STATE OF OREGON

DEPARTMENT OF ENVIRONMENTAL QUALITY

In the Matter of: Metro	)	**DEQ NO. LQSW-NWR-02-14**
	)	
	)	**ORDER ON CONSENT**
	)	
Respondent	)	

Pursuant to ORS 465.260(4) the Director, Oregon Department of Environmental Quality (DEQ), issues this Order on Consent (Consent Order) to Metro, a metropolitan service district. This Consent Order contains the following provisions:

Contents **Page**

1. **Purpose**

The mutual objective of DEQ and Metro is to determine the nature and extent of releases of hazardous substances at St. Johns Landfill and to develop, evaluate, and select appropriate removal and/or remedial measures in a manner that complies with the applicable provisions of ORS 465.200 through 465.420 and regulations promulgated thereto.

2. **Stipulations**

Metro consents and agrees:

A. To issuance of this Consent Order;

B. To perform and comply with all provisions of this Consent Order;

C. To not challenge DEQ's jurisdiction to enter and enforce this Consent Order;

D. To waive any right Metro might have, prior to commencement of action by DEQ to enforce this Consent Order, to seek judicial review or review by the Environmental Quality Commission of this Consent Order ;

E. To not litigate, in any proceeding brought by DEQ to enforce this Consent Order or to assess penalties for noncompliance with this Consent Order, any issue other than Metro's compliance with this Consent Order;

F. To not assert, in any proceeding brought by DEQ to enforce this Consent Order or to assess penalties for noncompliance with this Consent Order, that performance of any interim or removal measures or phase of work by Metro discharges Metro's duty to fully perform all remaining provisions of this Consent Order; and

G. To waive any right Metro might have under ORS 465.260(7) to seek reimbursement from the Hazardous Substances Remedial Action Fund of costs incurred under this Consent Order.

3. **Findings of Fact**

DEQ makes the following findings without admission of any such facts by Metro:

A. Site owner is Metro, an Oregon Government

B. St. Johns Landfill, a closed 238-acre solid waste landfill, is located within the city of Portland in an area called the St. Johns/Rivergate industrial District. The site is in Section 26 of T 2N, R1W, W.M. The general location of St. Johns landfill is shown on Attachment A to this Consent Order. The landfill lies within the Columbia River floodplain near the confluence of the Columbia and Willamette Rivers. It is bounded by Columbia slough, the North Slough arm of Columbia Slough and Smith and Bybee lakes. Site access is from North Columbia Blvd. Originally the site was an unnamed, shallow lake, part of an extensive, interconnected network of lakes, marshes, wetlands and sloughs near the confluence of Columbia and Willamette Rivers. A well-developed system of natural levees bordered the individual waterways including the unnamed landfill-lake. Solid waste disposal at the site began in 1932 and continued until the landfill closed in 1991. The city of Portland was the landfill's original owner. Initially, solid waste was burned in an incinerator located south of Columbia Blvd. The ash was deposited on City of Portland property, in an area just southwest of Columbia Slough and the main landfill. In 1939 or 1940 a bridge was constructed over Columbia Slough and filling northeast of Columbia Slough began in 1940. Apparently, disposal activities began in dry areas and in seasonal wetlands adjacent to the shallow lake known as Landfill Lake but soon spread to the lake bed itself. Early on the landfill received almost any type of waste that was discarded, including oil-

based sludge, white goods, incinerator ash, household solid waste and commercial solid wastes. By the early 1960s, Landfill-lake had been completely filled. The incinerator was decommissioned in 1970. By the early 1970s, commercial and industrial development altered much of the original agricultural and residential land near the landfill, increasing amounts of commercial and industrial wastes were deposited in the landfill and "sanitary landfill" operational practices were adopted, including routine waste compaction and daily cover. Separate disposal areas were maintained for commercial haulers and private vehicles. The landfill was developed in five distinct phases, referred to as subareas (see Attachment B, Site Plan). The original 183-acre landfill was filled to an average depth of about 40 feet by the late 1970s. A liquid waste pit was operated in the south portion of Subarea 2 from about 1948 through 1963. The final lateral expansion, a 55-acre sub-area constructed in 1980 and filled after 1984, incorporated an engineered perimeter-dike to provide more effective leachate containment. Expansion area operations began in 1985 and the landfill reached final capacity in 1991. Metro acquired the landfill site areas northeast of Columbia Slough in 1990.

C. After the landfill ceased accepting solid waste in 1991, construction began on the final cover system, the gas control system, the storm water control system and the other permanent closure improvements. The final cover system consists of a multi-layered cap and drainage and topsoil layers. The cap has two barrier layers, an 18-inch-thick low-permeability soil layer and an overlying 40-mil geomembrane. The landfill gas control system consists of over 100 extraction wells, a site-wide network of gas collection and header pipes, a condensate collection system, a vacuum-motor-blower/flare complex and a compressor and transmission pipeline. Currently, most of the collected landfill gas is piped to Ashgrove Cement Company and burned as fuel. The storm

water control system consists of a site-wide network of drainage ditches and sedimentation ponds. Collected surface water runoff is routed to 12 discharge points around the site perimeter.

D. The landfill bottom is unlined and intersects groundwater in most areas of the site. Consequently, groundwater intrusion is a significant component of leachate generation. The 55-acre expansion area has a leachate collection system consisting of a network of perforated underdrain pipes sloped to a perimeter wet-well and pump station. Collected leachate is pumped to the City sewer and treated at the Columbia Boulevard Wastewater Treatment Plant. Leachate levels within the landfill have been measured sporadically since the 1970s and regularly since 1992. Early monitoring points included several shallow leachate wells. Now, six relatively deep leachate wells and over fifty gas recovery wells serve that purpose.

E. Metro has conducted a number of investigations to characterize the landfill site's environmental effects and hydrogeologic properties. The following discussion, including the findings discussed in subsections G, H, I, and J, summarizes the current understanding of the site characterization. The previous investigations have identified three, distinct, hydrostratigraphic units that exert strong influence on local and regional groundwater flow patterns and fate and transport of landfill contaminants. These units, from youngest to oldest, include: the overbank silts (OBS), the Columbia River sands (CRS) and the Pleistocene gravel (PG). The shallowest sediments, the OBS, are in direct contact with the landfill and exhibit low overall hydraulic conductivity that may retard or stop contaminant (leachate) migration. The OBS consists of silts, clays, and fine sands. Discrete sand lenses have been identified within the OBS, but their lateral extent and hydrologic significance are unknown. Sand content appears greatest toward the bottom of the OBS near the OBS/CRS contact. Near the landfill, OBS thickness varies considerably. West of the landfill, OBS deposits are about 200-ft thick, below Bybee lake they are only 2-5 ft

thick. Directly under the landfill, OBS thickness varies from about 30-ft (North-Slough side) to about 150-ft (below landfill interior). The hydraulic conductivity (permeability) of the OBS has been estimated from slug tests and laboratory permeability tests. OBS horizontal-permeability values vary from about $1x10^{-6}$ cm/sec to $3x10^{-5}$cm/sec. Vertical permeability values range from about $2x10^{-7}$ cm/sec to $5x10^{-7}$ cm/sec. Most of the site's monitoring wells (twenty-two) are screened in the OBS. The Columbia River Sands (CRS) underlie the OBS and consist of fine to coarse sand, locally containing minor amounts of silt. The CRS deposits are abundant beneath the Columbia and Willamette rivers, but thin out considerably near the landfill. Although laterally discontinuous and thin where present beneath the landfill, the CRS deposit is permeable and hydraulically connected to the Willamette and Columbia rivers. The permeability of the CRS varies from about $1x10^{-4}$ cm/sec to $1x10^{-1}$ cm/sec. Three site groundwater monitoring wells are screened in the CRS. The Pleistocene gravels (PG) directly underlie the CRS. The gravel deposit is highly permeable and a productive aquifer in the region. The PG is mainly composed of sandy gravel and gravel. The PG's hydraulic conductivity varies from $5x10^{-2}$ cm/sec to $1x10^{-1}$ cm/sec. The PG deposit is characterized by a steep-sided, deep trough directly below the landfill and a prominent ridge to the north of the landfill that rises to within a few feet of the bottom of Bybee Lake. The gravel trough contains OBS deposits, the thickest OBS layer near the landfill. The gravel ridge coincides with the thinnest OBS deposits. This is where the PG aquifer is most vulnerable to near-surface contaminants. These gravel features exert a strong influence on regional and local groundwater-flow patterns and have important environmental implications. Five groundwater monitoring wells are screened in the PG.

