DRAFT GROUNDWATER ASSESSMENT WORKPLAN

CLIFF KOPPE METALS, INC.
1610 SOUTH RIVER ROAD
KELSO, WASHINGTON

Prepared for

Koppe Metals Facility

December 31, 1996

Prepared by

Maul Foster & Alongi, Inc.
7223 NE Hazel Dell Avenue, Suite B
Vancouver, Washington 98665

Project 9005-001.001

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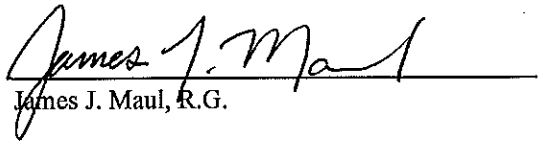
The material and data in this workplan were prepared under the supervision and direction of the undersigned.

Maul Foster & Alongi, Inc.



James J. Maul, R.G.

CONTENTS

TABLES AND ILLUSTRATIONS

1 INTRODUCTION

This workplan, prepared by MFA on behalf of Cliff Koppe Metals, Inc. (Koppe Metals) presents a scope of work to perform additional site assessment activities at the Koppe Metals facility located at 1610 South River Road, Kelso, Washington (Figure 1). The scope of work will evaluate if site operations have impacted shallow groundwater and surface soils at the site. Project objectives are described in Section 2.

1.1 Site Background

Koppe Metals (referred to as "the site") is located at 1610 South River Road, in Kelso, Washington (Figure 1). The site is approximately 5 acres, and is bounded by residential properties on the north, east, and south, and the Cowlitz River to the west. The site is adjacent to the diked portion of the Cowlitz a River's eastern floodplain (see Figure 1). South River Road is on top of the dike between the site and the Cowlitz River. The site is underlain by alluvial sands and silts deposited by the river. Groundwater is assumed to flow west toward the Cowlitz River; thus, the Cowlitz River would probably be the only downgradient recipient of groundwater coming from the site. The site was purchased in 1982 and is currently used as a scrap metal recycling facility.

1.2 Objectives

Additional site assessment activities will evaluate if site operations have potentially impacted surface soils and the shallow groundwater beneath the site. The proposed work includes:

- Installing three groundwater monitoring wells at the site (one upgradient and two downgradient) to evaluate groundwater quality and hydraulic gradients under the site.

- Collecting groundwater samples during a period of seasonally high water levels (April 1997), and a period of seasonally low water levels (October 1996). The three monitoring wells will be used to evaluate potential impacts to groundwater at the site.

- Surveying ground surface and top of monitoring well casing elevations, measuring groundwater levels, and converting groundwater levels to groundwater elevations to estimate the direction of groundwater flow.

- Collecting soil samples from two locations in a currently unused portion of the site to evaluate potential impacts to surface soil by former site operations.

The data form this assessment may be used by Ecology to evaluate if the site can be removed from the HSL, or if further assessment of environmental conditions is necessary.

