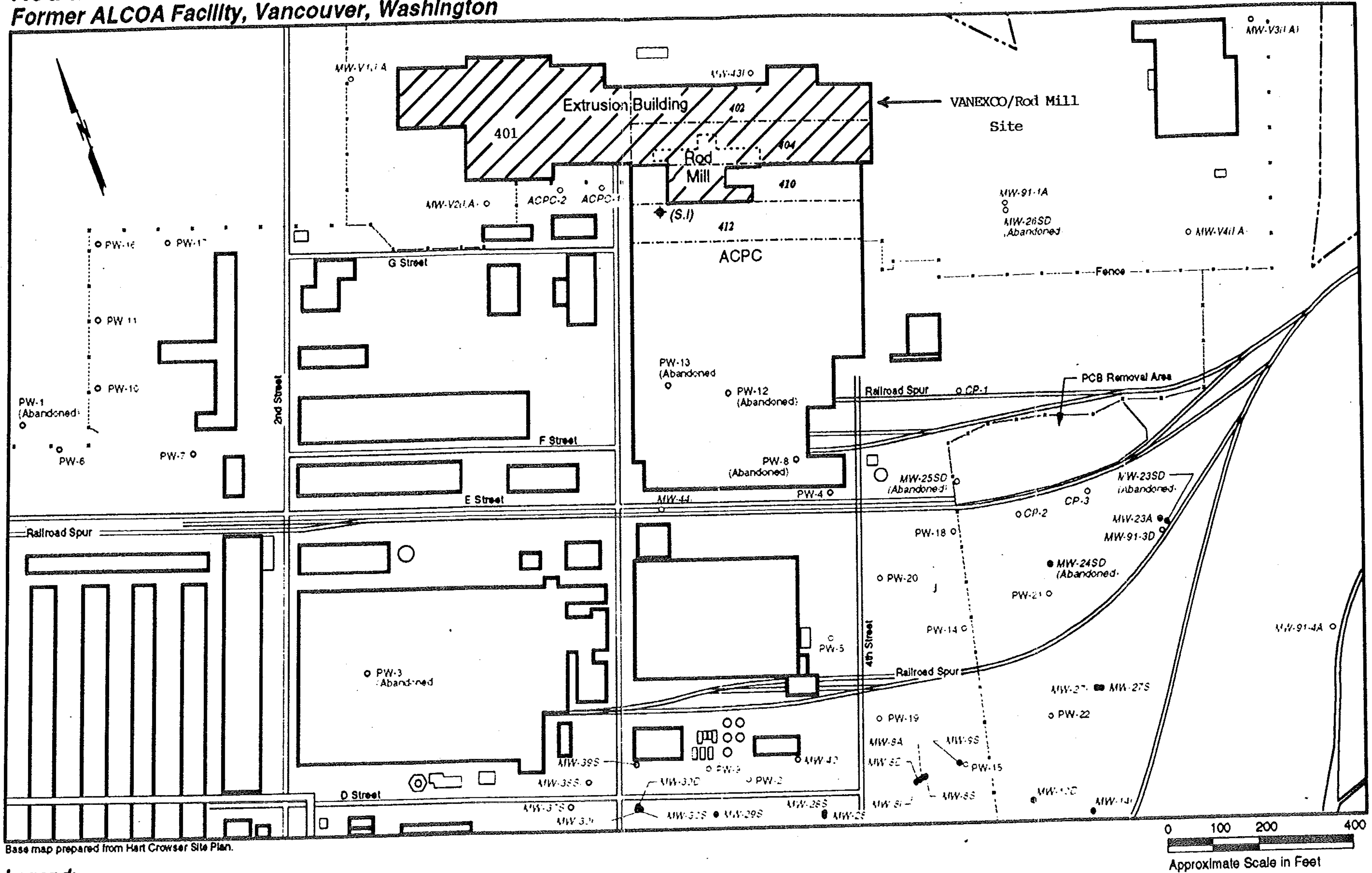
EXHIBIT A

Site Diagram

Rod Mill Site Plan

Former ALCOA Facility, Vancouver, Washington



Base map prepared from Hart Crowser Site Plan.

Legend:

MW-23A ● Well Location and Designation (Surveyed)

PW-7 ○ Well Location and Designation (Not Surveyed)

(S.I) ◆ Proposed Monitoring Well Cluster

HARTCROWSER
5191-18 1/94

CLEANUP ACTION PLAN

ALUMINUM CORPORATION OF AMERICA

RODMILL PCB CLEANUP SITE

1.1 PURPOSE

This document presents the selected cleanup action for the Aluminum Company of America (Alcoa) rod mill/Vanexco cleanup project. The site is located approximately 3 miles northwest of downtown Vancouver, Washington near the VANALCO aluminum smelter. The site includes both a portion of the floor of a large manufacturing building, and subsurface areas below the floor. Both areas are contaminated by polychlorinated biphenyl (PCB) compounds. The smelter complex is surrounded by both industrial and agricultural development. In 1992 Alcoa removed large amounts of contaminated soil as an independent action . This Cleanup Action Plan (CAP) documents the site - specific factors and analysis that led to the selection of the independent cleanup remedy and the final remediation for the site.

The purpose of the Cleanup Action Plan is to:

--- Summarize the Independent remedial actions that have been completed at the site.

--- Describe the proposed final cleanup action and monitoring plans including the rationale used to select both the plans.

--- Provide an opportunity for the public to comment on the proposed final cleanup action.

This final CAP is being issued on June 5, 1995 after a public comment period which began on May 4, 1995 and continued until June 2, 1995. No comment was recieved during the comment period.

1.2 APPLICABILITY

This Cleanup Action Plan is applicable only to the Alcoa - Vancouver Rod Mill/Vanexco site. The cleanup levels and monitoring requirements presented in this document have been developed as a result of a remediation process that was conducted by Alcoa as an Independent Cleanup. The cleanup levels and monitoring actions are site specific. The cleanup actions and levels should not be considered as setting precedents for other similar sites. Potentiality Liable Persons (PLP's) that are cleaning up sites under Ecology oversight must base cleanup levels on site specific regulatory considerations and not on the numerical values contained in this CAP.

OHM CORPORATION
WALNUT CREEK, CALIFORNIA

DRAWING NUMBER 12917-D1

1' SAMPLE RESULTS

SAMPLE POINT	RESULT *	SAMPLE POINT	RESULT *
[illegible]	0.80	[illegible]	1.2
[illegible]	<0.3	[illegible]	4.1
[illegible]	170	[illegible]	1.4
[illegible]	7.1	[illegible]	3.0
[illegible]	3.6	[illegible]	3.7
[illegible]	0.60	[illegible]	27
[illegible]	0.84	[illegible]	19
[illegible]	0.73	[illegible]	34
[illegible]	1.0	[illegible]	11
[illegible]	1.7	[illegible]	0.97
[illegible]	0.81	[illegible]	1.0
[illegible]	0.20	[illegible]	6.0
[illegible]	<0.3	[illegible]	13
[illegible]	<0.3	[illegible]	74
[illegible]	14	[illegible]	21
[illegible]	80	[illegible]	4.0

* Result as mg/kg of Ar1248

13' SAMPLE RESULTS

SAMPLE POINT	RESULT *	SAMPLE POINT	RESULT *
[illegible]	<0.3	5L12	1.4
[illegible]	40	[illegible]	21
[illegible]	13	[illegible]	24
[illegible]	17	[illegible]	<0.3
[illegible]	1.0	[illegible]	1.1
[illegible]	3.3	[illegible]	3.0
[illegible]	<0.3	[illegible]	13
[illegible]	3.7	[illegible]	17
[illegible]	<0.3	[illegible]	3.8
[illegible]	<0.3	[illegible]	16
[illegible]	<0.3	[illegible]	130
[illegible]	120	[illegible]	100
[illegible]	<0.3	[illegible]	3.0
[illegible]	<0.3	[illegible]	4.2
[illegible]	80	[illegible]	<0.3
[illegible]	<0.3	[illegible]	3.8
[illegible]	<0.3	[illegible]	0.44
[illegible]	1.7	[illegible]	3.7
[illegible]	120	[illegible]	34
5F10	0.80	[illegible]	0.84
5F11	0.3	[illegible]	70
5F12	17	[illegible]	0.85
5L9	<0.3	[illegible]	<0.3
5L10	<0.3	[illegible]	<0.3
5L11	<0.3		

* Result as mg/kg of Ar1248

18' SAMPLE RESULTS

SAMPLE POINT	RESULT *	SAMPLE POINT	RESULT *
[illegible]	7.8	[illegible]	130
[illegible]	84	[illegible]	<0.3
[illegible]	2.1	[illegible]	<0.3
[illegible]	19	[illegible]	3.2
[illegible]	66	[illegible]	39
[illegible]	90	[illegible]	4.6
[illegible]	1.6	[illegible]	3.3
[illegible]	63	[illegible]	70
[illegible]	65	[illegible]	80
[illegible]	7.8	[illegible]	<0.3
[illegible]	43	[illegible]	<0.3
[illegible]	2000	[illegible]	14
[illegible]	0.43	[illegible]	0.8
[illegible]	84	[illegible]	0.33
[illegible]	39	[illegible]	<0.3
[illegible]	79	[illegible]	<0.3
[illegible]	87	[illegible]	<0.3
[illegible]	86	[illegible]	3.0

* Result as mg/kg of Ar1248

15' SAMPLE RESULTS

SAMPLE POINT	RESULT *	SAMPLE POINT	RESULT *
[illegible]	3.0	[illegible]	3.6
[illegible]	<0.3	[illegible]	9.80

* Result as mg/kg of Ar1248

24' SAMPLE RESULTS

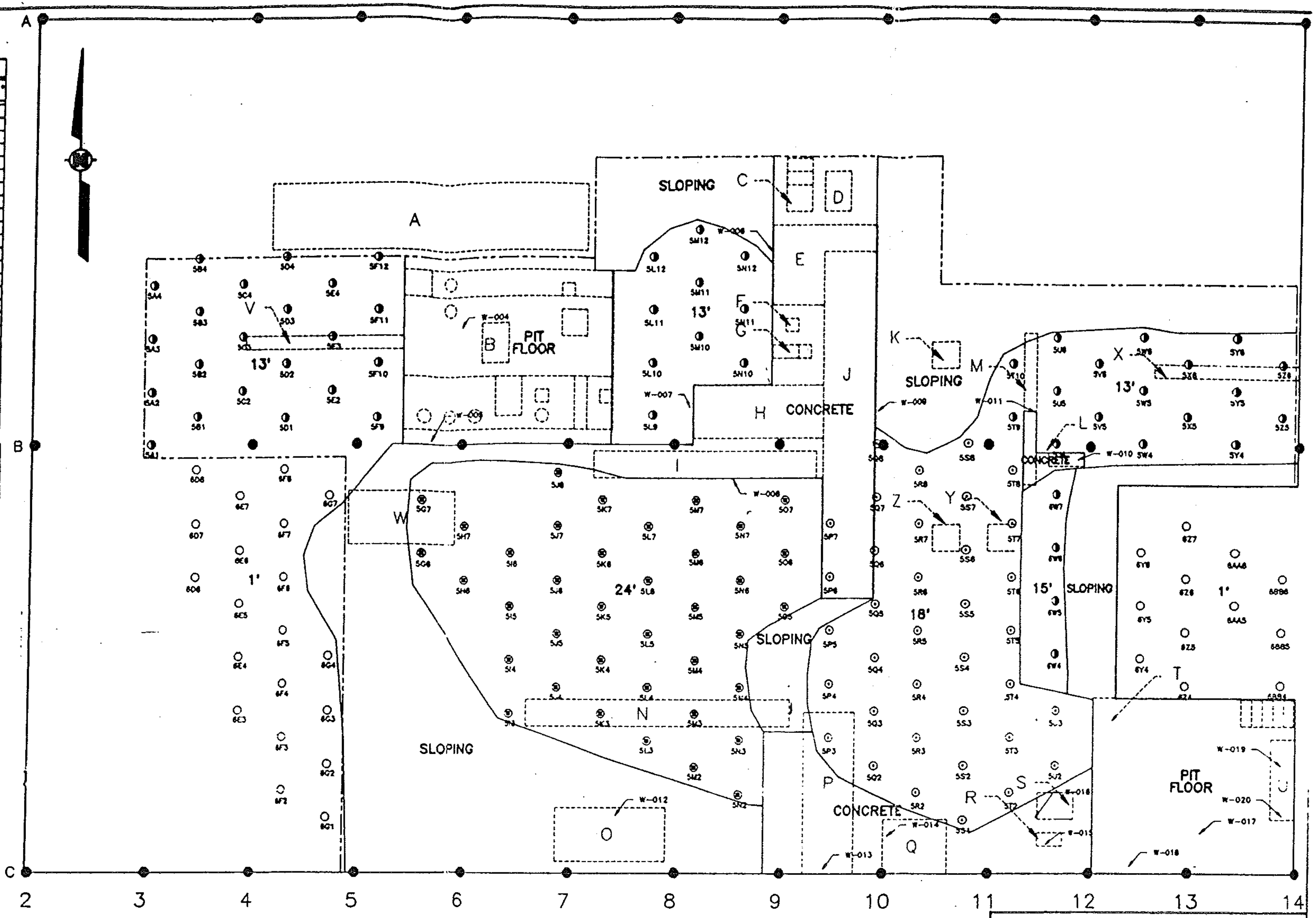
SAMPLE POINT	RESULT *	SAMPLE POINT	RESULT *
[illegible]	0.40	[illegible]	<0.3
[illegible]	0.76	[illegible]	<0.3
[illegible]	0.73	[illegible]	2.1
[illegible]	1.6	[illegible]	4.6
[illegible]	31	[illegible]	0.40
[illegible]	17	[illegible]	<0.3
[illegible]	36	[illegible]	<0.3
[illegible]	5.3	[illegible]	<0.3
[illegible]	<0.3	[illegible]	<0.3
[illegible]	<0.3	[illegible]	0.84
[illegible]	36	[illegible]	<0.3
[illegible]	<0.3	[illegible]	4.0
[illegible]	6.0	[illegible]	4.5
[illegible]	<0.3	[illegible]	1.6
[illegible]	<0.3	[illegible]	140
[illegible]	0.80	[illegible]	160
[illegible]	<0.3	[illegible]	70
[illegible]	[illegible]	[illegible]	<0.3
[illegible]	<0.3	[illegible]	40

* Result as mg/kg of Ar1248

CONCRETE WIPE SAMPLES

SAMPLE POINT	RESULT *	SAMPLE POINT	RESULT *
W-004	51	W-013	882
W-005	360	W-014	35
W-006	3.7	W-015	10
W-007	180	W-016	27
W-008	530	W-017	63
W-009	170	W-018	60
W-010	45	W-019	650
W-011	97	W-020	1300
W-012	307		

* Result as ug/100cm2 of Ar1248



SCALE

REV	DATE	DESCRIPTION	BY

OHM Corporation

EXPOSED EXCAVATION SURFACES

ALCOA ROD MILL DECONTAMINATION
PROJECT NUMBER 12917

PREPARED FOR

ALCOA
VANCOUVER, WASHINGTON

DRAWN BY	D.GEVLING 1-06-92	SCALE AS SHOWN	SHEET NO. 1 OF 1	REV. 0
APPROVED BY				

PLOT SCALE: 1" = 1'

1.3 DECLARATION

The selected remedy will be protective of human health and the environment. This CAP applies only to PCB contamination found in the rod mill/Vanexco building that is presently owned by Alcoa. The site was partiality cleaned up by Alcoa as an independent action. Ecology became involved with the site after the majority of the PCB contaminated soils were removed to a hazardous waste landfill. Ecology and Alcoa actions on the site involve determining the type of containment (cover) constructed on site, developing the ground water monitoring program for the site and placing institutional controls on the deed of the property.

Ecology gives preference to permanent solutions to the maximum extent where practical. There are three primary cleanup alternatives for non-liquid PCBs at concentrations greater than 50 ppm. These are incineration, treatment equivalent to incineration and disposal in a chemical waste landfill. In the original Alcoa independent cleanup, the treatment and incineration alternatives were briefly examined but not used due to the nature of the material present and the original low estimates of the volume of contaminated soil found on the site. The cost to mobilize an incinerator or treatment facility was not justified by the original volume estimate of contaminated soil. The landfill alternative was chosen by Alcoa. After the cleanup had started, treatment of the contaminated soils was reconsidered but judged not practicable at this site because further excavation of the soil from beneath the building would require extensive strengthening of cavity walls and dewatering or complete removal of the structure. The Alcoa selected remedy required that the building structure be left in place for further industrial use. Incineration was not considered once the true volumes of contaminated soil were determined.

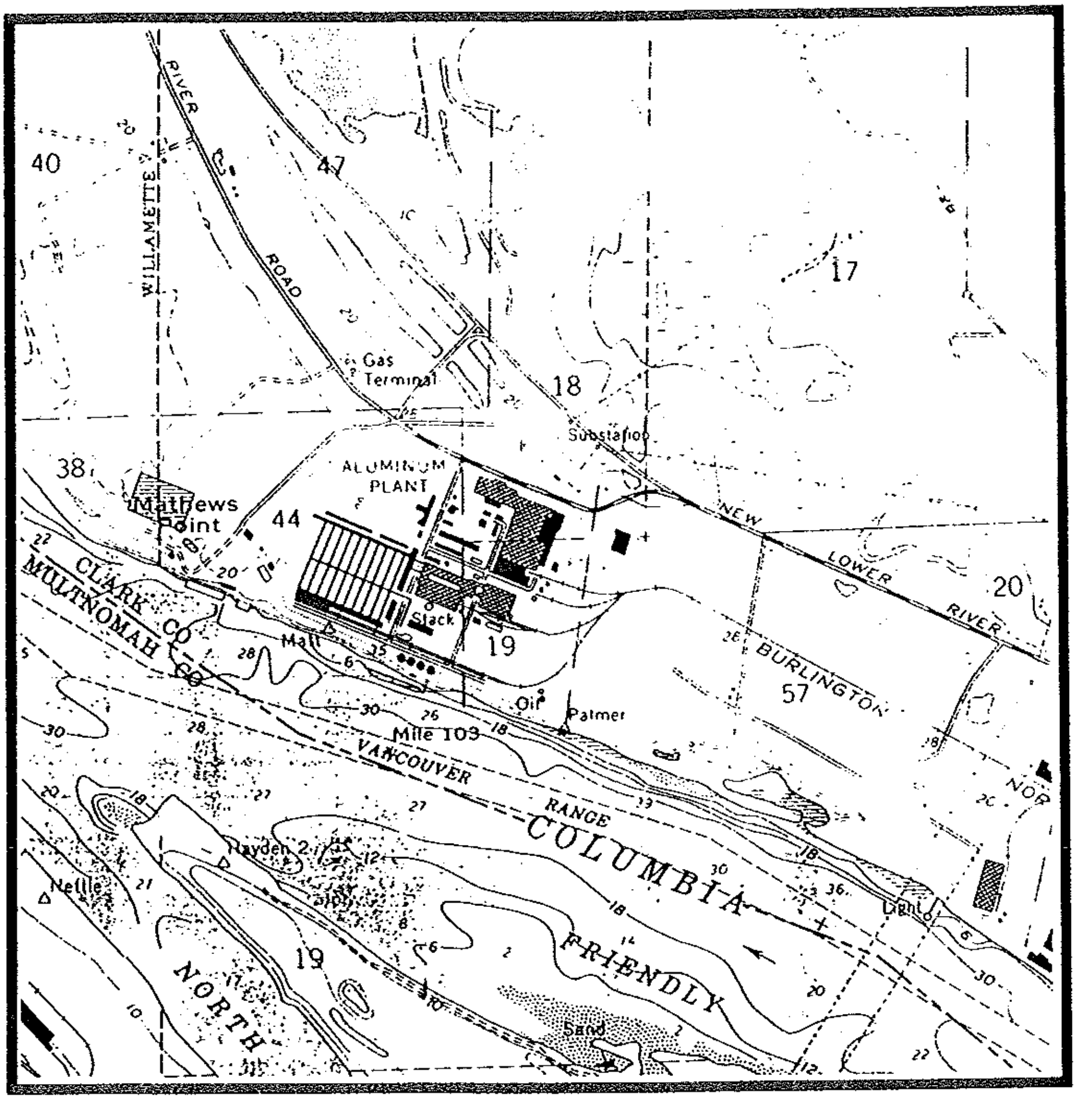
In addition to the remediation measures already taken by Alcoa, which consist of removal of a portion of the contaminated soil to an permitted hazardous waste landfill, this CAP requires construction of an impervious cover over the remainder of the contamination and deed restriction on some aspects of further activity at the site.

SITE DESCRIPTION AND HISTORY

2.1 SITE LOCATION

The Alcoa Vancouver rod mill/Vanexco site is located approximately three miles northwest of downtown Vancouver, Washington. The site consists of contaminated soils and concrete found inside of a large manufacturing building located northeast of the VANALCO aluminum smelter. The site is shown in Figure 1 and is surrounded by both industrial and agricultural land.

Site Location Map



Base map prepared from USGS 7.5-minute quadrangle of Vancouver, Washington.

N

0 2000 4000

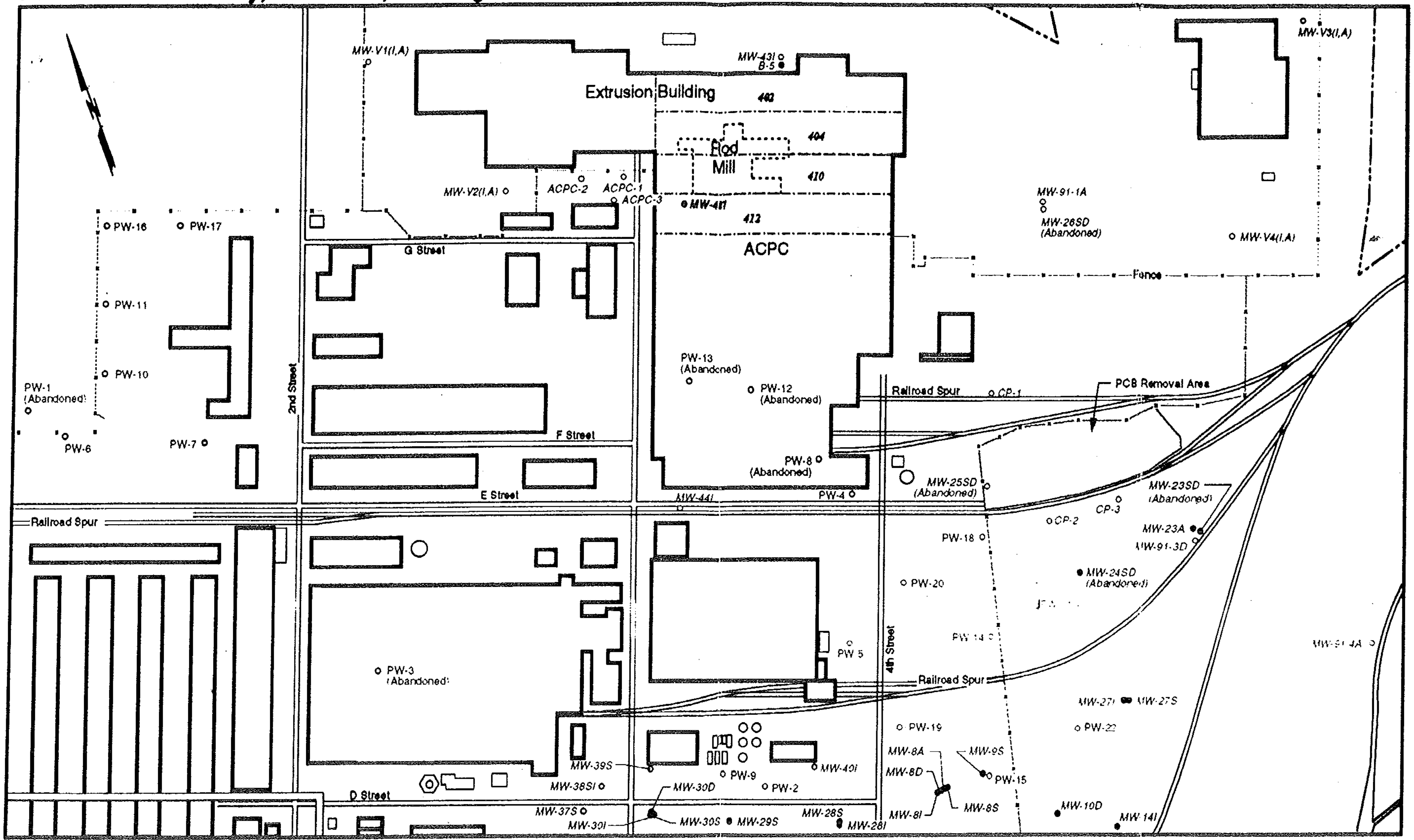
Scale in Feet

HARTCROWSER

J-2250-05 7/91

Figure 1

Rod Mill Site Plan
Former ALCOA Facility, Vancouver, Washington



Base map prepared from Hart Crowser Site Plan.