F. Under contract with Metro, Portland State University (PSU) developed a three-dimensional numerical groundwater model of the landfill and the surrounding area. The model was intended to provide a more comprehensive understanding of the landfill's hydrogeologic characteristics and to predict contaminant migration pathways and future conditions. The model has five discrete components including a water balance model, leachate mound model, regional flow model, local flow model, and local solute transport model. The mound model simulated the leachate mound as a uniform saturated zone extending from landfill-base level to about 15 feet above natural groundwater elevations. Although the model predicted complete dissipation of the leachate mound fifteen years after landfill capping, leachate levels have not changed perceptively since closure. The leachate mound model assumed the existence of a continuous, site-wide, saturated zone within the refuse, with predictable responses to input and output fluxes (e.g., precipitation and groundwater inflow and outflow). The leachate level data suggest, however, that leachate-saturated zones within the landfill are hydraulically discontinuous, and compartmentalized. Consequently, the model may have overestimated the amount of leachate stored within the refuse and the hydraulic pressures exerted by leachate on the bottom of the landfill. The solute transport model predicted landfill-contaminant migration to the PG aquifer at one location, northeast of landfill Subarea 2. The area of predicted migration coincides with the gravel (PG) ridge and thinnest silt (OBS) deposits. The model concludes that leachate cannot penetrate the silts and reach the PG aquifer under most of the site because of large silt thickness and gradually declining (post-closure) leachate pressures. Groundwater monitoring results for wells near the area of predicted migration are inconclusive, but these wells monitor the OBS and CRS deposits, not the PG aquifer.

As previously mentioned St. Johns landfill is bordered on all sides by surface waters, Columbia Slough to the west and south, North Slough and Bybee Lake to the north, and Smith Lake to the east. For years, pollutants from many sources have entered these surface waters and accumulated in the sediments. Historically, significant quantities of landfill leachate, present in visible surface seeps and in shallow groundwater, have discharged to surrounding surface waters (Columbia Slough and North Slough). Water quality monitoring, however, does not show significant surface water impacts. The PSU contaminant transport model predicted total seepage of less than ten gallons per minute to the sloughs after cover-cap completion. Despite the cap and associated improvements, visible leachate seeps remain. Metro continues to monitor significant seepage zones and implement appropriate seep-control measures. In 1995, a clay cutoff wall was installed at the head of Blind Slough to reduce one of the most significant leachate-seep areas. In 2001, Metro installed a second cutoff wall along the North-Slough perimeter of Subarea 2 to improve leachate containment in that area. Near subarea 2, erosion has undercut a section of slough bank, compromising the natural silt dike that separates the landfill contents from North Slough. In 2000, Metro repaired 1000 lineal feet of bank along North Slough. The Department established Total Maximum Daily Loads (TMDLs) for Columbia Slough, including an annual load allocation for dissolved lead at St. Johns Landfill. The annual allocation for lead is based on average lead concentrations detected in shallow groundwater monitoring wells located at the landfill perimeter. Metro conducts environmental monitoring to assess environmental quality near the landfill and to comply with the monitoring requirements established in the various permits for St. Johns Landfill. Metro conducts monitoring of surface water and sediments in the vicinity of the landfill on a voluntary basis to meet policy objectives of the Smith-Bybee Lakes Natural Resources

Management Plan. DEQ permits include the solid-waste closure permit, water-quality storm water discharge permit (NPDES General Permit 1200-COLS), and a Title V air quality permit for the site. The Title V permit regulates site-wide landfill gas emissions and requires compliance monitoring. The landfill also is regulated under an Industrial Waste Water Discharge Permit for leachate disposal issued to Metro by The City of Portland's Bureau of Environmental Services. Metro currently monitors twenty-nine (29) groundwater monitoring wells (many are nested multiple-depth wells), six (6) interior leachate-monitoring wells, one (1) leachate discharge monitoring station, nine (9) multi-depth piezometers, five (5) surface water monitoring stations, twelve (12) storm water monitoring stations and fourteen (14) sediment monitoring stations. Twenty-two (22) monitoring wells are screened at various levels within the Overbank Silts (OBS), the uppermost aquifer. Seven (7) monitoring wells are screened within the Pleistocene Gravels or the Columbia River Sands (a hydraulically connected unit) which underlie the OBS. The water quality monitoring data from perimeter wells indicate the presence of a leachate plume in the shallow OBS groundwater. This is evident from the high concentrations of leachate indicator parameters in the shallow groundwater, including chloride, specific conductance, ammonia, chemical oxygen demand (COD), dissolved iron and dissolved manganese and the similar chemical signatures of leachate and OBS ground water. Based on the current monitoring well network, it is not clear how deep the plume penetrates into the OBS deposits or how extensive the plume is directly beneath the landfill footprint. As previously mentioned, the solute transport model predicted total penetration of the silts in one localized area where the silts are thinnest (i.e., near MW G-4A, MW G-4B). Nevertheless, water quality data from two deep OBS wells (e.g., MW D-1B, MW D-1C), where the silts are quite thick, indicate that the contaminant plume

may extend deeper into the silts than the model predicted. Several hazardous substances have been detected in the site monitoring wells completed in the OBS deposits, including but not limited to the following:

Contaminant	Concentration (mg/l)	Ambient Surface Water Quality Criteria	
		SLV (Aquatic)	Background (Fresh water)
Arsenic	0.42 mg/L	0.15 mg/l	0.002
Lead	0.094 mg/L	0.0025 mg/l	0.013
Benzene	0.007 mg/L	0.13 mg/l	
Chromium	0.14 mg/L	0.74 mg/l	0.001

Although the PG aquifer is contaminated with low levels of VOCs in the vicinity of the landfill, the source of these contaminants is unclear. Available data suggest the VOCs may have originated from other regional sources unrelated to the landfill.

4. Conclusions of Law and Determinations

Based on the above findings of fact and the administrative record, DEQ determines, without admission of any such determinations by Metro, that:

A. Metro is a "person" within the meaning of ORS 465.200(20).

B. The chemicals described in Subsection 3.F. are "hazardous substances" within the meaning of ORS 465.200(15).

C. The presence of hazardous substances in groundwater at the site constitutes a "release" into the environment within the meaning of ORS 465.200(21).

D. The site described in Subsection 3.B. is a "facility" within the meaning of ORS 465.200(12).

E. The activities required by this Consent Order are necessary to protect public health, safety, and welfare and the environment.

Based upon the above Stipulations, Findings of Fact, and Conclusions of Law and Determinations, DEQ ORDERS:

5. **Work to be Performed**

A. Remedial Investigation and Feasibility Study

Metro shall perform a remedial investigation and feasibility study (RI/FS) including a Risk Assessment (RA) satisfying OAR Chapter 340 Division 122, the terms and schedules set forth in the Scope of Work (SOW) contained in Attachment C to this Consent Order, and the terms and schedules set forth in any DEQ-approved work plan. Once approved by DEQ, a work plan is deemed to be incorporated into and made a fully enforceable part of this Consent Order.

B. Additional Measures

(1) Metro may elect at any time during the term of this Consent Order to undertake measures, beyond those required under this Consent Order and the SOW, necessary to address the release or threatened release of hazardous substances at the facility. Such additional measures (including but not limited to engineering or institutional controls and other removal or remedial measures) are subject to prior approval by DEQ, which approval shall be granted if DEQ determines that the additional measures will not compromise the validity of the RI/FS or threaten human health or the environment and will comply with applicable laws.

(2) DEQ may determine that, in addition to work specified in the SOW or an approved work plan, additional work is necessary to complete the RI/FS in satisfaction of the SOW and OAR Chapter 340 Division 122, or is necessary to address unanticipated threats to human health or the environment. DEQ may require that such additional work be incorporated into the applicable work plan by modification and/or be performed in accordance with a DEQ-specified schedule. Metro shall modify the work plan and/or implement the additional work in accordance with DEQ's directions and schedule, or invoke dispute resolution under Subsection 7.L. within 14 days of receipt of DEQ's directions.

6. **Public Participation**

Upon issuance of this Consent Order, DEQ will provide public notice of this Consent Order through issuance of a press release describing the measures required under this Consent Order. Copies of the Consent Order will be made available to the public. DEQ shall provide Metro a draft of such press release and consider any comments by Metro on the draft press release, before publication. In addition, DEQ will prepare a public involvement plan that will serve as a blueprint for distributing public information and encouraging public participation. DEQ will provide copies of the draft plan to the public and to Metro for review.