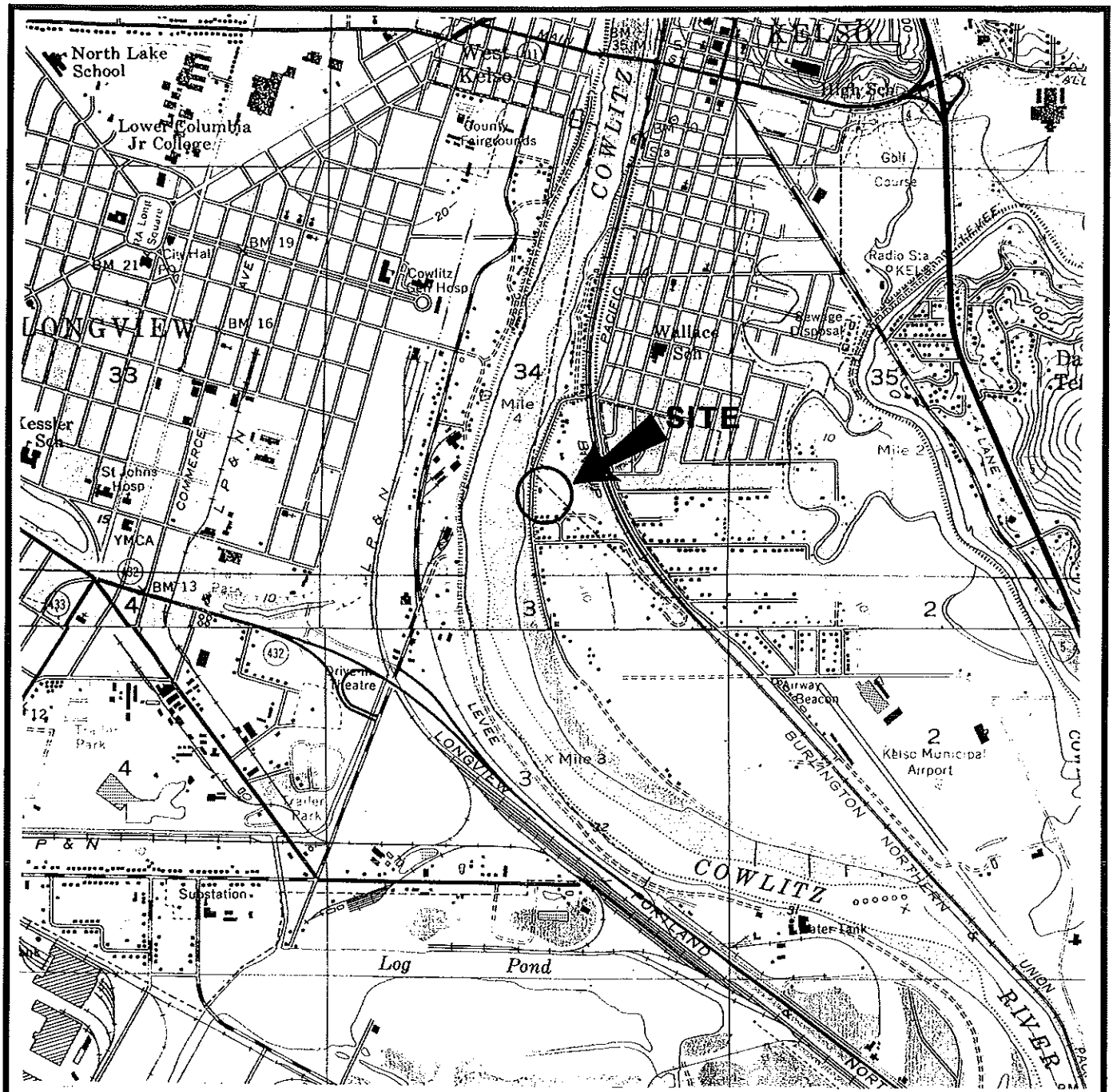
Table 1

Site Assessment Monitoring Summary
Koppe Metals Site
Kelso, Washington

Station	Analyses	Frequency	Rationale
Monitoring wells screened[a] in uppermost aquifer	Selected dissolved metals,[b] USEPA Method 6010/7000	Two times (10/96 and 4/97)	Evaluate potential impacts to uppermost aquifer
Surface soil sampling locations	WTPH-HCID and followup, selected metals,[b] USEPA Method 6010/7000	Once	Evaluate potential impacts to shallow soil

[a] See Figure 2.

[b] Cadmium, chromium, copper, iron, lead, mercury, selenium, silver, manganese, zinc.



Base Map From: U.S.G.S. 7.5 minute topographic quadrangles Kelso, Washington, 1970.

Maul Foster & Alongi, Inc. 1111 Main Street, Suite 300 Vancouver, Washington 98660	DATE: 12/31/96 DWN: SPT APPR: REVIS: PROJ: 9005-001.001	**Figure 1** **KOPPE METALS** **Kelso, Washington** **Site Location Map**

2 SCOPE OF WORK

Before field work begins, MFA will prepare a Site Health and Safety Plan. The drilling contractor will be license din the state of Washington, and will file start cards and other appropriate documentation with the state before drilling begins.

2.1 Installation of Groundwater Monitoring Wells

Groundwater monitoring wells will be installed at he site to:

- Evaluate the groundwater quality at three sampling points in the uppermost groundwater flowing beneath the site.
- Determine the direction of groundwater flow in shallow groundwater at the site.

Before drilling, downhole drilling and sampling equipment will be decontaminated using high-pressure hot water. Borings will be advanced using a Mobile B-59 drill rig equipped with 6 5/8-inch diameter hollow-stem augers. The maximum assumed drilling depth is 25 feet below the ground surface (bgs).

The site is underlain by interbedded silt and sands deposited by the Cowlitz River. It is anticipated that monitoring wells will be screened in the saturated silty and sandy alluvium. Continuous soil samples form the borings will be collected using a 5-foot-long, 6 5/8-inch-diameter core barrel to gather lithologic and hydrologic information. Soil samples will be described consistent with American Society of Testing and Materials procedures, and descriptions will be recorded on a field boring log (see Appendix A).

Monitoring Well Construction

Monitoring wells will be constructed using 2-inch wide diameter (i.d.), flush-threaded schedule 40 PVC well casings and screens (see Appendix B). The wells will be equipped with 10 feet of 2-inch i.d., schedule 40 PVC screens with 0.020-inch machine slots. A filter pack consisting of coarse-grained silica sand will be placed around each screen, and will extended 3 feet above the top of the screen. the remainder of the borehole annulus will be sealed using granular bentonite. Wells will be installed by lowering the

assembled PVC well screen and casing through the hollow-stem augers, with the augers gradually withdrawn as installation proceeds. Wells will be completed with locking, aboveground, steel security casings set in concrete.