0 100 200 400

Approximate Scale in Feet

Legend:

- MW-23A ● Well Location and Designation (Surveyed)
- PW-7 ○ Well Location and Designation (Not Surveyed)
- B-5 ● Boring Location and Designation

HARTCROWSER

5191-18 4/94

2.2 SITE HISTORY

The Alcoa Vancouver facility was initially constructed in 1939 and 1940. It started production of aluminum in 1940. Alcoa started aluminum smelting operations at the Vancouver facility during the late 1940's. The facility from the early 1950's through the mid 1980's contained an aluminum smelter, and a series of fabrication plants to form the metal into finished goods such as wire, rod and extruded channel.

Five cleanup sites exist on Alcoa property around the smelter complex Figure 2. These are: NPL (National Priorities Listing) site which has been cleaned up under an Ecology consent decree; TCE site which is undergoing cleanup negotiations with the Department of Ecology; Columbia Marine Lines site which is in operations and maintenance after being cleaned up under an Ecology enforcement order; PCB lagoon site which was cleaned up as an independent action by Alcoa; and the rod mill/Vanexco site. The Alcoa NPL site is found approximately 1000 feet south of the rod mill/Vanexco site. The TCE site consists of a closed land fill located east of the NPL site and southeast of the rod mill/Vanexco site. The Columbia Marine Lines site is located on the west side of the smelter. The rod mill/Vanexco site is found within a large building that once housed an extrusion plant and rod mill.

In 1986 Alcoa closed the aluminum smelter and adjacent manufacturing facilities. In 1987 Alcoa sold the smelter portion of the facility to Vanalco, Inc. and retained the title to the manufacturing section of the property. Vanalco re-started the aluminum smelter as a new company not related to Alcoa.

The manufacturing section of the property was divided into three portions in 1987, the extrusion mill, the rod mill and the wire mill. Alcoa retained title to all the manufacturing facility land but only operated the extrusion mill. In the wire mill portion of the building, Alcoa sold the manufacturing operation to ACPC, Inc., but retained ownership of the land. ACPC, Inc. continues to operate the wire mill. The extrusion mill section of the building was operated by Alcoa as a separate company until 1991 when the facility was closed and decommissioned. The rod mill portion of the building housed equipment that processed aluminum billet into rod. The rod mill was operated by Alcoa from the early 1950's to 1985. Alcoa started decommissioning the rod mill section of the building in 1987 and began final machinery removal in 1990. At the present time, all machinery has been removed from both the extrusion plant and rod mill sections of the building.

The rod mill consisted of a large rolling press that was used to make aluminum rod from aluminum billet. The rolling press used a series of rollers to reduce 7 inch by 7 inch billet into various size rod and bar. The rollers were lubricated and cooled with an oil/water emulsion. This oil/water cooling emulsion did not originally contain PCB contamination. The coolant was collected and stored in underground concrete storage tanks located beneath the fabricating machinery. The underground storage tanks were connected to the machinery by a series of concrete sumps, buried pipes, and raceways. During the operation of the rod mill, hydraulic oil containing PCB's was used in some rolling press systems. This PCB ladened hydraulic fluid came into contact with the oil/water cooling fluid and contaminated it. The contamination then spread throughout the concrete storage tanks located beneath the rolling press and along cracks and imperfections in the concrete footings that secured the rolling machinery.

During the demolition of the rod mill, PCB contamination was suspected and discovered in the concrete structures that extend below the floor surface and soil found beneath the floor. There are twenty six different concrete storage tanks, pits, sumps, and raceways in the rod mill section of the fabrication facility. These different structures ranged in depth from one foot to seventeen feet below the floor surface. In wipe tests, sections of each of the concrete structures were found to have some PCB contamination. Drilling indicated that PCB's were found in soils beneath the concrete structures.

In 1991 Alcoa finished removing all machinery from the building, steam cleaned the above ground structures and roof of the building, removed all sludge from the coolant tanks, cleaned concrete surfaces and conducted limited soil core drilling beneath the floor of the building. The limited drilling indicated minor soil contamination beneath the floor of the building. Wipe testing indicated high levels of PCB contamination still existed on the exposed cement surfaces. To satisfy some of the requirements of the Washington State cleanup regulation (MTCA), Alcoa elected to conduct an independent cleanup that consisted of removal of the contaminated soils and shot blasting and scarification of the PCB contaminated concrete structures. When complete, Alcoa expected that the cleanup would satisfy the federal Toxics Substances Control Act (TSCA) PCB regulations. Initial drilling indicated that a one foot excavation along with deeper hot spot soil removal was needed to clean the soil beneath the concrete structures.

Alcoa's contractor, OHM Remediation Services Corporation (OHM) began the removal and cleaning of concrete surfaces in February of 1992. Once the cleanup was underway, it became obvious that the original site assumptions were wrong and the contamination was more widespread than originally thought.

Shot blasting and scarification did not remove all of the PCB contamination from the subfloor concrete structures. Wipe testing revealed that residual PCB contamination existed in sixteen out of seventeen of the concrete structures. Where feasible, the concrete sumps, pits, and tanks were removed. Contaminated soil beneath the structures was removed and shipped to a hazardous waste landfill. Originally chemical analysis of the soil was used to determine if the soil was clean or contaminated. The analysis were used to direct excavation. As the excavation continued, only limited chemical analyses were taken and visible stainage was utilized to guide the excavation. Random grab samples of truck loads leaving the site were used to verify that visible stainage could be used as an excavation guide. Operations were halted when the size of the excavation grew to a point that threatened the two rows of center load bearing columns which support the building roof and soils at the bottom of the hole started to become moist from ground water. When the operations were halted, approximately 8000 cubic yards of material had been excavated leaving a 80 foot by 160 foot cavity. A structural engineer was retained to examine the excavation and determine what was required to continue the remediation. The engineer recommended that all work stop and the excavation be filled with crushed rock to prevent the collapse of the roof. Further remedial action would require extensive shoring of the pit walls and eventually de-watering of the excavation. Final sample results from the excavation show PCB levels above the MTCA method A cleanup levels (Figure 3).

The extrusion mill section of the building was cleaned up during the same time period as the rod mill. The contamination found in the extrusion mill was not as extensive as the rod mill. The extrusion mill manufacturing equipment was removed from the facility in 1991 and 1992. The independent cleanup of the extrusion mill was completed in 1992. The extrusion mill has one set of concrete sumps located near and beneath the former extrusion machinery. The mill does not contain any storage pits or tanks for cooling or hydraulic fluid.

During the demolition of the extrusion mill wipe tests were used to test for the presence of PCB contamination. When PCB was identified on the concrete surface, the area was removed using scarification equipment. The entire concrete floor was scarified using 1/2 inch lifts. In three areas in the building PCB contamination extended below the concrete floor. In two of these areas soil was removed down to a concentration of 0.3 mg/kg PCB. In the third area soil was removed down to the three foot level where an asphalt/oil mat road was discovered. The road contains greater than 900 ppm PCB's. Soil above and below the road contains trace amounts of PCB. Excavations in the extrusion mill were not extensive and all of the contaminated soils except for the road were removed from the building.

When the structural integrity of the rod mill building was threatened Alcoa requested that Region 10 of the Environmental Protection Agency (EPA) grant a waiver from the TSCA cleanup action level. The TSCA regulations require that a 25 ppm total PCB cleanup level in soils and concrete be achieved at cleanup sites when the PCB spill occurred after May 4, 1987. Spills that occurred prior to May 4, 1987 are excluded from the scope of the TSCA spill cleanup policy and are treated at the discretion of the local EPA Region. Region 10 granted Alcoa an alternative cleanup level because the structural integrity of the building was threatened during the cleanup project. Alcoa requested that the remediation project be halted and that the present excavation be filled and the ground water monitored. EPA approved the request on December 8, 1992.

2.3 CURRENT STATUS

The Department of Ecology became aware of the contamination during the decommissioning of the building equipment. The cleanup of the building was being conducted as an independent cleanup with no formal Ecology oversight. Alcoa intended that the independent cleanup conform to MTCA Method A cleanup standards of 1 ppm PCB in soil. Alcoa originally intended to remove all PCB contaminated soil and clean all PCB contaminated concrete. Alcoa did not achieve this goal and since contamination still exists above Method A cleanup levels, Alcoa will be required to cap the site, to use institutional controls, and to perform ground water monitoring.

The site is currently surrounded on the western and southern boundaries by an active aluminum smelter. A large parking lot borders the site on the eastern side and a BPA transformer and switching yard is located north of the site. The southern section of the building is occupied by ACPC, Inc. an aluminum wire manufacturer. The site is located within the flood control dike system that surrounds the smelter.

2.4 FUTURE STATUS

Alcoa plans to sell the building and land. Several prospective purchasers have expressed interest in the property. The existing aluminum smelter located west of the site continues to operate. ACPC occupies the southern portion of the site. East of the site is an anodizing facility which is currently being used by a Vancouver manufacturer. Directly east of the combined Alcoa property parcel is land recently purchased by the Port of Vancouver. The port development plans are unknown at this time. The property is zoned industrial and will likely remain industrial in the future.

RESULTS OF ENVIRONMENTAL STUDIES

3.1 SITE CHARACTERIZATION

3.1.1 Surface Water Characterization.

Surface water is controlled by the nearby aluminum plant storm sewer system. The land surface surrounding the building is generally flat and covered with asphalt. The area forms parking and outdoor product and material storage for the wire fabricating facility. The storm water from the building and surrounding parking lots is directed into the aluminum smelter waste water treatment system through storm sewers. The aluminum smelter waste water system was tested for PCB contamination during Department of Ecology Class II Waste Water Inspection on January 28-31, 1990. An effluent sample from the waste water lagoons contained no detectable PCB compounds. A sediment sample from the outfall in the Columbia River also contained no detectable PCB compounds. The water sample was analyzed for priority pollutants. No chemicals were detected exceeding water quality criteria. There has been no analysis for PCB's in surface water taken directly from the site. There is no reason to believe that surface water is effected by the site since the site has always been enclosed by a building and limited Ecology testing has not detected PCB's in storm and waste water treatment system.

3.1.2 Concrete Structures And Floor Characterization.

Extensive concrete floor, sump, pit, tank, and raceway sampling during the decommissioning of the rod mill machinery indicated high levels of polychlorinated biphenyl's (PCB) in portions of the concrete structures and soil below the structures. Prior to beginning the characterization of the site, Alcoa steam cleaned and removed the rod mill fabricating machinery. The roof and side walls of the building were cleaned and wipe tested. The wipe test cleanup levels were determined by the Federal TSCA PCB rules. In 1991 Alcoa finished removing all machinery from the building, removed all sludge from the coolant tanks, cleaned concrete surfaces and conducted limited soil core drilling beneath the concrete floor. This drilling indicated limited soil contamination beneath the floor of the building. Wipe testing indicated PCB contamination still existed on exposed concrete surfaces. The initial soil drilling indicated that one foot of soil was contaminated and needed to be removed beneath the concrete structures. Some hot spots were discovered that would require further excavation.

There are twenty six different concrete storage tanks, pits, sumps, and raceways in the rod mill section of the fabrication facility. These different structures ranged in depth from one foot to seventeen feet below the floor surface. Some of the larger structures were used as footings for the large rolling presses and contained landings for large steel anchor bolts. These 4 to 6 inch round anchor bolt landings extended through the concrete and acted as conduits to the soil surrounding the footings. The fact that the anchor bolts could be allowing cooling oil to contaminate soils deep below the floor of the building was not taken into consideration in the original estimates of volumes of contaminated soil and concrete at the site.

Levels of PCB contamination within the rod mill concrete structures ranged from non detection to over 16,000 ppm measured as Arochlor # 1248. The highest concrete chip sample was collected from a concrete cooling tank located in the southwest portion of the building. Levels of PCB Contamination in soil samples ranged from non detection to 2000 ppm measured as Arochlor # 1248. Observations taken during the excavation of soil on the site indicated that in many cases the soil was highly contaminated near the rolling press footings that contained anchor bolts.

Alcoa was also conducting an independent cleanup of the extrusion mill while conducting the independent rod mill cleanup. Testing in the extrusion mill indicates one area where soil contamination still exists below the contaminated concrete floor. This area is located in the southwest corner of extrusion building # 401. An exploratory pit in this area uncovered at approximately the three foot level an old oil mat/asphalt road or parking area that contains PCB contamination above 900 ppm. The old county road or parking area was buried during the construction of the extrusion mill in the early 1950's. It is theorized that PCB contaminated oil was used on the road to control dust. The sand sized material above and below the contaminated oil mat road was tested and contains trace amounts of PCB's.

The extrusion mill had only one below grade concrete structure that could form a pathway for deep PCB contamination. This concrete sump and raceway system was wipe tested and found to have minor PCB contamination. The original equipment located above the concrete structures in the extrusion mill did not have high levels of PCB contaminated oil used in or around it. The concrete floor was wiped tested and removed where high levels of PCB were detected. In three areas soil was removed from below the concrete floor. Final PCB testing shows that all soil contamination was removed from the soil excavations except for the area near the buried county road.

3.1.3 Hydrogeologic and Subsurface Soil Characterization.

There has been little hydrogeologic characterization work completed for the rod mill/Vanexco site. What is known about the subsurface geology below the contamination is derived from work completed on the Alcoa NPL site and two monitoring well borings completed at the site. The geology found at the NPL site can be projected beneath the rod mill building. Limited drilling in the vicinity of the rod mill building confirms the projections.

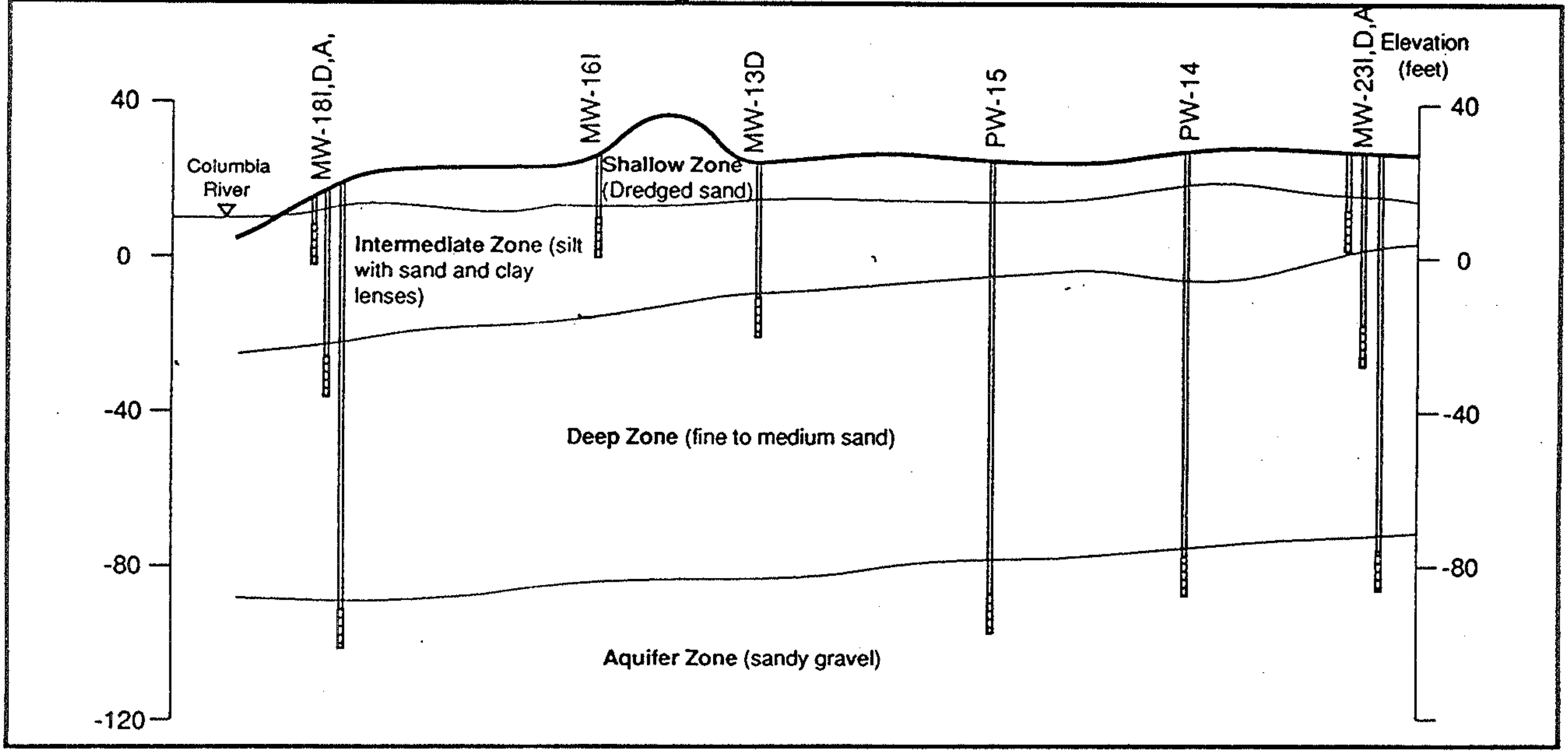
The ground water system at the site can be divided into four general zones: the shallow zone, the intermediate zone, the deep zone and the aquifer zone (Figure 4). The shallow zone consists of approximately 10 to 15 feet of dredged sand. The intermediate zone consists of 30 to 40 feet of silt with lenses of clay and fine sand. The top of the intermediate zone was the original ground surface before the dredged sands were placed over the site. The deep zone consists of fine to medium sand approximately 40 feet thick. The aquifer zone is comprised of coarse sand and gravel between 100 and 140 feet below the surface. Figure 5 shows monitoring wells located on site and Figure 4 shows the four water bearing zones beneath the site.

Drilling records indicate that the dredged sands found directly beneath the rod mill/Vanexco site do not contain water, even during the wetter months of the year. The shallow zone consists of ten to fifteen feet of sand which was dredged from the Columbia River. The shallow zone found at the NPL site south of the rod mill/Vanexco site has variable flow directions that appear to match the topography of the underlying sediments. At the NPL site the shallow zone contains water.

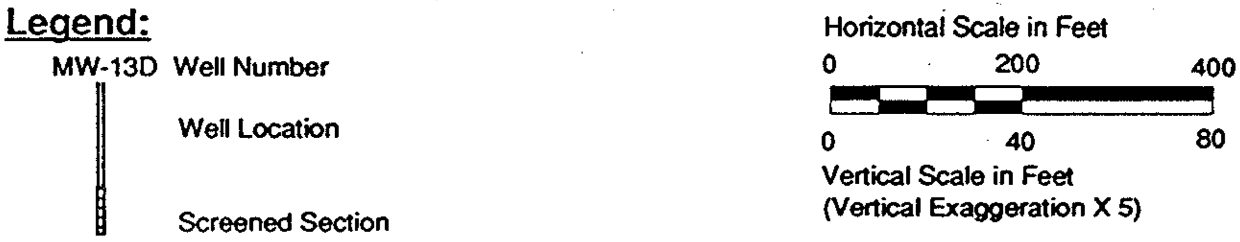
The intermediate zone is found beneath the shallow zone and is the first hydrologic zone that contains water at the rod mill/Vanexco site. The ground water flow through the intermediate zone is primarily vertical with a slight horizontal component. The unit consists of silts interbedded with small sand lenses. Water level measurements indicate that the ground water movement is to the southwest to the south southwest. The horizontal direction of movement changes slightly during the wetter months of the year.

Shallow zone sediments found directly beneath the rod mill floor are contaminated with PCB's. The PCB contamination is found extending from the shallow zone sediments into the intermediate zone. Ground water analysis of wells surrounding the building indicates <u>potential</u> minor contamination of ground water in one intermediate zone monitoring well. The monitoring well is believed to be screened in the intermediate zone approximately 125 feet from the PCB soil contamination. Well completion records for this well are not available. The well contains <5.0 ppb PCB which is the detection limit for the analysis. PCB contamination has not been found in other wells surrounding the facility. These analyses have detection limits of <0.1 to <1.0 ppb PCB. Analysis of water from a monitoring well located inside of the rod mill building approximately 20 feet down gradient from

Generalized Cross Section
Phase IIc TCE Remedial Investigation
ALCOA Facility, Vancouver, Washington



Note: Stratum lines are based upon interpolation between explorations and represent our interpretation of subsurface conditions based on currently available data.



HARTCROWSER
J-2550-06 10/92
Figure 4

Table 1 - Monitoring Well Data and PCB Sampling Results
Rod Mill Sampling and Analyses Plan
Former ALCOA Facility, Vancouver, Washington

Monitoring Well Number*	Top of Casing Elevation (ft)	Total Depth (ft)	Screened Interval (ft)	Depth to Groundwater (ft) 1/10/94	Water Level Elevation (ft) 1/10/94	Date Last Sampled	Concentration of PCBs (µg/l)
MW-V1S (I)	28.29	35	25 - 35	21.85	6.44	1/25/92	<1.0
MW-V1D (A)	28.35	87	74.5 - 84.5	22.97	5.38	1/25/92	<1.0
MW-V2S (I)	28.23	33	22 - 32	21.79	6.44	1/25/92	<1.0
MW-V2D (A)	28.45	90	76 - 86	22.00	6.45	1/25/92	<1.0
MW-V3S (I)	34.25	23	12.5 - 22.5	22.22	12.03	1/25/92	NA
MW-V3D (A)	34.19	85.5	71.5 - 81.5	28.02	6.17	1/25/92	<1.0
MW-V4S (I)	34.26	35	22 - 32	27.18	7.08	1/25/92	<1.0
MW-V4D (A)	34.05	85	71.5 - 81.5	27.97	6.08	1/25/92	<1.0
MW-43 (I)	31.27	31.5	25 - 30	24.05	7.22	11/18/92	<1.0
MW-44 (I)	28.01	31.5	25 -30	21.32	6.69	12/15/92	<0.5
ACPC-1 (I)	32.75	29.6	unknown	26.35	6.40	10/22/92	<0.025
ACPC-2 (I)	32.84	29.7	unknown	26.31	6.53	10/22/92	<5.0
CP-1 (I)	30.97	30	25 -30	24.15	6.82	1/9/91	<0.1
CP-2 (I)	---	30	25 -30	NA	NA	1/9/91	<0.1
CP-3 (I)	---	30	25 -30	NA	NA	1/9/91	<0.1
MW-24S	---	22	14.6 - 19.6	NA	NA	3/14/88	<0.25
MW-24D	---	63	46.1 - 56.1	NA	NA	3/14/88	<0.25
MW-25S	---	30	22.3 - 27.3	NA	NA	3/14/88	<0.25
MW-25D	---	58	47 - 57	NA	NA	3/14/88	<0.25
MW-26S	---	30	25 - 30	NA	NA	3/14/88	<0.25
MW-26D	---	60	48 - 58	NA	NA	3/14/88	<0.25
MW-30D	---	45	39 - 44	NA	NA	10/23/92	<0.25
MW-38I	---	25.5	20 -25	NA	NA	10/23/92	<0.25

NA - Data not available
*Last letter indicates aquifer zone (S,I,D,A)

OHM CORPORATION
WALNUT CREEK, CALIFORNIA

DRAWING NUMBER 12917-D1

1' SAMPLE RESULTS

SAMPLE POINT	RESULT*	SAMPLE POINT	RESULT*
6D8	0.80	6G2	1.5
6D7	<0.3	6G3	4.1
6D6	170	6G4	1.6
6E3	7.1	6G7	2.0
6E4	3.6	6Y4	8.7
6E5	6.00	6Y5	37
6E6	6.84	6Y8	10
6E7	0.73	6Z4	34
6F2	1.0	6Z5	11
6F3	1.7	6Z6	0.47
6F4	0.81	6Z7	1.0
6F5	6.30	6AA5	8.0
6F6	<0.3	6AA8	12
6F7	<0.3	6BB4	34
6F8	14	6BB5	31
6G1	30	6BB6	4.0