A. Public Involvement Objectives:

- To maintain open communication between DEQ and interested citizens.
- To meet statutory requirements for public notice and opportunities for public comment.
- To designate contact persons to answer questions on site activities-Tim Spencer for the DEQ Solid Waste Program and Bob Williams for the DEQ Cleanup Program.

- Provide information on the status of the Remedial Investigation and Feasibility Study to citizens, stakeholders, interested parties, and the media as the investigation progresses.
- To monitor community concerns and information needs by tracking feedback on new releases and public meetings.
- To adjust the public involvement plan as needed and to maintain relationships with the community and provide reasonable opportunity for their involvement.

7. **General Provisions**

A. Qualifications of Personnel

(1) All work required by this Consent Order must be performed under the supervision of a qualified environmental professional experienced in hazardous substance investigation or remediation. Within 30 days of the effective date of this Consent Order, Metro shall start the procurement process to select contractors and subcontractors to be used in performance of the work. Within 90 days of the start of the procurement process, Metro shall select said contractors and subcontractors and provide DEQ, in writing, the name, title, and qualifications of supervising personnel who will be responsible for performance of the work. The qualifications of such personnel shall be subject to DEQ review and, at DEQ's election, DEQ approval or disapproval. If DEQ disapproves in writing the qualifications of any personnel, Metro shall provide DEQ in writing the name, title, and qualifications of replacement personnel, subject to DEQ's review and approval as described above. If DEQ subsequently disapproves the replacement personnel, DEQ reserves its right under ORS 465.260 to perform the RI/FS work, to terminate this Consent Order, and to seek reimbursement of costs from Metro.

(2) If Metro changes supervisory or key contractor personnel during the course of work under this Consent Order, the qualifications of the personnel shall be subject to review and approval in accordance with Paragraph (1) above.

B. DEQ Access and Oversight

(1) Metro shall allow DEQ to enter and move freely about portions of the facility within its possession or control at all reasonable times for the purposes, among others of: inspecting records relating to work under this Consent Order; observing Metro's progress in implementing this Consent Order; conducting such tests and taking such samples as DEQ deems necessary; verifying data submitted to DEQ by Metro; and, using camera, sound recording, or other recording equipment.

(2) Metro shall also seek to obtain access to property not owned or controlled by Metro as necessary to perform the work required in this Consent Order, including access by DEQ for purposes described in Paragraph 7.B.(1). DEQ shall use its statutory authority to obtain access to property on behalf of Metro if DEQ determines that access is necessary and that Metro has exhausted all good faith efforts to obtain access.

(3) Metro shall permit DEQ to inspect and copy all records, files, photographs, documents, and data relating to work under this Consent Order, except that Metro may not be required to permit DEQ inspection or copying of items subject to attorney-client or attorney work product privilege.

(4) Metro shall identify to DEQ any document, record, or item withheld from DEQ on the basis of attorney-client or attorney work product privilege. Attorney-client and work product privileges may not be asserted with respect to any records required to be

submitted under Paragraph 7.F.(1). DEQ reserves its rights under law to obtain documents DEQ asserts are improperly withheld by Metro.

C. Project Managers

(1) To the extent possible, all reports, notices, and other communications required under or relating to this Consent Order shall be directed to:

DEQ's Project Manager:	**Respondent's Project Manager:**
Tim Spencer DEQ Northwest Region 2020 SW Fourth Avenue, Suite 400 Portland, Oregon 97201-4987 (503) 229-5826	Dennis O'Neil Metro 600 Northeast Grand Avenue Portland, OR 97232-2736 (503) 797-1697

(2) The Project Managers shall be available and have the authority to make day-to-day decisions necessary to implement the work plan. The Project Managers also may modify, by mutual agreement in writing, the SOW and work plans as necessary to complete the RI/FS in satisfaction of OAR Chapter 340 Division 122 or as necessary to address unanticipated threats to human health or the environment.

D. Notice and Samples

(1) Metro shall make every reasonable effort to notify DEQ of any excavation, drilling, sampling, or other fieldwork to be conducted under this Consent Order at least five working days before such activity, but in no event less than 24 hours before such activity. Upon DEQ's verbal request, Metro shall make every reasonable effort to provide a split or duplicate sample to DEQ or allow DEQ and/or its authorized

representative to take a split or duplicate of any sample taken by Metro while performing work under this Consent Order.

(2) In the event DEQ conducts any sampling or analysis in connection with this Consent Order, DEQ shall make every reasonable effort to notify Metro of any excavation, drilling, or sampling at least five working days before such activity, but in no event less than 24 hours before such activity. Upon Metro's verbal request, DEQ shall make every reasonable effort to provide a split or duplicate sample to Metro or allow Metro to take a split or duplicate of any sample taken by DEQ.

E. Quality Assurance

(1) Metro shall conduct all sampling, sample transport, and sample analysis in accordance with the Quality Assurance/Quality Control (QA/QC) provisions approved by DEQ as part of the work plan. All plans prepared and work conducted as part of this Consent Order must be approved by DEQ. Metro shall make all reasonable efforts to require that each laboratory used by Metro for analysis performs such analyses in accordance with such provisions. Metro shall also make all reasonable efforts to require that laboratories and personnel used by Metro for sample analysis allow DEQ and its authorized representatives access for audit purposes at reasonable times.

(2) In the event that DEQ conducts sampling or analysis in connection with this Consent Order, DEQ shall conduct sampling; sample transport, and sample analysis in accordance with the QA/QC provisions of the DEQ-approved work plan. Upon written request, DEQ shall provide Metro with DEQ records regarding such sampling, transport, and analysis.

F. Records

(1) In addition to those reports and documents specifically required under this Consent Order, Metro shall provide to DEQ within 10 days of DEQ's written request copies of QA/QC memoranda and audits, raw data, draft and final plans, reports, task memoranda, field notes, and laboratory analytical reports.

(2) Metro shall preserve all records and documents in its possession or control or in the possession or control of its employees, agents, or contractors relating in any way to activities under this Consent Order, for at least 10 years after termination under Section 8 of this Consent Order. Upon DEQ's request, subject to claim of privilege or confidentiality under Paragraphs 7.B.(3) or 7.F.(3), Respondent shall provide copies of such records to DEQ.

(3) Metro may assert a claim of confidentiality regarding any documents or records submitted to or copied by DEQ pursuant to this Consent Order, except that attorney-client and work product privileges may not be asserted with respect to any records required to be provided under Paragraph 7.F.1. DEQ shall treat documents and records for which a claim of confidentiality has been made in accordance with ORS 192.410 through 192.505. If Metro does not make a claim of confidentiality at the time the documents or records are submitted to or copied by DEQ, the documents or records may be made available to the public without notice to Metro.

G. Progress Reports

During each quarter of this Consent Order, Metro shall deliver to DEQ on or before the tenth day of each quarter two copies of a progress report containing:

(1) Actions taken under this Consent Order during the previous quarter;

(2) Actions scheduled to be taken in the next quarter;

(3) A summary of sampling, test results, and any other data generated or received during the previous quarter; and

(4) A description of any problems experienced during the previous quarter and actions taken to resolve them.

H. Other Applicable Laws

Subject to ORS 465.315(3), all activities under this Consent Order shall be performed in accordance with applicable federal, state, and local laws and regulations.

I. Reimbursement of DEQ Oversight Costs

(1) DEQ will submit to Metro a monthly invoice of costs actually and reasonably incurred by DEQ on or after the effective date of this Consent Order in connection with any activities related to the facility or oversight of Metro's implementation of this Consent Order. A sample invoice is attached to this Consent Order as Attachment D. DEQ shall maintain work logs, payroll records, receipts, and other records to document work performed and expenses incurred under this Consent Order and, upon request, shall make such records available to Metro for its inspection during the term of this Consent Order and for at least one year thereafter.

(2) DEQ oversight costs payable by Metro will include direct and indirect costs. Direct costs include site-specific expenses, DEQ contractor costs, and DEQ legal costs. Indirect costs include general management and support costs of DEQ and of the Land Quality Division allocable to DEQ oversight of this Consent Order and not charged as direct, site-specific costs. Indirect costs will be based on a percentage of direct personal services costs.

