WASHINGTON STATE
DEPARTMENT OF ECOLOGY

WORK PLAN FOR ONGOING RI/FS ACTIVITIES MARALCO SITE KENT, WASHINGTON

JUNE 5, 1991

SUBMITTED BY:

MK-ENVIRONMENTAL SERVICES
1300 114th Avenue SE, #112
Bellevue, Washington 98004

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SECTION 1
INTRODUCTION AND BACKGROUND

The following work plan has been prepared by MK-Environmental Services (MK). The MK work plan is a response to the February 27, 1991 Scope of Work prepared by the Department of Ecology requesting additional services to be performed as part of the ongoing RI/FS at the Maralco site.

This Interim Action Work Plan includes detailed task descriptions, budgets and schedules to complete Tasks 2 through 6 as shown below. The Work Plan describes subcontractor bid development and specifications, including materials sampling and analyses, data generation and reporting requirements to complete each task.

- Task 1. Write Interim Action Work Plan, develop schedules and budgets for the following tasks
- Task 2. Market Study
- Task 3. Immobilization Study
- Task 4. Interim Remedial Actions
    a. Cover waste pile with visqueen or plastic sheeting
    b. Grade site to eliminate standing water and direct drainage to storm sewer
        1. Re-route roof drains
        2. Drain standing water
    c. Replace fence
    d. Wash lot, clean storm drains, excavate old storm water holding pond
    e. Assess permitting requirements in terms of the classification of the site as a wetland.
- Task 5. Source Removal Bid Development
- Task 6. Project Management

Task 4 will begin immediately after approval of the Interim Action Work Plan and selection of subcontractors. Performance of the interim remedial actions will be coordinated with black dross sampling activities. Other tasks will follow as shown in the overall work plan schedule, Section 7.

Subtask 4b2 involves draining the standing water at the south end of the site. This item was not included in Ecology's Feb. 27 request. However, removal of the standing water on-site is necessary prior to grading the site. This item is not included in the budgets and schedules developed in this work plan and needs to be discussed prior to initiating work plan activities.

The task description, budget, personnel and schedule for each task are discussed under separate sections of this work plan, Sections 2 through 6. In addition, Section 7 presents the overall work plan budget and schedule. The Appendix I contains sampling protocols, Appendix II contains subcontractor bids, and Appendix III contains the Health and Safety Plan.

1.1 Background

The Maralco site is a 13 acre industrial property located at 7730 South 202 St, Kent, Washington. The Maralco Aluminum Company Inc. (Maralco) operated an aluminum recycling/refinery facility at the site from 1980 to 1986. The facility produced aluminum alloy ingots from aluminum cans and aluminum metal scrap. Waste products from the operation included black dross, furnace slag, and baghouse dust. During the first year of operation, these wastes were transported off-site to a landfill. After 1981, the

waste material was stored on-site.

In 1990, a Phase I Remedial Investigation (RI) was performed by MK (MK, February, 1991). In conjunction with the Phase I RI and as part of the Phase I Feasibility Study (FS), a pilot plant was operated by International Aluminum Inc. (IAI) to determine if the black dross could be remediated (MK, March 1991). As part of the Phase I RI/FS, MK oversaw the operation of the pilot plant.

The results from the Phase I RI and FS, combined with observations of on-site conditions, were used to guide the determination of what interim action tasks are necessary at the site.

SECTION 2
TASK 2 - MARKET STUDY

A market study will be performed to identify potential buyers and selling prices for the washed aluminum oxides which are produced by treating the black dross. The study will include sampling of the washed oxides, and may include collection and shipping of bulk samples (several tons) for the purposes of the potential buyers.

The market study will also include contacting and meeting with potential buyers, and determining a price/ton and shipping cost/ton for each potential buyer. A letter report summarizing the findings of the Market Study will be submitted to Ecology. If possible, letters of intent to buy the washed oxides will be obtained.

The study will also include the market potential and value of other by-products of treating the dross (silica and aluminum metal). The market study for these by-products will be limited to phone contacts and letters, as the silica sands are not available for testing, and the aluminum metal should be saleable to bulk aluminum metal processors.

2.1 Market Survey for Aluminum Oxide

The preliminary market study performed during the Phase I RI/FS concentrated on the cement industry. The study will be expanded to include not only additional potential cement industry buyers, but also other uses of aluminum oxide summarized in Section 7.2 of the Phase I Feasibility Study Report. Technical needs and specifications for utilizing the washed oxides produced at Maralco in other processes have yet to be evaluated.

MK will compile a list and contact aluminum oxide end use companies to inquire about their interest in purchasing aluminum oxide that could be produced from the Maralco site. A preliminary list is shown in Table 2.1. When requested by a potential client and after receiving approval from Ecology, MK will coordinate sampling and bulk testing of the Maralco aluminum oxide.

As part of the market survey, MK will research the U.S. Bureau of Mines and other government source reports to determine domestic/pacific northwest production and use, reserves, regional resources, recycling, import sources, events, and issues related to aluminum oxide. This information will be discussed as follows.

2.1.1 Domestic Production and Use

MK will identify the regional aluminum oxide production and use. Raw material and recycling operations will be identified by location, type, and annual production.

End use groups will be identified and broken down by market segment. At a minimum, MK will identify product and use in the following areas: cement manufacture, aluminum refining, offshore export, ceramic, glass and refractory brick. Potential contacts include:

Table 2.1
Preliminary List of End Use Companies

Cement Industry

Washington

ASH GROVE CEMENT WEST INC.
3801 E. Marginal Way S.
Seattle, WA
467-1400

IDEAL BASIC IND. CEMENT DIVISION
5400 W. Marginal Way SW
Seattle, WA 97202
937-8025

LAFARGE CORP.
578 Industry Dr.
Seattle, WA
575-1218

LONE STAR NORTHWEST
5975 E. Marginal Way S.
Seattle, WA
764-3000

TILBURY CEMENT CO.
5225 E. Marginal Way S.
Seattle, WA
763-2525

Oregon

CALAVERA CEMENT CO.
4035 SE 22nd
Portland, OR 97202
503-234-9364

SACRETE INC. OF PACIFIC NW
Foot of N. Van Houten
P.O. Box 83422
Portland, OR 97283-0422
503-285-0241

Aluminum Refining

Washington

INTALCO (raw material operations)
P.O. Box 937
Ferndale, WA 98248
734-9010

KAISER (reduction operations)
3400 Taylor Way
Tacoma, WA 98421

REYNOLDS (reduction operations)
P.O. Box 999
Longview, WA 98632
425-2800

ALCOA (Office only-handle area mat'l recyclers)
1333 Washington St.
Vancouver, WA 98660
694-7776

ALCOA (raw materials operation)
P.O. Box 221
Wenatchee, WA 98807
509-663-9278

KAISER ALUMINUM & CHEM. CO.
E. 2111 Hawthorne Rd.
Mead, WA 99021
509-466-3300

Aluminum Refining (continued)

Oregon

REYNOLDS (reduction operations)
5100 NE Sundial Rd
Troutdale, OR 97060
503-665-9171

NW ALUMINUM (Al manufacturer)
3313 W. 2nd St.
The Dalles, OR 97058
503-296-6118

Glass Manufacture

Washington

ALLITE TRU VIEW AUTOGLASS
17219 Aurora Ave N. #104
Seattle, WA
546-3711

ASPEN INDUSTRIES INC.
2625 Harbor SW
Seattle, WA
938-2778

HIGHLAND AUTOGLASS INC.
14101 Aurora N.
Seattle, WA
364-9800

HY-GRADE GLASS, INC.
1-800-824-5294

INSULATE INDUSTRIES INC.
7651 S 190th
Kent, WA
271-1010/872-5689

JENNINGS MFG. (insulated glass-flat glass distrib.)
930 N. 127th
Seattle, WA
367-5500

NATIONAL GLASS INDUSTRIES
17637 Wdnvl-Rdm Rd NE
Woodinville, WA
488-8126

SPECTRUM GLASS CO. INC.
24305 Wdnvl-Snohomish Rd
Woodinville, WA
483-6699

POLAR GLASS SYSTEMS
3635 Thorndyke W
Seattle, WA
622-0118/285-2631

WINDORCO
1201 NW 92nd
Seattle, WA
784-9440

NORTHWESTERN INDUSTRIES INC.
285-3140

Oregon

ACI GLASS PRODUCTS INC.
7555 SW Tech Cntr Dr.
Tigard, OR 97223
503-684-2583

Export and Ceramic contacts will be developed as part of the study.

2.1.2 Recycling

Other aluminum oxide recycling operations will be identified as part of the market study. MK will evaluate the economic viability of the sale of the black dross to the identified recyclers.

2.1.3 Import/Export

Import sources and export opportunities will be identified. A list of potential contacts will be compiled.

2.1.4 Aluminum Oxide Price Trends

MK will research government and private source data and determine current prices for aluminum oxide. Where ever possible, prices will also be determined from discussions with potential buyers. Buyers for aluminum oxides will be contacted and their product requirements determined. A price and shipping cost per ton will be estimated. The data will be presented in tabular form, with a discussion of the buyers most likely to utilize the washed oxides. Meeting buyers specifications for given products will become part of the technical bid specifications for the treatment plant.

Buyers for aluminum metal scavenged from the pile will also be contacted for prices and shipping estimates.

2.2 Washed Oxide Characterization Sampling and Analysis

Marketing of the aluminum oxide will require further characterization of the washed aluminum oxides. The objective of the sampling is to determine the following characteristics of the oxides: homogeneity, physical parameters (moisture content, average grain size, and standard deviation), and chemistry.

Of interest to the cement industry are alkaline metals, sodium oxide (Na_2O), and potassium oxide (K_2O). These two alkaline products present a problem to cement operations if the combination of K_2O and Na_2O exceeds 2% of the washed oxide product. The sodium and potassium oxides become particulate matter in the cement manufacture and are collected as emission particulates which are highly regulated. Sodium and potassium oxides must be removed to less than 2% prior to shipping the washed products. Other components to be determined are listed in Table 2.2. Sample collection techniques, quality control, and equipment decontamination are described in Appendix I.

The sampling approach has two objectives: 1) to determine the variability in oxide content and other parameters on a scale useful to potential buyers; 2) to determine if the oxides have been contaminated with salts or other materials along the edges or bases of the storage piles due to handling procedures.

To accomplish these objectives, a dual approach is proposed. Samples will be collected for compositing at random locations. The number of samples is proportional to the size of each storage pile. These samples will be collected with a hand auger or trowel to the total depth of the pile at each location. The various depths will be composited into one sample per location. To locate the sample locations, random x and y distances from a given starting point will be determined for each pile.

Discrete samples will be collected along the exposed edge of the shallow pile where contamination due to handling may have occurred. The discrete samples will be randomly located along each edge unless visual differences are noted. If an area appears unusual or contaminated, a sample will be collected. The

discrete samples will be analyzed for the same suite of parameters listed in Table 2-2.

Samples will be collected of the washed oxides utilizing a hand auger or a trowel as appropriate. A total of 3 discrete and 9 composite samples will be collected as listed below and analyzed for the parameters listed in Table 2.2. One composite sample consisting of material from each of the 9 composites will be analyzed for the target analyte list (TAL) inorganics. Washed oxides are presently stored in the Maralco refinery building in three separate areas (Figure 2-1):

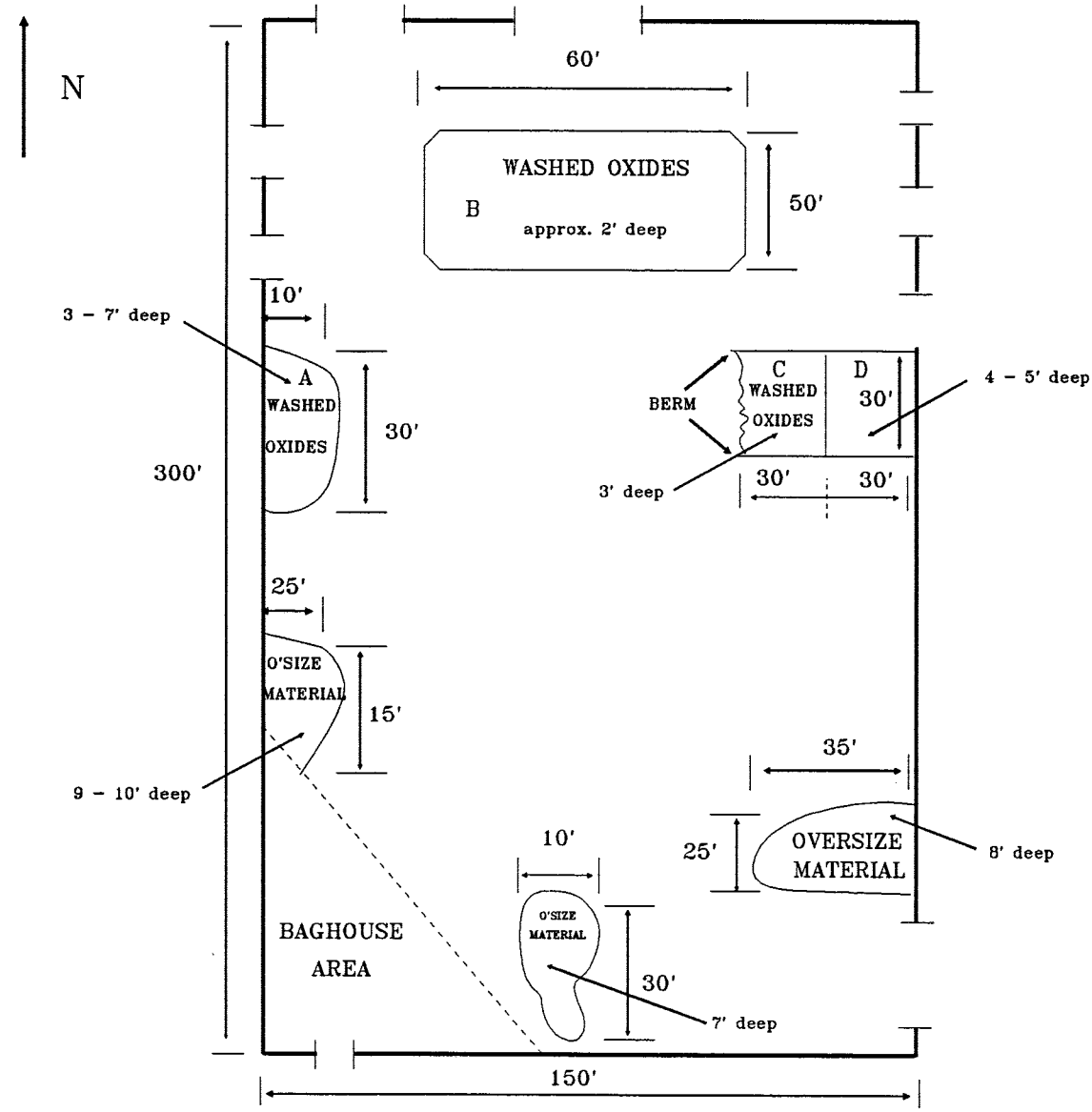
1) Washed oxides were stored for drying in a 30 ft by 60 ft area surrounded by blocks. This area is subdivided into two 30 ft by 30 ft areas. The west area is approximately 1/3 full, the east area is completely full to the 4 ft height of the blocks, with a ridge approximately 7 ft high along the northern edge. Three random vertically composited samples will be collected from the east portion of Area 1. Two random vertically composited samples will be collected from the west portion of this area.

2) Washed oxides covering an area approximately 50 ft by 60 ft have been spread out and tilled for drying in the north half of the building. This pile is approximately 8 inches high overall, with a ridge 2-3 ft high along the northern edge. Two random composite samples will be collected and composited from the drying pile.

3) An irregularly shaped area contained by blocks on the west wall contains washed oxides. This area is approximately 25 ft by 30 ft by 10 ft and varies in height from 3 to 7 feet. Two random vertically composited samples will be collected from this area.

Table 2.2
Analyses for Maralco Washed Oxides

OXIDE ANALYSES	METAL/INORGANIC ANALYSES	PHYSICAL PARAMETERS
SiO_2	Barium	Moisture Content
Al_2O_3	Cadmium	Grain Size
Fe_3O_3	Copper	Density (wet & dry)
CaO	Chromium	Loss on Ignition
MgO	Lead	
Na_2O	Manganese	
K_2O	Zinc	
SO_3	Salt Content	
TiO_2		
P_2O_5		



MK-ENVIRONMENTAL SERVICES Bellevue, WA		WASHED OXIDE PILES MARALCO SITE Kent, WA	
Job No: 3987	Scale: Not to scale		
Date: 4/29/91	Drafter: LMH	Figure 2-1	File Name:

2.2.1 Analytical Report

The analytical results will be statistically analyzed to determine the expected range of variability of the parameters listed in Table 2.2. All analytical data will be tabulated and be made available to potential buyers. The data will be appended to the market study report.

2.3 Bulk Sampling

Bulk sampling (sample size of several tons) may be required for some buyers to determine if the washed oxides are suitable for use on a specific process line. If bulk sampling is to be performed, a memo and cost estimate describing the bulk sampling will be issued prior to collecting and shipping the samples. The memo will include the identity of the buyer and shipper and will describe the tonnage to be sampled and methods of sample collection. Bulk samples will be collected by MK or their subcontractor for the purchaser. If the purchaser chooses to collect bulk samples at their own expense, an MK representative will be on site during all sampling activities. Collection of bulk samples will be considered a change in scope to the budget included in this work plan.

2.3.1 Analytical Report

Results of bulk sample analysis and success of bulk samples in buyer's product line will be summarized and described in the market study report.

2.4 Market Study Report

A letter report documenting marketing contacts, prices, and potential additional treatment will be submitted to Ecology upon completion of the study.

2.5 Cost Estimate/Schedule

MK's detailed cost estimate for this task is found in Table 2.3. The estimated total cost is $30,444. The Task 2 schedule is shown in Figure 7-1.

TABLE 2.3
Budget for Interim Actions
MARKET STUDY

MK LABOR COST	$22,738
DIRECT COSTS	$1,235
ANALYTICAL COSTS	$5,965
SUBTOTAL	$29,938
DPPP @ 1.69%	$506
TOTAL EST'D COST	$30,444

MK LABOR	PROJECT MANAGER	ENV'L ENGINEER	HYDRO GEOLOGIST	SECRETARY/ TECHNICIAN	DRAFTING	TOTAL HOURS
Oxide Sampling	2	0	16	16	6	40
I.D. Clients	4	24	0	0	0	28
Market Calls	60	120	0	16	0	196
Ecology Meeting	16	16	0	0	0	32
Report	16	60	4	24	8	112
Total Hours	98	220	20	56	14	408
Rate ($/hr)	$35.33	$17.16	$17.16	$10.75	$17.16	

Avg. Rate ($/hr)	$20.64
Raw Labor	$8,421.12
Overhead @ 1.4001	$11,790.41
Subtotal Labor	$20,211.53
Fee @ 30%	$2,526.34
MK Labor Total	$22,737.87

DIRECT COSTS

Sampling Costs	Field Supplies				$25
	Shipping				$100
	Vehicle	1	days @	$60.00	$60
	PPE				$30
Report & Marketing Contact Costs	Xerox	1000	pages @	$0.12	$120
	Phone				$300
	Shipping				$100
	Mileage	1000	miles @	$0.26	$260
	Per Diem	3	days @	$80	$240
				Subtotal	$1,235

mktstdy

ANALYTICAL COSTS*

Analytical Parameters	**Oxides**	16	sample @	$70	$1,120
	Metals	16	sample @	$113	$1,808
	Salinity	16	sample @	$45	$720
	LOI	16	sample @	$20	$320
	Moisture	16	sample @	$20	$320
	Particle Size	16	sample @	$30	$480
	Density	16	sample @	45	$720
	TAL	1	sample @	210	$210
	Eq Blank-Met	1	sample @	150	$150
				Subtotal	$5,848
				MK Fee @ 2%	$117
				Analytial Total	$5,965

***Laboratory estimates are found in Appendix II**

SECTION 3
TASK 3 - IMMOBILIZATION STUDY

3.1 Immobilization Report

Based upon our previous project experience, MK will review a variety of immobilization approaches and provide Ecology with an order of magnitude analysis (technical and cost considerations) on the advantages and disadvantages of immobilization as a remediation alternative. The results of MK's study will be issued as a letter report to Ecology for their review and consideration. Ecology will decide on the viability of in situ stabilization of the black dross.

3.2 Task 3 Cost Estimate/Schedule

The cost estimate for this task is found in Table 3.1, while the schedule is detailed in Figure 7-1. The estimated total cost is $3,228. The review and report will take approximately 32 hours to complete.

TABLE 3.1
Budget for Interim Actions
IMMOBILIZATION STUDY

MK LABOR	$3,139
DIRECT COSTS	$35
SUBTOTAL	$3,174
DPPP @ 1.69%	$54
TOTAL EST'D COST	$3,228

MK LABOR	PROJECT MANAGER	ENV'L ENGINEER	HYDRO GEOLOGIST	SECRETARY/ TECHNICIAN	DRAFTING	TOTAL HOURS
Review/Report	32	0	0	3	0	35
Total Hours	32	0	0	3	0	35
Rate ($/hr)	$35.33	$17.16	$17.16	$10.75	$17.16	

Avg. Rate ($/hr)	$33.22
Raw Labor	$1,162.70
Overhead @1.4001	$1,627.90
Subtotal Labor	$2,790.60
Fee @30%	$348.81
MK Labor Total	$3,139.41

DIRECT COSTS		$25
Contact and Report Costs	Phone	$10
	Xerox	
	Subtotal Direct Costs	$35

immob

SECTION 4
TASK 4 - INTERIM REMEDIAL ACTIONS

Specifications, contracts, and supervisory activities for the Task 4 interim actions are described in this section. This Work Plan includes a budget and schedule of interim actions based on specifications and subcontractors bids and time estimates. The proposed Interim Remedial Actions are as follows:

1) Fence the entire Maralco property, including the eastern portion of the site;

2) Wash down parking lot and clean out all storm drains. Excavate soil from the old storm water detention pond and store on-site in barrels for subsequent disposal.

3) Re-route roof drains from the Maralco building roof. Currently, the roof drains to the south end of the building, where the drainage contributes to standing water.

4) Remove standing water at the south of the site. This water is up to three feet deep, and overlies dross, acting as a potential source to groundwater. Draining this water is necessary prior to grading the site to eliminate low areas where water accumulates.

5) Grade the site to eliminate areas of standing water and direct drainage to the lined ditch on the site, or the sewer or storm sewer, as appropriate.

6) Place tarping material on the main dross pile and on the area south of and adjacent to the building to prevent rain from continuing dissolution of the salts to reduce contaminated discharge to groundwater and surface waters of the state.

Interim remedial actions will be overseen by MK engineers and geologists. A site inspection report will be submitted following completion of the work.

MK determined that it would be most effective to bid the fence replacement as a separate task and the excavating, grading and tarping as another task. The tasks are described in detail below.

4.1 Fence Replacement

Existing fencing around the plant portion of the site is being rented by the Maralco estate from Statewide Rental and consists of a six feet high rental chain link fence with barbed wire at the top. A segment of fence borders the parking lot to the north of the site, and another segment runs northeast along the black dross pile for a few hundred feet. A five to six feet high wood fence separates the south end of the site from the Colonial Cedar Mill (see Figure 4-1.)

The original interim action work plan called for repair of the existing fence and addition of new fence in all other areas surrounding the plant. The existing fence is rented, however, and was not intended to be permanent. Therefore, it will be removed by the rental company, and the entire property will be enclosed with new fencing by the selected contractor.

The fence will be seven feet high chain link with concertina wire (razor ribbon) placed on angled extensions. The chain link will be 11 gauge with structural (SS20) posts cemented into the ground. A 20 feet wide, double swinging gate will be installed at the entrance to the site, at the chlorine area and

MK-ENVIRONMENTAL SERVICES Bellevue, WA		AREA TO BE FENCED MARALCO SITE Kent, WA	
Job No: 3987	Scale: Not to scale		
Date: 6/05/91	Drafter: LMH	Figure No: 4-1	File Name: FIG4-1

HORTON DENNIS & ASSOC. INC.
320 SECOND AVENUE SOUTH
KIRKLAND, WASH. 98033-6687

MARALCO ALUMINUM SITE
1' CONTOURS

DEGROSS AERIAL MAPPING

near the northeast corner of the site. MK or Ecology will seek approval from the cedar mill to attach razor ribbon to the top of the wood fence.

Some clearing of trees, brush and debris will be necessary along portions of the new fence line. The contractor will be responsible for this work, as well as for moving the ecoblocks from the west side of the Maralco building and placing them in the building.

4.1.1 Schedule

The schedule for fence installation is shown in Figure 7-1. Mobilization will begin within 5 days of authorization to proceed. Removal of the existing fence and installation of the new fence can be completed within 11 days of authorization.

