richland, WA 99352

Dear Mr. Little:

Re: Action Memorandum Approval: Sodium Dichromate Barrel Landfill, U.S. Department of Energy Hanford Site, Richland, WA

This letter constitutes approval of the subject Action Memorandum.

I. PURPOSE

The purpose of this action is to mitigate any threat to public health and the environment from the Sodium Dichromate Barrel Landfill, and to meet the ERA objective of clean closure. It is assumed that this will be the final remedial action taken at the 100-IU-4 Operable Unit.

II. BACKGROUND

Pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), the U.S. Environmental Protection Agency (EPA) proposed the 100 Area at the U.S. Department of Energy (USDOE) Hanford Site for inclusion on the National Priorities List (NPL) on June 24, 1988. In November 1989, the 100 Area was included on the NPL.

A. Site Description

Located east of the D and DR reactors and west of H reactor (Figure 1), this landfill area is thought to have been in use in 1945 for disposal of discarded and crushed barrels. The landfill area is the sole waste site within the 100-IU-4 Operable unit.

Historical documentation for the site (site dimensions, usage, and waste volume) is not available. The Waste Information Data System (WIDS 1992) assumed that the crushed barrels contained 1% residual sodium dichromate at burial time and only these crushed barrels were buried at the site. Sodium dichromate was used as an additive to reactor cooling water to prevent pipe corrosion.

In addition to Sodium Dichromate Barrels, the site also includes homestead surface debris, barbed and fencing wire, stove pipe, and various tin cans. The site may have been used as a general landfill. Burial depth is shallow since visual inspection finds large amounts of barrel debris on the surface. The limited field investigation also proved the depth of burial is around 6.5 feet. The site is rectangular in shape, and is about 1,500 feet long by 300 feet wide. The immediate area surrounding the site still shows evidence of its original agricultural use; field rows are noticeable on the west perimeter.

Chromium (Cr) exists in the 100-HR-3 Operable Unit area groundwater, but this site is not the suspected source. Groundwater samples from the site's monitoring well (699-93-46) do not report detectable levels of chromium. The groundwater depth is 29 feet. Site radiation survey indicate that radiation levels are not in excess of the natural background levels. The site contains many bare patches (most in circular shape with diameters from about one foot to ten feet) surrounded by "healthy" cheat grass. A Hanford Site survey identified areas containing this "natural phenomena" at several other localities.

B. <u>Site Characterization</u>

Site characterization activities included two geophysical, nonintrusive, ground-penetrating radar and electromagnetic induction surveys, surface debris collection, sample trenches, sample pit, and soil sampling.

The first geophysical survey identified many subsurface anomalous zones. The survey identified the need to remove the surface debris (about 41 barrels and homestead debris) which interfered with the survey. Field screening and offsite laboratory analysis sample collection occurred during surface debris cleanup. The second geophysical survey provided more detail, clearer anomaly delineation, and detection of about 144 small and large anomalies. The survey interpreted most of these as metallic debris. Based on survey results, limited field investigations were carried out.

Two sample trenches and one sample pit were dug to confirm the survey findings. Numerous crushed drums were found to a depth of about 6.5 feet in both the trenches. A crushed drum with the wording "Sodium Dichromate Crystals" still legible was discovered in trench 2.

Soil samples were collected from the surface, two test trenches, and one test pit. Also during surface debris cleanup, surface samples were obtained for analysis. The samples were either field screened for Cr+6 and total Cr or sent to an offsite laboratory for analysis for Cr, Cr+6 and gamma emitting radionuclides.

All samples were field surveyed for radiation. The field instruments did not detect any radiation levels and showed detectable Cr+6 levels of less than five ppm. Laboratory analysis shows a maximum concentration of total Cr at 56.3 ppm and 15.6 ppm of Cr+6.

III. THREAT TO PUBLIC HEALTH OR WELFARE OR THE ENVIRONMENT

A. Present Conditions

Limited field investigations were carried out in the Sodium Dichromate Barrel Landfill. There are about 144 anomalies, and full scale investigation of a large number of these anomalies is yet to be carried out to determine all the contents of these anomalies. Historical documentation for the site (usage and waste type, waste volume) is not available. WIDS 1992, assumes that the crushed barrel contained 1% residual sodium dichromate at the burial time and that only crushed barrel were buried at the site. This assumption seems to be correct as evidenced from the limited field investigation of excavation of two test trenches, which revealed numerous crushed drums in the trenches. Only one crushed drum with the wording "Sodium Dichromate Crystals" still legible was discovered in trench No. 2. However, the entire site cannot be assumed to be the same based on this limited field investigation. The sample analysis results are well below the Model Control Toxic Act (MTCA) Residential Soil Clean-up chromium standard of 100 ppm. However, it is too early to conclude that there is no threat or danger to the public health or environment from contaminants at the site without full investigation of all the anomalies. The ERA's goal is to achieve clean closure and unrestricted use of land. Public comments are in favor of complete removal of these drums from the site.