(3) Within 30 days of receipt of a DEQ invoice, Metro either shall pay the amount of costs invoiced, by check made payable to the "State of Oregon, Hazardous Substance Remedial Action Fund", or invoke dispute resolution under Subsection 7.L. Metro shall pay simple interest of 9% per annum on the unpaid balance of any oversight costs, which interest shall begin to accrue at the end of the 30-day payment period unless dispute resolution has been invoked. Any unpaid amounts that are not the subject of pending dispute resolution, or that have been determined owing after dispute resolution, become a liquidated debt collectible under ORS 293.250 and other applicable law.

J. Force Majeure

(1) If any event occurs that is beyond Metro's reasonable control and that causes or might cause a delay or deviation in performance of the requirements of this Consent Order despite Metro's due diligence (force majeure), Metro shall promptly notify DEQ's Project Manager verbally of the cause of the delay or deviation and its anticipated duration, the measures that have been or will be taken to prevent or minimize the delay or deviation, and the timetable by which Metro proposes to carry out such measures. Metro shall confirm in writing this information within five working days of the verbal notification. Failure to comply with these notice requirements precludes Metro from asserting force majeure for the event and for any additional delay caused by the event.

(2) If Metro demonstrates to DEQ's satisfaction that the delay or deviation is due to force majeure, DEQ shall extend times for performance of related activities under this Consent Order as appropriate. Circumstances or events constituting force majeure might include but not be limited to acts of God, unforeseen strikes or work stoppages, fire,

explosion, riot, sabotage, or war. Economic hardship, normal inclement weather, and increased costs of performance shall not be considered force majeure.

K. DEQ Approvals

(1) Where DEQ review and approval is required for any plan or activity under this Consent Order, Metro may not proceed to implement the plan or activity until DEQ approval is received. Any DEQ delay in granting or denying approval correspondingly extends the time for completion by Metro. For purposes of this Consent Order, "day" means calendar day unless otherwise specified.

(2) After review of any plan, report, or other item required to be submitted for DEQ approval under this Consent Order, DEQ shall:

a) Approve the deliverable in whole or in part; or

b) Disapprove the deliverable in whole or in part and notify Metro of deficiencies and/or request modifications to cure the deficiencies.

(3) DEQ approvals, rejections, modifications, or identification of deficiencies shall be given as soon as practicable in writing and state DEQ's reasons with reasonable specificity.

(4) In the event of DEQ disapproval or request for modification, Metro shall correct the deficiencies and resubmit the revised report or other item for approval within 30 days of receipt of the DEQ notice or within such other time as specified in the DEQ notice.

(5) In the event a deficiency identified by DEQ is not addressed by Metro in good faith in the revised deliverable, DEQ may modify the deliverable to cure the deficiency.

(6) In the event of approval or modification of the deliverable by DEQ, Metro shall implement the action required by the plan, report, or other item, as so approved or

modified, or, as to any DEQ modifications, invoke dispute resolution under Subsection 7.L.

L. Dispute Resolution

(1) Any disputes concerning the activities or deliverables required under this Order may be resolved as follows: Metro shall notify DEQ in writing of its objection, within fourteen (14) days of receipt of notice from DEQ of the activity, deliverable or requirement to which Metro objects. Metro's written objections shall define the dispute, state the basis of its objections, and be sent to DEQ via certified mail, return receipt requested. DEQ and Metro shall then have an additional fourteen (14) days from the date DEQ receives the written objection of Metro to reach agreement. If an agreement is not reached within fourteen (14) days, Metro may request a determination by the applicable DEQ Region's Cleanup Manager. Thereafter, if Metro disagrees with DEQ's position in any dispute concerning activities or deliverables required under this order, Metro may elect, within fourteen (14) days of receipt of DEQ's position from the Cleanup Manager, either to seek independent review as provided in 7.L (2) and to proceed under the terms of that provision or to provide Metro's final position and rationale in writing to the DEQ Regional Administrator. The Regional Administrator may discuss the disputed matter with Metro and shall provide Metro with DEQ's final position in writing as soon as practicable after receipt of Metro's written position, or if independent review issought, after the Regional Administrator's receipt of the independent reviewer's advisory report as provided for under 7.L(2). DEQ's final position regarding the disputed matter is enforceable under this Consent Order.

(2) Prior to requesting a determination by the DEQ Regional Administrator, Metro may request, at its expense, an independent review of any dispute by a qualified, mutually acceptable, and neutral party (the "independent reviewer"). Within fourteen (14) days after selection of the independent reviewer, Metro and DEQ shall provide the independent reviewer with a statement of the nature of the dispute. Within the same fourteen (14) day period, Metro and DEQ shall provide the independent reviewer and each other with their respective positions regarding the dispute and the rationale, information, and documents supporting such position. Within thirty (30) days of the parties' submissions to the independent reviewer, or within such other time period as agreed to by the parties and the independent reviewer, the independent reviewer shall provide Metro and the DEQ Regional Administrator with a written advisory report setting forth the independent reviewer's determination regarding the dispute. The DEQ Regional Administrator shall consider the advisory report of the independent reviewer in making a final decision regarding the disputed matter. The advisory report of the independent reviewer shall not be binding on the Regional Administrator or on DEQ; provided, the advisory report shall be admissible in any action commenced by DEQ to enforce this Consent Order or to assess penalties regarding the disputed matter. DEQ's final decision shall be an enforceable part of this Consent Order.

(3) The dispute resolution provisions of Paragraphs 7.L.(1) and (2) above shall not apply to solid waste permit decisions by DEQ subject to contested case appeal under ORS Chapter 459.

(4) Metro's invocation of dispute resolution under paragraph (1) of this subsection shall not excuse or delay Metro's performance of work unrelated to the disputed matter.

M. Stipulated Penalties

(1) Subject to Subsections 7.J. and 7.L., upon any violation by Metro of any requirement of this Consent Order, and upon Metro's receipt from DEQ of written notice of violation, Metro shall pay the stipulated penalties set forth in the following schedule:

(a) Up to $5,000 for the first week of violation or delay and up to $ 2,500 per day of violation or delay thereafter, for failure to provide access or records in accordance with Subsection 7.B. or 7.F.

(b) Up to $ 2,500 for the first week of violation or delay and up to $ 1,000 per day of violation or delay thereafter, for:

(i) failure to submit a final work plan, addressing in good faith DEQ's comments on the draft work plan or incorporating DEQ modifications to the work plan, in accordance with the SOW's schedule and terms;

(ii) failure to perform work in accordance with an approved work plan's schedule and terms;

(iii) failure to perform additional work required by DEQ under Subsection 5.B.; or

(iv) failure to submit a final report, addressing in good faith DEQ's comments on the draft report or incorporating DEQ modifications to the report, in accordance with an approved work plan's schedule and terms.

(c) Up to $500 for the first week of violation or delay and up to $500 per day of violation or delay thereafter, for:

(i) failure to submit a good faith draft work plan in accordance with the SOW's schedule and terms;

(ii) failure to submit progress reports in accordance with Subsection 7.G.; or

(iii) any other violation of the Consent Order, SOW, or an approved work plan.

(2) Within 30 days of receipt of DEQ's written notice of violation, Metro either shall pay the amount of such stipulated penalty assessed, by check made payable to the "State of Oregon, Hazardous Substance Remedial Action Fund", or request a contested case regarding the penalty assessment in accordance with Subsection 7.M.(3). Metro shall pay simple interest of 9% per annum on the unpaid balance of any stipulated penalties, which interest shall begin to accrue at the end of the 30-day payment period. Any unpaid amounts that are not the subject of a pending contested case, or that have been determined owing after a contested case, are a liquidated debt collectible under ORS 293.250 and other applicable law.

(3) In assessing a penalty under this subsection, the Director may consider the factors set forth in OAR 340-12-045. Metro may request a contested case hearing regarding the

penalty assessment in accordance with OAR Chapter 340 Division 11. The scope of any such hearing must be consistent with the stipulations set forth in Section 2 of this Consent Order; must be limited to the occurrence or non-occurrence of the alleged violation; and may not review the amount of the penalty assessed. Penalties may not accrue pending any contested case regarding the alleged violation. Violations arising out of the same facts or circumstances or based on the same deadline are considered as one violation per day.

N. Enforcement of Consent Order and Reservation of Rights

(1) In lieu of stipulated penalties under Subsection 7.M., DEQ may assess civil penalties under ORS 465.900 for Metro's failure to comply with this Consent Order. Penalties may not accrue pending any contested case regarding the alleged violation. In addition to penalties, DEQ may seek any other available remedy for failure by Metro to comply with any requirement of this Consent Order, including but not limited to termination of this Consent Order or court enforcement of this Consent Order.