2.2 Well Development

Monitoring wells will be developed by bailing, surging, and pumping to remove sediment that may have accumulated ruing drilling, and to improve hydraulic communication with the aquifer. Development will continue until groundwater is visibly free of sediment (less than 1 millimeter of sand, as measured by an Imhoff settling cone), and the volume of water added during drilling has been removed. Field parameters (i.e., pH, specific conductance, and temperature) will be measure periodically during development. Meters will be calibrated according to manufacturer's specifications. Development will continue until field parameters stabilize to within 10 percent of the previous measurement, up to a maximum of 4 hours. If possible, at least 5 pore volumes will be removed during development.

New monitoring wells will be surveyed for ground surface elevation (to the nearest 0.1 foot), elevation of the top of the PVC casing (to the nearest 0.01 foot), and horizontal position (to the nearest 0.5 foot) relative to mean sea level. Surveying will be performed by a licensed surveyor.

2.3 Groundwater Monitoring

Groundwater samples will be collected from the monitoring wells in October 1996 and April 1997. MFA proposed to collect samples during periods of seasonal low water levels (October 1996) and seasonally high water levels (April 1997). Procedures for collecting groundwater samples include:

- Decontaminating sampling equipment before sampling each well.
- Measuring depth-to-water (DTW) and depth-to-bottom (DTB) in the well before sampling
- Purging three pore volumes from the well before sampling to ensure that samples are representative of groundwater flowing into the well from the aquifer.
- Measuring field parameters (temperature, pH, and specific conductance) after the removal of each pore volume using appropriate measurement equipment.
- Sampling each well using appropriate equipment.

- Documenting sampling procedures on field sampling data sheets, (FSDSs), chain-of-custody (COC) forms, and in a site field notebook.

- Proper handling, storage, and shipment of samples to the analytical laboratory with COC documentation.

- Validating data using appropriate criteria.

Water Level Measurements

The DTW and DTB measurements will be obtained form each well using an electric water level detector before sampling any of the wells. Water levels will be measured to the nearest 0.01 foot from a surveyed notch or mark at the top of the PVC casing. Measurements will be recorded on an FSDA, and will include the date, time , and initials of the sampler. The water level indicator will be decontaminated between wells by rinsing the sampler. The water level indicator will be decontaminated between wells by rinsing with deionized water. The DTW measurements collected using groundwater sampling activities will be converted to relative groundwater elevations using the well survey data. These data will be used to generate a water level elevation contour map for each sampling event., which will be included in a letter report, as described in Section 3.

2.3.1 Sample Collection

Before sampling each well, a minimum of 3 pore volumes will be removed with either a high-capacity peristaltic pump fitted with new silicon and Tygon™ tubing, or with a Teflon® or disposable bailer secured with monofilament line. The pore volumes (in gallon) will be calculated by multiplying the height of water column inside the well by the well's cross-sectional area. If a well purges dry during removal of groundwater, the well will be allowed to recharge for up to 24 hours before samples are collected. A minimum of 1 pore volume will be removed from each well before water quality samples are collected.

After removal of each pore volume, field parameters (i.e., temperature, pH, and specific conductance(will be measured with a portable pH meter and a combination temperature and specific conductance meter. Measurements will be recorded to the following standards: pH to ±0.01 units; conductivity to ±micromhos per centimeter, and temperature to ±0.5° C. Field instruments will be calibrated at least twice daily (i.e., beginning and middle of day) using standard solutions. Calibration procedures, date, and time will be recorded in the field notebook. Backup instruments will be available in case of malfunction. The field water quality data will be recorded on FSDSs. A copy of the

FSDS is included in Appendix A. Before sampling begins, pH and specific conductance must stabilize to within 10 percent of the previous pore volume reading.

Groundwater samples will be collected through the discharge line of the peristalitic pump. Samples will be analyzed for dissolved metals (Cd, Cr, Pb, Hg, Se, As, Cu, Fe, Ms, and Zn) using U.S. Environmental Protection Agency (USEPA) Method 6010/7000. Samples will be filtered during collection, using disposable, in-line 0.45 micron, nitro cellulose filters attached direction to the peristaltic pump discharge line. A new in-line filter and tubing will be used for each well to prevent cross-contamination. Samples will be transferred form the sampling equipment to laboratory-supplied containers. One duplicate sample will be collected per sampling event for field quality control. Samples will be submitted to Columbia Analytical Services, inc. (CAS), in Kelso, Washington, for analysis.