B. Applicable or Relevant and Appropriate Requirements

The ERA will be conducted in accordance with 40 CFR 300, Subpart E; the Hanford Federal Facility Agreement and Consent Order (Part 3, Article XIII, Section 38); the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA), and the State of Washington Model Toxics Control Act (MTCA, Chapter 173-340 WAC).

IV. PROPOSED ACTION AND ESTIMATED COSTS

Westinghouse Hanford Company (WHC), as the USDOE contractor, prepared an engineering evaluation/cost analysis (EE/CA) concerning technologies that were applicable to the Sodium Dichromate Barrel Landfill. The proposal was submitted to the EPA and Washington State Department of Ecology (Ecology) by USDOE for parallel review, and was also made available for public comment for the period of thirty (30) days. The EE/CA proposed three remedial action alternatives. They are: No-Action Alternative, Sample All Anomalies, and Excavate and Dispose At Central

Landfill. Ten (10) public comments were received, including comments from Confederated Tribes and Bands of the Yakima Indian Nation. One public comment supported a "no action alternative," while the majority (about 70% of the total response) opted for total excavation and removal of barrels from the site. The rest of the public comments were deemed not relevant. The following proposed alternatives were evaluated.

A. No Action - The very limited nature of the field activity does not justify the action. Also, the existing sampling data is not sufficient for Ecology regulators to support this alternative.

B. Sample All Anomalies - The purpose of sampling all anomalies (about 144) is to further confirm that the site contains no regulated hazardous waste. Sample collection will require a small backhoe and dust control devices. All excavated debris will be reburied where found. The debris type will be visually identified at each anomaly location. If the anomaly is a crushed drum(s), sample collection will be for field screening and offsite laboratory analysis. If the anomaly is homestead debris, no sample collection will occur. When all the analysis results are received and show that the site is contaminant free, all maps will be upgraded. A note will be added that the site contained buried crushed drums and that Cr and Cr+6 levels are within background levels. Reseeding of the disturbed sample areas will be done. The total cost for this alterative is estimated at $288,990.

This alternative will confirm whether the site contains any regulated hazardous waste. The sampling will also require total screening for metals and organics, and analysis for selected samples. The cost is much higher than the third alternative of total excavation and removal. Also, this option does not address future problem(s) that may arise. The public comments are against this option. This option does not meet the original intent of the ERA, which is clean closure of the site.

C. Excavate and Dispose At Central Landfill - This alternative involves excavation of all anomalies, placing the debris in dump trucks and disposal at the central landfill. Sample collection will occur if discolored soil or debris other than crushed drums or homestead types appear during the excavations. Area stabilization and reseeding will follow excavation. The total cost is estimated at $192,140. The cleanup activity will take about six (6) weeks, depending on weather conditions.

This alternative is technically feasible and cost effective. It will be effective in meeting the ERA goal by removing all potential contamination. This action is also the preferred alternative by the public, and may allow unrestricted use of the land. Confirmatory sampling must occur to show that the site is clean.

Implementation

Labor	$45,400
Materials and Supplies	5,000
Analytical Services	15,400
Equipment Leasing	18,000
Central Landfill	54,000
Engineering and Administration	10,000
Sub Total	$147,800
30% Contingency	44,340
TOTAL	$192,140

V. RECOMMENDATION

This decision document recommends the excavation of all anomalies and disposal of the materials at the central landfill (Option C) for the Sodium Dichromate Barrel Landfill of the USDOE Hanford Site in Richland, WA. This decision was developed in accordance with CERCLA as amended by the Superfund Amendments and Reauthorization Act (SARA), and to the extent practicable, the National Contingency Plan (NCP). This decision is based on the administrative record for this project. Because conditions at the site meet the NCP section 300.415(b)(2) criteria for action, it is recommended that the preferred alternative be approved.

If you have any further questions, please contact Dave Nylander at (509)736-3000.

Roger Stanley, Program Manager
Nuclear & Mixed Waste Mgmt. Program
Washington State Dept. of Ecology

Randall F. Smith, Director
Hazardous Waste Division Waste
U. S. Environmental Protection
Agency, Region 10

RS:mf

cc: Robert K. Stewart, USDOE
Paul Day, EPA
Paul Beaver, EPA
Dave Jansen, Ecology
Dave Nylander, Ecology
Darci Teel, Ecology
Dib Goswami, Ecology
Administrative Record (Sodium Dichromate ERA)

DISTRIBUTION

Number of Copies

Onsite

17	U. S. Department of Energy, Richland Field Office	
	J. K. Erickson (15)	H4-83
	G. I. Goldberg	H4-83
	DOE/RL Public Reading Room	H2-53
1	Pacific Northwest Laboratory	
	Hanford Technical Library	P8-55
18	Bechtel Hanford, Inc.	
	G. R. Eidam	H4-91
	C. W. Hedel	H4-89
	M. C. Tyler (3)	H4-90
	BHI Document Control (3)	H4-79
	BHI Project File (3)	H6-08
	Environmental Resource Center	H6-07
	ERE Project File	H6-03
	ER Program Office (2)	H6-27
	IRA (3)	H4-17