(2) Subject to Section 2, Metro does not admit any liability, violation of law, or factual or legal findings, conclusions, or determinations made by DEQ under this Consent Order.

(3) Subject to Subsection 2.G., nothing in this Consent Order prevents Metro from exercising any rights of contribution or indemnification Metro might have against any person regarding activities under this Consent Order.

O. Indemnification

(1) Metro shall save and hold harmless the State of Oregon and its commissions, agencies, officers, employees, contractors, and agents, and indemnify the foregoing

from and against any and all claims arising from acts or omissions related to this Consent Order by Metro or its officers, employees, contractors, agents, receivers, trustees, or assigns. DEQ shall not be considered a party to any contract made by Metro or its agents in carrying out activities under this Consent Order.

(2) To the extent permitted by Article XI Section 7 of the Oregon Constitution and by the Oregon Tort Claims Act, the State of Oregon shall save and hold harmless Metro and their officers, employees, contractors, and agents, and indemnify the foregoing, from and against all claims arising from acts or omissions related to this Consent Order of the State of Oregon or its commissions, agencies, officers, employees, contractors, or authorized representatives (excepting acts or omissions constituting DEQ approval of Metro's activities under this Consent Order). Metro shall not be considered a party to any contract made by DEQ or its authorized representatives in carrying out activities under this Consent Order.

P. Parties Bound

This Consent Order is binding on the parties and their respective successors, agents, and assigns. The undersigned representative of each party certifies that he or she is fully authorized to execute and bind such party to this Consent Order. No change in ownership or corporate or partnership status relating to the facility shall in any way alter Metro's obligations under this Consent Order, unless otherwise approved in writing by DEQ. Metro shall notify and provide a copy of this Consent Order to any prospective successor, purchaser, lessee, assignee, or mortgagee of the facility during the term of this Consent Order.

Q. Modification

DEQ and Metro may modify this Consent Order by written agreement.

R. Effective Date

The effective date of this Consent Order shall be the date of signature by the DEQ Northwest Region Administrator.

8. **Duration**

This Consent Order is deemed satisfied upon completion of work required under this Consent Order and payment by Metro of any outstanding oversight costs and penalties. DEQ shall determine whether work under this Consent Order is satisfactorily completed and the Consent Order terminated, by letter issued within 60 days of receipt of the last deliverable required from Metro under this Consent Order, or as soon thereafter as reasonably practicable.

9. **Signatures**

STIPULATED, AGREED, and APPROVED for issuance:

Metro

By: Michael Jordan Date: 10/24/03
(Signature)

Michael Jordan
(Name)

Chief Operating officer
(Title)

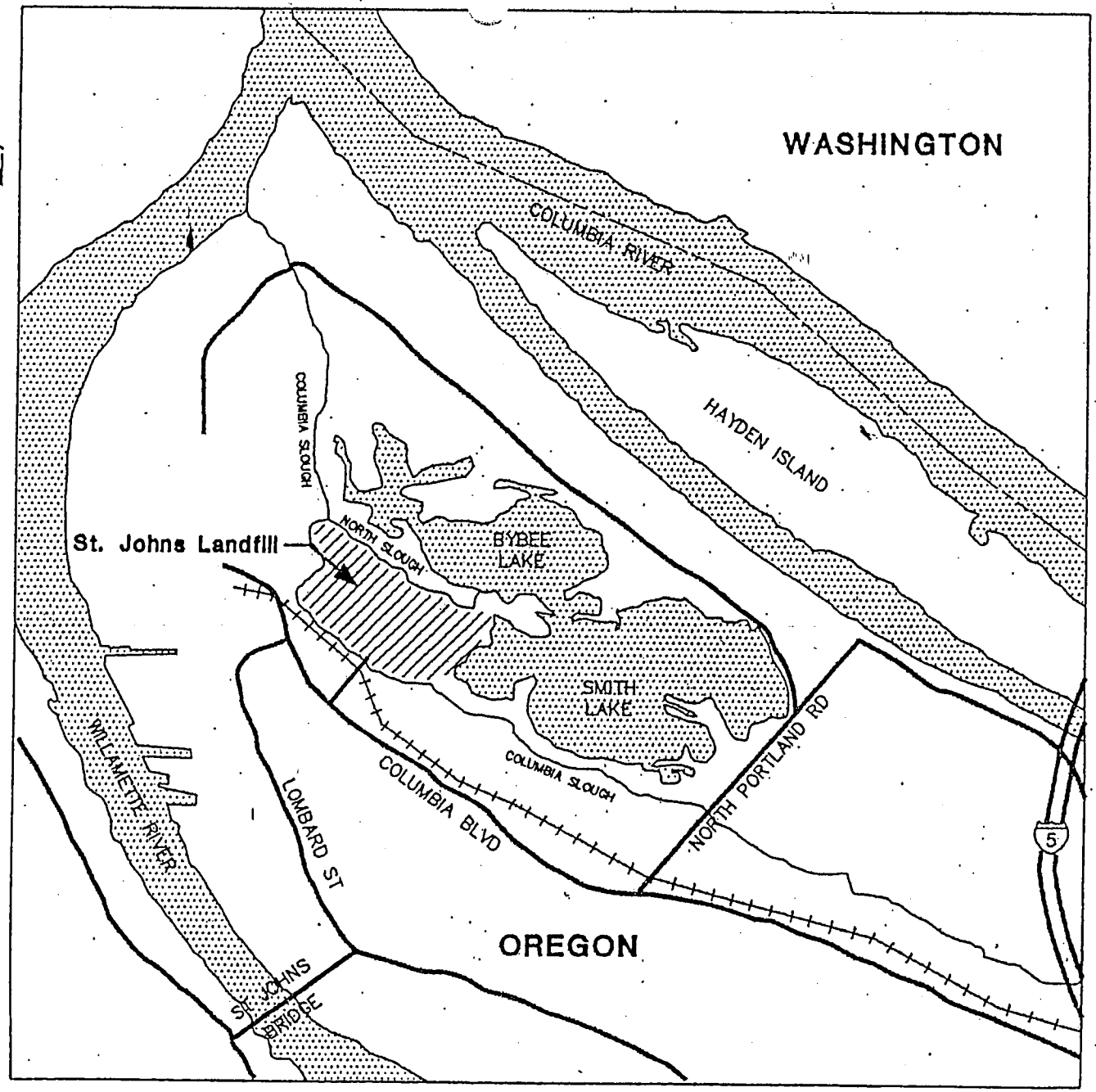
STIPULATED, AGREED, and so ORDERED:

State of Oregon
Department of Environmental Quality

By: _____ Date: 10/31/03
(Signature)