The rental fence can be removed in one day. The new fence installation is expected to require approximately 10 days to complete with a two-person crew, and will be coordinated with the removal of the rental fence. All work will comply with MK's Health and Safety Plan. Fence crews will be outside of the contaminant exclusion zone, and therefore, fence personnel are not required to have 40 hour hazardous waste training per 29 CFR 1910. MK will oversee fence installation and will conduct a final inspection upon completion. The oversight time will coincide with the installation time (about 10 days), and the inspection will require 4 man-hours.

4.1.2 Fencing Report

A letter report documenting the fencing activities and inspection results will be submitted to Ecology upon fence installation. A site map will be included indicating the location of the new fence.

4.1.3 Cost Estimate

The task was bid on a maximum, not-to-exceed basis with unit prices and labor rates included. The estimated total cost is $25,772, including Washington State Sales Tax (WSST). Four bids were solicited and are included as Appendix II. MK's detailed budget breakdown for this task is showing in Table 4.1.

TABLE 4.1
Budget for Interim Actions
FENCING

MK LABOR COST	**$4,112**
DIRECT COSTS	**$113**
SUBCONTRACT COST	**$26,288**
SUBTOTAL	**$30,513**
DPPP @ 1.69%	**$516**
TOTAL EST'D COST	**$31,029**

MK LABOR	PROJECT MANAGER	ENV'L ENGINEER	HYDRO GEOLOGIST	SECRETARY/ TECHNICIAN	DRAFTING	TOTAL HOURS
Supervision	2	60	0	0	6	68
Inspection	0	4	0	0	0	4
Report	2	4	0	4	4	14
Total Hours	4	68	0	4	10	86
Rate ($/hr)	$35.33	$17.16	$17.16	$10.75	$17.16	

Avg Rate ($/hr)	$17.71
Raw Labor	$1,523.06
Overhead @ 1.4001	$2,132.44
Subtotal Labor	$3,655.50
Fee @ 30%	$456.92
MK Labor Total	$4,112.41

DIRECT COSTS

Mileage	10 trips @	32	miles RT @	$0.26	$83
Field Supplies					$30
				Subtotal	$113

SUBCONTRACTOR COST

Fencing - 7' Chain Link w/Razor Ribbon	3010	feet @	$7.00	$21,070
Gates - Double Swinging	3	gates @	$350	$1,050
Razor Ribbon on Wood Fence	340	feet @	$2.35	$799
Move Ecoblocks into Building	1	Fee @	$400	$400
Clear Fenceline of Brush/Debris	1	Fee @	$500	$500
			Subtotal*	$25,772
			MK Fee @ 2%	$515
			Subcontract Total	$26,288

*Includes WSST @ 8.2%

fencing

4.2 Excavation, Grading and Tarping

This task will be performed by a single contractor in three phases, or subtasks, which are described in the following discussion.

4.2.1 Excavation of the Stormwater Collection Pond

The stormwater collection pond, located northwest of the site just west of the parking area, collects runoff from the parking lot. However, Stage I sampling during the Phase I RI indicated black dross contamination in the pond sediments.

The parking lot will be washed down with water and the washwater directed to the two storm drains in the lot. Water will be supplied by the on-site City of Kent hydrants. The alum mud storage area at the northwest corner of the parking lot contains small amounts of dried alum mud. This material will be removed and placed in lined, 55-gallon drums, and the area will be washed down. The ecoblocks will not be moved during the washing process. The metal and wood debris on the east side of the lot will be placed in a corner of the lot by the contractor; no disposal is anticipated at this time.

Sediments will then be removed from the drains and placed in labeled, lined 55-gallon drums. Excess water will be decanted from the sediments and placed in separate, labeled, lined, 55-gallon drums.

The collection pond sediments will be excavated from an area approximately 40' x 20' x 2' (1,600 ft^3). A track mounted excavator will be used to excavate the sediments, which will be placed in labeled, lined, 55-gallon drums. Excess water will be drummed separately. MK personnel will inspect the excavation to verify removal of visual contamination. The excavation will not be backfilled.

The contractor will stage all drums containing sediments and water on pallets within the ecoblock walls of the alum mud storage area for subsequent disposal. The contractor is not responsible for disposal.

The contractor will set up a high-pressure wash station to decontaminate all equipment, and a glove and boot wash area for personnel decontamination. All decontamination water will be drummed and staged with the other drums for subsequent disposal.

4.2.1.1 Schedule

The schedule for pond excavation is shown in Figure 7-1. Mobilization can begin within five days of authorization to proceed. The work is estimated to take two days to complete with a five-person crew, and can be performed at the same time as the black dross sampling (see Section 7). All workers are required to have their 40 hour hazardous waste training.

MK supervision will be concurrent with the excavation (approximately two days). The final inspection is estimated to take four hours to complete.

4.2.1.2 Excavation Report

A brief letter report documenting the excavation procedures, extent of the excavation and the inspection results will be submitted to Ecology upon completion of the task. A photo documentation of the excavation activities will also be included.

4.2.1.3 Cost Estimate

This task was bid on a unit price basis, with labor and equipment rates included. Three bids were solicited; only two were submitted and these are found as Appendix II. The estimated total cost is $23,867. MK's detailed budget breakdown for this task is found in Table 4.2.

TABLE 4.2
Budget for Interim Actions
POND EXCAVATION

MK LABOR COST	**$2,073**
DIRECT COSTS	**$47**
SUBCONTRACT COST	**$24,344**
SUBTOTAL	**$26,464**
DPPP @ 1.69%	**$447**
TOTAL EST'D COST	**$26,911**

MK LABOR	PROJECT MANAGER	ENV'L ENGINEER	HYDRO GEOLOGIST	SECRETARY/ TECHNICIAN	DRAFTING	TOTAL HOURS
Supervision	3	24	0	0	0	27
Inspection	0	4	0	2	0	6
Report	1	4	0	2	2	9
Total Hours	4	32	0	4	2	42
Rate ($/hr)	$35.33	$17.16	$17.16	$10.75	$17.16	

Avg. Rate ($/hr)	$18.28
Raw Labor	$768
Overhead @ 1.4001	$1,075
Subtotal	$1,842.70
Fee @ 30%	$230.33
MK Labor Total	$2,073.03

DIRECT COSTS					
Mileage	2 trips @	32	miles RT @	$0.26	$17
PPE		3	Days @	$10	$30
				Subtotal	$47
SUBCONTRACTOR					
Excavation*		188	barrels @	$48.18	$9,058
Mob/Demob**		1	lump sum @	$13,000	$13,000
				Subtotal***	$23,867
				MK Fee @ 2%	$477
				Subcontract Total	$24,344

*Unit price includes labor & equipment rates as follows:

Laborer	$36.00 per hour
Operator	$39.00 per hour
Supervisor	$40.00 per hour
JD450 Dozer	$60.00 per hour less operator
120 Kamatsu	$62.00 per hour less operator

**Mob/Demob is one price for excavating, grading and tarping activities
***Includes WSST @ 8.2%

pond

4.2.2 Re-routing of the Roof Drains

Currently, runoff from the old refinery building roof drains to the area south of the building, contributing to the standing water in this area. This runoff must be re-routed prior to commencement of grading activities (see Section 4.2.4).

The condition of the existing roof drains will be assessed prior to rerouting runoff. Unsuitable drain pipe will be replaced, and all drain lines from the roof will be plumbed into PVC piping and routed to the north, sloping downward along the walls of the building. Runoff will be directed to the parking lot at the north end of the building.

4.2.2.1 Schedule

The schedule for modification of the roof drain is shown in Figure 7-1. The work is estimated to take three days to complete with a five-person crew and should be completed prior to commencement of grading activities at the south end of the building.

MK will oversee the roofing activities, and the final inspection is estimated to take four hours to complete.

4.2.2.2 Roof Drain Report

A brief report documenting the roof drain activities and the inspection results will be submitted to Ecology upon completion of the task. A drawing of the new roof drainage will also be included.

4.2.2.3 Cost Estimate

This task was bid on a maximum not-to-exceed basis with unit prices and labor rates included. The estimated total cost is $11,686, including WSST. The two bids submitted are found as Appendix II. MK's detailed budget breakdown for this task is found in Table 4.3.

TABLE 4.3
Budget for Interim Actions
ROOF DRAINAGE MODIFICATION

MK LABOR COST	$1,312
DIRECT COSTS	$55
SUBCONTRACT COST	$11,919
SUBTOTAL	$13,286
DPPP @ 1.69%	$225
TOTAL EST'D COST	$13,511

MK LABOR	PROJECT MANAGER	ENV'L ENGINEER	HYDRO GEOLOGIST	SECRETARY/ TECHNICIAN	DRAFTER	TOTAL HOURS
Supervision	0	16	0	0	0	16
Inspection	0	4	0	0	0	4
Report	1	3	0	2	2	8
Total Hours	1	23	0	2	2	28
Rate ($/hr)	$35.33	$17.16	$17.16	$10.75	$17.16	

Avg. Rate ($/hr)	$17.35
Raw Labor	$485.80
Overhead @ 1.4001	$680.17
Subtotal	$1,165.97
Fee @ 30%	$145.74
MK Labor Total	$1,311.71

DIRECT COSTS

Mileage	3 trips @	32	miles RT @	$0.26	$25
PPE		3	days @	$10.00	$30
				Subtotal	$55

SUBCONTRACTOR COST

Roof Drain*		45000	sq ft @	$0.24	$10,800
				Subtotal**	$11,686
				MK Fee @ 2%	$234
				Subcontract Total	$11,919

*Unit price includes labor and equipment rates as follows:

Laborer	$36.00 per hour
Operator	$39.00 per hour
Supervisor	$40.00 per hour
JD450 Dozer	$60.00 per hour less operator
120 Kamatsu	$62.00 per hour less operator

**Includes WSST @ 8.2%

roof

4.2.3 Drainage of Standing Water

Runoff from the plant area collects at the south end of the refinery building and is as deep as three feet in some areas. Discussions with contractors indicate that this water must be removed prior to commencement of grading activities. Because the water is ponded within the contaminant exclusion zone on top of the black dross material, it is considered a dangerous waste and must be disposed of accordingly. The volume of water is prohibitive to its storage in drums or in the on-site vertical tanks. Therefore, MK proposes to discharge the water to the Metro sewer system, with Metro's approval. Discharge may be allowed under the waste discharge permit held by International Aluminum Inc. for the pilot plant operation discharges. The feasibility of this option should be discussed with Metro as soon as possible. Removal of standing water was not included in the list of interim action tasks.

4.2.4 Grading of the Plant Area

As discussed above, runoff from the plant area collects at the south end of the refinery building at depths that exceed evaporation rates. It is likely that the hydraulic head of this water is contributing to the transport of contaminants through the soil, possibly into the groundwater. Therefore, the area will be graded, after standing water is removed, to direct runoff to the southeast into the Christopher Ditch. The areas to be graded are shown in Figure 4-2.

4.2.4.1 Schedule

The grading schedule is shown in Figure 7-1. This task is estimated to take one day to complete with a five-person crew. As the contractor will already be mobilized on-site, work can begin immediately following removal of all standing water from the area to be graded. Again, 40 hour hazardous waste training is required for all on-site personnel.

MK will oversee the grading work, and the final inspection is estimated to take two hours to complete.

4.2.4.2 Grading Report

A brief report documenting grading activities and inspection results will be submitted to Ecology upon completion of the task.

4.2.4.3 Cost Estimate

This task was bid on a unit price basis, with labor and equipment rates included. The estimated total cost is $2,164, including WSST. The bids for this task are found in Appendix II. Table 4.4 outlines MK's budget breakdown for this task.

4.2.5 Tarping

The black dross pile must be covered to prevent further dissolution of salts into the surrounding soils and ground and surface water. There are approximately 130,000 ft^2 of black dross to be tarped. Prior to commencing this work, the site will be graded (see Section 4.2.4), and Ecology will define the boundaries of the dross material so that the appropriate amount of cover material can be ordered by the contractor.

Precipitation, sunlight and wind will affect the cover material, and because remediation of the dross could take up to two years, the life of the cover material must be comparable. The contractor is responsible for selection of the appropriate tarp.

Because areas of the dross pile are rough and uneven, some grading or smoothing of the pile will be necessary in order to prevent water from ponding on the tarp. This work may be performed manually or by a grader or backhoe. The tarp will then be laid over the pile in sections and secured to prevent it from blowing off or shifting and exposing the black dross. Tires will be used to secure the tarp.

Additionally, approximately 17,000 ft^2 of area south of and adjacent to the refinery building will be tarped to prevent dross-contaminated runoff. The channel which will connect the graded area to the ditch will also be lined with the same tarp material selected to cover the dross pile.

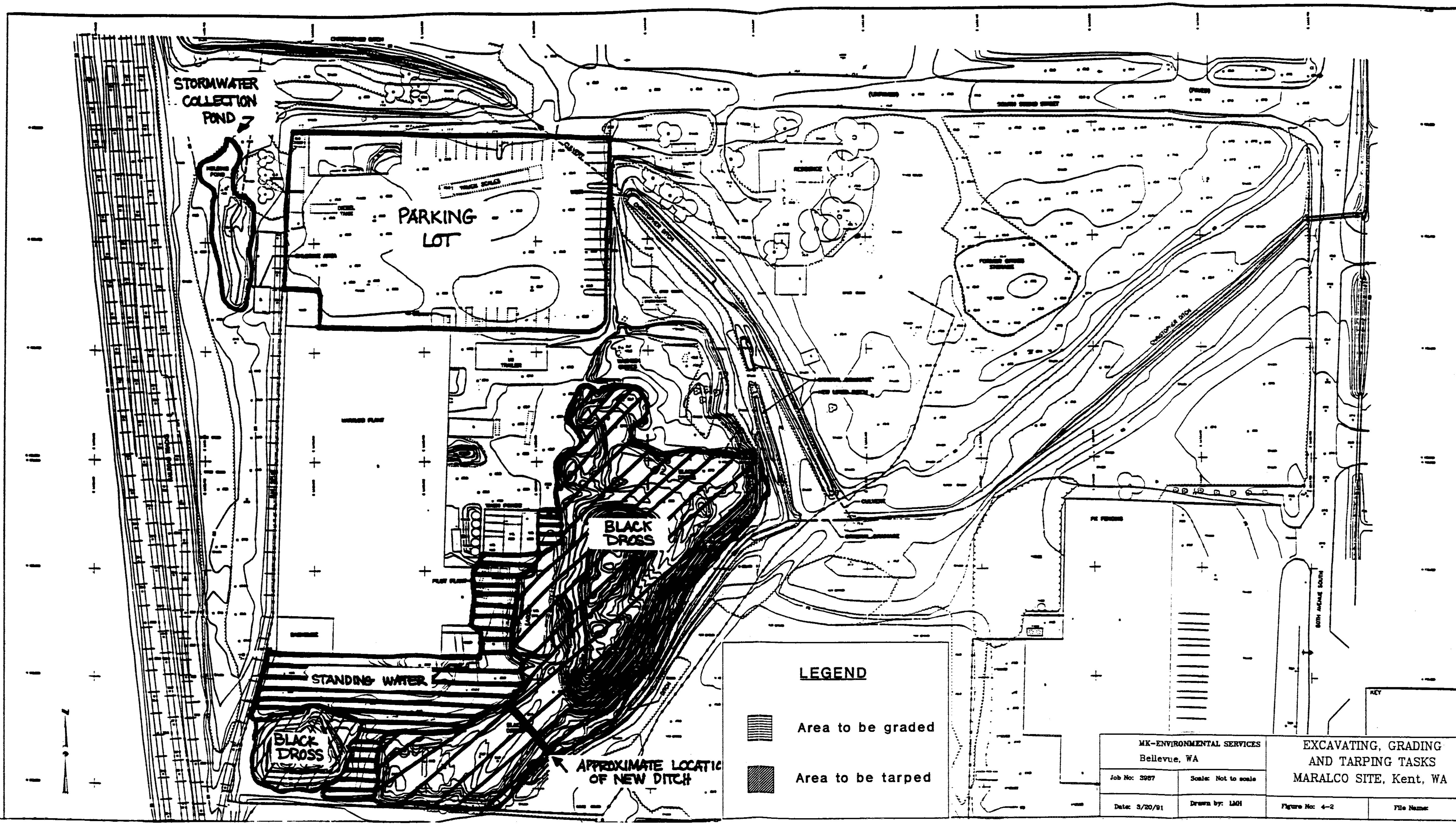

STORMWATER COLLECTION POND
PARKING LOT
BLACK DROSS
STANDING WATER
BLACK DROSS
APPROXIMATE LOCATIC OF NEW DITCH
LEGEND
Area to be graded
Area to be tarped
MK-ENVIRONMENTAL SERVICES
Bellevue, WA
Job No: 3987
Scale: Not to scale
Date: 3/20/91
Drawn by: LMH
EXCAVATING, GRADING AND TARPING TASKS
MARALCO SITE, Kent, WA
Figure No: 4-2
File Name:

TABLE 4.4
Budget for Interim Actions
GRADING

MK LABOR COST	$1,508
DIRECT COSTS	$47
SUBCONTRACT COST	$2,207
SUBTOTAL	$3,762
DPPP @ 1.69%	$64
TOTAL EST'D COST	$3,826

MK LABOR	PROJECT MANAGER	ENV'L ENGINEER	HYDRO GEOLOGIST	SECRETARY/ TECHNICIAN	DRAFTING	TOTAL HOURS
Supervision	3	12	0	0	0	15
Inspection	1	2	0	0	0	3
Report	1	3	0	2	4	10
Total Hours	5	17	0	2	4	28
Rate ($/hr)	$35.33	$17.16	$17.16	$10.75	$17.16	

Avg. Rate ($/hr)	$19.95
Raw Labor	$558.60
Overhead @ 1.4001	$782.10
Subtotal	$1,340.70
Fee @ 30%	$167.58
MK Labor Total	$1,508.28

DIRECT COSTS

Mileage	2 trips @	32	miles RT @	$0.26	$17
PPE		2	days @	$10.00	$20
				Subtotal	$47

SUBCONTRACTOR COST

Grading*		1	lump sum @	$2,000.00	$2,000
				Subtotal**	$2,164
				MK Fee @ 2%	$43
				Subcontract Total	$2,207

*Price includes labor and equipment rates as follows:

Laborer	$36.00 per hour
Operator	$39.00 per hour
Supervisor	$40.00 per hour
JD450 Dozer	$60.00 per hour less operator
120 Kamatsu	$62.00 per hour less operator

**Includes WSST @ 8.2%

4.2.5.1 Schedule

The tarping schedule is shown in Figure 7-1. No mobilization time is required, as the contractor will already be mobilized on-site. Tarping can begin as soon as the grading (Section 4.2.4) is complete. This task is estimated to take fourteen days to complete using a five-person crew. MK will oversee the tarping activities, and a final inspection will take one day to complete.

4.2.5.2 Tarping Report

A brief report documenting tarping activities and inspection results will be submitted to Ecology upon completion of the task.

4.2.5.3 Cost Estimate

This task was bid on a unit price basis, including equipment and labor rates. The estimated total cost is $65,212. The bids received are found in Appendix II, and MK's detailed budget breakdown is found in Table 4.5.

TABLE 4.5
Budget for Interim Actions
TARPING

MK LABOR COST	$5,929
DIRECT COSTS	$238
SUBCONTRACT COST	$66,516
SUBTOTAL	$72,684
DPPP @ 1.69%	$1,228
TOTAL EST'D COST	$73,912

MK LABOR	PROJECT MANAGER	ENV'L ENGINEER	HYDRO GEOLOGIST	SECRETARY/ TECHNICIAN	DRAFTER	TOTAL HOURS
Supervision	10	88	0	0	0	98
Inspection	1	8	0	0	0	9
Report	1	4	0	2	2	9
Total Hours	12	100	0	2	2	116
Rate ($/hr)	$35.33	$17.16	$17.16	$10.75	$17.16	

Avg. Rate ($/hr)	$18.93
Raw Labor	$2,195.88
Overhead @ 1.4001	$3,074.45
Subtotal	$5,270.33
Fee @ 30%	$658.76
MK Labor Total	$5,929.10

DIRECT COSTS

Mileage	13 trips @	32	miles RT @	$0.26	$108
PPE		13	days @	$10.00	$130
				Subtotal	$238

SUBCONTRACTOR COST

Tarping*		147000	sq ft @	$0.41	$60,270
				Subtotal**	$65,212
				MK Fee @ 2%	$1,304
				Subcontract Total	$66,516

*Unit price includes labor and equipment rates as follows:

Laborer	$36.00 per hour
Operator	$39.00 per hour
Supervisor	$40.00 per hour
JD450 Dozer	$60.00 per hour less operator
120 Kamatsu	$62.00 per hour less operator

**Includes WSST @ 8.2%

tarping

SECTION 5

SECTION 5
TASK 5 - SOURCE REMOVAL BID DEVELOPMENT

MK will prepare a technical bid specification for removal of the main black dross pile at the site by washing the salt from the dross. Development of the bid specifications will include site plans and drawings, specifications of the work to be performed, and additional information resulting from sampling and characterization of the black dross.

5.1 Engineering Plan

MK will assemble the necessary site plans, drawings, and pilot plant information to allow a contractor to develop a final process design/construct proposal for processing the black dross. Preparation of the plan will be scheduled to follow the market study and will only be prepared once the markets have been proven. This plan will include:

- All related project data and criteria that is available on the Maralco project including the E&E report, the Phase 1 Remedial Investigation Report, selected information from the Phase 1 Feasibility Study Report, and analytical results generated from this work plan.

- Flow diagrams showing the basic concepts of material handling, unit processes, products, and weight distributions based on pilot plant results.

- Site areas and utility availability process, specifications, etc. which establish the process plant battery limits and operating parameters.

The Engineering design will involve process technology/environmental engineering, civil, and electrical disciplines and result in the following information:

Block Flow diagrams and flowsheets
Material Balances based on pilot plant experience
Areas available for plant siting
Electrical Specifications, capacity
Water availability, specification
Sewer location, battery limit
Permit listing, process objectives

5.2 Technical Bid Specification

MK will develop a technical bid specification based on the information developed during the conceptual engineering plan and for the processing of the black dross using a washing technology as demonstrated in the pilot plant program.

Preparation of the bid specification will be scheduled to follow the market study and will only be developed once the markets have been proven.

The bid specification will be developed specifically to allow the bidders to use their equipment and standards to the maximum extent possible to perform the work providing it meets WDOE requirements and all local, state and federal regulations for safety and permits.

The bid package will contain, but is not limited to the following major items:

1. Brief description and history of the Maralco site and present status.

2. Pilot plant process for treating black dross, product and results. Typical block diagram/flow sheet.

3. Available black dross resource, tonnage, analyses, physical properties, etc. Sample availability for testing, shipping procedure, liability, etc.

4. Treatment specifications and permit limits. Project schedule.

5. Washed dross (alumina) specifications, customer identification, shipping/receiving information.

6. Health and safety rules/specifications. Personnel protective clothing/equipment. Emergency/evacuation plans/requirements.

7. Plant site areas, limits (W x D), topographic information.

8. Location and identification of utilities including service specifications and battery limits.

9. Contract conditions, penalties, premiums (if any) payment schedule. Project monitoring program.

10. Mobilization and demobilization requirements, procedures.

11. Specific WDOE requirements and personnel contacts.

5.3 Dross Characterization Sampling

The objective of additional characterization sampling of the dross pile is to determine variations in metals and salt content for the use of engineers performing preliminary design of the dross treatment system. Variations in the salt content of the dross with depth may have an affect on treatment processing times, volumes of water used, and costs. Chemical variability within the dross pile at depths below a few feet has not been evaluated. Thick salt crusts have been observed within the black dross pile in areas freshly exposed by backhoe cuts. Salts leached from the top of the pile by percolating rainwater may have concentrated at depth. Sampling to the base of the pile is necessary to determine the variations in salt content, metals concentrations, and physical parameters with depth. Samples will be collected utilizing drilling techniques and analyzed for indicator parameters listed in Table 5.1.

Table 5.1
Analyses for Maralco Black Dross

INORGANIC ANALYSES	PHYSICAL PARAMETERS
Aluminum	Moisture Content
Barium	Grain Size
Cadmium	Dry Weight
Calcium	
Copper	
Chromium	
Lead	
Magnesium	
Manganese	
Potassium	
Sodium	
Zinc	
Ammonia	
Chloride	
Cyanide	
Salt Content	

Four vertically composited samples will be collected from the "washed oxide lagoon". These samples will be collected with a hand auger to the depth of the "lagoon", about 10 - 15 ft. Two vertical borings will be drilled on the main black dross pile. Borehole depths will range from 35 to 55 feet. Samples will be collected continuously in each boring for purposes of visual observation and logging. Split spoon (1.5 foot) samples for laboratory analysis will be collected at 5 ft intervals beginning at 5 feet below the surface of the pile to the base of the black dross encountered in each borehole. The basal sample from each boring will be analyzed. The field geologist logging the borehole will also collect samples of discrete layers or intervals that appear to be different from the majority of the dross (such as salt layers or areas of unusual appearance). The geologist will estimate the portion of the different material encountered as a percent of the total boring depth.

