

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

In the Matter of Remedial Action by:

US Ecology Washington, Inc.
1777 Terminal Drive, Suite A
Richland, WA 99352

AGREED ORDER

No. DE 3834

TO: Stephen A. Romano
President and Chief Operating Officer
American Ecology Corporation
805 W. Idaho, Suite 200
Boise, ID 83702-8915

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I. INTRODUCTION

The mutual objective of the State of Washington, Department of Ecology (Ecology) and US Ecology Washington, Inc. (US Ecology) under this Agreed Order (Order) is to provide for sitewide investigation and other remedial action at a facility where there has been a release or threatened release of hazardous substances. This Order requires USE to implement the attached Scope of Work (SOW) (Exhibit B) and, based on the resulting focused feasibility study, develop a Draft Cleanup Action Plan in accordance with WAC 173-340-380. Ecology believes the actions required by this Order are in the public interest.

II. JURISDICTION

This Agreed Order is issued pursuant to the authority of the Model Toxics Control Act (MTCA), RCW 70.105D.050(1).

III. PARTIES BOUND

This Agreed Order shall apply to and be binding upon the Parties to this Order, their successors and assigns. The undersigned representative of each Party hereby certifies that he or she is fully authorized to enter into this Order and to execute and legally bind such Party to comply with the Order. USE agrees to undertake all actions required by the terms and conditions of this Order. No change in ownership or corporate status shall alter US Ecology's responsibility under this Order. US Ecology shall provide a copy of this Order to all agents, contractors, and subcontractors retained to perform work required by this Order, and shall ensure that all work undertaken by such agents, contractors, and subcontractors complies with this Order.

IV. DEFINITIONS

Unless otherwise specified herein, the definitions set forth in Chapter 70.105D RCW and Chapter 173-340 WAC shall control the meanings of the terms used in this Order.

1. Site: Refers to the LLRW Facility, including the extent of contamination caused by the release of hazardous substances at the LLRW Facility. The actions required by this Order will define the nature and extent of contamination at the Site by collecting, analyzing, and evaluating sufficient information to select a cleanup action. The Site is more particularly

described in Exhibit A to this Order, which includes a detailed Site diagram. The Site constitutes a facility under RCW 70.105D.020(4).

2. LLRW Facility or “leased premises”: Refers to the Low-Level Radioactive Waste (LLRW) Disposal Site generally located approximately 23 miles northwest of Richland, Washington on approximately 100 acres of land leased to the State of Washington near the center of the 560 square mile United States Department of Energy Hanford Nuclear Reservation (Hanford Site). The site is more particularly described in Exhibit A to this Order.

2. Parties: Refers to the State of Washington, Department of Ecology and US Ecology

3. PLP: Refers to US Ecology.

4. Agreed Order or Order: Refers to this Order and each of the exhibits to the Order. All exhibits are integral and enforceable parts of this Order. The terms “Agreed Order” or “Order” shall include all exhibits to the Order.

5. Remedial Action: Refers to any remedial action as defined in RCW 70.105D.020(21) and shall include, without limitation, the attached Scope of Work (Exhibit B). Final closure and decommissioning as provided in RCW 43.200.080 includes remedial action for the purposes of this Order.

6. SOW: Refers to the attached Scope of Work (Exhibit B), which describes the Remedial Investigation and Focused Feasibility Study.

V. FINDINGS OF FACT

Ecology makes the following findings of fact, without any express or implied admissions of such facts by US Ecology:

1. On September 10, 1964, State of Washington (State) and the United States Government (U.S. Government), represented by the Atomic Energy Commission now succeeded by the United States Department of Energy (Energy), entered into a 100-year lease agreement (Prime Lease) for 1,000 acres of land in Benton County within an area owned by the U.S. Government known as the Department of Energy Hanford Nuclear Reservation. The State

agreed under Article 9 of the Prime Lease to take all necessary measures to decontaminate the leased premises to the satisfaction of the U.S. Government. By the terms of Article 9 this obligation did not extend to “any land used as a burial site” for radioactive waste over which the State had agreed to assume “perpetual care” under agreement with the U.S. Government. .

2. On July 29, 1965, the State and California Nuclear, Inc. (California Nuclear) entered into a sublease for 100 acres of the leased premises (the LLRW Facility). The sublease provided that the 100 acres were available to be used for “the burial and storage of both solid and liquid processed wastes, the treatment of hazardous and toxic materials, decontamination work generally and activities associated with or incidental to” those uses. The sublease acknowledged that the State had or intended to enter into a Perpetual Care Agreement in accordance with Article 9 of the Prime Lease. The sublease further provided that California Nuclear would, at its own expense, “take or cause to be taken all necessary measures” to decontaminate the property to the State’s satisfaction, provided that this requirement would not apply to “the decontamination of any land used as a burial or storage site for radioactive wastes where appropriate payments to the State’s Perpetual Maintenance Fund” had been made. The sublease indicated that the State intended to collect fees from California Nuclear sufficient to finance all the State’s obligations under the Perpetual Care Agreement. To this effect, the sublease provided for California Nuclear to make payments into the Perpetual Maintenance Account (including an initial deposit of \$20,000) and to assess a surcharge of at least \$.05 per cubic foot to fund the perpetual care obligations.

3. On July 29, 1965, the State and U.S. Government entered into the Perpetual Care Agreement for the leased premises. That agreement established the Perpetual Maintenance Fund and provides that all deposits to the fund would be used exclusively for defraying the costs of insuring perpetual surveillance and maintenance of the subleased premises. The State further agreed to place all deposits in a special account and to act as custodian of the funds deposited into the account.

4. On April 16, 1965, the sublease was assigned to Nuclear Engineering Company, which subsequently changed its name to US Ecology, Inc. On or about December 29, 1969, the State and Nuclear Engineering Company executed the First Amendment to the Sublease. The amendment clarifies that the sublease premises could be used for the burial and storage of radioactive waste and material.

5. On February 26, 1976, the State and Nuclear Engineering Company entered into a new sublease agreement. The new agreement increased the amount of the rental payments and increased the perpetual care surcharge to \$.08 per cubic foot of waste and material disposed of at the sublease premises.

6. On January 11, 1980, the State and Nuclear Engineering Company entered into the Second Amendment to the Sublease. The amendment increased the amount of the rental payment paid to the State. The amendment also increased the perpetual maintenance surcharge to \$.25 per cubic foot.

7. On January 14, 1982, the State and US Ecology, Inc. (successor to Nuclear Engineering Company) entered into the Third Amendment to the Sublease. The amendment increased the perpetual maintenance surcharge to \$1.75 per cubic foot. The amendment also established a closure fund surcharge of \$.25 per cubic foot. The parties agreed that the closure fund should be used to pay all reasonable costs of closure under the terms of the Sublease. Pursuant to RCW 43.200.080 the funds in the closure account are exclusively available for final closure and decommissioning of the LLRW Facility.

8. On May 3, 1991, the State, represented by the Department of Ecology, and US Ecology, Inc., entered into the Fourth Amendment to the Sublease. The amendment extended the lease term and increased the rental payments to the State.

9. On July 29, 2005, the State and US Ecology, a wholly owned subsidiary of American Ecology Corporation, entered into a new sublease. The lease has a term of ten years with the option to renew for four additional terms of ten years each. The sublease further

provides for the continued collection of the perpetual maintenance surcharge at \$1.75 per cubic foot and continued payment of rent to the State for the use of the sublease premises.

10. The LLRW Facility has been in operation since 1965.

11. From its operating inception through the date of this Order, the LLRW Facility has practiced conventional near-surface burial of packaged waste into unlined trenches. The trenches range from 300-850 feet long, 50-150 feet wide, and 30-50 feet deep. There are currently four open operating trenches (Trench 14-W, Trench 11-B, Trench 18 and Trench 19) and 20 filled trenches whose contents include: one nuclear reactor vessel; three emptied underground tanks; scintillation fluids; absorbed liquids; and metal drums, fiber-board drums, and cardboard, wood, and metal boxes. The filled trenches have been covered with at least five feet of site soils.

12. In addition to the trenches, five underground storage tanks were installed for treatment of liquid low-level radioactive resin wastes. Two of these tanks were removed and the remaining three tanks were emptied to the extent possible and closed in place with concrete in 1986. The resins remaining in these three tanks designated as extremely hazardous waste as defined in Chapter 173-303 WAC.

13. Several types of waste have been disposed at the LLRW Facility since 1965. This includes waste currently defined as low-level radioactive (LLRW), naturally occurring radioactive material (NORM) and accelerator-produced material (NARM), non-radioactive hazardous, and mixed waste (radioactive waste having a hazardous component). Since 1985, only waste defined as LLRW, NORM and NARM have been allowed for disposal.

14. LLRW is waste such as trash, clothing, tools, hardware, and equipment that has been contaminated by radioactive substances. The LLRW at the LLRW Facility is typically generated by five sources. These sources are nuclear power plants, industrial users, government and military organizations, academic institutions, and the medical community. NARM waste includes, but is not limited to, pipe scale from oil and gas pipelines, soils from cleanup of mineral processing sites, and measuring devices and gauges.

15. Up until October 28, 1985, the LLRW Facility license did not prohibit scintillation fluids to be disposed in trenches 1 through 10, 11A, and 13. This waste included radioactive material and was from research labs, hospitals, and power plants. The chemicals in the scintillation fluids included toluene, benzene, and xylene. This waste was disposed in sealed, 20 ml glass vials, surrounded by absorbent within plastic bag-lined containers. An absorbent sufficient to absorb at least twice the amount of any liquids was required for these wastes. Disposal of these wastes ended in 1985.

16. An estimated 17,000 cubic feet of non-radioactive hazardous wastes were disposed at the commercial Site between November 1965 and June 1970. These wastes were disposed in the Chemical Trench located in the north-central portion of the Site. The Chemical Trench was approximately 80 percent full when it was closed. Documented sources of waste in the Chemical Trench include nine drums of beryllium/copper solid metal shavings, 56 drums of unknown waste, and several thousand drums of phenolic waste.

17. Table 1 presents general information on trench contents.

Table 1. General Trench Information.

Area	Trench Information
Trenches 16* & 18*	Trench 18 active now. Clastic Dike was observed in 2002 photograph.
Trenches 13 & 14	West portion of Trench 14A active now. Confirm no hazardous substances are present.
Trench 12	Trojan reactor disposed August 1999, 8,490 ft ³ w/1.54 million curies.
Trench 11A	Contains mixed waste stabilized with Aquaset/ Petroset, including drums from close out of resin tank area.
Trench 11B	Active, now in use. Contains caissons (vertically placed corrugated steel culverts) as described in trenches 4A & B.
10	Likely to contain scintillation fluids.
9	Likely to contain scintillation fluids.
8	Likely to contain scintillation fluids.
7	Likely to contain scintillation fluids.
6	Likely to contain scintillation fluids.
7A	Need to confirm if hazardous substances are present or not.
RXT	Head and Reactor Vessel Trench.
5	Known to have containerized/absorbed liquids disposed in the trench. Contains scintillation fluids. Contains mixed waste.

Table 1. General Trench Information.

Area	Trench Information
4A & B	Trench 4A, which was open from 4/30/82-6/18/82, was designed for dewatered, feedwater heaters from J.A. Fitzpatrick power plant. Trench 4B, open from 7/9/84-8/23/85, has six IF-300s that contain activated hardware. There are four caissons (not wells); two were used for the disposal of high-activity sources. The caissons are 30 foot vertical tubes, 6 feet apart, 24 inches in diameter with liners made of steel pipe that rest on eight-inch thick concrete pads. After a caisson was filled, a concrete cap was poured to seal the caisson.
1-4	Contain waste in metal drums, fiber-board drums, and cardboard boxes. Likely to contain scintillation fluids.
Chemical	Known to have absorbed liquids disposed in the trench, disposal of waste phenol, drums of chemical waste, phenolic resin, toluene, benzene, xylene, lead, and beryllium. Records of disposal from 1965-70 are incomplete. Trench used 1968-1972 for disposal of 17,000 ft ³ of non-radioactive material.

* Trench sequence is out of order; trenches 15 and 17 have not been constructed at this time.

18. A site hazard assessment has been completed and the LLRW Facility is listed on the state Hazardous Sites List.

19. US Ecology, with technical assistance from Ecology and Washington State Department of Health (WDOH), conducted Phase I and Phase II of a site investigation at the LLRW Facility in 1998 and 1999 (USE 1999). The purpose of the LLRW Facility investigation was to determine if any release has occurred at the Site. Trench 5 was selected for placement of slant borings because it is reported to contain tritium-containing waste and volatile organic compounds, such as toluene, xylene, and benzene. These compounds were components of scintillation fluids used in research. The Chemical Trench was selected for evaluation because it may contain unique chemical contaminants when compared with the other trenches.

20. Hazardous substances have been detected in the subsurface soils and soil gases as documented in the 1999 *Comprehensive Facility Investigation, Richland LLRW Disposal Facility Phase I and II Report*. Results of the site investigation indicate the presence of volatile and semivolatile organic chemicals in the soil, including: acetone, 1,2,4-trimethyl-benzene, and (total) xylene. Multiple volatile organic compounds (VOC) were detected in vadose zone gas

samples (USE 1998). Data indicates metals in the vadose zone including arsenic, beryllium, cadmium, and chromium that exceed screening levels.

21. Hazardous substances have been detected in groundwater above MTCA Method B cleanup levels as documented in the 1999 *Comprehensive Facility Investigation, Richland LLRW Disposal Facility Phase I and II Report*. Two rounds of ground water samples were collected from six existing onsite wells and one well located outside the LLRW Facility fence. The two sampling events occurred between September/October and December 1998. The highest detected analytical results from the groundwater samples are above the practical quantitation limit (PQL) for trichloroethylene, chloroform, chromium VI, and nitrate. For groundwater, trichloroethylene concentrations in one well exceeded the MTCA Method B and maximum contaminant level (MCL) limits in successive quarters, chloroform has exceeded MTCA Method B in two wells, and for hexavalent chromium results in six wells have exceeded the MTCA Method B level. The source of hazardous substances released to the groundwater has not been established.

22. Groundwater monitoring data collected the fourth quarter of 2004 and the first and second quarters of 2005 was analyzed for volatiles using EPA SW-846 methods. Groundwater contamination was detected above MTCA Method B groundwater cleanup levels for chloroform and trichloroethylene, all three quarters.

VI. ECOLOGY DETERMINATIONS

1. US Ecology is an "owner or operator" as defined in RCW 70.105D.020(12), of a "facility" as defined in RCW 70.105D.020(4).

2. Based upon all factors known to Ecology, a "release" or "threatened release" of "hazardous substance(s)" as defined in RCW 70.105D.020(20) and RCW 70.105D.020(7), respectively, has occurred at the Site.

3. Based upon credible evidence, Ecology issued a potentially liable person status letter to Stephen A. Romano, President and Chief Operating Officer for US Ecology, Inc. dated January 17, 2002, pursuant to RCW 70.105D.040, .020(16) and WAC 173-340-500. US

Ecology provided a response dated March 1, 2002. US Ecology, Inc. did not address potentially liable person status, but requested that if Ecology proceeds under MTCA, it should be under an agreed order that coordinates MTCA remedial actions with WDOH closure work underway at previously used disposal areas. By letter of September 27, 2006, Ecology issued its final determination of potentially liable person status to US Ecology.

4. Pursuant to RCW 70.105D.030(1) and .050(1), Ecology may require PLPs to investigate or conduct other remedial actions with respect to any release or threatened release of hazardous substances, whenever it believes such action to be in the public interest. Based on the foregoing facts, Ecology believes the remedial action(s) required by this Order is(are) in the public interest.

VII. WORK TO BE PERFORMED

Based on the Findings of Fact and Ecology Determinations, it is hereby agreed that US Ecology shall take the below remedial action(s) at the Site and that this (these) action(s) be conducted in accordance with Chapter 173-340 WAC unless otherwise specifically provided for herein.

The US Ecology Site is unique in that a LLRW Facility closure account has been established and funded under RCW 43.200.080. The funds reserved in this account may, among other things, be used to fund remedial actions for the purposes of this Order. On February 12, 2005, the Department of Ecology, the Washington Department of Health and US Ecology executed a Memorandum of Agreement (MOA) as a non-enforceable statement of intent, made in good faith to address interim closure of filled trenches and a MTCA remedial investigation and feasibility study (RI/FS Study). The parties to the MOA agreed that the costs of activities described in the SOW, contained in Exhibit B, will be fully reimbursed up to the limit available and authorized by legislative appropriation from the LLRW Facility closure account per RCW 43.200.080. The parties to the MOA further agreed that no funding obligations are to be imposed on US Ecology for the SOW.

Without limitation on Ecology's rights under RCW 70.105D.050 or Section VIII.M of this Order, US Ecology shall, under the scope of this Agreed Order, take the below remedial actions consistent with the statement of intent expressed in the MOA. To the extent funds per RCW 43.200.080 are available and appropriated, Ecology shall reimburse US Ecology in a timely manner for work performed under this Order in accordance with the contracts entered into for the activities described in the SOW. In the event such funds are not available or appropriated, any further obligation on the part of US Ecology to take the below remedial actions will arise either under an amendment to this Order or a separate enforcement order or agreed order issued pursuant to RCW 70.105D.050.

The remedial actions required by this Order, and conditions related to those remedial actions, are:

1. Implement all activities described in the SOW, contained in Exhibit B, in accordance with the requirements and schedules therein, including issuance of a remedial investigation (RI) report and a focused feasibility study (FFS) report. No later than ninety (90) days after receiving Ecology's written approval of the RI/FFS report, submit a draft Cleanup Action Plan (CAP) that complies with WAC 173-340-380, for Ecology's consideration. All actions and specifications provided in the attached SOW are incorporated by reference and are an integral and enforceable part of this Order.

2. A schedule directing RI/FS activities is included in the SOW, Table 1, Exhibit B. Development of the Cleanup Action Plan will occur as follows:

Activity	Date	Deliverable
Submit draft CAP for Ecology consideration	90 days after Ecology approval of final RI/FFS Reports	Draft CAP

3. Unless agreed otherwise, all reports and documents must be submitted in accordance with schedule specified in this Agreed Order and SOW, Exhibit B. QA/QC requirements for all field and analytical work are specified in the SOW, Exhibit B.

4. If, at any time after the first exchange of comments on drafts, Ecology determines that insufficient progress is being made in the preparation of any of the deliverables required by this section, Ecology may complete and issue the final deliverable.

VIII. TERMS AND CONDITIONS OF ORDER

A. Public Notices

This Order has been the subject of public notice and comment pursuant to WAC 173-340-600.

B. Implementation of Remedial Action

Except where necessary to abate an emergency situation, US Ecology shall not perform any remedial actions at the Site outside those remedial actions required by this Order, unless Ecology concurs, in writing, with such additional remedial actions.

C. Designated Project Coordinators

The project coordinator for Ecology is:

Deborah Singleton
3100 Port of Benton Blvd.
Richland, WA 99354
Phone: (509) 372-7923
Fax: (509) 372-7971
E-mail address: dsin461@ecy.wa.gov

The project coordinator for US Ecology is:

Tom Hayes
1777 Terminal Drive, Suite A
Richland, WA 99352
Phone: (509) 946-4945
Fax: (509) 946-5495
E-mail address: thayes@americanecology.com

The project coordinator(s) shall be responsible for overseeing the implementation of this Order. The Ecology project coordinator will be Ecology's designated representative for the Site. To the maximum extent possible, communications between Ecology and US Ecology, and all documents, including reports, approvals, and other correspondence concerning the activities

performed pursuant to the terms and conditions of this Order shall be directed through the project coordinator(s).

Ecology and US Ecology may change their respective project coordinator, but must provide ten (10) days advance written notification of the change to the other party.

D. Performance

All work performed pursuant to this Order shall be under the direction and supervision, as necessary, of a licensed professional engineer or licensed hydrogeologist, or equivalent as approved by Ecology, with experience and expertise in hazardous waste site investigation and cleanup. US Ecology shall notify Ecology in writing of the identity of such engineer(s), or hydrogeologist(s), or others, and of any contractors and subcontractors to be used in carrying out the terms of this Order, in advance of their involvement at the Site.

Any construction work performed pursuant to the Order shall be under the supervision of a professional engineer or a qualified technician under the direct supervision of a professional engineer. The professional engineer must be registered in the State of Washington, except as provided in RCW 18.43.130.

E. Access

Ecology or any Ecology authorized representative shall have the full authority to enter and freely move about all property at the Site that US Ecology either controls or has access rights during hours in which work is being performed for the purposes of, *inter alia*: inspecting records, operation logs, and contracts related to the work being performed pursuant to this Order; reviewing US Ecology's progress in carrying out the terms of this Order; conducting such tests or collecting such samples as Ecology may deem necessary; using a camera, sound recording, or other documentary type equipment to record work done pursuant to this Order; and verifying the data submitted to Ecology by US Ecology. Ecology and US Ecology shall make all reasonable efforts to secure access rights for those properties within the Site not controlled by US Ecology where remedial activities or investigations will be performed pursuant to this Order. Ecology or any Ecology authorized representative shall give reasonable notice before entering any Site

property controlled by US Ecology unless an emergency prevents such notice. All persons who access the Site pursuant to this paragraph shall comply with the approved health and safety plan, if any. Ecology employees and their representative shall not be required to sign any release or waiver as a condition of site property access.

F. Sampling, Data Reporting, and Availability

With respect to the implementation of this Order, US Ecology shall make the results of all sampling, laboratory reports, and/or test results generated by it or on its behalf available to Ecology and shall submit these results in accordance with Section VII of this Order.

All sampling data shall be submitted to Ecology according to the requirements of WAC 173-340-840(5). Ground water sampling data shall also be submitted to Ecology according to the requirements specified in the SOW, Exhibit B. These submittals shall be provided to Ecology in accordance with Section VII of this Order.

If requested by Ecology, US Ecology shall allow split or duplicate samples to be taken by Ecology and/or its authorized representative of any samples collected by US Ecology pursuant to implementation of this Order. US Ecology shall notify Ecology seven (7) days in advance of any sample collection or work activity at the Site. Ecology shall, upon request, allow split or duplicate samples of any samples collected by Ecology pursuant to the implementation of this Order to be taken by US Ecology or its authorized representative provided it does not interfere with Ecology's sampling. Without limitation on Ecology's rights under Section VIII.E of this Order, Ecology shall notify US Ecology prior to any sample collection activity unless an emergency prevents such notice.

In accordance with WAC 173-340-830(2)(a), all hazardous substance analyses shall be conducted by a laboratory accredited under Chapter 173-50 WAC for the specific analyses to be conducted, unless otherwise approved by Ecology.

G. Public Participation

A public participation plan is required for this Site. Ecology shall review any existing public participation plan to determine its continued appropriateness and whether it requires

amendment, or if no plan exists, US Ecology shall develop a public participation plan as specified in Exhibit B, and obtain Ecology review and approval.

Ecology shall maintain the responsibility for public participation at the Site. However, US Ecology shall cooperate with Ecology, and shall:

1. If agreed to by Ecology, develop an appropriate mailing list, prepare drafts of public notices and fact sheets at important stages of the remedial action, such as the submission of work plans, remedial investigation/feasibility study reports, cleanup action plans, and engineering design reports. As appropriate, Ecology will edit, finalize, and distribute such fact sheets and prepare and distribute public notices of Ecology's presentations and meetings;

2. Notify Ecology's project coordinator prior to any of the following: the issuance of all press releases; distribution of fact sheets; performance of other outreach activities; meetings with the interested public and/or local governments. Likewise, Ecology shall notify US Ecology prior to the issuance of all press releases and fact sheets, and before meetings with the interested public and local governments. For all press releases, fact sheets, meetings, and other outreach efforts by US Ecology that do not receive prior Ecology approval, US Ecology shall clearly indicate to its audience that the press release, fact sheet, meeting, or other outreach effort was not sponsored or endorsed by Ecology;

3. When requested by Ecology, participate in public presentations on the progress of the remedial action at the Site. Participation may be through attendance at public meetings to assist in answering questions, or as a presenter;

4. When requested by Ecology, arrange and/or continue information repositories to be located at the following locations:

Nuclear Waste Program
3100 Port of Benton Blvd.
Richland, WA 99354

At a minimum copies of all public notices, fact sheets, and press releases; all quality assured monitoring data; remedial action plans and reports, supplemental remedial planning

documents, and all other similar documents relating to performance of the remedial action required by this Order shall be promptly placed in these repositories.

H. Retention of Records

During the pendency of this Order and for a period of ten (10) years from the longer of either (a) the term of the sublease agreement and any extension thereto, or (b) the date of completion of work performed pursuant to this Order, US Ecology shall preserve all records, reports, documents, and underlying data in its possession relevant to the implementation of this Order. Record retention shall include project contractors and subcontractor's records, reports, documents, and underlying data relevant to the implementation of this Order. Upon request of Ecology, US Ecology shall make all records available to Ecology and allow access for review within a reasonable time. In the alternative, upon the end of the lease term, US Ecology may tender all applicable records to Ecology.

I. Resolution of Disputes

1. In the event a dispute arises as to an approval, disapproval, proposed change, or other decision or action by Ecology's project coordinator, the Parties shall utilize the dispute resolution procedure set forth below.

(a) Upon receipt of the Ecology project coordinator's decision, US Ecology has fourteen (14) days within which to notify Ecology's project coordinator of its objection to the decision.

(b) The Parties' project coordinators shall then confer in an effort to resolve the dispute. If the project coordinators cannot resolve the dispute within fourteen (14) days, Ecology's project coordinator shall issue a written decision.

(c) US Ecology may then request Ecology management review of the decision. This request shall be submitted in writing to the Nuclear Waste Program (NWP) Program Manager within seven (7) days of receipt of Ecology's project coordinator's decision.

(d) The Program Manager shall conduct a review of the dispute and shall endeavor to issue a written decision regarding the dispute within sixty (60) days of US Ecology's

request for review. In light of the unique nature of the Site, including its role in the interstate disposal of radioactive wastes, if the parties are still unable to agree, the dispute shall be elevated to the Director, Department of Ecology and the US Ecology President and Chief Executive Officer. Final administrative resolution shall reside with the Director of Ecology.

2. The Parties agree to only utilize the dispute resolution process in good faith and agree to expedite, to the extent possible, the dispute resolution process whenever it is used.

3. Implementation of these dispute resolution procedures shall not provide a basis for delay of any activities required in this Order, unless Ecology agrees in writing to a schedule extension.

J. Extension of Schedule

1. An extension of schedule shall be granted only when a request for an extension is submitted in a timely fashion, generally at least thirty (30) days prior to expiration of the deadline for which the extension is requested, and good cause exists for granting the extension. All extensions shall be requested in writing. The request shall specify the reason(s) the extension is needed. The request shall specify:

- (a) The deadline that is sought to be extended;
- (b) The length of the extension sought;
- (c) The reason(s) for the extension; and
- (d) Any related deadline or schedule that would be affected if the extension

were granted.

2. The burden shall be on US Ecology to demonstrate to the satisfaction of Ecology that the request for such extension has been submitted in a timely fashion and that good cause exists for granting the extension. Good cause includes, but is not limited to:

(a) For the purposes of this order only, lack of sufficient funds in the closure account or legislative appropriation to use those funds for remedial actions as provided herein.

(b) Circumstances beyond the reasonable control and despite the due diligence of USE including delays caused by unrelated third parties or Ecology, such as (but not

limited to) delays by Ecology in reviewing, approving, or modifying documents submitted by US Ecology; or

(c) Acts of God, including fire, flood, blizzard, extreme temperatures, storm, or other unavoidable casualty; or

(d) Endangerment as described in Section VIII.L of this Order.

However, and except as provided in 2(a) above, neither increased costs of performance of the terms of this Order nor changed economic circumstances shall be considered circumstances beyond the reasonable control of US Ecology. Good cause as provided in 2(a) above shall not limit Ecology's rights under RCW 70.105D.050 or Section VIII.M of this Order.

3. Ecology shall act upon any written request for extension in a timely fashion. Ecology shall give US Ecology written notification in a timely fashion of any extensions granted pursuant to the Order. A requested extension shall not be effective until approved by Ecology. Unless the extension is a substantial change, it shall not be necessary to amend this Order pursuant to Section VIII.K when a schedule extension is granted.

4. An extension shall only be granted for such period of time as Ecology determines is reasonable under the circumstances. Ecology may grant schedule extensions exceeding ninety (90) days only as a result of:

(a) Delays described in 2(a) above;

(b) Delays in the issuance of a necessary permit which was applied for in a timely manner;

(c) Other circumstances deemed exceptional or extraordinary by Ecology; or

(d) Endangerment as described in Section VIII.L of this Order.

K. Amendment of Order

The project coordinators may verbally agree to minor changes to the work to be performed without formally amending this Order. Minor changes will be documented in writing by Ecology within seven (7) days of verbal agreement.

Except as provided in Section VIII.M of this Order, substantial changes to the work to be performed shall require formal amendment of this Order. This Order may only be formally amended by the written consent of both Ecology and US Ecology. US Ecology shall submit a written request for amendment to Ecology for approval. Ecology shall indicate its approval or disapproval in writing and in a timely manner after the written request for amendment is received. If the amendment to the Order represents a substantial change, Ecology will provide additional public notice and opportunity to comment. If Ecology does not agree to a proposed amendment, the disagreement may be addressed through the dispute resolution procedures described in Section VIII.I of this Order.

L. Endangerment

In the event Ecology determines that any activity being performed at the Site pursuant to the SOW is creating or has the potential to create a danger to human health or the environment on or surrounding the Site, Ecology may direct US Ecology to cease such activities for such period of time as it deems necessary to abate the danger. US Ecology shall immediately comply with such direction.

If, for any reason, US Ecology determines that any activity being performed at the Site pursuant to the SOW is creating or has the potential to create a danger to human health or the environment, US Ecology may cease such activities. US Ecology shall notify Ecology's project coordinator as soon as possible, but no later than twenty-four (24) hours after making such determination or ceasing such activities. Upon Ecology's direction US Ecology shall provide Ecology with documentation of the basis for the determination or cessation of such activities. If Ecology disagrees with US Ecology's cessation of activities, it may direct US Ecology to resume such activities.

If Ecology concurs with or orders a work stoppage pursuant to this section, US Ecology's obligations with respect to the ceased activities shall be suspended until Ecology determines the danger is abated, and the time for performance of such activities, as well as the time for any other

work dependent upon such activities, shall be extended for such period of time as Ecology determines is reasonable under the circumstances.

Nothing in this Order shall limit the authority of Ecology, its employees, agents, or contractors to take or require appropriate action in the event of an emergency.

M. Reservation of Rights/No Settlement

This Order is not a settlement under Chapter 70.105D RCW. Ecology's signature on this Order in no way constitutes a covenant not to sue or a compromise of any Ecology rights or authority. In addition, Ecology will not take additional enforcement actions against US Ecology regarding remedial actions required by this Order, provided US Ecology complies with this Order.

Ecology nevertheless reserves its rights under Chapter 70.105D RCW, including: (a) the right to require additional or different remedial actions at the Site should it deem such actions necessary to protect human health and the environment, and to issue orders requiring such remedial actions; (b) the right to require additional or different remedial actions at the Site under Chapter 70.105E RCW (currently invalidated), pending the results of current litigation in the matter of United States v. Manning, Ninth Circuit Court of Appeals No. 06-35613; and (b) all rights regarding the injury to, destruction of, or loss of natural resources resulting from the release or threatened release of hazardous substances at the Site.

Both the remedial actions required by this Order (including any remedial action costs incurred by Ecology) and financial assurance for future remedial actions are anticipated to be funded and from the commercial LLRW facility site closure account and/or perpetual surveillance and maintenance account established under RCW 43.200.080. Ecology nevertheless reserves all rights under Chapter 70.105D RCW to compel remedial actions that may be at US Ecology's expense; to recover remedial action costs from US Ecology; and to require that US Ecology provide adequate financial assurance for remedial actions. Ecology may not compel such additional remedial action or seek to recover remedial action costs under the terms of this Order.

US Ecology reserves its rights under Chapter 70.105D RCW to seek contribution from Ecology and any other person, including any other state agency or institution, to obtain contribution for remedial action costs that are not fully funded and reimbursed by the State. US Ecology, further reserves its rights, including without limitation any rights that may exist under Chapter 43.200 RCW and applicable lease agreements for reimbursement of its costs incurred in conducting remedial actions at the Facility. US Ecology disputes that Chapter 70.105E RCW applies to the Site in any manner and reserves any and all rights to contest any future action or effort of any kind to apply Chapter 70.105E RCW to the Site.

N. Transfer of Interest in Property

No voluntary conveyance or relinquishment of title, easement, leasehold, or other interest in any portion of the Site shall be consummated by US Ecology without provision for continued implementation of all requirements of this Order and implementation of any remedial actions found to be necessary as a result of this Order.

Prior to US Ecology's transfer of any interest in all or any portion of the Site, and during the effective period of this Order, US Ecology shall serve a copy of this Order upon any prospective purchaser, lessee, transferee, assignee, or other successor in said interest; and, at least thirty (30) days prior to any transfer, US Ecology shall notify Ecology of said transfer. Upon transfer of any interest, US Ecology shall restrict uses and activities to those consistent with this Order and notify all transferees of the restrictions on the use of the property.

O. Compliance with Applicable Laws

1. All actions carried out by US Ecology pursuant to this Order shall be done in accordance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits, except as provided in RCW 70.105D.090.

2. Pursuant to RCW 70.105D.090(1), the substantive requirements of Chapters 70.94, 70.95, 70.105, 77.55, and 90.58 RCW and of any laws requiring or authorizing local government permits or approvals for the remedial action under this Order and that are known to

be applicable at the time this Order becomes effective, have been included in Exhibit C, and are binding and enforceable requirements of this Order.

US Ecology has a continuing obligation to determine whether additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order. In the event either Ecology or US Ecology determines that additional permits or approvals addressed in RCW 70.105D.090(1) would otherwise be required for the remedial action under this Order, it shall promptly notify the other party of its determination. Ecology shall determine whether Ecology or US Ecology shall be responsible to contact the appropriate state and/or local agencies. If Ecology so requires, US Ecology shall promptly consult with the appropriate state and/or local agencies and provide Ecology with written documentation from those agencies of the substantive requirements those agencies believe are applicable to the remedial action. Ecology shall make the determination on the additional substantive requirements that must be met by US Ecology and on how US Ecology must meet those requirements. Ecology shall inform US Ecology in writing of these requirements. Once established by Ecology, the additional requirements shall be requirements of this Order. US Ecology shall not begin or continue the remedial action potentially subject to the additional requirements until Ecology makes its final determination.

Ecology shall ensure that notice and opportunity for comment is provided to the public and appropriate agencies prior to establishing the substantive requirements under this section.

3. Pursuant to RCW 70.105D.090(2) in the event Ecology determines that the exemption from complying with the procedural requirements of the laws referenced in RCW 70.105D.090(1) would result in the loss of approval from a federal agency which is necessary for the state to administer any federal law, the exemption shall not apply and US Ecology shall comply with both the procedural and substantive requirements of the laws referenced in RCW 70.105D.090(1), including any requirements to obtain permits.

P. Periodic Review

As remedial action, including ground water monitoring, continues at the Site, the Parties agree to review the progress of remedial action at the Site, and to review the data accumulated as a result of monitoring the Site as often as is necessary and appropriate under the circumstances. At least every five (5) years after the initiation of any cleanup action at the Site the Parties shall meet to discuss the status of the Site and the need, if any, for further remedial action at the Site. At least ninety (90) days prior to each periodic review, US Ecology shall submit a report to Ecology that documents whether human health and the environment are being protected based on the factors set forth in WAC 173-340-420(4). Ecology reserves the right to require further remedial action at the Site under appropriate circumstances. This provision shall remain in effect for the duration of this Order.

Q. Indemnification

US Ecology agrees to indemnify and save and hold the State of Washington, its employees, and agents harmless from any and all claims or causes of action for death or injuries to persons or for loss or damage to property to the extent arising from or on account of acts or omissions of US Ecology, its officers, employees, agents, or contractors in entering into and implementing this Order. However, US Ecology shall not indemnify the State of Washington, its employees, or agents, nor save nor hold any of them harmless from any claims or causes of action for death or injuries to persons or for the loss of damage to property arising out of the negligent acts or omissions of the State of Washington, or the employees or agents of the State, in implementing the activities pursuant to this Order.

IX. SATISFACTION OF ORDER

The provisions of this Order shall be deemed satisfied upon US Ecology's receipt of written notification from Ecology that US Ecology has completed the remedial activity required by this Order, as amended by any modifications, and that the US Ecology has complied with all other provisions of this Agreed Order.

X. ENFORCEMENT

Pursuant to RCW 70.105D.050, this Order may be enforced as follows:

1. The Attorney General may bring an action to enforce this Order in a state or federal court.

2. The Attorney General may seek, by filing an action, if necessary, to recover unreimbursed amounts spent by Ecology for remedial actions within the scope of this Order as defined by Section VII, and any orders related to the Site other than this Order.

3. In the event US Ecology refuses, without sufficient cause, to comply with any term of this Order, US Ecology may be liable for:

(a) Up to three (3) times the amount of any costs incurred by the State of Washington as a result of its refusal to comply; and

(b) Civil penalties of up to \$25,000 per day for each day it refuses to comply.

4. This Order is not appealable to the Washington Pollution Control Hearings Board.

This Order may be reviewed only as provided under RCW 70.105D.060.

Effective date of this Order: SEPTEMBER 28, 2006

US ECOLOGY WASHINGTON, INC.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY



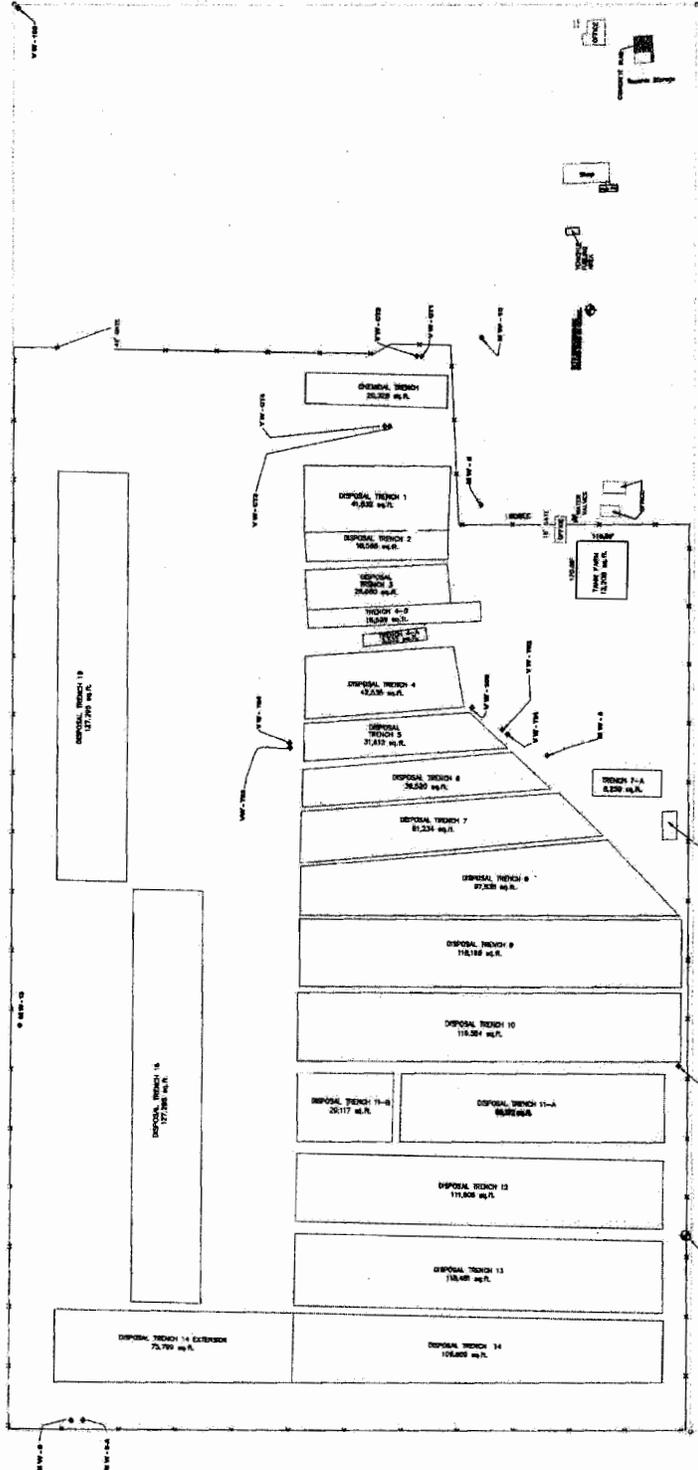
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US Ecology Agreed Order

EXHIBIT A

Site Diagram



LEGEND

- DISPOSAL TRENCH
- TRASH PAIL
- TRASH BIN

EXHIBIT B

Scope of Work

US Ecology, Inc.
Low Level Radioactive Waste Site
Agreed Order

Scope of Work

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ACRONYMS

AOC	Area of Contamination
ASTM	American Society for Testing and Materials
bgs	below ground surface
CLARC	Cleanup Levels and Risk Calculations
DQO	Data Quality Objective
EIS	Environmental Impact Statement
EPA	United States Environmental Protection Agency
FFS	Focused Feasibility Study
GM	Geiger-Mueller Counter
HASP	Health and Safety Plan
LLRW	Low-Level Radioactive Waste
MTCA	Model Toxics Control Act
NARM	Natural Occurring or Accelerator Produced Radioactive Material
NGVD	North American Vertical Datum
PAH	polynuclear aromatic hydrocarbons
PCB	polychlorinated biphenyl
PID	photo ionization detector
PPP	public participation plan
PQL	practical quantitation limit
PVC	polyvinyl chloride
QAPjP	quality assurance project plan
QA	quality assurance
QC	quality control
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
RI	remedial investigation
ROM	rough order of magnitude
SAP	Sampling and Analysis Plan
SVOC	semi-volatile organic compounds
USDOE	United States Department of Energy
USE	US Ecology Inc.
VOC	volatile organic compound
WAC	Washington Administrative Code
WDOE	Washington State Department of Ecology
WDOH	Washington State Department of Health

1.0 SITE DESCRIPTION

1.1 Background

The Low Level Radioactive Waste (LLRW) disposal site is located in Benton County approximately 23 miles northwest of Richland, Washington, and is operated by US Ecology Inc. (USE). It is situated near the center of the 560 square mile United States Department of Energy (USDOE) Hanford Facility (Hanford) on approximately 100 acres of federal land leased to the State of Washington and sublet to USE. The commercial LLRW disposal site (see Figure 1) has been in operation since 1965. Additional details on the location and description of the site can be found in the Data Quality Objective (DQO) Summary Report (EQM, 2003).

The site history and physical site setting (including site geology and hydrology) are presented in detail in the DQO Report. Previous LLRW disposal site investigations performed between 1988 and 1999 generated available site characterization information. These investigations involved data collection from slanted borings to assess soil and soil gas contamination under the trenches, vertical borings to evaluate soil contamination around the resin tank area, and installation of groundwater monitoring wells and groundwater sample collection to evaluate groundwater contamination. Information from these investigations is documented in USE 1988, USE 1998, USE 1999, USE 1999a, and Landau 1998 and is summarized in the DQO Report. Environmental monitoring reports, including groundwater monitoring data, are generated annually by USE. Other data generated during previous investigations remains on file at the USE Richland office. This Scope of Work identifies work activities that are intended to meet objectives defined in the DQO Report or that were agreed to in subsequent meetings between USE and the Washington State Department of Ecology (WDOE). A site map depicting the major features of the LLRW disposal site is shown in Figure 1.

1.2 Site History

The following discussion provides a brief history of the LLRW disposal site. In 1965, the commercial LLRW disposal site was licensed to California Nuclear, Inc. and began accepting LLRW and chemical waste. In 1968, Nuclear Engineering Company acquired California Nuclear, Inc. and took over as site operator. Around 1970, the chemical trench, holding approximately 17,000 cubic feet of waste, was closed. After this, purely chemical waste was banned from disposal. In October 1979, the LLRW disposal site was temporarily closed due to transportation-related noncompliance events and was reopened in November of the same year.

In 1980, Congress passed the LLRW Policy Act. As a result, packaging requirements became more stringent and cardboard and fiberboard packaging was prohibited; wooden boxes were prohibited in 1987. In 1985, all disposal of *Resource Conservation and Recovery Act of 1976* (RCRA) mixed waste, including hazardous scintillation fluids, ceased at the LLRW disposal site. In 1986, oils and chelates were required to be solidified. By 1993, the Northwest Compact restricted disposal of LLRW to member states and Rocky Mountain Compact states (11 states total).

Vadose zone and groundwater contamination from past USDOE activities on the central plateau has been well documented (PNNL, 2002). Radionuclides and hazardous constituents contaminating the groundwater include tritium, chromium, cobalt 60, trichloroethene, strontium 90, carbon tetrachloride, technetium 99, nitrate, iodine 129, cesium 137, and plutonium and uranium isotopes. Several of these plumes have passed or are still expanding and moving towards the LLRW disposal site (PNNL, 2002). The USDOE, under the Hanford Federal Facility Agreement and Consent Order with the WDOE and the United States Environmental Protection Agency (EPA), is in the process of remediating many of these contaminated sites (WDOE, EPA, and USDOE 1989). Although the LLRW disposal site is operated by USE, the USDOE owns the land on which it is located and leases the land to Washington State (USDOE, 1993). When the Ecology issued the Hazardous and Solid Waste Act portion of the Hanford Facility RCRA Dangerous Waste Permit, the LLRW disposal site was included for corrective action, Condition II.Y.3.a.

In 1997 a Draft Environmental Impact Statement (EIS) was started, and in 1998 the LLRW disposal site Investigation began. The final EIS was issued in May 2004 and lists three preferred alternatives:

- a. Renewing the current radioactive materials license with additional requirements.
- b. Amending Washington Administrative Code (WAC) Chapter 246-249 with the goal of limiting Naturally Occurring or Accelerator Produced Radioactive Material (NARM) wastes for disposal.
- c. Construction of a geosynthetic cover in three phases beginning in year 2006 (WDOH, 2004). Additional historical information can be found within the DQO Report and other references listed within this Scope of Work.

1.3 Purpose and Scope

This Scope of Work outlines sample and analysis activities associated with the Remedial Investigation (RI), the ensuing Feasibility Study (FS) and the interim cap design for the LLRW disposal site. The DQO Report states that “the purpose of the RI is to collect sufficient data to select a cleanup action in accordance with WAC 173-340-360 through 390. In addition, the quantity of data collected must ensure the cleanup action selected complies with requirements per WAC 173-340-740(6)(f) for containment as part of the cleanup action.” In addition to supporting the RI, physical soil data may be collected to support cap design and installation. Any cap design data collected through this Scope of Work will be used to augment the existing data already available from the Washington Department of Health (WDOH).

This Scope of Work provides the RI contractor with sufficient guidance to meet the DQOs defined for the RI and the interim cap design. The Sampling and Analysis Plan must be prepared in accordance with the WDOE’s Model Toxic Control Act (MTCA) WAC 173-340 and applicable laws and regulations.

2.0 WORK DESCRIPTION

2.1 Deliverables

The Scope of Work deliverables describe the tasks, work elements, sampling approach and associated rationale, RI/Focused Feasibility Study (FFS) schedule, and estimated budget. All tasks and work elements are subsequently presented in sufficient detail and format to facilitate a request for proposal for independent bids for this RI/FFS project.

Task 1 – RI Deliverables

The RI/FFS Planning scope will include:

1. A Work Plan (which includes the following documents).
 - a. A Sampling and Analysis Plan (SAP) in compliance with MTCA's SAP requirements (WAC 173-340-820)
 - b. A Quality Assurance Project Plan (QAPjP)
 - c. A Health and Safety Plan (HASP) in compliance with MTCA's worker safety health plan requirements (WAC 173-340-810)
 - d. Public Participation Plan (PPP) in compliance with MTCA's PPP requirements (WAC 173-340-600)
 - e. Project Schedule
 - f. Project Budget
2. Obtaining the required permits (e.g., air monitoring).

All deliverables must be submitted in draft form for USE and WDOE review and approval prior to implementation.

These deliverables will ensure that the RI/FFS is executed in compliance with applicable regulations and guidance, DQO Report criteria, quality assurance and data quality requirements, health and safety requirements, and disposal requirements associated with investigation-derived wastes (e.g., purge water, drill cuttings).

Task 2 – RI Implementation

The Work Plan will address each of the following:

- a. Mobilization
- b. The RI field work which includes sampling and analysis as specified in the SAP as well as air monitoring requirements derived from the SAP and HASP
- c. Assessment of laboratory and data quality (i.e., data validation) in accordance with applicable criteria specified in the QAPjP
- d. Determination of the nature and extent of contamination in affected media
- e. Identification of additional MTCA cleanup levels, as needed
- f. Demobilization, including appropriate disposition of Investigative Derived Wastes

Task 3 – Long Term Monitoring

Key activities under this task must be conducted quarterly for eight quarters in accordance with the approved SAP (deliverable 1.a.). Activities include:

- a. Collecting quarterly groundwater samples
- b. Collecting quarterly soil gas samples
- c. Sample/data analysis (including quality assurance (QA)/quality control (QC))

Task 4 – RI/FFS Report

Key deliverables under this task include:

- a. RI Report
- b. Development of a Focused Feasibility Study
- c. Identification of the cleanup action and potential remediation levels
- d. Evaluation of the cap remedy in accordance with MTCA requirements and procedures to validate selection of the cleanup action
- e. FFS Report

These deliverables must be generated in compliance with applicable MTCA requirements. All deliverables must be submitted in draft form for USE and WDOE review and approval prior to implementation.

2.2 Project Schedule

The majority of the RI field investigations associated with this Scope of Work are anticipated to occur during the period October 2006 through March 2007. Groundwater and soil gas sample collection will be conducted for eight quarters beginning in 2006. Additional detail on the anticipated project schedule is outlined below.

Table 1. Key Deliverables and Project Milestones

Activity	Date	Deliverables
Receive Notice To Proceed (on Effective Date of Order)	After 30 day public comment period has ended, estimated start date to be November 1, 2006	
Initial scoping meeting with USE/WDOE/Contractors	Two weeks after notice to proceed	Discuss content/questions on Scope of Work
Draft Work Plan	45 days after notice to proceed	Task 1 Deliverables (1.a-f) for USE/WDOE Comments
Finalize Work Plan	21 days after receiving WDOE approval	
Obtain Necessary Permits	Prior to finalizing Work Plan	Task 1 Deliverable (2)
Initiate field activities for RI Implementation	21 days after finalizing work plan	Task 2 Deliverables a-e

Table 1. Key Deliverables and Project Milestones

Activity	Date	Deliverables
Complete field activities	120 days after initiating field activities	
Complete Demobilization	15 Days after completion of field activities	Task 2 Deliverable (f)
Receive analytical results	60 days after receiving samples	
Complete Data Validation (Reanalysis as required)	21 days after receiving data	
Draft Interim RI Report (excluding second year groundwater/soil gas data)	45 days after receiving data	Task 4 Deliverable (a) for USE/WDOE Review/Comments
Final Interim RI Report	21 Days after receipt of WDOE comments	Task 4 Deliverables (b) RI Report
Draft Interim FFS	60 days after WDOE approval of final interim RI Report	Task 4 Deliverables b through e
Long term monitoring	8 consecutive quarters initiated during field activities	Task 3 Deliverables a through c
Draft Final RI Report (including all groundwater data)	45 days after receiving final groundwater and soil gas sample results	Task 4 Deliverable (a) for USE/WDOE Review/Comments
Final RI Report	21 Days after receipt of WDOE comments	Task 4 Deliverable (a)
Draft Final FFS Report (including information from Final RI Report)	30 days after WDOE approval of Final RI Report	Task 4 Deliverables b through e
Final FFS Report	21 Days after receipt of WDOE Comments*	Task 4 Deliverables b through e
Progress Meetings/Reports	Scheduled every two weeks for the duration of Task 2 work activities, meetings may be conducted via teleconference. Scheduled quarterly for duration of Task 3 work activities, meetings may be conducted via teleconference.	Meeting minutes and attendee list distributed within 5 days of scheduled meeting.
<p>*Within sixty (60) days of receiving the draft FFS report, Ecology shall endeavor to provide comments on the FFS report. If Ecology is unable to provide comments within sixty (60) days, they will provide notification. Within thirty (30) days of receiving Ecology's comments on the draft FFS report, a revised FFS report will be submitted for Ecology's approval. Ecology will approve, approve with conditions, or disapprove of the revised FFS report. If Ecology disapproves of the revised FFS report, Ecology will provide comments and the parties will establish a mutually agreed upon date for resubmittal of the FFS report, not to exceed ninety (90) days after receipt of Ecology's comments. The FFS will then be revised to address Ecology's comments.</p>		

2.3 Worker Qualifications

All subcontractors must provide documentation of individual employee training/testing for the following USE/regulatory requirements prior to being allowed into the LLRW disposal site.

1. Radiation Worker to meet 10 CFR 805 requirements
2. Fitness for Duty
3. Medical Qualifications
4. Hazwopper Certification

2.4 Decision Units for the RI

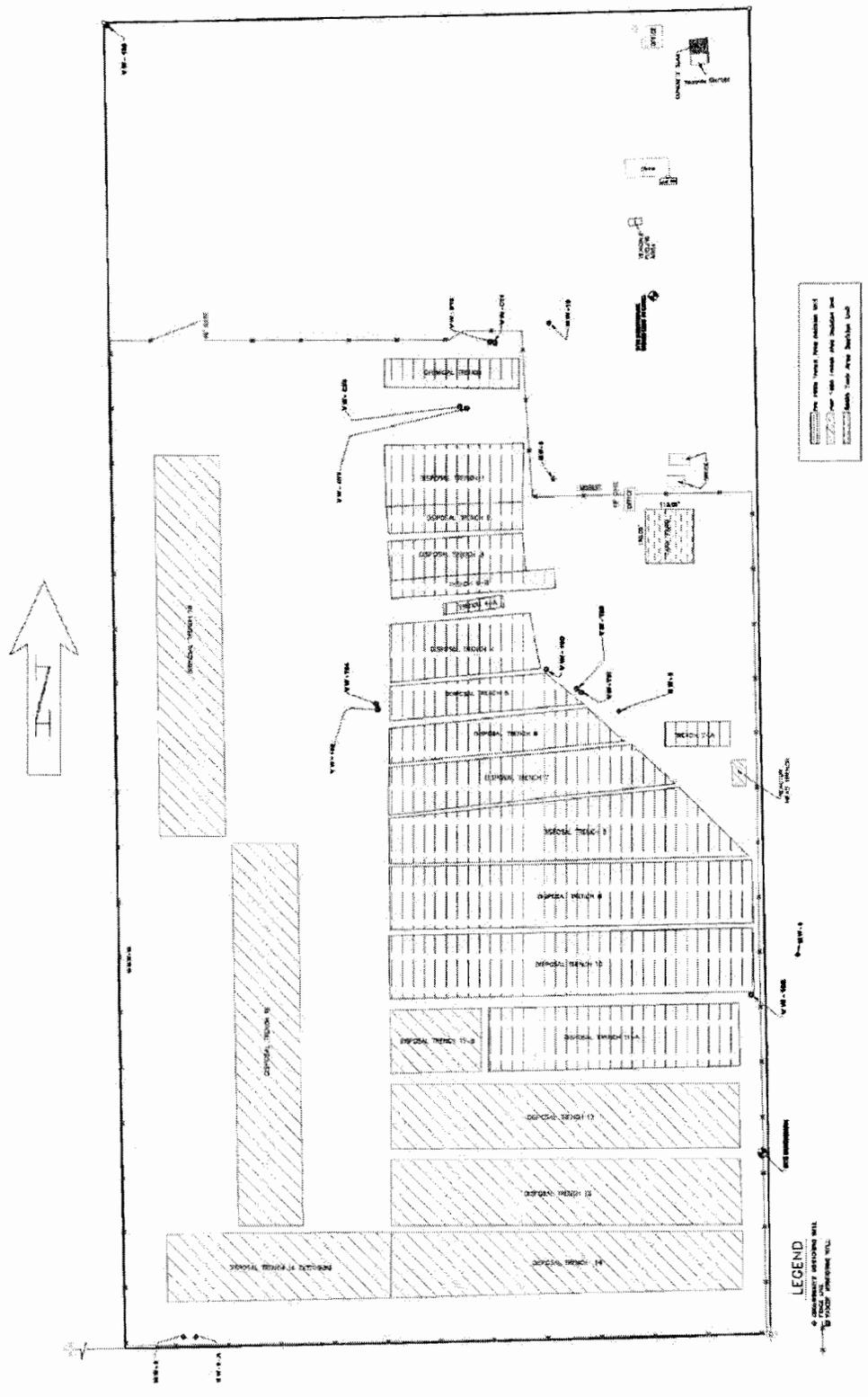
The DQO participants divided the site into four 'decision units' segregated largely on operational history, physical location, and affected media (e.g., soil vs. groundwater). This division of the site is intended to allow for the sampling of four *relatively* homogeneous units. The four decision units include:

- Resin Tank Area
- Pre 1985 and Inclusive Trench Areas
- Post 1985 Trench Areas
- Groundwater

The decision units, excluding the groundwater unit, are depicted in Figure A-2. The scope of this SAP is the characterization of three of the four decision units: the resin tank area, the pre-1985 and inclusive trench areas, and groundwater. During the DQO process, it was determined, based on process knowledge, historical depositional data, and legal restrictions, that the post 1985 trench area should not contain mixed waste, and therefore would not be sampled during the RI.

Investigation of the three primary decision units (resin tank area, trenches, and groundwater) allows consideration of separate remedial alternatives for each unit. Capping, as established in the Final EIS (WDOH, 2004), will be the primary remedial alternative for the trenches. However, this approach allows identification and evaluation of alternative and/or additional remedial actions for each area. The following text provides additional details and investigation guidance for each of the specific decision units.

Figure 2. Site Map Showing Decision Units



3.0 CONTAMINANTS OF POTENTIAL CONCERN

The DQO Report identified dense non-aqueous phase liquid and liquid and gas-phase contaminant sources as posing the greatest potential impact to the environment at the LLRW disposal site. The DQO working group examined analytical results from previous investigations to determine which chemical constituents warranted evaluation during the RI. Rather than specify individual contaminants, all constituents associated with specified analytical method should be considered. The specified analytical methods for the RI are discussed in Section 4.1.

4.0 ANALYTICAL REQUIREMENTS FOR THE REMEDIAL INVESTIGATION

4.1 Analytical Methods

Analytical methods used in the RI were identified in the DQO process. The methods were chosen based on an examination of analytical results from previous investigations. For the RI, the WDOE will require the analysis of all the constituents included in the applicable analytical method. The analytical methods to be used for the RI, except for the analyses required to support physical characterization, are EPA SW-846 methods (EPA, 1986) unless otherwise specified. If a method substitution is required, it must comply with the analytical and sampling methods allowed under MTCA (WAC 173-340-830) and be approved by WDOE.

The analytical methods to be used during the RI include:

- Anion and metals using EPA SW-846 Methods 9056, 9030B, 6010B; American Society for Testing and Materials (ASTM) D5174, 7195, or 7196A, or 7197, or 7198, and 7470A/7471A (specifics are provided in Table 2).
- Volatile organic compounds (VOC) using EPA SW-846 Method 8260B.
- Semi-volatile organic compounds (SVOC) using EPA SW-846 Method 8270C.
- Polynuclear aromatic hydrocarbon compounds (PAH) using EPA SW-846 Method 8270C.
- Polychlorinated Biphenyls (PCB) (Aroclors) using EPA SW-846 Method 8082.
- Total Phenols using EPA SW-846 Method 9065.
- Cyanide using EPA SW-846 Method 9010A.
- Soil gas samples from existing and newly installed soil gas monitoring wells using EPA Method TO-14.

This group of analytical methods will be collectively referred to as the “Chemical Characterization Group”.

Table 2. Anions and Metals for Soil and Groundwater

Constituent	CAS #	Method (SW-846 Except as Noted Otherwise)
Anions		
Chloride	7782-50-5	9056
Fluoride	16984-48-8	9056
Nitrate	14797-55-8	9056
Nitrite	14797-65-0	9056
o-Phosphate	14265-44-2	9056
Sulfate	14808-79-8	9056
Sulfide		9030B
Metals		
Aluminum	7429-90-5	6010B
Antimony	7440-36-0	6010B
Arsenic	7440-38-2	6010B
Barium	7440-39-3	6010B
Beryllium	7440-41-7	6010B
Boron	7440-42-8	6010B
Cadmium	7440-43-9	6010B
Calcium	7440-70-2	6010B
Chromium	7440-47-3	6010B
Cobalt	7440-48-4	6010B
Copper	7440-50-8	6010B
Iron	7439-89-6	6010B
Lead	7439-92-1	6010B
Magnesium	7439-95-4	6010B
Manganese	7439-96-5	6010B
Molybdenum	7439-98-7	6010B
Nickel	7440-02-0	6010B
Potassium	7440-09-7	6010B
Selenium	7782-49-2	6010B
Silicon	7440-21-3	6010B
Silver	7440-22-4	6010B
Sodium	7440-23-5	6010B
Strontium	7440-24-6	6010B
Thallium	7440-28-0	6010B
Tin	7440-31-5a	6010B
Titanium	7440-32-6	6010B
Vanadium	7440-62-2	6010B
Zinc	7440-66-6	6010B
Uranium	7440-61-1	ASTM D5174 or 6010B
Chromium VI	18540-29-9	7195 or 7196A or 7197 or 7198
Mercury	7439-97-6	7470A/7471A

Selected soil samples will be analyzed as specified in Section 3.6 of the DQO Report to support cap design. The cap design data collected during this RI will be used to augment the existing data already available from WDOH. The parameters in Table 3 will be compared to existing WDOH data. Any missing data should be collected, as needed, to ensure cap design fulfills requirements of WAC 173-303-350 through 370 and selection of a remedial alternative for the resin tank area. To provide clarity to subsequent discussion in this Scope of Work, this group of analytical methods will be collectively referred to as the “Physical Characterization Parameters” and include:

Table 3. List of Physical Properties That May Influence Cap Design

Porosity-total volume filled by pores (total soil porosity)
Bulk density-soil mass/whole soil volume
Dry soil bulk density
Grain size analysis
Plastic limits
Pore size distribution – pores may vary in size and may be indicative of volumes available for trapping soil gases
Moisture content (percent)
pH
Cation exchange capacity meq/100 grams
Fines, percent<200 mesh
Fraction soil organic carbon

4.2 Data Quality and Reporting Limits

The reporting limits from the analytical laboratory should meet the limits specified in Tables 3-2, 3-3, and 3-4 in the DQO Report. Tables 3-7 and 3-8 in the DQO Report also list the groundwater and soil cleanup levels for selected contaminants; however, cleanup standards will be established in the cleanup action plan. The reporting limits are listed by analytical method along with accuracy and precision from the SW-846 methods. The goal is to have the practical quantitation limit (PQL) lower than the cleanup levels. If a PQL below the cleanup level cannot be achieved, the PQL will be used as the cleanup level per MTCA regulations.

5.0 FIELD INVESTIGATION APPROACH FOR DECISION UNITS

5.1 Resin Tank Area

As noted in the DQO, Report the existing data for the resin tank area are not defensible; therefore, the resin tank area is considered uncharacterized for this investigation. The investigation approach for this unit will involve subsurface soil sample collection at defined locations and depth intervals. Sample collection will occur during drilling of two slant borings and six vertical borings around the perimeter of the buried tanks, and shallow borings within the vicinity of the flood-impacted area (Figures 3 and 4). The DQO Report and Scope of Work recommend that the following actions be taken:

Table 4. Proposed Sampling Approach for the Resin Tank Area
A. Install 2 slant borings and 6 vertical borings
<i>35 ft bgs (vertical) 6 locations, 4 chemical characterization samples each, 24 chemical characterization samples total, sample at 20, 25, 30 and 35 foot below ground surface (bgs†). Physical characterization samples to be taken at 4 locations at 30 ft bgs*</i>
<i>35 ft bgs (slanted), 2 locations, 4 chemical characterization samples each, 8 chemical characterization samples total, sample at 20, 25, 30 and 35-foot bgs.</i>
B. Shallow sampling to determine extent of flood contamination
<i>10 locations; 10 samples</i>
<i>3-4 feet (precise depth determined in the field @ fill/native soil interface)</i>
†bgs is measured from the native soil surface (pre LLRW disposal site operation).
*Depth/location to be verified by WDOE prior to sample collection.

The advantages offered with the recommended approach include the ability to sample soil from directly underneath the tanks via the slanted boreholes. The first sample will be collected at 20 feet (ft) bgs, which is 2 ft below the estimated bottom of the buried tanks. Subsequent samples will be collected at 5 ft intervals to 35 ft. Vertical soil borings are placed around the periphery of the tanks with sampling to occur at 5 ft intervals from 20 to 35 ft bgs. These depths were selected to coincide with samples from slanted boreholes within the resin tank area. In addition, ten shallow boreholes or test pits will be placed within this region to determine the lateral extent of the 1985 flood event. Sampling will occur at a depth to coincide with the native soil surface, which was covered by gravel fill in 1988. Sample and boring locations are shown in Figure 3. Figure 4 depicts a cross section of the investigation approach in the resin tank area.

In general, a focused sampling approach will be used to guide the majority of RI sampling for the resin tank area. Focused sampling is described in Appendix I of the *Guidance on Sampling and Data Analysis Methods* (WDOE 1995). In a focused sampling approach, sample locations are selected in areas where potential or suspected soil contamination can reliably be expected to be found.

5.1.1 Buried Tank Investigation

For the buried tank investigation, two slant borings and six vertical borings will be installed adjacent to the tank locations. Figure 3 shows the proposed locations of the eight borings. Buried tank locations will be verified by USE prior to initiating the investigation. Drilling in the Resin Tank Area has a potential of encountering soil contaminated with Cs-137, Co-60, and/or Sr-90.

5.1.1.1 Slant Borings

Borings B-1 and B-2 are 30° slant borings to be drilled to a total estimated depth of 35 ft bgs assuming the following:

- 30° vertical offset
- 10-ft diameter tank
- Bottom of tank at 18 ft bgs
- 25 ft horizontal offset from center of tank

The purpose of the slant borings is to allow soil sample collection near the bottom and directly below the buried tanks. Soil samples obtained during drilling of the slant borings will be collected at specified depths as shown in Figure 4. Samples will be used for chemical characterization to support investigation of potential tank leakage.

Table 5 shows the proposed sample collection information for slant borings B-1 and B-2. Proposed sample depths are based on the above drilling assumptions. Changes to any of the assumptions will influence sample collection depth.

Table 5. Proposed Soil Samples for the Resin Tank Area Slant Borings

Boring ID	Proposed Soil Sample Intervals (ft below ground surface)	Purpose of Sample	Analytical Method or Analytical Group
B-1, B-2	20, 25, 30, 35 ^{1,2}	Assess potential chemical impacts to subsurface from buried resin tanks	Chemical Characterization Group

Notes:

1. A 30° slant boring advances 1 ft vertically for every 1.15 ft of borehole.
2. Continue drilling if radiation levels exceed background.

In 1988 during installation of soil borings in the resin tank area, investigators noted a correlation between radiation levels and discolored soils beneath the underground tanks. For this reason, all RI samples collected in the resin tank area will be field-screened using a Geiger-Mueller Counter (GM) and a photo ionization detector (PID). The GM and PID measurements will be recorded on the field log. If radiation or organic vapor levels at 35 ft bgs (proposed target depth) exceed background, then drilling will continue and samples will be collected at 5 ft intervals. When radiation and organic vapor levels equal background, drilling will cease and a final sample will be collected.

Figure 3. Proposed Sample and Boring Locations for Resin Tank Area

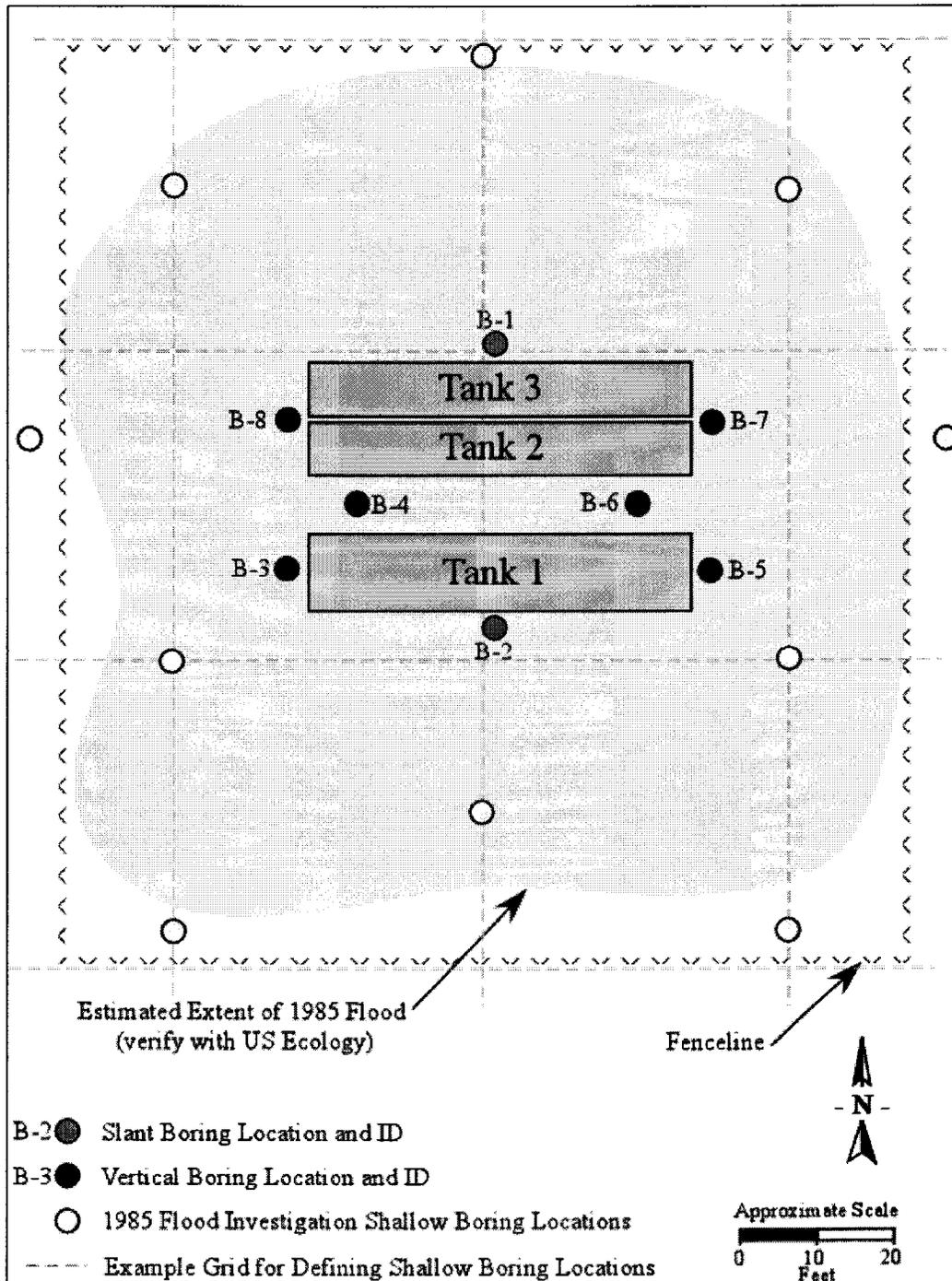
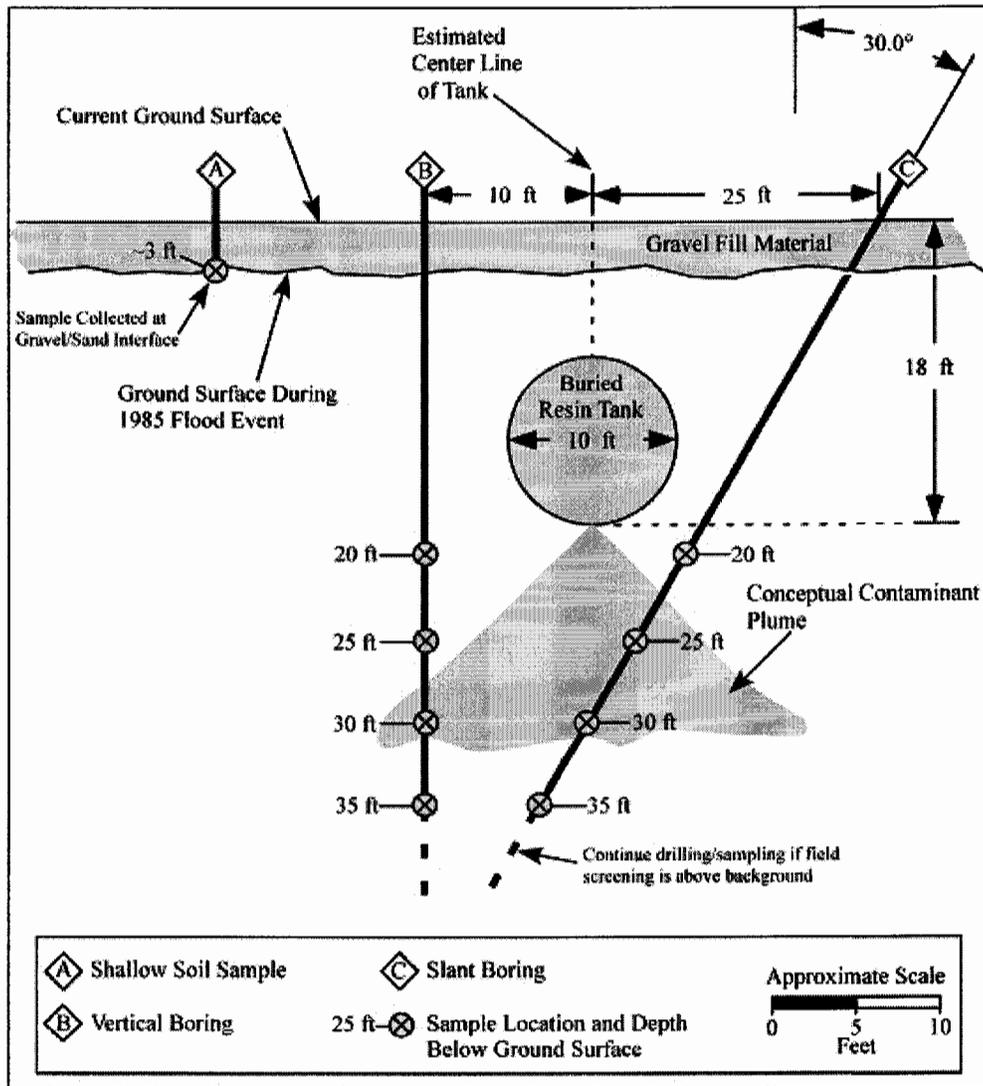


Figure 4. Proposed Sample and Boring Approach for Resin Tank Area



5.1.1.2 Vertical Borings

Borings B-3 through B-8 are vertical borings to be drilled to a total estimated depth of 35 ft bgs assuming the following:

- 10-ft diameter tank
- Bottom of tank at 18 ft bgs
- 10 ft horizontal offset from center of tanks for borings B-4, and B-6
- 5 ft horizontal offset from end of tanks for borings B-3, B-5, B-7, and B-8

The purpose of the vertical borings is to allow soil sample collection around the buried tanks. Soil samples obtained during drilling will be collected at depths as specified and shown in Figure 4. Samples will be used for chemical characterization to support investigation of potential tank releases. Physical characterization samples will be collected from a depth of approximately 30 ft bgs from four of the vertical borings. WDOE will approve the exact depth and location prior to sample collection.

Table 6 shows the proposed sample collection information for vertical borings B-3 through B-8. Proposed sample depths are based on the above drilling assumptions.

The depth of the two samples intended to augment the 1985 flood investigation is estimated at 3 ft bgs. Exact depth will be the depth of the original 1985 ground surface in the vicinity of the resin tank area. The precise depth of these samples should be determined during drilling operations, based on a visual observation of the soils. Specifically, the samples should be collected at the interface between the gravel fill and the native soils (sand dominated) below.

Chemical characterization samples collected between the depths of 20 ft bgs and 35 ft bgs will be field-screened using a GM and PID. The measured radiation and organic vapor levels will be recorded on the field log. If radiation or organic vapor levels at 35 ft bgs (proposed target depth) exceed background, then drilling will continue and samples will be collected at 5 ft intervals. When radiation and organic vapor levels equal background, drilling will cease and a final sample will be collected.

Table 6. Proposed Soil Samples for the Resin Tank Area Vertical Borings

Boring ID	Proposed Soil Sample Intervals (ft below ground surface)	Purpose of Sample	Analytical Method or Analytical Group
B-3, B-7	TBD (at gravel fill and native soils interface)	Augment 1985 flood investigation	Chemical Characterization Group
B-3, B-7	30	Support physical characterization	Physical Characterization Parameters
B-3 through B-8	20, 25, 30, 35 ¹	Assess potential chemical impacts to subsurface from buried resin tanks	Chemical Characterization Group
TBD ²	3 (or at gravel fill and native soils interface)	1985 flood investigation	Chemical Characterization Group

Notes: 1. Continue drilling if field screening levels exceed background
 2. Boring ID numbers have not been assigned to 10 vertical borings for flood investigation

5.1.2 1985 Flood Investigation

In 1985, rapid snowmelt resulted in flooding of the low-lying resin tank area. Pooled water entered one of the underground resin tanks and filled it to the riser. Changing liquid levels were observed in the tank after the flood event, suggesting a potential release from the tank. According to the DQO Report an estimated 100-120 gallons was released.

An area-wide sampling approach will be used to guide shallow soil sampling to determine the lateral extent of impact from the 1985-flood event in the resin tank area. Area-wide sampling is the preferred approach when the spatial distribution of potential or suspected soil contaminants is uncertain (WDOE, 1995). This investigation is intended to characterize the nature and lateral extent of the flood-related release. The estimated boundary of the ponded water, shown in Figure 3, is conceptual and is only meant to depict the rationale for sampling locations. Prior to initiating the investigation, a more accurate representation of the flood-impacted area should be determined based on photographs and interviews with USE personnel. Ten shallow subsurface soil samples will be collected from an estimated depth of 3 ft. The shallow sample depth is based on estimates of the original 1985 ground surface in the vicinity of the resin tank area. The precise depth of the samples should be determined during the investigation based on a visual observation of the soils. Specifically, the samples should be collected at the interface between the gravel fill and the native soils (sand dominated).

Shallow sample locations will be determined using a stratified grid sampling approach. Figure 3 shows shallow sample locations using a representative grid. The grid design should allow for collection of an equal number of samples outside and inside the estimated 1985 flood boundary. Each of the ten samples will be field screened using a GM due to the expectation of radiological contamination in the flood-impacted area. Each of the samples will be analyzed using the methods included in the Chemical Characterization Group.

5.2 Pre-1985 Trench Area

Investigation of the Pre-1985 Trench Area will examine the periphery of the pre-1985 trench area to evaluate potential impacts to subsurface soils from regulated hazardous (i.e., non-radiological) substances. Additionally, this investigation will include soil vapor sampling from existing wells to evaluate the repeatability of previous soil gas sample results, and installation of new soil gas monitoring wells to determine the potential for vertical and horizontal gas migration. The Scope of Work recommends that the following actions be taken:

Table 7. Proposed Sampling Approach for Pre-1985 Trench Area

A. Soil borings at ends of trenches (East – West ends)
<i>18 locations – Including both ends of 4A and Chemical Trench, 0-45 ft below bottom of trench. Sample @ depth equal to the bottom of trench and 5, 10, 20 and 45 feet below the trench bottom, 90 chemical characterization samples total; Physical characterization samples to be taken at 10 locations at a depth equal to the bottom of the trench(s)*</i>
B. 10 soil vapor monitoring wells around periphery of trenches consisting of 9 vapor wells in existing borings (installed in item A) and 1 vapor well installed in new boring.
<i>There are three independent completion intervals for soil vapor monitoring wells: 5 ft bgs, equal w/bottom of trench, and 45ft below bottom of trench, 30 locations, sampled quarterly for two years, 240 samples total.</i>

Table 7. Proposed Sampling Approach for Pre-1985 Trench Area

C. Re-sample soil gas from existing wells (VW-100, VW-101, VW-102) (T-51, T-52, T-53, T-54) (CT1, CT2, CT3, CT4), 11 locations, sample quarterly for two years, 88 samples total
* Depth/location will be verified by WDOE prior to sample location.

New soil vapor wells will be installed to provide a better understanding of the nature and extent of soil gas and its potential impacts on remediation alternatives. The three-stage monitoring well design will allow monitoring at three independent elevations and enable evaluation of potential low and high density vapor plumes. Two years of quarterly sampling from soil gas wells will provide sufficient data to evaluate trenches.

The investigation approach in the pre-1985 trench area will involve three major activities:

1. Subsurface soil sample collection during drilling of 18 vertical borings around the perimeter of the trench area.
2. Soil gas sample collection from existing wells VW-100, VW-101, VW-102, VW-t51, VW-t52, VW-t53, VW-t54, VW-ct1, VW-ct2, VW-ct3, and VW-ct4.
3. Installation of 10 new soil gas monitoring well locations.

Proposed boring and soil gas monitoring well locations are shown in Figure 5. It may be necessary to relocate some well locations due to site limitations. All well locations will be approved by USE and WDOE prior to drilling. Figure 6 graphically depicts the vertical sampling approach for the pre-1985 trench area investigation. Figure 7 shows a schematic of a proposed three-stage soil gas monitoring well.

5.2.1 Vertical Borings

Eighteen vertical borings will be drilled around the perimeter of the pre-1985 decision unit. The purpose of the vertical borings is to collect soil samples at specified depths to determine the nature and extent of potential contamination associated with historical trench operations. Rough surveys of proposed boring locations should be conducted prior to initiating investigation activities to provide a reference for calculating sample depths bgs.

Vertical borings will be installed at locations designated B-10 through B-27, as shown in Figure 5. Figure 6 depicts the vertical sampling approach for the pre-1985 trench area. Table 9 shows the proposed sample collection information for the proposed vertical borings. The proposed sample intervals to assess chemical impacts to the subsurface from trench operations are based on trench depth information obtained from USE. The beginning of these sample intervals coincides with the bottom depth of the trench nearest the boring. Trench bottom depths vary from approximately 25 ft to 55 ft below the native soil surface. Changes to any of the assumptions will influence sample collection depth.

Figure 5. Proposed Sample and Boring Locations for the Pre-1985 Trench Area

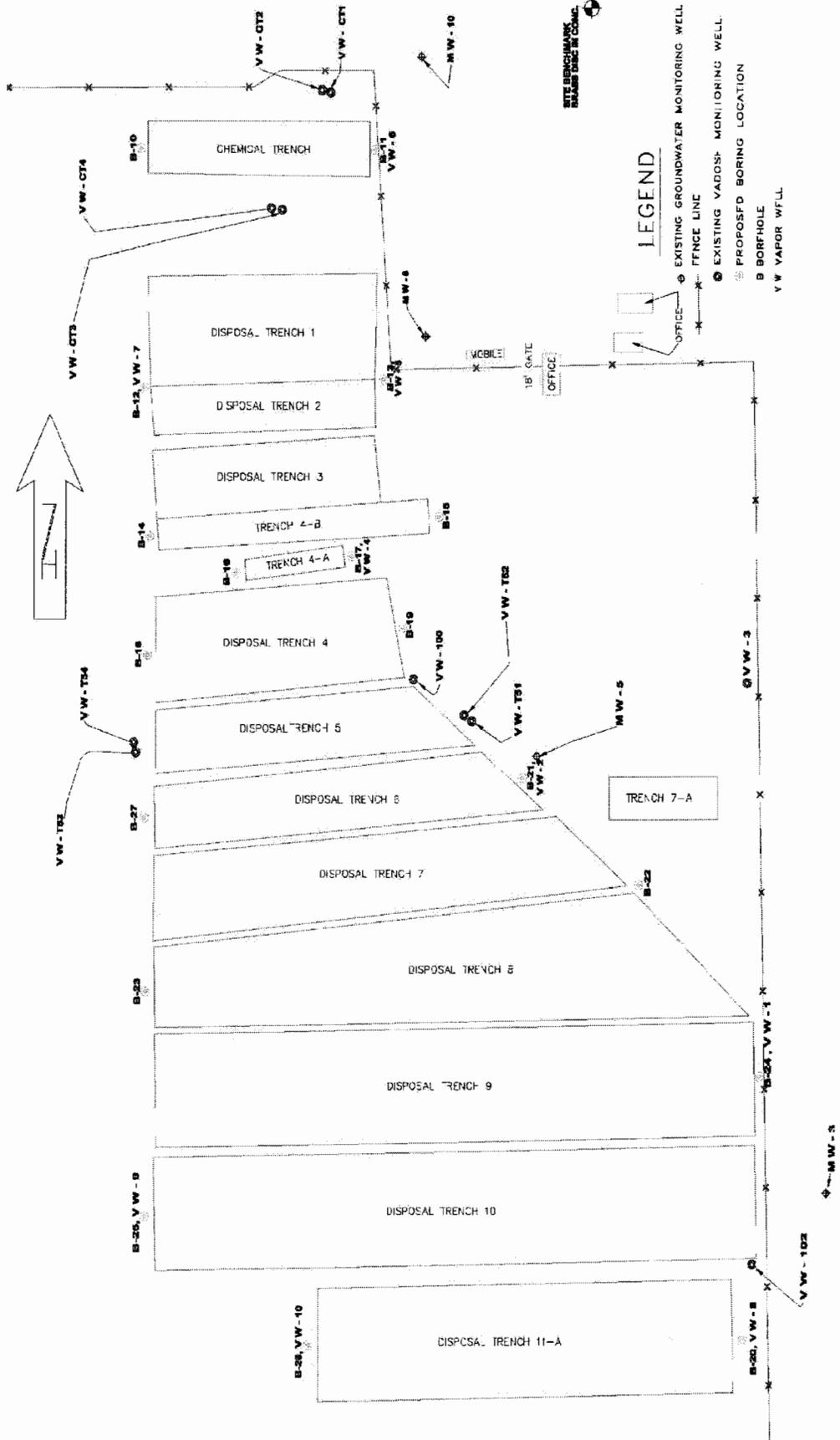
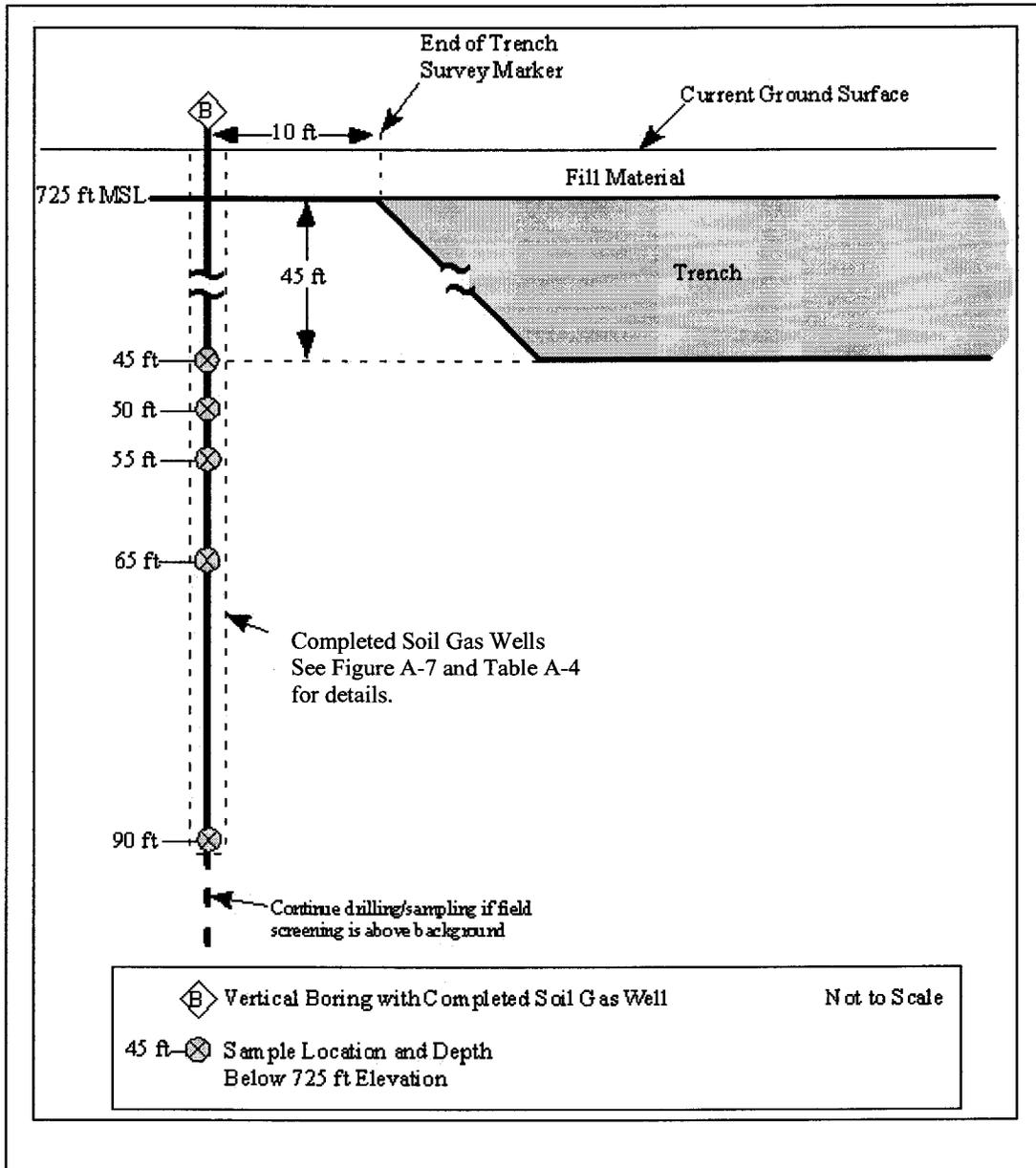


Figure 6. Proposed Sample and Boring Approach for Pre-1985 Trench Area



Soil samples will be collected at depths corresponding to the bottom of the trenches (see Table 8) at 5, 10, and 20 ft below trench bottom with a final sample 45 ft below the trench bottom. These samples will be analyzed for the Chemical Characterization Group. All samples will be field-screened using a PID and GM. Field screening measurements will be recorded in the field log. If radiation levels and/or organic vapor concentration measurements at the designated termination depth shown in Table 9 exceed background, then drilling will continue and samples will be collected at 5 ft intervals. When field screening concentrations equal background, drilling will cease and a final sample will be collected. In the event field screening indicates high radiation and/or organic vapor concentrations at an interval not identified for sampling, an additional sample will be collected.

Table 8. Proposed Soil Samples for the Pre-1985 Trench Area Vertical Borings

Boring ID	Proposed Soil Sample Intervals (bgs)	Purpose of Sample	Analytical Method or Analytical Group
B-10	25	Support cap design	Physical Characterization Parameters
	20, 25, 30, 40, 65 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-11	20, 25, 30, 40, 65 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-12	30, 35, 40, 50, 75 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-13	35	Support cap design	Physical Characterization Parameters
	30, 35, 40, 50, 75 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-14	50	Support cap design	Physical Characterization Parameters
	45, 50, 55, 65, 90 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-15	45, 50, 55, 65, 90 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-16	20, 25, 30, 40, 65 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-17	25	Support cap design	Physical Characterization Parameters
	20, 25, 30, 40, 65 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-18	35	Support cap design	Physical Characterization Parameters
	30, 35, 40, 50, 75 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-19	30, 35, 40, 50, 75 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group

Table 8. Proposed Soil Samples for the Pre-1985 Trench Area Vertical Borings

Boring ID	Proposed Soil Sample Intervals (bgs)	Purpose of Sample	Analytical Method or Analytical Group
B-20	30, 35, 40, 50, 75 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-21	35	Support cap design	Physical Characterization Parameters
	30, 35, 40, 50, 75 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-22	40, 45, 50, 60, 85 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-23	45	Support cap design	Physical Characterization Parameters
	40, 45, 50, 60, 85 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-24	50	Support cap design	Physical Characterization Parameters
	45, 50, 55, 65, 90 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-25	50	Support cap design	Physical Characterization Parameters
	45, 50, 55, 65, 90 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-26	45, 50, 55, 65, 90 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group
B-27	50	Support cap design	Physical Characterization Parameters
	45, 50, 55, 65, 90 ¹	Assess chemical impacts to subsurface from trench operations	Chemical Characterization Group

Notes: 1. Continue drilling if field-screening levels exceed background

5.2.2 Soil Gas Sampling (Existing Wells)

Soil gas samples will be collected quarterly for eight quarters from existing wells VW-100, VW-101 VW-102, VW-T51, VW-T52, VW-T53, VW-T54, VW-CT1, VW-CT2, VW-CT3, and VW-CT4. These samples will be analyzed for VOCs using EPA Method TO-14. Soil gas sampling will follow a Soil Vapor Sampling Procedure (provided by the contractor) approved by USE and WDOE. The procedure must be designed for existing well-head configurations found in soil gas monitoring wells at the LLRW disposal site. Any required modifications to the procedure will be approved in advance by USE and WDOE.

The interim and final RI reports will address any differences between soil vapor data documented in USE, 1999a and soil vapor data collected during this investigation. Completion information for the existing soil gas monitoring wells may be obtained from USE to provide a basis for data interpretation.

5.2.3 Installation and Sampling of New Soil Gas Monitoring Wells

Ten soil gas monitoring wells will be installed at locations shown in Figure 5. The purpose of these wells is to allow measurement of soil gas concentrations at the base of the pre-1985 trenches, 45 ft below, and near the native soil surface. Data from the new soil gas monitoring wells will augment data collected from the existing wells described above. In total, soil gas data will be used to evaluate the potential impacts from vapor-phase contamination to:

1. Groundwater from downward migration.
2. Off-site locations from lateral migration.
3. The interim cap from upward migration.

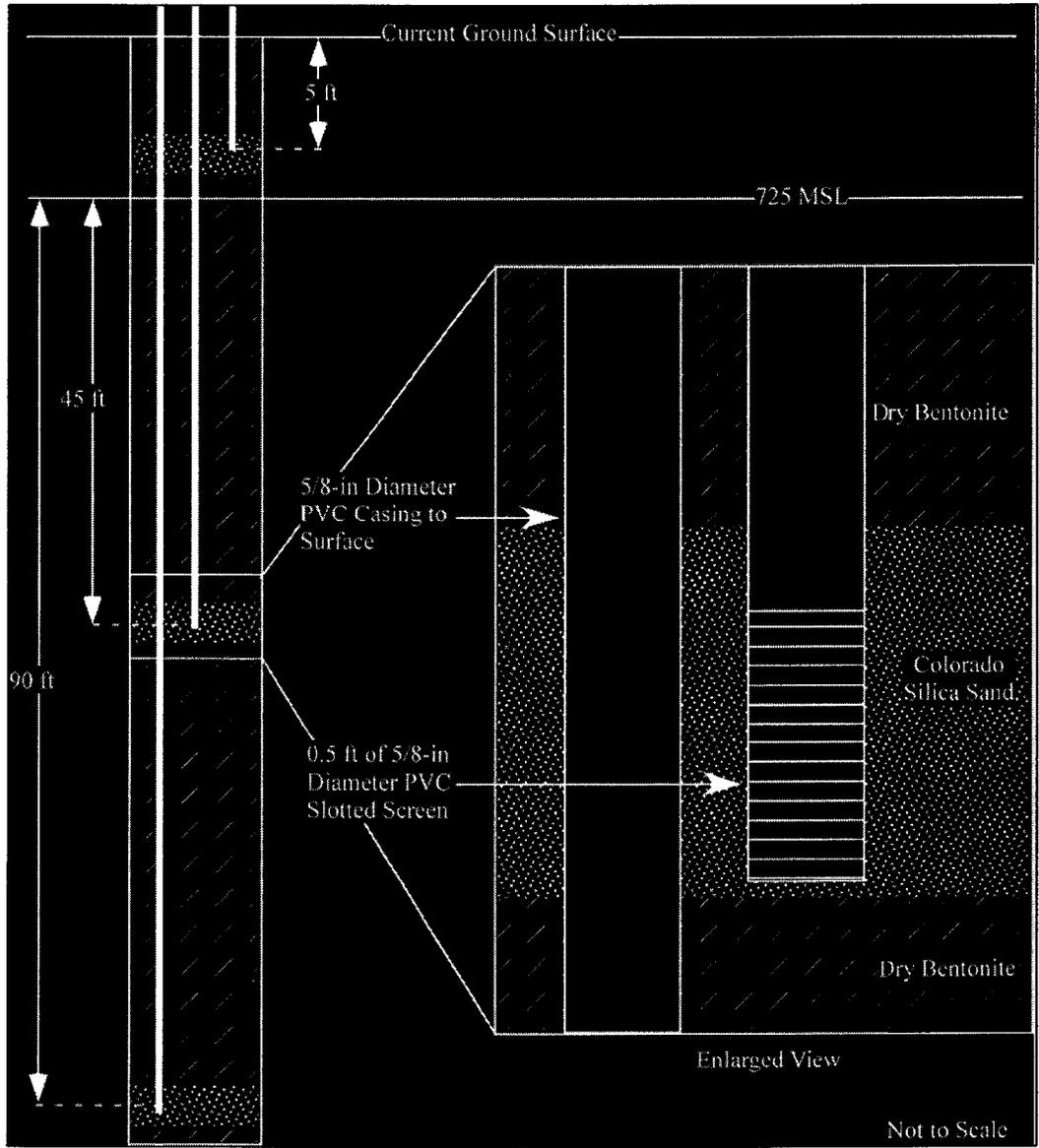
As shown in Figure 5, nine of the ten soil gas wells will be completed in borings installed for the chemical investigation. Soil gas monitoring well design is depicted in Figure 7. The example design shown in Figure 7 is for soil gas wells installed adjacent to 45 ft deep trench (such as proposed wells VW-1, VW-9, and VW-10).

Soil gas monitoring well construction shall consider technical principles found in ASTM *Standard Guide for Soil Gas Monitoring in the Vadose Zone* (ASTM D 5314-92). As shown in Figure 7, each well will be completed at three depth intervals: 45 ft below the bottom of the nearest trench, even with the bottom of the nearest trench, and approximately 5 ft below the native soil surface, as identified in USE, 1999a. The completion interval corresponding to the bottom of the trench is ideal for identifying potential lateral migration of soil gas. A monitoring interval 45 ft below the bottom of the nearest trench allows evaluation of potential downward migration of high density soil gas plumes. The near-surface completion depth is designed to intercept upward-migrating soil gas, and will be useful in evaluating potential impacts to the surface cap. Table 9 shows the completion intervals for the proposed soil gas monitoring wells, and the chemical characterization boring associated with each proposed well.

Table 9. Proposed Boring and Completion Intervals for Soil Gas Monitoring Wells

Proposed Well ID	Associated Chemical Characterization Boring	Approximate Completion Intervals (from original ground surface)
VW-1	B-24	5, 45, 90
VW-2	B-21	5, 30, 75
VW-3	None – Needs new boring	5, 40, 85
VW-4	B-17	5, 20, 65
VW-5	B-13	5, 30, 75
VW-6	B-11	5, 20, 65
VW-7	B-12	5, 30, 75
VW-8	B-20	5, 30, 75
VW-9	B-25	5, 45, 90
VW-10	B-26	5, 45, 90

Figure 7. Schematic for Proposed Soil Gas Well



Proper soil gas monitoring well construction materials and protocol will ensure collection of representative and depth discrete soil gas samples. In general, soil gas monitoring wells will be completed using three lengths of 5/8-in diameter polyvinyl chloride (PVC) piping with a 0.5 ft length of 20-slot, 5/8-in diameter slotted PVC screen with end cap. Only threaded PVC will be used during construction of the soil gas monitoring wells to avoid potential introduction of organic compounds associated with PVC primers and glues. Wells installed in chemical investigation borings will require backfilling to the lowest desired completion depth using dry bentonite chips. The screened intervals will be backfilled using 8-12 Colorado silica sand. The interval between screen depths will be backfilled using dry bentonite chips. Well completion methods shall follow typical groundwater monitoring well construction methods as required by WDOE's *Minimum Standards for Construction and Maintenance of Wells* (WAC-173-160).

Once installed, the soil gas wells will be sampled for eight quarters corresponding to the existing soil gas monitoring well sampling schedule. Soil gas sampling will follow the Soil Vapor Sampling Procedure (provided by contractor) approved by USE and WDOE. Any procedure modifications will be approved by USE and WDOE prior to use. Soil gas samples will be analyzed for VOCs using EPA Method TO-14.

5.3 Groundwater

Groundwater samples and depth to groundwater measurements will be collected from the seven existing groundwater monitoring wells (MW-3, -5, -8, -9, -9A, -10, and -13) on a quarterly basis for a period of eight quarters. This scope of work recommends the following:

Table 10. Proposed Sampling Approach for Groundwater Monitoring

A. Resurvey horizontal & vertical for all wells
B. Inspect/document well casings with borehole camera
C. Sample 8 quarters of data from existing wells
<i>8 wells, 8 quarters, 64 samples(total)</i>

Sampling and depth measurements will be performed according to the Groundwater Monitoring Procedure (provided by the contractor) and approved by USE and WDOE. Any required modifications to the procedure will be approved in advance by USE and WDOE.

5.3.1 Groundwater Monitoring

Groundwater data will be used to evaluate potential impacts to groundwater from landfill operations and to determine local groundwater flow direction. Data collected during this RI will augment existing site groundwater data to establish trends in contaminant concentration and groundwater flow. After eight quarters of groundwater data have been collected and reviewed, an assessment of the existing groundwater monitoring system will be conducted and the need for additional wells will be addressed in the FFS.

The first four quarters of groundwater samples will be analyzed using the Chemical Characterization Group of analytical methods. Upon written approval from the WDOE, individual analytes may be removed from the analyte list if concentrations do not exceed risk based screening levels identified in MTCA Clean-up Levels and Risk Calculations (CLARC),

Updated Version 3.1 (WDOE, 2000) Standard Method B groundwater cleanup values. Analytical data and physical monitoring data (e.g., depth to water measurements) obtained from quarterly groundwater monitoring will be used to evaluate groundwater conditions beneath the LLRW disposal site.

5.3.2 Resurvey and Inspection of Wells

Prior to initiating groundwater data collection during the RI, all monitoring wells will be resurveyed for both horizontal and vertical coordinates. The top of the well casing, the top of the riser, and the ground surface elevations will be surveyed to the nearest 0.01 foot. A mark will be placed on the casing indicating the location that was surveyed. Horizontal positions will be surveyed to the nearest 0.1 foot. All survey points will be performed by a registered surveyor, referenced to permanent monuments, and tied to the State Plane Coordinate System, NAD 1983/91, and the North American Vertical Datum (NGVD) of 1988.

The purpose of the resurvey is to eliminate survey information as a potential source of error when interpreting groundwater elevation data. Historical groundwater elevation data have been inconclusive in determining groundwater gradient and flow direction across the site. Determining groundwater gradient and flow direction are important in establishing contaminant migration and extent of plumes in both upgradient and downgradient monitoring wells. In addition, a borehole camera will be used to inspect/document the integrity of internal surfaces for each well casing.

6.0 STANDARD INVESTIGATION PROCEDURES

Table 11 summarizes applicable guidance documents or regulations that will be incorporated into procedures for completion of the various activities associated with this RI. Procedures will be approved by USE and WDOE prior to initiating related field activities. Alternatives to the specified procedures may be used upon pre-approval by USE and WDOE. Copies of the procedures will be included in the final RI Work Plan.

Table 11. Summary of Applicable Regulations and Guidance for RI Activities

RI Activity	Regulation or Guidance
Angle Boring Installation and Abandonment	WAC-173-160
Vertical Boring Installation and Abandonment	WAC-173-160
Soil Sampling	WAC 173-340-740
Groundwater Sampling	WAC 173-340-720 and 173-340-350(7)
Soil-Gas Sampling	ASTM D 5314-92
Operational Equipment Decontamination	WAC 173-340-820
Sampling Instrument Decontamination	WAC 173-340-820
Water-Level Measurements	Work Plan (TBD)
Field Documentation	QAPjP (TBD)
Sample Preparation and Handling	EPA SW-846
Field Instrument Calibration	Work Plan (TBD)
Laboratory QA Plan	WDOE Publication No. 01-03-003 (WDOE, 2001)
Radiological Air Emission Monitoring	WAC 246-247
Investigative-Derived Waste	WDOE Letter to USE (WDOE, 1998) and WAC 173-303

7.0 QUALITY ASSURANCE/QUALITY CONTROL

This section summarizes overall QA/QC requirements for the RI investigation. The DQO Report includes minimum QA/QC procedure requirements for the selected RI activities. Additional QA/QC requirements include:

- Analytical reporting limits are listed by analytical method along with accuracy and precision from the SW-846 methods in Section 3.3 of the DQO Report (EQM, 2003).
- Data validation requirements:
 - Verification of required deliverables, requested versus reported analyses, evaluation of requested versus achieved analyte detection limits, and evaluation and qualification of results based on analytical holding times.
 - Verification of transcription errors (if not already performed prior to receipt of the data package by the data validator), and evaluation and qualification of results based on method blank result criteria.
 - Validation and the evaluation and qualification of sample results based on matrix spike, laboratory control sample, and laboratory duplicate or matrix spike/matrix spike duplicate (as appropriate to the method).
 - Field blanks, field duplicates, and field splits (if information is provided) will be examined.

7.1 Preparation of a Quality Assurance Project Plan

A QAPjP will be prepared by the RI Contractor prior to initiation of the RI field activities. The QAPjP will be an integral part of the Work Plan and must be used by the RI Contractor during performance of RI activities. The QAPjP will be prepared using *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies* (WDOE, 2001) and should address each of the fourteen primary elements.

7.2 Field Quality Control

QC checks for field sampling will be used to assess and document data quality and to identify discrepancies in the sample handling process. The collection and analysis of trip blanks and field replicates will be used as QC checks for environmental sampling activities. Sample containers will be pre-cleaned according to documented laboratory procedures. A sampling event, as defined for the purpose of QC sample frequency, consists of a set of groundwater, soil, or soil gas samples collected during a specified phase, during a two-week period, or the set of soil samples collected during the drilling of an individual borehole.

7.3 Blind Field Duplicate Samples

Field duplicate samples are collected in order to distinguish between sampling and analytical variability. Field duplicates for groundwater, soil, and soil vapor will consist of a split sample collected at a sample location that will be given a separate sample number that cannot be associated by the laboratory to the specific sample location. Soil samples will be collected during drilling of borings. Duplicate soil samples to be analyzed for VOCs will be collected from co-located areas within the same depth interval and placed directly into separate sample containers immediately following collection. Duplicate soil samples for other analyses will be

collected from the same depth interval, homogenized by mixing in a stainless-steel bowl, and split into duplicate sample containers. Duplicate water quality samples (groundwater) will be collected by alternately filling sample containers for both the original and the corresponding duplicate sample at the same sample location to decrease variability between duplicates. Duplicate soil vapor samples will be collected by consecutively filling sample containers at the same location.

Field duplicate samples will be collected at a frequency of at least one per 20 samples (5 percent), not including other field QC samples, but not less than one duplicate per sampling event per matrix (soil, groundwater, and soil gas).

7.4 Equipment Rinsate Blanks

Field equipment rinsate blanks will be collected for groundwater and soil samples where non-dedicated equipment is used. The rinsate blanks will consist of deionized water (supplied by the analytical laboratory) passed over or through decontaminated sampling equipment and collected in the appropriate sample containers. Equipment surfaces actually exposed to the samples being collected will be rinsed. Field equipment rinsate blanks will be collected at a rate of one blank per 20 samples per borehole or well, per sampling event, not including QC samples; but not less than one blank per sampling event. No rinsate blanks will be collected from dedicated or disposable field equipment.

7.5 Trip Blanks

Trip blanks will consist of de-ionized water sealed in a 40-ml VOC vial by the analytical laboratory. The trip blank will be transported to the field, and then returned to the laboratory unopened for analysis. One trip blank per cooler containing samples for VOC analysis will be evaluated to determine possible sample contamination during transport.

8.0 WASTE CONTROL

8.1 Investigation Derived Waste

Precise procedures for managing investigative-derived waste (IDW) generated during the RI will be developed by the RI Contractor. Ecology can grant approval to dispose of drill cuttings and purgewater to the ground surface on site without treatment if the environmental media does not exceed MTCA Method B cleanup standards. Since the RI will generate IDW that is being "excavated, consolidated, or otherwise moved within a defined area of contamination," Ecology's Area of Contamination Policy (AOC) would apply. The AOC allows storage and disposal of material on site as long as it does not exacerbate the area of contamination and manages the waste at the site in a manner that is protective of human health and the environment. A letter dated July 2, 1998, from WDOE to USE provides general guidance on the issue (WDOE 1998).

8.2 Waste Stream Management

Waste will be designated in accordance with WAC 173-303 using a combination of process knowledge, historical analytical data, and analyses of samples required by the SAP, as appropriate.

Materials requiring collection will generally be placed in drums. However, packaging for large or irregular shaped material (e.g., well casing) may include containment other than drums. The packaging shall provide insurance against migration of contaminants and protection from environmental degradation. The packaging may include, but is not limited to, plastic wrap. Container packaging and labeling will be in accordance with WAC 173-303

Waste will be stored within the AOC pending appropriate disposal. Waste will be transported in accordance with WAC 173-303 and U.S. Department of Transportation requirements as appropriate.

8.3 Waste Disposal

Contaminated solid waste, soil, and slurries may be disposed at the LLRW disposal site, provided the waste acceptance criteria can be met. Waste that does not meet the acceptance criteria may be treated to meet acceptance criteria of the LLRW disposal site. Any treatment of IDW necessary to meet the acceptance criteria of the disposal facility must be approved by WDOE prior to conducting the treatment. Miscellaneous solid waste and demolition debris that is non-hazardous and has been radiologically released may be disposed to an offsite solid waste landfill. Uncontaminated soil and slurries may be placed on the ground near the point of generation.

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WDOE, 2001, *Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies*, Publication No. 01-03-003, Washington State Department of Ecology, Olympia, Washington.

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US Ecology Agreed Order

EXHIBIT C

Air Emission Monitoring Requirement

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WAC 246 -247 CHAPTER Chapter 246-247 WAC

RADIATION PROTECTION -- AIR EMISSIONS

Last Update: 9/1/04

WAC SECTIONS

- 246-247-001 Purpose.
- 246-247-002 Authority.
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- 246-247-020 Exemptions.
- 246-247-030 Definitions.
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- 246-247-045 Where to find technical references.
- 246-247-060 Applications, registration and licensing.
- 246-247-065 Fees.
- 246-247-075 Monitoring, testing and quality assurance.
- 246-247-080 Inspections, reporting, and recordkeeping.
- 246-247-085 Compliance determination for existing emission units and facilities.
- 246-247-100 Enforcement actions.
- 246-247-110 Appendix A -- Application information requirements.
- 246-247-120 Appendix B -- BARCT compliance demonstration.
- 246-247-130 Appendix C -- ALARACT compliance demonstration.

DISPOSITIONS OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

- 246-247-050 Registration. [Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-247-050, filed 12/27/90, effective 1/31/91. Statutory Authority: Chapter 70.98 RCW. 88-17-060 (Order 2671), § 402-80-060, filed 8/17/88. Statutory Authority: RCW 70.98.080. 87-01-031 (Order 2450), § 402-80-060, filed 12/11/86.] Repealed by 94-07-010, filed 3/4/94, effective 4/4/94. Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC.
- 246-247-070 New and modified sources. [Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-247-070, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 70.98.080. 87-01-031 (Order 2450), § 402-80-070, filed 12/11/86.] Repealed by 94-07-010, filed 3/4/94, effective 4/4/94. Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC.
- 246-247-090 Special reports. [Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-247-090, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 70.98.080. 87-01-031 (Order 2450), § 402-80-090, filed 12/11/86.] Repealed by 94-07-010, filed 3/4/94, effective 4/4/94. Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC.

WAC 246-247-001 Purpose. The purpose of this chapter is to establish application requirements and procedures for the issuance of a radioactive air emissions license and for the regulation of those emissions by the department of health (hereinafter referred to as "the department") to assure compliance with the standards for radioactive air emissions set by the department of ecology pursuant to RCW 70.94.331, promulgated in chapter 173-480 WAC, and with the rules and regulations of this chapter.

[Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-001, filed 3/4/94, effective 4/4/94. Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-247-001, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 70.98.080. 87-01-031 (Order 2450), § 402-80-010, filed 12/11/86.]

WAC 246-247-002 Authority. (1) Rules and regulations set forth herein are adopted and enforced by the department pursuant to the provisions of chapter 70.98 RCW which:

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(a) Designate the department as the state's radiation control agency having sole responsibility for the administration of the regulatory, licensing, and radiation control provisions of chapter 70.98 RCW;

(b) Vest in the department the authority to formulate, adopt, promulgate, and repeal codes, rules, and regulations related to the control of sources of ionizing radiation;

(c) Authorize the department to implement an independent statewide program to monitor radioactive air emissions from sources within the state;

(d) Authorize the department to conduct inspections of facilities, both private and public, to determine whether or not there is compliance with or violation of the provisions of chapter 70.98 RCW and rules and regulations issued thereunder; and

(e) Authorize the department to require registration of sources of ionizing radiation.

(2) In addition, RCW 70.94.422 (Washington Clean Air Act) grants to the department the enforcement powers contained in that chapter.

[Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-002, filed 3/4/94, effective 4/4/94.]

WAC 246-247-010 Applicability. (1) The standards and requirements of this chapter apply statewide at the following types of facilities that emit radionuclides to the air:

(a) Facilities licensed by the department or by the United States Nuclear Regulatory Commission (NRC);

(b) United States Department of Energy (DOE) facilities;

(c) Non-DOE federal facilities;

(d) Uranium fuel cycle facilities;

(e) Uranium mills that are processing material; and

(f) Any other facility that the department determines emits or has the potential to emit radionuclides to the ambient air.

(2) The standards and requirements of this chapter apply to point sources, nonpoint sources, and fugitive emissions.

(3) The standards and requirements of this chapter apply to stationary and mobile emission units, whether temporary or permanent.

(4) The control technology standards and requirements of this chapter apply to the abatement technology and indication devices of facilities and emission units subject to this chapter. Control technology requirements apply from entry of radionuclides into the ventilated vapor space to the point of release to the environment.

(5) In accordance with RCW 70.94.161(10), air operating permits issued under chapter 173-401 WAC shall incorporate all applicable requirements of this chapter. Therefore, all facilities listed in subsection (1) of this section that are also subject to the operating permit regulations in chapter 173-401 WAC shall be considered in compliance with the requirements of this chapter if they comply with all the applicable requirements of the air operating permit issued

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under chapter 173-401 WAC. These applicable requirements shall be contained in the radioactive air emissions license which shall be incorporated as part of the air operating permit. In accordance with RCW 70.94.422(1), the department shall enforce all the requirements contained in the radioactive air emissions license.

(6) Should any of the federal regulations that have been adopted by reference in this chapter be rescinded, the affected facilities shall nonetheless comply with all other applicable requirements of this chapter.

(7) An applicant may obtain a copy of any document referenced in this chapter by contacting the department's division of radiation protection, air emissions and defense wastes section at (360) 236-3260. Mail reports, applications, and other written correspondence to the Air Emissions and Defense Wastes Section at 7171 Cleanwater Lane, Building 5, P.O. Box 47827, Olympia, Washington, 98504-7827.

[Statutory Authority: RCW 70.98.050. 04-18-094, § 246-247-010, filed 9/1/04, effective 10/2/04; 98-13-037, § 246-247-010, filed 6/8/98, effective 7/9/98. Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-010, filed 3/4/94, effective 4/4/94. Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-247-010, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 70.98.080. 87-01-031 (Order 2450), § 402-80-020, filed 12/11/86.]

WAC 246-247-020 Exemptions. (1) The following types of facilities or sources of radiation are exempt from the requirements of this chapter because they release no airborne radioactivity, or they prima facie comply with the standards in WAC 246-247-040, or they are already adequately regulated under other requirements:

- (a) Users of only sealed sources;
 - (b) sealed sources;
 - (c) Accelerators less than 200 Mev;
 - (d) Nuclear-powered vessels underway or moored dockside unless under a maintenance condition with a potential-to-emit;
 - (e) Uranium mill tailings piles disposed of under 40 CFR Part 192.
- (2) Exemption determinations.

(a) Any exemptions shall be consistent with 40 CFR 61. No exemptions from the standards in WAC 246-247-040 will be granted.

(b) A nonfederal facility may request exemption from some of the requirements of WAC 246-247-060 and 246-247-075 if the potential-to-emit, for the emission unit(s) under consideration, results in compliance at level I of the COMPLY computer code or level I of the NCRP's Commentary No. 3, or equivalent as approved by the department.

(c) A federal facility may request exemption from some of the requirements of WAC 246-247-060 and 246-247-075 if the potential-to-emit, for the emission unit(s) under consideration, results in a TEDE to the MEI from all pathways less than 0.1 mrem/yr.

(d) The facility shall submit all the data necessary to make the exemption determinations of (b) and (c) of this subsection. The department shall determine if any exemptions apply.

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(e) Commercial nuclear power plants may request exemption from some of the requirements of this chapter in order to minimize dual regulation with the NRC.

(3) The department may require a facility with exempt emission units to submit a radioactive air emissions report to confirm compliance with applicable standards. The department reserves the right to conduct inspections and audits of the facility to confirm the status of its exempt emission units.

(4) Naturally occurring airborne radionuclides are exempt from the requirements of this chapter unless the concentrations or rates of emissions have been enhanced by industrial processes.

[Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-020, filed 3/4/94, effective 4/4/94. Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-247-020, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 70.98.080. 87-01-031 (Order 2450), § 402-80-030, filed 12/11/86.]

WAC 246-247-030 Definitions. Terms used in this chapter have the definitions set forth below with reference to radioactive air emissions.

(1) "Abatement technology" means any mechanism, process or method that has the potential to reduce public exposure to radioactive air emissions. Abatement control features include automatic mechanisms and administrative controls used in the operation and control of abatement technology from entry of radionuclides into the ventilated vapor space to release to the environment.

(2) "Administrative control" means any policy or procedure that limits the emission of radionuclides.

(3) "ALARA" means as low as reasonably achievable making every reasonable effort to maintain exposures to radiation as far below the dose standards in this chapter as is practical, consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other socioeconomic considerations, and in relation to the utilization of nuclear energy, ionizing radiation, and radioactive materials in the public interest. See WAC 246-220-007.

(4) "As low as reasonably achievable control technology" (ALARACT) means the use of radionuclide emission control technology that achieves emission levels that are consistent with the philosophy of ALARA. ALARACT compliance is demonstrated by evaluating the existing control system and proposed nonsignificant modifications in relation to applicable technology standards and other control technologies operated successfully in similar applications. In no event shall application of ALARACT result in emissions of radionuclides that could cause exceedance of the applicable standards of WAC 246-247-040. See the definition of ALARA in this section. Note that ALARACT is equivalent to, but replaces, RACT in the May 7, 1986, version of chapter 173-480 WAC.

(5) "Annual possession quantity" means the sum of the quantity of a radionuclide on hand at the beginning of the calendar year and the quantity of that radionuclide received or produced during the calendar year.

(6) "Best available radionuclide control technology" (BARCT) means technology that will result in a radionuclide emission limitation based on the maximum degree of reduction for radionuclides from any proposed newly constructed or significantly modified emission units that the licensing authority determines is achievable on a case-by-case basis. A BARCT compliance demonstration must consider energy, environmental, and economic impacts, and

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other costs through examination of production processes, and available methods, systems, and techniques for the control of radionuclide emissions. A BARCT compliance demonstration is the conclusion of an evaluative process that results in the selection of the most effective control technology from all known feasible alternatives. In no event shall application of BARCT result in emissions of radionuclides that could exceed the applicable standards of WAC 246-247-040. Control technology that meets BARCT requirements also meets ALARACT requirements. See WAC 173-480-030 and 246-247-120.

(7) "Committed effective dose equivalent" (CEDE) means the sum of the products of absorbed dose from internally deposited radionuclides and appropriate factors to account for differences in biological effectiveness due to the quality of radiation and its distribution in the body of reference man over a fifty-year period.

(8) "Construction" means fabrication, erection, or installation of a new building, structure, plant, process, or operation within a facility that has the potential to emit airborne radionuclides. Construction includes activities of a permanent nature aimed at completion of the emission unit, such as pouring concrete, putting in a foundation, or installing utilities directly related to the emission unit. It does not include preliminary activities such as tests to determine site suitability, equipment procurement and storage, site clearing and grading, and the construction of ancillary buildings.

(9) "Decommissioning" means actions taken to reduce or eliminate the potential public health and safety impacts of a building, structure, or plant that has permanently ceased operations, including, but not limited to, actions such as decontamination, demolition, and disposition.

(10) "Emission unit" means any single location that emits or has the potential to emit airborne radioactive material. This may be a point source, nonpoint source, or source of fugitive emissions.

(11) "Facility" means all buildings, structures, plants, processes, and operations on one contiguous site under control of the same owner or operator.

(12) "Fugitive emissions" are radioactive air emissions which do not and could not reasonably pass through a stack, vent, or other functionally equivalent structure, and which are not feasible to directly measure and quantify.

(13) "Indication device" means any method or apparatus used to monitor, or to enable monitoring, the operation of abatement controls or the potential or actual radioactive air emissions.

(14) "License" means a radioactive air emissions license, either issued by the department or incorporated by the department as an applicable portion of an air operating permit issued by the department of ecology or a local air pollution control authority, with requirements and limitations listed therein to which the licensed or permitted party must comply. Compliance with the license requirements shall be determined and enforced by the department.

(15) "Maximally exposed individual" (MEI) means any member of the public (real or hypothetical) who abides or resides in an unrestricted area, and may receive the highest TEDE from the emission unit(s) under consideration, taking into account all exposure pathways affected by the radioactive air emissions.

(16) "Modification" means any physical change in, or change in the method of operation of, an emission unit that could increase the amount of radioactive materials emitted or may result in the emission of any radionuclide not previously emitted. This definition includes the cleanup of land contaminated with radioactive material, the decommissioning of buildings, structures, or plants where radioactive contamination exists, and changes that will cause an

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increase in the emission unit's operating design capacity. This definition excludes routine maintenance, routine repair, replacement-in-kind, any increases in the production rate or hours of operation, provided the emission unit does not exceed the release quantities specified in the license application or the operating design capacity approved by the department, addition of abatement technology as long as it is not less environmentally beneficial than existing, approved controls, and changes that result in an increase in the quantity of emissions of an existing radionuclide that will be offset by an equal or greater decrease in the quantity of emissions of another radionuclide that is deemed at least as hazardous with regard to its TEDE to the MEI.

(17) "Monitoring" means the measurement of radioactive material released to the ambient air by means of an in-line radiation detector, and/or by the withdrawal of representative samples from the effluent stream. Ambient air measurements may be acceptable for nonpoint sources and fugitive emissions.

(18) "Nonpoint source" is a location at which radioactive air emissions originate from an area, such as contaminated ground above a near-surface waste disposal unit, whose extent may or may not be well-defined.

(19) "Notice of construction" (NOC) is an application submitted to the department by an applicant that contains information required by WAC 246-247-060 for proposed construction or modification of a registered emission unit(s), or for modification of an existing, unregistered emission unit(s).

(20) "Point source" is a discrete, well-defined location from which radioactive air emissions originate, such as a stack, vent, or other functionally equivalent structure.

(21) "Potential-to-emit" means the rate of release of radionuclides from an emission unit based on the actual or potential discharge of the effluent stream that would result if all abatement control equipment did not exist, but operations are otherwise normal. Determine the potential-to-emit by one of the following methods:

(a) Multiply the annual possession quantity of each radionuclide by the release fraction for that radionuclide, depending on its physical state. Use the following release fractions:

- (i) 1 for gases;
- (ii) 10⁻³ for liquids or particulate solids; and
- (iii) 10⁻⁶ for solids.

Determine the physical state for each radionuclide by considering its chemical form and the highest temperature to which it is subjected. Use a release fraction of one if the radionuclide is subjected to temperatures at or above its boiling point; use a release fraction of 10⁻³ if the radionuclide is subjected to temperatures at or above its melting point, but below its boiling point. If the chemical form is not known, use a release fraction of one for any radionuclide that is heated to a temperature of one hundred degrees Celsius or more, boils at a temperature of one hundred degrees Celsius or less, or is intentionally dispersed into the environment. Other release fractions may be used only with the department's approval; or

(b) Perform a back-calculation using measured emission rates and in situ measurements of the control equipment efficiencies, as approved by the department; or

(c) Measure the quantities of radionuclides captured in each control device, coupled with in situ measurements of the control equipment efficiencies, as approved by the department; or

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(d) Sample the effluent upstream from all control devices, as approved by the department; or

(e) Use an alternative method approved by the department.

(22) "Replacement-in-kind" means the substitution of existing systems, equipment, components, or devices of an emission unit's control technology with systems, equipment, components, or devices with equivalent, or better, performance specifications that will perform the same function(s).

(23) "Routine" means:

(a) Maintenance, repair, or replacement-in-kind performed on systems, equipment, components, or devices of an emission unit's abatement technology as a planned part of an established inspection, maintenance, or quality assurance program that does not increase the emission unit's operating design capacity; or

(b) Normal, day-to-day operations of a facility.

(24) "Sealed source" means radioactive material that is permanently bonded or fixed in a capsule or matrix, or radioactive material in airtight containers, designed to prevent release and dispersal of the radioactive material under the most severe conditions encountered in normal use and handling.

(25) "Significant" means the potential-to-emit airborne radioactivity at a rate that could increase the TEDE to the MEI by at least 1.0 mrem/yr as a result of a proposed modification.

(26) "Total effective dose equivalent" (TEDE) means the sum of the dose equivalent due to external exposures and the CEDE due to internal exposures.

(27) "Uranium fuel cycle" means the operations of milling uranium ore, chemical conversion of uranium, isotopic enrichment of uranium, fabrication of uranium fuel, generation of electricity in a nuclear power plant that uses uranium fuel, and reprocessing of spent uranium fuel, to the extent that these operations solely support the production of electrical power for public use. Excluded are mining operations, waste disposal sites, transportation of any radioactive material, and the reuse of recovered nonuranium special nuclear and by-product materials from the cycle.

[Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-030, filed 3/4/94, effective 4/4/94. Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-247-030, filed 12/27/90, effective 1/31/91. Statutory Authority: Chapter 70.98 RCW. 88-17-060 (Order 2671), § 402-80-040, filed 8/17/88. Statutory Authority: RCW 70.98.080. 87-01-031 (Order 2450), § 402-80-040, filed 12/11/86.]

WAC 246-247-040 General standards. (1) Standards for radioactive air emissions in the state of Washington are contained in WAC 173-480-040, 173-480-050, and 173-480-060. Additional standards for emissions of radionuclides other than radon from United States Department of Energy facilities and for radionuclide emissions from federal facilities other than United States Nuclear Regulatory Commission (NRC) licensees are contained in 40 CFR Part 61, subparts H and I (as effective on October 9, 2002). Additional standards for NRC licensees are contained in 10 CFR 20.1101 (as effective on January 9, 1997). In accordance with WAC 173-480-050(3), the department shall enforce the most stringent standard in effect, notwithstanding any agreement between EPA and any other agency, including those agreements made pursuant to 42 USC 7412(d)(9).

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(2) In addition to the radioactive air emission standards of subsection (1) of this section, the department's radioactive materials licensees shall comply with the limitations on radioactive air emissions contained in WAC 246-221-070.

(3) All new construction and significant modifications of emission units commenced after August 10, 1988 (the date this chapter originally became effective) shall utilize BARCT (see Appendix B).

(4) All existing emission units and nonsignificant modifications shall utilize ALARACT (see Appendix C).

(5) In order to implement these standards, the department may set limits on emission rates for specific radionuclides from specific emission units and/or set requirements and limitations on the operation of the emission unit(s) as specified in a license.

(6) All emissions of radionuclides, including those due to emergency conditions resulting from startup, shutdown, maintenance activities, or process upsets are subject to the standards of this section and, therefore, subject to the enforcement actions of WAC 246-247-100.

[Statutory Authority: RCW 70.98.050. 04-18-094, § 246-247-040, filed 9/1/04, effective 10/2/04. Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-040, filed 3/4/94, effective 4/4/94. Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-247-040, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 70.98.080. 87-01-031 (Order 2450), § 402-80-050, filed 12/11/86.]

WAC 246-247-045 Where to find technical references. The following referenced document is available for purchase from the American National Standards Institute, 25 West 43rd Street, 4th Floor, New York, New York 10036:

ANSI/HPS N13.1.1999 "Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities."

This document is also available for inspection at the Washington State Office of Radiation Protection, Air Emissions and Defense Waste Section, 7171 Cleanwater Lane, Bldg. 5, Tumwater, WA 98501 (phone 360-236-3260); and at the Washington State Office of Radiation Protection, Air Emissions and Defense Waste Section, 309 Bradley Blvd., Suite 201, Richland, WA 99352 (phone 509-946-0363).

[Statutory Authority: RCW 70.98.050. 04-18-094, § 246-247-045, filed 9/1/04, effective 10/2/04.]

WAC 246-247-060 Applications, registration and licensing. This section describes the information requirements for approval to construct, modify, and operate an emission unit. Any notice of construction (NOC) requires the submittal of the information listed in Appendix A. Complex projects may require additional information. The applicant should contact the department early in the conceptual design phase for guidance on applicable control technologies to consider.

Appendices B and C outline the procedures to demonstrate compliance with the BARCT and ALARACT standards. Based on the Appendix A information provided, the department may advise the applicant which subset of technologies to consider as candidates for meeting BARCT or ALARACT requirements.

For those facilities subject to the operating permit regulations in chapter 173-401 WAC, the radioactive air emissions license will be incorporated as an

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applicable portion of the air operating permit issued by the department of ecology or a local air pollution control authority. The department will be responsible for determining the facility's compliance with and enforcing the requirements of the radioactive air emissions license.

(1) Requirements for new construction or modification of emission units.

(a) Early in the design phase, the applicant shall submit a NOC containing the information required in Appendix A.

(b) Within thirty days of receipt of the NOC, the department shall inform the applicant if additional information is required. The department may determine, on the basis of the information submitted, that the requirements of BARCT or ALARACT have been met, or may require the applicant to submit a BARCT or ALARACT demonstration compatible with Appendix B or C, respectively.

(c) Within sixty days of receipt of all required information, the department shall issue an approval or denial to construct. The department may require changes to the final proposed control technology.

(d) The applicant may request a phased approval process by so stating and submitting a limited application. The department may grant a conditional approval to construct for such activities as would not preclude the construction or installation of any control or monitoring equipment required after review of the completed application.

(e) The department shall issue a license, or amend an existing license, authorizing operation of the emission unit(s) when the proposed new construction or modification is complete. For facilities subject to the air operating permit requirements of chapter 173-401 WAC, the license shall become part of the air operating permit issued by the department of ecology or a local air pollution control authority. For new construction, this action shall constitute registration of the emission unit(s).

(2) Requirements for modification of unregistered emission units that are not exempt from these regulations.

(a) The applicant shall submit an application containing the information required in Appendix A.

(b) Within thirty days of receipt of the application, the department shall inform the applicant if additional information is required. The department may determine, on the basis of the information submitted, that the requirements of BARCT or ALARACT have been met, or may require the applicant to submit a BARCT or ALARACT demonstration compatible with Appendix B or C, respectively.

(c) Within sixty days of receipt of all required information, the department shall issue or amend the license. For facilities subject to the air operating permit requirements of chapter 173-401 WAC, the license shall become part of the air operating permit issued by the department of ecology or a local air pollution control authority. This action shall constitute registration of the emission unit(s). A determination of noncompliance may result in the issuance of a notice of violation.

(d) The department reserves the right to require the owner of an existing, unregistered emission unit to make modifications necessary to comply with the applicable standards of WAC 246-247-040.

(3) If an emission unit is in violation of any standards contained in WAC 246-247-040, the facility shall either submit a compliance plan which describes how it intends to achieve compliance with the standards, and/or cease operation of the emission unit(s). The facility shall submit the compliance plan within forty-five days of the notice of violation. The cessation of operation of the

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emission unit(s) shall not necessarily exempt the facility from the requirements of this chapter if active or passive ventilation and radioactive air emission controls will still be required. The department reserves the right to take further enforcement action, if necessary, in accordance with WAC 246-247-100.

(4) The facility shall notify the department at least seven calendar days prior to any planned preoperational tests of new or modified emission units that involve emissions control, monitoring, or containment systems of the emission unit(s). The department reserves the right to witness or require preoperational tests involving the emissions control, monitoring, or containment systems of the emission unit(s).

(5) The license shall specify the requirements and limitations of operation to assure compliance with this chapter. The facility shall comply with the requirements and limitations of the license.

(6) All radioactive air emissions licenses issued by the department, except those issued to radioactive materials licensees, shall have an expiration date of five years from date of issuance or as specified in the air operating permit. For radioactive material licensees, the requirements and limitations for the operation of emission units shall be incorporated into their radioactive materials license, and shall expire when the radioactive materials license expires.

(7) Each federal facility that comes under the authority of this chapter shall hold one license for each site, base, or installation. When applicable, the license shall be part of the facility's air operating permit.

(8) Facilities may request a single categorical license which identifies limits and conditions of operation for similar multipurpose temporary and/or portable emission units. When applicable, the license shall be part of the facility's air operating permit.

(9) All facilities with licensed emission units, except for radioactive materials licensees, shall submit a request to the department for renewal of their radioactive air emissions license at least sixty days prior to expiration of the license or as required by the air operating permit. All renewal requests shall include a summary of the operational status of all emission units, the status of facility compliance with the standards of WAC 246-247-040, and the status of any corrective actions necessary to achieve compliance with the requirements of this chapter. Facilities with licensed emission units that also hold a radioactive materials license issued by the department shall submit this information along with their radioactive material license renewal submittal. If the department is unable to renew a radioactive air emissions license before its expiration date, the existing license, with all of its requirements and limitations, remains in force until the department either renews or revokes the license.

(10) For commercial nuclear power plants or any other thermal energy facility subject to chapter 80.50 RCW and to the requirements of this chapter, the radioactive air emissions license and amendments thereto shall be issued pursuant to a memorandum of agreement between the energy facility site evaluation council (EFSEC) and the department.

[Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-060, filed 3/4/94, effective 4/4/94. Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-247-060, filed 12/27/90, effective 1/31/91. Statutory Authority: Chapter 70.98 RCW. 88-17-060 (Order 2671), § 402-80-065, filed 8/17/88.]

WAC 246-247-065 Fees. (1) All facilities under the authority of this chapter

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shall submit fees in accordance with WAC 246-254-160.

(2) Those facilities required by WAC 246-254-160(2) to submit an application fee, shall submit the fee with the application.

[Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-065, filed 3/4/94, effective 4/4/94.]

WAC 246-247-075 Monitoring, testing and quality assurance. (1) All radioactive air emissions monitoring, testing, and quality assurance requirements of 40 CFR 61, subparts H and I (as effective on October 9, 2002), are adopted by reference, as applicable as specified by the referenced subparts. The department may, upon request by a nonfederal licensee, authorize provisions specific to that nonfederal licensee, other than those already set forth in WAC 246-247-075 for nonfederal emission unit monitoring, testing, or quality assurance, so long as the department finds reasonable assurance of compliance with the performance objectives of this chapter.

(2) Equipment and procedures used for the continuous monitoring of radioactive air emissions shall conform, as applicable, to the guidance contained in ANSI N13.1, ANSI N42.18, ANSI N323, ANSI N317, reference methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17 of 40 CFR Part 60, Appendix A, 40 CFR Part 52, Appendix E, and any other methods approved by the department.

(3) The operator of an emission unit with a potential-to-emit of less than 0.1 mrem/yr TEDE to the MEI may estimate those radionuclide emissions, in lieu of monitoring, in accordance with 40 CFR 61 Appendix D, or other procedure approved by the department. The department may require periodic confirmatory measurements (e.g., grab samples) during routine operations to verify the low emissions. Methods to implement periodic confirmatory monitoring shall be approved by the department.

(4) The department may allow a facility to use alternative monitoring procedures or methods if continuous monitoring is not a feasible or reasonable requirement.

(5) The following types of facilities shall determine radionuclide emissions in accordance with either a methodology referenced in subsections (1) through (4) of this section or the respective document referenced below:

(a) Nuclear power reactors licensed by the NRC: Offsite Dose Calculation Manual;

(b) Fuel fabrication plants licensed by the NRC: NRC's Regulatory Guide 4.16, dated December 1985;

(c) Uranium mills that are processing material: NRC's Regulatory Guide 4.14, dated April 1980.

(6) Licensed facilities shall conduct and document a quality assurance program. Except for those types of facilities specified in subsection (5) of this section, the quality assurance program shall be compatible with applicable national standards such as ANSI/ASME NQA-1-1988, ANSI/ASME NQA-2-1986, QA/R-2, and QA/R-5.

(7) Those types of facilities specified in subsection (5) of this section shall conduct and document a quality assurance program compatible with either the applicable national standards referenced in subsection (6) of this section or the NRC's Regulatory Guide 4.15, dated February 1979.

(8) Facilities shall monitor nonpoint and fugitive emissions of radioactive

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material.

(9) The department may conduct an environmental surveillance program to ensure that radiation doses to the public from emission units are in compliance with applicable standards. The department may require the operator of any emission unit to conduct stack sampling, ambient air monitoring, or other testing as necessary to demonstrate compliance with the standards in WAC 246-247-040.

(10) The department may require the owner or operator of an emission unit to make provision, at existing emission unit sampling stations, for the department to take split or collocated samples of the emissions.

(11) The planning for any proposed new construction or significant modification of the emission unit must address accidental releases with a probability of occurrence during the expected life of the emission unit of greater than one percent.

(12) All facilities must be able to demonstrate that appropriate supervisors and workers are adequately trained in the use and maintenance of emission control and monitoring systems, and in the performance of associated test and emergency response procedures.

(13) All facilities must be able to demonstrate the reliability and accuracy of the radioactive air emissions monitoring data.

[Statutory Authority: RCW 70.98.050, 04-18-094, § 246-247-075, filed 9/1/04, effective 10/2/04. Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC, 94-07-010, § 246-247-075, filed 3/4/94, effective 4/4/94.]

WAC 246-247-080 Inspections, reporting, and recordkeeping. (1) The department reserves the right to inspect and audit all construction activities, equipment, operations, documents, data, and other records related to compliance with the requirements of this chapter. The department may require a demonstration of ALARACT at any time.

(2) All reporting and recordkeeping requirements of 40 CFR 61, subparts H and I (as effective on October 9, 2002), are adopted by reference, as applicable as specified by the referenced subparts. The department may, upon request by a nonfederal licensee, authorize provisions specific to that nonfederal licensee, other than those already set forth in WAC 246-247-080 for nonfederal emission unit inspections, reporting, or recordkeeping, so long as the department finds reasonable assurance of compliance with the performance objectives of this chapter.

(3) The facility shall annually submit to the department the information requirements adopted in subsection (2) of this section, as applicable, along with the following additional information, as applicable:

(a) The results of emission measurements for those emission units subject only to periodic confirmatory measurements;

(b) Wind rose or joint frequency table;

(c) Annual average ambient temperature;

(d) Annual average emission unit gas temperature, if available;

(e) Annual total rainfall;

(f) Annual average emission unit flow rate and total volume of air released

during the calendar year.

If this additional information is available in another annual report, the facility may instead provide a copy of that report along with the information requirements in this subsection. Annual reports are due by June 30 for the previous calendar year's operations.

(4) Any report or application that contains proprietary or procurement-sensitive information shall be submitted to the department with those portions so designated. The department shall hold this information confidential, unless required to release the information pursuant to laws, regulations, or court order.

(5) The facility shall notify the department within twenty-four hours of any shutdown, or of any transient abnormal condition lasting more than four hours or other change in facility operations which, if allowed to persist, would result in emissions of radioactive material in excess of applicable standards or license requirements. If requested by the department, the facility shall submit a written report within ten days including known causes, corrective actions taken, and any preventive measures taken or planned to minimize or eliminate the chance of recurrence.

(6) The facility shall file a report of closure with the department whenever operations producing emissions of radioactive material are permanently ceased at any emission unit (except temporary emission units) regulated under this chapter. The closure report shall indicate whether, despite cessation of operations, there is still a potential for radioactive air emissions and a need for an active or passive ventilation system with emission control and/or monitoring devices. If decommissioning is planned and will constitute a modification, a NOC is required, as applicable, in accordance with WAC 246-247-060.

(7) The facility shall maintain a log for each emission unit that has received categorical approval under WAC 246-247-060(8). The log shall contain records of important operations parameters including the date, location, and duration of the release, measured or calculated radionuclide concentrations, the type of emissions (liquid, gaseous, solid), and the type of emission control and monitoring equipment.

(8) The facility shall maintain readily retrievable storage areas for all records and documents related to, and which may help establish compliance with, the requirements of this chapter. The facility shall keep these records available for department inspection for at least five years.

(9) The facility shall ensure all emission units are fully accessible to department inspectors. In the event the hazards associated with accessibility to a unit require training and/or restrictions or requirements for entry, the facility owner or operator shall inform the department, prior to arrival, of those restrictions or requirements. The owner or operator shall be responsible for providing the necessary training, escorts, and support services to allow the department to inspect the facility.

(10) The facility shall make available, in a timely manner, all documents requested by the department for review. The facility shall allow the department to review documents in advance of an inspection. The facility shall allow access to classified documents by representatives of the department with the appropriate security clearance and a demonstrable need-to-know.

(11) The facility shall respond in writing in a timely manner, or within a time limit set by the department, to inspection results which require the facility to implement corrective actions or any other actions so directed by the department.

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[Statutory Authority: RCW 70.98.050. 04-18-094, § 246-247-080, filed 9/1/04, effective 10/2/04. Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-080, filed 3/4/94, effective 4/4/94. Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-247-080, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 70.98.080. 87-01-031 (Order 2450), § 402-80-080, filed 12/11/86.]

WAC 246-247-085 Compliance determination for existing emission units and facilities. (1) All procedures for determining compliance with the dose equivalent standards of 40 CFR 61, subparts H and I (as effective on October 9, 2002), are adopted by reference, as applicable as specified by the referenced subparts. The department may, upon request of a nonfederal licensee, authorize provisions specific to that nonfederal licensee, other than those already set forth in WAC 246-247-085 for determining compliance with appropriate dose equivalent standards by nonfederal emission units, so long as the department finds reasonable assurance of compliance with the performance objectives of this chapter.

(2) Facilities subject to 40 CFR 61 shall use computer codes or procedures approved by the EPA to determine the TEDE to the MEI; all other facilities shall use computer codes or procedures approved by the department.

(3) The determination of compliance with the dose equivalent standard of WAC 246-247-040 shall include all radioactive air emissions resulting from routine and nonroutine operations for the past calendar year.

[Statutory Authority: RCW 70.98.050. 04-18-094, § 246-247-085, filed 9/1/04, effective 10/2/04. Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-085, filed 3/4/94, effective 4/4/94.]

WAC 246-247-100 Enforcement actions. (1) In accordance with RCW 70.94.422, the department may take any of the following actions to enforce compliance with the provisions of this chapter:

(a) Notice of violation and compliance order (RCW 70.94.332).

(b) Restraining order or temporary or permanent injunction (RCW 70.94.425; also RCW 70.98.140).

(c) Penalty: Fine and/or imprisonment (RCW 70.94.430).

(d) Civil penalty: Up to ten thousand dollars for each day of continued noncompliance (RCW 70.94.431 (1) through (7)).

(e) Assurance of discontinuance (RCW 70.94.435).

(2) The department, in accordance with RCW 70.98.050 (4)(1), may issue subpoenas in order to compel attendance of witnesses and/or production of records or documents in connection with any adjudicative or other administrative proceeding.

(3) The department, in accordance with RCW 70.98.160, may impound sources of ionizing radiation.

(4) The secretary of the department, in accordance with RCW 43.70.190, is authorized to bring an action to prohibit a violation or a threatened violation of any department rules or regulation, or to bring any legal proceeding authorized by law to a county superior court.

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(5) Any party, against which an enforcement action is brought by the department, has the right to submit an application for the adjudicative process in accordance with chapter 246-10 WAC and chapter 34.05 RCW.

[Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-100, filed 3/4/94, effective 4/4/94. Statutory Authority: RCW 43.70.040. 91-02-049 (Order 121), recodified as § 246-247-100, filed 12/27/90, effective 1/31/91. Statutory Authority: RCW 70.98.080. 87-01-031 (Order 2450), § 402-80-100, filed 12/11/86.]

WAC 246-247-110 Appendix A -- Application information requirements. (1) Name and address of the facility, and location (latitude and longitude) of the emission unit(s).

(2) Name, title, address, and phone number of the responsible manager.

(3) Identify the type of proposed action for which this application is submitted:

(a) Construction of new emission unit(s);

(b) Modification of existing emission unit(s); identify whether this is a significant modification;

(c) Modification of existing unit(s), unregistered.

(4) If this project is subject to the requirements of the State Environmental Policy Act (SEPA) contained in chapter 197-11 WAC, provide the name of the lead agency, lead agency contact person, and their phone number.

(5) Describe the chemical and physical processes upstream of the emission unit(s).

(6) Describe the existing and proposed (as applicable) abatement technology. Describe the basis for the use of the proposed system. Include expected efficiency of each control device, and the annual average volumetric flow rate(s) in meters³/sec for the emission unit(s).

(7) Provide conceptual drawings showing all applicable control technology components from the point of entry of radionuclides into the vapor space to release to the environment.

(8) Identify each radionuclide that could contribute greater than ten percent of the potential-to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI.

(9) Describe the effluent monitoring system for the proposed control system. Describe each piece of monitoring equipment and its monitoring capability, including detection limits, for each radionuclide that could contribute greater than ten percent of the potential-to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI, or greater than twenty-five percent of the TEDE to the MEI, after controls. Describe the method for monitoring or calculating those radionuclide emissions. Describe the method with detail sufficient to demonstrate compliance with the applicable requirements.

(10) Indicate the annual possession quantity for each radionuclide.

(11) Indicate the physical form of each radionuclide in inventory: solid, particulate solids, liquid, or gas.

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(12) Indicate the release form of each radionuclide in inventory: Particulate solids, vapor, or gas. Give the chemical form and ICRP 30 solubility class, if known.

(13) Release rates.

(a) New emission unit(s): Give predicted release rates without any emissions control equipment (the potential-to-emit) and with the proposed control equipment using the efficiencies described in subsection (6) of this section.

(b) Modified emission unit(s): Give predicted release rates without any emissions control equipment (the potential-to-emit) and with the existing and proposed control equipment using the efficiencies described in subsection (6) of this section. Provide the latest year's emissions data or emissions estimates.

In all cases, indicate whether the emission unit is operating in a batch or continuous mode.

(14) Identify the MEI by distance and direction from the emission unit(s). The MEI is determined by considering distance, windrose data, presence of vegetable gardens, and meat or milk producing animals at unrestricted areas surrounding the emission unit.

(15) Calculate the TEDE to the MEI using an approved procedure (see WAC 246-247-085). For each radionuclide identified in subsection (8) of this section, determine the TEDE to the MEI for existing and proposed emission controls, and without any emission controls (the potential-to-emit) using the release rates from subsection (13) of this section. Provide all input data used in the calculations.

(16) Provide cost factors for construction, operation, and maintenance of the proposed control technology components and system, if a BARCT or ALARACT demonstration is not submitted with the NOC.

(17) Provide an estimate of the lifetime for the facility process with the emission rates provided in this application.

(18) Indicate which of the following control technology standards have been considered and will be complied with in the design and operation of new or modified emission unit(s) described in this application:

ASME/ANSI AG-1, Code on Nuclear Air and Gas Treatment (where there are conflicts in standards with the other listed references, this standard shall take precedence)

ASME/ANSI N509, Nuclear Power Plant Air-Cleaning Units and Components

ASME/ANSI N510, Testing of Nuclear Air Treatment Systems

ANSI/ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities

40 CFR 60, Appendix A, Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17

ANSI/HPS N13.1.1999, Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities if the unit's potential-to-emit exceeds 0.1 mrem/yr TEDE to the MEI and the unit is required to meet ANSI/HPS N13.1.1999 under federal regulations.

ANSI N13.1.1969, Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities if the unit's potential-to-emit exceeds 0.1 mrem/yr TEDE to the MEI and the unit is not required to meet ANSI/HPS N13.1.1999 under federal

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regulations.

For each standard not so indicated, give reason(s) to support adequacy of the design and operation of the emission unit(s) as proposed.

[Statutory Authority: RCW 70.98.050. 04-18-094, § 246-247-110, filed 9/1/04, effective 10/2/04. Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-110, filed 3/4/94, effective 4/4/94.]

WAC 246-247-120 Appendix B -- BARCT compliance demonstration. Purpose. A BARCT demonstration is used to choose control technologies for the mitigation of emissions of radioactive material from new emission units or significant modifications to emission units. The bases for the BARCT demonstration requirements are the BARCT standard given in WAC 246-247-040, and the definition of BARCT given in WAC 246-247-030. This procedure incorporates certain implementing criteria that enable the department to evaluate a facility's compliance with the BARCT standard. It is the applicant's responsibility to demonstrate the effectiveness of their BARCT determination to the department. The facility should contact the department at the conceptual design phase for guidance on the BARCT demonstration requirements. The department may adjust this demonstration procedure on a case-by-case basis, as needed, to ensure compliance with the substantive standard.

Scope. The BARCT demonstration includes the abatement technology and indication devices that demonstrate the effectiveness of the abatement technology from entry of radionuclides into the ventilated vapor space to release to the environment. The applicant shall evaluate all available control technologies that can reduce the level of radionuclide emissions.

Technology Standards. The BARCT demonstration and the emission unit design and construction must meet, as applicable, the technology standards shown below if the unit's potential-to-emit exceeds 0.1 mrem/yr TEDE to the MEI. If the potential-to-emit is below this value, the standards must be met only to the extent justified by a cost/benefit evaluation.

ASME/ANSI AG-1, Code on Nuclear Air and Gas Treatment (where there are conflicts in standards with the other listed references, this standard shall take precedence)

ASME/ANSI N509, Nuclear Power Plant Air-Cleaning Units and Components

ASME/ANSI N510, Testing of Nuclear Air Treatment Systems

ANSI/ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities

40 CFR 60, Appendix A, Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17

ANSI/HPS N13.1.1999, Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities

The following standards and references are recommended as guidance only:

ANSI/ASME NQA-2, Quality Assurance Requirements for Nuclear Facilities

ANSI N42.18, Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents

ERDA 76-21, Nuclear Air Cleaning Handbook

ACGIH 1988, Industrial Ventilation, A Manual of Recommended Practice, 20th
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BARCT Demonstration Procedure.

Step 1. Define facility process variables. Describe the physical and chemical process. Include the potential radionuclide release rates (by isotope, in units of curies/year), process variables (such as flow rate, temperature, humidity, chemical composition), and other technical considerations. Base the radionuclide release rate on the potential-to-emit.

Radionuclides selected for consideration in the BARCT demonstration shall include those which contribute more than ten percent of the potential TEDE to the MEI or more than 0.1 mrem/yr, and any others which the department determines are necessary.

Step 2. Gather information on all available control technologies. Search for all available technologies that can reduce the emissions levels for the radionuclides selected in Step 1. Sources of information shall include previous BARCT demonstrations, regulatory authorities, industry or regulatory agency data bases, literature searches, information from technology vendors, research and development reports, and any other means necessary to identify all available technologies. "Available technology" includes any technology that is commercially available. Recently completed searches may be used with department approval.

Step 3. Determine technical feasibility. Determine technical feasibility by evaluating vendor specifications for available control technologies identified in Step 2 with respect to the process variables identified in Step 1. Evaluate combinations of abatement technology and control devices by component, and the system as a whole.

If a control technology has poor safety, reliability, or control effectiveness as achieved in practice under the proposed process conditions, or the technology is not applicable to the emission unit under consideration, the technology may be eliminated with supporting documentation of the technical infeasibility.

Step 4. List all feasible control technologies in order of effectiveness. Evaluate feasible control technologies for efficiency (effectiveness) in reducing the TEDE to the MEI. List them in order, with the most effective first. If the most effective feasible technology is proposed as BARCT, the demonstration is complete at this step.

Step 5. Evaluate the environmental, energy, and economic impacts. Evaluate each control technology in succession, beginning with the most effective. Present an objective evaluation considering both beneficial and adverse impacts. Quantify the data where possible. Impact cost and effectiveness evaluations are incremental and include only that portion of the facility which comes under the authority of this chapter. Evaluate at least the following impacts:

Environmental impact - Determine the incremental environmental impact, both beneficial and adverse. Evaluate the beneficial impact of reduction in the TEDE to the surrounding population or, at a minimum, to the MEI due to the abatement of radioactive air emissions. Consider the adverse impacts from waste generation (radioactive and nonradioactive, air and nonair), disposal and stabilization, construction of control equipment, and the health and safety to both radiation workers and the general public.

Energy impact - Determine the incremental energy impact. Include the impact of any resulting need for new services such as energy distribution systems.

Economic impact - Determine the incremental economic impact. Determine capital and expense costs including design, development, procurement,

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construction, operation, maintenance, taxes, waste disposal, and any other applicable financial components. Base all costs on the expected lifetime of the emission unit and reduce to an annualized cost for evaluation and comparison.

The adverse economic impact compared to the beneficial impact, including reduction in TEDE to the surrounding population or the MEI, is a measure of the cost versus benefit for the control technology evaluated.

The most effective technology may be eliminated from consideration if the applicant can demonstrate to the department's satisfaction that the technology has unacceptable impacts. State clearly the basis for this conclusion and proceed to the next most effective control technology. If the next most effective technology is proposed as BARCT, the demonstration is complete; otherwise, evaluate the control technology for impacts in accordance with this step.

If the control technology cannot be eliminated on the basis of its impacts, it is proposed as BARCT.

Reporting. Prepare a BARCT compliance demonstration report for department review. Provide sufficient information such that the department can validate essential results. If no control technology is feasible, and/or emissions are unacceptable, the department reserves the right to prohibit the construction and operation of the emission unit(s).

[Statutory Authority: RCW 70.98.050. 04-18-094, § 246-247-120, filed 9/1/04, effective 10/2/04. Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-120, filed 3/4/94, effective 4/4/94.]

WAC 246-247-130 Appendix C -- ALARACT compliance demonstration. Purpose. An ALARACT demonstration is used for inspection or audit purposes, and to demonstrate compliance with the substantive ALARACT technology standard as required by this chapter. An ALARACT demonstration is used to evaluate the adequacy of control technology on existing emission units and to choose control technologies for proposed nonsignificant modifications of emission units. The bases for the ALARACT demonstration requirements are the ALARACT standards given in WAC 246-247-040 and the definition of ALARACT given in WAC 246-247-030. It is the applicant's responsibility to demonstrate the effectiveness of their ALARACT determination to the department. The department may adjust this demonstration procedure on a case-by-case basis, as needed, to ensure compliance with the substantive standard.

Scope. The ALARACT demonstration includes the abatement technology and indication devices, from entry of radionuclides into the ventilated vapor space to release to the environment. The facility shall evaluate the existing control system in relation to applicable technology standards, and other control technologies that have been successfully operated for similar applications.

Technology Standards. The ALARACT demonstration and the emission unit design and construction must meet, as applicable, the technology standards shown below if the unit's potential-to-emit exceeds 0.1 mrem/yr TEDE to the MEI. If the potential-to-emit is below this value, the standards must be met only to the extent justified by a cost/benefit evaluation.

ASME/ANSI AG-1, Code on Nuclear Air and Gas Treatment (where there are conflicts in standards with the other listed references, this standard shall take precedence)

ASME/ANSI N509, Nuclear Power Plant Air-Cleaning Units and Components

ASME/ANSI N510, Testing of Nuclear Air Treatment Systems

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ANSI/ASME NQA-1, Quality Assurance Program Requirements for Nuclear Facilities

40 CFR 60, Appendix A, Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17

ANSI/HPS N13.1.1999, Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities (for emission units constructed or significantly modified after October 15, 2004).

The following standards and references are recommended as guidance only:

ANSI/ASME NQA-2, Quality Assurance Requirements for Nuclear Facilities

ANSI N42.18, Specification and Performance of On-Site Instrumentation for Continuously Monitoring Radioactivity in Effluents

ERDA 76-21, Nuclear Air Cleaning Handbook

ACGIH 1988, Industrial Ventilation, A Manual of Recommended Practice, 20th ed., American Conference of Governmental Industrial Hygienists

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[Statutory Authority: RCW 70.98.050. 04-18-094, § 246-247-130, filed 9/1/04, effective 10/2/04. Statutory Authority: Chapters 70.98 and 70.94 RCW and chapter 173-480 WAC. 94-07-010, § 246-247-130, filed 3/4/94, effective 4/4/94.]