Paul Slyman

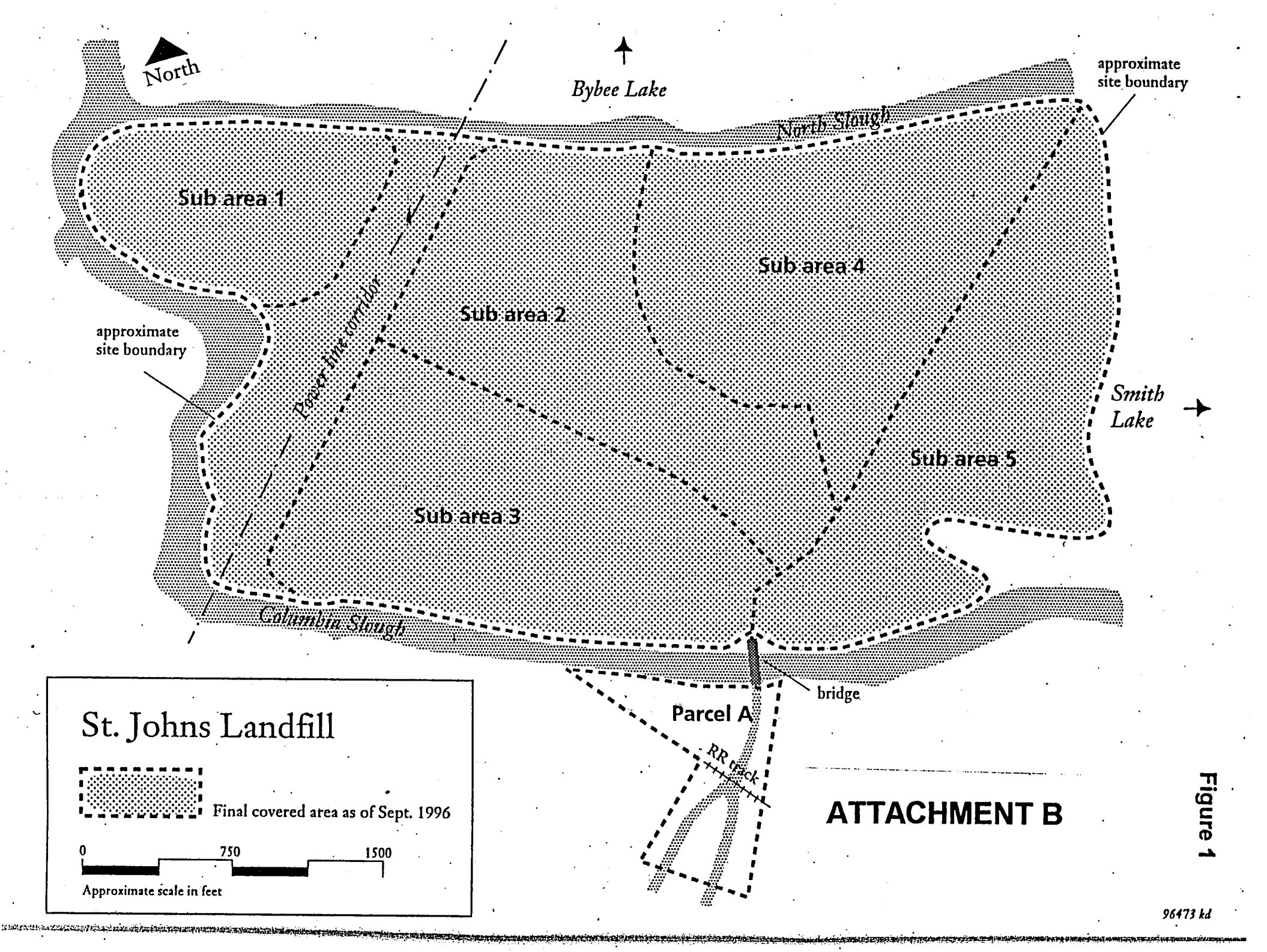
Northwest Region Administrator



NO SCALE

FIGURE 1: SITE LOCATION MAP

ATTACHMENT A


North
Bybee Lake
North Slough
approximate site boundary
Sub area 1
Sub area 2
Sub area 3
Sub area 4
Sub area 5
Power line corridor
approximate site boundary
Smith Lake
Columbia Slough
bridge
Parcel A
RR track
St. Johns Landfill
Final covered area as of Sept. 1996
0
750
1500
Approximate scale in feet
ATTACHMENT B
Figure 1
96473 kd

ATTACHMENT C

DRAFT REMEDIAL INVESTIGATION/FEASIBILITY STUDY SCOPE OF WORK

I. SCHEDULE

Metro shall submit for DEQ review and approval Remedial Investigation (RI), Risk Assessment (RA) and Feasibility Study (FS) work plans and reports which address all elements of this Scope of Work (SOW). Elements of the SOW may be addressed by alternative means or by using existing data or information to the extent that the data are applicable, meet the objectives of the RI/FS, and are of acceptable quality.

All work completed under this order shall proceed in general accordance with the schedule below. However, upon DEQ's and Metro's mutual agreement, the schedule may be modified as needed to allow for public meetings and implementation of other public outreach activities.

Draft RI Proposal	To DEQ within **120** days of issuance of this order.
Metro/DEQ Meeting	Within **15** days of receipt of Draft RI Proposal.
DEQ Review and comment	Within **30** days of receipt of the Draft RI proposal.
Final RI Proposal	Within **15** days of Metro's receipt of DEQ review and comments.
Draft RI Work Plan	To DEQ within **60** days of receipt of the final RI Proposal.
Metro/DEQ Meeting	Within **15** days of receipt of the draft RI Work Plan DEQ will meet with Metro to discuss RI Work plan content and scope.
DEQ Review and Comment	Within **30** days of receipt of draft work plan DEQ will provide review comments.
Final RI Work Plan	To DEQ within **30** days of Metro's receipt of DEQ's review comments.
Initiation of RI	To be specified in Project Management section of RI Work Plan.
Completion of RI/FS	The RI/FS must be completed within **4** years of issuance of this Consent Order

As indicated in the table above, DEQ will review and comment within 30 days of receipt of the draft RI proposal, the draft RI work plan and any associated work products. The schedule for additional deliverables

specified in this SOW (e.g. Risk Assessment work plan, Feasibility Study work plan, Remedial Investigation report, Risk Assessment report and Feasibility Study report) should be specified in the Project Management Plan section of the RI work plan.

All work plans may be amended by Metro as necessary to reflect or incorporate newly discovered information and/or environmental conditions. Additional work plans and work plan amendments are subject to DEQ review and approval and shall be processed according to schedules negotiated between the parties at the time of each phase change or task addition. Metro shall initiate and complete work according to the schedule specified in the applicable approved work plan or amendment.

II. OBJECTIVES

A. Work performed under this Consent Order shall complement and incorporate existing site information. The overall objectives shall be as follows:

1. Identify the hazardous substances which have been released to the environment.

2. Determine the nature, extent and distribution of hazardous substances in affected media on- and off-site.

3. Determine the direction and rate of migration of hazardous substances.

4. Identify migration pathways and receptors.

5. Determine the risk to human health and/or the environment.

6. Identify hot spots of contamination.

7. Develop the information necessary to evaluate remedial action alternatives and select a remedial action.

8. Generate or use data of sufficient quality for site characterization, risk assessment, and the subsequent analysis, and selection of remedial alternatives.

B. Additional specific RI objectives will be developed in the RI Proposal based on review and analysis of existing and available information.

III. RI PROPOSAL

The RI Proposal shall discuss Metro's proposed approach to the RI, addressing soil, groundwater, surface water, sediments, and air. The proposal will provide the framework for the RI Work Plan and will include at a minimum, a summary of data collected to date, a conceptual site model (including a conceptual site hydrogeologic model), and a description of proposed investigation tasks, phases, and schedule necessary to satisfy the objectives of this SOW.

The proposal shall address landfill features and site hydrogeologic characteristics, including but not limited to the following:

1. Heterogeneity and anisotropy of the overbank silt deposits (OBS), including hydraulic properties of sand lenses present within the OBS.

2. Leachate distribution within the landfill, including hydraulic head relationships and vertical hydraulic gradients at and below the landfill's base.

3. Vertical hydraulic gradients in the Pleistocene Gravel (PG) aquifer, in the Columbia River sand (CRS), and in the OBS near the PSU-Groundwater-Model predicted leachate impacted area.

4. Seasonal groundwater flow maps for the OBS and PG units (including CRS where present), and cross-sectional flow nets for the OBS from actual water level measurements to verify computer model predictions and help assess potential off-site sources of contamination.

5. Installation of monitoring wells necessary to determine groundwater chemistry in the model-predicated area of leachate impact in the PG aquifer, beneath the landfill footprint in the upper layers of the OBS, and west of the landfill near monitoring well G-6 in the upper, middle and lower portions of the OBS.

6. Installation of additional monitoring wells in the PG aquifer as needed to characterize contamination of the aquifer on a site-wide scale.

7. The current physical condition and performance of the final cover system.

In addition, the development of RI objectives shall address the landfill's potential impacts to surface water and sediment including: analysis of existing surface water and sediment data; further sampling and analysis of sediments and surface water as needed to characterize landfill impacts; analysis of contaminants in groundwater wells adjacent to surface water; and, where feasible, direct analysis of contaminants in groundwater seepage within the zone of interaction between groundwater and surface water. The surface water and sediment impacts analysis shall assess the changes to landfill-impacted media due to the existing water control structure's replacement. Specifically, this analysis shall evaluate the following:

- The effects of changes in tidal fluctuations and lake levels on groundwater flow, and on the quality of landfill-impacted groundwater, surface water, and sediments.
- The characteristics, fate, and environmental impact of any landfill-impacted sediments (near-surface or subsurface) that may be disturbed or moved by operation of the planned water-control structure, or by natural processes.