Four angle borings will be drilled; two within the dross pile and two within the "bag house pile". Three to four samples will be collected from the angle holes, including one at the base of each borehole. Samples for laboratory analysis will be composited over the length of the sample barrel. Figure 5-1 shows proposed boring locations.

Rejects from all the dross borings will be collected and mixed into a single composite sample of approximately 3,000 lbs. (approximately 5-55 drums). These samples will be reserved for those bidders who request samples for bench scale work to verify their processes and/or to check the physical and chemical properties of the material.

Quality control samples will be collected at the rate of one duplicate per 20 analyses (5%). One equipment rinsate blank per day will also be collected for analysis. Sample collection protocols and decontamination procedures are described in Appendix I.

Statistical analyses will be performed on the resulting data to determine the distribution of indicator parameters within the pile.

5.3.1 Schedule

Work on the conceptual design will begin within three weeks of authorization to proceed. However, finalization of the design will depend on the dross analytical results.

The black dross sampling will begin within five days of authorization to proceed. Sampling is estimated to require four field days. Analyses will be performed on a regular laboratory turn around time of approximately three weeks. The interaction of dross sampling with other interim actions is discussed in Section 7.

5.3.2 Report

MK will submit to Ecology a technical bid specification document suitable for inclusion in Ecology's Public Works Bid Request.

5.3.3 Cost Estimate

The budget breakdown for the task is shown in Table 5.2. Estimated project cost is $61,753.

CHRISTOPHER DITCH

(UNPAVED)

SOUTH 203RD STREET

(PAVED)

HOLDING POND

TRUCK SCALES

DIESEL TANK

CHLORINE AREA

CULVERT

WEIR

CHRISTOPHER DITCH

RESIDENCE

FORMER DROSS STORAGE

CHRISTOPHER DITCH

HB-IA-1

HB-IA-2

HB-IA-4

HB-IA-3

WASHED DROSS

IAI TRAILER

ORIGINAL DRAINAGE

NEW LINER DITCH

MARALCO PLANT

BLACK DROSS

B-IA-3

WASH PONDS

CULVERT

ORIGINAL DRAINAGE

PK FENCING

PILOT PLANT

B-IA-2

B-IA-1

LAGOON

BAGHOUSE

B-IA-4

DITCH 1

B-IA-6

B-IA-5

BLACK DROSS

80TH AVENUE SOUTH

N

KEY

HB-IA-1 HAND BORING LOCATION

B-IA-1 BORING LOCATION

B-IA-5 ANGLE BORING LOCATION

CEDAR MILL

MICRO OPTICAL LABORATORIES

DATUM:
HORIZONTAL - CITY OF RENT SECTION BREAKDOWN
VERTICAL - N.G.V.D. FROM U.S.C.& G.S. BM C-407 RESET

SITE B.M.: ELEV. 28.84
CHISELED SQUARE IN N.W. CORNER OF CONCRETE TRANSFORMER PAD. NEAR N.E. CORNER OF LARGE BUILDING.

MK - ENVIRONMENTAL

FIGURE 5-1
BORING LOCATIONS
BLACK DROSS PILE

HORTON DENNIS & ASSOC. INC.
320 SECOND AVENUE SOUTH
KIRKLAND, WASH. 98033-6987

MARALCO ALUMINUM SITE

1" CONTAINS

DEGROSS AERIAL MAPPING

TABLE 5.2
Budget for Interim Actions
TECHNICAL BID DEVELOPMENT
BLACK DROSS REMOVAL

MK LABOR COST	$36,927
DIRECT COSTS	$2,775
ANALYTICAL COSTS	$14,280
SUBCONTRACT COST	$6,745
SUBTOTAL	$60,727
DPPP @ 1.69%	$1,026
TOTAL EST'D COST	$61,753

MK LABOR	DROSS SAMPLING	BID DOCUMENT DEVELOPMENT	MEETINGS	TOTAL HOURS
Project Manager	2	36	24	62
Met/Process Engineer	8	80	16	104
Civil Engineer	0	32	0	32
Electrical Engineer	0	32	0	32
Specification Writers	0	40	0	40
Drafting/CADD	10	40	0	50
Environmental Engineer	6	24	24	54
Environmental Specialist	40	0	0	40
Field Technician	40	0	0	40
Office Support	0	72	0	72
Total Hours	106	356	64	526

Avg. Rate ($/hr)	$26.00
Raw Labor	$13,676.00
Overhead @ 1.4001	$19,147.77
Subtotal	$32,823.77
Fee @ 30%	$4,102.80
MK Labor Total	$36,926.57

DIRECT COSTS

Travel/per diem (includes 3 meetings)	7	days		$2,100
Vehicle	7	days @	$60	$420
PPE	4	days @	$20	$80
Field Supplies	3	days @	$25	$75
Shipping	1	cost @	$100	$100
			Subtotal	$2,775

biddoc

ANALYTICAL*

Parameters	Metals	40	Samples @	$125	$5,000
	Oxides	40	Samples @	$70	$2,800
	Cyanide	40	Samples @	$40	$1,600
	Ammonia	40	Samples @	$40	$1,600
	Salt Content	40	Samples @	$45	$1,800
	Grain Size	40	Samples @	$30	$1,200
				Subtotal	$14,000
				MK Fee @ 2%	$280
				Analytical Total	$14,280

DRILLING SUBCONTRACTOR*

Rig Time		32	Hours @	$145	$4,640
Level C Surcharge (10% of rig rate)		16	Hours @	$14.50	$232
Steam Cleaner		3	Days @	$100	$300
Drums (soil cuttings and decon water)		12	Drums @	$45	$540
Mobilization	Fixed fee	1	Charge @	$400	$400
				Subtotal**	$6,613
				MK Fee @ 2%	$132
				Subcontract Total	$6,745

*Estimates are found in Appendix II
**Includes WSST @ 8.2%

SECTION 6
TASK 6 - PROJECT MANAGEMENT

The project manager has responsibility for coordinating the tasks described above. This includes tracking the project schedule and budget, reviewing subcontractor bids and proposals, preparing monthly reports, developing and reviewing invoices, and conducting telephone conferences and meetings.

The project managerial budget is shown in Table 6.1. Project management for all preceding tasks has been separated into the Project Management Task. The budget includes four meetings with Ecology. Additional meetings will require a change in scope.

TABLE 6.1
Budget for Interim Actions
PROJECT MANAGEMENT

MK LABOR COST	$24,515
DIRECT COSTS	$610
SUBTOTAL	$25,125
DPPP @ 1.69%	$425
TOTAL EST'D COST	$25,549

MK LABOR	PROJECT MANAGER	ENV'L ENGINEER	HYDRO GEOLOGIST	SECRETARY/ TECHNICIAN	DRAFTING	TOTAL HOURS
Market Study	20	40	0	8	0	68
Immobilization Study	1	0	0	0	0	1
Interim Actions	16	80	0	8	0	104
Bid Development	24	60	0	8	0	92
Meetings	32	16	16	24	0	88
Total Hours	93	196	16	48	0	353
Rate ($/hr)	35.33	17.16	17.16	10.75	17.16	

Avg. Rate ($/hr)	$25.72
Raw Labor	$9,079.16
Overhead @ 1.4001	$12,711.73
Subtotal	$21,790.89
Fee @ 30%	$2,723.75
MK Labor Total	$24,514.64

DIRECT COSTS

5 trips to Olympia	Mileage	1000	miles @	$0.26	$260
	Phone				$100
	Xerox				$100
	Shipping				$100
	Computer				$50
				Subtotal	$610

projmgt

SECTION 7
SCHEDULE/COST ESTIMATE

The work plan schedule for all interim tasks is shown in Figure 7-1. The total cost of tasks 2 through 6 is shown in Table 7.1.

The market study and technical bid development schedules will depend in part on laboratory turn around times. A standard turn-around time of three weeks on all analytical data will be requested. The separate deliverables are noted on the schedule. Each deliverable will be due to Ecology 45 days from completion of the action or receipt of laboratory data, whichever is appropriate.

Tasks involving subcontractors and field activities, such as the fencing and site security, grading, tarping, clean up, and drilling will be dependent on the time it takes to procure the contracts and on contractor schedules. The fencing and security of the site will be the first activity performed.

Bid specifications and conceptual engineering will begin only after the market study has demonstrated the viability of selling the product.

	MONTH	1				2				3			
	WEEK	1	2	3	4	5	6	7	8	9	10	11	12
TASK 2 – MARKET STUDY													
Preliminary Market Survey													
Buyer Contacts													
Washed Oxide Sampling													
Washed Oxide Analysis													
Report													
TASK 3 – IMMOBILIZATION STUDY/REPORT													
TASK 4 – INTERIM REMEDIAL ACTIONS													
MK Supervision													
Fencing													
Installation													
Final Inspection													
Report													
Grading													
Grading													
Final Inspection													
Report													
Pond													
Pond Excavation													
Final Inspection													
Report													
Roof Drainage													
Rerouting													
Final Inspection													
Report													
Tarping													
Tarp Installation													
Final Inspection													
Report													
TASK 5 – SOURCE REMOVAL BID DEVELOPMENT													
Black Dross Sampling													
Black Dross Analysis													
Bid Document Development													
Preliminary Draft													
Final Version													
Bid Specification													
TASK 6 – PROJECT MANAGEMENT													

MK-ENVIRONMENTAL SERVICES Bellevue, WA		INTERIM ACTION PROJECT SCHEDULE Kent, WA	
Job No: 3987	Scale: Not to scale		
Date: 6/05/91	Drafter: LMH	Figure No: 7-1	File Name: FIG7-1

Table 7.1
Total Cost Estimate

Task Number	Total Cost
2	$ 30,444
3	$ 3,228
4.1	$ 31,029
4.2	$ 26,911
4.3	$ 13,511
4.4	$ 3,826
4.5	$ 73,912
5	$ 61,753
6	$ 25,549
	$270,163

SECTION 8
REFERENCES

MK-Environmental Phase I Remedial Investigation Report, Maralco Site, February 1991

MK-Environmental Phase I Feasibility Report, Maralco Site, March 1991

APPENDIX I
FIELD SAMPLING PROTOCOLS

APPENDIX I

FIELD SAMPLING PROTOCOLS

1.0 WASHED OXIDE SAMPLING

Washed oxide samples will be collected for compositing at random locations. The number of samples is proportional to the size of each storage pile. These samples will be collected with a hand auger or trowel to the total depth of the pile at each location. The various depths will be composited into one sample per location. Discrete samples will be collected along the exposed edge of the shallow pile where contamination due to handling may have occurred. The discrete samples will be randomly located along each edge unless visual differences are noted. If an area appears unusual or contaminated, a sample will be collected.

1.1 Selection of Random Sample Locations

Sample locations will be selected utilizing a random number generator or random number tables. Two random numbers will be generated for each vertically composited sample. The first will correspond to the "x" distance (east-west); the second will correspond to the "y" distance (north-south). The "x" and "y" coordinates for the sample locations are calculated by multiplying the random numbers obtained by the east-west and north-south dimensions of the pile being sampled. These distances generated are measured from set starting points in the northeast corner of each washed oxide pile as shown in Figure 1. Tape off the distances and stake the sample location. For discrete samples, only one random "x" or "y" distances will be selected along one side.

1.2 Sample Labeling and Numbering

All containers for each sample will be labeled with the same sample number, time and date of sample collection, sampler's name, and list the analyses requested on each label. The sample number will identify which pile the sample was from, and numbers will be sequential for each pile. For example, Pile A, samples 1, 2, and 3 would be A-1, A-2, and A-3. Duplicate samples will be labeled with numbers starting with 100 (e.g., A-103 would be the duplicate of sample A-3).

1.3 Sampling Utilizing a Hand Auger

Decontaminate the auger prior to collecting the first sample.

Auger to the base of the pile, collecting material continuously from all depths into a container large enough to hold the material. Log the material in 6 inch intervals as augering progresses.

When total depth has been reached, thoroughly mix materials using a stainless steel spoon or trowel. Fill the number of containers required by the laboratory for the analyses listed in Table 1. When collecting field duplicates, alternately place material from the composite into the regular sample containers and the containers for the duplicate sample until all containers are filled.

Table 1
Analyses for Maralco Washed Oxides

OXIDE ANALYSES	METAL/INORGANIC ANALYSES PHYSICAL PARAMETERS
SiO_2	Barium
	Moisture Content
Al_2O_3	Cadmium
	Grain Size
Fe_3O_3	Copper
	Density (wet & dry)
CaO	Chromium
	Loss on Ignition
MgO	Lead
Na_2O	Manganese
K_2O	Zinc
SO_3	Salt Content
TiO_2	
P_2O_5	

One cup of material from each sample location will be composited into the TAL sample. Place one cup of the homogenized material into a separate container (pre-cleaned bowl or bucket) for the TAL composite. Keep the container covered and continue to collect one cup from each sample until all samples have been collected.

Decontaminate the auger between each sample location.

1.4 Trowel Sampling

The shallow oxide pile will be sampled utilizing a stainless steel hand trowel. Decontaminate the trowel prior to collecting the first sample. Collect samples to the total depth of the pile. Collect samples into a pre-cleaned container until enough volume is obtained for all sample containers plus one cup for the TAL composite. Composite the sample and fill required containers as described above. Retain one cup of sample in the TAL composite container.

Decontaminate the trowel between sample locations.

1.5 TAL Composite

Following collection of all oxide samples, homogenize the TAL composite and fill necessary containers for the complete target analyte list of inorganics.

2.0 DROSS SAMPLING

The objective of additional characterization sampling of the dross is to determine variations in metals and salt content for the use of engineers performing preliminary design of the dross treatment system. Variations in the salt content of the dross with depth may have an affect on treatment processing times,

volumes of water used, and costs. Chemical variability within the dross pile at depths below a few feet have not been evaluated. Thick salt crusts have been observed within the black dross pile in areas freshly exposed by backhoe cuts. Salts leached from the top of the pile by percolating rainwater may have concentrated at depth. Sampling to the base of the pile is necessary to determine the variations in salt content, metals concentrations, and physical parameters with depth. Samples will be collected utilizing drilling techniques and analyzed for indicator parameters listed in Table 2.

Table 2
Analyses for Maralco Black Dross

INORGANIC ANALYSES	PHYSICAL PARAMETERS
Aluminum	Moisture Content
Barium	Grain Size
Cadmium	
Calcium	
Copper	
Chromium	
Lead	
Magnesium	
Manganese	
Potassium	
Sodium	
Zinc	
Ammonia	
Chloride	
Cyanide	
Salt Content	

Dross samples will be collected using both standard hollow stem auger drilling techniques and a hand held auger. Hollow stem auger borings will be installed vertically at two locations on top of the black dross pile and at a 45° angle at four locations on the pile slopes (Figure 2). The two western most angle-boreholes in the black dross pile are located in what may be waste disposed from the facility baghouse. When power drilling equipment is used, samples may be collected using a split spoon, or modified California sampler. The step-by-step procedures for collecting dross samples are described in the following paragraphs.

2.1 Dross Sample Collection

Four vertically composited samples will be collected from the "washed oxide lagoon". These samples will be collected with a hand auger to the depth of the "lagoon", about 10 - 15 ft. Two vertical borings will be drilled on the main black dross pile. Borehole depths will range from 35 to 55 feet. Samples will be collected continuously in each boring for purposes of visual observation and logging. Split spoon (1.5 foot) samples for laboratory analysis will be collected at 5 ft intervals beginning at 5 feet below the surface of the pile to the base of the black dross encountered in each borehole. The basal sample from each boring will be analyzed. The field geologist logging the borehole will also collect samples of

discrete layers or intervals that appear to be different from the majority of the dross (such as salt layers or areas of unusual appearance). The geologist will estimate the portion of the different material encountered as a percent of the total boring depth.

Dross samples for laboratory analyses will be collected at 5 feet below the pile surface and at 5 foot intervals to the base of the black dross pile or as determined in the field based on visual observations. Dross samples from different holes will not be composited for analysis. Borehole locations are shown in Figure 2.

Prior to sampling, all sampling equipment will be decontaminated as described in Section 3.

All sample containers will be supplied pre-cleaned from the analytical laboratory. Fill sample containers to the top, with no head space and seal the container immediately.

- Collect samples at 5 foot intervals. Samples at varying intervals may be collected as determined by the field geologist or geological engineer. Sample collection includes describing and homogenizing material and placing samples in labeled containers.

- Duplicate (split) samples are required for Quality Control. To split the sample, place the entire sample in a stainless steel bowl and mix with a stainless steel spoon until visually homogenized. Fill two jars from the material in the bowl, alternately placing material first in one jar then the other jar.

- Collect one equipment blank of distilled water per day per piece of sampling equipment, following decontamination of the equipment.

3.0 DECONTAMINATION

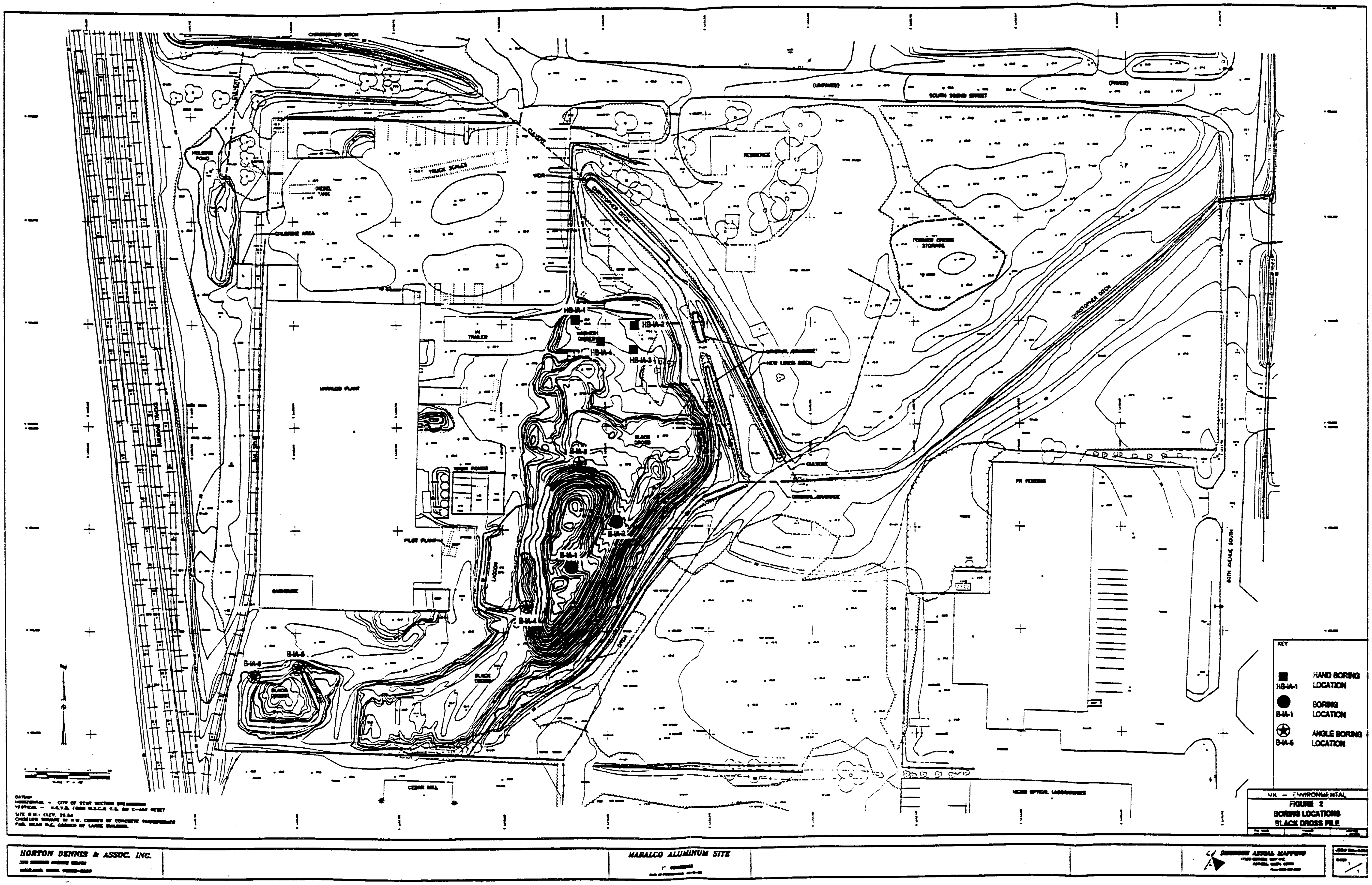
The following decontamination procedures will be followed for collection of oxide and dross samples.

1. Decontaminate all equipment that contacts the samples prior to collecting the first sample and between sampling locations. For oxide samples, decontaminate between separate locations. For dross samples, decontaminate the split spoons between sample depths within the same hole. Decontaminate the auger flights between borings.

2. Decontamination of hand augers and other hand tools will generally be performed utilizing an "alconox" and potable water wash, followed by a double rinse with distilled water. Split spoons will be decontaminated with alconox and water between downhole samples and cleaned with high pressure hot water between borings. Augers will be cleaned with high pressure hot water between borings.

3. Clean plastic tarp or garbage bags will be spread out for a work area during sample collection. Cleaned sampling equipment will be placed on the plastic, not on the ground.

4. Clean latex or PVC gloves will be worn by the sampling personnel and will be changed between each sample depth. If additional protection is needed for health and safety, the protective gloves will be worn beneath the disposable latex or PVC gloves.


CHRISTOPHER DITCH
TRUCK SCALES
DIESEL TANK
CHLORINE AREA
HOLDING POND
WEIR
CULVERT
RESIDENCE
FORMER DROSS STORAGE
TRAILER
MARALCO PLANT
WASH PONDS
PILOT PLANT
BAGHOUSE
LAGOON
BLACK DROSS
ORIGINAL DRAINAGE
NEW LINED DITCH
PK FENCING
80TH AVENUE SOUTH
HB-IA-1
HB-IA-2
HB-IA-3
HB-IA-4
B-IA-1
B-IA-2
B-IA-3
B-IA-4
B-IA-5
B-IA-6
KEY
HB-IA-1 HAND BORING LOCATION
B-IA-1 BORING LOCATION
B-IA-5 ANGLE BORING LOCATION
MK – ENVIRONMENTAL
FIGURE 2
BORING LOCATIONS
BLACK DROSS PILE
DATUM:
SITE B.M.: ELEV. 26.84
HORTON DENNIS & ASSOC. INC.
MARALCO ALUMINUM SITE

5. One equipment blank per day of sampling will be collected. Collect the sample from the freshly decontaminated sampling tool by pouring distilled water over the tool and collecting the water into the proper sample containers.

6. All decontamination water will be placed in drums for future disposal.

4.0 SAMPLE DOCUMENTATION AND FIELD RECORDS

Information associated with sampling will be recorded in a field log book. This log book serves as a record of field activities associated with sample collection and handling. The field log book will contain all additional information and observations not included on either the standardized forms or the chain-of-custody document. This information will describe factors or conditions which might affect sampling procedures (e.g., prevailing weather). All routine measurements and observations will be recorded in the field log book and on prepared forms including borehole logs, samples collected, material descriptions, and pertinent colors or odors.

- Sample collector's name(s)
- Date and time of sample collection
- Weather conditions, estimated air temperature
- Method of sample collection (including name of drilling company and driller's name if appropriate)
- Physical sample characteristics and boring logs
- Sample identification (boring number and depth)
- Number and types of containers and sample identification number (includes preservatives used if any)
- Analyses requested
- Field observations during sampling
- Description of decontamination procedures
- Descriptions of deviations from standard procedures

5.0 SAMPLE HANDLING, TRACKING, AND CHAIN-OF-CUSTODY PROCEDURES

5.1 Sample Preservation and Shipping

Each sample container will be labeled with indelible ink. The following information will be included on the label:

- Sample identification number, including depth interval
- Date and time and sample collection
- Sample collector's name
- Analyses requested
- Preservative used

All sample numbers for each dross core sample will include the boring number and the depth of the sample.

All containers will be supplied pre-cleaned from the analytical laboratory. No preservatives are required in the containers for the suite of analytes listed in Table 2.

5.2 Shipment

Samples transported off-site will be packaged for shipment in compliance with current Department of Transportation (DOT) and commercial carrier regulations. Before the ice chests leave the facility, they will be packed with ice and sealed by the personnel who performed the sampling. Once sealed, the ice chests will be delivered to the laboratory either by field personnel or by same-day or overnight carrier. The completed chain-of-custody records, laboratory analysis request forms (if needed), and any other shipping or sample documentation accompanying the shipment will be enclosed in a waterproof plastic bag and taped to the underside of the cooler lid. The laboratory receiving the samples will be notified when and where the samples are arriving.