* Result as mg/kg of Ar1248

18' SAMPLE RESULTS

SAMPLE POINT	RESULT*	SAMPLE POINT	RESULT*
5P3	7.2	5R8	130
5P4	64	5S1	<0.3
5P5	3.1	5S2	<0.3
5P6	19	5S3	3.2
5P7	96	5S4	39
5Q2	60	5S5	4.0
5Q3	1.0	5S6	3.3
5Q4	63	5S7	70
5Q5	63	5S8	60
5Q6	7.0	5T2	<0.3
5Q7	63	5T3	<0.3
5Q8	2000	5T4	14
5R3	0.43	5T5	9.0
5R2	64	5T6	0.33
5R4	39	5T7	<0.3
5R5	70	5T8	<0.3
5R6	97	5U2	<0.3
5R7	86	5U3	3.8

* Result as mg/kg of Ar1248

15' SAMPLE RESULTS

SAMPLE POINT	RESULT*	SAMPLE POINT	RESULT*
6W4	2.0	6W6	2.5
6W5	<0.3	6W7	0.08

* Result as mg/kg of Ar1248

CONCRETE WIPE SAMPLES

SAMPLE POINT	RESULT*	SAMPLE POINT	RESULT*
W-004	31	W-013	880
W-005	360	W-014	38
W-006	3.7	W-015	49
W-007	190	W-016	22
W-008	830	W-017	62
W-009	170	W-018	89
W-010	46	W-019	650
W-011	67	W-020	1300
W-012	290		

* Result as ug/100cm2 of Ar1248

13' SAMPLE RESULTS

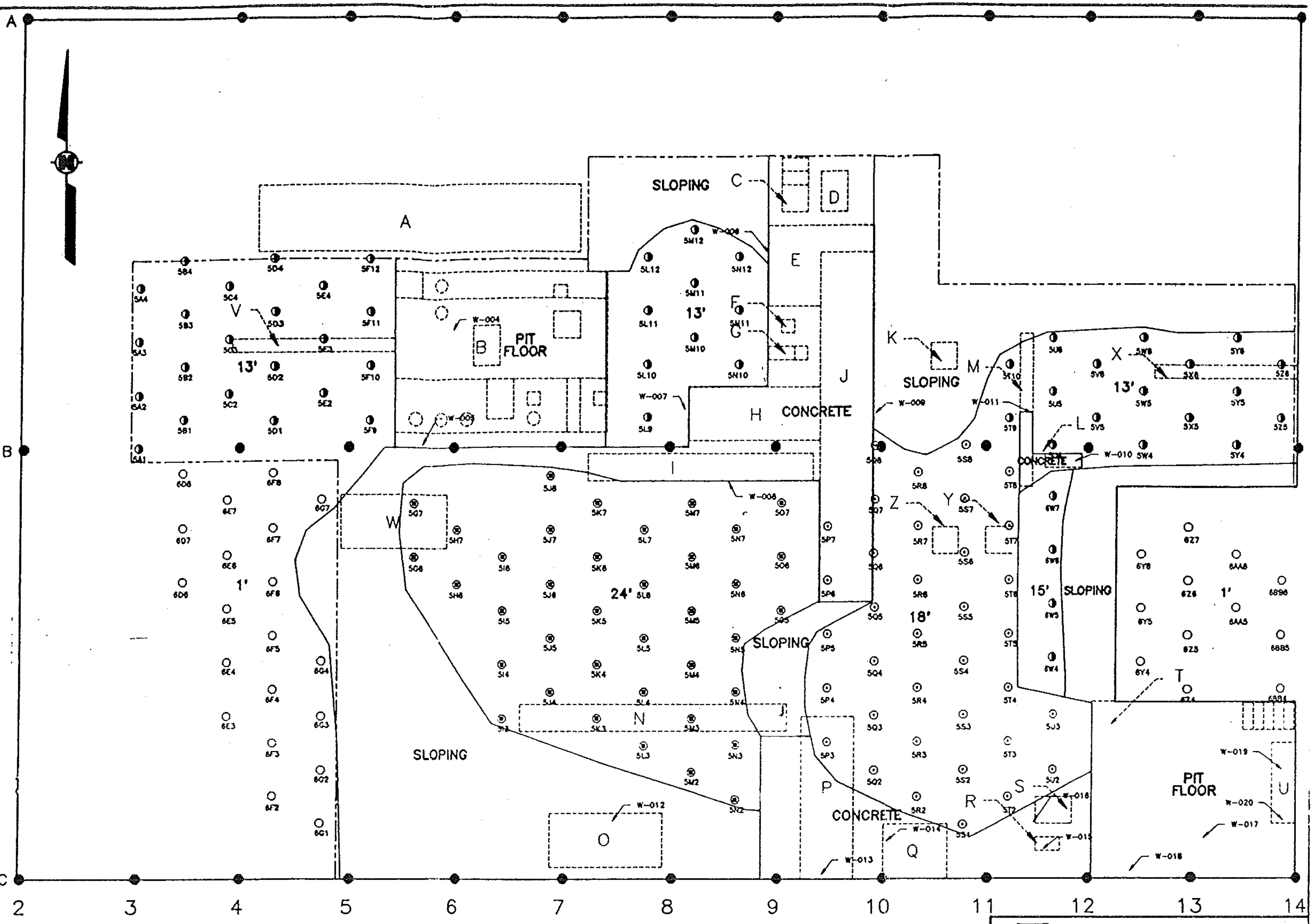
SAMPLE POINT	RESULT*	SAMPLE POINT	RESULT*
5A1	<0.3	5L12	1.4
5A2	40	5M10	31
5A3	13	5M11	34
5A4	17	5M12	<0.3
5B1	1.6	5N10	1.1
5B2	3.3	5N11	5.0
5B3	<0.3	5N12	12
5B4	2.7	[illegible]	17
5C2	<0.3	[illegible]	2.2
5C3	<0.3	[illegible]	19
5C4	<0.3	[illegible]	130
5D1	120	[illegible]	100
5D2	<0.3	[illegible]	2.6
5D3	<0.3	[illegible]	4.2
5D4	80	[illegible]	<0.3
5E2	<0.3	[illegible]	2.2
5E3	<0.3	[illegible]	0.44
5E4	1.7	[illegible]	2.7
5F9	120	[illegible]	34
5F10	0.88	[illegible]	0.64
5F11	3.3	[illegible]	73
5F12	17	[illegible]	0.88
5L9	<0.3	5Z5	<0.3
5L10	<0.3	5Z6	<0.3
5L11	<0.3		

* Result as mg/kg of Ar1248

24' SAMPLE RESULTS

SAMPLE POINT	RESULT*	SAMPLE POINT	RESULT*
5G6	0.80	5L4	<0.3
5G7	0.79	5L5	<0.3
5H6	0.73	5L6	2.1
5H7	1.5	5L7	4.6
5I3	31	5M2	0.40
5I4	17	5M3	<0.3
5I5	36	5M4	<0.3
5I6	9.3	5M5	<0.3
5J4	<0.3	5M6	<0.3
5J5	<0.3	5M7	0.84
5J6	24	5M8	<0.3
5J7	<0.3	5N3	4.6
5J8	8.4	5N4	4.6
5K3	<0.3	5N5	1.6
5K4	<0.3	5N6	140
5K5	0.80	5N7	180
5K6	<0.3	5O6	76
5K7	[illegible]	5O8	<0.3
5L3	<0.3	5O7	49

* Result as mg/kg of Ar1248



SCALE
0 10 20 FEET

REV	DATE	DESCRIPTION	BY

OHM Corporation

EXPOSED EXCAVATION SURFACES

ALCOA ROD MILL DECONTAMINATION
PROJECT NUMBER 12917

PREPARED FOR

ALCOA
VANCOUVER, WASHINGTON

DRAWN BY	D.GEHLING 1-06-92	SCALE AS SHOWN	SHEET NO. 1 OF 1	REV. 0

PLOT SCALE: 1" = 1'

the excavation and contamination shows no detectable PCB's. This well is screened in the intermediate zone. Ground water samples taken from the well were analyzed for priority pollutants. None of the priority pollutant analytes were detected above the reported method detection limits. Data from the monitoring wells located near the site is give in Table 1, with well locations noted in Figure 5.

During the independent cleanup, soil samples were collected at the 1 foot, 3 foot, 6 foot, 8 foot, 10 foot, 12.5 foot, 15 foot, 18 foot and 24 foot excavation levels. Alcoa removed both shallow and intermediate zone sediments. Analysis of PCB in soil samples indicates that the majority of the data fits a lognormal plot. The range of PCB contamination in each zone is show below. During the installation of monitoring well MW 45 (I), located immediately down gradient of the former rod mill, no evidence of soil contamination was noted. The well was completed to 33 feet. The soil from the well was visually inspected, tested for sheen, and checked by a photoionization instrument. It appears that the PCB contamination formed a plume that traveled vertically to the water table but did not travel horizontally down gradient.

Sample Level	Range of Contamination (ppm)	N
1 Foot	0.3 (ND) - 1680	124
3 Foot	0.3 (ND) - 2000	113
6 Foot	0.3 (ND) - 1900	38
8 Foot	0.3 (ND) - 1300	47
10 Foot	0.3 (ND) - 1300	40
12.5 Foot	0.3 (ND) - 3100	59
15 Foot	0.3 (ND) - 24	64
18 Foot	0.3 (ND) - 2000	45
20 Foot	0.3 (ND) - 300	54
24 Foot	0.3 (ND) - 180	42
27 Foot	0.3 (ND) - 6.3	28

3.2 CHEMICALS OF CONCERN AND RISKS TO HUMAN HEALTH AND THE ENVIRONMENT

The chemical of concern addressed by this consent decree is polychlorinated biphenyl. The substance is a known carcinogen. The PCB contamination was the only environmental hazard detected. PCBs were found in concrete and soils. Priority pollutant analysis of ground water shows no other contaminates present downgradient from the PCB contaminated area of the rod mill. One ground water monitoring well down gradient of the excavation had higher detection limits than normal. PCB was analyzed from this well and found to be <5.0 ppb. All other analyses of ground water had no PCB's detected at detection limits of 1.0 ppb or less. There are three media of concern which may pose risks to human health and the environment at the rod mill/Vanexco site: soil, contaminated concrete, and ground water. The independent action addressed the contaminated concrete and soil media. Ground water was not addressed in the independent cleanup and based on available data does not appear to be affected down gradient of the contaminated soil column.

3.3 MEDIA CLEANUP LEVELS

3.3.1 Selection of Method for Establishing Cleanup Levels

The Model Toxics Control Act cleanup regulation provides three methods for determining cleanup levels at a contaminated site. The methods are known as Method A, Method B, and Method C. Method A applies to relatively straight forward sites that involve only a few hazardous substances. The method defines cleanup levels for 25 of the most hazardous substances. It also requires that the cleanup meet promulgated federal and state regulations such as maximum contaminant levels established by the Clean Water Act. Method B is a standard method that can be used at all sites. The clean up levels are set using a site risk assessment which focuses on-site characteristics or concentrations of individual hazardous substances set under applicable state and federal laws. Method C is similar to Method B. The main difference is that the lifetime cancer risk is set at a lower number. This method can be used only when either Method A or Method B are technically impossible, the site is defined as an industrial site, or when the attainment of Method A or Method B cleanup levels has the potential for creating a significantly greater overall threat to human health and the environment. In addition, Method C also requires that the person undertaking the action comply with all applicable state and federal laws.

The rod mill/Vanexco site is considered a routine site where Method A soil standards for industrial sites can be used.

3.3.2 Soil Cleanup Levels

The soil cleanup standard at the Alcoa rod mill/Vanexco site was set according to WAC 173-340-745, "Soil Cleanup Standards for Industrial Sites". Method A, WAC 173-340-745(2)(a)(i) establishes levels using concentrations derived using the procedures in subsection (4)(a)(iii)(B) of section 745. The cleanup standard is 10.0 mg/kg PCBs. The contaminated soils on the site have been partially removed to a hazardous waste landfill. Containment has been chosen as the cleanup remediation. The MTCA Regulation requires that where containment is selected as a remedy, a compliance monitoring plan must be

EXHIBIT B

Cleanup Action Plan

Table of Contents

List of Figures

Figure

List of Tables

Table

designed to ensure the long-term integrity of the containment system. Long-term monitoring of ground water is required and will be implemented to assure the integrity of the cover system. Institutional controls (deed restrictions to prevent residential use) are required in WAC 173-340-745(1)(b)(v) and will not be removed from the site until residential cleanup standard for PCB in soils (WAC 173-340-740(2)(a)(i)) is met.

SUMMARY OF ALTERNATIVE CLEANUP ACTIONS AND SELECTION OF CLEANUP ALTERNATIVE

4.1 Introduction

This section of the CAP summarizes the actions that are feasible for the cleanup of non-liquid PCBs, the cleanup alternative chosen by Alcoa in the rod mill, and Vanexco Independent cleanup actions. Three cleanup alternatives exist for the remediation of non-liquid PCBs. These are: incineration, treatment by an alternative method equivalent to incineration, or disposal in a chemical waste landfill. No successful remediation technologies exist for the recycle or reuse of PCB contaminated soil or concrete.

Prior to beginning the independent action, Alcoa evaluated the remediation technologies available for PCBs, looking at both technical feasibility and cost. To be considered as a viable cleanup technology the following items were required:

1) The building surrounding the site had to remain structurally sound. The building and property had to be commercially saleable after the cleanup.

2) The Department of Ecology needed to be informed of the cleanup action. The action must conform to rules outlined in the MTCA.

3) The cleanup must meet the mandates of the Environmental Protection Agency Toxic Substance Control Act.

Alcoa originally based the selection of a cleanup alternative on the following assumptions concerning the site.

1) The overall volume of PCB contaminated soil was thought to require removal of approximately one foot of soil from below the floor of the building. Drilling data indicated deep contamination was not widespread.

2) High levels of PCBs found in the concrete sumps, pits,

and raceways were thought to be surface features. Scarification of the concrete structure surface was the preferred remediation.

Ecology agrees, considering the low original volume estimates and belief that PCB contamination was a surface feature, that excavation with transportation to a permitted hazardous waste landfill was an acceptable remediation alternative. This is due to the high cost of mobilizing a treatment or incineration units; and the permitting problems associated with a temporary dangerous waste incinerator.

4.2 Selected Independent Cleanup Action

Because of the original estimate of low volumes of soil and contaminated concrete, Alcoa did not consider incineration or treatment as cleanup alternatives. Alcoa chose shipment to the hazardous waste landfill at Arlington, Oregon as the preferred cleanup technology. Alcoa contacted OHM Remediation Services Corporation (OHM) to begin the facility cleanup in February of 1992. OHM contracted to:

1) Excavate soils contaminated with PCBs at levels above the MTCA Method A level (1.0 mg/kg PCBs).

2) Demolish and remove PCB-contaminated concrete pits and sumps.

3) Coordinate the transportation and disposal of contaminated soil and debris.

4) Backfill and compact the excavated pits.

5) Collect and treat contaminated waters.

OHM subcontracted Sound Analytical Services as a validation laboratory, Jack Grey Trucking as a waste transportation service, and Chemical Waste Management as the hazardous waste landfill for final disposal of the soil and concrete.

The cleanup began in August of 1992. Excavation of soils continued until late October of 1992. The excavation of soils was completed in one, two and three foot lifts. OHM established a portable field laboratory at the site and conducted field determinations of PCB's in soil and concrete. From the PCB field determinations the horizontal and vertical limits of the contamination were determined and a field excavation schedule was developed. Duplicate samples (5%) were used to determine homogeneity within the plume of contamination. After the initial lifts were removed and it became clear that the contamination was more wide spread than the original data indicated, Alcoa changed the procedure from detailed delineation sampling to detailed spot sampling. Appendix A shows raw data for each of the excavated lifts. The excavation was directed by visible stainage found in the soils. The soils were removed from the contaminated area and stock piled in a controlled area. The soils were either sampled when they were transported to the collection area or from the stock pile. A waste stream profile sample was collected prior to the start of cleanup activities and sent to the Arlington facility. Each truck was loaded with soil from the collection area after the analysis of PCB was known. The trucks then proceeded to the Arlington, Oregon hazardous waste landfill. Alcoa halted the excavation in late October when the size of the hole threaded the structural integrity of the building. At that time, over 8000 cubic yards of material had been excavated leaving a hole measuring 80 feet by 160 feet. The excavation at its deepest point was 27 feet. Ground water is located at approximately 27 feet in this portion of the building and wet soil was encountered at the bottom of the pit. The hole was located between two rows of roof bearing columns set on cement piers. The trussed roof is solely supported by these piers in this section of the building. The piers are also connected to several of the main concrete sumps and oil storage pits. One row of roof bearing columns was exposed on the north side of the hole. A second row of roof bearing columns was not exposed in the hole but located close enough to the excavation to risk lateral buckling failure of the concrete pier footings. An Alcoa structural engineer recommended that the excavations should be halted because further digging would cause the roof bearing columns to become unstable. He also recommended that Alcoa start a program to measure the tilt of the columns while the excavation remained open. He was unsure if the columns would continue to hold up the roof. Further excavation would also require removal of ground water.

When the excavation was halted, PCB contamination still existed in soils and concrete found in the building. Alcoa conducted delineation sampling on the exposed surfaces and cement structures found in the excavation. The analysis of the soils and concrete are given in Figure 6. The data has a lognormal distribution. PCB values range from non-detection to 2000 ppm .

OHM also cleaned up the extrusion mill portion of the building. The concrete floor of sections 401, 402 and 404 of the rod mill/extrusion building were wipe tested to determine PCB levels. The floor was removed in 1/2 inch lifts and transported to the hazardous waste landfill at Arlington, Oregon. Up to 2 inches of concrete was removed and landfilled. In three areas contamination continued to soils found below the floor. The contaminated soils were removed and landfilled using three foot lifts. Two of the three contaminated areas were cleaned up to PCB levels less than 0.3 ppm PCB. The third area where an abandoned road was discovered was covered in place after removal of three feet of soil.

SELECTED CLEANUP ACTION

5.1 Introduction

The cleanup strategy proposed by Ecology is to combine source removal, institutional controls, and containment to provide for the protection of human health and the environment. This strategy assumes that the site will be surrounded by industrial or commercial development for the near future. The proposed cleanup alternative allows for the use of a valuable industrial property/building and is described in more detail below.

5.2 Selected Cleanup Action

The proposed cleanup action consists of waste disposal in a dangerous waste landfill, filling the resulting excavation with compacted material, covering site with a concrete or asphalt cover and long term ground water monitoring. Specifically:

-- Alcoa has removed 8,000 cubic yards of contaminated soils from the site. The excavation was completed down to the water table in the rod mill building and down to the fifteen foot level in the extrusion building. Contamination still exists in the soils in the rod mill excavation and in one excavation in the extrusion building.

-- Alcoa has completed the characterization of the remaining soil in place in all sections of the building. The characterization consisted of 158 samples collected on a grid along the bottom and sides of the rod mill excavation and 39 samples selected on a grid at bottom of the two extrusion mill excavations. Alcoa has sampled the ground water directly down gradient of the excavation.

-- Alcoa will fill all excavations with compacted clean fill.

-- Alcoa will cap each excavation that contains PCBs greater than 10 ppm with a cap that consists of material that will be equivalent to 4 inches of asphalt.

-- Alcoa will place institutional controls on the property that will prevent major disruption of the floor of the rod mill building. If the building structure is removed Alcoa will fence and grade the site to drain.

-- Alcoa will continue ground water monitoring of the intermediate zone at the site.

A detailed description of each of the yet to be completed components of the cleanup is given below.

5.3 Fill and Cap the Excavation.

The rod mill building excavation is currently one half filled with clean compacted fill consisting of rock and sand. The excavation will be completely filled with clean structural fill. After the fill is compacted the area will be capped. The capping material will be either asphalt or concrete. At the present time Alcoa is negotiating with several potential purchasers. In the negotiations the needs of the future owner of the building will determine the type of cap that will be constructed. The cap will consist of material that is the equivalent 4 inches of asphalt. It will be engineered to support loads consistent with the expected use of the space after the sale of the building. Excavations in the extrusion building will be filled with structural fill and capped after compaction.

Maintenance requirements for the final cap will be to maintain the building surrounding the buried PCB sediments. The future owner will be required to insure the integrity of the cap and the roof of the building found over the cap.

5.4 Ground Water Monitoring

Since contaminated soils and concrete remain on site, a confirmational monitoring program for PCB's will be implemented as part of the cleanup. The proposed ground water monitoring plan consists of quarterly monitoring for five years with analysis for PCB's. Four intermediate zone monitoring wells will be used for the data collection. At the end of the five year period, Ecology and Alcoa will exchange proposals to amend the consent decree with regard to whether continued ground water monitoring is necessary and, if so, what constitutes an appropriate schedule. The proposed monitoring will be evaluated at the end of each five year period until the site is no longer a danger to human health and the environment. No surface water monitoring is planned for this site.

5.5 Institutional Controls

Alcoa will record a restrictive land use covenant with the property records for the site to ensure that soils will not be disturbed beneath the cap and that there is no interference with the cleanup action. This will be specified in the Consent

Decree. Alcoa and future owners of the site, may use the site for industrial purposes consistent with the cleanup action and the covenant.

5.6 Schedule

The proposed cleanup is approximately one half complete. The remainder of the cleanup action is scheduled to occur in 1995. If approved, the soil fill and capping will be completed by the fall of 1995. Ground water monitoring has already started at the site and will continue for five years after the Consent Decree is signed. At the end of the five year period, Ecology and Alcoa will exchange proposals for continued monitoring.

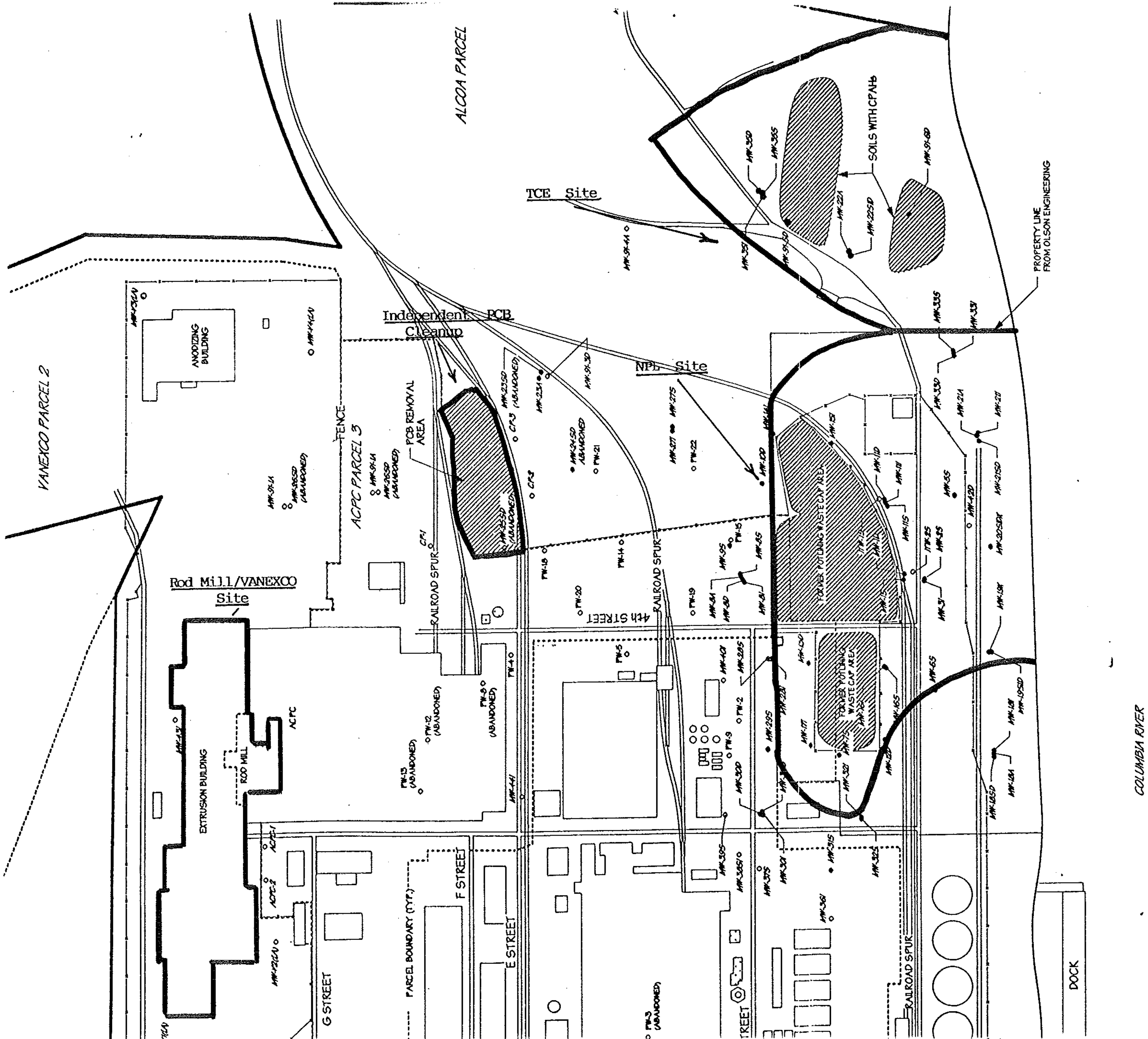


Figure 2

Alcoa Vancouver
Cleanup Sites

EXHIBIT C

Schedule

EXHIBIT C

Project Schedule
Alcoa Rod Mill Cleanup Project

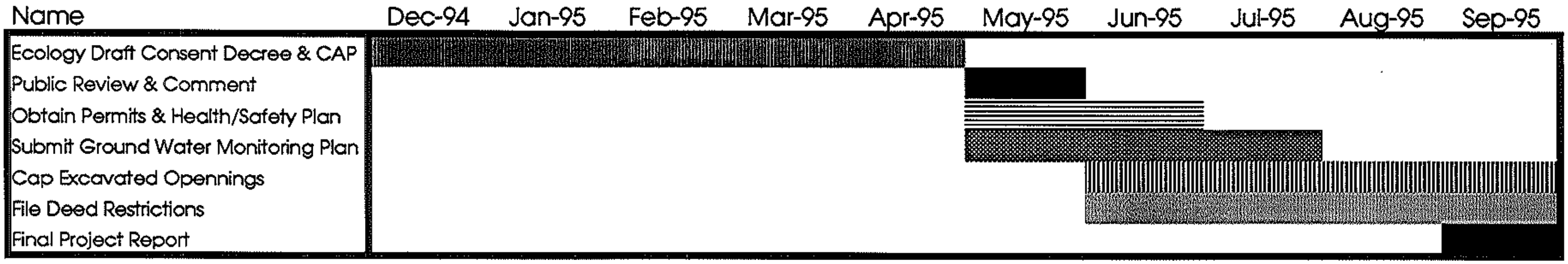


EXHIBIT D

Public Participation Plan

EXHIBIT D

I. INTRODUCTION AND OVERVIEW OF PUBLIC PARTICIPATION PLAN

The Washington Department of Ecology (Ecology) is committed to providing public participation opportunities during the investigation and cleanup of hazardous waste sites. The public participation plan is intended to promote public understanding of Ecology's responsibilities, planning activities and remedial activities at the Alcoa rod mill PCB hazardous waste site. It also provides an opportunity for Ecology to learn information, from the public, that will enable the department to develop a comprehensive cleanup plan that is protective of both human health and the environment.