IV. REMEDIAL INVESTIGATION WORK PLAN

The work plan shall be developed in accordance with applicable Oregon Administrative Rules (OAR 340-122-010 through -115), DEQ guidance and the Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, OSWER Directive 9355.3-01, 1988, as appropriate. Existing data may be used if it meets data quality objectives for the RI/FS. The submitted work plan shall include, but not be limited to the following items:

A. PROJECT MANAGEMENT PLAN

The RI Work Plan shall include a proposed schedule for submittals and implementation of all proposed activities and phases pertaining to this scope of work (this schedule will include target dates for the submittal of a Risk Assessment work plan, Feasibility Study work plan, and submittal of draft and final Remedial Investigation, Risk Assessment and Feasibility Study reports); a description of the personnel (including subcontractors, if known) involved in the project, and their respective roles in the project; and a discussion of how variations from the approved work plan will be managed.

B. SITE DESCRIPTION

The RI work plan shall include a discussion of the current understanding of the physical setting of the site and surrounding area; the site history; hazardous substance and waste management history; and current site conditions.

C. SITE CHARACTERIZATION PLAN

The Site Characterization plan shall be consistent with DEQ guidance and the requirements specified in OAR 340-122-080. The site characterization plan shall include, but not be limited to, characterization of the hazardous substances, characterization of the facility, identification of potential receptors and the collection and evaluation of information relevant to the identification of hot spots of contamination, and shall address the following:

1. Soils

Objective: To identify and characterize releases of hazardous substances from the facility to soils.

Scope: The plan shall supplement previous soil sampling at the facility. The plan shall address all areas which could potentially have received spills, leaks from tanks or piping, been used for waste treatment or disposal, or have been affected by contaminated surface water or storm water runoff, and all other areas where soil contamination is known or suspected.

Procedures: The plan shall be designed and conducted to determine the vertical and lateral extent of soil contamination, characterize the site geology, determine the physical and chemical soil characteristics relevant to the RI, evaluate the potential for contaminant migration and gather the information necessary to identify hot spots of contamination. The plan shall include the proposed methodology for characterizing soil.

2. Groundwater

Objective: To identify and characterize releases of hazardous substances and other non-hazardous substances that might affect the beneficial water uses within the locality of the facility, or otherwise characterize the geochemical characteristics of groundwater within the locality of the facility.

Scope: The plan shall supplement previous investigations at the facility and shall identify and characterize all past, current and potential releases of hazardous substances to groundwater.

Procedures: The plan shall be designed and conducted to determine the vertical and lateral extent of groundwater contamination, both on and, if applicable, off-site; characterize the site hydrogeology, determine the physical and chemical water bearing zone characteristics relevant to the RI; evaluate the potential for contaminant migration through groundwater; and gather the information necessary to identify hot spots of contamination. The plan shall include the proposed methodology for characterizing groundwater. Alternative methods for characterizing groundwater should be considered to accelerate the RI. Monitoring wells and other holes must be drilled, constructed and decommissioned in accordance with OAR Chapter 690, Division 240 and DEQ "Ground Water Monitoring Well, Drilling, Construction and Decommissioning" guidelines (DEQ 1992). Continuous core samples shall be obtained from test borings and monitoring well borings.

3. **Surface Water and Sediments**

Objective: To identify and characterize releases of hazardous substances from the facility to surface water and sediments.

Scope: The plan shall supplement previous investigations at the facility and shall identify and characterize all past, current, and potential impacts to surface waters and sediments.

Procedures: At a minimum, the plan shall delineate past and present surface drainage patterns at the site and evaluate whether surface water and sediments may have been impacted by the facility. Unless this evaluation is sufficient to demonstrate that surface water or sediment quality has not been impacted, an appropriate surface water and sediment characterization plan shall be prepared. The plan shall be designed to delineate the nature and extent of contamination, characterize the site hydrology, determine the physical and chemical surface water and sediment characteristics relevant to the RI, evaluate the potential for contaminant migration and gather the information necessary to identify hot spots of contamination. The plan shall include the proposed methodology for characterizing surface water and sediments.

4. **Air**

Objective: To identify and characterize the release of hazardous substances to the air, from soil, surface water, or groundwater contamination at the facility.

Scope: The plan shall supplement previous investigations at the facility and shall identify and characterize all past, current and potential releases (e.g. contaminated soil or groundwater) of hazardous substances to air.

Procedures: The plan shall include the proposed methodology for evaluating air emissions using appropriate emission calculations and/or a field sampling program. The plan shall be designed to delineate the nature and extent of contamination, characterize the site climatology, determine the physical and chemical air characteristics relevant to the RI, evaluate the potential for contaminant migration and gather the information necessary to identify hot spots of contamination.

5. **Identification of Current and Reasonably Likely Future Land and Water Use**

Objective: To identify current and reasonably likely future land and water uses in the locality of the facility.

Scope: The plan shall be designed to identify current and reasonably likely future land and water uses for the purposes of identifying hot spots of contamination and conducting the baseline human health and ecological risk assessments based on OAR 340-122-080 and DEQ Guidance.

Procedures: The plan shall include the proposed methodology for identifying current and reasonably likely future land and water uses in the locality of the facility.

D. SAMPLING AND ANALYSIS PLAN (SAP)

Objective: To adequately document all supplemental (RI/FS) sampling and analysis procedures not already addressed in the DEQ approved Environmental Monitoring Plan (EMP).

Scope: In preparation of the SAP, the following guidance documents shall be utilized: Data Quality Objectives for Remedial Response Activities, EPA/540/G-87/004 (OSWER Directive 9355.0-7B), March, 1987; Test Methods for Evaluating Solid Waste, SW-846; and A Compendium of Superfund Field Operations Methods, EPA/540/P-87/001 (OSWER Directive 9355.0-14), December 1987. The SAP shall address all topics listed in Environmental Cleanup Division Policy #760.000, Quality Assurance Policy.

Procedures: The work plan shall include a sampling and analysis plan (SAP). The SAP shall include quality assurance and quality control (QA/QC) procedures for both field and lab procedures. The SAP shall be sufficiently detailed to function as a manual for field staff.

E. HEALTH AND SAFETY PLAN (HASP)

Objective: To establish policies and procedures to protect workers and the public from the potential hazards posed by a hazardous materials site.

Scope: The HASP portion of the work plan shall comply with 29 CFR 1910.120 and OAR Chapter 437, Division 2.

Procedures: The HASP shall include a description of risks related to RI activities, protective clothing and equipment, training, monitoring procedures, decontamination procedures and emergency response actions.

F. MAPS

The work plan shall include a map or maps of the facility which clearly shows site topography, on-site structures, waste disposal areas, surface water, and proposed sampling locations.

V. RISK ASSESSMENT WORK PLAN

A. HUMAN HEALTH RISK ASSESSMENT PLAN

Objective: To evaluate the collective demographic, geographic, physical, chemical, and biological factors at the site, for the purposes of characterizing current or reasonably likely future risks to human health as a result of a threatened or actual release(s) of a hazardous substance; documenting the magnitude of the potential risk at a site; supporting risk management decisions; and establishing remedial action goals if necessary.

Scope: The human health risk assessment shall evaluate risk in the context of current and reasonably likely future land and water uses and in the absence of any actions to control or mitigate these risks (i.e., under an assumption of no action). The human health risk assessment portion of the work plan shall be developed based on the requirements specified in OAR 340-122-084, DEQ guidance, the Risk Assessment Guidance for Superfund - Human Health Evaluation Manual Part A, United States Environmental Protection Agency (EPA), Interim Final, July 1989, (RAGS-HHEM); Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors", EPA, March 1991,(HHE-SG); and the Exposure Factors Handbook, EPA, 1996. A suggested outline for the human health evaluation is given in Exhibit 9-1 of the RAGS-HHEM. The work plan should use this outline as a framework for discussing the methodologies and assumptions to be used in assessing the potential human health risks at the site.

Procedure: The plan shall describe the different tasks involved in preparing the human health risk assessment. The human health risk assessment can be completed using either deterministic or probabilistic methodologies. If probabilistic methodologies are to be used, then Metro shall discuss risk protocol with DEQ before the commencement of a probabilistic risk assessment. If deterministic methodologies are to be used, then the human health risk assessment shall include an estimate of both the central tendency exposure (CTE) and the reasonable maximum exposure (RME) expected to occur under both current and future land use conditions. In general, RME exposures should be based on the 90th percentile exposure case. Additional guidance on quantifying the RME is given in Chapter 6 of the RAGS-HHEM, SRAGS, and HHE-SG. Quantifying the potential risks associated with the RME shall be the overall goal of the risk assessment.