Water samples from the wells will be blind labeled; each sample will be designed by the abbreviation "KM-" followed by the date of collection, followed by a unique identification number, followed by a "W." Numbers will be assigned in sequential order, starting from 1, during a single monitoring period, regardless of the collection date. For example, a sample labeled KM-021596-1W would indicate that it was obtained at the Koppe Metals site on February 15, 1996, it was the first sample obtained for that sampling event, and it was a water sample.

2.4 Soil Sampling

Surface soil samples will be collected at two locations at the site from shallow excavations. The objective of the sampling is to evaluate potential impacts to shallow soils from previous site operations. Figure 2 shows soil sample locations. The actual locations may be modified in the field on the basis of access constraints or additional information concerning the objective.

Soil samples will be collected by excavating down to approximately 6 inches below grade using a decontaminated stainless-steel hand auger. Soil samples will be collected directly out of the auger and placed in labeled, laboratory-supplied sampling containers, and sealed with a Teflon-lined cap. The sample containers will be placed in an iced shipping container, and hand delivered to CAS for analysis with COC documentation. A copy of the COC form is included in Appendix A.

Soil samples will be blind labeled; each sample will be designed by the abbreviation "KM-" followed by the date of collection, followed by a unique identification number, followed by an "S." Numbers will be assigned in sequential order, starting from 1. For example, a sample labeled KM-021596-1W would indicate that it was obtained at the

Koppe Metals site on February 15, 1996, it was the first sample obtained, and it was a soil sample.

Soil samples will be analyzed for type and concentration of petroleum hydrocarbons (TPH) using Method WTPH-HCID and the appropriate followup. The soil samples will also be analyzed for total metals (Cd, Cr, Pb, Hg, Se, Ag, Cu, Fe, Mg, and Zn) using USEPA Method 6010/7000.

2.5 Decontamination and Waste Management

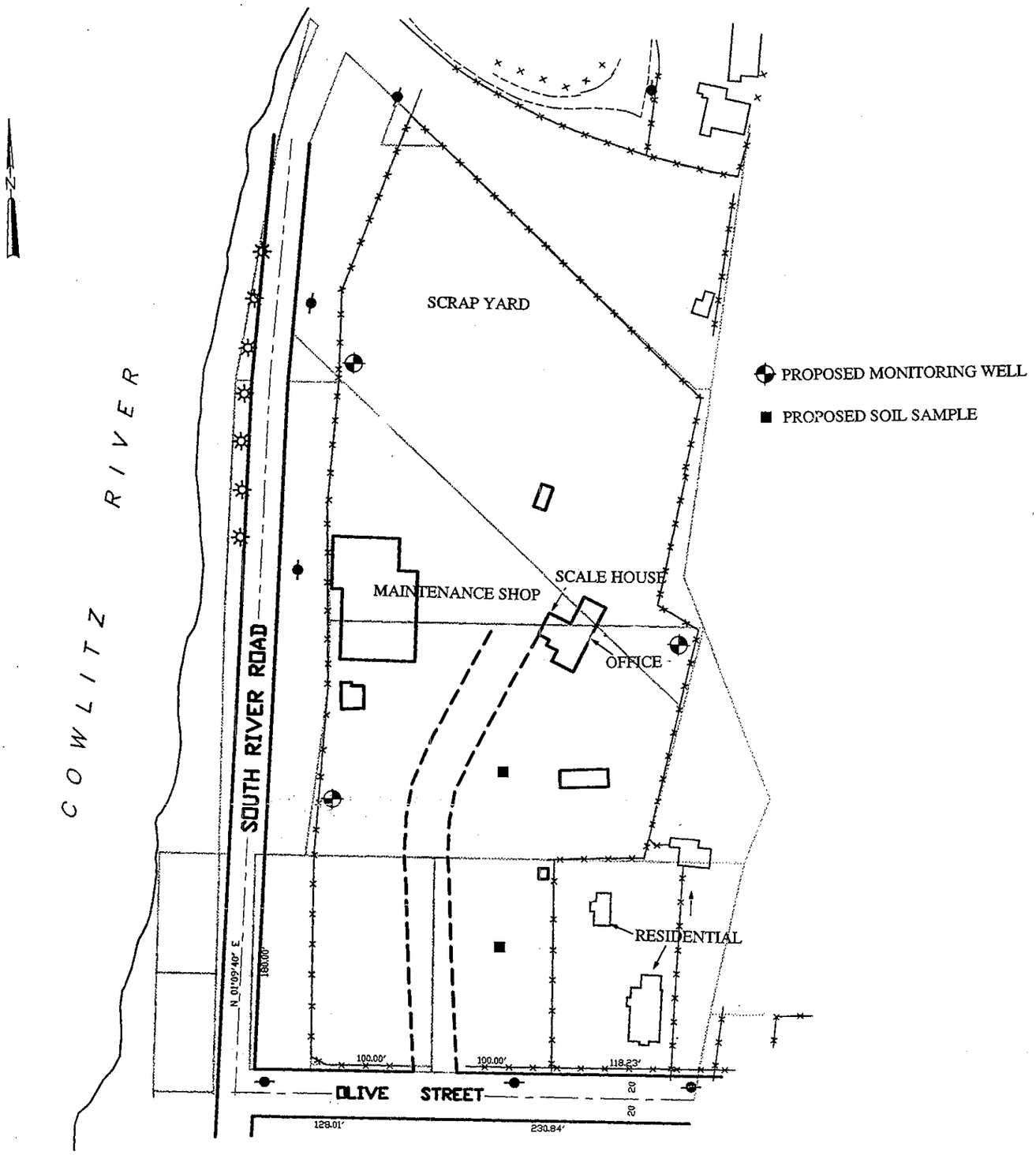
The hand auger and groundwater sampling equipment will be decontaminate before first use and between sampling locations. Decontamination will proceed as follows:

- Distilled water rinse
- Nonphosphatic detergent (e.g. Liquinox) and water wash
- Distilled water rinse
- Dilute nitric acid rinse
- Distilled water rinse
- Dilute methanol rinse
- Distilled water rinse
- Sample rinse

All sampling equipment and reusable materials will be decontaminated on site, between sampling locations.

Water generated during steam-cleaning, drilling, development, and sampling will be contained in clean 55-gallon drums until the results of laboratory analysis are obtained. It is anticipated that special handling of purge water following the first sampling run will not be necessary.

Cuttings generated during drilling will be stored in clean 55-gallon drums pending the results of laboratory analysis.



0 100 200

SCALE IN FEET

Base Map from EMCON Figure dated 3-12-96

Maul Foster & Alongi, Inc. 1111 Main Street, Suite 300 Vancouver, Washington 98660	DATE: DWN: APPR: REVIS: PROJ: 9005-001.001	**Figure 2** **KOPPE METALS** **Kelso, Washington** **Site Map**

3 REPORTING

3.1 Semiannual Monitoring Reports

Following each sampling event, a monitoring report will be submitted to Ecology, which provides the following information:

- A description of field procedures used during sample collection.
- A table summarizing DTW measurements and calculated water level elevations for each monitoring well at the site.
- An estimated potentiometric surface contour map constructed using appropriate computer software.
- A table summarizing soil and groundwater analytical results.
- A data validation report.
- A copy of the laboratory analytical report.
- An evaluation of the soil and groundwater data relevant to Ecology's cleanup standards.

The first biannual report will discuss the soil analytical results. The second biannual letter report will compare data collected from the current and previous groundwater monitoring events. The second biannual report will describe the direction of groundwater flow at the site, evaluate the adequacy of the existing monitoring well locations relative to the estimated groundwater flow direction(s), summarize chemicals detected in groundwater, evaluate compounds detected in samples from downgradient monitoring wells and upgradient monitoring wells, and compare concentrations detected with appropriate human health and environment risk screening criteria.

4 QUALITY ASSURANCE/QUALITY CONTROL

All field procedures, including monitoring well installation, groundwater sampling, and groundwater level monitoring, will be performed consistent with the quality procedures, in accordance with appropriate industry quality standards and regulatory agency guidelines. Groundwater quality samples will be analyzed in accordance with USEPA standard analytical methodology.

Procedures for validating and verifying analytical data include checking for internal consistency, transmittal errors, laboratory protocol, and laboratory quality assurance/quality control (QA/QC). The QA/QC sample results and information documented in field notes will be used to interpret and evaluate laboratory analytical results.

Where applicable, laboratory validation procedures will be consistent with USEPA guidance (USEPA, 1994a,b). Data validation will incorporate the following elements:

- Comparing COC documentation (analyses requested) with laboratory reports (analyses performed)
- Proofing data for anomalies; and investigating and correcting anomalies where reasonably possible
- Proofing laboratory data sheets for detection limits, holding times, surrogate recovery performance, and spike recovery performance
- Checking computerized data entries

5 SCHEDULE

Koppe Metals will initiate performance of the groundwater assessment within 60 days of receiving comments from Ecology. The first groundwater sampling event will be in October 1996. The second will be in April 1997. A groundwater assessment summary report will be prepared and submitted to Ecology within approximately 30 days following receipt of laboratory data from the October sampling event. A final report will be submitted approximately 30 days following the April 1997 sampling event.

REFERENCES

Ecology. 1990. Screening site inspection report, Cliff Koppe Metals, Kelso Washington.