A. This public participation plan for the Alcoa rod mill cleanup site covers activities from August 1993 until December 1995 during the public notice of the site draft cleanup action plan and consent decree for cleanup. It has been tailored to the needs of the public based on the stage and nature of the cleanup, the level of public concern, and the risks posed by the site.

B. The Alcoa rod mill site is located three miles northwest of downtown Vancouver, Washington near the VANALCO aluminum smelter. The site includes both a portion of the floor of a large manufacturing building, and the subsurface areas below the building floor. The manufacturing building contained an extrusion mill, rod mill, and wire mill. The extrusion mill and rod mill were owned and operated by Alcoa until the late 1980's. Alcoa has decommissioned both plants and removed the heavy aluminum forming machinery. The wire mill still operates in the southern half of the building and is owned by ACPC, Inc. Both the rod and extrusion mills are contaminated with polychlorinated biphenyl (PCB).

The contamination consists of PCB laddened cooling and hydraulic oil in concrete and sediments. The coolant was stored in large underground concrete storage tanks beneath the fabrication machinery. The underground tanks were connected to the machinery by a series of concrete sumps, buried pipes and raceways. The PCB contaminated hydraulic oil and cooling fluids contacted and contaminated all of the 27 different concrete structures in the rod mill and extrusion mill. It also contaminated soil next to the concrete structures.

Prior to remediation the levels of PCB in soils and concrete ranged from non-detection to over 30,000 ppm PCB. In 1992 Alcoa conducted an extensive independent cleanup in both the rod mill and extrusion mill. Each building was wipe tested to determine the presence of PCB oils and pressure washed. Where PCB was detected in concrete, the concrete structure was removed, where possible, and taken to a hazardous waste landfill. Contaminated soil was removed down to the water table at 28 feet. Not all the contamination was removed because of structural problems with the building roof support columns. Levels of PCB contamination that remain on site after the independent cleanup range from non-detection to 2000 ppm. This consent decree will finish the remediation by filling the excavations, capping the contaminated areas, and establishing institutional controls and a ground water monitoring plan.

Ecology has the responsibility for the development of this plan. Ecology mailing lists established during the cleanup of the Alcoa NPL Potliner site were used in the public participation effort.

C. The purpose of the public participation effort and of this plan is to assure that the affected public and governmental agencies are kept informed as the site studies and remediation proceed and that each group has an opportunity to contribute information regarding the site and to comment on the study and cleanup activities.

The City of Vancouver, local community action groups and interested citizens were placed on the site mailing list and contacted using a site fact sheet.

II. SITE DESCRIPTION

A. Land Use. The current land use in the area of the site is a mixture of heavy industry and agriculture. The site is located in the northeastern corner of the VANALCO aluminum smelter complex in the SE 1/4 of Section 18, T. 3 N, R 1 E, Willamette Meridian. The site is currently surrounded on the western and southern boundaries by an active aluminum smelter, VANALCO. A large parking lot borders the site on the eastern side and a BPA transformer and switching yard is located north of the site. The southern section of the building is occupied by ACPC, an aluminum wire manufacturer. The site is zoned Heavy Industrial (MH-E) and is accessible via Lower River Road and a private entrance road. The nearest residents are located at least 5,000 feet to the east and the west of the site. The smelter production cooling water wells are located south of the site.

B. Chemical Contamination. Studies conducted at the site prior to independent cleanup discovered PCB contamination in concrete and soils next to the concrete structure. The PCB contamination <u>prior to</u> independent remediation ranged from non-detection to greater than 30,000 ppm PCB as measured as Ar 1248. The PCB contamination is a result of the use of PCB hydraulic fluid in the rolling mill and extrusion mill metal forming presses. The contamination was found in 26 of the 27 concrete structures found in the two mills and in soil surrounding the concrete structures. PCB was not found in ground water monitoring wells located near the site.

The majority of the contamination in the rod mill portion of the site. All of the contamination in the extrusion mill was cleaned up as an independent cleanup by Alcoa in 1992. In the rod mill Alcoa left contamination in soils and concrete.

The consent decree and cleanup action plan address only PCB contamination. The principal elements of the proposed Alcoa remedial action are:

- Filling excavations with clean structural fill.
- Capping of all exposed areas of soil with PCB contamination.
- Placing institutional controls on the deed of the property which limit the use of the property to industrial and prevent disruption of the cap.
- Continued ground water monitoring.

III. PUBLIC PARTICIPATION ACTIVITIES

The public participation plan for the Alcoa rod mill site will consist of the following activities:

A. A 30 day public comment period will be held for the draft cleanup action plan and consent decree, beginning May 4, 1995 and ending June 2, 1995.

B. A public hearing on the consent decree shall be held on May 24, 1995 at 5:30 PM at Clark County PUD Building.

C. Notification of the potentially affected vicinity, which includes the mill site and area near the mill site.

D. Advertising the public comment period with a legal notice in the Vancouver newspaper.

E. The public will be provided copies of the signed SEPA documents, consent decree and draft cleanup action plan for review at the following locations. Extra copies of the fact sheet are available at the following locations:

Department of Ecology
Industrial Section
300 Desmond Drive
Post Office Box 47706
Olympia, Washington 98504-7706

Attn: Paul Skyllingstad

Fort Vancouver Regional Library
Main Branch
1007 East Mill Plain Boulevard
Vancouver, Washington 98633

F. All comments received will be retained in the Ecology site files. Responses to comments received on documents circulated for public comment will be compiled in a "responsiveness summary" that will be sent to those who submit written comments and to the designed information repositories.

G. Persons requesting to be placed on the mailing list for the site will be provided with updates on site activities as new information becomes available.

H. Should there be need for additional public participation activities, the public shall be notified through advertisement in the Vancouver daily paper plus a fact sheet mailing utilizing the site mailing list. This public participation plan will be updated and delivered to the information repositories listed above.

I. Public notice announcements regarding the site will be placed in the Ecology Site Register for each comment period.

J. A press release using Ecology's "Enviro News Tips" will notify media of the public comment period and public hearing.

EXHIBIT E

Ground Water Sampling and Data Submittal Requirements

EXHIBIT E

April 11, 1994

SITE DESCRIPTION AND SAMPLE DATA SUBMITTAL REQUIREMENTS

1. Media

Required data must be submitted on MS-DOS[1](version 5) or compatibly formatted diskettes. The diskettes may be 5 1/4 inch (or 3 1/2 inch) either: double sided, double density; or double sided, high density.

2. Data Formats

The SITE DESCRIPTION FILE, FIELD SAMPLE FILE and the LABORATORY SAMPLE FILE are quote, comma delimited ASCII files used as the standard format for transferring sample data to and from Ecology (LOTUS WK1 files and Ashton Tate DBF files may be substituted for ASCII files). The files will include the fields in the format and order listed (C=Character, N=Numeric, D=date[Character may be substituted in non DBF or WK1 format]).

The following Appendices are attached to standardize information entered into required files (see following appendices):

A. Matrix Codes

B. Sample Source Codes

C. Collection Method Codes

D. Chemical Data Dictionary (Standardizes Spelling, STORET P-codes., etc entered into the SAMPLE ANALYSIS FILE.

E. Laboratory Qualifiers

E. State Plane Zones (N or S)
(NOTE: Copy of RCW 58.20 provided for reference)

F. County Fips Codes

3. Submittal

Computer diskettes containing the SITE DESCRIPTION FILE, FIELD SAMPLE FILE and/or the LABORATORY SAMPLE FILE, clearly labeled for Project and Originator shall be submitted in duplicate, along with a backup hard copy of the diskette contents.

---

[1] Trademark of the Microsoft Corporation

FIELD DEFINITIONS FOR SITE DESCRIPTION FILE

FIELD	TYPE	WIDTH	DEFINITION
REP_DATE	D	10	Reporting date (mm/dd/yyyy).
REP_NAME	C	48	Reporting entity, data submitted by.
PRJ_NAME	C	48	Project, site, or facility name.
STA_TYPE	C	12	Station type (Ground water, Surface water, Sediment, Soil, Sludge, Biological or Air).
STA_USE	C	1	Well use (USGS codes) O=observation, W=water withdrawal, X=waste disposal, D=drain, T=test hole, E=geothermal, P=oil/gas, U=unused, R=recharge, Z=destroyed.
WTR_USE	C	1	Water use (USGS codes) W=water quality/level monitoring, D=dewatering, N=industrial, S=stock supply, B=bottling, I=irrigation, Q=aquaculture, U=unused, C=commercial supply, H=domestic supply, P=public supply, J=industrial cooling, F=fire protection, Z=other.
DATA_REL	C	1	Data Reliability (USGS codes) C=field checked, L=poor location, U=unchecked.
STA_ID	C	12	Station or Well ID number.
PRI_STA	C	15	Ecology primary station code. To be obtained from Ecology TCP.
SEC_STA1	C	12	Additional station code (previous well numbers, alternate or other well designations).
SEC_STA2	C	12	Additional station code (if any).
SEC_STA3	C	12	Additional station code (if any).
STATE_FIPS	C	2	State FIPS code (WA=53).
COUNTYFIPS	C	3	County FIPS code (use state county code, Appendix F).
STATE_CHAR	C	2	State (WA).
COUNTYCHAR	C	16	County.
OWN_NAME	C	30	Sampling location owner's name.
OWN_DT	D	10	Date of ownership of well (mm/dd/yyyy).
OWN_ADD	C	60	Address of owner.
DRILLER	C	30	Name of Driller.

FIELD DEFINITIONS FOR SITE DESCRIPTION FILE

FIELD	TYPE	WIDTH	DEFINITION
STA_DESC	C	48	Activity Site, Sample location or Well location description (for example: "East of Bldg. 2," or "SE corner, intersection 6th and Seneca").
LOC_METHD	C	48	Method of determination of station location coordinates (Note: survey to known horizontal datum is required.)
LAT	N	8	Latitude OPTIONAL (degrees-minutes-seconds-tenths).
LONG	N	9	Longitude OPTIONAL (degrees-minutes-seconds-tenths).
STPCO_NORT	N	12	Northerly state plane coordinates REQUIRED (nearest ft.).
STPCO_EAST	N	12	Easterly state plane coordinates REQUIRED (nearest ft.).
STPCO_ZONE	C	1	State plane coordinates: state plane zone REQUIRED (N or S).
LAND_NET	C	20	Land net location of well (Township, Range, Section, 1/4-1/4 Sec.) Use USGS 1/4-1/4 section alphabetic designator A through R OPTIONAL.
UTM_NORTH	N	9	UTM grid system coordinates: North (meters) OPTIONAL.
UTM_EAST	N	8	UTM grid system coordinates: East (meters) OPTIONAL.
UTM_ZONE	C	2	UTM grid zone.
MAP NAME	C	24	Name of USGS map, scale, and date covering the sampling location (e.g., Yakima 100K 1977).
BORE_DEP	N	8	Depth of original hole drilled, if applicable (nearest 0.01 ft. or equivalent).
WELL_DEP	N	8	Well depth (nearest 0.01 ft. or equivalent).
WTR_ELEV1	N	8	Water level elevation at time of installation (nearest 0.01 ft. or equivalent).
WLEV_DAT1	D	10	Date of water level elevation measurement (mm/dd/yyyy).
MEAS_ELEV	N	8	Measuring point (reference point) elevation (nearest 0.01 ft. or equivalent.
ELEV_UNITS	C	12	May be "FEET," "METERS," "CENTIMETERS," "FATHOMS," etc.
MEAS_DESC	C	48	Measuring point description

FIELD DEFINITIONS FOR SITE DESCRIPTION FILE

FIELD	TYPE	WIDTH	DEFINITION
DATUM	C	48	Measuring point datum (the source of the altitude used to survey in the sampling location altitude, i.e., City of Tacoma Sewer Survey 1921).
LEV_COMM	C	240	Comments, depth, and water level data.
ALTITUDE	N	8	Approximate land surface elevation XXXXX.XX (ft.) at the Station Location.
DEPTOWTR1	N	8	Water depth at time of installation (nearest 0.01 ft. or equivalent).
CONST_DT	D	10	Date of installation (mm/dd/yyyy).
MOREINT	C	1	More than one open interval (Y/N).
UP_DEPTH	N	8	Depth to top of open interval (ft. below measuring point).
LOW_DEPTH	N	8	Depth to bottom of open interval (ft. blow measuring point).
DEPT_UNITS	C	12	May be "FEET," "METERS," "CENTIMETERS," "FATHOMS," etc.
CONST_COMM	C	240	Comments, construction details.
MTD_CON	C	1	Method of construction (USGS WATSTORE codes) A=air rotary, B=bored/augured, C=cable tool, D=dug, H=hydraulic rotary, J=jetted, P=air percussion, T=trenching, V=driven, W=drive wash, R=reverse rotary, X=mud rotary, Z=other.
FILT_LEN	N	5	Length of filter pack (nearest 0.01 ft. or equivalent).
FILT_MAT	C	48	Type of filter pack material and size of material (e.g., Sand 200 mesh).
DIA_BOR	N	8	Boring diameter (in.).
DIA-CAS	N	8	Casing diameter (in.).
CAS_MAT	C	1	Casing material (USGS WATSTORE codes) B=brick, C=concrete, D=copper, F=teflon/fluorocarbon, G=galvanized iron, I=wrought iron, M=other metal, P=pvc/plastics, R=rock/stone, S=steel, T=tile, W=wood, U=coated steel, Z=other.
DIA_OPN	N	6	Diameter of open interval (in.).
LEN_OPN	N	6	Length of open interval (nearest 0.01 ft. or equivalent).
TYP_OPN	C	1	Type of open interval (USGS WATSTORE codes) P=perforated/slotted screen, L=louvered/shuttered screen, S=screen (unknown type), F=fracture, R=wire wound, M=mesh, T=sand point, W=walled, X=open hole, Z=other.

FIELD DEFINITIONS FOR SITE DESCRIPTION FILE

FIELD	TYPE	WIDTH	DEFINITION
TYP_OMT	C	1	Material type, open interval (USGS WATSTORE codes) R=stainless steel, F=teflon/fluorocarbon, G=galvanized iron, P=pvc/plastic, B=brass/bronze, W=wrought iron, S=steel, T=tile, C=concrete, M=other metal, Z=other.
INT_COMM	C	240	Comments, open interval.
LOG_AVAIL	C	1	Well log data available? (Y/N).
TYP_LOG	C	10	Type of well log (USGS WATSTORE codes) A=time, B=collar, C=caliper, D=driller, E=electric, F=fluid conduction, G=geologist, H=magnetic, I=induction, J=gamma ray, K=dip meter, L=lateral log, M=microlog, N=neutron, O=microlateral log, P=photo/video, Q=radioactive, S=sonic, T=temperature, U=gamma gamma, V=fluid velocity, X=core, Z=other.
LOG_DOC	C	240	Log data source documents (e.g., Remedial Investigation Report).
OTHER_DOC	C	240	Other data source documents.
LOG_LOC	C	60	Location of well log (e.g., Ecology Southwest Regional Office).
AQUI_TEST	C	1	Aquifer testing performed (Y/N).
PUMP_DATA	C	240	Pump data such as: Type, Manufacturer, Horsepower, and depth set.
ANDAT_AVAL	C	1	Analytical or Statistical data available (Y/N).
PROGRAM	C	9	Ecology program (TCP, WQFA, WQ, other).
GEN_COMM	C	240	General comments.
HUCODE	C	8	See US Geological Survey Hydrologic Unit Map 1974-Washington.
AGN_USE	C	1	Agency use (USGS codes) A=active, I=inactive, 0-inventory only.

END OF SITE DESCRIPTION FILE

FIELD DEFINITIONS FOR FIELD SAMPLE FILE

***All Fields Required**

FIELD	TYPE	WIDTH	DEFINITION
PRI_STA	C	15	Ecology Monitoring station No. will be assigned by Ecology TCP Program.
STA_ID	C	12	Site or monitoring station ID no. or other designation.
X_LOCATION	C	12	Surveyed coordinates reported in the State Plane Coordinates (to the nearest foot).
Y_LOCATION	C	12	Surveyed coordinates reported in the State Plan Coordinates (to the nearest foot).
STPLNZONE	C	1	N = North; S = South
LO_DAT_U	C	5	Year of reference datum either 1929 or 1983 and which system L Lat Long or S for State Plane Coordinate System.
LOC_DATUM	C	48	Reference datum from map or survey, e.g., 1983 North American Datum (see RCW 58.20).
DEPT_WATER	N	8	Depth to water (in 0.01 ft. or equivalent) at time of sampling.
UP_DEPTH	N	7	Depth (nearest 0.01 ft. or equivalent) to the top of the interval sampled (e.g., top of well screen or core interval).
LOW_DEPTH	N	7	Depth (nearest 0.01 ft. or equivalent) to the bottom of the interval sampled (e.g., bottom of well screen or core interval).
DEPT_UNITS	C	12	May be "FEET," "METERS," "CENTIMETERS," "FATHOMS," etc.
WTR_ELEV	N	8	Water level elevation (in 0.01 ft. or equivalent) at the time of sampling.
AGENCY	C	8	Agency requesting sampling data.
SAMPLE_DAT	D	8	Date of well sampling (mm/dd/yyyy).
SAMP_TIME	C	4	Time of well sampling in military time.
SAMPLE_ID	C	8	Sample ID code or number.
FILTERED	L	1	Was the sample field filtered? Yes(Y) or No(N).
ANAL_MTHOD	C	15	EPA analysis method descriptions (i.e., EPA Method 601).

FIELD DEFINITIONS FOR FIELD SAMPLE FILE

***All Fields Required**

FIELD	TYPE	WIDTH	DEFINITION
MEAS_ELEV	N	8	Surveyed elevation of the measuring point used to determine water level depths and elevations (nearest 0.01 ft. or equivalent).
ELEV_UNITS	C	12	May be "FEET," "METERS," "CENTIMETERS," "FATHOMS," etc.
MEAS_DESC	C	48	Description of the well measuring point used (e.g., top of casing, file mark on casing, etc.)
DATUM	C	48	Vertical datum used to reference elevations (e.g., MSL and source/date of information).
MATRIX	C	2	Type of sample; water, sediment, soil, other (from Appendix A).
SOURCE_COD	C	2	Physical environment sampled (from Appendix B).
COLLECTMET	C	2	Collection method code (from Appendix C).
FIELD_PH	N	5	The pH value taken at time of sampling (e.g., 11.67).
FIELD_COND	N	7	The conductivity value in umhos.
FIELD_TEMP	N	5	The field temperature of the sample in degrees Celsius.
PURGE_METH	C	1	Purging method: B = Bail, P = Pump.
PURGE_VOL	C	2	Number of boring volumes removed prior to sampling (liquid).
PRJ_NAME	C	48	Project, site, or facility name.
COMMENTS	C	50	General comments.

END OF FIELD SAMPLE FILE

FIELD DEFINITIONS FOR LABORATORY SAMPLE FILE*

All Fields Required

FIELD	TYPE	WIDTH	DEFINITION
PRI_STA	C	15	Ecology Monitoring Station No. will be assigned by Ecology TCP Program.
STA_ID	C	12	Site or station ID no. or other designation.
SAMPLE_DAT	D	10	Date of sampling event (mm/dd/yyyy).
ANALYZ_DAT	D	10	Date the sample was analyzed (mm/dd/yyyy).
SAMPLE_ID	C	15	Sample ID code or no.
LAB_NAME	C	20	Laboratory performing analysis.
LABSAMP_ID	C	15	Sample number assigned by the laboratory.
CONSTITUEN	C	30	Chemical constituent names as defined in Ecology's Chemical Dictionary (see attached Appendix D).
CAS_ID	C	12	Chemical Abstract Systems ID (see Appendix D).
P_CODE	C	5	STORET Parameter Code (see Appendix D).
RESULT	N	12	Detected chemical concentration result.
UNITS		10	Units of measurement (e.g., ug/Kg not PPB or PPM).
QUAL	C	4	Contract Laboratory Program chemical data qualifiers (such as U, J, R, UJ, etc.). Non-Contract Lab Program qualifiers such as less-than signs ("<") or asterisks, are not acceptable (see Appendix E).
QA_QUAL	C	4	Qualifier associated with QA Review of Lab Report (see Appendix E).
LIMIT	C	10	Lab method detection limit.
DILUTION	N	6	Amount the sample was reduced and diluted to accommodate analysis (i.e., 10x, 20x).
FILTERED	L	1	Was the sample lab filtered? Yes(Y) or No(N).
ANAL_MTHOD	C	15	EPA analysis method descriptions (i.e., EPA Method 601).
MATRIX	C	2	Type of sample; water, sediment, soil, other (from Appendix A).
PRJ_NAME	C	48	Project, site, or facility name.