B. ECOLOGICAL RISK ASSESSMENT PLAN

Objective: To evaluate the collective demographic, geographic, physical, chemical, and biological factors at the site, for the purposes of characterizing current or reasonably likely future risks to the environment as a result of a threatened or actual release(s) of a hazardous substance; documenting the magnitude of the potential risk at a site; supporting risk management decisions; and establishing remedial action goals if necessary.

Scope: The ecological risk assessment shall evaluate risk in the context of current and reasonably likely future land and water uses and in the absence of any actions to control or mitigate these risks (i.e., under an assumption of no action). The ecological risk assessment will use a tiered approach (with four levels) to produce a focused and cost-effective assessment of risk. The ecological risk assessment work plan shall be developed based on the requirements specified in OAR 340-122-084; DEQ guidance; Proposed Guidelines for Ecological Risk Assessment, EPA, September 1996; Framework for Ecological Risk Assessment, EPA, February 1992; and Risk Assessment Guidance for Superfund, Volume II, Environmental Evaluation Manual, Interim Final, EPA, March 1989 (RAGS-EEM). The ecological risk assessment plan shall consider but not be limited to the following list of fish and wildlife species:

a. benthic macroinvertebrates
b. mussels
c. crayfish
d. juvenile salmonids
e. amphibians
f. western painted turtle
g. great blue heron
h. osprey
i. savannah sparrow
i. river otter

Procedure: The plan shall describe the different tasks involved in preparing the ecological risk assessment. Ecological risk assessments may include a level I scoping plan; a level II screening plan; and a level III baseline plan or level IV field baseline plan. The level III and level IV baseline plans shall include an exposure analysis, an ecological response analysis, a risk characterization and an uncertainty analysis as required by OAR 340-122-084(3). The ecological risk assessment can be completed using either deterministic or probabilistic methodologies. If probabilistic methodologies are to be used, then Respondent shall discuss risk protocol with DEQ before the commencement of a probabilistic risk assessment. If deterministic methodologies are to be used, then the ecological risk assessment shall include an estimate of both the central tendency exposure (CTE) and the reasonable maximum exposure (RME) expected to occur. Estimating the potential risks associated with the RME shall be the overall goal of the risk assessment.

VI. FEASIBILITY STUDY WORK PLAN

Objective: To develop the information required to identify and evaluate remedial action alternatives and select or approve a remedial action to be taken at the facility.

Scope: The Feasibility Study (FS) shall be developed in accordance with the requirements specified in OAR 340-122-085 and 090, DEQ guidance, and Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA, OSWER Directive 9355.3-01, 1988. The FS shall develop and evaluate an appropriate range of alternatives. The FS may be developed in parallel with Remedial Investigation (RI) activities or may be developed and submitted separately after commencement of RI activities.

Procedures: A work plan shall be submitted which will include, but not be limited to, the following:

A. PRELIMINARY EVALUATION OF REMEDIAL INVESTIGATION DATA

The FS work plan shall include a preliminary evaluation of data collected during the RI. The evaluation should be used to identify preliminary remedial alternatives and additional data needs.

B. DESCRIPTION OF FS EVALUATION PROCESS

The FS work plan shall include a description of how remedial alternatives will be developed, screened, and evaluated in detail, including identification of hot spots of contamination and completion of a residual risk assessment.

VII. REPORTS

A. QUARTERLY REPORTS

Three copies of the quarterly reports shall be submitted to DEQ by the 10th day of the month following the reporting period. The quarterly reports shall summarize activities performed, data results collected or received and problems encountered or resolved during the past quarter and activities planned for the upcoming quarter.

B. REMEDIAL INVESTIGATION REPORT

The Remedial Investigation report shall follow the outline in Table 3-13 (page 3-30 - 3-31) in the CERCLA RI/FS guidance, as applicable, and address the items listed below:

1. **Executive Summary.**

2. **Introduction.**

3. **Site Background**. A discussion and supporting maps of facility operations, site description, site setting, and current and reasonably likely future land and water uses.

4. **Study Area Investigation.** A discussion of the investigative procedures and results for soil, groundwater, surface water, sediments and air.

5. **Summary and Conclusions.** A discussion of the nature, extent, distribution and environmental fate and transport of contaminants in soil, groundwater, surface water, sediments and air.

6. **Appendices.** Detailed information supporting the results of the Remedial Investigation shall be submitted in the Appendices of the report.

C. RISK ASSESSMENT REPORT

1. **Human Health Risk Assessment Report**

The results of the human health risk assessment should follow the outline suggested by the RAGS-HHEM (see Exhibit 9-1 of the RAGS-HHEM). Justification for not following the outline should be explained.

The main sections of the human health risk assessment report should include the following:

i. Introduction.

ii. Chemicals of Concern.

iii. Exposure Assessment.

iv. Toxicity Assessment.

v. Risk Characterization.

vi. Uncertainty analysis.

2. **Ecological Risk Assessment Report**

The main sections of the ecological risk assessment report should include the following:

i. Problem Formulation.

ii. Exposure analysis.

iii. Ecological response analysis.

iv. Risk characterization.

v. Uncertainty analysis.

D. FEASIBILITY STUDY REPORT

The results of the Feasibility Study (FS) shall be submitted to DEQ in a report which, at a minimum, includes a full evaluation of remedial action alternatives. The FS shall provide a workable number of options, acceptable to DEQ, which achieve the remedial action objectives and are protective of public health, safety and welfare, and the environment.

The results of the FS should comply with OAR Chapter 340, Division 122, DEQ Guidance, and, as appropriate, Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA OSWER Directive 9355.3-01, 1988. The results of the feasibility study should follow the outline suggested in Table 6-5 (Page 6-15) of the CERCLA RI/FS guidance.

The main sections of the FS report should include the following:

1. **Introduction**

2. **Identification of Hot Spots of Contamination.**

3. **Identification of Areas or Volumes of Media which Require Remedial Action.** Identify areas or volumes of media which exceed the acceptable risk level and areas or volumes of media which have been identified as hot spots of contamination.

4. **Development of Remedial Action Objectives.** Develop and discuss the remedial action objectives (RAOs) that meet the standards in OAR 340-122-040.

5. **Identification and Screening of Remedial Technologies**. Identify potential containment, treatment, and removal technologies and eliminate (screen) those technologies that cannot be implemented at the site.

6. **Development and Screening of Preliminary Remedial Action Alternatives.** Develop a range of preliminary remedial action alternatives acceptable to DEQ.

7. **Detailed Analysis of Remedial Action Alternatives.** Analyze remedial action alternatives in detail according to the requirements set forth in OAR 340-122-085 and 090.

8. **Comparative Analysis of Remedial Action Alternatives**.

9. **Recommended Remedial Action Alternative.** Recommend a remedial action alternative based on the comparative analysis of remedial action alternatives. Perform a residual risk assessment on the recommended alternative as specified in OAR 340-122-084(4).

E. REPORT DISTRIBUTION.

1. Three bound and one unbound copy of all reports should be submitted to DEQ.

2. DEQ requests that all copies be duplex printed on recycled paper.

State of Oregon
Department of Environmental Quality

ATTACHMENT D

INVOICE

Site Name: SLUDGE SITE
Project No: 00000000
Authorization:

Invoice Number: HSRAF98-XXXX
Invoice Date: 12/31/1997

John Q. Public Corporation
Attn: John
123 S.W. Bedrock Avenue
Portland, OR 97200

Payment Due: 1/30/1998

Project Expenditures:	Billing Period *11/97*
Personal Services	$ 0.00
Attorney General	0.00
Travel	0.00
Services and Supplies	0.00
Contract Payments	0.00
Capital Outlay	0.00
Agency Indirect Cost	0.00
WMCD Indirect Cost	0.00
Cleanup Law Rewrite	0.00
Total Current Charges:	$ 0.00

Previous Balance	Billing Period Expenditures	Interest	**Total Balance Due**
0.00	0.00	0.00	0.00

---------- Cut here and return this portion with payment ----------

Remit and make checks payable to:

Dept. of Environmental Quality
Attn.: Business Office
811 SW Sixth Avenue
Portland, OR 97204-1390

Check box if your address has changed and complete back of invoice: ☐

Site Name: SLUDGE SITE
Project No: 00000000

Invoice Number: HSRAF98-XXXX
Amount Enclosed:

Current	31-60 Days	61-90 Days	90+ Days	Total Due
0.00	0.00	0.00	0.00	0.00