USEPA. 1994b. USEPA Contact Laboratory Program National Functional Guidelines for Mental Data Review. U.S. Environmental Protection Agency. Office of Solid Waste and Emergency Response. EPA-540/R-94-012.

APPENDIX A

FORMS

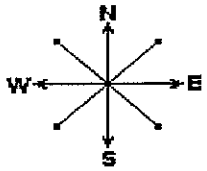
Maul Foster & Alongi, Inc.

7223 NE Hazel Dell Avenue, Suite B, Vancouver, WA 98665 • (360) 694-2691 • Fax: (360) 906-1985

Groundwater Field Sampling Data Sheet

Project Name: _____ Weather (circle):  Temperature (°C or °F): _____

Site Address: _____ Wind Speed (approx. mph): _____

Well I.D.: _____ Wind Direction (Circle): 

Label Code: _____ Specify Other:_____

Hydrology/Level Measurements (Nearest 0.01 ft.)

					(Product Thickness)	(Water Column)	(Gallon/ft x Water Column)	
Date	Time	DT-Bottom	DT-Product	DT-Water	DTP-DTW	DTB-DTW	Volume (Gallons)	
							1 Pore Vol:	
							3 Pore Vol:	

Gallons of Water/Foot for Various Well Diameters
(1" = 0.041 gal/ft) (2" = 0.163 gal/ft) (3" = 0.367 gal/ft) (4" = 0.653 gal/ft) (6" = 1.469 gal/ft) (10" = 4.080 gal/ft) (12" = 5.875 gal/ft)

Water Quality Data

Vol. #	Method*	Gallons Purged	pH	E Cond (µS)	°F Temp °C	DO (mg/L)	Other	Water Quality
1								
2								
3								
4								
	(Select 1-7)	(Running Total)			(Circle Units)		(Specify)	(Color, Clarity, Sheen)

*Methods: (1) Submersible Pump (2) Peristaltic Pump (3) Disposable Bailer (4) PVC/Teflon Bailer (5) Dedicated Bailer (6) Dedicated Pump (7) Other (Specify):

Groundwater Sampling Data

Bottle Type	Date	Time	Method *	Num. @ Vol.	Preservative (circle)	Ice	Filtered
VOA Glass				3 @ 40 ml.	HCL	YES	NO
Amber Glass				@	None/HCL/H_2SO_4	YES	NO
White Poly				@	None	YES	NO
Yellow Poly				@	H_2SO_4	YES	NO
Green Poly				@	NaOH	YES	NO
Red Total Poly				@	HNO_3	YES	NO
Red Diss. Poly				@	HNO_3	YES	NO
				@		YES	YES

(Circle if Used) Total Bottles (Include duplicate count): _____ **Duplicate ID:**

BOTTLE TYPE	Typical Analysis Allowed Per Bottle Type (Circle Applicable or Specify Non-Standard Analysis Below)
VOA-Glass	(8010) (8010/8020) (8020) (8240) (8260) (BTEX) (TPH-G) (BTEX/TPH-G) OR[ ] WA [ ]
AMBER - Glass	(PAH) (TPH-HCID) (TPH-D) (TPH-418.1) (Oil&Grease)
WHITE - Poly	(pH) (Conductivity) (TDS) (TSS) (BOD) (Turbidity) (Alkalinity) (HCO3/CO3) (Cl) (SO4) (NO3) (NO2) (F)
YELLOW - Poly	(COD) (TOC) (Total PO4) (Total Keldahl Nitrogen) (NH3) (NO3/NO2)
GREEN - Poly	(Cyanide)
RED TOTAL - Poly	(As) (Sb) (Ba) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na)
RED DISSOLVED - Poly	(As) (Sb) (Ba) (Ca) (Cd) (Co) (Cr) (Cu) (Fe) (Pb) (Mg) (Mn) (Ni) (Ag) (Se) (Tl) (V) (Zn) (Hg) (K) (Na) (Hardness) (Silica)

SAMPLER: _____ _____

(Printed Name) (Signature)

Maul Foster & Alongi, Inc.