5.3 Chain-of-Custody Procedures

A Chain-of-Custody form must accompany all samples that are shipped or delivered to laboratories for analysis, or whenever the samples leave the custody of the person collecting the samples. The following chain-of-custody procedures apply to all samples.

1. Remove all samples from the field coolers, and sort into sample types.

2. Check the labels on all samples for completeness. If incomplete, fill in necessary information, referencing the field logbook.

3. Wipe the jars. Check to be sure that the lids are on securely.

4. Fill out the Chain-of-Custody (as described below) as the samples are placed into the shipping cooler.

5. Pack the jars carefully. Wrap each jar in bubble wrap or the styrofoam bag supplied by the laboratory. Leave enough room for blue ice (or ice) (if required) on the top layer. Pack the interstices with vermiculite or polystyrene popcorn.

6. In the top layer, include at least two blocks of frozen blue ice or two quart-size zip-lock bags of wet ice. Double seal the wet ice, if used.

7. At the time of shipping, double check to insure the Chain-of-Custody is enclosed, the air bill vendor name and number is on the chain-of-custody, and tape the cooler securely.

8. Double check that the shipping form clearly shows the destination address and indicates who the samples are going to. Insure samples for the amount specified in the sampling SOP, or for $1,000 if no specifications were made.

9. If delivering the samples to the laboratory, have the laboratory receiving personnel sign the chain-of-custody. Retain a signed copy for the operating record.

5.3.1 Chain-of-Custody Instructions

Described below are step-by-step procedures for completing chain-of-custody forms. Please refer to the example for clarification.

1. Fill out client name and project number, including task number.

2. All sample collector's names should be in the Sampler(s) Signature box, including person filling out Chain-of-Custody record. The person completing the Chain-of-Custody record should circle his/her name.

3. For each sample, record the sample ID, date and time the sample was collected, whether it is a composite or discrete sample, and how many containers contain that sample. In the Sample Type column, note the sample matrix (water, soil, etc).

4. The series of columns following Sample Type is for Requested Analyses. Fill in the requested analytical parameters and put an "x" in the box for each sample to be analyzed for this parameter.

5. There is room for comments. For example, if the samples contain preservatives, or any special instructions are necessary, this should be noted under "comments" for that/those sample(s).

6. When a cooler has been filled, complete the area above the Comments column. Note the page number (eg., 1 of 1, 1 of 2, 2 of 2), and the cooler number. If any page has lines remaining, cross them out in such a way that nothing else can be added to that page.

7. Under Shipping Notes, fill in the shipper (e.g., Federal Express or UPS), and the air bill number. Also note on the first page the total number of containers in the cooler.

8. When the form has been completed, sign and note the date and time under "Relinquished By". This section is to be signed immediately prior to delivery of samples to the shipper or to the laboratory. Double seal the white copy of the Chain-of-Custody form(s) inside two zip-lock type bags and tape them inside of the cooler lid.

9. Keep the pink and yellow copies in the project file.

10. Deliver samples to shipper or directly to laboratory.

6.0 QUALITY ASSURANCE/QUALITY CONTROL

The sampling program was designed for the collection and analysis of washed oxides and black dross from the Maralco site for the purpose of supplying technical data to potential buyers of washed oxides and for design of a remediation system. Quality Assurance and Quality Control (QA/QC) will be established through field performance and fixed laboratory analytical procedures.

Field personnel will adhere to the following QA/QC procedures:

1. Follow established sampling procedures.
2. Decontaminate all equipment as outlines.
3. Collect field duplicate samples. Duplicate samples will be collected at a frequency of one per total number of analytical samples per matrix or 10 percent, whichever is greater, and submitted for analysis.
4. Collect equipment blanks. One distilled water equipment blank per day per piece of sampling equipment used will be collected and submitted for analysis.

Fixed laboratory analyses will be completed by a CLP Laboratory. Analyses will follow methods as established in EPA Test Methods for Evaluating Solid Waste, SW-846. Analyses not referenced in SW-846 will follow standard laboratory quality control including equipment calibration, laboratory duplicates, analytical standards, and if required for inorganic analyses, method of standard additions.

All laboratory reports will be reviewed by MK personnel to assure that maximum holding times are not exceeded, and that laboratory duplicates, standards, and sample recoveries are within expected method limits.

APPENDIX II
BID DOCUMENTS

FENCING CONTRACTOR BIDS

Bergsma Fence Co. 226 0376 INVOICE

14810 SE Jones RD.
Renton, Wa. 98058

NO. 1507
DATE 5-16-91
YOUR ORDER NO.
OUR ORDER NO.

SOLD TO:
Lynn Higgins MK-Environmental
1300 114th Ave SE Suite 112
Bellevue Wa. 98004

SHIP TO:
453-1110

F.O.B.	TERMS	DATE SHIPPED	SHIPPED VIA	SALESMAN

	ORDERED	SHIPPED	DESCRIPTION	PRICE	PER	AMOUNT
1	7' 11GA Fabric		Jobsite			
2	1 7/8" SS 20 line Posts		7730 So 202nd St.			
3	2 7/8" Structual Terminal & Gate Posts		Kent, Wa.			
4						
5	@ 7.00 Per Ft.		Approx 3,010' of 7' Chain-link			
6			with Razor Ribbon on Top	21,070.	00	
7						
8	@ 350.00 per		3- 20' D.D. Gates	1050.	00	
9						
10			Clearing Fence lines	500	00	
11			Move Ecoblocks	400	00	
12						
13	@ 2.35 per Ft.		ADD Razor Ribbon to Ex.			
14			Wood Fence at Colonial Cedar Mill	800	00	
15						
16			(Price based on MK's Estimated Footage.) Total Price	@ 23,820.	00	
17				1155	6.2%	
18	Job Completion time		2 person Crew	Not paid in Full		
19			@ 40.00 per Hour			
20	2 WEEKS					

BAILEY

"A Straight Deal On Fences — A Swingin' Deal On Gates"

27701 68th Avenue South
Kent, Washington 98032

Kent (206) 854-5100 • Puyallup (206) 845-2115
Fax (206) 854-5101

_____

_____ DATE: 5/24/91

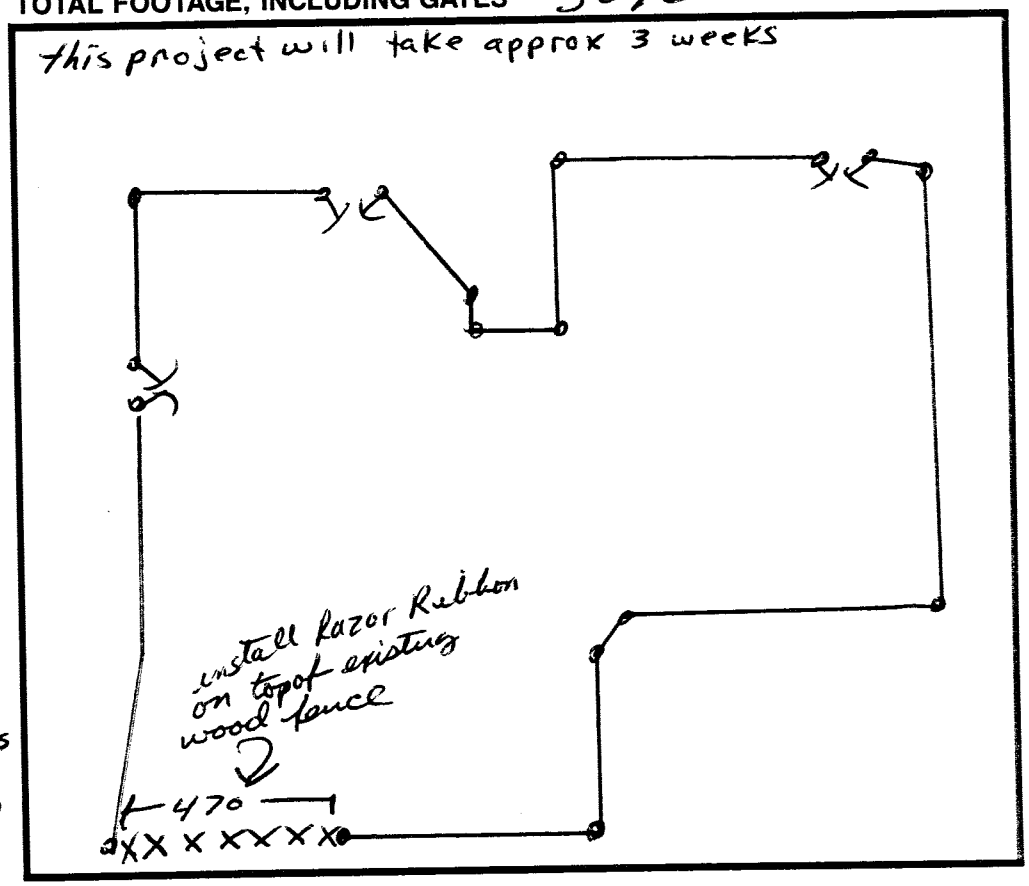
E Suite 112 PHONE: 453-1110 / Fax 646-5434

98004 LOC. #: _____ DATE _____ TIME _____

Higgins

y ıbor and material in accordance with the plans and specifications below and subject to

TOTAL FOOTAGE, INCLUDING GATES 3070



ngs
Footings
blocks
10.00
11.00
41.00

TERMS AND CONDITIONS

ainder on completion of project. In the event that the purchaser shall fail to pay when due. any amount owed rees to pay a delinquency charge of one and one half percent (1½%) per month, on the unpaid balance of this placed in the hands of an attorney for collection, or if suit shall be brought to collect any unpaid balance due asonable attorney's fee and costs.

T..d to Bailey Security, Inc. before any work will start.

e customer's repsonsibility to locate, clear, and mark the fence lines. Customer agrees that **Bailey Security, Inc.,** t be held liable for any damage to any underground installation not specifically located and marked by customer. ti thereto.

made necessary by customer will be subject to an additional charge billed at the current rate.

stallation to be free from defects in material and workmanship in normal use and service for five years from date of *y in lieu of all other warranties, express or implied, including the waranties of merchantability and fitness.*

rty days. It is submitted in duplicate, and the return to us of one copy signed by the customer will constitute a

ion to any other rights that the seller may have, and without prejudice to the same, that seller may claim a lien on the erial and supplies are to be installed, for said materials and supplies, and that purchaser waives notice of same.

wood products, only the installation thereof.

g ırantee all amounts due pertaining to this agreement *(name only)* _____

Accepted:
Customer

_____ By _____

ALPINE FENCE CO.

CONTRACTOR# AL- PI - NF - 301JF
11235 16TH S.W., SEATTLE, WASH. 98146
248-1310 • 246-6312

Lynn

① On State Sales Tax we add 8.2% on total amount of Contract.

② Our hourly Rate for (1) Crew (2 men + Truck) 65.00 Hr

③ Cost per Ft $10.60 Ft + GATES + Corner posts

④ I will need 3 weeks (120 Hours) To Complete Job

⑤ On the footage of job we will measure on post set on at end of job. Changes can be made if Approved By both parties.

⑥ Equipment Rates at 35.00 per hour.

Thanks
Sam Brewer

ALPINE FENCE CO.

CONTRACTOR# AL-PI-NF-301JF

11235 16TH S.W., SEATTLE. WASH. 98146

248-1310

CONTRACT

Contract # 3987

STE 112

NAME MK ENVIRONMENTAL SERVICES ADDRESS 1300 114AVE SE

CITY BELLEVUE, WA 98004 PHONE 453-1110 JOB AT KENT, WA
MARLACO SITE

ALPINE FENCE CO. agrees to perfom to the following specifications:

MATL. ONLY ☐ POST SET ☐ COMPLETE INSTALLATION ☒

OVERALL LENGTH	OVERALL HEIGHT
3010 toc-	7FT+
WALK GATE	DRIVE GATE
	(3) 20FT D/D

CHAIN LINK

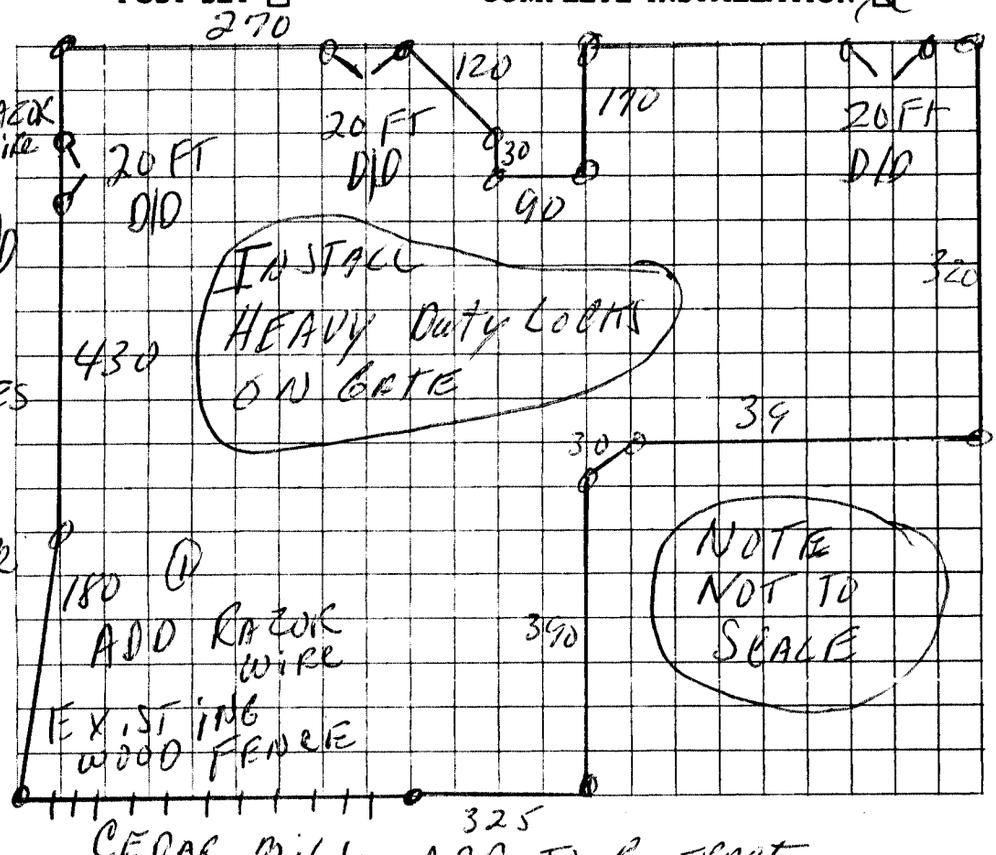
WIRE GAUGE	DIAMETER Terminal Post
11GA	2 3/8
DIAMETER LINE POST	DIAMETER TOP RAIL
2" ST	TENISON WIRE
DIAMETER GATE FRAME	LINE POST SPACE
1 5/8	NOT MORE 10 FT
KNUCKLE UP	BARB UP
	YES

WOOD

TYPE OF WOOD	STYLE OF FENCE
SIZE OF POST	SIZE OF RAIL

RAZOR WIRE

GATES 3"



CEDAR MILL ADD TO CONTRACT.

EXTRA INSTRUCTIONS

① INSTALL RAZOR WIRE 340 WOOD FENCE @ 350FT @ 1190 OC

② CLEARING BRUSH/DEBRIS — $400.00

③ MOVING THE ECOBLOCKS — 200.00

④ FOOTAGE MAY VARY ACTUAL FOOTAGE WILL BE DETERMINED AT END OF JOB

ALL POSTS WILL BE SET IN CONCRETE. ALL WOOD POSTS WILL BE TREATED. ALL GALVANIZED NAILS, HINGES AND LATCHES WILL BE USED IN CONSTRUCTION OF WOOD FENCE.

Grade and boundary stakes shall be set at the direction of the purchaser. ALPINE FENCE COMPANY shall not be liable to purchaser for error in placement or location of the grade or boundary. Purchaser hereby agrees to save and hold ALPINE FENCE COMPANY, its owner, agents and employees, harmless from any and all liability or obligation including costs, expenses or attorney's fees in the event there is an error in the determination of the grade or boundary.

This contract is not subject to cancellation by either party. This contract shall be binding upon acceptance by the owner of ALPINE FENCE COMPANY or upon the commencement of work pursuant to this contract. ALPINE FENCE COMPANY makes no covenants, promises or warranties, written or oral, express or implied, except as set forth herein. In the event of any suit or action by ALPINE FENCE COMPANY to recover any balance due under this contract, the purchaser agrees to pay a reasonable sum for attorney's fees. Venue of any action is to be in King County. Interest at the rate of 1% per month charged on all past-due accounts.

TERMS PAYMENT 1/2 Down on POST SET
Balance on Completion of job

SELLING PRICE 34.806.00

S.S.T. 2854.09

TOTAL 37,660.09

ALPINE FENCE CO. D.B.A. Connie J Rafferty (owner) ACCEPTED BY

Sam Brewer

5/17/91 DATE

DATE

ALL CITY FENCE CO.

2345 RAINIER AVENUE SOUTH • SEATTLE, WASH. 98144 • (206) 324-3747
FAX # (206) 324-1508
BONDED AND INSURED CONTRACTORS LIC # ALLCIFC123C4

PROPOSAL

MK - Environmental Services
c/o Llynn M. Higgins
1300 114th Ave. SE Suite 112
Bellevue Wa. 98004

PHONE
HOME
BUSINESS 453-1110
FAX 646-5434

JOB ADDRESS IF DIFFERENT
@ Marlaco Site, Kent Wa.

We propose to install on your property the fencing materials as indicated below, such installation is subject to terms and conditions as outlined on the reverse side hereof:

Chain Link Specifications

Fence Height	7'+1 Strand Barb Wire
Fabric Selvage	(BK) w/razor ribbon
Size and Gauge of Wire	2" 11 Gauge
Lineal Foot Amount	3025'
Line Post Size	1 7/8"
Line Post Type	.116 Wall (Galv.)
Line Post Depth	24" cement
Top Rail Size	7 Ga. tension wire
Top Rail Type	Steel wire (Galv.)
End, Corner Post Size	2 3/8"
End, Corner Post Type	.116 Wall (Galv.)
Terminal Post Depth	24" Cement
Gate Post Size	(6) 4"
Gate Post Type	Full wt. posts Schedule 40
Gate Design and Size	(3) 20'x7'+1 Strand Double Gates with Razor Ribbon
Gate Frame Size	1 7/8" .116 wall
Barbed Wire	Yes (1) strand @ top
Tension Wire	as to stay
Braces	Yes @ ends & corners
Slats	None
Other	Razor Ribbon @ top of fence and gates.

Cedar Fence Specifications

Fence Height	
Fence Style	
Material Grade	
Lineal Foot	
Post Size	
Post Type	
Post Spacing	
Post Depth	
Rail Size	
Rail Type	
Board Size	
Board Spaced	
Boards Faced	
Fence Contour	
Gates	
Other	

SELLING PRICE:	$ 43,500.00
STATE SALES TAX:	3,567.00
TOTAL:	$ 47,067.00

TERMS: Net 30 Days

SPECIALS: * Also 340' of razor ribbon @ wood fence separating mill
* Labor rates are based on 2 man crews with truck & equipment @ $ 75.00 per hour.
* " " " " " 3 man " " " " @ $105.00 per hour.
* " " " " " 4 man " " " " @ $150.00 per hour.
* Fencing mat'ls based on lineal footage through gates @ $ 7.67 per ft.
* Clear fence line (no haul away) also relocating ecology blocks $ 1,400.00 for job.
* Other line clearing of brush based @ $ 100.00 p/hr with back HOE

ALL CITY FENCE COMPANY: Ron Scott 5/20/91
Representative DATE

PURCHASER: BY:
Please sign front and date back side of orginal copy DATE

GRADING AND TARPING CONTRACTOR BIDS

WILDER

WILDER CONSTRUCTION COMPANY

May 24, 1991

Lynn M. Higgins
ENVIRONMENTAL/HAZARDOUS WASTE DIVISION
MK-ENVIRONMENTAL SERVICES
1300 114th Avenue S.E., Suite 112
Bellevue, WA 98004

Dear Lynn;

Wilder Construction Company (WCC) is pleased to offer the following revised quotes for grading, tarpping, excavation and roof drainage work to be completed at the Maralco facility. Based on our review of the scope of work for W.O. #3987 and our tour of the work site, our proposals are as follows:

UNIT PRICE BASIS:

		Quantity	Unit	$/Unit	Total
1.	Mobilization	1	LS	$13,000.00	$13,000.00
2.	Black Dross	130,000	SF	0.41	53,300.00
3.	Grading	1	LS	2000.00	2,000.00
4.	Soils Excavation (and lot cleaning)	188	BBL	48.18	9,057.84
5.	South Area Cover	17,000	SF	0.41	6,970.00
6.	Roof Drain Modification	45,000	SF	0.24	10,800.00
				Sub Total.....	$ 95,127.84
	Washington State Sales Tax			8.1%	7,705.36
				Total.....	**$102,833.20**

CORPORATE HEADQUARTERS AND
WESTERN DIVISION OFFICES:
2006 N. STATE STREET
BELLINGHAM, WA 98225-4292
(206) 733-2060
FAX (206) 733-7115

ALASKA DIVISION OFFICES:
11301 LANG STREET
ANCHORAGE, AK 99515-3006
(907) 344-2593
FAX (907) 344-1562

SNOHOMISH COUNTY BRANCH:
3315-15TH STREET
EVERETT, WA 98201-1900
(206) 339-8340
FAX (206) 259-1976

Labor Rates:

Labor	$36.00/hour
Operator	$39.00/hour
Superintendent	$40.00/hour

Note: Labor rates include -- 40 Hrs Health & Safety Training
Physical Examinations & Clothing

Equipment Rates*:

JD 450 Dozer	$60.00/hour less operator
120 Kamatsu	$62.00/hour less operator

*Rented on a daily basis only.

Our total bid is based on our projection of a four (4) week project duration. This duration results from a conservative estimate for proper tarp application to ensure a minimum two year service life.

The additional work requested in the revision of WO #3987 required the addition of one crew week which also increased our mobilization costs.

TIME AND MATERIAL BASIS:

WCC offers the following schedule should MK Environmental Services prefer the work be performed on a Time & Material basis:

Mobilization	$13,000.00/Lump Sum
Crew day	1,300.00/day

Note: Crew day = 1 superintendent
1 operator
3 laborers

Material	At cost
Equipment	Above Rates
Overhead & Profit	10% of total contract

Our new material estimate for this project is $41,334.00. This price includes 200 barrels with liners, 149,000 Sq.Ft of liner and netting, sandbags, rope, 1000 FT Class 200 PVC piping, fittings and hangers. The material estimate for this project has increased due to the unavailability of the netting previously quoted for this project.

Please feel free to contact us should you need clarification to this proposal. We hope we may be of service to MK Environmental Services on this important project.

Very truly yours,

WILDER CONSTRUCTION COMPANY

Jerry A. Thayer
Project Engineer

JAT/km

ITEM ANALYSIS

MOBILIZATION This item covers expenses for jobsite facilities, insurance and supervision. For the time and materials contract option supervision is included in the crew day cost.

GRADING Minimal site grading for surface drainage to the lined ditch is anticipated. Our estimate for this item is one crew day using the JD 450 dozer.

COVER PLACEMENT Wilder Construction Company proposes placement of Griffolyn TX-1200 for the stockpile cover. This material possesses semi-long term stability and toughness to meet the two year minimum life requirement for the cover. The cover will be placed in 40' x 100' panels. The panels will be placed in an order that creates a shingling effect for proper drainage. The liner material will be covered with gill net for attaching the sandbags and to provide stability in the wind. Assuring a two year life of the cover will require some shaping of the large black dross pile to eliminate vertical surfaces. The liner will better resist wind damage when it is at least partially supported by underlying dross so that flapping and hanging weight are avoided. One crew day for shaping with the JD 450 Dozer is anticipated. We have successfully used these materials and placement techniques in similar applications on recent projects.

We have allowed for 132,000 square feet of liner and net, and one sandbag per each ten square feet of cover. The use of tires was considered but the availability of sandbags and ease in handling and disposal make sandbags much more practical. The projection for the placement of all cover components to completion is 12 crew days.

EXCAVATION The size and location of the anticipated excavation would be most efficiently done with a small track mounted excavator. Two crew days are anticipated for the excavation and placement of the excavated material in lined drums.

PARKING LOT WASH/WASTE WATER HANDLING At the conclusion of the excavation, we propose the installation of a temporary sump below the parking lot catch basin discharge. Water collected in this sump could be pumped directly into drums.

SOUTH AREA GROUND COVER This are will be shaped as required, tarpped, netted and sandbagged in the same manner at the black dross pile quoted in item two. We anticipate that this activity will require 2 crew days to complete.

BUILDING DRAINAGE MODIFICATION The existing roof drains will be plumbed into Class 200 6" dia. PVC piping and routed to the north end sloping downward along the walls of the existing structure. We calculate that a rainfall of .1 Ft/Hr will result in a water velocity of less than 1.5 Ft/Sec in the 4 PVC Drain pipes. Our quote includes any necessary pipe, fittings, flashing and hangers. Three crew days are planned for this activity.

Alternate to drums:
The placement of a rented temporary storage tank, with secondary containment, for waste water handling. One 6,500 gallon tank should have adequate storage capacity for waste water generated at the site. The water in the tank would be sampled (by others) for sample profile analysis. The waste water in the tank would be disposed of in bulk (by others) at a potentially lower rate.
Installation of the temporary sump would allow the use of the parking lot for equipment decontamination at the conclusion of the project. It is anticipated that washing and water handling items could be handled concurrent with other site activities.

CEcon corp

Environmental and Industrial Contractors

P.O. Box 1514
Tacoma, WA 98401
FAX (206) 759-2720
(206) 759-0615

May 24, 1991

MK-Environmental Services
1300 114th Avenue S.E., Suite 112
Bellevue, Washington 98004

Attn: Lynn M. Higgins

Re: Additional Work Tasks
Maralco Site

Dear Ms. Higgins:

We have reviewed the additional work tasks, and in accordance with your request please find below our revised estimate(s) for the above referenced project:

Task 1: Additional work tasks do not impact this task.

Subtotal cost	$4,000.00
WSST @ 8.2%	$ 328.00
Total Cost NTE:	$4,328.00

Task 2: Cover the specified black dross with tarp or other suitable material.

Additional work this task: Cover the area South of and adjacent to the refinery building

Revised Estimate:

(a) Estimated number of days	17
(b) Crew size	5/6
(c) Extimated material cost	$46,500.00
(d) Estimated equipment cost	$ 3,200.00
(e) Subtotal cost (including labor)	$81,200.00
(f) WSST @ 8.2%	$ 6,658.40
Total Cost NTE:	$87,858.40

Task 3: Additional work tasks do not impact this task.

Subtotal cost	$20,900.00
WSST @ 8.2%	$ 1,713.80
Total Cost NTE:	$22,613.80

Task 4: (New Task) Re-route the refinery building roof drain.

(a)	Estimated number of days	3
(b)	Crew size	3
(c)	Estimated material costs	$3,700.00
(d)	Estimated equipment cost	$1,000.00
(e)	Subtotal cost (including labor)	$8,600.00
(f)	WSST @ 8.2%	$ 705.20
	Total Cost NTE:	$9,305.20

The method we propose to use to secure the dross pile tarp (Task 2) would be a combination of sandbags, rope and concrete anchors.

We hope that you find our proposal satisfactory. Please call if you have any questions or require additional information.

Very truly yours,

CEcon corp

Charles S. Engstrom

President

CSE:be

LABORATORY PRICES

Western Atlas International
A Litton/Dresser Company

CORE LABORATORIES

Morrison Knudsen Corporation
1300 114th Ave.
Southeast Suite 112
Bellevue, Washington 98004

Attention: Ms. Marian Allen

Dear Ms. Allen,

We at Core Laboratories are pleased to give you the following quote per Mr. Bill Stearn's request:

Parameters	Price per sample
Metals*	$ 10.00
Sample Preparation	$ 20.00
Moisture Content	$ 10.00
Grain size: wet sensitivity	$160.00
dry sensitivity	$ 60.00
Chloride	$ 9.00

From the list of parameters that Bill Stearns faxed me, these are the only ones that we can do. We can do loss on ignition if you can specify the test method or temperature you want the test done. We can't analyze for the oxides either.

*You listed a group of metals and this price is for one metal per sample.

Please don't hesitate to call us or Bill if you have any question.

Sincerely,

Virginia R. Bleich

Virginia R. Bleich
Inorganics Group Leader

Silver Valley Laboratories

P. O. BOX 929
ONE GOVERNMENT GULCH
KELLOGG, IDAHO 83837-0929
PHONE (208) 784-1258
FAX (208) 783-0891

March 22, 1991

Ms. Marion Alan
Morrison-Knudsen
1300 114 Ave. SE, Suite 112
Bellevue, WA 98004
FAX 206-646-5434

Dear Marion,

Pursuant to my telephone conversation with you, below is a summary of the current project.

Number of Samples
The number of samples is estimated to be 25 - 50. If samples are submitted to SVL in groups of not less than 10 samples, there will be no charge for the QC (LCS, SPK and DUP); for sample groups containing less than 10 samples, QC will be billed at the quoted price.

Report
The data report will include analytical results for the samples and identification of the analytical technique utilized. A computer floppy disk containing results can be provided, if requested prior to sample analysis.

Turnaround
15 business days

Sampling Supplies
Sample bottles, shipping coolers and blue ice will be provided by SVL at no additional cost to MK. SVL will pay for shipping sampling supplies from Kellogg, ID to Bellevue, WA.

Sample Description

Processed Material -	Processed black dross. Washed oxide, not soluble in water. Homogeneous sand-like material < 16 mesh sieve in diameter. Because this material has been washed, salt is not expected in this sample.
Waste Material -	Black dross. Heterogeneous material. Elevated levels of As are not expected. Up to 30% salt content possible.

List of Analytes	Cost per Sample ($)
Metal oxides. Si, Al, Fe, Ca, Mg, Na, K, S, Ti and P. Total digestion + ICAP scan.	70
Priority Pollutant Metals. Ag, As, Be, Cd, Cr, Cu, Hg, Pb, Ni, Sb, Se, Tl and Zn. EPA digestion + analysis by ICAP. EPA digestion + analysis by GFAA as required. Price includes analysis by MSA as required by EPA protocols.	190
Moisture Content (Loss at 105° C)	20
Loss on Ignition (Loss at 850° C)	20
Chloride	
Waste Material. Hot D.I. water extraction + analysis by ion chromatography or specific ion electrode	45
Processed Material. Sodium peroxide fusion + analysis by ion chromatography or specific ion electrode	90
TAL Metals (23 HSL Metals). EPA digestion + analysis by ICAP. EPA digestion + analysis by GFAA as required. Price includes analysis by MSA as required by EPA protocols.	210
Salt Content	45
CN in Waste Material	40
Wet and Dry Density (Pycnometer Method)	45
Particle Size Analysis (% sand, %silt, %clay)	30
Grain Size Analysis (ASTM D 422-63)	135

Should you have any questions, please call me.

Sincerely yours,

Dave Slater

David L. Slater
Projects Manager

DRILLER PRICES

PACIFIC TESTING LABORATORIES

TACOMA DIVISION
2402 Pacific Highway East
Tacoma, WA 98424
(206) 922-9299
FAX (206) 922-1512

EXECUTIVE OFFICES
3220 - 17th Avenue West
Seattle, WA 98119-1790
(206) 282-0666
FAX (206) 282-0710

EASTSIDE DIVISION
18939 - 120th Avenue N.E. Suite 107
Bothell, WA 98011
(206) 451-8436
FAX (206) 485-4611

CONTRACT DRILLING DEPARTMENT SERVICES

ENVIRONMENTAL

2-Inch Monitoring Wells
4-Inch Monitoring Wells
Undisturbed Soil Sampling
Plume Tracking
Well Development
Well Sampling
Well Abandonment
To Level B

SOILS ENGINEERING

Mineral Exploration
Sample Retrieval
Lysimeters
Slope Indicators
Pneumatic Piezometers
Anodes
Core Drilling
Packer Testing

QUALIFICATIONS

40-Hour Hazardous Waste Training
Washington State Water Well Licenses
Oregon State Water Well Licenses
Medical Monitoring Program
Marine Drilling
Low Overhead
All Terrain

EQUIPMENT

Two B-61 Truck-Mounted Rigs
One B-61 Track-Mounted Rig
Truck-Mounted Simco
Auger and Rotary
Casing Advancer
Auger Wireline System
NX-Coring

Our Drilling Department is the Pacific Northwest's leader in hazardous waste site drilling with extensive experience at Level B conditions. Our licensed drillers are experts at maintaining production rates in difficult soils including till, cobbles, clays, and heaving sands.

PACIFIC TESTING LABORATORIES

Drilling Capabilities Fact Sheet

Category No. 1: Drill Rigs

Rig No. 1: Simco 4000 Truck-Mounted Drill Rig for use in tight access areas where clearance length and width are factors. Maximum depth is 40 feet auger and 200 feet core.

Rig No. 2: Nodwell Track-Mounted Mobile B-61 Drill Rig for use in all terrain vehicle situations. Maximum depth is 200 feet auger and 2000 feet core or rotary.

Rig No. 3: B-75 Truck-Mounted Drill Rig with 3,700 ft.lbs. torque. Modified right angle drive and drill table for difficult drilling situations. Maximum depth 200 feet auger and 2000 feet core or rotary.

Rig No. 4: B-65 Truck-Mounted Mobile B-61 with 3,700 ft.lbs. torque. Modified for difficult drilling situations. Mounted on a 6X6 Wittenburg for all terrain capabilities. Maximum depth 200 feet auger and 2000 feet core or rotary.

Category No. 2: Tools and Equipment

2-15/16-inch inside diameter auger

3-3/8-inch inside diameter auger

4-inch inside diameter auger

6-inch inside diameter auger

4-inch inside diameter wire line sample with continuous 3-inch core capabilities for soil

Longyear casing advancer 4 inch

NX C-3 coring wire line

Piston type sampler

Pitcher barrel sampler

Sample tubes: standard, 2-1/2-inch, 3-inch, standard penetrometer, shelby, etc.

PTL

PACIFIC TESTING LABORATORIES

Drilling Capabilities Fact Sheet

Category No. 3: Hazardous Waste

Hazardous waste training in accordance with OSHA 29 CFR 1910.120.

All equipment and support necessary to complete both modified level D, C, and B with execution and confidence.

Category No. 4: Site Support

2 one ton service trucks

3 trailers

2 steam cleaners

Water Tanks

Full-time mechanic

On-site equipment maintenance

Category No. 5: Personnel

4 State of Washington licensed drillers

1 State of Oregon licensed driller

Commercial truck drivers

Welders

Site support technicians

Hazardous material technicians

2 Hazardous waste licensed backhoe operators

Additional equipment available upon request.

PTL

DRILLING DEPARTMENT PRICE LIST

Effective: February 1, 1991

ITEM NO.

Prices exclude applicable taxes.

Mobilization/Demobilization

Mobilization/Demobilization costs based on two (2) man crew within King County for Hollow Stem Auger projects.

1. SIMCO Truck-Mounted Rig $200.00
   SIMCO Truck-Mounted Rig Environmental Jobs $250.00

2. Truck-Mounted B-61 Equivalent Drill Rig $200.00
   Truck-Mounted B-61 Equivalent Drill Rig Environmental Jobs ... $250.00

3. Track-Mounted Nodwell B-61 Equivalent Drill Rig $350.00
   Track-Mounted Nodwell B-61 Equivalent Drill Rig Environmental Jobs $400.00

4. Mobilization/Demobilization outside King County quoted upon request.

Drilling

Hollow stem auger drilling with two (2) man crew. Prices include SPT samples at five-foot intervals.

5. SIMCO Truck-Mounted Drill Rig (not to Exceed 40 foot depth)
   2-5/8" ID auger only ..... Per Hour $140.00

6. Truck-Mounted Drill Rig ..... Per Hour $145.00

Under 100 blows/foot soils, 3-3/8" I.D. or 4" I.D.:

0 - 50 foot depth of hole	Per L.F.	$ 10.50
50 - 100 foot depth of hole	Per L.F.	$ 12.50

Auger over 100 blows/foot hole, 3-3/8" I.D. or 4" I.D.:

0 - 50 foot depth of hole	Per L.F.	$ 12.00
50 - 100 foot depth of hole	Per L.F.	$ 13.00

Auger under 100 blows/foot 6" I.D. ..... Per L.F. $ 14.00
The maximum depth limitation for 6-inch I.D. auger is 60 feet.

0 - 50 foot depth of hole	Per L.F.	$ 14.00
50 - 100 foot depth of hole	Per L.F.	$ 15.00

Auger over 100 blows/foot 6" I.D.:

0 - 50 foot depth of hole	Per L.F.	$ 14.75
50 - 100 foot depth of hole	Per L.F.	$ 15.75

ITEM NO.			
7.	Drilling and Sampling, Track-Mounted Drill Rig, and 2 Operators	Per Hour	$145.00
	Under 100 blows/foot 6" I.D. (60' max)	Per L.F.	$ 15.00
	Over 100 blows/foot 6" I.D. (60'max)	Per L.F.	$ 16.00
8.	Rotary Casing Advancer	Per L.F.	$ 19.00
9.	NX Core Drilling	Per L.F.	$ 45.00
10.	Extra Samples: Split-spoon	Each	$ 15.00
	Shelby samples (includes tube and caps)	Each	$ 30.00
	Dames and Moore samples	Each	$ 15.00
	No charge for extra samples on hourly job		

Support Equipment

11.	Water Truck with Operator	Per Hour	$ 30.00
12.	Well Development Vehicle with Operator	Per Hour	$ 80.00
13.	Steam Decontamination with Portable Steam Cleaner/Generator	Per Day	$100.00

Crew Rates

14.	Instrument Installation	Per Hour	$115.00
15.	Well Abandonment	Per Hour	$110.00
16.	Decontamination	Per Hour	$110.00
17.	Standby (PTL crew at job location waiting for notice to proceed)	Per Hour	$ 90.00
18.	Travel Pay (per crew per hour)	Per Hour	$ 45.00
19.	Overtime (work beyond 8 hours per day) (per 2-man crew per hour)	Per Hour	$ 53.00
20.	Additional Man	Per Hour	$ 30.00
21.	Surcharge for Level C or B Hazardous Waste Work		10%
22.	Drum Containers for Hazardous Wastes	Each	$ 45.00

ITEM NO.

PVC Wells

23.	PVC Flush Threaded Well Materials, Schedule 40, 4-inch Blank Casing		
	5-foot section	Per Foot	$ 11.50
	10-foot section	Per Foot	$ 9.00
	20-foot section	Per Foot	$ 6.50
24.	4-inch, 0.02-inch Slot Screen		
	5-foot section	Per Foot	$ 11.50
	10-foot section	Per Foot	$ 9.00
	20-foot section	Per Foot	$ 6.50
25.	2-inch Blank Casing		
	5-foot section	Per Foot	$ 4.75
	10-foot section	Per Foot	$ 3.25
	20-foot section	Per Foot	$ 2.50
26.	2-inch, 0.02-inch Slot Screen		
	5-foot section	Per Foot	$ 6.50
	10-foot section	Per Foot	$ 5.00
	20-foot section	Per Foot	$ 4.25
27.	Cap/Plug/Coupling, 4-inch, threaded	Each	$ 18.00
28.	Cap/Plug/Coupling, 4-inch, slip	Each	$ 6.50
29.	Cap/Plug/Coupling, 2-inch, threaded	Each	$ 13.75
30.	Cap/Plug/Coupling, 2-inch, slip	Each	$ 1.50

PTL

DRILLING DEPARTMENT PRICE LIST

Effective: February 1, 1991

ITEM NO.			
	Stainless Wells		
31.	Stainless Steel Threaded Materials, Schedule 5, No. 304 4-inch Blank Casing		
	5-foot section	Per Foot	$ 46.75
	10-foot section	Per Foot	$ 31.00
	20-foot section	Per Foot	$ 27.25
32.	4-inch, 0.02-inch Slot Screen		
	5-foot section	Per Foot	$ 68.00
	10-foot section	Per Foot	$ 56.50
	20-foot section	Per Foot	$ 51.00
33.	2-inch Blank Casing		
	5-foot section	Per Foot	$ 22.50
	10-foot section	Per Foot	$ 16.00
	20-foot section	Per Foot	$ 13.00
34.	2-inch, 0.02-inch Slot Screen		
	5-foot section	Per Foot	$ 43.00
	10-foot section	Per Foot	$ 37.50
	20-foot section	Per Foot	$ 34.50
35.	Plug, 4-inch, threaded	Each	$ 69.00
36.	Cap, 4-inch	Each	$ 69.00
37.	Plug, 2-inch, threaded	Each	$ 44.50
38.	Cap, 2-inch	Each	$ 44.50
	Miscellaneous Materials		
39.	Bolt-locking Well Centralizers		
	2-inch	Per Foot	$ 20.50
	4-inch	Per Foot	$ 23.50

ITEM NO.			
40.	Steel Conductor Casing		
	8-inch x 0.25-inch	Per Foot	$ 17.50
	12-3/4-inch x 0.25-inch	Per Foot	$ 27.00
	16-inch x 0.25-inch	Per Foot	$ 34.50
	20-inch x 0.25-inch	Per Foot	$ 43.50
41.	PVC 1-inch screen	Per Foot	$ 2.00
42.	PVC 1-inch	Per Foot	$ 1.25
43.	Slope Inclinometer Casing	Per Foot	$ 6.50
44.	Slope Inclinometer Caps	Each	$ 4.00
45.	Slope Inclinometer Couplings	Each	$ 5.25
46.	Piezometer Tips 18 inches	Each	$ 25.00
47.	Filter Sand, Colorado Silica 10-20, 100-lb. sack	Per Sack	$ 12.50
48.	Pea Gravel	Per Sack	$ 4.50
49.	Cement, 94-lb. sack	Per Sack	$ 10.00
50.	Bentonite, powder, 50-lb. sack	Per Sack	$ 18.00
51.	Bentonite chips, 50-lb. sack	Per Sack	$ 8.50
52.	Bentonite, Pellets, 50-lb. bucket, 1/4-inch diameter 1/2-inch diameter	Per Bucket Per Bucket	$ 46.00 $ 37.00
53.	Calcium Chloride	Per Sack	$ 12.00
54.	Lime, 50-lb. sack	Per Sack	$ 9.00
55.	Pre-mix Concrete, 60-lb. sack	Per Sack	$ 6.50
56.	Revert, 25-lb. sack	Per Sack	$110.00
57.	Asphalt Cold Patch, 35-lb. sack	Per Sack	$ 7.50
58.	Steel Standing Monument with Locking Cover, (4-foot x 6-inch)	Each	$155.00

ITEM NO.			
59.	Steel Flush Monument with Locking Cover, (3-foot x 6-inch)	Each	$115.00
60.	Traffic-rated Ground-level Well Housing with Locking Cap, 8-inch diameter	Each	$ 75.00
61.	Gold Anodized Aluminum Monuments with Locking Cap (6-inch x 5-foot)	Each	$125.00
62.	4-inch diameter x 6-foot Steel Stand Pipe, Guard Posts	Each	$ 42.00
63.	Shelby Tubes, 3-inch	Each	$ 15.00
65.	Shelby Caps	Each	$ 1.25
66.	Sample Jars with Lids	Per Case	$ 10.00
67.	Sample Catchers	Each	$ 2.50
68.	Sample Brass Liner (6-inch x 2-1/2-inch) with 2 Plastic End Caps	Each	$ 12.00
	Stainless Steel Liners, 6-inch with end caps	Each	$ 13.00
69.	Padlock, (similarly keyed)	2 Per Set	$ 18.00
70.	Disposable (Tyvek) suits (25 per case)	Each	$ 12.50
71.	Oil Sorbant Sheets, (18"x18") (100 per bale)	Bale	$ 80.00
72.	Rubber Gloves (inner)	Per Box	$ 10.00
	Rubber Gloves (outer)	Per Pair	$ 5.50
73.	Boot (outer)	Per Pair	$ 30.00
	Boot (inner with steel toe)	Per Pair	$ 30.00
74.	Level "C" Cartridges	Cost Plus 30%	
75.	Street Control Signs	Cost Plus 30%	
76.	Subsistence, more than 50 miles from Seattle	Per Day/ Per Man	$ 65.00

ITEM NO.

77.	Special Supplies or Instrumentation	Cost Plus 30%
78	Night Labor	Rate Plus 20%
79.	Hazardous Waste Rate Level "C"	Rate Plus 10%
	Hazardous Waste Rate Level "B"	Rate Plus 10%
	Percent is based on labor hours.	
80.	Extraordinary Costs	Cost Plus 30%

This Price List is intended to be used for estimating costs for routine drilling in and around the City of Seattle. Prices for hazardous work (Levels B or C), installation of slope indicators, large diameter PVC, deep holes, barge drilling, drilling over water, and large amounts of footage will be quoted upon request.

Above prices shall remain in effect for four (4) months, unless extended in writing by Pacific Testing Laboratories.

Material prices are subject to change without notice.

Engineer shall pay Contractor necessary and reasonable costs incurred by Contractor directly attributable to the suspension in addition to other compensation provided for by this Agreement. Should Engineer suspend performance of service at no fault of Contractor, Engineer will pay a cancellation fee for services not performed.

P128

SOIL SAMPLING SERVICE, INC.
1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399
FEDERAL ID #: 91-0762274 WA CONT. #SOILSS*344LD
Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains
Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

(206) 927-3173
(206) 838-9494
TELEX: 466762
FAX: (206) 927-3478

These documents are being transmitted from SOIL SAMPLING SERVICE, INC., on a Sharp FO-5200 Facsimile Machine - (206) 927-3478

REF #: 91-437

DATE: March 19, 1991

TOTAL PAGES INCLUDING COVER 7

TO: MK

FROM: Edward Hines

ATTN: Marian Allen

FAX #: 1-646-5430 5434

RE: Price List

****

FACSIMILE MESSAGE:

Attached is our most current price list.

For your Drilling Program in Kent, our changes are as follows:

1.	Mobe & DeMobe	$850.00
2.	Drilling	$150.00 per hour, 3.
	" overtime	$ 42.50 per hour
4.	All supplies at our price list	

IMPORTANT: If you do not receive all pages, please call Soil Sampling Service, Inc. at once at (206) 927-3173

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOILSS*344LO

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains

Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

(206) 927-3173
(206) 838-0494
TELEX: 466762
FAX: (206) 927-3478

SOIL SAMPLING SERVICE, INC.

SERVICE AND MATERIALS

PRICE LIST

PRICES ARE SUBJECT TO CHANGE WITHOUT NOTICE.

The prices on this price list are for standard items only and are for Level D site conditions. All other prices to be negotiated between client and Soil Sampling Service, Inc.

Effective April 1, 1990

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CONT. #SOIL SS*344LO

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains

Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

(206) 927-3173
(206) 838-9494
TELEX: 466762
FAX: (206) 927-3478

S E R V I C E P R I C E L I S T

AUGER DRILLING

MOBILIZATION	
Mobilization/Demobilization - Highway Rig, Local	**$250.00/ls**
Mobilization/Demobilization - Off Highway Rig, Local	**850.00/ls**
DRILLING - INCLUDES ONE SAMPLE ATTEMPT EVERY 5.0 L.F.	
Hollow Stem Auger Drilling - Highway Rig	
4 inch Soft	**10.50/lf**
4 inch Hard	**13.00/lf**
6 inch Soft	**14.00/lf**
6 inch Hard	**16.50/lf**
Hollow Stem Auger Drilling - Off Highway Rig	
4 inch Soft	**13.50/lf**
4 inch Hard	**16.00/lf**
6 inch Soft	**17.00/lf**
6 inch Hard	**19.50/lf**
Rotary Drilling	**18.00/lf**
Core Drilling	**42.50/lf**
HOURLY WORK	
Hourly Site Work - Auger, Rotary & Core (Highway and Off Highway Rigs)	
Hourly - Operating (Includes Installation, Moving over .5/hour per move, Clean & Patch, Abandonment, Steam Cleaning, Change Bits, Casing Time, Re-drill, etc.)	**140.00/hr**
Hourly - Non-operating (Includes Standby)	**110.00/hr**
Extra Samples	**20.00/each**

AIR ROTARY DRILLING

MOBILIZATION	
Mobilization/Demobilization - Local	**500.00/ls**
DRILLING	
Drilling - Air Rotary / 6 inch Casing (Does not include pulling casing which is part of abandonment - charged at $170.00/hr)	**34.00/lf**
HOURLY WORK	
Hourly Site Work - Air Rotary	
Hourly - Operating (Includes Installation, Moving and set-up over .5/hour per move, Clean & Patch, Abandonment, Steam Cleaning, Re-drill, etc.)	**170.00/hr**
Hourly - Non-operating (Includes Standby)	**130.00/hr**
Extra Samples	
0 - 25'	**25.00/each**
25 - 50'	**42.50/each**
50 - 100'	**85.00/each**
100 - 150'	**127.00/each**
150 - 200'	**175.00/each**

OTHER SERVICE PRICES

Per Diem	**Per Man Per Day**	**70.00/pmpd**
Meals	**Per Man Per Day (To be used for out of town jobs when the crew does not stay overnight in a hotel)**	**25.00/pmpd**
Travel Time	**Per Man Per Hour**	**50.00/pmph**
Overtime Premium	**2 man crew**	**45.50/hour**
	3 man crew	**68.25/hour**
Steam Cleaner	**Per Day**	**80.00/day**

SOIL SAMPLING SERVICE, INC.

