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Meeting Minutes Transmittal/Approval
Unit Manager's Meeting: Remedial Action and Waste Disposal Unit/Source Operable Unit
3350 George Washington Way, Room 2A01, Richland, Washington
August 20, 1997

FROM/APPROVAL: _____ Date 9/16/97
Nancy Werdel/Glenn Goldberg, 100 Area Unit Managers, RL (H0-12)

APPROVAL: _____ Date 9-10-97
Wayne Soper/Keith Holliday, 100 Aggregate Area Unit Manager, Ecology (B5-18)

APPROVAL: _____ Date 9-17-97
Dennis Faulk, 100 Aggregate Area Unit Manager, EPA (B5-01)

APPROVAL: _____ Date Sept. 10, 1997
Bryan Foley, 200 Area Unit Manager, RL (H0-12)

APPROVAL: _____ Date Sept 17, 1997
Joan Bartz/Shri Mohan, 200 Aggregate Area Unit Managers, Ecology (B5-18)

APPROVAL: _____ Date 9/10/97
Ted A. Wooley, 200-B Area Project Manager

APPROVAL: _____ Date 9-16-97
Robert G. McLeod, 300 Area Unit Manager, RL (H0-12)

APPROVAL: Did not attend meeting Date _____
Jeanne Wallace, 300 Area Aggregated Area Unit Manager
WA Dept of Ecology (B5-18)

APPROVAL: _____ Date 10 Oct 97
David R. Einan, 300 Area Aggregated Unit Manager, EPA (B5-01)

APPROVAL: _____ Date 9/10/97
Ted A. Wooley, 300 Area Process Trenches Subproject Manager

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Meeting Minutes are attached. Minutes are comprised of the following:

Attachment #1	-	Agenda
Attachment #2	-	Attendance Record
Attachment #3	-	Meeting Minutes
Attachment #4	-	Status Package All Source Operable Units
Attachment #5	-	Comment/Response for the RD Report/RAWP for the 100 Area
Attachment #6	-	Comparison of list of COCs and Methods (200 Area)
Attachment #7	-	300 Area Remedial Action 300-FF-1 Status
Attachment #8	-	Field Screening for Volatile Organic Compounds at 300-FF-1

Prepared by: Mar Mesell Date 10/2/97
Gary Gesell/Tamen Rodriguez (H0-17)

Concurrence by: VRD/J R James Date 10/2/97
Vern Dronen, BHI Remedial Action and Waste Disposal Project Manager (H0-17)

Attachment 1

052080

UNIT MANAGERS' MEETING AGENDA
3350 George Washington Way, Room 2A01
August 20, 1997

1:00 p.m. **100 Area**

100 Assessment/Design
- 2,4-D Burial Site Remediation Status
- 100-D Ponds Vadose Zone Sampling
- Burial Ground Task Team - Status of Cost Revisions
- Appendix C Updates
- Remedial Design Report Update
- Group 4 Design Status

100 Area Remedial Action
- Remedial Action Work Plan

2:00 p.m. **200 Area**

- 200-BP-1 Prototype Barrier Testing and Monitoring
  - Completion of three-year testing program
  - Mothballing of field testing activities per Detailed Work Plan
  - Delay in initiation of asphalt and settlement/subsidence testing
- 216-B-2-2 Ditch Borehole Field Preparation
- Nonradioactive Dangerous Waste Landfill (NRDWL) Soil Gas Sampling

3:00 p.m. **300-FF-1 Area**

- Remedial Action Status
- Process Trenches Permit Changes Status
- Process Trenches Closure/Post Closure Cost Estimate

Remedial Action and Waste Disposal Unit Managers' Meeting
Official Attendance Record
August 20, 1997

Please print clearly and use black ink.

Printed Name	Organization	O.U. Role	Telephone
Gary Gesell	BHI	RAWD Editor	372-9067
Glenn Goldberg	DOE	Project Manager	376-9552
Frank Corpuz	BHI	Resident Engineer	373-1661
W Remsen	BHI	RA/WD	2-9620
Kelly Cook	CHI	Design/RA	2-9363
Wayne Soper	Ecology	PM	736-3049
Keith Holliday	Ecology	Project Manager	736-3036
Pamela Innis	EPA	P.M.	376-4919
Clarence Corrivau	BHI	Assessments	372-9565
Jeff James	BHI	Task Lead	372-9563
Nick Donohue	BHI	Task Lead	531-0654
Fred Roeck	BHI	Environ Lead	372-9086
Bryan Foley	DOE-RL	Project Manager/UMA	376-7087
Greg Mitchem	BHI	200 Area Task Lead	372-9632
Curt Wittreich	CHI	ERC support	372-9586
Ted Wooley	Ecology	Ecology	736-3012
John Auten	ERC		372-9695
Richard Carlson	BHI	Technical Lead	373-3008
Charlie Johnson	BHI	Task Lead	373-6372
Dave Einan	EPA	300 Area P.M.	376-3883

Unit Managers' Meeting Minutes
Bechtel Building, Room 2A01
August 20, 1997

100 AREA

100 Assessment/Design

2,4-D Burial Site Remediation Status

Excavation of contaminated soil was initiated. One container of crushed tanks and two containers of highly contaminated soil were loaded and sent off site for treatment and disposal. During the week of August 25, approximately six more containers will be loaded starting on August 21. Excavation should be completed early next week. Sampling and laboratory analysis to confirm achievement of cleanup goals will be initiated on August 26.

100-D Ponds Vadose Zone Sampling

No comments. The issue resides with the U.S. Department of Energy, Richland Operations Office (RL).

Burial Ground Task Team - Status

The task team will discuss options to accelerate remediation of a 100 Area Burial Ground at a team meeting on August 22. The team will also discuss material handling and disposal of anomalous waste streams anticipated during excavation.

Appendix C Updates

The team updated management at the August 19 DWP meeting.

Remedial Design Report Update

Comments were received from the Washington State Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA). The Environmental Restoration Contractor (ERC) discussed three issues: (1) RESRAD model, (2) Institutional Controls, and (3) selection of shallow zone datum. A workshop was scheduled for September 9 to discuss these three issues.

Group 4 Design Status

The 60% design package was completed and Bechtel Hanford, Inc. (BHI) is working toward the 90% design package, which is due in November. Test pits were excavated, and samples are being analyzed. Closeout verification packages will be submitted to Ecology in early October 1997 for sites where data indicates no further action is needed. Ecology requested that all sampling results be submitted to them as soon as they become available; RL and BHI concurred.

Remedial Action

100 B/C Remedial Action

Excavation of contaminated materials is nearing completion at the 116-C-1 Liquid Waste Disposal Trench, and initial coordination work for decommissioning well 199-B3-2 (within 116-C-1) is underway.

With excavation work winding down at 116-C-1, subcontractor activities are picking up at the 116-C-5 Retention Basins. A detailed pipeline excavation plan and cost proposal is being developed/evaluated, along with an asbestos abatement program for the asbestos containing material (ACM) surrounding large diameter steel piping.

Prompted by responses to regulator comments on the generic vadose zone model presented in the Remedial Design Report/Remedial Action Work Plan (RDR/RAWP) and followup meetings, evaluation and plotting of existing vadose zone contamination information is in progress for the 100-B/C Group 1 Sites. This is the first step in the related issue of site closeouts and concurrence on the process involved.

100 DR Remedial Action

Excavation of additional plumes to the north and northeast have been halted due to possible undermining of support facilities and haul roads, and deferred to a later date.

Excavation of soil burden and breaking of concrete slabs and walls continues at 116-D-7 and 116-DR-9 concrete-lined retention basins. The process for "waste designation by representative sampling" is essentially completed. As presented in the Waste Profile revisions for these sites, results of "representative sampling" indicate that leachable lead concentrations of the demolition debris, as a whole, is below Environmental Restoration Disposal Facility allowable limits. A detailed documentation package is being prepared by BHI and will be transmitted to RL in the near future.

Similar to Subcontract Change Request activities and negotiations at 100 BC, a detailed pipeline excavation plan and cost proposal is being developed/evaluated, along with an asbestos abatement program for the asbestos containing material (ACM) surrounding large diameter steel piping.

Final field verification testing for the 107-D1 and 107-D5 (relatively small and shallow) Sludge Pits were recently completed; test samples are being analyzed.

Prompted by responses to regulator comments on the generic vadose zone model presented in the RDR/RAWP, evaluation and plotting of existing vadose zone contamination information is in progress for the 100 DR Group 2 sites. Once this information is assimilated, along with the related 100 BC information search, a joint meeting with EPA and Ecology will be requested to present and discuss the information, and work to a path forward for the process of site close-outs at 100 BC, D, and the 100 remedial action sites.

200 AREA

200-BP-1 Prototype Barrier Testing and Monitoring

RL provided an overview of the program's current status, which include the following:

- Completion of the 3-year testing program: EPA would like to continue testing, per RL. EPA's preference is to continue monitoring in the long term as an option to keep data updated/maintain the data. With current budget projections, EM-40 is unable to continue field testing and recommends EPA to encourage other users of this data (i.e., EM-30) to contribute to the program.

- Mothballing of field testing activities per the Detailed Work Plan: Current plans are to mothball the equipment for the first quarter of fiscal year (FY) 1998. If additional funding is available from EM-30 or EM-50, ER can forego this activity.

- Delay in initiating asphalt and settlement subsidence testing: The budget for both activities would be approximately $800,000. This work is an integral part of the 3-year testing program, but has been deferred to FY 2000 based on the latest DWP priorites.

216-B-2-2 Ditch Borehole Field Preparation

Comment responses to RL and EPA comments were received before this meeting. Heat generated due to drilling and potential cross-contamination were the only issues that still required discussion. Using a combination of a split spoon sampler and cable rig results in no problems due to heat generation, per John Auten. Ecology was satisfied with this discussion, but requested that RL be available for further discussion if new issues arise regarding drilling operations.

Ecology had no major concerns regarding the Description of Work (DOW); however, Ecology would like a better understanding of the ERC's logging approach in the field after the DOW is completed. The IRM and QRA were deleted from Phase I.

Ecology had a concern about rad prequalifications and laboratory method and procedures that would be used; Quanterras lab will analyze the samples, per the ERC. Ecology said that method

SW-846 should be used by the lab or if not, any deviations should have the proper quality assurance backup to make it an acceptable methodology.

Action: RL to evaluate rad prequalification options and to present to Ecology the analytical methods (and deviations) that will be used for this work.

300 AREA

300-FF-1

Remedial Action Status

Excavation of the process trenches above cleanup level (ACL) area is going well and is nearly complete. The haul truck loading area is being moved such that the northern portion of the ACL area can be excavated. Excavation and material handling at 300-10 waste site started on August 19. A schedule of upcoming remediation activities was provided and discussed (Attachment 7). The Independent Professional Engineer, LATA, has been performing site visits and providing monthly reports on the Process Trenches excavation oversight and review.

A writeup on the "Field Screening for Volatile Organic Compounds at 300-FF-1" was provided and discussed. The "Onsite Waste Tracking" Form was also provided and discussed (Attachment 8).

Process Trenches Permit Change Status

Revisions to the Closure Plan were submitted to RL for review. The document will be sent to Ecology 2 weeks before the end of the 90-day clock.

Process Trenches Closure/Postclosure Cost Estimate

Cost estimates must be submitted each September 30, which delineates monitoring and expected costs. The estimates were submitted to Fluor Daniel (they coordinate all submittals); they will be submitted to RL and then to Ecology.

Attachment 4

STATUS PACKAGE

UNIT MANAGERS' MEETING - AUGUST 1997

SOURCE OPERABLE UNITS

100-B/C, 100-K, 100-D, 100-H, 100-F

200 AREAS

300 AREA

prepared by

DOE-RL

8/21/97

100 AREAS

Assessment-Related Activities

Laboratory analytical results received in June 1997 for soil samples collected at the 2,4-D Burial Site, located on the Wahluke Slope portion of the Hanford Site, indicated high levels of the herbicide 2,4-D, as well as indications of dioxin. Accordingly, plans for waste remediation were confirmed during July and include offsite disposal of the most contaminated materials and onsite bioremediation for the bulk of the contaminated soils. CH2M Hill (CHI) has provided staff augmentation to Bechtel Hanford, Inc. (BHI) in preparing required documentation for the startup of remedial actions and in providing technical expertise for bioremediation.

CHI summarized strategies (documentation) to obtain a Record of Decision (ROD) for burial grounds in the 100 Area (45 sites) and 300 Area (13 sites). The U.S. Department of Energy, Richland Operations Office (RL), U.S. Environmental Protection Agency, and the Washington State Department of Ecology (Ecology) agreed with the summary. CHI will update cost estimates for removal, treatment, and disposal of burial ground waste for use in feasibility studies planned for fiscal year 1998. This work is to be completed by the end of September 1997.

CHI continued work on Administrative Record documentation for waste site dispositioning and for a proposed plan summarizing cleanup options for the 100 Area Remaining Sites. The 100 Area Remaining Sites group includes approximately 450 waste sites in the 100 Area that are not currently addressed in a ROD.

A report summarizing soil sampling for the 190-C Building completed CHI and BHI technical reviews. Sampling was conducted during April and May to determine whether soil contamination was present beneath the building before demolishing the building in place, an event that would preclude cost-effective sampling in the future. The report indicates that contaminants are not present. The report is expected to be completed in early August.

Comments were received from RL on the *100-D Ponds Closure Plan*, Rev. 1. The document was delivered to BHI for submittal to RL for technical review on May 28. The Closure Plan is in support of closure of the facility under the *Resource Conservation and Recovery Act of 1976* Sitewide Permit. Comments will be incorporated into the document. The entire closure plan may be reevaluated because of a letter received during July from Ecology, requesting that soil samples be collected and analyzed from the vadose zone in support of closure of this treatment, storage, and disposal facility.

On July 16, 1997, a Baseline Change Proposal was approved by BHI authorizing CHI to collect soil samples in the 100-D Reactor Area from locations where high levels of chromium contamination are suspected. Planning efforts and searches of historical records were initiated during July.

100 B/C

Remedial Action - Five plume excavations were completed at 116-C-1 Liquid Waste Disposal Trench; the fifth plume had a ramp excavated into it to allow ingress and egress by the 199-B3-2 monitoring well's decommissioning subcontractor. The five combined plumes constitute approximately 38% of the original volume of the 116-C-1 waste site. The 116-C-5 Retention Basins excavation is approximately 69%complete. An asbestos abatement program for the limited scope pipe wrap is being issued to a lower-tier subcontractor. Plans are being finalized for macroencapsulation of contaminated lead materials unearthed at the 100 Area Remedial Action sites.

Prompted by responses to Regulator comments on the generic vadose zone model presented in the Remedial Design Report/Remedial Action Work Plan (RDR/RAWP) and followup meetings, evaluation and plotting of existing vadose zone contamination information is in progress for the 100 BC Group 1 Sites. (Summary level, interim results tabled). This is the first step in the related issue of site closeouts, and concurrence on the process involved.

100 DR

Remedial Action - Excavation of plume material in 116-DR-1 and 116-DR-2 was halted in May due to possible undermining of support facilities and haul roads. Excavation of soil burden and breaking of concrete slabs and walls continues at 116-D-7 and 116-DR-9 concrete lined Retention Basins. The process for "waste designation by representative sampling" is essentially completed. As presented in the Waste Profile revisions for these sites, results of "representative sampling" indicate that leachable lead concentrations of the demolition debris, as a whole, are below the Environmental Restoration Disposal Facility (ERDF) allowable limits. A detailed documentation package is being prepared by BHI, and will be transmitted to RL in the near future.

Similar to Subcontract Change Request activities and negotiations at 100 BC, a detailed pipeline excavation plan and cost proposal is being developed/evaluated, along with an asbestos abatement program for the asbestos containing material (ACM) surrounding large diameter steel piping.

Final field verification testing for the 107-D1 and 107-D5 (relatively small and shallow) sludge pits were recently completed and are awaiting results.

Prompted by responses to regulator comments on the generic vadose zone model presented in the RDR/RAWP, evaluation and plotting of existing vadose zone contamination information is in progress for the 100 DR Group 2 sites. Once this information is assimilated, along with the related 100 BC information search, the information will be presented to the U.S. Environmental Protection Agency (EPA) and Ecology. A path forward will also be discussed for the process of site closeouts at 100 BC and D and for the 100 remedial action sites.

Grout macroencapsulation specifications are ongoing for current lead waste volume at 100 BC and DR, with dedicated staff to close out open items. Correspondence is in progress from RL

(with BHI assistance) outlining to EPA and Ecology macroencapsulation as the selected treatment technology before disposal at ERDF; treatment will be centralized at 100 BC.

200 AREAS

200 Areas Strategy

The draft Tentative Agreement is on hold pending funding shortfall discussions. Working meetings and start of the public comment period on the Tri-Party Agreement change package for the 200 Areas Strategy are also on hold pending funding disposition.

200-BP-1 Operable Unit

The barrier testing program continues to provide data on water infiltration, vegetation growth, and biointrusion associated with the Hanford Site barrier. Detail Work Plan activities are underway, and the plan is to stop the 3-year testing program at the end of fiscal year (FY) 1997. Asphalt testing and settlement and subsidence testing were deferred to FY 1998, but are subject to elimination because of last minute budget reductions. A final report will be generated after all activities are completed.

200-BP-11 Operable Unit

Comments on the Description of Work for a borehole at the B-2-2 Ditch were received from RL and Ecology. A final draft will be prepared once comments are resolved. In parallel, BHI is initiating other prefield planning activities (i.e., hazards analysis, Health and Safety Plan, etc.).

Nonradioactive Dangerous Waste Landfill

The Sampling and Analysis Plan (SAP) was issued for RL and Ecology review. Comments were received and responses prepared. A revised SAP is planned to be signed off and field work to begin the week of August 18, 1997.

300 AREA

300-FF-1 Operable Unit

Remedial Action - The remedial action subcontractor continued excavation of the Process Trenches Above Cleanup Level area during the last month. Approximately 33 containers of contaminated soils were excavated daily. The filled containers were hauled to ERDF for disposal

on the back shift. A potentially anomalous material (what appeared to be two yellow-colored clay balls) were identified, sampled, and found to be within the process trenches waste profile. Data from six test pits in the Undetermined Cleanup Level (UCL) area of the process trenches was evaluated and excavation plans are nearly complete for this area.

Excavation of the North Process Pond (NPP) test trenches resumed on July 29 with the last of seven trenches in the NPP berm areas expected to be completed on August 11. Eight test pits in the NPP are slated to be excavated and sampled following the NPP trenches.

Efforts are underway to excavate the 618-4 Burial Ground, which include a data quality objective (DQO) and separate contingency planning. The 618-4 Burial Ground DQO team met during the last month and a draft 618-4 Burial Ground Data Quality Objectives Summary Report (BHI-01075) was prepared. The final report will be issued in August. Items identified during 618-4 Burial Ground Contingency Planning meetings are being evaluated and addressed in project documentation to support a readiness evaluation before initiating excavation scheduled in October.

Holographic ground penetrating radar (GPR) technology demonstration work was initiated on the 618-4 Burial Ground on August 4. Clearing and grubbing a test portion of the burial ground and a detailed scan using standard GPR was performed before implementing the holographic GPR testing. The results of the technology demonstration work are expected to facilitate the upcoming excavation of the burial ground. Holographic GPR technology provides three-dimensional images of the buried metallic objects.

300-FF-2 Operable Unit

Groundwater Sampling - Copies of field measurements and logbook pages from the June 25 groundwater sampling at well 699-S6-E4A were received and compared against previous sampling events. No unusual conditions were noted. Discussions have been initiated with Sampling and Analytical Services personnel regarding disposal of groundwater samples, and are ongoing with staff from BHI Field Engineering regarding disposal of the drummed waste from well 699-S6-E4A upgrade activities.

A visit to well 699-S6-E4A was conducted on July 15 with J. Carson and W. Frisbee from the THI Quality group to address findings that were expressed in an RL surveillance that was conducted in March 1997. This was a followup activity to verify that actions had been completed.

Other Activities - An update to the Scope of Work associated with addressing the potential for listed waste in 300-FF-2 waste sites was provided to the regulators as a result of a request made at the July Unit Managers' Meeting. Review of documents associated with this Scope of Work is currently underway.

In support of a request from the Burial Ground Strategy Team, a review of the MCACES model inputs for the 100 and 300 Area burial grounds is being conducted. Based on information that is currently available, it is likely that the burial ground model will be modified and estimates will be recalculated.

Comments were provided on a draft RL memorandum concerning the 300 Area Waste Acid Treatment System Treatment Storage and Disposal Unit.

August 18, 1997

Comment/Response
for the
Remedial Design Report/Remedial Action Work Plan for the 100 Area, Rev. 1, Draft A

EPA Comments:

1. **Page 2-6, Section 2.1.2.5, 1st paragraph**

The rational for why the 100 times rule is being applied to all contaminants should be provided. It is unclear by the text provided on when the RESRAD model will be used and when it will not be applied to help determine groundwater protection. Please clarify this section.

Response: **Comment accepted. The text will be modified to reflect the fact that the 100 times rule will be applied only to nonradioactive contaminants when modeling using RESRAD does not demonstrate that higher residual soil concentrations are protective of groundwater and the river. The 100 times rule will not be applied to radioactive contaminants. Rather, for radioactive contaminants, the RESRAD model will be used to determine residual soil concentrations that are protective of groundwater and the river (i.e., concentrations in soil that meet the groundwater/DAF remedial action goals in water and also meet a 4 mrem/yr dose). The text indicates that RESRAD was used to determine which residual contaminants in soil reach groundwater using the conceptual model identified in the RDR/RAWP. All references to applying the 100 times rule to radioactive contaminants will be removed. RESRAD will be used on a site-specific basis to determine which contaminants potentially impact groundwater and the river. The section will be revised to reflect this intent.**

2. **Page 2-9, Section 2.1.5, 1st paragraph**

This section discusses balancing factors and when they might be applied. It appears that #2 is incorrect. The statement currently reads that balancing factors will be invoked if residual contamination is present below the engineered structure. It should be modified to state that balancing factors may be invoked when residual contamination is left below the engineered structure is shown to impact groundwater or the Columbia River.

Response: **Comment accepted. (Note: this text was not revised from Rev. O) Text will be revised to: (2) where residual contamination is present below 4.6 m (15 ft) or below the engineered structure, and ...**

The first bullet in Section 2.1.5 will be revised to: Contaminant

concentrations below 4.6 m (15 ft) or below the engineered structure will be required to meet the criteria for protection of the groundwater and the Columbia River, as stated in RAO number 2 in Section 2.1. For residual contamination below 4.6 m (15 ft) or below the engineered structure shown to impact groundwater or the Columbia River, the balancing factors may be invoked.

3. **Page 2-22, Table 2-2**

The values shown for uranium 233/234, uranium 235, and uranium 238 appear to be incorrect for the soil concentration corresponding to 15 millirem. The values provided are extremely conservative. Please provide the rational for these look up values.

Response: **Comment noted. The single radionuclide soil concentration look up values corresponding to 15 mrem/yr dose for uranium isotopes presented in Table 2-2 are correct. The values are those determined using RESRAD and the input parameters identified for direct exposure. The input parameters used are identified in Table B-1 of Appendix B (p. B-3). The RESRAD output file identifying the look up values are in the RDR/RAWP calculation brief (0100X-CA-V0003) as part of the project file. The addition of 0.76 m/yr irrigation had an impact on these values.**

4. **Page 3-3, Section 3.1.4**

This section should be expanded to provide the rational on how debris will be sampled. This rational should also be provided in the Sampling and Analysis Plan.

Response: **Comment noted. (Note: this text was not revised from Rev. O) The sampling of debris is beyond the scope of this document and is determined through the DQO process leading up to the preparation of a Sampling and Analysis Plan. The current 100 Area SAP does not address burial ground sampling specifically; however, the same cleanup criteria would apply to the area once the anticipated cleanup has been completed and verification is needed. Sampling of debris would mainly be for waste profiling, not verification. ERC anticipates an update to the 100 Area SAP Instruction Guide will be needed to address the sampling of burial grounds for waste acceptance. This effort has already been started to address concerns at D Area and is currently in the form of a calculation brief.**

5. **Page 3-6, Section 3.2.2, last paragraph**

The ERDF ESD has been approved. This section should be updated to reflect this.

Response: **Comment accepted. (Note: this text was not revised from Rev. O) Text will be eliminated.**

6. **Page 3-10, Section 3.5 last paragraph**

Change the word goal to responsibility in the second to the last sentence.

Response: **Comment accepted. Text will be revised to: ... agency's responsibility is to determine...**

7. **Appendix B, Table B-1**

Input parameter for the thickness of the contaminated zone should be changed to footnote that this will be calculated using site specific data. In addition Appendix B should be expanded to provide the rational on how the thickness of the contaminated zone will be determined.

Response: **Comment accepted. Footnote will be added to table stating: "The thickness of the contaminated zone and the thickness of the uncontaminated zone will be determined on a site-specific basis for cleanup verification calculations."**

Text to be added to section 5.0 "ASSUMPTIONS": "The input values for the thickness of the contaminated zone and the thickness of the uncontaminated zone will be determined on a site-specific basis. If best available information (process knowledge, site characterization, monitoring data, or other sources) indicates contamination does not extend to ground water, half the distance from surrounding grade to groundwater for shallow zone verification, and half the distance from the bottom of the excavation to groundwater for deep zone verification will be used. If the same information indicates contamination does extend to groundwater, the input value for shallow zone verification will be the distance from surrounding grade to groundwater, and the distance from the bottom of the excavation to ground water for deep zone verification."

Ecology Comments

General Comments

1. The document is better organized than its predecessor. The text now flows in a logical

manner through the various steps of design and action operations.

Response: **Comment noted. Thank you.**

2. The planned use, implementation, and importance of institutional controls needs to be discussed in this document. These controls prohibit exposure in the rural residential scenario, reducing risk. The document also needs to acknowledge the importance of separation between soil contamination and ground water. The risks calculated from the rural residential scenario are limited by the inability of contaminants to migrate to ground water and by institutional controls. These factors need to be documented.

Response: **Comment noted. Sections refer to use (p.2-2 3rd. RAO), implementation (p. 2-9 sec. 2.1.5), importance (p. 2-10 first bullet). Further discussion of these would be possible through a sensitivity analysis of different institutional controls and how they would eliminate or reduce potential risk from exposure. This discussion is not planned at this time.**

Specific Comments

1. **Page 2-2, Section 2.1.1**, Remedial Action Objective (RAO) #2, the point of compliance was discussed in the ROD on pages 25 and 26 (EPA 1995). Please delete the reference to MTCA and the quotation of WAC 173-340-[6][b], then quote the ROD language in RAO #2 on the point of compliance.

Response: **Comment accepted. The text will be revised to: The ROD defines the point of compliance for soil cleanup levels protective of groundwater as *a designated point of compliance beneath or adjacent to the waste site in groundwater. The location and measurement of the point of compliance is to be defined by EPA and Ecology. Monitoring for compliance will be performed at the defined point* (EPA 1995, page 25).**

2. **Page 2-3, Section 2.1.2.1, first paragraph, first sentence**, add "from the grade surrounding the waste site and assuming the waste site will be completely backfilled." after "[15 ft]" inside the parentheses. This will document how the excavation to 15 feet is being defined.

Response: **Comment accepted. Agree it is important to point out where 4.6 m (15ft) begins but further discussion on backfill is needed.**

3. **Page 2-4, Section 2.1.2.2, second paragraph, third bullet**, delete "all." Drinking water ingestion should not be included because there is not a domestic water well in the exposure scenario.

Response: **Comment noted. (Note: this text was not revised from Rev. O) The residential scenario has always included the ingestion of groundwater. A quick sensitivity analysis has been performed (see below) to assess the impact of turning off this pathway. This has been considered part of the institutional controls (i.e. - no domestic wells) in previous reasoning. If this is indeed a consideration for the exposure scenario, the ERC would support the regulatory agencies in facilitating this revision.**

Not including the drinking water pathway or not allowing any use of contaminated groundwater increases the soil concentration corresponding to 15 mrem/yr for Tc-99 and the uranium isotopes by approximately 4 to 150 times.

4. **Page 2-6 and 2-7, Section 2.1.2.5**, the text is unclear exactly which contaminant standard will be used and where it will be applied. There is discussion on applying the 100 times ground water rule, but to which standard, MCL or AWQC? As an example, for Cr^{+6} the 100 times MTCA value for protection of groundwater in soil gives a value of 8.0 ppm. Yet the 100 times AWQC, times the 1:1 dilution factor gives a value of 2.2 ppm for protection of the Columbia River in soil. Will the most restrictive value for a given contaminant be applied to all waste sites?

Response: **Comment noted. No modification of the referenced text is necessary. The 100 times rule is applied to both the dilution-attenuation factor (DAF) remedial action goals for protection of the river and the groundwater remedial action goals for protection of groundwater. The current procedure is to apply the most restrictive value for a given contaminant in soil (p. 2-5 sec. 2.1.2.3 last sentence). However, if residual contamination below 4.6 m (15 ft) or below the engineered structure is shown to impact groundwater, and the balancing-factors process is used to determine that potentially impacting the groundwater is preferable to removing the residual contamination, then the value protective of the river would be applicable.**

The verification section of the text (Goal Attainment, section 3.6) will be revised to more fully explain the site close-out verification process including the requirements to meet remedial action goals protective of groundwater and the river, to meet 4 mrem/yr, and to use the 100 times rule when appropriate.

5. **Page 2-6, Section 2.1.2.5, first paragraph**, does applying the 100 times rule to radionuclides comply with the 4 mrem/yr MCL? Are the radionuclide specific DCGs less or more than the

100 times rule concentrations?

Response: **Comment accepted. Applying the 100 times rule to radionuclides does not necessarily comply with the 4 mrem/yr MCL. The radionuclide specific remedial action goals based on 1/25th of the DCG require lower concentrations in soil than those required by the 100 times rule. All references to applying the 100 times rule to radionuclides will be removed from the document. Associated values in Tables 2-5, 2-6, and 2-7 will be changed. See response to EPA comment #1.**

6. **Page 2-10, Section 2.1.5, third paragraph, third bullet**, how are the need for deed restrictions being recorded? How is risk of direct exposure being calculated?

Response: **Comment accepted. (Note: this text was not revised from Rev. O) Text will be added stating that the requirement for deed restrictions will be documented in the site close-out verification package based on RESRAD modeling. The ultimate implementation of deed restrictions will be dealt with in the public review process as indicated in the ROD.**

7. **Page 2-27, Table 2-7**, Second Remedial Action Objective - Protection of Groundwater/Columbia River, was some depth of clean soil between contamination and ground water assumed in calculating these numbers?

Response: **Yes, 6 meters of clean soil between contamination and groundwater was assumed in calculating which contaminants reach groundwater. The conceptual model applied is illustrated on page C-4 in Appendix C. The text will be revised to indicate that the model is a generic model applicable to the 100 Area, and the contaminated zone will be identified as 50% of the vadose zone below 4.6 m (15 ft). All references to 116-C-1 and the use of 6 meters will be removed.**

8. **Page 3-2, Section 3.1.2, first paragraph of the page, first sentence**, delete "soil."

Response: **Comment accepted. The word "soil" will be deleted from the text.**

9. **Page 3-5, Section 3.2.1.1, second sentence**, delete "above" insert "below."

Response: **Comment rejected. The word "above" is correct for the context of the sentence.**

10. **Page 3-13, Section 3.6.5, second paragraph**, unrestricted future use needs to include a

discussion of assumptions about institutional controls (e.g., well drilling prohibitions and excavation restrictions) when required because of direct exposure concerns.

Response: **Comment noted. (Note: this text was not revised from Rev. O) See response to Ecology general comment #2.**

11. **Page 3-21/22, Figure 3-3**, delete "(100 X DAF Remedial Action Goals)." When modeling calculates residual soil contaminant concentrations above the 100 times rule values as protective, DOE should apply them as remedial action objectives.

Response: **Comment noted. The comment is correct; for nonradioactive contaminants, if modeling calculates residual soil contaminant concentrations above the 100 times rule values, then those values should be used as remedial action goals. The figure will be revised to reflect the verification process in detail including the use of the 100 times rule for nonradioactive contaminants.**

Comparison of list of COCs and Methods.

DQO Table Appendix D, Attachment 1, DOE/RL 1995			Target Analytes per Table 5-7, DOE/RL 1995		Analytes of Interest, Table B-2, BHI-01052		Proposed Change for Table B-2, BHI-0-1052
Contaminant	PQL	Analytical Method	PQL (nonrad)or minimum dectection limites (rad)	Analytical Method	Target Quantitation Limit Soil	Analytical Method	Analytical Method
Inorganics	(mg/kg)		Metals				
Arsenic	10 or 0.3	GFAA/6010 (or 7060)	0.3	GFAA/7060	0.3 mg/kg	7060/6010	ICP 6010/ICPSupertrace 6010
Barium	1	ICP/6010	1	ICP/6010	1 mg/kg	6010	ICP 6010/ICPSupertrace 6010
Beryllium	1	ICP/6010	1	ICP/6010	1 mg/kg	6010	ICP 6010/ICPSupertrace 6010
Bismuth	TBD	AA	TBD	ICP/6010	TBD	6010	ICP 6010/ICPSupertrace 6010
Boron	10	ICP/6010	10	ICP/6010	10mg/kg	6010	ICP 6010/ICPSupertrace 6010
Cadmium	2	ICP/6010	2	ICP/6010	2 mg/kg	6010	ICP 6010/ICPSupertrace 6010
Chromium-VI (a)	2	ICP/6010	2	ICP/6010	2 mg/kg	6010	ICP 6010/ICPSupertrace 6010
Copper	2	ICP/6010	2	ICP/6010	2 mg/kg	6010	ICP 6010/ICPSupertrace 6010
Iron	10	ICP/6010	10	ICP/6010	10 mg/kg	6010	ICP 6010/ICPSupertrace 6010
Lead	10 or 0.3	ICP/6010 or 7421	10 (or 0.3)	ICP/6010 (Or 7421)	10 or 0.3 mg/kg	6010 or 7421	ICP 6010/ICPSupertrace 6010
Manganese	1	ICP/6010	1	ICP/6010	1 mg/kg	6010	ICP 6010/ICPSupertrace 6010
Mercury	0.1	AA/7471	0.1	AA/7471	0.1 mg/kg	7471/245.2(water)	CVAA 7471/245.2 (water)
Nickel	4	ICP/6010	4	ICP/6010	4 mg/kg	6010	ICP 6010/ICPSupertrace 6010
Potassium	500	ICP/6010	500	ICP/6010	500 mg/kg	6010	ICP 6010/ICPSupertrace 6010
Selenium	25 or 0.3	GFAA/6010 or 7740	25 (or 0.3)	GFAA/6010 (or 7740)	25 or 0.3 mg/kg	6010 or 7740	ICP 6010/ICPSupertrace 6010
Silver	20	ICP/6010	20	ICP/6010	20 mg/kg	6010	ICP 6010/ICPSupertrace 6010
Tin	50	ICP/7870	50	ICP/7870	50 mg/kg	7870	ICP 6010/ICPSupertrace 6010
Uranium (d)	TBD	ICP/6010			1.0 ug/g	TBD (total chem.)	ICP 6010/ICPSupertrace 6010 Target Quant. Limit =10ug/g
Vanadium	2	ICP/6010	2	ICP/6010	2 mg/kg	6010	ICP 6010/ICPSupertrace 6010
Zinc	2	ICP/6010	2	ICP/6010	2 mg/kg	6010	ICP 6010/ICPSupertrace 6010

CLP=Contract Laboratory Procedure
IC=Ion Chromotology
VOA=Volatile Organic Analysis
GCFID=Gas Chromatograph Flame Ionization Detector
(a) Cr-VI will be analyzed as total Cr
(b) Listed quantitation limits are for water. Quantitation limits are highly matrix dependent and will be higher in soils.

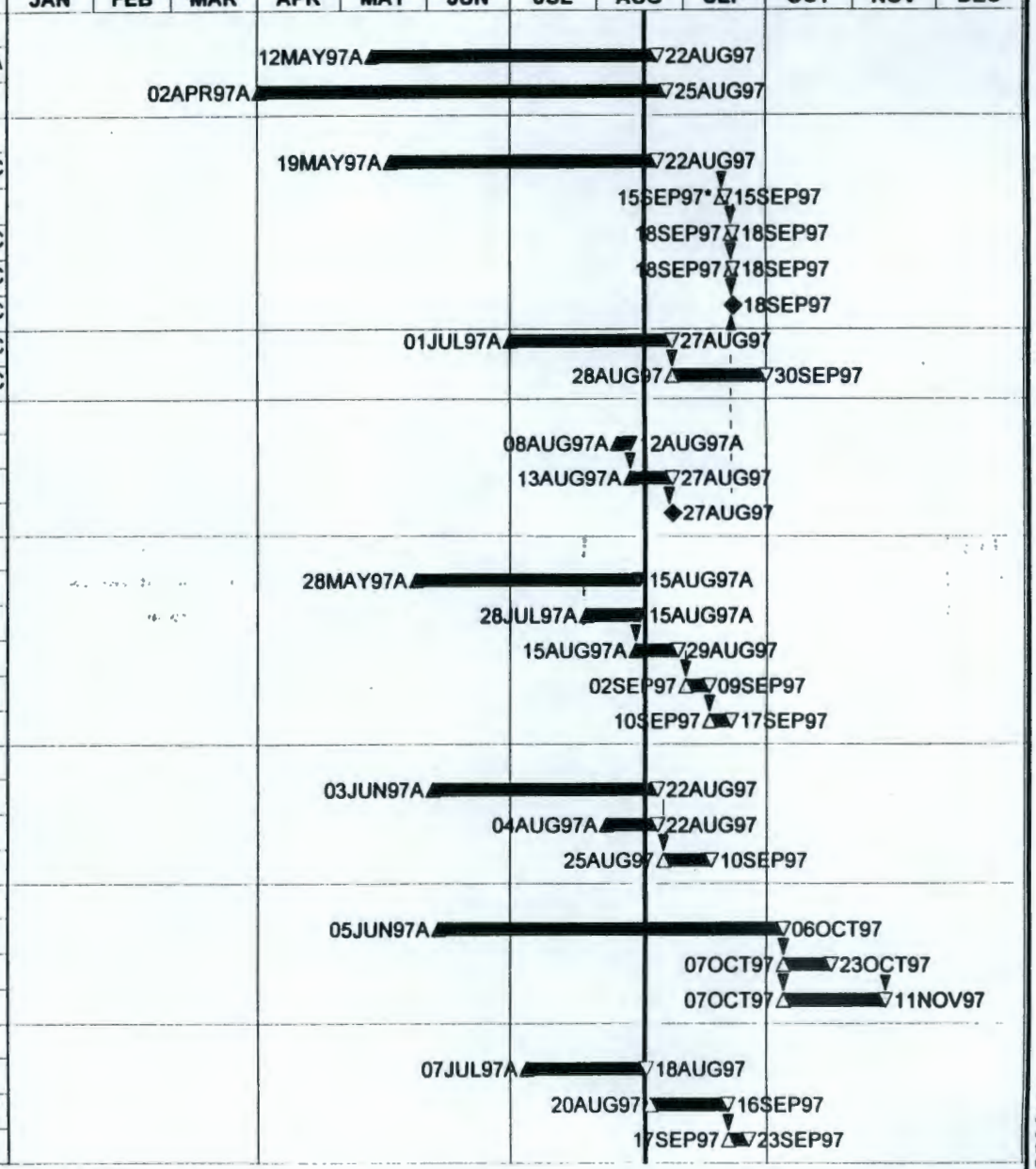
Attachment 6

Contaminant	PQL	Analytical Method	PQL (nonrad)or minimum dectection limits (rad)	Analytical Method	Target Quantitation Limit Soil	Analytical Method	Analytical Method
Other Inorganics	(ug/L)		Ions				
Acetate (from acetic acid)	TBD	8270 TIC	TBD (TIC)	Semi-VOA/8270	TBD	8270 (TIC)	8270 (TIC)
Ammonia	30 (b)	350.2	30	IC/350.2	TBD	350.2/350.1	350.1
Cyanide (total)	0.78 (b)	Colorimetric/CLP Metals/9010	0.8	Colorimetric/CLP Metals/9010	TBD	9010/320.3 (water)	9010
Fluoride	6 (b)	IC/300	51	IC/300 (water only)	-- (water only)	EPA 300/modified	IC 300 mod (water only)
Nitrate	51 (b)	IC/300 & 353	6	IC/300 and 353	1.0 mg/kg	EPA300 mod & 353	IC300 mod & 353.1
Nitrite (as N)	100 (b)	IC/300 & 353	100	IC/300 and 353	1.0 mg/kg	EPA300 mod & 353	IC300 mod & 353.1
Sulfate (from sulfuric acid)	150 (b)	IC/300	150	IC/300	TBD	EPA 300	IC300
Volatile Organics	(ug/kg)		Organics				
Acetone	10	VOA/8240	10	VOA/8240	10ug/kg	8240	8240
Butanol, 1-	TBD	8240 TIC	TBD (TIC)	VOA/8240	TBD	8240 (TIC)	8240 (TIC)
Butenone, 2- (ME)	10	VOA/8240	10	VOA/8240	10ug/kg	8240	8240
Carbon tetrachloride	5	VOA/8240	5	VOA/8240	5ug/kg	8240	8240
Chloroform	5	VOA/8240	5	VOA/8240	5ug/kg	8240	8240
Ethyl ether	TBD	8240 TIC	TBD (TIC)	VOA/8240	TBD	8240 (TIC)	8240 (TIC)
Methylene chloride	5	VOA/8240	5	VOA/8240	5 ug/kg	8240	8240
Toluene	5	VOA/8240	5	VOA/8240	5 ug/kg	8240	8240
Trichloroethane, 1,1,1-	5	VOA/8240	5	VOA/8240	5 ug/kg	8240	8240
Trichloroethane, 1,1,2-	5	VOA/8240	5	VOA/8240	5 ug/kg	8240	8240
Semivolatile Organics	(ug/kg)						
Formaldehyde	TBD	8270 TIC	TBD (TIC)	Semi-VOA/8270	TBD	8270 (TIC)	8270 (TIC)
Hydrazine		Will not be analyzed					
Kerosene	5000	8270 TIC	5000	Semi-VOA/8270	5,000 ug/kg	8270 (TIC)	8270 (TIC)
PCBs	21 or 33	8080 (1242-21; all others = 33)	33	Semi-VOA/8080	21 or 33 ug/kg	8080	8080
Tributyl phosphate	TBD	8270 (special calibration)	TBD	Semi-VOA/8270	TBD	8270	8270
Naphthalene	660	8270	660 (special calib. req.)	Semi-VOA/8270	660 ug/kg	8270	8270

CLP=Contract Laboratory Procedure
IC=Ion Chromotology
VOA=Volatile Organic Analysis
GCFID=Gas Chromatograph Flame Ionization Detector
(b) Listed quantitation limits are for water. Quantitation limits are highly matrix dependent and will be higher in soils.

Contaminant	MDA	Analytical Method	PQL (nonrad)or minimum dectection limites (rad)	Analytical Method	Target Quantitation Limit Soil	Analytical Method	Analytical Method
Radionuclides	(pCi/g)		Radionuclides				
Gross Alpha	10.00	Gas Proportional	--	Gas proportional	10 pCi/g	900.0M (soil)/900 (water)	Gas Prop. Lab SOP
Gross Beta	15.00	Gas Proportional	--	Gas proportional	15.0 pCi/g	900.0M (soil)/900 (water)	Gas Prop. Lab SOP
Cesium-137 (Ba-137m)	0.10	Gamma Spectrometry	0.1	Gamma Spec/D3649M	0.1 pCi/g	D3649M (Barium-134)	Gamma Spec Lab SOP
Cobalt-60	0.05	Gamma Spectrometry	0.05	Gamma Spec/D3649M	0.05 pCi/g	D3649 M	Gamma Spec Lab SOP
Europium-152	0.10	Gamma Spectrometry	0.1	Gamma Spec/D3649M	0.1 pCi/g	D3649 M	Gamma Spec Lab SOP
Europium-154	0.10	Gamma Spectrometry	0.1	Gamma Spec/D3649M	0.1 pCi/g	D3649 M	Gamma Spec Lab SOP
Europium-155	0.10	Gamma Spectrometry	0.1	Gamma Spec/D3649M	0.1 pCi/g	D3649 M	Gamma Spec Lab SOP
Uranium-235 (Pa-231)	1.00	Gamma Spectrometry	1.0	Gamma Spec/D3649M			Gamma Spec Lab SOP
Americium-241	1.00	Alpha Spectrometry/gamma spec	1.0	Alpha Spec/Am-01	1 pCi/g	Am-01 (water)/Am-02 (water)	Alpha Spec Lab SOP
Curium-244	1.00	Alpha Spectrometry	1.0	Alpha Spec/907.0M or may use gamma spec.	1.0 pCi/g	907.0 M/907.0(water)	Alpha Spec Lab SOP
Neptunium-237	1.00	Alpha Spectrometry	1.0	Alpha Spec/907.0M	1.0 pCi/g	907.0M/907.0(water)	Alpha Spec Lab SOP
Plutonium-238	1.00	Alpha Spectrometry	1.0	Alpha Spec/Pu-02	1.0 pCi/g	Pu-02/Pu (water)	Alpha Spec Lab SOP
Plutonium-239/24	1.00	Alpha Spectrometry	1.0	Alpha Spec/Pu-02	1.0 pCi/g	Pu-02/Pu (water)	Alpha Spec Lab SOP
Plutonium-241	15.00	Alpha Spectrometry	15.0	Alpha Spec/Pu-02	15.0 pCi/g	Pu-02/Pu (water)	Liq Scint. Lab SOP
Thorium-228	1.00	Alpha Spectrometry	TBD	Alpha Spec/	TBD	Alpha Spec	Alpha Spec Lab SOP
Thorium-230	1.00	Alpha Spectrometry	1.0	Alpha Spec/	1.0 pCi/g	Alpha Spec	Alpha Spec Lab SOP
Thorium-232	1.00	Alpha Spectrometry	1.0	Alpha Spec/	1.0 pCi/g	Alpha Spec	Alpha Spec Lab SOP
Uranium-233/234	1.00	Alpha Spectrometry (most measured)	TBD	Alpha Spec/U (by counting Pa-231)	TBD	U-04/908.0 (water)	Alpha Spec Lab SOP
Uranium-235 (Pa-231)	1.00	Alpha Spectrometry	1.0	Alpha Spec/U (by counting Pa-231)	TBD	U-04/908.0 (water)	Alpha Spec Lab SOP
Uranium-236	1.00	Alpha Spectrometry	TBD	Alpha Spec/	TBD	U-04/908.0 (water)	Alpha Spec Lab SOP
Uranium-238	1.00	Alpha Spectrometry	TBD	Alpha Spec/U	TBD	U-04/908.0 (water)	Alpha Spec Lab SOP
Iodine-129	2.00	Beta Counting	2.0	Beta Count./902.0M	2.0 pCi/g	902.0M/902.0(water)	Beta Cnt Lab SOP
Strontium-90 (Y-90)	1.00	Beta Counting	1.0	Beta Count./SR-02	1.0 pCi/g	Sr-02 (Yttrium-90)	Beta Cnt Lab SOP
Technetium-99 (Y-90)	15.00	Beta Counting	15.0	Beta Count./TC-01M	15.0pCi/g	Tc-01 M/Tc-01(water)	Beta Cnt Lab SOP
Selenium-79	5.00	Beta Counting	5.0	Beta Count./	10.0 pCi/g	Beta Counting	Beta Cnt Lab SOP
Samarium-151		No known method	TBD	Beta Count./	TBD	TBD	NA
Carbon-14	50.00	Liquid Scintillation	50	Liquid Scint./C-01 (water only)	--	C-01 (water)	Liq. Scint. Lab SOP (water only)
Tritium (H-3)	400.00		400	Liquid Scint/906.0 (water only)	--	906.0 (water only)	Lab SOP (water only)

Activity ID	Activity description	% CPT	Rem Dur	RESP
STARTUP / MOBILIZATION				
655	PUNCHLIST SUBCONTRACTOR FACILITY	99	5	DURANCEA
695	2.1 DESIGN WORK / SUBMITTALS	99	6	WESTON
READINESS EVALUATION				
1130	PERFORM ASSESSMENTS of BG618-4	40	5	WILSON,RC
1131	READINESS EVALUATION - DRY RUN	0	1	
1132	READINESS EVAL MEET - BG618-4	0	1	WILSON,RC
1134	READINESS EVAL SITE VISIT - BG618-4	0	1	WILSON,RC
1136	DOE Issue Auth to Start Work on BG618-4	0	0	WILSON,RC
1140	PREPARE READINESS EVALUATION REPORT	95	8	WILSON,RC
1145	CLOSEOUT POST-START PUNCHLIST ITEMS	0	23	WILSON,RC
WASTE MANAGEMENT				
1330	ISSUE AND REVIEW SSWMI FOR BG 618-4	100	0	WOLF
1350	INCORPORATE COMMENTS	0	8	WOLF
1380	ISSUE SSWMI	0	0	WOLF
EM-50 DEMONSTRATION PROGRAM				
1230	SUPPORT COLD OPERATION TEST	100	0	APRIL
1260	SUPPORT HOT TEST AT BG618-4	100	0	APRIL
1275	DRAFT TECH MEMO OF RESULTS	5	10	APRIL
1280	REVIEW TECH MEMO	0	6	APRIL
1285	FINALIZE TECH MEMO	0	6	APRIL
BURIAL GROUND DQO				
1420	7-Step DQO process (external)	95	5	CARLSON
1435	Incorp Comments & issue DQO report	80	5	CARLSON
1455	Desk Instruction for Sampling (inc. Rev.)	0	12	CARLSON
CLOSURE CERTIFICATION OF APT				
1450	EVALUATE CLOSURE DATA/SITE VISITS	55	35	LATA
1460	PREPARE INDEPENDENT CERTIFICATION	0	13	LATA
1470	SUBMIT CLOSURE CERTIFICATION	0	26	LATA
PROCESS TRENCHES				
1601	Excavate Spoils Pile Area (PI 2.4)	89	1	WESTON
1602	Excavate Undetermined Area	0	19	WESTON
1622	Remove/Demolish/Dispose of Blockhouse	0	5	WESTON



Project Start	28AUG95	Early Bar
Project Finish	05OCT99	Progress Bar
Data Date	18AUG97	Critical Activity
Run Date	20AUG97	

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300B

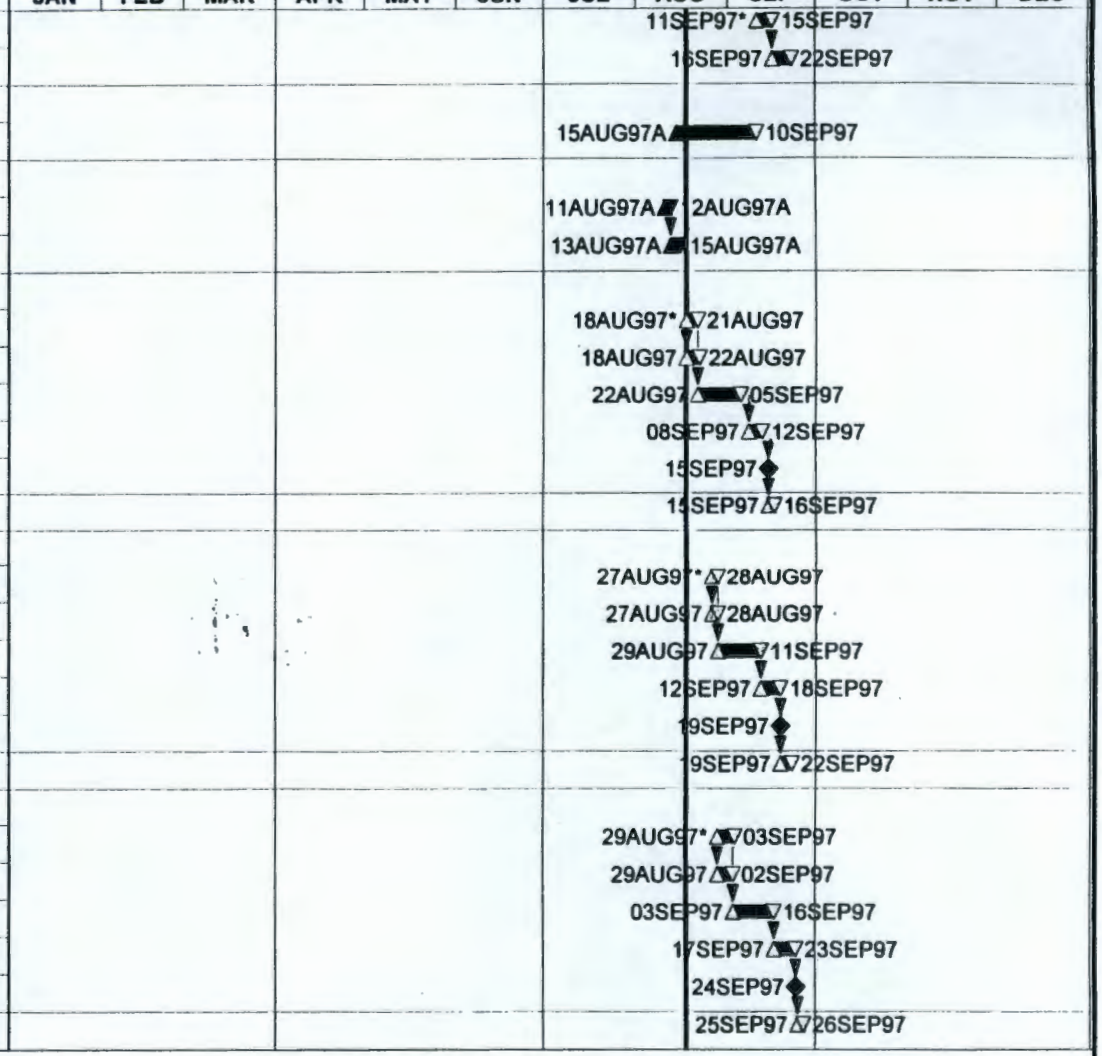
Sheet 1 of 2

300 AREA REMEDIAL ACTION
300-FF-1
STATUS AS OF August 18, 1997

Date	Revision	Checked	Approved

Attachment 7

Activity ID	Activity description	% CPT	Rem Dur	RESP
1625	Remove/Demolish/Dispose of Birdscreens	0	3	WESTON
1627	Remove/Demolish/Dispose of Headworks	0	5	WESTON
TEST TRENCHING				
1677	South Process Pond	7	18	WESTON
TEST PITS				
1695	North Pond Scaping Area	100	0	WESTON
1697	Ash Pits	100	0	WESTON
300-10 SITE				
1800	Field Monitoring, Screening, Sampling	0	4	CARLSON
1805	Perform Excavation and Material Handling	0	5	WESTON
1810	Offsite Lab Analysis for Verification (2)	0	10	CARLSON
1815	Data Evaluation	0	5	CARLSON
1820	Receive Approval to Backfill	0	0	CARLSON
1825	Backfill and Regrading	0	2	WESTON
300-44 SITE				
1700	Field Monitoring, Screening, Sampling	0	2	CARLSON
1705	Perform Excavation and Material Handling	0	2	WESTON
1710	Offsite Lab Analysis for Verification (2)	0	9	CARLSON
1715	Data Evaluation	0	5	CARLSON
1720	Receive Approval to Backfill	0	0	CARLSON
1725	Backfill and Regrading	0	2	WESTON
300-45 SITE				
1900	Field Monitoring, Screening, Sampling	0	3	CARLSON
1905	Perform Excavation and Material Handling	0	2	WESTON
1910	Offsite Lab Analysis for Verification (2)	0	10	CARLSON
1915	Data Evaluation	0	5	CARLSON
1920	Receive Approval to Backfill	0	0	CARLSON
1925	Backfill and Regrading	0	2	WESTON



Field Screening For Volatile Organic Compounds at 300-FF-1

August 19, 1997

Volatile organic compounds (VOC) are qualitatively measured in soils excavated from the 300-FF-1 remediation sites. Approximately 100 grams of soil is put into a clean plastic bag and sealed shut by tying a knot in the end of the bag. Before the bag is sealed approximately 1 liter of ambient air is trapped in the bag. The soil is shaken vigorously for about 30 seconds and then the entrapped air is screened for VOCs in the headspace contributed from the soil sample. This method has been shown to be an effective method for qualitatively detecting VOCs in soil.

The headspace vapors are screened using an OVA 128 organic vapor analyzer. The OVA uses a flame ionization detector (FID) which has been calibrated to methane gas. The FID is a sensitive, multi-purpose detector and will detect any vapor that can be ionized (burned) by the hydrogen flame. The results are reported as total VOC in parts-per-million (ppm)/methane equivalent. The units are methane-equivalent because the instrument is calibrated to methane.

Soil headspace vapors containing greater than 5.0 ppm total VOC (methane equivalent) were also analyzed using a Photovac 10S Plus portable gas chromatograph (GC) calibrated to detect three chlorinated organic compounds of interest for the 300-FF-1 site. These compounds are cis-1,2-dichloroethylene (DCE), trichloroethylene (TCE), and perchloroethylene (PCE). To date, less than 1.0 ppm of perchloroethylene was identified in the soils using this GC method. In addition, ppm levels of chloroform was tentatively identified in one set of samples. No other peaks have been detected. Methane is not readily detected by the GC method. The total VOC measurements obtained with the OVA are therefore assumed to be methane.

This is a reasonable assumption. The soils in question were dredged from the bottom of a liquid trench containing a large amount of organic material and stockpiled at the end of the trench. The stockpiled soils were then excavated, wetted to suppress dust, and put into smaller stock piles which are loaded into the transport containers. These conditions are conducive to aerobic decomposition of the organic materials in the soil. Evolution of methane and other related landfill gases would be expected under these conditions (similar to composting or land farming).

X-Ray Fluorescence (XRF) Field Screening Units of Measurement Used at 300-FF-1

August 19, 1997

Field screening measurements at the 300-FF-1 site have been conducted according to ERC Interoffice Memorandum #047452, Screening with Portable XRF Units for the 300-FF-1 Remedial Action Project[1]. The following information briefly describes the method and the units of measurement used for XRF field screening measurements at 300-FF-1.

A qualitative model was developed to screen for arsenic (As), thallium (Tl), uranium (U) and other elements at the 300-FF-1 site. The model compares the XRF spectra obtained from each unknown sample with the average of several similar XRF measurements obtained from background soil samples collected from the 300-FF-1 area. This model provides an indication of the relative amounts of various elements present in the soil samples.

Six background samples were collected, prepared, and analyzed from surface soils within the 300-FF-1 remedial action region. This generated a set of background data for each of the 256 channels (spectra) used per XRF source. Broad windows or regions of consecutive channels that include energy ranges corresponding to the analytes of interest were then defined for the two excitation sources. The sources, channels, and corresponding energy ranges are listed in Table 1. Additional information can be obtained from the referenced memo. The end result was a set of site-specific background count rate measurements for each analyte window and source combination of interest.

The concentration of a particular analyte in a sample is directly proportional to the net counts (X-rays) detected in a specific region of the X-ray spectrum. Results in each region of the spectrum are determined by comparing the empirically derived, site-specific background mean count rate with the count rate measured from the specific sample being analyzed. Positive results are reported in terms of the standard deviation of the background data set. The units, Relative Deviation, represent standard deviations from the empirical baseline mean, where:

$$RelativeDeviation = (X - \overline{X})/s$$

Again, the concentration of an element in a sample is proportional to the net counts in a specific region of the measured X-ray spectrum. This qualitative model does not correct for spectral overlap or background measurement interferences. The ability to distinguish between closely related elements is related to the resolution of the measurement system and matrix affects, like other element concentrations. Other elements that emit characteristic fluorescence in the selected spectral regions could cause an increase in gross counts or response.

Table 1. Element Range Names and Background Parameters

Element Range Name	Source	Energy Range (keV)	Elements Detected Include	Average Count Rate (c/s)	Count Rate Std. Deviation (c/s)
Cr	Cm-244	4.96--5.56	Ba, Cr	58.26	5.57
Fe	Cm-244	5.62--7.31	Fe	596.67	46.97
Cu	Cm-244	7.37--9.30	Cu	139.78	7.96
As	Cm-244	9.36--11.64	As, Se, Hg, Tl, Pb	100.28	1.88
Cd	Am-241	20.08--25.12	Ag, Cd	193.17	5.47
U	Am-241	12.51--18.08	U	207.44	5.44

1. J.A. Lerch to M.J. Galgoul, ERC Interoffice Memorandum #047452, Screening with Portable XRF Units for the 300-FF-1 Remedial Action Project, June 19, 1997.

052080

Distribution
Unit Managers' Meeting: Remedial Action Unit/Source Operable Units
100, 200, and 300 Areas

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