Soil Sampling Data Sheet

CLIENT _____
PROJECT NAME _____
PROJECT # _____
Engineer/Geologist _____
[illegible]tor/Driller _____
Collection Method _____

Sheet ___ Of ___
Boring/Test Pit Number _____
Date Started _____
Date Finished _____
Total Depth _____

Sample Number and Name	Sample Interval	FID/PID Reading (ppm)	UV Fluorescence	Depth in feet	Soil Group Symbol (USCS)	Field Location of Test Pit/Boring: LITHOLOGIC DESCRIPTION, REQUIRED ANALYSIS, POTENTIAL CONTAMINATION

Maul Foster & Alongi, Inc. **Test Pit Log**

CLIENT _____
PROJECT NAME _____
PROJECT # _____
Engineer/Geologist _____
Excavator _____
Method _____
Depth-to-water in pit _____

Sheet ___ Of ___
Test Pit Number _____
Date Started _____
Date Finished _____
Total Depth _____
Ground Elevation _____
Datum _____

Sample Number and Number	Sample Interval	FID/PID Reading (ppm)	Depth in feet	Soil Group Symbol (USCS)	Field Location of Test Pit: / LITHOLOGIC DESCRIPTION

Test Pit Drawing

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST FORM

Columbia Analytical Services inc. 1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222 • FAX (360) 636-1068

DATE_____ PAGE _____ OF_____

PROJECT NAME_____ #_____

PROJECT MANAGER _____

COMPANY/ADDRESS _____

_____

_____ PHONE_____

SAMPLERS SIGNATURE _____

SAMPLE I.D.	DATE	TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	Base/Neu/Acid Organics GC/MS 625/8270	Volatile Organics GC/MS 624/8240	Halogenated or Aromatic Volatiles 601/8010 ☐ 602/8020 ☐	Pesticides/PCBs 608/8080	Total Petroleum Hydrocarbons EPA/418.1 ☐ OR/418.1 ☐ WA/418.1 ☐	TPH/Gas/BTEX 5030/8015/8020 Gas ☐ BTEX ☐	TPH/8015 Modified Diesel ☐ Hydrocarbon Scan ☐	TPH/HCID ☐ OR/HCID ☐ WA/HCID ☐	TCLP Metals ☐ VOA ☐ Semi Pest/ VOA ☐ Herb ☐	Metals (total or dissolved) List Below	Cyanide	pH, Cond, Cl, SO_4, PO_4, F, Br NO_2, NO_3, (circle)	NH_3-N, COD, Total-P, TKN, TOC (circle)	Total Organic Halides (TOX) 9020 ☐ (AOX) 1650A ☐			REMARKS

RELINQUISHED BY:

Signature

Printed Name

Firm

Date/Time

RECEIVED BY:

Signature

Printed Name

Firm

Date/Time

TURNAROUND REQUIREMENTS

____ 24 hr ____ 48 hr. ____ 5 day

____ Standard (10-15 working days)

____ Provide Verbal Preliminary Results

____ Provide FAX preliminary Results

Requested Report Date _____

REPORT REQUIREMENTS

____ I. Routine Report

____ II. Report (includes DUP.MS. MSD, as required, may be charged as samples)

____ III. Data Validation Report (includes All Raw Data)

____ IV. CLP Deliverable Report

INVOICE INFORMATION:

P.O.# _____

Bill To _____

_____

_____

_____

SAMPLE RECEIPT:

Shipping VIA: _____

Shipping #: _____

Condition: _____

_____

Lab No: _____

RELINQUISHED BY:

Signature

Printed Name

Firm

Date/Time

RECEIVED BY:

Signature

Printed Name

Firm

Date/Time

SPECIAL INSTRUCTIONS/COMMENTS:

Maul Foster and Alongi, Inc.
Drum Inventory Sheet

Drum Number	Source(s)	Date	Depth	Matrix	Sample I.D.	Number of Samples	Analyzed (yes/no)

Maul Foster & Alongi, Inc.	Log of Exploratory Boring

CLIENT _____
PROJECT NAME _____
PROJECT # _____
Engineer/Geologist _____
Drilling Contractor _____
Drilling Method _____
Hole Diameter _____

Sheet _____ Of _____
Boring Number _____
Date Started _____
Date Finished _____
Total Depth _____
Ground Elevation _____
Datum _____

Water Level Data

Depth				
Time				
Date				
Boring Depth				

Completion Details	Sample Number	Sampling Method	Blow Count	Sample Interval	Other (Specify)	Depth in Feet	Soil Group Symbol	Field Location of Boring:
								LITHOLOGIC DESCRIPTION

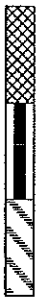
Notes:

APPENDIX B

GENERALIZED WELL CONSTRUCTION DIAGRAM

EXPLANATION OF SYMBOLS ON EXPLORATORY BORING LOGS

SAMPLE COLUMN

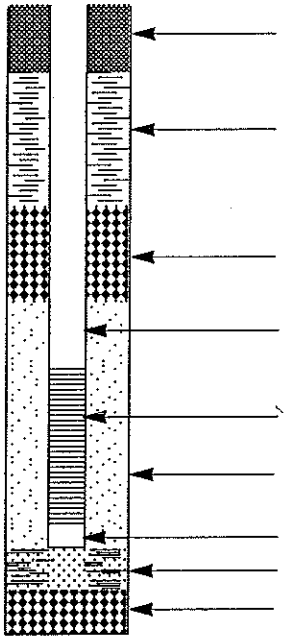


GRAB (GS)