1415 MERIDIAN EAST, PUYALLUP, WA 98371-1399

FEDERAL ID #: 91-0762274 WA CON T. #SOIL SS*344LO

Geotechnical, Engineering & Mineral Exploration Drilling • Instrumentation • Horizontal Drains

Ground Water Monitoring • Hazardous Waste Identification • Well Abandonments

(206) 927-3173
(206) 838-9494
TELEX: 466762
FAX: (206) 927-3478

M A T E R I A L S P R I C E L I S T

FITTINGS

3/4" PVC Sch. 40 Slip Caps	.35/each
1" PVC Sch. 40 Slip Cap	.55/each
2" PVC Sch. 40 Slip Cap	1.01/each
2" PVC Sch. 80 Slip Cap	29.87/each
4" PVC Sch. 40 Slip Cap	7.99/each
Hydro Tip	34.37/each
Stainless Steel Centralizer	
for 2" Casing	21.87/each
for 4" Casing	25.10/each

END PLUGS

3/4" PVC Sch. 80 End Plug - Threaded End	8.67/each
2" PVC Sch. 40 End Plug - Threaded End	9.45/each
2" PVC Sch. 80 End Plug - Threaded End	11.55/each
4" PVC Sch. 40 End Plug - Threaded End	27.75/each

PVC BLANK CASING

3/4" Piezo Pipe - Class 200 Blank - 20' length - Belled End	.30/L.F.
3/4" PVC Sch. 80 Blank Pipe - 5' length - Threaded End	18.79/each
3/4" PVC Sch. 80 Blank Pipe - 10' length - Threaded End	21.20/each
2" PVC Sch. 40 Blank Pipe - 5' length - Threaded End	26.07/each
2" PVC Sch. 40 Blank Pipe - 10' length - Threaded End	31.30/each

2"	PVC Sch. 80 Blank Pipe - 5' length - Threaded End	28.07/eac
2"	PVC Sch. 80 Blank Pipe - 10' length - Threaded End	35.22/eac
4"	PVC Sch. 40 Blank Pipe - 5' length - Threaded End	58.97/eac
4"	PVC Sch. 40 Blank Pipe - 10' length - Threaded End	74.35/eac

PVC SLOTTED SCREEN

3/4"	PVC Sch. 80 Slotted Screen - 5' length - Threaded End	21.84/eac
3/4"	PVC Sch. 80 Slotted Screen - 10' length - Threaded End	27.39/eac
2"	PVC Sch. 40 Slotted Screen - 5' length - Threaded End	33.99/eac
2"	PVC Sch. 40 Slotted Screen - 10' length - Threaded End	36.86/eac
2"	PVC Sch. 80 Slotted Screen - 5' length - Threaded End	35.54/eac
2"	PVC Sch. 80 Slotted Screen - 10' length - Threaded End	42.04/eac
4"	PVC Sch. 40 Slotted Screen - 5' length - Threaded End	74.30/eac
4"	PVC Sch. 40 Slotted Screen - 10' length - Threaded End	105.01/eac

MONUMENT CASES

8" x 4' Monument Case with Locking Cap	130.00/each
9" x 12" Monument Case with Flush Locking Cap	95.00/each

SHELBY TUBES

3" x 30" Shelby Tube	14.70/each
3" x 36" Shelby Tube	17.70/each

MUDS

Asphalt Cold Patch	10.25/each
Bentonite - Pellets	57.50/each
Bentonite - Chips	7.45/each

MUDS (CONT.)

Bentonite - Granular	7.45/eac
Bentonite - Powdered	9.65/eac
Cement - 100# Sack	10.25/eac
Concrete Mix - 60 lb. sack	3.40/eac
Concrete Mix - 90 lb. sack	5.75/eac
Jet Set	28.00/eac
Lime	10.25/eac
Pea Gravel	5.00/eac
Revert	112.50/eac
Sand - Colorado Silica	14.35/eac
Volclay Grout	36.85/eac

MISCELLANEOUS

55 Gallon Barrel	49.90/eac
6" x 1-1/2" Brass SPT Liner	9.15/eac
6" x 2" Brass Sampler Liner	9.00/eac
2" Plastic Cap	.38/eac
2" Locking "Easy Seal"	6.75/eac

HAZARDOUS WASTE MATERIALS

Tyvek Suits SARANEX SUITS	12.50/eac
Gloves - Neoprene	27.00/pair 7.15/pair
Gloves - PVC/Nitrile	5.10/pair
Gloves - Nitrile	3.45/pair

KRING DRILLING COMPANY, INC.

POST OFFICE BOX 817 MILTON, WASHINGTON 98354

Sea. (206) 623-0259 Fed. Way (206) 838-3314 Tac. (206) 952-5347

CCEX KRINGDC160RE

Dear Sirs,

Enclosed is our current price list for this year. Our prices may vary a little depending on conditions at the job location, or where the job is located. This list gives a close guide line of what to expect for charges. Please call and confirm prices for each job.

Our company currently has the rigs listed below, all active at this time and in good mechanical condition.

1 - TH60 top drive air rotary with Wellen 915 Casing Hammer.
2 - Mobile B61, augers 3 3/8" - 4" - 6" - 6 5/8" HSA, also can do air or mud rotary and odex.
1 - Mobile B50, mounted on a TD14 International cat crawler. Runs 3 3/8" - 4" - 6" - 6 5/8" HSA as well as air or mud rotary and odex.
1 - Nodwell, for marsh areas
1 - Joy Core Rig, skid mounted, can be mounted on a pickup truck or on a trailer.
1 - Acker Soil Mechanic, on wheels, 2 men can pack it in and out of tight clearance areas or inside buildings. If necessary we have flex tubing to divert exhaust out side of buildings. It is equipped to do 2" regular SPT'S.
140 pound drop hammer, 35' of HSA.
50' of rotary tools.

We have 40 hour Haz-Mat training, and a variety of special tooling to do special jobs:

ODEX	Underreaming
Bucket augers	Perforating
Flush wall threaded steel casing	

If you would like more information about our firm please call Victor R Kring or myself.

We are insured through American Star Insurance, who will provide any information need, upon request.

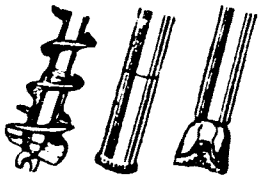
Sincerely yours,

KRING DRILLING COMPANY, INC.

Mark T. Conom by

Mark T. Conom
Project Manager

ws/a:0197



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CCEX KRINGDC160RE

PARTIAL PRICE SUMMARY FOR DRILLING SERVICES IN 1990

I. Mobilization and Demobilization (M & D)

A. Truck mounted B-61:
   1. Seattle - Tacoma area — $180.00 ea
   2. All other areas: Mileage measured from the shop(round trip per mile) — $ 2.25 per mile

B. Tracked Rigs:
   1. Call for M & D price

II. SUBSISTENCE FOR 2 MAN CREW (INCLUDING M & D TIME)

A. Per Day — $130.00 per day

III. DRILLING, TRUCK MOUNTED B-61 OR B-50

A. Hollow Stem Auger HSA 3 3/8" or 4" I.D.
   1. Including a driven or pushed sample at 5' intervals, standard elevations:

DEPTH	SOFT CHARGE*	HARD CHARGE**	OVERSIZE GRAVEL***
0- 50 ft	$ 9.50 ft	$12.00 ft	$15.00 ft
50-100 ft	$11.40 ft	$13.80 ft	$18.60 ft
100-150 ft	$14.40 ft	$16.80 ft	
150-200 ft	$19.20 ft	$21.60 ft	

* SOFT: Less than 50 blows ft. (SPT)
** HARD: More than 50 blows ft (SPT)
*** OVER: 100 blows ft, refusal, redrill, coarse gravels, concrete, concrete rubble, plus bit teeth, cost, plus 20%

Inserting a bottom plug, extra sample attempts:
   0-100 ft — $ 25.50 ea
   100-150 ft — $ 35.00 ea

B. 6" I.D. HSA:
   1. Add $3.60 ft to above prices
   2. M & D — $120.00 extra
   3. 4" OR 5" I.D. samples (EACH ATTEMPT) — $ 30.00 ea att
      Plus shoes and retainers
      M & D — $100.00 extra

IV. DRILLING, TRACKED

A. Add $2.40 ft to prices and add $24.00 on hourly rates

V. DRILLING - SPECIAL TOOLS

A. Heavy Duty Sampler Rental — $ 30.00 a day

Plus shoes and retainers

B. Pneumatic Piston Sampler:

0-100	$ 50.00 att.
M & D	$ 60.00 extra

VI. ROTARY DRILLING

A. Including a driven or pushed sample at each 5' interval

DEPTH	SOFT CHARGE*	HARD CHARGE**
0- 50 ft	$10.20 ft	$12.60 ft
50-100 ft	$12.00 ft	$14.40 ft
100-150 ft	$15.00 ft	$17.40 ft
150-200 ft	$19.80 ft	$22.20 ft

* SOFT: Less than 50 blows ft (SPT)

** HARD: More than 50 blows ft (SPT)

__ Not including mud and bits

B. Extra sample attempts, in addition to the 5' interval

DEPTH	CHARGE
0-100 ft	$25.00 per sample
100-150 ft	$25.00 per sample

C. Installation and removal of casing required $15.00 ft

D. Pitcher barrel sample attempts, in addition to the above charge:

DEPTH	CHARGE
0-100 ft	$24.00 ea attempt
100-150 ft	$36.00 ea attempt
Pitcher Tubes	$19.20 ea

E. Wireline Core Drilling: NX Size $ 42.00 ft

1. M & D $180.00 extra

VII. ODEX 115 DRILLING

A. 5" casing $ 26.00 ft

1. Call for M & D price

B. ODEX $150.00 hr

C. Samples $ 50.00 ea

VIII. HOURLY WORK B-61 TRUCK MOUNTED

In conjunction with above prices

A. To be charged by the hour, including, but not limited to:

1. Stand by (ALL EQUIPMENT IDLE) $125.00 hr

2. Overtime Differential $ 50.00 hr

B. Cleanup of site, Cribbing and blocking or difficult set-up, Instrumentation, Installing piezometers, haul water, difficult or long moves between holes or off road moving $125.00 hr

IX HOURLY DRILLING WORK -unusual drilling or of a nature that cuts production, plus all materials. 4 & 8 hr min. per day,

including all work hours for the day

A. B-61 truck mounted, basic equipment	$125.00 hr
B. B-61 track mounted, basic equipment	$156.00 hr
C. B-50 track mounted, basic equipment	$144.00 hr
D. Acker Soil Mechanic (Shop to shop)	$120.00 hr
E. Overtime differential	$ 50.00 hr

X. MATERIALS, F.O.B. SHOP: (subject to change without notice)

A. Shelby tubes	$ 19.20 ea
B. 3/4" P.V.C. pipe	$ .48 lf
C. Piezometer tips	$ 24.90 ea
D. Pea gravel	$ 5.40 sk
E. Bentonite Pellets	$ 1.20 lb
F. Cement	$ 10.20 sk
G. 3" screw cap type monument cases	$ 15.60 ea
H. Others, F.O.B. shop (LIST OR COST PLUS 20%)	

XI. CHECKING UTILITIES

A. We can check utilities in advance of the drill rig and crew arrival, fees are:

Shop to shop	$ 60.00 hr
Mileage	$ .30 mile

B. We require:
A detailed site plan showing expedted utilities, boring locations, etc., three working days notice before the anticipated rig arrival

NOTE: The above fees are based on payment terms of:
Net 30 days, 1.5% month late charge will be collected on invoices over 60 days old, from the date of the invoice

The above prices are not based on prevailing wages as set either by union agreement of governmental authority: and are subject to change if necessary to comply therewith as may be required

WS/A:PRICELST

NOTICE TO CUSTOMER

KRING DRILLING COMPANY, INC., is registered with the State of Washington, Registration No. CCEX KRINGDC160RE, as general specialty contractor and has posted with the State a bond or cash deposit contractor for negligent or improper work or breach of contract in the conduct of the contractor's business. The expiration date of this contractor's registration is 1-20-91. This bond or cash deposit may not be sufficient to cover a claim which might arise from the work done under your contract. If any supplier of materials used in your construction project or any employee of he contractor or subcontractor is not paid by the contractor or subcontractor on your job, your property may be liened to force payment. If you wish additional protection, you may request the contractor to provide you with original "lien release" documents from each supplier or subcontractor on your project. The contractor is required to provide you with further information about lien release documents if you request it. General information is also available from the Department of Labor & Industries.

Contractor has the right and intent to file a labor and material lien against said property if not paid as outlined above.

Construction Liens: What You Should Know About Contracts

If your contractor fails to pay subcontractors, suppliers or laborers or neglects to make other legally required payments, those who are owed money can look to your property for payment, even if you have paid your contractor in full. This is true if you have hired a contractor to build a new home, are buying a newly built home or are remodeling or improving your property.

Under Washington laws, those who work on your property or provide materials and are not paid have a right to enforce their claim for payment against your property. This claim is known as a construction lien.

Persons who supply materials or labor ordered by your contractor are permitted by law to file a lien only if they do so within 90 days of completion of performance or delivery of materials. The time frame is spelled out in RCW 60.04.000.

If you enter into a contract to buy a newly built home, you may not receive a notice of a lien based on a claim by a contractor or material handler. Be aware that a lien may be claimed even though you have not received a notice.

Washington laws require contractors and lending institutions to give you this notice if your contract price exceeds $1,000 (RCW 18.27.114(1) and (RCW 60.04.250). This notice explains the basics of the construction lien law to help you protect yourself. This notice isn't a reflection upon the ability or credit of your contractor.

You have final responsibility for seeing that all bills are paid even if you have paid your contractor in full.

If you receive a notice to enforce a lien, take the notice seriously. Let your contractor know you have received the notice. Find out what arrangements are being made to pay the sender of the notice.

Prior to making final payment on the project, have the attached lien release form completed by each of the contractors and material suppliers.

When in doubt, or if you need more details, consult your attorney. When and how to pay your contractor is a decision that requires serious consideration.

This notice was prepared by the state Attorney General's office and the state Department of Labor and Industries, Building and Construction Safety Inspection Services division, for reproduction by lending institutions and contractors for distribution to their clients.

RELEASE OF LIEN BY CONTRACTOR AND SUBCONTRACTOR(S)

In consideration of the amounts stated below, receipt of which is hereby acknowledged, we, _____, _____, _____, and _____, the undersigned residents of the city of _____, County of _____, State of _____, having been employed by _____, owner of the following described property: _____

_____

_____

_____

to _____(erect, alter, or repair) _____ (specify structure) located on the aforementioned property, do hereby, jointly and severally, release and discharge said owner from any and every liability arising out of _____ (labor performed or as the case may be) by us under the terms of the aforesaid agreements of employment.

The consideration received by each lienor for this release is as follows:

NAME	AMOUNT
_____	_____
_____	_____
_____	_____
_____	_____

Dated _____, 19 ___

Contractor _____

Subcontractor _____

Subcontractor _____

Subcontractor _____

APPENDIX III
DRAFT SITE HEALTH & SAFETY PLAN

DRAFT SITE SAFETY PLAN
MARALCO ALUMINUM
SECONDARY ALUMINUM REFINERY

KENT, WA.

Project Manager:	Alan Parker
Site Safety Officer:	Lynn Higgins
Date of Issue:	03/29/91

1.0 INTRODUCTION

This draft project safety plan delineates the basic safety requirements for the Remedial Investigation/Feasibility Study at the Maralco Secondary Aluminum Smelter Site located in Kent, Washington (Figures 1 & 2). It will be refined as additional information becomes available.

The provisions set forth in this plan will apply to the employees of MK-Environmental Services, their subcontractors working on this project, and any authorized visitors. The subcontractors may elect to modify these provisions, but only with the written concurrence of MK-Environmental Services.

This project safety plan will address the expected potential hazards that may be encountered for this project. Field activities are planned to begin in April or May 1991 with the duration estimated at approximately three months. If unanticipated changes in site or working conditions occur as the activities progress, written addenda to this plan will be provided by MK-Environmental Services.

Effectiveness of the plan will be evaluated on a weekly basis in consultation with the Project Manager.

2.0 PROJECT SAFETY AUTHORITY

Personnel responsible for the project safety are the Project Manager and the Site Safety Officer.

The Project Safety Officer is responsible for the development and submittal of this plan to the Project Staff, and for advising the Project Staff on health and safety matters. He or she has the authority to provide for the auditing of compliance with the provisions of this plan, to suspend or modify work practices, and to initiate enforcement or dismissal action for individuals whose conduct does not meet the requirements set forth herein.

The Project Safety Officer is responsible for the dissemination of the information contained in this plan to all MK Environmental Services personnel assigned to the project, to the responsible representative of each subcontractor firm, and to authorized visitors. The Project Safety Officer will also act as the Site Safety Officer and as such, is responsible for ensuring that the following elements are addressed:

- Safety Supplies and Equipment Inventory
- Medical Surveillance Program/Physical examinations
- Training Programs/Hazard Communication

- Accident/Incident Reporting Procedures
- Decontamination/Contamination Reduction Procedures
- Air Monitoring Programs
- Emergency Response Procedures

The Site Safety Officer has the authority to suspend work at any time if there is an imminent threat to the health and safety of project personnel or the general public. The Site Safety Officer will also inform the Project Manager of the conduct of individuals that is not in conformance with the requirements of the plan.

3.0 MEDICAL SURVEILLANCE

For regulatory compliance purposes, MK-Environmental Services personnel and sub-contractors engaged in project execution will participate in the Medical Surveillance program, and must be approved by the examining physician(s) to wear respiratory protection devices and protective clothing for protection from exposure to hazardous materials. The applicable requirements under the appropriate sections of the final rule governing Hazardous Waste Operations 29 CFR 1910.120(f) and WAC 296-62-3050 will be observed.

An episodic examination will be required if any worker develops signs or symptoms related to over-exposure to hazardous substances on-site or in the event an unprotected worker is potentially exposed in an emergency situation. The scope of any episodic examinations will be left to the discretion of the examining physician.

4.0 TRAINING

4.1 Basic OSHA Training

For regulatory compliance purposes, all personnel will have received the health and safety training as described in this section before being allowed to participate in field activities that could expose them to hazardous substances, safety hazards, or health hazards. This training is required pursuant to 29 CFR 1910.120(e) and WAC 296-62-3040.

- Forty-Hour Hazardous Waste Operations Health and Safety Training
  Forty hours of classroom instruction and simulated field exercises regarding the following topics: 1) biology, chemistry, and physics of hazardous materials; 2) toxicology; 3) industrial hygiene; 4) hazard evaluation and control; 5) personal protective equipment (PPE); 6) medical surveillance; 7) decontamination; 8) legal and regulatory aspects; 9) emergency response.

- Eight-Hour Manager/Supervisor Hazardous Waste Operations Health and Safety Training
  Eight hours of additional specialized instruction on managing/supervising employees engaged in hazardous waste operations. Required of on-site supervisors who are directly responsible for or who supervise employees engaged in hazardous waste activities.

- Eight-Hour Annual Hazard Waste Operations Health and Safety Refresher Training
  Eight hours of refresher training annually, as necessary.

4.2 Additional Training/Documentation Requirements

- Submit evidence for three days of actual field experience under the direct supervision of a trained, experienced supervisor.
- Submit evidence of appropriate or sufficient training for heavy equipment operations.
- Contingency measurements for control of runoff and flooding during rainstorms.

4.3 Site and Task Specific Training

Field personnel from MK-Environmental Services and their subcontractors will attend a project-specific training program for safety issues and project work task review before beginning work. The meeting will be conducted by the Site Safety Officer. Periodic safety briefings (or tail-gate sessions) will be conducted before the start of work. All training programs, safety meetings, and daily safety briefings will be documented by agenda and signature of each attendee.

4.4 First Aid and CPR Training

There will be at least one worker at the site with current, valid certification in first aid and cardiopulmonary resuscitation (CPR) training from the American Red Cross (or the equivalent).

5.0 HAZARD ANALYSIS AND CONTROL

The site investigation is conducted to assist in determining the nature and extent of hazardous substances at the site.

Historical information regarding the types of wastes that exist at the site will be utilized in establishing requirements for the medical surveillance program, monitoring/sampling equipment, and personal protective equipment. As the site investigation proceeds, and more detailed information regarding the type, quantities, and extent of hazardous substances becomes known, the Health and Safety Plan will be modified as necessary.

It will be necessary to perform certain evaluations of airborne contaminants prior to a final decision on the level of protection required for the RI/FS field work.

5.1 Chemical Hazards

According to a site assessment report prepared by Ecology and Environment, Inc. (October 1987), the major repositories exhibiting concentrations of priority pollutant metals exceeding background soil concentrations are as follows: black dross piles, Kawecki-Berylco, Inc. (KBI) dross, "aluminum oxide" pile, and baghouse dusts. These compounds are generally characterized by high concentrations of antimony, chromium, copper, nickel, and zinc.

Airborne exposure to heavy metal dusts have been implicated in a variety of occupational illnesses such as lung cancer, lung fibrogenesis, mucus membrane inflammation and contact dermatitis. In these instances, the principle exposure pathways are through lung inhalation and skin contact.

As one may expect, the exposure potential is directly related to quantitities of dust generated by any given activity. Weather conditions such as wind velocity and rainfall will also have an important bearing on worker exposure.

Under dry conditions while in performance of activities generating substantial dust (operation of heavy equipment), workers should attempt to position themselves upwind of the dust cloud when feasible.

Most of the black dross generated by Maralco is located in a 20,000 ton pile to the south east of the refinery building. Ten tons of KBI dross are located in a concrete bin inside the refinery in the southwest corner of the building.

The aluminum oxide pile, weighing approximately 5,000 tons, is located about 60 feet due east of the refinery building at the north end of the black dross pile.

Baghouse dusts are located in each of eight metal ash receptacles below the baghouse hoppers in the southwest corner of the refinery. These dusts are considered to be corrosive in nature.

Other potentially hazardous substances that have been identified on the Maralco premises are a pile of grey, sandy material (appearance similar to that of black dross) located at the northeast quadrant of the site (approximately 40 yards east of a housing residence); brine solution noted in the salt saver holding ponds on the east side of the refinery building; and yellow colored patches of unknown chemical composition randomly distributed throughout the black dross pile.

The black dross, KBI dross, aluminum oxide and baghouse dusts will be suspect in representing an airborne inhalation hazard until background air monitoring has shown otherwise.

An underground diesel storage tank lies at the northwest quadrant of the property. Its contents and condition are unknown. A specific health & safety work plan will be drawn up to support investigative activities. Approval from the Site Safety Officer is required before any RI/FS activities can occur in the tank vicinity.

There is also the possibility that some areas within the site may contain patches or small spills of unknown organic chemicals. Metal drums of unknown contents may also be found. Old lead vehicle batteries have also been found on-site.

5.2 Physical Hazards

There are various physical hazards that project personnel may be exposed to during the field investigation. These include brambles, uneven terrain, falling objects, slippery surfaces, marshy ground, ditches, holes, sharp objects, tools, and heavy machinery/equipment.

Weather conditions may expose personnel to cold temperatures. The principal hazards of cold stress are frostbite, hypothermia and impaired ability to work. Wind will lower the effective temperature. Low illumination levels may exist inside the building and produce a vision hazard.

The use of power tools and equipment often creates excessive noise. Chronic over-exposure can lead to loss of hearing. At the least, excessive noise can annoy or distract workers and increase the risk of other accidents due to interference with communication.

5.3 Hazard Control

Engineering controls are the preferred method to control health and safety hazards whenever such controls are available and practical. The use of dust suppression techniques, equipment guards, and work procedures that minimize worker exposure to hazardous substances or situations are examples of engineering controls.

Only equipment that is used for its intended task and is in safe operating condition will be used. Personnel will be familiar with the hazards associated with the use of the tools and equipment and methods to mitigate the hazards.

Personal protective equipment will be utilized when engineering and administrative controls are not feasible or practical. Personal protective equipment may consist of boots, clothing, gloves, head, eye, and hearing protection. Respirators may be utilized if concentrations of airborne contaminants warrant it. All respirators will be NIOSH/MSHA approved.

6.0 WORK ZONES AND MONITORING

6.1 Work Zones

At those sites where there is a potential for the accidental spread of hazardous substances from contaminated or potentially contaminated sites to clean areas, work zones will be established where different types of operations will occur, and the flow of personnel and equipment will be controlled. The establishment of work zones will help ensure that personnel are properly protected against hazards present where they are working, that work activities and contamination are confined to the appropriate areas, and that personnel can be located and evacuated in an emergency.

Prior to the commencement of field activities within areas of concern, work zones will be established as needed to meet operational and safety objectives.

Exclusion (Control) Zone

The exclusion zone is the area where contamination does or could occur. Entry into this area is limited to those personnel wearing the specified personal protective equipment who have completed the required health and safety training, and who are participating in the medical surveillance program. The boundary of the exclusion zone will be determined for each site individually and may change depending on site activities and conditions. The exclusion zone will be clearly delineated through the use of signs, barricade tape, and/or fences. Access control points will be established to regulate the flow of personnel and equipment into and out of the zone and to help verify that proper procedures for entering and exiting are followed (Figure 3). The required level of personal protective equipment in the exclusion zone depends upon the job assignment and detailed information known regarding types, quantities and extent of hazardous substances. Table I provides a chart of known RI/FS activity to be carried out on site at the time of this writing, and anticipated levels of required personal protective equipment. As additional tasks become known, they will be added to the list and the chart modified accordingly.

Contamination Reduction Zone

The contamination reduction zone is the transition area between the exclusion zone and the clean zone.

This zone is designed to reduce the probability that the support (clean) zone will become contaminated or affected by other site hazards. Decontamination of personnel and equipment will occur in the contamination reduction zone. Personnel and equipment will not be allowed to leave the contamination reduction and exclusion zones without being properly decontaminated except in emergency situations.

Support (Clean) Zone

The support zone is all areas outside the exclusion and contamination reduction zones. An access control log will be maintained at the access control point into the exclusion and contamination reduction zones. The access control log will record the names and the time of personnel entering/exiting the exclusion zone.

Figure 3 illustrates the zonation principle of the exclusion, contamination reduction and support zones in hazardous waste site clean-ups.

7.0 MONITORING

Monitoring will be performed to assess the potential exposure to hazardous substances and to ensure that the proper level of personal protective equipment has been selected. It will also be performed to delineate areas where protection is needed and to assist in determining specific medical monitoring requirements (if necessary).

Air monitoring/sampling will be performed by collection of air samples in a suitable collection media and subsequent laboratory analysis.

Monitoring for priority pollutant metals through use of filter collection media will be implemented using the following sampling scheme for compliance with WAC 296-62-3070:

Initial Entry - Prior to the preliminary washed oxide removal and shipment operations at Maralco, background air filter samples were collected to identify potential personnel exposure above Permissible Exposure Limits (PELs) and to determine the appropriate level of PPE. Six samples were collected from the following locations:

- Immediately south of the farmhouse
- Inside the storage shed west of the farmhouse
- At the southeast corner of the refinery building near the black dross pile
- Inside the refinery building
- At the northwest corner of the Maralco property near the fence line

A blank sample was also submitted for analyses.

All samples were analyzed for aluminum, antimony, chromium, copper, nickel and zinc. The sample from the storage shed and the blank sample were also analyzed for asbestos. All sample concentrations were below the PELs established by WISHA at WAC 296-62-075(H) (see Table II).

Periodic - Periodic monitoring will be conducted when there is indication that exposures may have risen above permissible exposure limits. Situations under consideration are as follows:

- When work begins at a different portion of the site.

- Handling of previously unidentified contaminants.
- Initiation of a new operation.
- Sufficient passage of a time interval such that exposures may have increased.

On May 27, 1990, washed oxide removal operations commenced, and three air filter samples were collected to monitor airborne contaminant exposures from the operations. A personal air sample was collected from the driver of the front end loader and another was collected from the north inside wall of the refinery building. A blank air sample was also submitted for analyses. All sample concentrations were below the WISHA PELs.

When levels of any of the Priority Pollutant metals reach the Permissible Exposure Level (Site Action Level), mandatory respirator use at Level C will be enforced until air monitoring has determined concentrations have subsided.

Table II lists the Permissible Exposure Limits for the Priority Pollutant metals of concern at the work site and required procedures to be implemented at concentrations less than, equal to, or greater than the action levels.

8.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

This section describes the personal protective equipment program for the project. The level of PPE required will be dependent upon the work task, site hazards, and current level of hazard assessment within the area. Modifications (i.e. upgrading/downgrading) of the specified level of PPE may be made at the discretion of the Site Safety Officer as more information regarding site hazards becomes known. Engineering controls and work practices will be the primary methods of protecting site workers. Only when such controls and practices are not feasible will PPE be utilized.

Based upon information obtained from the Ecology and Environment, Inc. site assessment report, the site visit and walk-through, and the absence of air sampling data currently available at the time of this writing, Level C PPE will be implemented during initial phases of the RI.

Level C

Level C to be selected when the concentration and type of air contaminants is known and the criteria for selection of air-purifying respirators are met.

Level C equipment; (used as appropriate)

- Full-face or half-face respirator with appropriate cartridges/canisters
- Chemical-resistant coveralls (polyethylene coated Tyvek, or equivalent)
- Gloves, outer, chemical-resistant (nitrile, or equivalent)
- Gloves, inner, chemical-resistant (vinyl, or equivalent)
- Boots, chemical-resistant, steel toe (PVC, or equivalent)
- Safety glasses with side shields

Following an assessment of background air monitoring data, the Site Safety Officer has elected to downgrade to a Modified Level C (full-face or half-face air-purifying respirators with HEPA cartridges, not necessarily worn, but readily available).

For regulatory compliance purposes (29 CFR 1910.134), a written respiratory protection program is attached as Appendix A of this plan.

9.0 DECONTAMINATION

All personnel, clothing, equipment, and samples leaving a control zone (contaminated or potentially contaminated area) shall be decontaminated to remove any harmful substances that may have adhered to them. Some equipment/clothing may be disposed of rather than decontaminated. This section gives guidelines regarding the decontamination procedures to be implemented at the site.

9.1 Personnel Decontamination

A decontamination (decon) station will be established in the contamination reduction zone. The decon station will consist of the following, as appropriate:

- Equipment drop
- Boot wash station; a tub of water and detergent with brushes for cleaning and another tub of water for rinsing
- Glove wash station (similar to boot wash station)
- Disposable clothing barrel; all contaminated or potentially contaminated disposable clothing shall be placed into barrels (or equivalent) for disposal as contaminated waste. The drums will be clearly labeled, stored on pallets inside the building and kept separate from other old drums scattered throughout the building

9.2 Equipment Decontamination

All equipment/tools used in the control zone will be inspected for contamination prior to removal from the site. Any equipment/tools with visible contamination will be required to be cleaned. A water and detergent solution will be used as necessary for highly contaminated equipment. All water used during decontamination will be containerized (as described above) for proper disposal. If necessary, cleaning solvents may be used on a case-by-case basis.

10.0 GENERAL PROJECT SAFETY REQUIREMENTS

The project operations shall be conducted with the following minimum safety requirements employed:

- Eating, drinking, and smoking will be restricted to a designated area.
- All personnel shall be required to wash hands and face before eating, drinking, or smoking.
- Gross decontamination and removal of all personal protective equipment shall be performed prior to exiting the facility. Contaminated clothing will be removed and collected for disposal.
- Shaking or blowing of potentially contaminated clothing or equipment to remove dust or other materials is not permitted.
- The Project Manager and Site Safety Officer will be responsible to take necessary steps to ensure that employees are protected from physical hazards, which would include:
  - Falling objects such as tools or equipment
  - Falls from elevations
  - Tripping over hoses, pipes, tools, or equipment
  - Slipping on wet or oily surfaces

- Insufficient or faulty protective equipment
- Insufficient or faulty operation, equipment or tools

- Field operations personnel shall be cautioned to inform each other of non-visual effect of the presence of toxics, such as:
  - Headaches
  - Dizziness
  - Nausea
  - Blurred Vision
  - Cramps
  - Irritation of eyes, skin, or respiratory tract
  - Changes in complexion or skin discoloration
  - Changes in apparent motor coordination
  - Changes in personality or demeanor
  - Excessive salivation or changes in papillary response
  - Changes in speech ability or pattern

11.0 EMERGENCY RESPONSE PROCEDURES

In the event of an accident resulting in physical injury, First Aid will be administered and the Project Manager and the Site Safety Officer will be notified. The injured worker will be transported to Valley Medical Center for emergency treatment. A physician's attention is required regardless of the severity of the injury.

In the event of fire, explosion, or property damage, the local emergency response agencies will be immediately notified.

Emergency Telephone Numbers:

- Fire, Police, Ambulance. 911

- Hospital (Valley Medical Center)
  400 S. 43rd, Renton
  Emergency. 251-5185
- Directions from Kent - take I-5-N to 405N. Exit on SW 43rd Street going south. Hospital will be off to the left.

- Additional Contingency Telephone Numbers
  MK-Environmental Services, Bellevue, WA. 453-1110
  Washington Dept. of Ecology
  Redmond, WA. 867-7200
  Olympia, WA. 459-6418

TABLE I

TASK CHART
MARALCO ALUMINUM - PHASE 1 - RI/FS

TASK	LEVEL OF PROTECTION
Fencing	Level D (Fencing crew will not enter the exclusion zone)
Grading and Tarping	Modified Level C (Full-face air purifying respirators with HEPA cartridges, not necessarily worn but readily available)
Dross and Oxide Sampling	

TABLE II

AIR MONITORING ACTION LEVELS

PRIORITY POLLUTANT METAL	WISHA PEL[1] (mg/M^3)
Aluminum	
Metal and oxides	10
Soluble salts	2
Antimony	0.5
Chromium (total, VI)	0.5, 0.05
Copper	1.0
Nickel	1.0
Zinc (oxide, chromate)	10
Asbestos	0.2 f/cc^2 1.0 f/cc^3

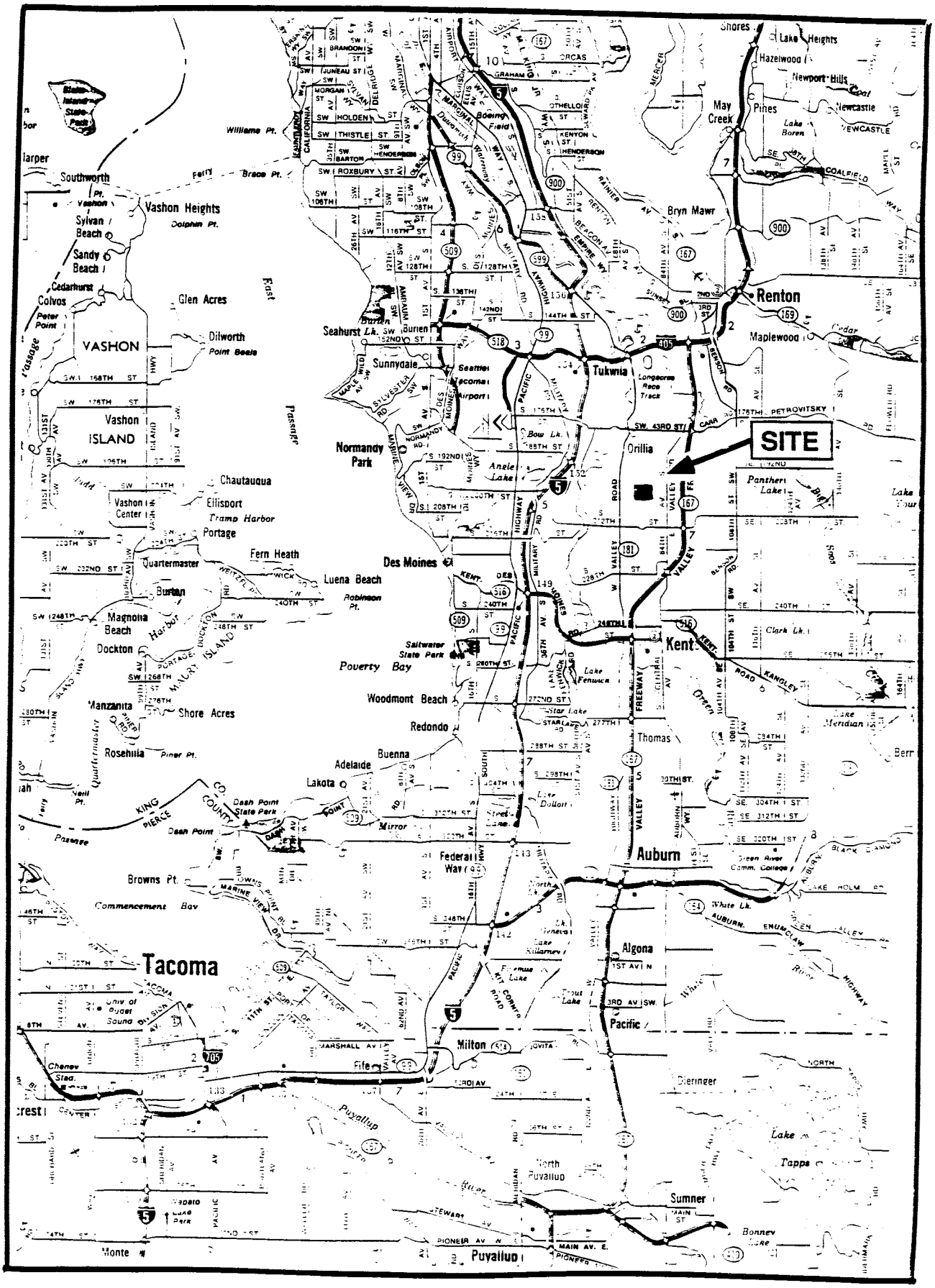
Breathing Zone Level	Required Action
Less than Action Level	- modified Level C protection - respirators optional but must be available
Equal to or Greater than Action Level	- Level C protection with mandatory respirator use - Evacuate downwind personnel without respirators - Establish causative factors - Implement corrective action if possible

NOTES:

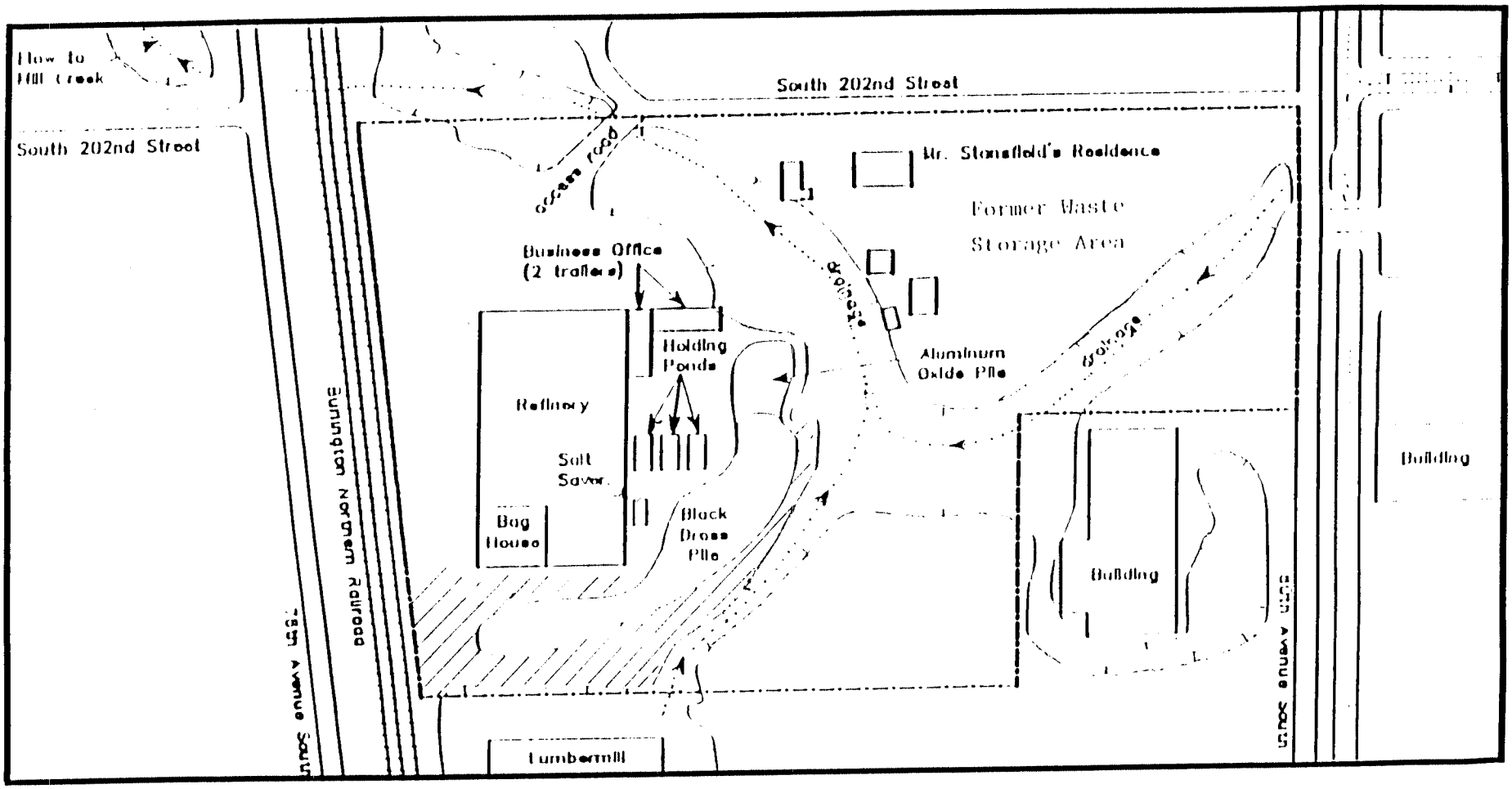
1 WAC 296-62-075(H)

2 f/cc = fibers per cubic centimeter
Taken as an 8-hour time weighted average as determined by the method prescribed in WAC 296-62-0775, or by an equivalent method.

3 Averaged over a 15-minute sampling period.



MK-ENVIRONMENTAL SERVICES BELLEVUE, WASHINGTON	FIGURE NO.: **1**	**SITE LOCATION**

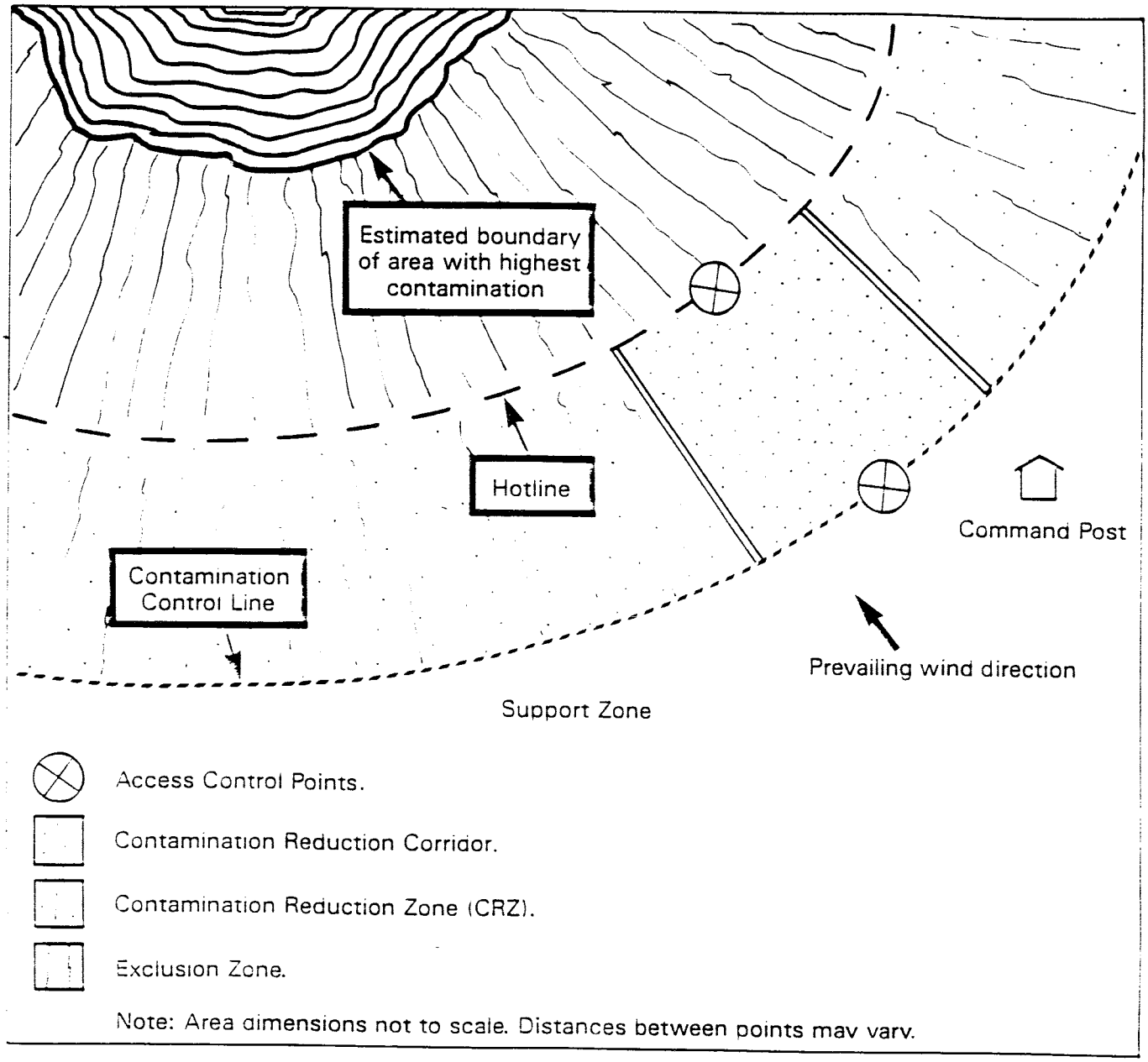


MK-ENVIRONMENTAL SERVICES
BELLEVUE, WASHINGTON

FIGURE NO
2

MARALCO SITE
GENERAL SITE LAYOUT

Figure 3



Site Work Zones. (Note that decontamination facilities are located in the Contamination Reduction Zone.)

N1054/OSHA-Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities (1985)

APPENDIX A

RESPIRATORY PROTECTION

PROGRAM

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APPENDICES

RESPIRATORY PROTECTION PROGRAM

PURPOSE

This procedure shall be used to provide minimum standards for respirator training and respirator use during performance of jobsite work. Because no safe level of exposure to asbestos fibers has been established, respiratory protection is used in conjunction with good work practices in abatement work. Since respirators are essential in the protection of worker health, the establishment and maintenance of an effective program is necessary.

This procedure shall apply to all personnel required to use respiratory protective devices as prescribed by the U.S. Department of Labor Occupational Safety and Health Standards for Construction 29 CFR 1926, for General Industry 29 CFR 1910 and/or all local authorities.

RESPIRATORY PROGRAM ELEMENTS

Certain tasks performed by employees will require the use of a respirator to assure that a healthful breathing environment is maintained at all times. The law requires that if respirators are used, a very comprehensive set of requirements be met. The minimal acceptable program is detailed in OSHA 1910.134(b) (1-11), and elaborated below:

A. Written standard operating procedures governing the selection and use of respirators shall be established.

B. Respirators shall be selected on the basis of the hazards to which the worker is exposed.

C. The user shall be instructed and trained in the proper use of respirators and their limitations,

D. Where practical, the respirators should be assigned to individual workers for their exclusive use.

E. Respirators shall be regularly cleaned and disinfected. Those issued for the exclusive use of one worker should be cleaned after each day's use, or more often if necessary. Those used by more than one worker shall be thoroughly cleaned and disinfected after each use.

F. Respirators shall be stored in a convenient, clean and sanitary location.

G. Respirators used routinely shall be inspected during cleaning. Worn or deteriorated parts shall be replaced. Respirators for emergency use, such as self-contained devices, shall be thoroughly inspected at least once a month and after each use.

H. Appropriate surveillance of work area conditions and degree of employee exposure or stress shall be maintained.

I. There shall be regular inspection and evaluation to determine the continued effectiveness of the program.

J. Persons should not be assigned to tasks requiring use of respirators unless it has been determined that they are physically able to perform the work and use the equipment. The consulting physician shall determine what health and physical conditions are pertinent. The respirator user's medical status should be reviewed periodically (usually, annually).

K. Approved or accepted respirators shall be used when they are available. The respirator furnished shall provide adequate respiratory protection against the particular hazard for which it was designed in accordance with standards established by competenet authorities.

This document specifies protocol to meet/exceed the minimal requirements of the law. As part of the program, a certification procedure shall be used for all respirator users. Certification checklists, essentially similar to Appendix J, shall be used to document that all training, fitting, and medical requirements have been met before a respirator is issued. These requirements shall be described in greater detail in the appropriate sections of this report.

TYPES OF RESPIRATORS

Respirators can be classified into the following categories:

A. Air-Purifying Respirators

1. These devices function by filtering the air before it reaches the breathing zone of the wearer.

2. Several different filter types have been approved (by the National Institute for Occupational Safety and Health) for protection against asbestos dusts. However, most contractors use high efficiency particulate air (HEPA) filters. These filters are capable of filtering 99.97% of a 0.3 micron monodispersed aerosol of dioctyl phthaiate (DOP).

3. These respirators are made in quarter-, half-, and full-face configurations. They are manufactured in sizes small, medium, and large to better fit the face of the wearer. To have the optimum seal, the worker must have no facial hair.

4. Prior to issuing any air-purifying respirator, the seal of the facepiece must be checked. This is done by conducting a qualitative fit test. The procedures for various tests are included in Appendix D.

B. Powered-Air Purifying Respirators

1. This type of respirator also purifies air by passing it through filters before it reaches the breathing zone of the worker.

2. Battery powered, it decreases the negative pressure inside the facepiece. This results in a higher level of protection for the wearer because the wearer is not drawing air from around the face seal.

C. Air-Supplied Respirators

1. These devices provide a fresh supply of air to the wearer. The protection of the worker does not depend upon the filtration of contaminated air.

2. Unlike air-purifying respirators, a positive pressure is maintained inside the facepiece in Type C, airline devices. This provides a higher lever of protection for the worker.

3. Breathable air (Grade D) must be supplied to workers. This is usually done through delivery of air from compressors or cylinders of compressed air.

4. If oil-lubricated compressors are used, a high temperature shut-off and/or carbon monoxide alarm must be placed inline. In the event the compressor overheats, the oil could burn, resulting in an influx of carbon monoxide into the breathing air.

5. Fit testing is required only if the type of airline respirator has a face-to-facepiece seal.

6. Caution must be taken to assure free movement of the hose supplying air.

RESPIRATOR SELECTION

A. Respirators must be selected on the basis of the hazards to which employees are exposed. Considerations include the type and concentration of contaminant, as well as regulatory intent. The selection shall be made by an industrial hygienist.

B. The National Institute for Occupational Safety and Health (NIOSH) is the government agency responsible for testing and certifying respirators. Only NIOSH certified respirators, filters, and cartridges should be used.

C. Only the respirator type individually assigned and fitted by the industrial hygienist should be used.

D. Appendix A contains an outline to assist with the selection of the appropriate respiratory protective device.

MEDICAL DETERMINATION OF ABILITY TO WEAR RESPIRATORS (all types)

A. Prior to respirator certification, the employee shall receive a medical evaluation by a designated occupational medicine physician. Additionally, examinations shall be made at least annually and within 30 days after the termination of employment to determine that there are no signs of disease. These evaluations shall be coordinated through the project manager and the designated project physician.

B. The following information shall be provided to the physician by the industrial hygienist prior to the employee examinations:

1. Type of respirator to be used.
2. Tasks employee will perform.
3. Energy requirements of the task.
4. Visual and hearing requirement related to the task.
5. Substances to which employee will be exposed.

C. The medical evaluation shall include both a medical history and a physical examination.

. Prior to beginning work on an asbestos project, the worker should undergo the following medical examinations (OSHA requirements) provided or made available by employer:

a. A chest roentgenogram (posterior-anterior 14 x 17 inches);

b. A history to elicit symptomatology of respiratory disease;

c. Pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second ($FEV_{1.0}$)

EMPLOYEE TRAINING

A. The user and supervisor shall be trained in the proper use and maintenance and limitations of their respirators.

B. A training protocol for air purifying and supplied air respirators can be found in Appendix C.

C. Training shall include a written and/or practical examination as part of the respirator certification process.

FIT TESTING OF RESPIRATORS

A. The following tests shall initially be performed by an industrial hygienist to certify adequacy of respirator fit:

1. Irritant smoke and/or isoamyl acetate
2. Negative pressure test
3. Positive pressure test

Specific fit testing procedures to be followed are found in Appendix D.

B. Prior to each entry of the work environment, a fit test will be performed to insure integrity of the filters, proper filter seating and/or a satisfactory face seal. Such tests will be documented and acknowledged by each employee.

C. Employees not able to demonstrate a good facial seal shall not be certified to wear a respirator.

RESPIRATOR USE FOR ASBESTOS WORK

A. Adequate respiratory protection will be worn:

1. During all pre-removal activities when the possibility of exposure to airborne asbestos fiber exists;

2. During all removal activities;

3. During all clean-up, decontamination, and disposal activities, until the final clearance level has been met;

4. During disposal at the landfill to avoid exposure if an asbestos container ruptures.

B. Procedures for wearing respirators.

1. Air-Purifying Respirators.

a. Only a clean and sanitized respirator, which has been inspected, will be worn.

b. The device will be properly donned in the Clean Area, prior to putting on disposable hoods or any other articles which will be worn on the head or neck.

c. A positive or negative pressure check will be performed. If this check is successful, any remaining clothing and equipment can be donned, and the worker can proceed with his duties. If the check is not successful, the worker will contact his supervisor or assistant supervisor. A smoke test may be required at any time.

d. Each time the worker exits the work area, the respirator is worn into the shower, and the respirator is thoroughly soaked before it is removed.

e. The respirator is then removed and the filters placed in the labeled receptacle.

f. Any visible contamination is washed from the respirator, and the respirator is then placed in the labeled receptacle.

g. The worker then showers and proceeds to the Clean Area.

2. Powered-Air Purifying Respirators

a. Only a clean and sanitized respirator, which has been inspected, will be worn.

b. The device will be properly donned in the Clean Area, prior to putting on disposable hoods or any other articles which will be worn on the head or neck.

c. A positive or negative pressure check will be performed. If this check is successful, any remaining clothing and equipment can be donned, and the worker can proceed with his duties. If the check is not succesful, the worker will check the respirator, redon the device, and again perform a negative or positive pressure check. If successful, the worker will don any remaining clothing and equipment and proceed with his duties. If the check is still unsuccessful, the worker must contact his supervisor for assistance.

d. Each time the worker exits the work area, the battery pack is unfastened from the respirator and carefully held while the worker removes his disposable clothing in the Equipment Room.

e. The worker then shuts off the battery pack and places it into the designated plastic bag. The battery pack is still connected to the respirator. Clean air is still being supplied to the worker, but the respirator is now a negative-pressure device.

f. The worker proceeds into the shower and carefully holds close the plastic bag at the point where the breathing tube connects to the battery pack.

g. The worker then soaks the respirator and exposed breathing tube.

h. After the exposed respirator parts are soaked, the respirator is removed, and the breathing tube is carefully disconnected from the battery pack, while holding the top shut.

i. The battery pack is secured with the closure provided and placed in the labeled receptacle.

j. Any visible contamination is washed from the respirator, and the respirator is then placed in the labeled receptacle.

k. The worker then showers and proceeds to the Clean Area.

3. Airline Respirators

a. Only a clean, disinfected, and inspected respirator will be worn.

b. The device will be properly donned in the Clean Area.

c. The airline will be connected to the respirator prior to the worker leaving the Clean Area.

d. Whenever the work area will be exited, the worker will proceed to the Equipment Room, remove his clothing, and proceed to the shower, while still wearing the respirator connected to the airline.

e. The respirator is thoroughly soaked and is then removed.

f. All visible contamination is washed from the device, the airline is disconnected, and the respirator is placed into the labeled receptable.

g. The worker then showers and proceeds to the Clean Area.

STORAGE AND MAINTENANCE OF RESPIRATORS (all types)

A. All respirators will be stored in a clean and sanitary location convenient to the area requiring their use.

B. All respirators, when not in use shall be kept in an approved storage location.

C. Respirators shall be maintained and inspected in accordance with procedures outlined in Appendix F.

SUPPLIED AIR RESPIRATORS

A. Breathing air tanks will be refilled after each use.

B. Air used in supplied air respirators shall, minimally, meet Grade D specifications for breathing air (Compressed Gas Association Commodity Specifications G-7. 1-1966).

C. Compressed oxygen will not be used in supplied air respirators designed for using compressed air.

D. Supplied air respirators shall be maintained according to the maintenance schedule in Appendix F.

E. Periodic cleaning, changing and maintenance of filters for breathing air compressors shall be conducted to ensure they are functioning properly.

F. Compressors supplying breathing air shall be designed, constructed and located to prohibit entry of contaminated air into the system.

G. Oil lubricated compressors must be equipped with a carbon monoxide alarm, and/or a high temperature shutoff.

H. Air line couplings shall be incompatible with other gas or compressed air systems to prevent accidental hook-up to non-respirable gas or oxygen.

EMERGENCY PROCEDURES (supplied air respirators)

A. Appropriate respiratory protection will be utilized, by certified users only, upon entering contaminated atmospheres to perform rescue or maintenance operations.

B. When it is determined that rescue or emergency maintenance operations will be required on a process or in an area, suitable personal protective equipment will be provided for such purposes.

C. Such equipment shall be easily accessible to personnel but located outside the area in question.

D. Whenever operations require an individual to enter an immediately dangerous to life and health (IDLH) atmosphere wearing a supplied air respirator for rescue or maintenance, standby personnel must be present wearing suitable rescue equipment. Standby personnel shall be in such a position so that they would be unaffected by any toxic or oxygen deficient atmospheres encountered.

E. Airline respirators may only be used in IDLH atmospheres in pressure-demand mode and with the use of an accessory egress bottle.

F. Additional safety equipment can be used (such as safety harnesses and safety lines for lifting and removing individuals) as needed. The requirements for this additional equipment shall be properly documented in emergency response procedures.

LIMITATIONS

A. Air purifying respirators are to be used only in:

1. Atmospheres that are not oxygen-deficient;

2. Atmospheres that are not immediately dangerous to life or health (IDLH);

3. Atmospheres that do not exceed the protection factors of the type of respirator chosen.

B. Powered-air purifying respirators are to be used only in:

1. Atmospheres that are not oxygen-deficient;

2. Atmospheres that are not immediately dangerous to life or health (IDLH);

3. Atmospheres that do not exceed the protection factors of the type of respirator chosen.

C. Airline respirators are to be used only in:

1. Atmospheres that are not immediately dangerous to life or health (IDLH);

2. Atmospheres that do not exceed the protection factors of the type of respirator chosen.

RESPONSIBILITES

A. The industrial hygienist or designee shall be responsible for:

1. Documenting and maintaining the respirator program on file.

2. Updating the program as needed.

3. Conducting or arranging for training and fit testing.

4. Certifying and maintaining on file a list of certified respirator users and their certification forms. (Appendix J)

5. Conducting random inspections of all areas using respirators to ensure compliance with the program.

6. Specifying the type of respiratory protection required.

7. Conducting periodic evaluations to determine the need for respirators on a continuous basis.

8. Providing examining physicians with pertinent information regarding potential respirator users.

9. Repairing respirators or arranging for repairs as needed.

10. Performing air measurements on all breathing air compressors to assure Grade D specifications.

11. Arranging to have breathing air tanks refilled within one day after their use.

12. Arranging to have hydrostatic tests performed on compressed air cylinders, as required.

B. The employee shall be responsible for:

1. Wearing appropriate respirators, as well as required personal protective equipment, for performing assigned tasks.

2. Informing their supervisor of any health conditions that may be aggravated by the use of a respirator.

3. Storing and maintaining respirators in a clean, sanitary condition.

4. Reporting to their supervisors any maintenance needs of their respirator.

5. Cleaning and sanitizing respirators after each use and returning them to their storage location properly bagged and sealed.

6. Performing self administered fit tests prior to the use of respirators.

7. Using only clean, assigned respirators, which are in good condition.

C. Supervisors shall be responsible for:

1. Interfacing with the industrial hygienist regarding potential contaminants in their area.

2. Ensuring that all respirator users are certified.

3. Ensuring that employees maintain respirators in a clean, sanitary condition.

4. Ensuring that only approved respirators are utilized by employees.

5. Maintaining a list of respirator users in their areas, including type of respirator used, dates of training, fit testing and medical examinations.

6. Conducting frequent (daily/weekly) inspections of respirator storage areas and noting condition of respirators.

7. Informing the industrial hygienist of any changes in workplace conditions or new employees who might be required to use respirators.

8. Stocking and issuing approved replacement cartridges for air purifying respirators.

9. Returning defective respirators for repair.

D. Area managers will be responsible for informing the industrial hygienist of any future work which may require the use of a respirator. Additionally, area managers will ensure that a respiratory protection program is maintained as required.

APPENDICES

APPENDIX A

RESPIRATOR SELECTION GUIDE

HAZARD:	RESPIRATOR:
Oxygen Deficiency	Self-contained breathing apparatus. Hose mask with blower. Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
Gas and Vapor Contaminants: Immmediately dangerous to life or health.	Self-contained breathing apparatus. Hose mask with blower. Air purifying, full facepiece respirator with chemical canister (gas mask). Self-rescue mouthpiece respirator (for escape only). Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
Not immediately dangerous to life or health.	Air-line respirator. Hose mask without blower. Air-purifying, half mask or mouthpiece respirator with chemical cartridge.
Particulate Contaminants: Immediately dangerous to life or health.	Self-contained breathing apparatus. Hose mask with blower. Air-purifying, full facepiece respirator with appropriate filter. Self rescue mouthpiece respirator (for escape only). Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
Not immediately dangerous to life or health.	Air-purifying, half-mask or mouthpiece with filter pad or cartridge. Air-line respirator. Air-line abrasive-blasting respirator. Hose mask without blower.
Combination Gas, Vapor and Particulate Contaminants: Immediately dangerous to life or health.	Self-contained breathing apparatus. Hose mask with blower. Air-purifying, full facepiece respirator with chemical canister and appropriate filter (gas mask with filter). Combination air-line respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.

Not immediately dangerous to life or health.	Air-line respirator. Hose mask without blower. Air-purifying, half mask or mouthpiece respirator with chemical cartridge and appropriate filter.

Reference:

U.S. Department of Labor Construction Safety Standards 29 CFR 1926 Respiratory protection. Table E-4.

APPENDIX B

MEDICAL QUESTIONNAIRE FOR RESPIRATOR PROGRAM

Based upon the recommendations listed in the American National Standard, ANSI Z88.2-1980, "Practices for Respiratory Protection", all employees who will or may be required to wear respirators on this project must complete the following questionnaire:

Instructions:

Please indicate if you have any of the following: (if you answer any items "yes", please explain below).

	YES	NO
Emphysema	____	____
Chronic obstructive pulmonary disease	____	____
Bronchial Asthma	____	____
Pneumoconiosis	____	____
Coronary artery disease	____	____
Cerebral blood vessel disease	____	____
Severe or progressive hypertension	____	____
Epilepsy, grand mal or petit mal	____	____
Anemia	____	____
Diabetes	____	____
Punctured eardrum	____	____
Breathing difficulty when wearing a respirator	____	____
Claustrophobia or anxiety when wearing a respirator	____	____
	____	____

Describe nature of illness/any medications: _____

_____

_____

_____

_____

_____

Name (Print) _____
Last First Middle

Date: _____ _____
Signature

2173g/15

APPENDIX C

EMPLOYEE TRAINING
(Air Purifying Respirators)

I. Training shall be conducted prior to the use of respirators on the job, and shall cover at least the following items:

1. Reason for wearing respirator
2. Type to be worn and how it works
3. Components of the respirators to be used
4. Inspection of the respirator
5. Cleaning and maintenance procedures
6. Self administered fit tests prior to use, stressing the importance of a good seal
7. Proper storage procedures
8. Replacement of cartridges (frequency procedure)
9. Employee responsibilities
10. Emergency use (if applicable)
11. Limitations of respirators
12. User certification procedures

II. A written and/or practical exam shall be passed by all respirator users before certification.

EMPLOYEE TRAINING

(Supplied Air Respirators)

I. All supplied air respirator users will be trained and fit tested prior to using such equipment. This includes any individuals who may be required to use such respiratory equipment for maintenance, emergency or rescue activities.

II. Training shall minimally consist of the following items:

A. The function and components of the unit, including theory of operation.

B. Pre-use inspection:

1. Check tank for air (if applicable)
2. Perform stretch test to check mask, headstraps and breathing tube
3. Check harness straps

C. Demonstration:

1. How to don the unit (posture and sequence of strap tightening)
2. Proper adjustment of headstraps
3. How to operate unit

D. Demonstration of good fit and factors that may affect facial seal:

1. Positive and negative pressure test (Appendix D)
2. How facial hair affects fit
3. Self administered fit tests

E. Proper removal of supplied air respirator

F. Care, maintenance and cleaning of supplied air respirator (instruction will vary depending on type used).

G. Procedures to be followed and factors to be considered when using supplied air respirators in contaminated environments:

1. Length of air supply (SCBA)
2. Air supply warning bell
3. Use of standby personnel in atmospheres Immediately Dangerous to Life and Health (IDLH)

H. Limitations of Supplied Air Respirators

IV. A written and practical exam shall be passed by all supplied air respirator users before certification.

APPENDIX D

FORMAL FIT TESTING

I. The following tests will be performed on all individuals required to wear a respirator prior to issuance:

A. Negative Pressure Test
B. Positive Pressure Test
C. Irritant Smoke/Isoamyl Acetate Vapor Test

II. Negative Pressure Test

A. The procedure for the negative pressure tests is as follows:

1. Put on respirator without cartridges.
2. Cover cartridge inlets with hands.
3. Breath in gently and hold for 5 seconds.

III. Positive Pressure Test

A. The positive pressure test is similar to the negative pressure test, the difference being the exhalation valve is covered and the employee exhales into the mask gently. If no leakage occurs, adequate fit is indicated.

B. At this point, employees will be reminded to conduct positive and negative pressure tests prior to each use of the respirator.

C. Once the negative and positive pressure tests are satisfactorily performed, the isoamyl acetate and/or irritant smoke test may be conducted.

IV. Irritant Smoke Test

A. Supply the type of respirator to be worn with appropriate cartridges.

B. Have the individual put the respirator on as he normally would (during this time observe the technique, and correct if necessary).

C. Score a smoke tube and place in bulb.

D. Instruct user to close his eyes (necessary if using a quarter or half mask respirator) and breath regularly.

E. Blow smoke along entire facial seal. If the irritant smoke produces an involuntary cough, stop the test. In this case, the respirator is either rejected, readjusted and retested, or another respirator is selected and tested.

F. In addition to normal breathing, test using the above methods while:

1. Employee swings head from side to side and up and down
2. During deep breathing
3. While bending over several times
4. While talking

G. If all tests prove satisfactory, the type of respirator worn is recorded, and a permanent respirator of that type is issued.

V. Isoamyl Acetate (Banana Oil) Fit Test

This is performed similarly to the irritant smoke test with the following exceptions:

A. Organic vapor cartridges are used on the respirators.

B. The user is instructed to indicate to the tester if he can smell the vapor (banana oil scent), as an involuntary response will not be elicited.

Generally, the banana oil test should precede the smoke test for the comfort of the respirator user.

APPENDIX F

INSPECTION OF AIR PURIFYING RESPIRATORS

I. Air purifying respirators shall be inspected by employees before each use and after cleaning for the following items:

A. Rubber facepiece:

1. Excessive dirt
2. Cracks, tears or holes
3. Distortion of facepiece

B. Headstraps:

1. Breaks or tears
2. Loss of elasticity
3. Missing, broken, or malfunctioning buckles or straps
4. Excessively worn serrations on the head harness

C. Inhalation and exhalation valves:

1. Detergent residue, dust particles or dirt on valve or valve seat
2. Cracks, tears or distortion of valves
3. Missing or defective valve covers

D. Filter cartridges:

1. Proper filter (approved by industrial hygienist)
2. Missing or worn gaskets
3. Worn threads
4. Cracks or dents in filter housing

II. Correct deficiencies or notify the industrial hygienist who will issue a new respirator.

MONTHLY PREVENTIVE MAINTENANCE FOR SUPPLIED-AIR RESPIRATORS

I. The following inspection shall be performed monthly by qualified personnel on Self-Contained Breathing Apparatus and after each use:

A. Rubber facepiece, check for:

1. Excessive dirt
2. Cracks, tears or holes
3. Distortion of facepiece (allow facepiece to "sit" freely, if distortion does not disappear, replace facepiece)
4. Loose fitting, cracked or scratched facepiece

B. Headstraps, check for:

1. Breaks or tears
2. Loss of elasticity
3. Condition of buckles
4. Worn serrations on head harness which would allow facepiece to slip
5. Fully extended in front of mask

C. Corrugated breathing tube, check for:

1. Cracks or holes
2. Missing or loose hose clamps
3. Broken or missing end connectors

D. Harness, check for:

1. Straps in fully extended position
2. All straps on unit
3. Straps not torn or frayed
4. Missing or broken buckles

E. Air cylinder, check for:

1. "Full" pressure reading on cylinder (if not full, refill tank)
2. Condition of tank
3. Date of last hydrostatic test (if over 5 years, make arrangements to have test performed)

F. Air tightness:

1. With main-line (yellow) closed, open cylinder valve to pressurize regulator and hose.
2. Place hand over regulator outlet and block it until leaktight
3. Open main-line handwheel fully and observe the pressure gauge on the pressure demand regulator and compare to cylinder pressure

4. Close the cylinder valve and observe regulator pressure gauge for drop in pressure. Remove hand from regulator outlet and check for function of audi-larm (375-560 PSI). If leakage is noted or alarm malfunctions, remove unit from service and contract the industrial hygienist.

G. Main-line and by-pass valves:

1. Test by donning the apparatus and operating normally. The regulator should follow the normal breathing pattern. Open by-pass and ensure a rush of air is delivered to the facepiece.

H. Log inspection results

I. If any unit is not ready for service it should be tagged "DO NOT OPERATE".

II. Airline respirators used for periodic maintenance operations shall be inspected prior to each use as follows:

A. If the device is a tight-fitting facepiece, use the procedures outlined under AIR PURIFYING RESPIRATORS, except those relating to the purifying elements.

B. If the device is a hood, helmet or blouse, use the following procedures:

1. Examine for rips, tears and seam integrity
2. Examine headgear, if appropriate, for general condition with emphasis on the suspension
3. Examine faceshield for cracks, breaks or impaired vision

C. Check air supply for:

1. Integrity and condition of air supply lines and hoses
2. Operation and condition of regulators, valves or other air flow regulators

APPENDIX G

CLEANING AND STORAGE PROCEDURES

A. Cleaning

1. Labeled receptacles, which contain the manufacturer's recommended cleaning solution, are maintained in the shower.

2. The facepieces are removed from the receptacles and are disassembled.

3. All parts are washed in warm soapy water, and visible residue is removed with a brush.

4. The parts are rinsed in clean water and allowed to air-dry.

B. Inspection

1. All parts are inspected for dirt, residue, pliability of rubber, deterioration and cracks, tears, and holes.

2. The valves are checked for holes, warpage, cracks, and dirt.

3. Check hoods, helmets, and faceshields for cracks, tears, abrasions, and distortions.

4. Check air supply for air quality, breaks or kinks in the supply hoses and detachable coupling attachments, tightness of connectors, and manufacturer's recommendations concerning the proper setting of regulators and valves.

5. Check that couplings are compatible with other couplings used on the site.

6. Check the air purifying elements, carbon monoxide alarm, and high temperature shut-off.

C. Storage

1. All cleaned and inspected respirators are stored in plastic bags in the Clean Area.

2. The devices are stored in a normal position.

APPENDIX H

SPECIAL PROCEDURES FOR AIRLINE RESPIRATORS

A. Air pumps are routinely used for airline respirators. The intake must be located in a clean, temperate air source.

B. Compressed breathing air is tested weekly with a Draeger Aerotest Kit to insure that the following air purity standards are met:

1.	Oxygen	19-23%
2.	Carbon Monoxide	20 ppm
3.	Hydrocarbon	5 mg/m^3
4.	Carbon Dioxide	1,000 ppm

C. The individual performing the tests will be technically competent.

D. The test results are recorded in the Test Log.

E. To avoid freezing of parts in cold weather, the dewpoint of the air is maintained at least 10^{o} F below the lowest recorded temperature.

Contract Location: _____ Contract Number: _____

Qualitative fit test for exposure to: _____

Cartridge Type: _____

Name/Signature	Date	RespiratorStyle & Number	Fit	Test By

MORRISON KNUDSEN ENGINEERS
A MORRISON KNUDSEN COMPANY

_____
Health & Safety Compliance Manager

_____
Project Manager

AIR PURIFYING RESPIRATOR---------CERTIFICATION CHECKLIST

NAME:
DEPT. #: SHIFT: EMPLOYEE #:
SUPERVISOR:

JOB TITLE:

TYPE OF RESPIRATOR:

POTENTIAL CONTAMINANT(S):

CONDITIONS OF USE (JOB DESC.,LOCATION,PROCESS):

MEDICAL EXAM COMMENTS:

DATE: Physician's Signature:

WRITTEN/PRACTICAL EXAM COMMENTS:

Date: Examiner:

FIT TEST COMMENTS:

Date: I.H. Signature:

The person named above has fulfilled the requirements for using the respirator(s) stated under specified conditions. This certification shall expire in one year.

Date: Expiration Date:

I.H. Signature:

I acknowledge that I have received instruction, been medically examined and have been fit tested to wear the respirator(s) stated above.

Date: Employee Signature:

APPENDIX J

For more information, please contact us at one of the following office locations:

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ENVIRONMENTAL SERVICES DIVISION