APPENDIX A: MATRIX CODES

10	Water-Total
11	Water-Dissolved
40	Sediment/Soil
45	Semi-Solid/Sludge
46	Sediment for EP Toxicity
70	Tissue
80	Oil/Solvent
00	Other

APPENDIX B: SAMPLE SOURCE CODES AND DESCRIPTIONS

00	Unspecified source
01	Unknown liquid media (drum/tank)
02	Unknown liquid media (spill area)
03	Unknown liquid media (waste pond)
10	Water (general)
12	Ambient stream/river
13	Lake/reservoir
14	Estuary/ocean
15	Spring/seepage
16	Rain
17	Surface runoff/pond (general)
18	Irrigation canal/return flow
20	Well (general)
21	Well (industrial/agricultural)
22	Well (drinking water supply)
23	Well (test/observation/monitoring)
24	Drinking water intake
25	Drinking water (at tap)
30	Effluent wastewater (general)
31	Municipal effluent
32	Municipal inplant waters
33	Sewage runoff/leachate
34	Industrial effluent
35	Industrial inplant waters
36	Industrial surface runoff/pond
37	Industrial waste pond
38	Landfill runoff/pond/leachate
40	Sediment (general)
42	Bottom sediment of deposit
44	Sludge (general)
45	Sludge (waste pond)
46	Sludge (drum/tank)
48	Soil (general)
49	Soil (spill/contaminated area)
50	Bore hole material

Sample Source Codes and Descriptions (continued)

60	Air (general)
61	Ambient air
62	Source of effluent air
63	Industrial or workroom air

64	Hi-vol filter
70	Tissue (general)
71	Fish tissue
72	Shellfish tissue
73	Bird tissue
74	Mammal tissue
75	Macroinvertebrate
76	Algae
77	Periphyton
78	Plant/vegetation
80	Oil/solvent (general)
81	Oil (transformer/capacitor)
82	Oil/solvent (drum/tank)
83	Oil/solvent (spill area)
84	Oil/solvent (waste pond)
90	Commercial product formulation
95	Well drill water
96	Well drill mud
97	Well sealing material
98	Gravel pack material

APPENDIX C: COLLECTION METHOD CODES

00	Unknown
10	Hand grab
11	Plastic bucket
12	Stainless steel bucket
13	Brass kemmerer
14	PVC kemmerer
15	D.O. dunker
16	DH 48/DH 49 Integrating sampler
17	Van Dorn bottle
18	Glass dip tube
19	Other
20	Automatic sampler (general)
21	ISCO auto sampler
22	Manning auto sampler
23	Hydrostar or similar pump
24	Submersible pump (electric)
25	Well point sampler (pump)
26	Stainless steel bailer (hand)
27	PVC bailer
28	Teflon bailer
29	Peristaltic pump
30	Dredge (unspecified)
31	Dredge (Peterson)
32	Dredge (Van Dorn)
33	Dredge (Van Veen)
34	Core
35	Freeze core
36	Bladder Pump
40	Macroinvertebrate (unspecified)
41	Picked by hand
42	Kick net
43	Surber
44	Modified Hess type sampler
45	Rock basket
46	Hester Dendy sampler
50	Fish (unspecified)
51	Fish (shocking)
52	Fish (netting)
53	Fish (hook & line)

APPENDIX C CONTINUED:

54	Fish (poison)
60	Periphyton (unspecified)
61	Rock scraping
62	Glass slides

APPENDIX E: LABORATORY QUALIFIERS

LIST OF QUALIFIERS FOR NUMERIC RESULTS

REMARK CODE	DEFINITION
B	Analyte is found in the blank as well as the
sample,	indicated possible/probable blank contamination.
J	Estimated value; not accurate.
M	Presence of material verified but not quantified
U or K	Compound was analyzed for but not detected. The associated numerical value is the sample
quantitation	detection limit.
UJ	Compound was analyzed for but not detected. The number is the estimated minimum detection limit.
C	The value is one of, or the sum of both, Benzo (b) Fluoranthene and Benzo (k) Fluoranthene.
X	Many background organisms.
H	Over holding time. Analysis run.
G	Improper container.
Z	Sample low due to interfering substance.
D	Sample high due to interfering substance.
IS	Interfering Substance.
P	Greater than (>).
A	Less than (<).
LMX	Lab Matrix Number.
LBK	Lab Blank Number.

APPENDIX E CONTINUED:

Data Qualifier Definitions

For the purpose of this document the following code letters and associated definitions are provided:

dr	dry weight
wt	wet weight
R	The data are unusable (compound may or may not be present). Resampling and reanalysis is necessary for verification.
N	Presumptive evidence of presence of material.
NJ	Presumptive evidence of the presence of the material at an estimated quantity.
UJ	The material was analyzed for, but was not detected. The sample quantitation limit is an estimated quantity.

The reviewer may determine that qualifiers other than those used in this document are necessary to describe or qualify the data. In these instances, it is the responsibility of each reporting entity to thoroughly document/explain the qualifiers used and notify Ecology prior to submition of data packages.

APPENDIX F: COUNTY FIPS CODES

WASHINGTON

001	ADAMS
003	ASOTIN
005	BENTON
007	CHELAN
009	CLALLAM
011	CLARK
013	COLUMBIA
015	COWLITZ
017	DOUGLAS
019	FERRY
021	FRANKLIN
023	GARFIELD
025	GRANT
027	GRAYS HARBOR
029	ISLAND
031	JEFFERSON
033	KING
035	KITSAP
037	KITTITAS
039	KLICKITAT
041	LEWIS
043	LINCOLN
045	MASON
047	OKANOGAN
049	PACIFIC
051	PEND OREILLE
053	PIERCE
055	SAN JUAN
057	SKAGIT
059	SKAMANIA
061	SNOHOMISH
063	SPOKANE
065	STEVENS
067	THURSTON
069	WAHKIAKUM
071	WALLA WALLA
073	WHATCOM
075	WHITMAN
077	YAKIMA

EXHIBIT F

Restrictive Covenant

9603120195

RETURN RECORDED DOCUMENT TO:

Sanford W. Harvey, Jr., Esquire
Aluminum Company of America
425 Sixth Avenue
Suite 1244E - Alcoa Building
Pittsburgh, PA 15219

12

EXHIBIT F

RESTRICTIVE COVENANT

The property that is the subject of this Restrictive Covenant has been the subject of remedial action under Chapter 70.105D RCW. The work done to clean up the property (hereafter the "Cleanup Action") is described in the Consent Decree entered in State of Washington Department of Ecology v. Aluminum Company of America (ALCOA), Clark County Superior Court No. 95-2-03268-4 ____, and in attachments to the Decree and in documents referenced in the Decree. This Restrictive Covenant is required by Ecology under Ecology's rule WAC 173-340-440 (1991 ed.) because the Cleanup Action on the Site resulted in residual concentrations of polychlorinated biphenyl (PCB) contaminates which exceed Ecology's Method A cleanup levels for soils established under WAC 173-340-740(2).

The undersigned, Aluminum Company of America, is the fee owner of real property in the County of Clark, State of Washington (legal description attached), hereafter referred to as the "Alcoa VANEXCO/Rod Mill Site". Alcoa makes the following declaration as to limitations, restrictions, and uses to which the Alcoa VANEXCO/Rod Mill site may be put, and specifies that such declarations shall constitute covenants to run with the land, as provided by law, and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the Alcoa VANEXCO/Rod Mill Site.

Section 1. No residential development may take place on the Alcoa VANEXCO/Rod Mill site.

Section 2. Any activity on the Alcoa VANEXCO/Rod Mill Site that may interfere with the Cleanup Action is prohibited. Any activity on the Alcoa VANEXCO/Rod Mill Site that may result in the release of a hazardous substance that was contained as part of the Cleanup or Independent Action(s) is prohibited.

Section 3. The owner of the Alcoa VANEXCO/Rod Mill Site must give written notice to the Department of Ecology, or to a successor agency, of the owner's intent to convey any interest in the Alcoa VANEXCO/Rod Mill Site. No conveyance of title, easement, lease or other interest in the Alcoa VANEXCO/Rod Mill Site shall be consummated by the owner without adequate and complete provision for the continued operation, maintenance and monitoring of the Cleanup Action.

RECEIVED
MAR 22 1996
S. W. H.

Section 4. The owner must notify and obtain approval from the Department of Ecology, or from a successor agency, prior to any use of the Alcoa VANEXCO/Rod Mill Site that is inconsistent with the terms of this Restrictive Covenant. The Department of Ecology or its successor agency may approve such a use only after public notice and comment.

Section 5. The owner shall allow authorized representatives of the Department of Ecology, or of a successor agency, the right to enter the Alcoa VANEXCO/Rod Mill Site at reasonable times for the purpose of evaluating compliance with the Cleanup Action Plan and the Consent Decree, to take samples, to inspect Cleanup Actions conducted at the Alcoa VANEXCO/Rod Mill Site, and to inspect records that are related to the Cleanup Action.

Section 6. The owner of the Alcoa VANEXCO/Rod Mill Site and the owner's assigns and successors-in-interest reserve the right under WAC 173-340-740 and WAC 173-340-440 (1991 ed.) to record an instrument which provides that this Restrictive Covenant shall no longer limit the use of the Alcoa VANEXCO/Rod Mill Site or be of any further force or effect. However, such an instrument may be recorded only with the consent of the Department of Ecology, or successor agency. The Department of Ecology, or a successor agency, may consent to the recording of such an instrument only after public notice and comment.

Richard B Kelson

Name Richard B. Kelson
Title Executive Vice President, Environmental
Health & Safety and General Counsel
of Aluminum Company of America

March 8, 1996
Date

103\alcoa-f.exh

COMMONWEALTH OF PENNSYLVANIA)
) ss:
COUNTY OF ALLEGHENY)

Before me, a Notary Public in and for the Commonwealth and County aforesaid, on this day personally appeared Richard B. Kelson known to me to be the Executive Vice President, Environmental Health & Safety and General Counsel of Aluminum Company of America and signed, acknowledged and delivered the foregoing Restrictive Covenant.

Witness my hand and official seal this 8th day of March, 1996.

Doris P. Marston
Notary Public

Notarial Seal
Doris P. Marston, Notary Public
Pittsburgh, Allegheny County
My Commission Expires April 13, 1999
Member, Pennsylvania Association of Notaries

OLSON
LAND SURVEYORS
ENGINEERS

1111 Broadway
Vancouver, WA
98660

LEGAL DESCRIPTION FOR ALCOA
Building Perimeter

March 7, 1996

A parcel of property in Sections 18 and 19 in Township 2 North, Range 1 East of the Willamette Meridian in Clark County, Washington and being a portion of the Henry Van Alman, John Matthews and Patrick Markey Donation Land Claim further described as follows:

The following courses are on a grid bearing, Washington State coordinate system, North American Datum 1983. A scale factor of 1.000049 has been applied to the measured field distances:

COMMENCING at the Southeast corner of said Section 18, from which a 1-1/2" iron pipe (as shown on that survey recorded in Book 29 at Page 161) bears North 02° 24' 03" East 273.11 feet;

THENCE North 75° 36' 06" West 879.38 feet to a building corner and the TRUE POINT OF BEGINNING;

THENCE South 24° 07' 45" West along a building wall 160.67 feet to a point on the Northerly face of the Southerly column line of ALCOA Building 404;

THENCE North 65° 51' 44" West along said face of said column line 187.05 feet to a brass screw set by E.V. Hill and Associates;

THENCE North 22° 05' 56" East 8.55 feet to a brass screw set by E.V. Hill and Associates;

THENCE North 66° 13' 59" West 13.61 feet to the Easterly line of a red brick structure;

THENCE South 24° 37' 05" West along said face of said structure 1.53 feet to a point that is on the projection of the centerline of an interior partition of said red brick structure;

THENCE North 65° 52' 17" West along the centerline of said partition 13.30 feet to a point;

THENCE South 24° 07' 43" West along the centerline of said partition 6.96 feet to a point on the Southwesterly face of said red brick structure;

THENCE North 65° 52' 17" West along said Southwesterly face 6.87 feet to the Southwest corner of said structure;

THENCE North 23° 33' 08" East along Northwesterly face of said structure 15.21 feet to the Northwest corner of said structure;

THENCE North 49° 37' 08" West 23.30 feet to a brass screw set by E.V. Hill and Associates;

THENCE South 24° 09' 10" West 33.08 feet to a brass screw set by E.V. Hill and Associates;

THENCE North 65° 57' 22" West 56.43 feet;

THENCE South 24° 07' 43" West 39.58 feet ;

THENCE South 65° 56' 07" East 51.78 feet to a brass screw set by E.V. Hill and Associates;

THENCE South 23° 53' 20" West 28.60 feet to a brass screw set by E.V. Hill and Associates;

THENCE North 65° 52' 50" West 172.16 feet to a brass screw set by E.V. Hill and Associates;

THENCE North 24° 13' 41" East 88.32 feet;

THENCE North 65° 52' 17" West 27.40 feet;

THENCE North 24° 07' 43" East 19.34 feet;

THENCE North 70° 02' 43" West 13.07 feet;

THENCE North 88° 57' 23" West 22.37 feet;

THENCE South 24° 07' 43" West 18.17 feet;

THENCE North 65° 48' 14" West 21.16 feet to a brass screw set by E.V. Hill and Associates;

THENCE South 24° 02' 41" West towards a ½" iron pipe set by E.V. Hill and Associates 2.04 feet to a building wall;

THENCE North 65° 55' 37" West along a building wall 159.82 feet;

THENCE along a building wall the following courses:

THENCE South 24° 05' 36" West 25.09 feet;

THENCE North 65° 54' 24" West 182.39 feet;

THENCE North 24° 05' 36" East 104.89 feet;

THENCE North 65° 54' 22" West 139.81 feet;

THENCE North 24° 05' 38" East 122.46 feet;

THENCE South 65° 53' 56" East 111.75 feet;

THENCE North 24° 05' 54" East 13.85 feet

THENCE South 65° 53' 56" East 18.55 feet;

THENCE South 24° 05' 38" West 13.85 feet;

THENCE South 65° 53' 56" East 9.94 feet;

THENCE North 24° 05' 38" East 19.70 feet;

THENCE South 65° 50' 49" East 171.48 feet;

THENCE South 24° 06' 09" West 19.56 feet;

THENCE South 65° 53' 52" East 113.23 feet;

THENCE South 24° 06' 41" West 39.94 feet;

THENCE South 65° 54' 06" East 120.90 feet;

THENCE North 24° 05' 54" East 11.20 feet;

THENCE South 65° 54' 06" East 35.80 feet;

THENCE South 24° 05' 54" West 11.20 feet;

THENCE South 65° 54' 06" East 180.51 feet;

THENCE North 24° 10' 52" East 34.80 feet;

THENCE South 65° 49' 08" East 102.48 feet;

THENCE South 24° 10' 52" West 34.65 feet;

THENCE South 65° 55' 05" East along a building wall 119.89 feet to the TRUE POINT OF BEGINNING.

KURT F. STONEX
STATE OF WASHINGTON
26352
REGISTERED
PROFESSIONAL LAND SURVEYOR
MAY 5, 1996

3/7/96

EXHIBIT G

Summary of Independent Cleanup Report.

SAMPLING, ANALYTICAL, AND TRANSPORTATION AND DISPOSAL FINAL REPORT

ALCOA ROD MILL
VANCOUVER, WASHINGTON

SUBMITTED TO:

ALCOA
MR. STEVE MYERS
5509 NW LOWER RIVER ROAD
VANCOUVER, WASHINGTON 98660

SUBMITTED BY:

OHM REMEDIATION SERVICES CORP.
1990 NORTH CALIFORNIA BLVD., SUITE 400
WALNUT CREEK, CALIFORNIA 94596

1289

WILLIAM PERRY
FIELD TECHNICAL SERVICES MANAGER

MARCH 17, 1993

OHM PROJECT NO. 12917

TABLE OF CONTENTS

VOLUME I

VOLUME II

VOLUME III

VOLUME IV

VOLUME V

VOLUME VI

TABLE OF CONTENTS (CONT.)

VOLUME VII

VOLUME VIII

VOLUME IX

LIST OF FIGURES AND TABLES

1.0 INTRODUCTION

OHM Remediation Services Corporation (OHM), a wholly owned subsidiary of OHM Corporation is pleased to present this document detailing the services delivered by its Western Regional Field Technical Services (FTS or FAS) group in connection with the remediation activities performed at the Aluminum Company of America (ALCOA) Vancouver facility.

The facility is located approximately 2 miles west of the city of Vancouver, Washington on State Highway 501 (see Figure 1-1). Operations at this site consisted of an aluminum processing operation known as a Rod Mill.

The process employed hydraulic contaminated oil with PCBs as a lubricant for the milling equipment which sat over pits and sumps. The oil drained into these pits and was recycled through a system of pipes which ran from the pits and through soil underlying the pits.

The equipment was removed in 1991 leaving contamination of the concrete structure (pits, sumps and floor) and underlying soil.

This represents the final document and conclusion of services contracted under Bid Request Number 640388VA dated February 11, 1992. Under this contract, OHM performed a facility decontamination which included:

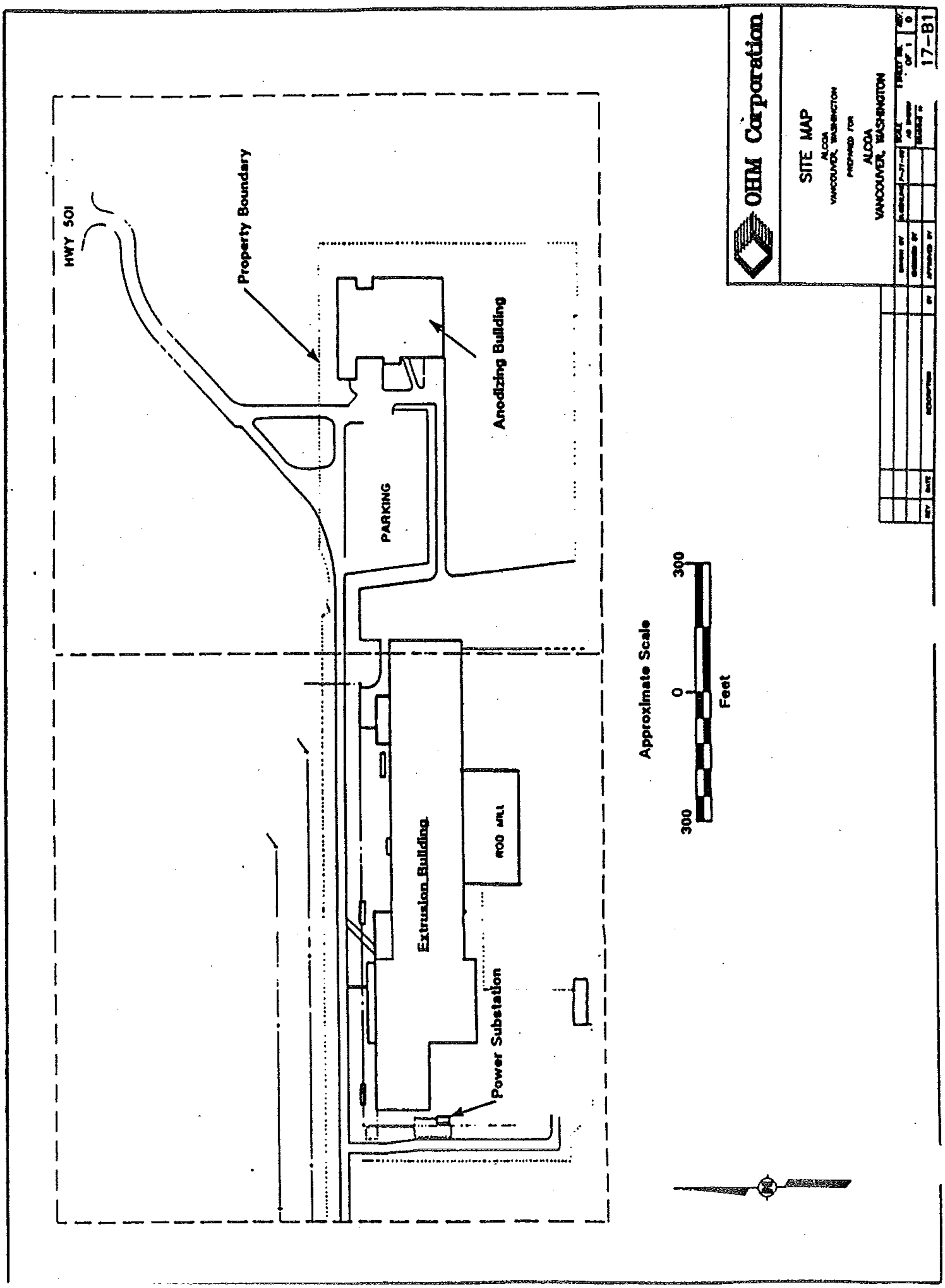
- Excavation of soils contaminated with polychlorinated byphenyls (PCBs) at levels above the Action Limit (AL) stated in Table 1-1.
- Demolition and removal of PCB-contaminated concrete pits and sumps.
- Coordination of transportation and disposal of contaminated soil and debris.
- Backfilling and compaction of excavation pits.
- Collection and treatment of contaminated waters.

TABLE 1-1
SITE-SPECIFIC ACTION LIMITS

CONTAMINANT-OF-INTEREST	ACTION LIMIT	ANALYTICAL METHOD
PCBs (wipes)	10 ug/100 cm^2	SW846 M8080
PCBs (total)	1.0 mg/Kg	SW846 M8080

Note: Since this was a voluntary cleanup, ALCOA selected the concentration of the Action Limit which was drawn from W-MTCA clean-up requirements.

FIGURE 1-1: SITE MAP



In support of this operation, FTS performed the following activities:

- Sampling for purposes of delineating the extent of contamination on concrete surfaces and underlying soils.

  This required the creation of a Sampling and Analytical Plan (SAP) and the utilization of a gridding system. Appendix A presents the SAP dated July 27, 1992.
- Analysis in an on-site Field Analytical Unit (FAU) utilizing standard USEPA methodology from Test Methods for Evaluating Solid Waste (SW846), Organochlorine Pesticides and PCBs (Method 8080), Third Edition, Revision 1, November 1990. Appendix C presents data packages.
- Creation a detailed set of sampling maps denoting contamination areas and sample results.

  This was used as a preliminary data reporting system which will be represented, in this report as a final data summary. Appendix B presents the Sample Map Log.
- Coordination of transportation and disposal for ALCOA with OHM subcontractors. Appendix E presents T&D records such as the waste profile, waste manifests and weight tickets.

Subcontracted services related to these services included:

Sound Analytical Services - a Tacoma, Washington based laboratory which acted as a Quality Assurance validation laboratory for the FAU. Appendix D presents data reports.

Jack Grey Trucking - a Federal Way, Washington based transportation company who was used for transportation of waste material.

Chemical Waste Management - an Arlington, Oregon TSCA approved landfill to which waste was sent.

In order to assure the objectives of the remedial action were met OHM established a Quality Assurance team to assist the Project Manager in implementation of the project. The organizational chain-of-command, with respects to the role of FTS is given as Figure 1-2.

As part of the Quality Assurance objectives, a document control system was enacted by which vital logs would be tracted on-site and after completion of the project. Tables 1-2 and 1-3 present the Document Control Inventory of logs created in the execution of the project.

Figure 1-2

General Organizational Chart

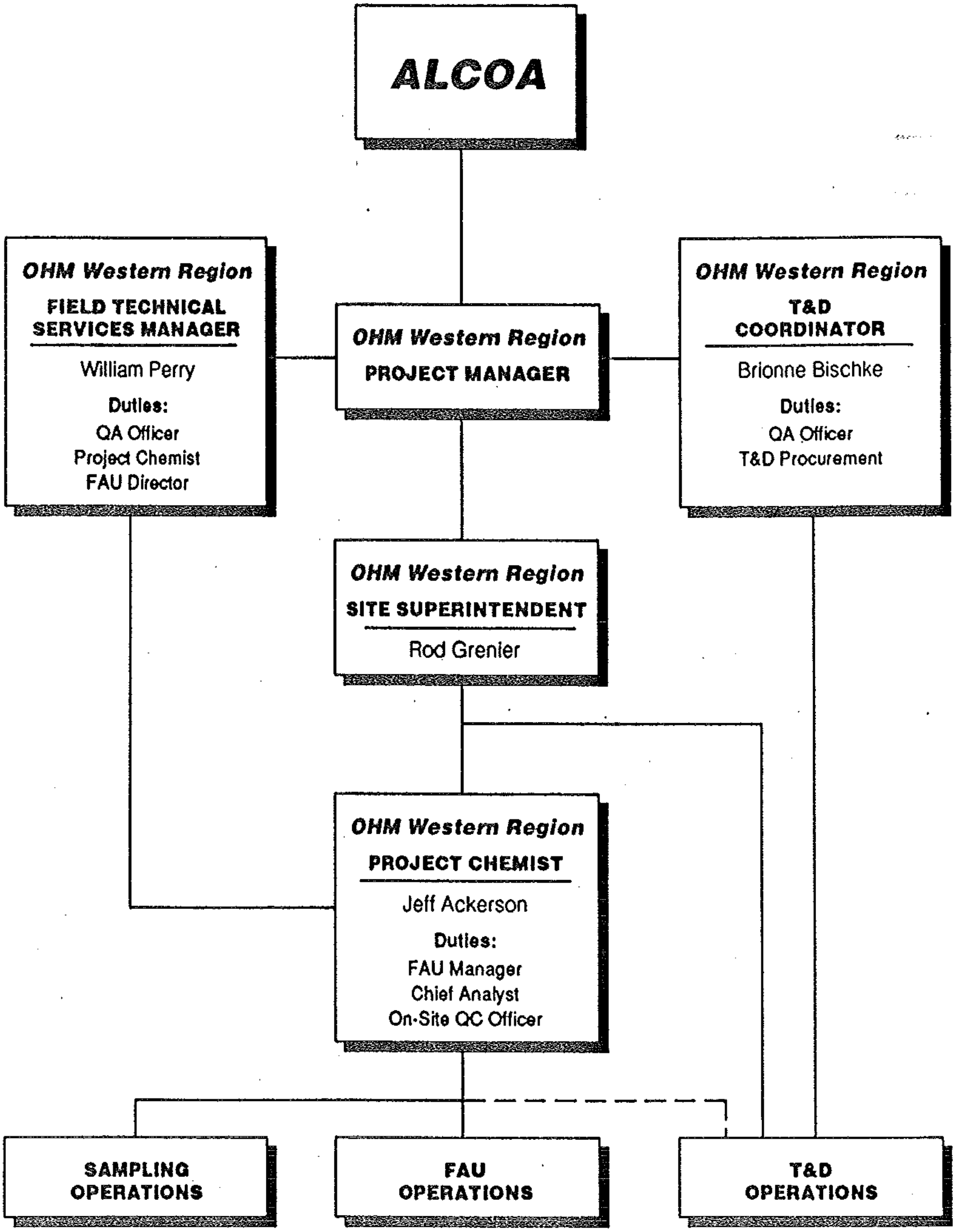


TABLE 1-2
DOCUMENT CONTROL INVENTORY

D.C.N. 12917-	Document Title	Contents	Current Location
001	Document Control Log	Summary of logbook assignment and contents.	WRO
002	Wipe Sample Log	Log detailing wipe sample collection.	WRO
003	Disposal Sample Log	Log detailing disposal sample collection.	WRO
004	Soil Sample Log	Log detailing soil sample collection.	WRO
005	Extractions Log: Separatory Funnel	Log not used.	WRO
006	Extractions Log: Waste Dilutions	Extractions Data for oil sample preparation.	WRO
007	Reagents Preparation Log	Details of reagent preparation.	WRO
008	Standards Preparation Log	Details of standards preparation.	WRO
009	Chain-of-Custody Log	COCs from sample receipt (Laboratory copy).	WRO
010	Chain-of-Custody Log	COCs from sample submittal (Sampler's copy).	Job site
011	Sampler's Log (Jeff Geske)	Personal logbook.	Job site
012	Sampler's Log (Edwin Dillhoefer)	Personal logbook.	Job site
013	Chip Sample Log	Logbook detailing chip sample collection.	WRO
014	Compositing Log	Log not used.	WRO
015	Sampler's Log (Tom Vaughn)	Personal logbook.	Seattle shop
016	Extraction Log: Sonication (Batches 1-47)	Extraction Data for solids preparation.	WRO
017	Extraction Log: Sonication (Batches 48-67)	Extraction Data for solids preparation.	WRO
018	Soil Sample Log	Logbook detailing soil sample collection (Volume II).	WRO
019	Sampler's Log (Thomas Stanley)	Personal logbook.	Job Site
020	Balance Calibration Log	Calibration for Ohaus CT600 balance.	WRO
021	Temperature Log	Temperature readings of FAU refrigerators.	WRO
022	Visitor's Log	Log not used.	WRO

Note: Original records archived at OHM Western Regional Offices (WCO) in Walnut Creek, California. All questions and requests should be directed to the OHM Project Manager: Kevin Strahley at (510) 256-6110 extention 504.

TABLE 1-3
DOCUMENT CONTROL INVENTORY

D.C.N. 12917-	Document Title	Contents	Current Location
023	Balance Calibration Log	Log not used.	WRO
024	Instrument Chronicle	GC5455 (left) daily run log.	WRO
025	Instrument Chronicle	2GC06 (left) daily run log.	WRO
026	Instrument Chronicle	GC5455 (left) daily run log - Volume II.	WRO
027	Instrument Chronicle	2GC06 (left) daily run log - Volume II.	WRO
028	Instrument Chronicle	GC5455 (right) daily run log.	WRO
029	Extractions Log: Sonication	Extraction Data for solids preparation.	WRO
030	Duplicate Analysis Log	Logbook comparing on-site with off-site results.	WRO
031	Chain-of-Custody Log	COCs from sample receipt (Laboratory - Volume II).	WRO
032	Chip Sample Log	VANEXCO Project	Job site
033	Soil Sample Log	VANEXCO Project	Job site
034	Batch Log	Extraction Batch Source Log.	WRO
035	Wipe Sample Log	VANEXCO Project	Job site
036	Batch Log	Log not used.	WRO
037	Extractions Log: Sonications (Batches 49-104)	Extraction Data for solids preparation.	WRO
038	Chain-of-Custody Log	COCs from sample submittal (Sampler's copy - Volume II).	Job site
039	Liquid Sample Log	Logbook detailing liquid sample collection.	Job site
040	Liquid Sample Log	Log not used (Volume II).	Job site
041	Instrument Chronicle	GC5455 (left) daily run log - Volume III.	WRO
042	Instrument Chronicle	2GC06 (right) daily run log - Volume III.	WRO
043	Sampler's Log (Dianne Gehling)	Personal Log	WRO
044	Outside Analysis Log	Data results since FAU shutdown.	Job site.

Note: Original records archived at OHM Western Regional Offices (WRO) in Walnut Creek, California. All questions and requests should be directed to the OHM Project Manager: Kevin Strahley at (510) 256-6110 extention 504.

2.0 SAMPLING SERVICES

2.1 OPERATIONAL OVERVIEW

Initially, site operations were to entail decontamination of concrete sumps and pits by shot blasting or other surface scarification process. A limited, one foot depth excavation was envisioned as sufficient to remediate the site.

The basis for this had been previous site studies which directed the Request for Quotation (RFQ) and led to the creation of the Scope of Work.

These assumptions were later proven to be under-estimations using a step-by-step, surgical excavation process in which the vertical and horizontal limits of contamination were first defined and excavation of contaminated areas subsequently followed.

One side benefit desired was the segregation of non-contaminated soils from that material which would need to be disposed as hazardous. This was never truly accomplished due to the degree of contamination throughout the excavation and ALCOA's desire to abbreviate the sampling effort. Visible stainage was utilized as a guide to excavation.

This created gaps in the delineation sampling effort and maps but analysis of the disposed material which were taken as random grab samples of the trucks leaving site showed an average concentration 122 mg/Kg (ppm). See Section 4.2 for a discussion of these results. This would support the visible stainage assumption.

Operations were halted when the size of the excavation grew to the point where concerns over structural integrity of the surrounding building were raised. At that point, over 8000 cubic yards of material had been excavated leaving a hole measuring 80 feet by 160 feet in the area immediately south of columns ROW B (ALCOA Designation). The excavation's deepest point was 27 feet at a point ajacent to the load-bearing columns which partially exposed the column piers.

Due to style of the piering and the absense of the stabilizing soil around them, removal of the main sump and pits which were connected to the column piers was never attempted.

The USEPA Region X office in Seattle, Washington gave ALCOA approval to abandon further excavation at the Rod Mill area. It is recognized that contamination was left unremoved which is demonstrated by the limited number of verification samples and the last round of delineation samples taken. Excavation closure began on January 8, 1993 using an aggregate fill from Zimmerlly Rock of Woodland, WA which was verified clean by OHM sampling and subcontracted analysis (Appendix C) for pollutants, especially PCBs. The excavation was filled without lining which would prevent contamination of the fill material.

The excavation was filled in 2 foot lifts which were levelled and compacted between each lift. The final grade was to approximately 12" below warehouse floor with those remaining sumps and pits being filled in-place. An estimated 15,500 cubic yards of fill was used in closure of the excavation.

2.2 OVERVIEW OF SAMPLING SERVICES

Sampling activities included:

> Delineation - Contaminated areas were sampled in an effort to determine the extent of contamination and in an attempt to minimize the volume of hazardous waste generated.
>
> Verification - Excavated areas were sampled to demonstrate that contamination was removed.
>
> Disposal - Waste stream profile samples were collected. Trucks were sampled routinely for the purpose of checking compliance with the terms of the profile.

To accomplish these goals, FTS mobilized a sampling crew composed of three technicians. The lead technician was responsible for sampling Quality Control and also served as the sampling records custodian.

The sample crew implimented the SAP by laying out sampling grids, collecting samples, documenting the sample collection, generating sampling diagrams and maintaining sample security. The sampling services portion of the organization is shown in Figure 2-1.

A summary of the sampling services delivered is found in Table 2-1 which details the frequency and number of samples by matrix type and date.

All sampling efforts entailed a 10% QC sampling effort which included:

- Replicate Sampling - Co-located samples collected at a 5% rate.
- Equipment Blanks - Final decontamination rinsate (Hexane) samples taken from sampling equipment, when used and collected at a 5% rate.

Figure 2-1

Sampling Services Organizational Chart

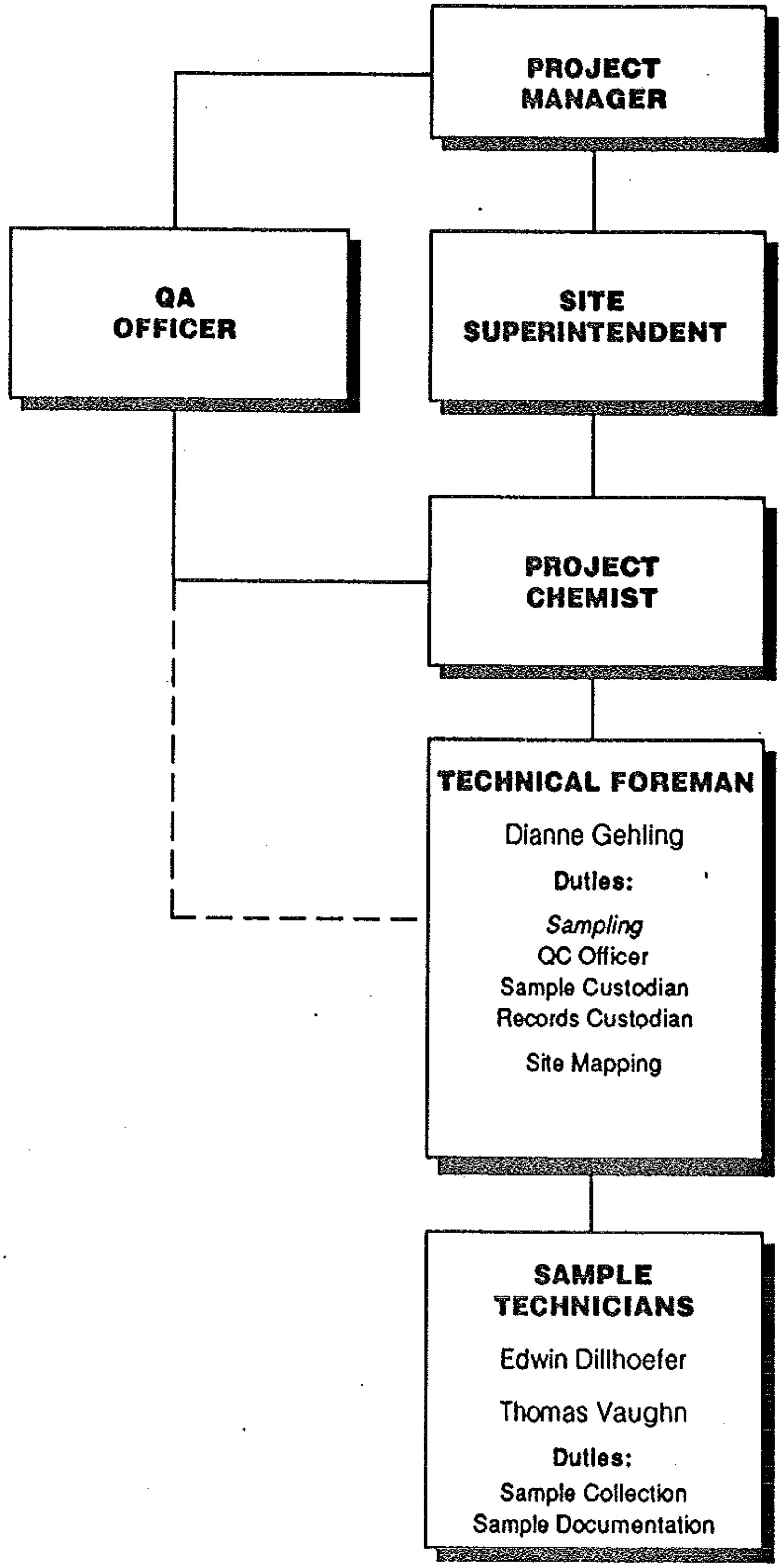


TABLE 2-1
SUMMARY OF SAMPLING EFFORT

MATRIX TYPE	DATES TAKEN	NUMBER OF SAMPLES
SOILS:		
DELINEATION:	July - October, 1992	723
DISPOSAL:	July - December, 1992	31
CONCRETE:		
DELINEATION: (chip)	July - September, 1992	28
DELINEATION: (wipe)	July, 1992	1
VERIFICATION: (wipe)	October, 1992	18
DISPOSAL:	August - November, 1992	6
LIQUIDS:		
DELINEATION:	December, 1992	1
DISPOSAL:	July - August, 1992	2

2.3 DELINEATION SAMPLING

Contaminated areas were sampled in an effort to determine the extent of contamination and in an attempt to minimize the volume of hazardous waste generated.

A hexagonal gridding sytem was employed which placed samples on ten foot centers extending horizontally across the area of possible contamination. Vertical definition was accomplished by sampling intervals of two feet.

Samples were collected as hand or hand auger grabs. If equipment was used, decontamination procedures were employed which contained a final hexane rinse as chemical decontamination.

This hexane rinse was used as an equipment blank. Equipment blanks were collected at a 5% rate (1 in 20 equipment cleanups) and were analyzed without cross-contamination being detected.

A 5% duplicate (co-located) sampling effort was utilized to determine sample medium homogeneity. These samples were analyzed on-site and in some cases, off-site. See Section 5.1 for review of these QC samples.

Delineation sampling maps were employed to graphically represent the contamination spread in the excavation and as a vehicle for conveying analytical results to the OHM Project Management and to ALCOA. These maps required the use of a computer aided design (CAD) system to present the day-to-day progress in sampling and analysis.

Within these maps, contamination limits are drawn by extending contaminated areas outward to where positive proof existed in the form of a sample result below the Action Limits given in Table 1-1.

2.4 VERIFICATION SAMPLING

Excavated areas were sampled to demonstrate that contamination was removed. The approach, as directed by the SAP was to sample all exposed surfaces at 10 foot intervals. Chip sampling of concrete surfaces was employed whereas soil surfaces were sampled by hand grab or hand auger.

Sample collected techniques included hand grab, hand auguring and chip sampling. Wherever sampling equipment was employed decontamination of equipment occurred.

Hexane rinses were used to create equipment blanks. No cross-contamination was evident. As before a 5% creation rate was employed for equipment blanks.

Duplicates were created at a 5% rate also. See Section 5.2 for a discussion of precision QC data.

This process was greatly abbreviated due to the approval by the USEPA for closure of the excavation.

2.5 DISPOSAL SAMPLING

Waste stream profile samples were collected and sent to disposal companies prior to site activities. Trucks were sampled routinely for the purpose of checking compliance with the terms of the profile. These samples were analyzed for PCBs on-site.

See Table 4-2 for a summary of the disposal sampling effort and results.

3.0 ANALYTICAL SERVICES

3.1 OVERVIEW OF ANALYTICAL SERVICES

OHM chose to perform analytical services itself in order to facilitate operational continuity. This was accomplished by utilization of FTS' on-site analytical capability.

FTS mobilized a Field Analytical Unit (FAU) to the ALCOA site on July 15, 1992. FAU staffing included a project-dedicated chemist with a support staff including one instrumentalist and two extractionists. FAU organizational structure is presented as Figure 3-1.

Table 3-1 summarizes analytical activity associated with Project 12917.

Samples were received from the field under Chain-of-Custody (COC) with samples being stored in a designated, locked sample storage refrigerator which was located within the FAU. Once samples were received, they were considered "in the possession" of the FAU crew and internal COC were not utilized.

Sample batches were constructed by the senior chemist so as to maximize the batch size while maintaining a similarity in sample matrices. At no time were batch sizes greater than 20 samples.

Prior to initiation of sample preparation on site, extractionists proficiency was demonstrated by performance of a Method Detection Limit (MDL) Study as described in 40 CFR Part 136 Appendix B. MDLs were determined for Arochlor 1254 (Ar1254) by sonication which calculated to be 0.033 mg/Kg but were reported for all PCBs at 0.3 mg/Kg.

Water samples were reported with a 0.01 mg/l detection limit and wipes with a 0.1 $\mu g/cm^2$ detection limit.

Samples were destroyed after 30 days by crushing samples into the soil pile destined for disposal as hazardous. Wastewater from glassware cleaning was collected and treated to remove PCBs by carbon adsorption. This carbon was disposed as a hazardous solid. Wastewater from glassware cleaning showed 3.0 µg/l (ppb) of methylene chloride. This was below the acceptance limit for ALCOA's wastewater disposal permit so the water was disposed to the City of Vancouver's POTW. Extracts were bulked after 45 days. The solvent was evaporated off and the residue disposed as part of the site's solid waste stream.

FAU analytical methodology included extractions by sonication and waste dilution (SW846 M3550 and M3580). Sample extracts underwent acid hydrolysis and silica gel cleanup (SW846 M3650).

Figure 3-1

Analytical Services Organizational Chart

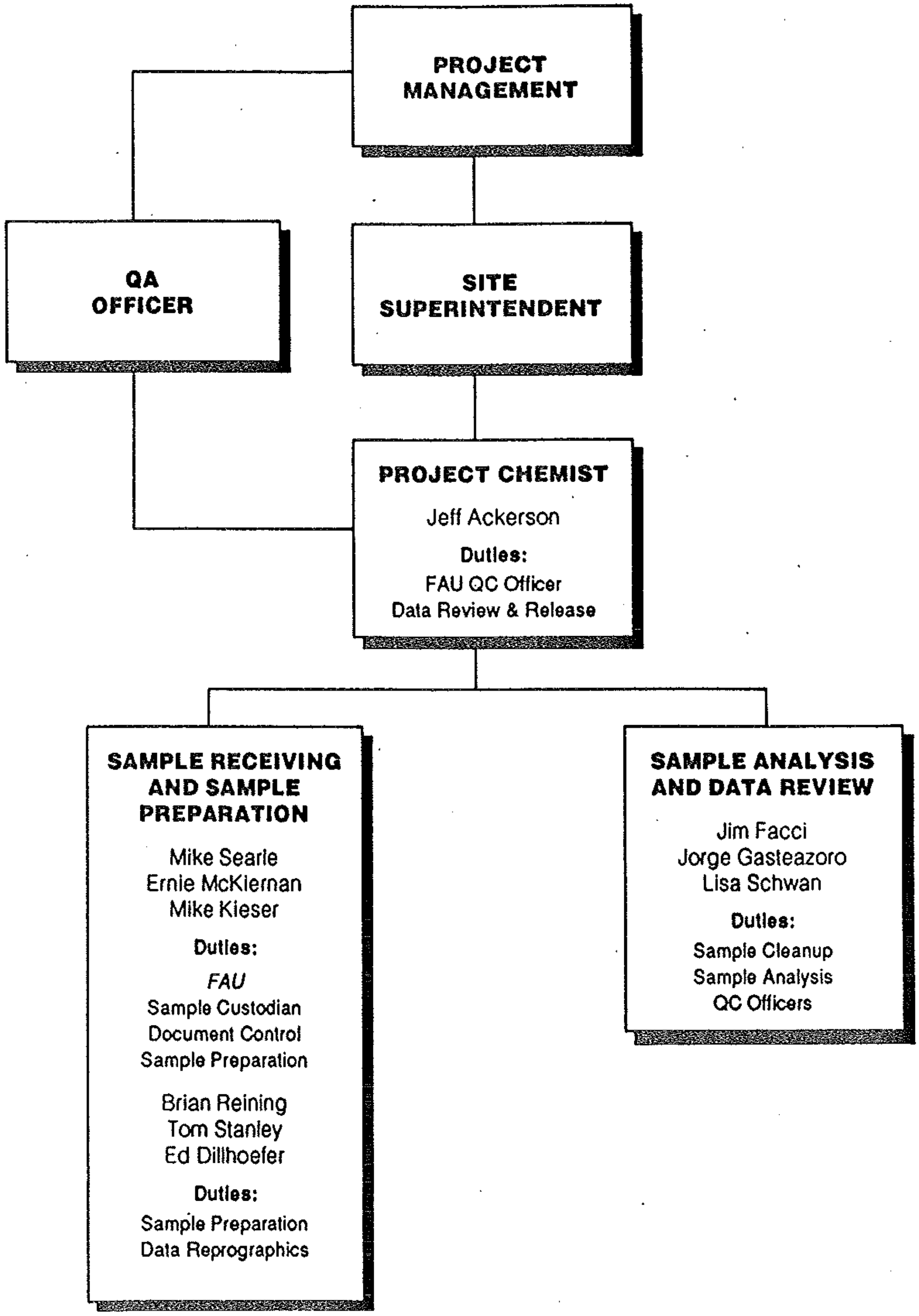


TABLE 3-1
SUMMARY OF ANALYTICAL EFFORT

MATRIX TYPE	MONTH ANALYZED	NUMBER OF SAMPLES
SOILS:		
	August	420
	September	358
	October	40
	November	0
CONCRETE:		
	August	14
	September	0
	October	0
	November	0
WIPES		
	August	0
	September	13
	October	19
	November	0
WATER:		
	August	0
	September	0
	October	0
	November	1

Each extraction batch had a complement of Quality Control samples prepared with the batch. The QC complement included:

- Reagent (Batch) Blank
- Blank Spike - Blank spiked at < 10% of the calibration range with a second source.
- Matrix Spike and Matrix Spike Duplicate - Samples spiked at 10 to 30% of the calibration range.
- Replicate Samples - QC samples created by the sampling crew at a 5% rate.

Extraction spike standards were created from stock solutions which were from sources other than those used for instrumental calibration. All spike solutions were analyzed prior to use in extractions.

Instrumentation, involving quantification consisted of gas chromotography with electron capture detectors (GC/ECD - SW846 M8080). Screening techniques utilized GC with Electolytic Conductivity Detector (ELCD). Instruments were calibrated per SW846 M8000 with at least five differing concentrations of diluted calibration stock standard. Average response factors (R_f) were calculated for Ar1260, Ar1254, and Ar1248 linearity through the origin was assumable in all cases.

Continuing calibration standards (CCS) consisted of mid-level calibration standards which were varied between the three middle standards of the calibration standards set. CCSs were ran at a 10% rate (once in every ten runs). Calibration was assured (<15% Difference) or those samples which followed an out-of-control standard were reran.

QA/QC activities are detailed in Tables 3-2 through 3-6.

Data reduction was performed on-site with "verbal" results being delivered as soon as the Quality Control data showed the extraction and analytical procedures to be properly executed. Final data packages are presented as Appendix C and are prepared as "stand-alone" documents.

Out-of-Control Reports were completed for all situations in which deviation from the norm was seen.

An off-site laboratory was sought for validation of on-site analytical performance. The samples submitted consisted of replicate samples, replicate extracts, split extracts and calibration standards. A summary of the resultant precission and accuracy data is presented as Tables 5-2 through 5-5.

Subcontracted analytical data packages are presented as Appendix D.

TABLE 3-2
METHOD DETECTION LIMIT STUDIES

PROCEDURE:

Weigh-up, Spiking, Extraction and Concentration:
Ten 30.0 grams aliquots of granular Sodium Sulfate (Baker Lot #F01160) were weighed on calibrated balance CT600/13804. Each aliquot was spiked with 10.0 mL of Spiking Standard S6-001 (1.0 ug/mL AR1254: 1 mL of 1000 ug/mL AR1254 Stock Standard (Accustandard Lot #072-185) diluted to 1000 mL with Acetone (EM Science Lot #3006001)) using a Class "A" 10.0 mL Volumetric Transfer Pipet while the spiking solution was still cold (freshly removed from the freezer). Immediately 50 mL of 50:50 Mix (R6-001: equal portions of Methylene Chloride (EM Science Lot #9090) and Hexane (B&J Lot #BA617)) was added to the aliquots. Aliquots were extracted per SW846 method 3580 (Sonication) and then concentrated by K-D Apparatus to a final volume of 10.0 mL in Hexane (EM Science Lot #31248). Extracts were stored in 20 mL Scintillation vials.

Clean-up (applies to "cleaned" extracts only):
Extracts were subjected to clean-up by Acid Hydrolysis which consisted of washes with ≈ 5 mL of concentrated Sulfuric Acid (Baker Lot #F09041) being added to the vials containing concentrated extracts. Vials were carefully shaken and opened to vent excess pressure. Extract layers were transfered to a new vial and the process repeated until the acid layer appeared light yellow in color. The final acid wash was heated slightly (until vial was warm to the touch) while in contact with the extract. The extract was shaken (carefully) one last time and vented. The extracts were left to cool in contact with the sulfuric acid.

All acid-hydrolyzed extracts were tranfered to a new 20 mL scintillation vial and ≈ 5 g of Silica Gel (Baker Lot #E11713) was added to the vials. Vials were carefully shaken to mix and allowed to settle in the freezer. Cleaned extracts were transfered to a screw-topped 1.5 mL autosampler vial.

Analysis:
Extracts were analyzed per SW846 Method 8080 (Organochlorine Pesticides and PCBs) which utilized calibrated (>5 points) GC-ECDs.

CALCULATION:

ANALYSIS RENDERED THE FOLLOWING RESULTS (in mg/Kg):

EXTRACT ID	MDL A	MDL B	MDL C	MDL D	MDL E	MDL F	MDL G	MDL H	MDL I	MDL J	AVG.	s
UN-CLEANED	0.85	▨ 0.43	▨ 0.41	▨ 0.35	▨ 0.43	▨ 0.41	lost	▨ 0.44	▨ 0.39	0.47	0.41	0.03
CLEANED	▨ 0.28	▨ 0.29	▨ 0.29	0.24	▨ 0.28	0.25	lost	▨ 0.27	▨ 0.28	▨ 0.29	0.28	0.01

▨ = Data used to determine MDLs

METHOD DETECTION LIMIT

AR 1254

STATISTICAL		REPORTED	
UN-CLEANED	0.10 mg/Kg	UN-CLEANED	0.30 mg/Kg
CLEANED	0.02 mg/Kg	CLEANED	0.30 mg/Kg

TABLE 3-3
METHOD DETECTION LIMIT STUDIES

PROCEDURE:

Weigh-up, Spiking, Extraction and Concentration:
Ten 30.0 grams aliquots of granular Sodium Sulfate (Baker Lot #F01160) were weighed on calibrated balance CT600/13804. Each aliquot was spiked with 10.0 mL of Spiking Standard S6-047 (1.0 ug/mL AR1248:0.5 mL of 1000 ug/mL AR1248 Stock Standard (Accustandard Lot #072-186) diluted to 500 mL with Acetone (VWR Lot #32177228)) using a Class "A" 10.0 mL Volumetric Transfer Pipet while the spiking solution was still cold (freshly removed from the freezer). Immediately 50 mL of 50:50 Mix (R6-012: equal portions of Methylene Chloride (Baker Lot #F21252) and Hexane (Baker Lot #F11252)) was added to the aliquots. Aliquots were extracted per SW846 method 3580 (Sonication) and then concentrated by K-D Apparatus to a final volume of 10.0 mL in Hexane (Baker Lot #F11252). Extracts were stored in 20 mL Scintillation vials.

Clean-up (applies to "cleaned" extracts only):
Extracts were subjected to clean-up by Acid Hydrolysis which consisted of washes with ≈ 5 mL of concentrated Sulfuric Acid (Baker Lot #F09041) being added to the vials containing concentrated extracts. Vials were carefully shaken and opened to vent excess pressure. Extract layers were transfered to a new vial and the process repeated until the acid layer appeared light yellow color. The final acid wash was heated slightly (until vial was warm to the touch) while in contact with the extract. The extract was shaken (carefully) one last time and vented. The extracts were left to cool in contact with the sulfuric acid.

All acid-hydrolyzed extracts were tranfered to a new 20 mL scintillation vial and ≈ 5 g of Silica Gel (Baker Lot #E11713) was added to the vials. Vials were carefully shaken to mix and allowed to settle in the freezer. Cleaned extracts were transfered to a screw-topped 1.5 mL autosampler vial.

Analysis:
Extracts were analyzed per SW846 Method 8080 (Organochlorine Pesticides and PCBs) which utilized calibrated (>5 points) GC-ECDs.

CALCULATION:
ANALYSIS RENDERED THE FOLLOWING RESULTS (in mg/Kg):

EXTRACT ID	MDL K	MDL L	MDL M	MDL N	MDL O	MDL P	MDL Q	MDL R	MDL S	MDL T	AVG.	s
CLEANED	0.17	0.17	0.21	0.17	0.17	0.17	0.33	0.17	0.17	0.19	0.17	0.00

▨ = Data used to determine MDLs

METHOD DETECTION LIMIT AR 1248			
STATISTICAL		REPORTED	
CLEANED	0.02 mg/Kg	CLEANED	0.30 mg/Kg

TABLE 3-4
INITIAL (SETUP) QUALITY CONTROL ACTIONS

ACTION	PURPOSE
FAU Physical Setup:	
Installed D.I. water system	Assured reagent grade water
Installed Sample Storage Refrigerator	Fulfilled sample separation requirement
Installed thermometers in refrigerators	Calibration of refrigerators
Installed charcoal in refrigerators	Prevention of organic cross-contamination
Purchased analytical balances	Assured accurate sample weighing
Purchased Class S weights	Calibration of balances
Implemented waste collection system	Minimization and proper segregation of various waste streams
Collected MSDs for all chemicals used	Health and Safety requirement
Method Developement:	
Reviewed Sampling and Analysis Plan with chemists and technicians	Familiarization of personnel with QA objectives of activities
Developed logbooks	Standardization of format and detail
Trained personnel	Standardization of technique
Developed extraction technique	Optimization of extraction efficiency
Developed cleanup technique	Optimization of extract throughput
Purchased standards from two sources	QA and source method requirement for the independent accuracy check
Purchased ACS (or better) grade reagents	Minimization of interferants
Purchased glassware	Minimization of interferants
Developed analytical technique	Optimization of instrumentation for proper resolution of analytes
Established deliverables package	Assurance of timely delivery procedures
Developed Control Charts	Real-time feedback of FAU QA and QC performance
Established calibration curves	QA and source method requirement for analyte quantification
Analyzed D.I. water and solvents	QA and source method requirement for extraction procedure cleanliness
Performed Method Detection Limit Studies	QA and source method requirement for analyte quantification
Contracted validation laboratory	QA requirement for FAU accuracy measurement

TABLE 3-5
DAILY QUALITY CONTROL ACTIONS

ACTION	PURPOSE
Extractions Related:	
Checked refrigerators, freezers and balances	Calibration requirement
Checked water bath	Assurance of proper operation
Checked water tank level (fullness)	Assurance of water supply.
Rinsed glassware with solvent	Decontamination requirement prior to extraction operations
Prepared QC Complement	Required blank and blank spike preparation
Cleaned glassware	Decontamination requirement after extraction operations
Completed logbooks	QA requirement for routine operations
Instrument Related:	
Changed septum	Routine maintanance for optimum systems operation
Checked solvent reservior on Electrolytic Conductivity Detectors	Routine maintanance for optimum systems operation
Checked gases	Routine maintanance for optimum systems operation
Inspected autosamplers	Routine maintanance for optimum systems operation
Ran instrument blank	QA and source method requirement to assure instrument cleanliness
Ran calibration check standard (Beginning of day and at 10% rate)	QA and source method requirement to assure instrument calibration
Ran QC Compliment	QA requirement to assess extraction efficiency before extraction batch closed
Screened all samples and diluted those requiring dilution	QA requirement for protection of calibrated instruments
Completed Instrument Chronicles	Proper and complete documentation of instrumental activity
Produced verbal results as soon as QC Compliment assured propiety	Sampling and Analyutical Plan (SAP) requirement
Batch closed	Enforced routine QC Compliment creation
Computer backup (every other day)	Secured data from loss
Maps generated or filled in	SAP requirement

TABLE 3-6
WEEKLY QUALITY CONTROL ACTIONS

ACTION	PURPOSE
Extractions Related:	
Cleaned waterbath	Good laboratory practice for control of cross-contamination
Cleaned counters	Good laboratory practice for control of cross-contamination
Cleaned floors	Good laboratory practice for control of cross-contamination
Disposal of samples >30 days old	Waste disposal procedure
Disposal of extracts > 45 days old	Waste disposal procedure
Neutralization of acid cleanup waste	Waste disposal procedure
Instrument Related:	
Inspected GC injection ports	Good laboratory practice for control of cross-contamination
Inspection of glass wool in GC injection port	Good laboratory practice for control of cross-contamination
Changed nickel tube on Electrolytic Conductivity Detectors (ELCDs)	Routine maintanance for optimum systems operations
Changed integrator paper	Assures not running out of paper during automated runs
Ordered supplies	Assurance that supplies available for uninterupted operations
Completed weekly QA Report to Project QA Officer	QA requirement

3.2 FIELD ANALYTICAL UNIT (FAU) SETUP

Initial FAU setup procedures included:

- Performance of Method Detection Limit Studies for Arochlor 1248 and Arochlor 1254 by the method described in 40 CFR Part 136 Appendix B.
- Establishment of calibration of GC/ECD instruments only so as to comply with SW846 M8000 and M8080.

Sample results were not created until the FAU and its crew had demonstrated the ability to produce data meeting the requirements of the source methodology.

3.3 ANALYTICAL DATA PRODUCTION

Stand-alone, CLP-comparable data packages were generated for every batch of samples analyzed. These data packages take the format as follows:

Cover Letter
Case Narrative
Results Summary
Calculation Spreadsheet
Calibration Summary
Calibration Curve Spreadsheet
Instrument Chronical:
  Calibration Chromatograms
  Instrumental Blank
  Sample (extract) Chromatograms
Extraction Log

See Appendix C for these packages. Also included is supporting logs such as:

Batch Log
Reagent Preparation Log
Standard Preparation Log
Balance Calibration Log
Refrigerator Temperature Log

3.4 FAU QUALITY CONTROL EFFORTS

All samples were extracted and analyzed as batches not exceeding 20 samples in number. All batches had a full compliment of Quality Control samples including:

Reagent Blanks
Blank Spikes

Matrix Spikes
Matrix Spike Duplicates

These were coupled with sampling Quality Control efforts including:

Replicate Samples
Co-located Samples
Split Samples
Equipment Blanks

Statistical development from these samples are discussed in Section 5.

4.0 TRANSPORTATION AND DISPOSAL (T&D) SERVICES

4.1 OVERVIEW OF T&D SERVICES

OHM performed brokering services for ALCOA's PCB waste solids associated with the Rod Mill remediation. The PCB solid waste stream is summarized as Table 4-1. The average concentration of that waste stream quantities is calculated as Table 4-2

The OHM T&D technicians scheduled truck arrivals to the site. Once on-site the trucks were inspected for DOT compliance.

Trucks which were found to be in violation of the law or safety requirements were sent back to the subcontractor's yard to have violations addressed. Trucks were also sent back if they were found to be dirty.

Clean, safe trucks were loaded by the following process:

1. Trucks were lined with visqueen.
2. Trucks were loaded with debris or soil. This was blended to maximize the density of the shipment.
3. Trucks were tarped to cover the load.
4. Trucks were weighed at scales located off-site
5. The loads were shifted or material was added or removed to maximize the load per the limitation set by the State of Washington.

See Figure 4-3 for the flowchart used in truck loading.

A supported operational activities in the T&D area by supplying a technician for the purposes of placarding, weighing, manifesting and controlling the regulatorily mandated paperwork associated with hazardous waste disposal. The T&D organizational chart is presented as Figure 4-4 .

Central to the T&D effort was the OHM Western Regional T&D Coordinator. His duties entailed auditing of the selected transportation and disposal companies for compliance with Federal (49 and 29 CFR) and State regulations. The development and initial implementation of the on-site waste tracking system, and training of the T&D Technician for on-site/day-to-day concerns was also the responsibility of the Regional T&D Coordinator.

The on-site T&D Technician was responsible for the implementation of OHM Regional T&D policies, specifically those of the OHM Waste Tracking Record which includes:

TABLE 4-1
CALCULATION SPREADSHEET FOR DISPOSAL

SHIP. DATE	MANIFEST NUMBER OF LOAD SAMPLED	SAMPLE NUMBER	SAMPLE RESULT (mg/Kg)	VOLUME SHIPPED (tons)	TOTAL PCBs SHIPPED (Kg)
8/14	not sampled	-	122	203	108.63
8/17	not sampled	-	122	263	140.74
8/18	not sampled	-	122	316	169.10
8/19	not sampled	-	122	409	218.87
8/20	not sampled	-	122	538	287.90
8/21	not sampled	-	122	442	236.53
8/22	not sampled	-	122	18	9.63
8/24	129170098	D-006	77	706	239.19
8/31	129170130	D-007	130	843	482.20
9/1	129170148	D-008	140	503	309.85
9/2	129170179	D-009	110	858	415.27
9/3	129170192	D-010	2.9	506	6.46
9/4	129170206	D-011	89	442	173.09
9/8	129170224	D-012	38	450	75.24
9/9	129170239	D-013	72	732	231.90
9/10	129170264	D-014	120	434	229.15
9/11	129170274	D-015	340	539	806.34
9/14	129170287	D-016	23	651	65.88
9/15	129170314	D-017	35	407	62.68
9/16	129170322	D-018	17	67	5.01
9/17	not sampled	-	122	47	25.15
9/18	not sampled	-	122	94	50.30
9/21	129170332	D-020	120	76	40.13
9/22	129170335	D-021	180	90	71.28
9/23	129170341	D-022	160	98	68.99
9/24	129170342	D-024	110	113	54.69
10/19	129170347	D-026	140	23	14.17
10/20	129170353	D-027	310	139	189.60
10/21	129170355	D-028	130	117	66.92
10/22	129170364	D-029	140	162	99.79
10/23	129170367	D-030	140	50	30.80
10/26	129170370	D-031	200	64	56.32
10/27	129170372	D-032	95	81	33.86

AVERAGE SAMPLE RESULT (mg/Kg) 122

TOTAL TONNAGE SHIPPED (as tons) 10,481

TOTAL WEIGHT OF PCBs SHIPPED (as Kgs) 726.55

Figure 4-1
TRUCK LOADING
FLOWCHART
Inspection & Loading

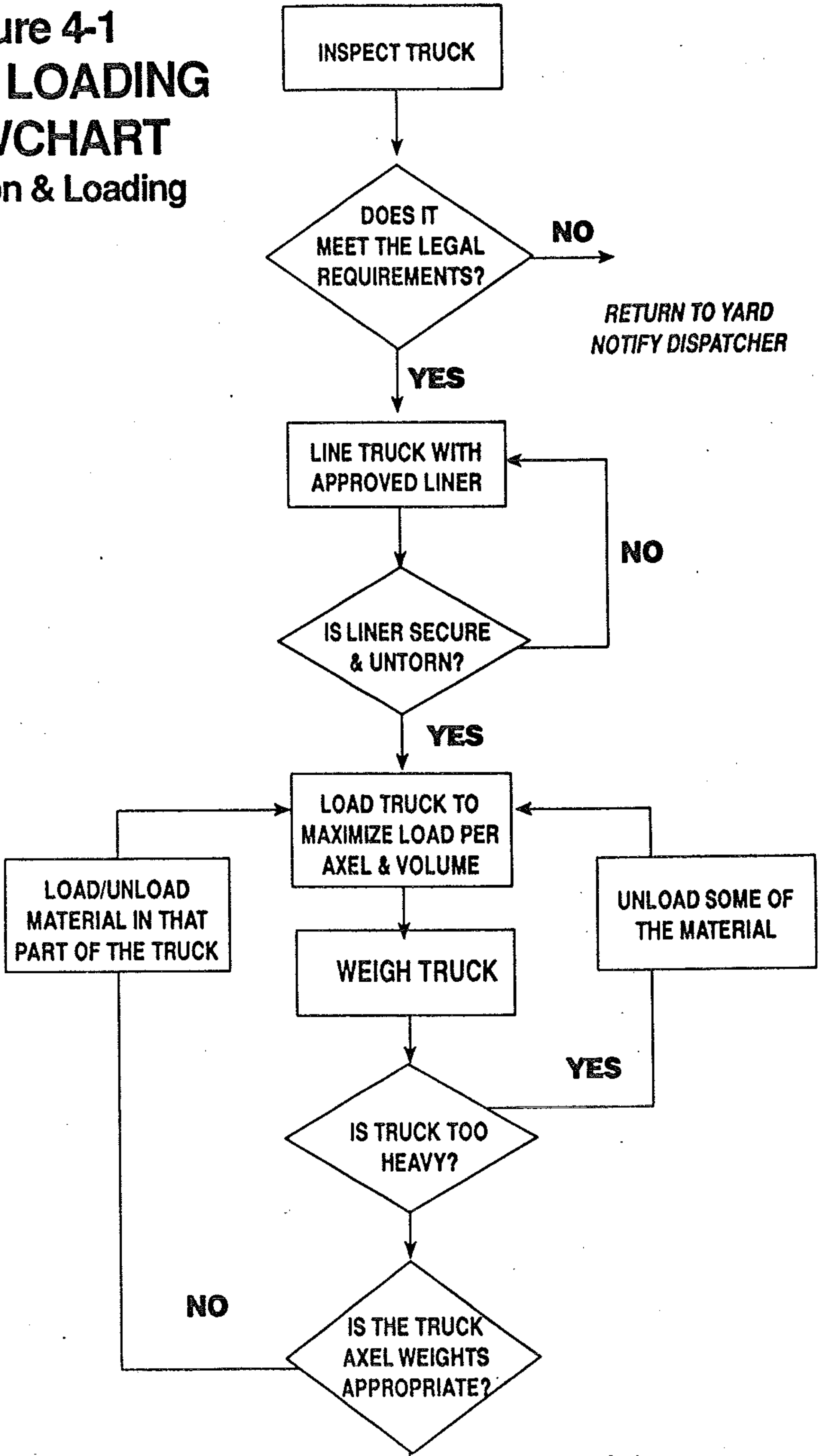
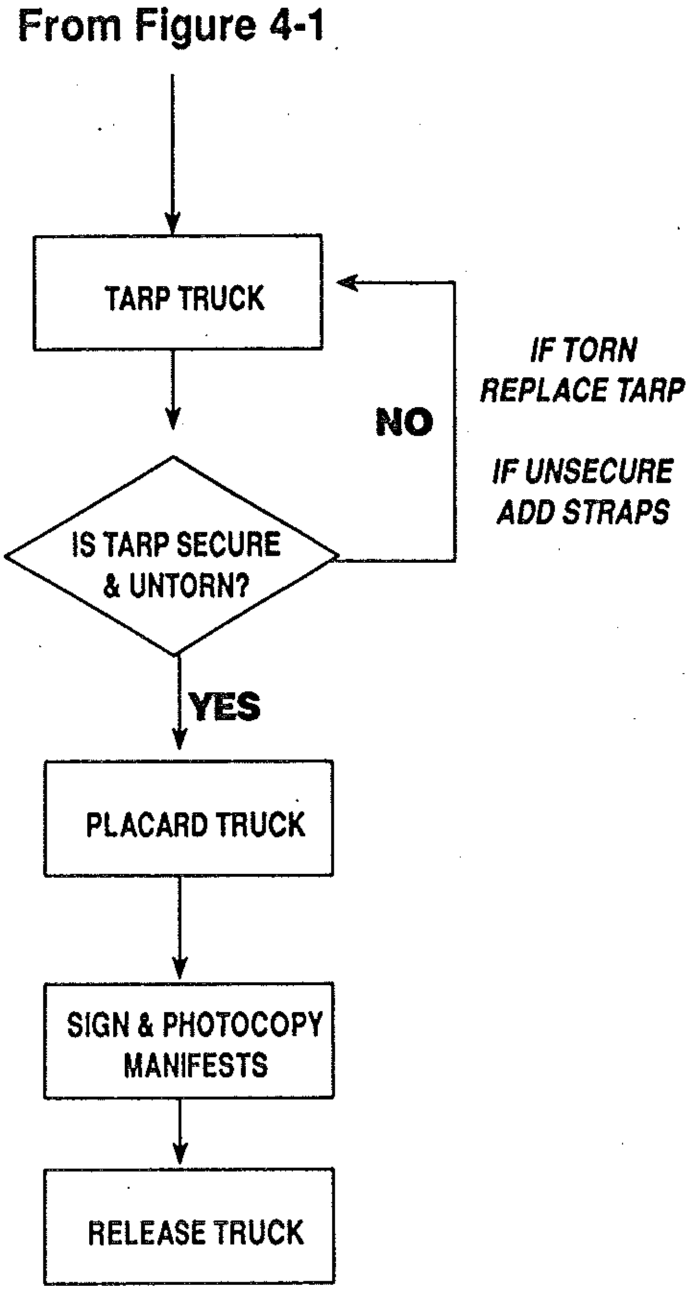


Figure 4-1 cont.
TRUCK LOADING FLOWCHART
Inspection & Loading



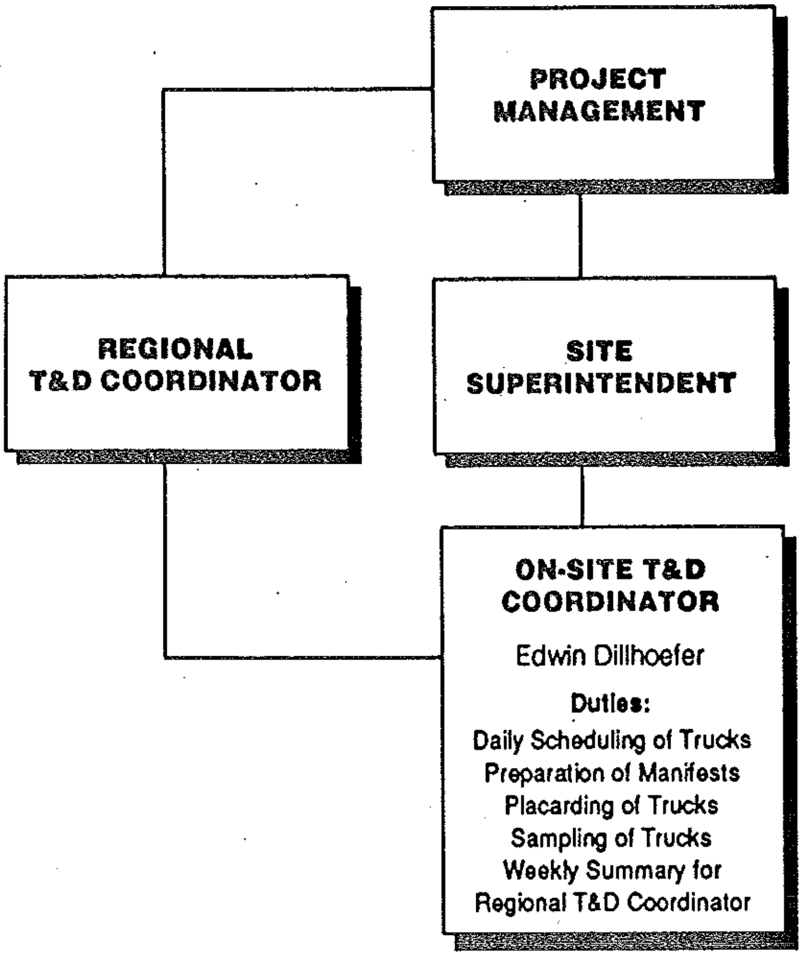
Transporter identification
Quantity of shipment
Transporter time on-site (demurrage consideration)
Regulatory compliance (ERG Book and license)

Also on a per shipment basis, Hazardous Waste Manifests were completed, copied and copies collected for daily presentation to ALCOA. Placards and hazardous waste labels were also presented and used by each transporter during shipment.

Daily and weekly summaries of the volume of material shipped were compiled by the T&D Technician for the OHM Project Manager and Regional T&D Coordinator. These are summarized in Table 4-1.

Figure 4-2

T&D Services Organizational Chart



5.0 QUALITY ASSURANCE REVIEW

This section is provided for two major reasons:

- To identify the failures in application of the Sampling and Analytical Plan (SAP), published on July 27, 1992, known as Out-of-Control Events (OCEs), the duration of these events and the effect these occurrences had on the overall quality of the services rendered.

- To calculate a numerical value to variance within the system actuated under the SAP to generate analytical results. This will require the manipulation of precision data created from the analysis of QC samples, such as:

  - Duplicate (collocated) samples,
  - Duplicate (split) samples,
  - Replicate extractions (Matrix Spikes, Matrix Spike Duplicates and Duplicate Extracts),
  - Replicate analyses (within the on-site lab) and
  - Replicate analyses (between the on-site lab and the validating off-site lab).

  This numerical value, a statistically-based probability range will assist in estimating the true value for each result given in Appendix C.

5.1 OVERVIEW OF QUALITY CONTROL EFFORT

One Out-of-Control Event (OCE) was recorded by the sampling crew. It entailed the improper layout of a sampling grid at the beginning of the project and was corrected by resampling.

Thirteen OCEs were reported within the Field Analytical Unit:

- 6 unresolved - precision problems (highly contaminated).
- 3 requiring reanalysis.
- 1 resulting in repreparation of batches.
- 1 resulting in a reported elevation of the detection limit.
- 1 reporting 3 aborted batches (related to the sampling OCE).
- 1 resulting in results being qualitative (questioned).

Table 5-1 details the OCEs by date of occurrence.

TABLE 5-1
OUT-OF-CONTROL EVENTS

OCE#	DATE	DESCRIPTION	ACTION
001	08/06/92	Improper gridding	Regridding with resampling
002	08/06/92	Compositing Scheme unable to work due to large number of highly contaminated samples and improper sampling (OCE#001).	Batches Q003, Q004 and Q005 aborted.
003	08/06/92	Calibration out-of-control. Affected samples not reran.	H005, H007, H009, H010 and H011 should be reported as qualitative only.
004	08/12/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).
005	08/12/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).
006	08/16/92	Blank Spike recovery failure.	Reprep Batch Q009 as Q015.
007	08/17/92	3 samples (S122, S127 and S130) not ran at proper dilution.	S122, S127 and S130 reported as N.D. with an elevated D.L. (3.0 ppm).
008	08/19/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).
009	08/23/92	Autosampler functioning improperly.	Reran samples without compromising batch.
010	09/02/92	Autosampler functioning improperly.	Reran samples without compromising batch.
011	09/29/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).
012	10/02/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).
013	10/20/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).
014	10/28/92	Improper logging of instrument chronicle.	Reran samples without compromising batch.
015	8/15/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).
016	8/14/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).
017	9/22/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).

TABLE 5-1 (Cont'd)
OUT-OF-CONTROL EVENTS

OCE#	DATE	DESCRIPTION	ACTION
018	8/26/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).
019	8/24/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).
020	8/18/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).
021	9/28/92	Precision measurement for MS and MSD exceed limits. Samples highly contaminated.	Batch released citing matrix effects (non-homogeneity).

Source: OCE LOG (Appendix C).

Quality Control (QC) samples were embedded within the operations so as to allow estimation of bias (inaccuracy) and variance (imprecision). The OCEs cited on the preceding page are those situations of bias and variance noted by personnel during operational activity ("real time").

Additional information is obtainable from analysis of QC samples but usually these are not in "real time." This information will now be presented, with review so that a estimate of the quality of the data can be attempted. A more concrete result will be the calculation of variance in sample results reported in Appendix C.

Standard deviation (s) will be used to calculate the imprecision of QC sample recovery (%R) and relative percent difference (%RPD) results. S is calculated by the following formula:

$$s = \{[\Sigma(x - x_{avg})]/(N-1)\}^{1/2}$$

where: "x" means any individual measurement (ie %R or %RPD).
"x_{avg}" means the average of all such measurements.
"N" is the total number of such measurements.
"Σ" is the mathematical sign for summation.

The imprecision of the various QC samples can help determine the previously mentioned (Section 5.0) probability range. It will be determined as follows:

$$AR_{95\%\ CL} = (+/-\ 1.96 * s) * (RR)$$

and

$$AR_{99\%\ CL} = (+/-\ 2.58 * s) * (RR)$$

where: "AR" means the actual result (spread) with either 95 or 99% probability of being correct.
"95%CL and 99%CL" refer to "t" Factors of 1.96 and 2.58, respectively.
"RR" means the reported result from Appendix B or C.

Each of the following sections will explore the imprecisions specific to each operation. In Section 5.2, the total variance will be calculated by totalling the respective standard deviations. This number applied by the "AR" formulas given above will render the actual spread of results for the data generated by the Field Analytical Unit during its operations at the remediation of the Alcoa Rod Mill facility in Vancouver, Washington.

5.1.1 Sampling Effort

Quality Control efforts in the sampling activities entailed duplicate sampling of collocated points. A 5% (1 in 20) duplicate sampling rate was outlined in the SAP. Table 5-2 summarizes the QC sampling effort with the outlined requirements.

Also mentioned in Table 5-2 are Equipment Blanks (EBs) which were samples of collected final rinsate of non-dedicated (non-expendable) sampling equipment. In most cases, hand grabs were used to collect samples, this did not require EBs since gloves were changed between samplings.

It is notable that during chip sampling, no duplicates and no EBs were taken. This, itself constitutes an OCE. Disposal samples were not required to have QC sampling and did not have any taken. Liquid samples were not specifically addresses as requiring QC sampling and this did not occur.

A valuable piece of variance data can be drawn from the duplicate sampling effort. With the 40 soil duplicates and their respective collocated samples, the average relative percent difference (%RPD) was found to be 72%. The imprecision of this data (s) was calculated to be 0.59.

The most likely cause of this imprecision was the sample matrix (the soil) itself. Soil on the site is a mixture of sand and a silty clay. It was often noted in handling of the material, that small particles of clay which were black (presumably highly contaminated) were unevenly dispersed throughout the predominant matrix, a brown sand.

Figure 5-1 graphically presents the relative percent differences for the duplicate sampling effort.

5.1.2 Analytical Effort

Quality Control efforts in the analytical activities entailed:

- Blank Spikes - 5% (1 per batch of up to 20 samples) effort.
- Matrix Spike (MS) and Matrix Spike Duplicate (MSD)- 5% (1 each per batch) effort.

Figures 5-2 and 5-3 graphically present Control Charts for blank spikes (Method Spikes) and MS/MSD precision (Relative Percent Differences), respectively.

A valuable accuracy measurement is available from the recovery data of the blank spikes. The average recovery of the 47 batches was 81% which was slightly lower than the source method (SW846 M8080) which showed an

TABLE 5-2
SUMMARY OF SAMPLING QC EFFORT

MATRIX TYPE	NUMBER OF SAMPLES TAKEN	NUMBEROF QC SAMPLES DESIRED	NUMBEROF QC SAMPLES TAKEN
SOILS (Delineation)	723	36	40
SOILS (Disposal)	31	0	0
CONCRETE (Chip)	28	2	0
CONCRETE (Wipe)	19	1	1
CONCRETE (Disposal)	6	0	0
LIQUID (Delineation)	1	1	0
LIQUID (Disposal)	2	0	0

Source: Table 2-1 and Appendix C.

FIGURE 5-1

Relative Percent Difference

Duplicate Sampling Effort

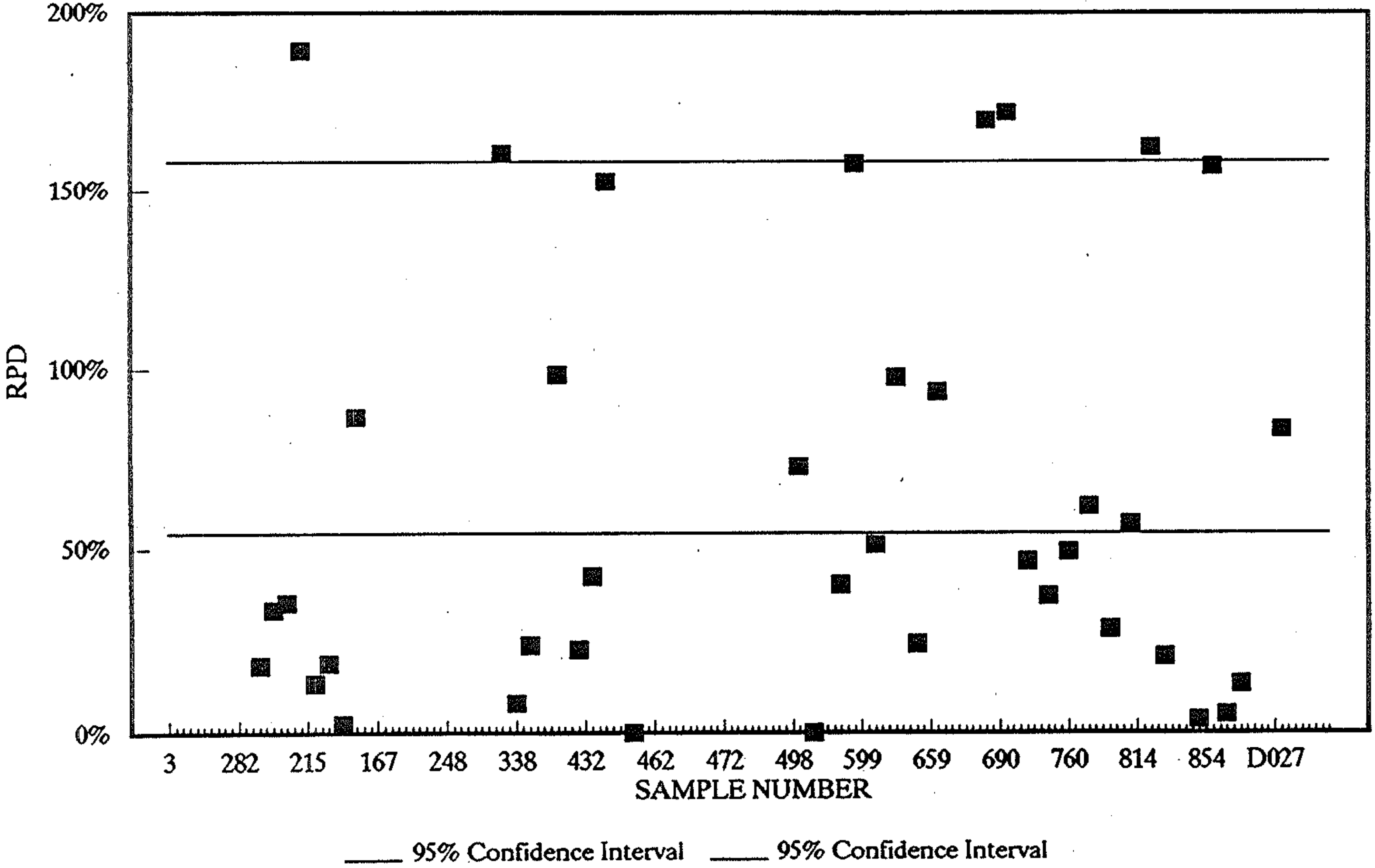
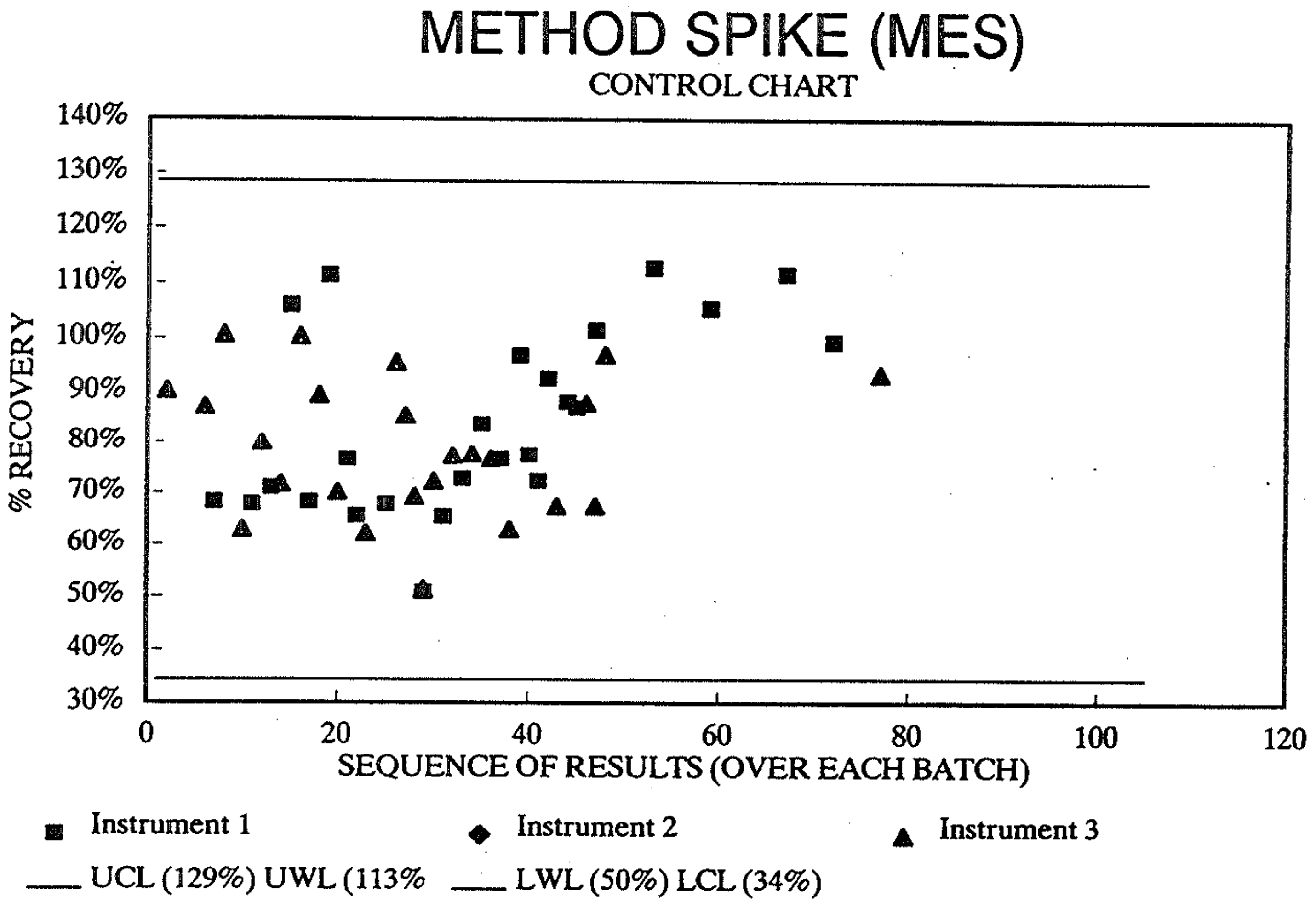


FIGURE 5-2

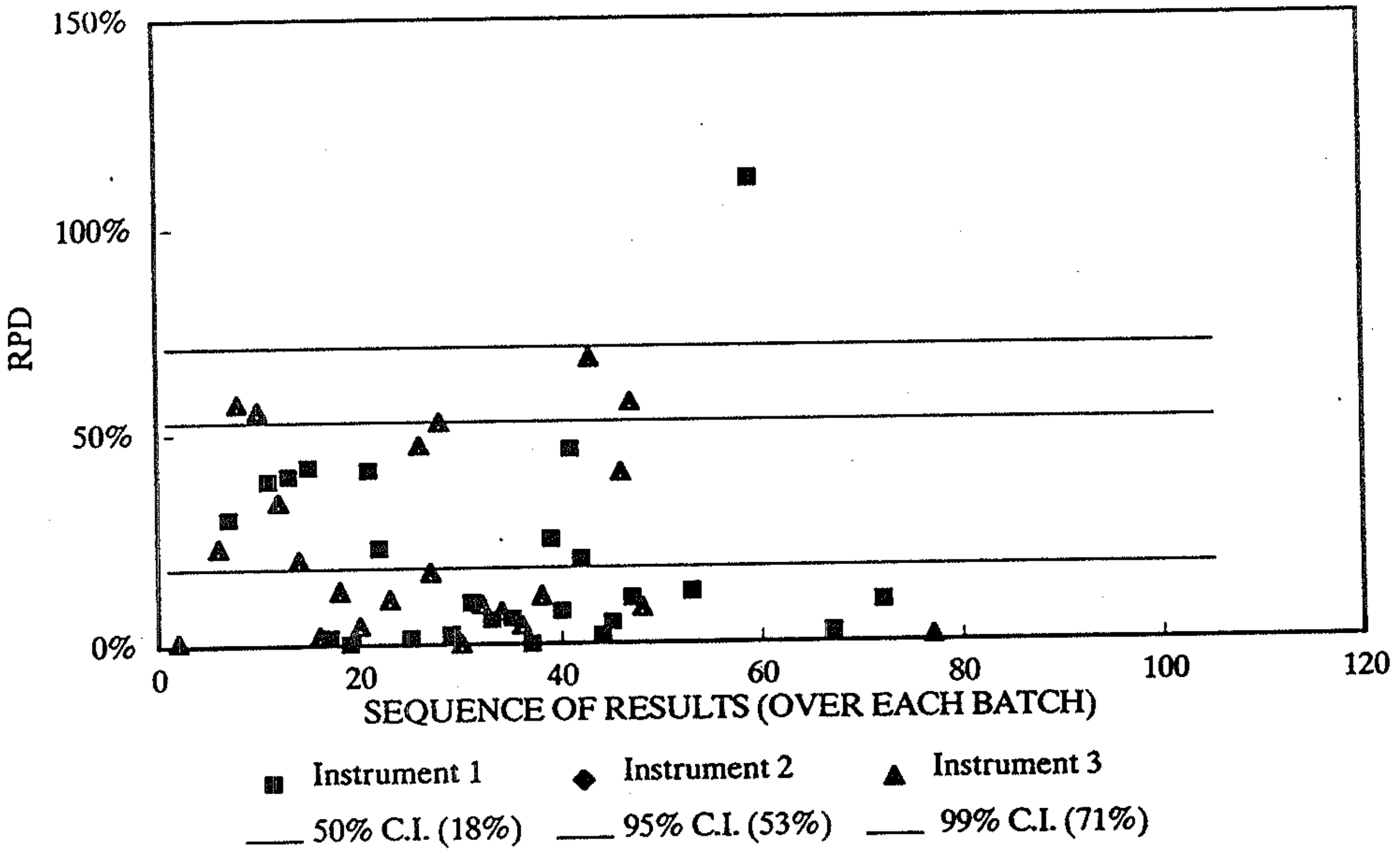


ALCOA Rod Mill Sampling, Analytical and T&D Final Report
OHM Project No. 12917

FIGURE 5-3

RELATIVE PERCENT DIFFERENCE

Matrix Spike/Matrix Spike Duplicate



ALCOA Rod Mill Sampling, Analytical and T&D Final Report
OHM Project No. 12917

average single laboratory recovery of 85%. This would indicate that the FAU was operating with an extraction efficiency comparable to those laboratories utilized in establishing the source methodology.

Variance data here reflects the precision of the extraction technique coupled with the instrumentalist's technique. Of the 47 measurements (batches) identified for Project 12917, the average relative percent difference (%RPD) was found to be 23%.

Two measurements of imprecision within the laboratory are available, these can be looked upon as a best case and worst case. The better precision is demonstrated by the deviation seen in the recoveries of the blank spikes. (S) for these measurements was found to be 0.16. Precision demonstrated by the relative percent differences of the MS and MSDs was found to be an (s) of 0.26.

Either of these are found to be less than half the (s) due to matrix non-homogeneity.

Several factors have been found to exist to account for imprecision within the FAU. They also help to evaluate which of the (s) values should be applied in the determination of the Actual Result (AR) spread.

The identifiable causes of variation in analytical results within the FAU, in order of intensity are:

1) <u>Dilution Technique</u> - Analysts employed straight dilutions of greater than 100X in preparing extracts for instrumental analysis. Serial dilutions (several 10X or smaller) would have rendered greater precision and would have offered the chance to differ dilution paths (10X,10X,5X vs 5X,10X,10X) to measure precision.

2) <u>Extract Evaporation</u> - Extract storage may have allowed evaporation (and analyte concentration) to have occured. To correct for this, the lab analyzed samples within 24 hours of preparation and stored extracts in more secure autosampler vials.

3) <u>Matrix Homogeneity</u> - Same phenomena explained in Section 5.1.1. This made for difficulties in MS/MSD precision. Attempts were made to compensate by thorough homogenization before sample weigh-up.

4) <u>Solvent Saturation</u> - Extraction solvent may not have been present in excess during extraction of highly-contaminated samples thus reducing the efficiency of the extraction. Medium level (reduced sample weight) extractions for highly-contaminated samples should have been used.

5) Unfilterable Extracts - Matrices which contained high levels of oil and silt often proved unfilterable by gravity filtration. Centrifugal separation followed by gravimetric filtration was employed to overcome the problem.

   Variations in technique were shown in selection of the two techniques and particularly a difficulty in determining whether the centrifuge was needed until after the filtration was attempted. Loss of analyte and filter throughput could account for variability.

6) Extraction Efficiencies - Variation in extraction efficiency might occured between the two sonicators used.

7) Quantitative Transfer - The proper, quantitative transfer of extracts was hampered with super-saturated extracts in which precipitated organic matter and heavy oils were seen.

8) Clean-up Technique - Possible loss could have occured during clean-up of extracts. This loss has been observed to be approximately 5%.

   For those extracts which are highly-contaminated with saturated and oxygenated organic matter, the acid hydrolysis may render the extract a gel or solid. In these cases, recoveries drop considerably (>50% loss) and variations in recoveries are pronounced (>50%RPD).

9) Length of Initial Solvent Exposure - The longer the solvent sat in contact with the sample prior to extraction the better the extraction efficiency. However, variation in the increased efficiency could be possible due to the ratio of sample to sodium sulfate, temperature relative other samples and varying rates of evaporation.

Of the above mentioned variance-causing factors, five (1,3,4,5 and 8) are enhanced with highly-contaminated samples. The remaining factors would show a variation without regard to matrix contamination levels.

If the greater imprecision shown by the (s) value for the MS/MSD (relative to the blank spike recoveries) is attributed due to the presence of the matrix (the only factor varying between them), then it may follow that for highly-contaminated samples, the (s) value for the MS/MSD data of 0.26 is better applied to these "hotter" samples.

Those samples whose results are closer to that of the concentrations found in the blank spikes (1.0 mg/Kg) may be better represented with the precision measurement for the blank spikes, 0.16.

5.2 ACCURACY AND PRECISION OF THE RESULTS PRESENTED

5.2.1 Accuracy Of The Data

The accuracy of the data is felt to be good based on the average percent recoveries of the blank spikes, namely 4% less than those fixed-base labs selected by the USEPA in development of the methodology employed. This is supported, although not universally, by the precision seen between the on-site and off-site labs.

5.2.2 Precision Of The Data

Factors affecting the sampling and analytical process have been explored in the preceding sections:

TABLE 5-3
VARIATIONS ATTRIBUTED TO SERVICES RENDERED

SOURCE	SIZE (as (s))	TOTAL VARIANCE (as (s))
MATRIX	0.59	-
ANALYSIS (low level)	0.16	(0.59 +0.16)
ANALYSIS (high level)	0.26	(0.59+0.26)

Sources and degree-of-effect were explored in the preceding sections.

5.2.3 Calculation Of The Variance Of The Data

The probability range associated with data found in Appendix C (FAU generated only) is created by applying the data found in Table 5-3 to the first formula found in Section 5.1 (following Table 5-1). For every result the following factor should be considered:

TABLE 5-4
PROBABILTY RANGE
(assuming matrix nonhomogeneous)

REPORTED RESULT (RR)	CONFIDENCE LIMIT	ACTUAL RESULT (RR)
ND - 15 mg/Kg	95%	+/- 1.47(RR) mg/Kg
ND - 15 mg/Kg	99%	+/- 1.94(RR) mg/Kg
>15 mg/Kg	95%	+/- 1.67(RR) mg/Kg
>15 mg/Kg	99%	+/- 2.19(RR) mg/Kg

TABLE 5-5
PROBABILTY RANGE
(assuming matrix homogeneous)

REPORTED RESULT (RR)	CONFIDENCE LIMIT	ACTUAL RESULT (RR)
ND - 15 mg/Kg	95%	+/- 0.31(RR) mg/Kg
ND - 15 mg/Kg	99%	+/- 0.41(RR) mg/Kg
>15 mg/Kg	95%	+/- 0.51(RR) mg/Kg
>15 mg/Kg	99%	+/- 0.67(RR) mg/Kg

The increase in AR range between Tables 5-4 to 5-5 is attributable to the increased variation due to non-homogeneity (s) = 0.59. Use of these lower numbers assumeS that the soil present on-site does not contain silty clay particles in the sand matrix.