PQ CORE (PQ-1)

SPLIT-SPOON (SS)

WELL DETAILS COLUMN



CONCRETE WELL PAD

BENTONITE GROUT SLURRY

BENTONITE CHIPS

WELL CASING

WELL SCREEN

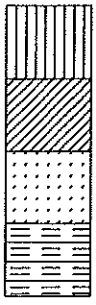
FILTER PACK

END-CAP

BOREHOLE SLUFF

BENTONITE SEAL

LITHOLOGIC COLUMN

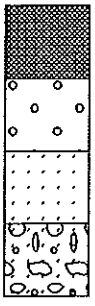


SANDY SILT

CLAYEY SILTSTONE

SANDSTONE

CLAYSTONE

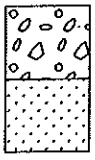


TUFF

GRAVEL

SAND

CONGLOMERATE



PUMICE

ASH

WELL DETAILS

PROJECT NUMBER _____ BORING / WELL NO. _____

PROJECT NAME _____ TOP OF CASING ELEV. _____

LOCATION _____ GROUND SURFACE ELEV. _____

WELL PERMIT NO. _____ DATUM _____

INSTALLATION BY _____ INSTALLATION DATE _____

DIMENSIONS

A Total Depth of Boring (ft.) _____

B Borehole Diameter (in.) _____

C Well Casing Diameter (in.) _____

D Well Casing Length (ft.) _____

E Well Casing Slotted Interval (ft.) _____

F Well Casing End Cap or Sump (ft.) _____

G Well Casing Height (ft.) _____

H Annular Seal Interval (ft.) _____

I Annular Seal Interval (ft.) _____

J Sand Pack Interval (ft.) _____

K Bottom Material Interval (ft.) _____

L Protective Cover Height (ft.) _____

M Protective Cover Diameter (in.) _____

N Annular Seal Interval (ft.) _____

Well Centralizer Depth(s) (ft.) _____

MATERIALS DATA

Monument Footing (1) _____

Annular Seal (2) _____

Annular Seal (3) _____

Sand Pack (4) _____

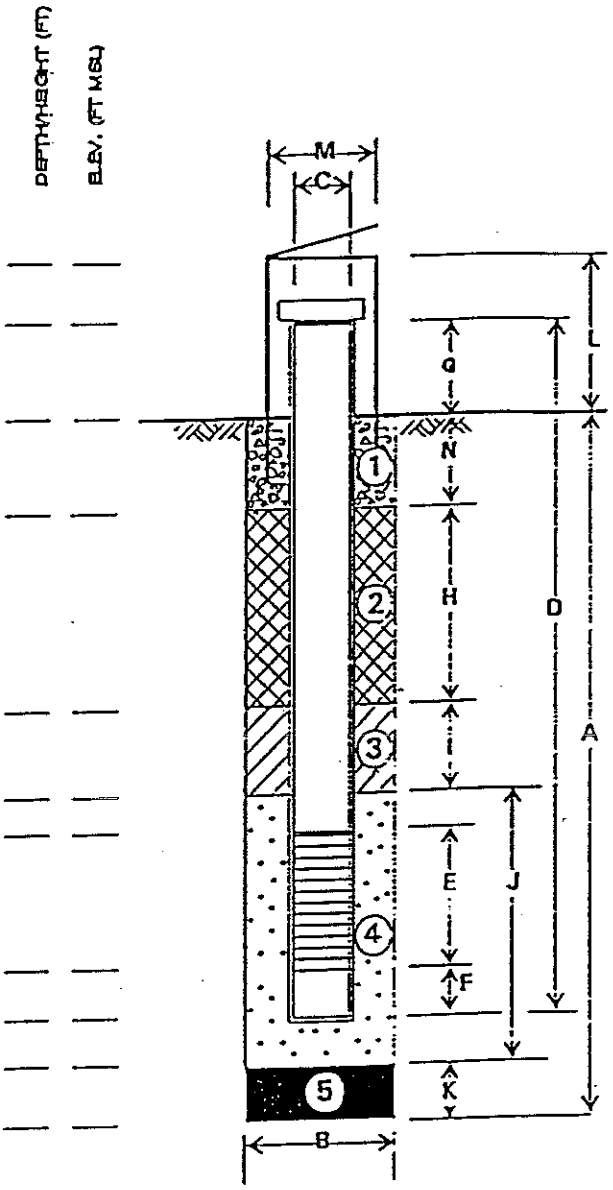
Bottom Material (5) _____

Slotted Casing _____

Well Casing _____

Well Centralizers _____

Protective Cover _____



SECTION VIEW (not to scale)

NOTES: