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100 AREA UNIT MANAGERS' MEETING MINUTES

129623

Groundwater / Remedial Action Unit / Source Operable Units

July 28, 2005

DISTRIBUTION

DOE-RL

John Sands	A3-04
Arlene Tortoso	A6-38
Jamie Zeisloft	A3-04

ECOLOGY

John Price	H0-57
Noel Smith-Jackson	H0-57

EPA

Dennis Faulk	B1-46
Larry Gadbois	B1-46

FH

Jane Borghese	E6-35
Ronald Jackson	E6-35
Scott Petersen	E6-35

PNNL

John Fruchter	K6-96
Mary Hartman	K6-96
Robert Peterson	K6-75

WCH

Mark A. Buckmaster	X9-07
Jack Donnelly	X0-17
Scott Parnell	X5-57
Mike Schwab	H0-23
Dean Strom	X3-40
Steve Weiss	H0-23

ADMIN RECORD

Debbie Isom - (2 copies)	H6-08

Please forward distribution list changes to *Sharon Black* WCH (H0-19)

100-BC-5
100-FR-3
100-HR-3
100-KR-4
100-NR-2

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100 AREA UNIT MANAGERS' MEETING MINUTES

Groundwater / Remedial Action Unit / Source Operable Units

July 28, 2005

TRANSMITTAL / APPROVAL

APPROVAL: _____ Date 6/8/06

Chris Smith / Jamie Zeisloft, RL (A3-04)
100 Area Unit Managers

APPROVAL: _____ Date 06/08/06

Michael Thompson / Arlene Tortoso, RL (A6-38)
Waste Management Division

APPROVAL: _____ Date 6/08/2006

John Price, Ecology (H0-57)
100 Aggregate Area Unit Manager

APPROVAL: _____ Date _____

Larry Gadbois, EPA (B5-01)
100 Aggregate Area Unit Manager

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The attached 7/28/05 UMM Meeting Minutes are comprised of the following:

Attachment 1	-	July Agenda and Open Action Items
Attachment 2	-	Attendance Sheet
Attachment 3	-	Meeting Minutes and New Action Items
Attachment 4	-	Groundwater Operable Unit Status
Attachment 5	-	100-KR-4 Treatability Test and Test Startup
Attachment 6	-	Influence of Nitrate Reduction on the 100D Area ISRM Barrier Longevity and Nitrate Plume in 100D Area
Attachment 7	-	Jack Donnelly email on Asbestos Paragraph
Attachment 8	-	Jack Donnelly –100F Staging Pile Maps
Attachment 9	-	100N Color Coded Design
Attachment 10	-	Dean Strom Map100 B/C Area
Attachment 11	-	Rev. 0 – Treatment Plan for Treatment of 100-C-7 Remaining Pipelines and Sewers (RPAS) Chromium Contaminated Soils
Attachment 12	-	100 Area Burial Ground in Process Soil Sampling

Prepared by: Sharon Black 8/8/06

Sharon Black *for Pat Ellsworth* (H0-19) Date

Regulatory Integration and Outreach Admin

Concurrence by: _____ _____

Richard A. Carlson (X0-17) Date

BHI Remedial Action Project

100 AREA UNIT MANAGERS' MEETING

Groundwater/ Remedial Action Unit / Source Operable Units

July 28, 2005

ATTACHMENT 1

July Agenda and Open Action Items

Attachment 1

100 AREA UNIT MANAGERS' MEETING AGENDA

Thursday, July 28, 2005, 1:00 – 3:00 p.m.

Hanford Square II, Room 20

ADMINISTRATIVE

- ***Next 100 Area UMM*** –

  Thursday, August 25, 2005, at the Washington State Department of Ecology (Ecology) Building, Conference Room A/B

- ***Review Action Items***

  - ***Ron Jackson, FH***, will send an e-mail to Arlene Tortoso, RL, giving more information about installation of smaller diameter ISRM wells.

  - ***Jamie Zeisloft, RL***, will make Leif Erickson, RL, aware of Ecology's concerns regarding the Orphan site work scope not being included in the River Corridor Contractor

GROUNDWATER

- ***Aquifer Sampling Tube Task: 100/300 Areas***

  Status of Current Activities

  Planning for FY 2006

- ***100-NR-2 Groundwater Operable Unit***

  Remediation Treatment Status

- ***100-KR-4 Groundwater Operable Unit***

  Remediation Treatment Status

  Calcium Polysulfide Treatability Test Status

  K-Basins Monitoring

  Decommissioning of KE Basin wells

- ***100-HR-3 Groundwater OU***

  Remediation Treatment Status

  Summary of ISRM Sampling Event

  Nitrate Reduction in the ISRM Barrier (Jim Szecsody, PNNL)

- ***100-BC-5 Groundwater OU***

  Monitoring Status

- ***100-FR-3 Groundwater OU***

  Monitoring Status

REMEDIAL ACTION

- ***100 Area Common***

  Remaining Sites Sampling Efforts Status

  Cleanup Verification Packages/Remaining Sites Verification Packages (CVP/RSVP)

  Status Explanation of Significant Difference

  -Status of Current Activities (Chuck Hedel)

  Design Status

  Agreement on Asbestos Language for the 100Area RDR (Jack Donnelly)

- ***100-F, -K, and Group 4***

  100-F General Status

  -Approval of waste staging Locations (Jack Donnelly)

  100-K General Status

- ***100-N***

  General Status

  Verification Sampling Approach at 116-N-1 (Jack Donnelly

  Installed Fencing at 116-1, Discuss Future Options (Jack Donnelly)

- ***100 B/C***

  Burial Ground Status

  Remaining Sites Status

  Remaining Sites Pipelines and Sewers Status (RPAS)

  Approval of Lead and Chromium Treatment Plans (Jack Donnelly)

  Process Soil Sampling at Burial Grounds, Discuss Proposed Change (Jack Donnelly)

D&D FACILITIES DECOMMISSIONING PROJECT

- ***Status***

RISK ASSESSMENT AND SITE CLOSURE PROJECT

- ***100-B/C Pilot Risk Assessment***

- ***100/300 Area Risk Assessment***

- ***River Corridor Risk Assessment***

GENERAL CROSSOVER ITEMS

- ***100-F Orphan Site Evaluation*** ***(Mike Schwab)***

100 AREA UNIT MANAGERS' MEETING

Groundwater/ Remedial Action Unit / Source Operable Units

July 28, 2005

ATTACHMENT 2

Attendance Sheet

Remedial Action and Waste Disposal Unit Managers' Meeting
Official Attendance Record – 100 Area
July 28, 2005

Please print clearly and use black ink

PRINTED NAME	ORGANIZATION	O.U. ROLE	TELEPHONE
Richard Heggen	Ecology		372-7906
Larry Gadbois	EPA		376-9884
John Price	Ecology	Proj. Mgr	372-7921
Edward Gonsalves	BHI/ERC		539-2296
Ron Jackson	FH	TL	373-3599
Jane Borghese	FH	GW	373-3804
Van J Omson	FH	TL	373-3987
Arlene Tortoso	DOE	GW UMM	373-8631
Dennis Faulk	EPA		
Mark Buckmaster	BHI		521-2089
Kevin Baker	BHI	PMO	521-0877
Scott Petersen	FH		372-9126
Mike Schwab	BHI	Site Closure	372-9407
Jamie Zeeslaff	DOE	100-K/D	372-0189
John Sands	DOE	RI/FS Assessment	372-2282
Jack Donnelly	BHI	PEL	373-9299
Robert Hynes	BHI	WMGT	521-2098

Remedial Action and Waste Disposal Unit Managers' Meeting
Official Attendance Record – 100 Area
July 28, 2005

Please print clearly and use black ink

PRINTED NAME	ORGANIZATION	O.U. ROLE	TELEPHONE
Bob Peterson	PNNL	100-KR-4	373-9020
Steve Weiss	BHI	100/300 Risk Assess	372-9495
Neil Smith-Jackson	ecology	100-N Chemist	372-7926
Mary Hartman	PNNL	Groundwater	373-0028
John Fruchter	PNNL	"	376-3937
D.N. Strom	CHI	100-BC RE	373-5519
Scott Parnell	CHI	100-N T.L.	373-9975

100 AREA UNIT MANAGERS' MEETING

Groundwater/ Remedial Action Unit / Source Operable Units

July 28, 2005

ATTACHMENT 3

Meeting Minutes and New Action Items

100 AREA UNIT MANAGERS' MEETING MINUTES

Groundwater / Remedial Action Unit / Source Operable Units

JULY 28, 2005

ADMINISTRATIVE

- ***Next 100 Area Unit Manager Meeting (UMM)***

  The next UMM will be held Thursday, August 25, 2005, at the Washington State Department of Ecology Building

- ***Review June Action Items***

  - ***Ron Jackson, Fluor Hanford (FH)*** will send an e-mail to Arlene Tortoso, Department of Energy, Richland (RL) giving more information about installation of smaller diameter In situ REDOX Manipulation (ISRM) wells.

  - ***Jamie Zeisloft (RL)*** will make Leif Erickson (RL) aware of Ecology's concerns regarding the Orphan site work scope not being included in the River Corridor Contract (RCC).

GROUNDWATER

- ***Aquifer Sampling Tube Task: 100/300 Areas***

  - ***Status***: Will meet with regulators the end of August to agree on next year's schedule. The aquifer tube report should be ready for the meeting.

  - ***Planning for FY 2006:*** The meeting for FY 2006 planning is scheduled for August 22 at 1:00 PM.

- ***100-NR-2 Groundwater Operable Unit (OU)***

  - ***Remediation Treatment Status***: Vern Johnson (FH) stated efficiency was less than 90%. The loss of efficiency is due to lower quality Clino. A new batch of clino has been ordered from the old supplier (Ash Meadows) -- Status provided in ***Attachment 4***.

  - ***Remedial Design Report/Remedial Action Work Plan (RDR/RAWP)*** is being updated. The RDR/RAWP will include the treatment test plan as an appendix. The ecological risk assessment a Record of Decision (ROD) requirement is due in October.

    Dennis Faulk, U. S. Environmental Protection Agency (EPA), stated that due to the sensitive nature of the report, the regulators need to be given a look at or status of the report so they can make recommendations prior to sending the report to the Trustees for review.

John Price (Ecology) stated that they should receive the report by 5:00 PM on October 31, prior to sending to the Tri Party Agreement (TPA) Administrative Record.

- ***100-KR-4 Groundwater Operable Unit***

  - ***Remediation Treatment Status***: -- Status provided in ***Attachment 5***

  - ***Calcium Polysulfide Treatability Test Status***

    Scott Petersen (FH) presented the results of the 100-KR-4 Treatability Test -- Status provided in ***Attachment 5.***

  - ***K-Basins Monitoring***

    The draft quarterly report will be issued soon.

  - ***Decommissioning of KE Basin Wells***

    Some KE wells may be removed due to the KE Basin demolition.

- ***100-HR-3 Groundwater OU***

  - ***Remediation Treatment Status*** -- Status provided in ***Attachment 4***

  - ***Summary of ISRM Sampling Event*** -- Status provided in ***Attachment 4***

  - ***Nitrate Reduction in the ISRM Barrier*** -- Status provided in ***Attachment 6.***

  - John Price, Ecology, stated that D Area will be a high priority. The fiscal year (FY) 05, 06 work should focus on D Area, some work may need to be moved forward.

- ***100-BC-5 Groundwater OU***

  - Monitoring Status - Dennis Faulk (EPA) stated the BC-5 Waste Control Plan (WCP) was approved by EPA.

- ***100-FR-3 Groundwater OU***

  - Monitoring Status - nothing new to report.

REMEDIAL ACTION

- ***100 Area Common***

  - ***Remaining Sites Sampling Efforts Status:*** Lorna Dittmer (ERC) stated that sampling should begin in D-Area in October, pending Ecology's agreement. A closeout status letter is all that remains to complete for 100-F Area Remaining Sites. The 100-F liquid sites are in Design.

  - ***Cleanup Verification Packages/Remaining Sites Verification Packages (CVP/RSVP)*** Status: 100-B-16, 128-C-1 is in review; Dennis Faulk needs a new copy.

  - ***Design Status:*** IU-2/6 Request for Proposals (RFPs) will be issued in mid-August.

  - Dennis Faulk (EPA) stated that EPA and Ecology are still interested in taking splits during sampling. They would like to know if things will be the same as they are now under the new contract. If the process is to change, they will need to be notified.

  - Jack Donnelly (ERC) stated that the Explanation of Significant Difference (ESD) is on hold pending the Ecology and EPA meeting on August 15 to discuss the new Model Toxics Control Act (MCTA), but that comments by EPA Region 10 have been received. Comments will be reviewed and incorporated. Also, as a result of the new contract additional waste sites may need to be added to the ESD so the additional time to evaluate MTCA will allow for additional time in assessing the need to add more waste sites. .

  - Jack Donnelly (ERC) presented emails from EPA and Ecology agreeing to the following wording on how to handle asbestos piping *(See **Attachment 7**)*. This wording will be inserted in the next update of the 100 Area RDR/RAWP.

    Approach for Addressing Asbestos Piping in 100 OU's
    "Asbestos is identified in the 100 Area as a 'waste media' anticipated to be unearthed and disposed during remedial action of the 100 Area Operable Unit (OU) waste sites. In fact, this is a true statement. Excavation of waste containing contaminated (friable and non-friable) asbestos is being removed and disposed to Environmental Restoration Disposal Facility (ERDF). This paragraph is written to clarify the ROD requirements for asbestos found in the shallow zone that is not contaminated and is a non-friable form. This situation exists at 100 Area OU's where there are miles of underground pipelines that previously transported steam (100 B/C), water, or other non-hazardous liquids that either contain or are wrapped in asbestos media in non-friable form (i.e., asbestos in the pipe matrix, asbestos wrapped [asbestos impregnated in tar paper], etc.). It is in these cases, where there is no Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) hazardous waste associated with the pipelines other than asbestos in a non-friable form, that clarification is requested that remediation of such pipelines is not required."

- ***100-F, -K, and Group 4***

  - Mark Buckmaster (ERC) stated things are going well, they will start hauling to ERDF next week.

  - A set of emails from EPA approving the waste staging piles, and maps outlining the locations of the waste staging piles for the 100-F Area waste sites. These waste staging pile location maps as well as the revised 118-F-5 waste staging pile location map were approved by EPA. -- Status provided in ***Attachment 8***.

  - ***100-K General Status***: Still working in the mile long trench chasing plumes. Expecting backfill concurrence for 116-KE-4 remaining pipelines next week. The trench will be completed in September, after which the site will be revegetated.

- ***100-N***

  - ***General Status***: Scott Parnell (ERC) reported the Detailed Work Plan (DWP) tonnage was met in July. A new plume was discovered along the wall of the crib. He is looking to use the budget for sampling to cover the costs and put funding for sampling in next fiscal year. A cultural resource review to remove the *Mooli Mooli* is at DOE and is expected to go to Washington State Historic Preservation Office (SHPO) very soon. A one week turnaround is expected from SHPO. Scott Parnell (ERC) is the task lead for this month, John Fancher will become task lead on August 27.

  - ***Verification Sampling Approach at 116-N-1*** Jack Donnelly (ERC) documented Ecology's approval to include a portion of the 116-N-1 pipeline that has been remediated with the 116-N-1 crib sample design versus having a separate pipeline sample design as required by the Sampling and Analysis Plan (SAP). Additionally, sampling for the UPR-31 will be deferred to when the UPR-31 plumes can be excavated, which was also agreed to by Ecology. -- Status provided in ***Attachment 9***

  - ***Installed Fencing at 116-1- Discuss Future Options***, Jack Donnelly (ERC) stated that there was discussion on the project as to what the basis is for removing the clean fence surrounding the perimeter of 116-N-1. Jack indicated that there appeared to be no real reason or basis from research, but there appeared to be more reason for leaving it in anticipation of future institutional controls. Jack Donnelly (ERC) stated the permit requires the removal, but asked if Ecology could revise the language in the upcoming Permit renewal to make it more flexible. This would save money by not doing a Permit Modification solely for this type of activity. John Price (Ecology) indicated this could be accomplished and seemed reasonable. John requested an email next week outlining proposed language

  - Jack Donnelly (ERC) mentioned that other sampling efficiencies at 116-N-1 are being considered and included the use of Gamma Energy Analysis (GEA) for americium-241 versus alpha energy analysis, as well as removing tritium as a contaminate of

concern in the shallow zone. Noel Smith-Jackson (Ecology) indicated they would be unable to approval today but would be willing to discuss the details at a later date. Jack stated he was not looking for approval as all the justification is not available, but wanted to give a notice to some future discussions.

- ***100 B/C***

  - ***Burial Ground Status*** Dean Strom (ERC) reported on the 100-B/C status, attached is a map of the 100-B/C Area -- Status provided in ***Attachment 10***.

  - ***118-B-1*** Continuing to load-out material from pre-sorted staging pile area. Updating documentation to re-continue remedial activities. Wait for MOC review from RL.

  - ***118-C-1*** Updating document to re-continue remedial activities. Waiting for method of characteristics (MOC) review from RL.

  - ***118-B-6*** Need to secure FY 06 funding to re-continue at this site. Target is an additional 5 feet in depth.

  - ***Remaining Sites Status***

    126-B-3: Sample design should be approved soon for the staging pile area.

    128-B-3: New scope to remediate the slide slope needed for the river has been initiated. Walkdown with US Fish and Wildlife (USF&WL) and EPA was complete. Waiting on letter from SHPO.

    128-B-2: Close out samples taken on July 9, 2005.

    600-233: Developing sample design.

    100-B-1: Developing sample design.

  - ***Remaining Sites Pipelines and Sewers Status (RPAS)***

    100-B-14: N Box Culvert: Developing sample design.

    100-C-7: Borehole sampling effort estimated start time about August 1. A discovered 3 inch chromium line was included in funding. The sewer line associated with 1607-B10 will be left in place as part of the Head House footprint.

    Monolith removed approximately 7 feet. Samples will be taken to determine the extent of contamination.

    1607-B2: The Work Instruction (WI) for the sample design is complete. Manhole sampling is complete.

- ***Miscellaneous***
  100-B-27 is a new waste site discovered in the staging area at 126-B-3: 100-B-27 contains chromium contamination. Dennis Faulk (EPA) approved the 100-B-27 site to be a proximity site to the 126-B-3 site to allow remediation to proceed prior to issuance of an ESD. Jack Donnelly (ERC) indicated this is another waste site that may be added to the existing ESD in development.

- ***Approval of Lead and Chromium Treatment Plans See Attachment 11:*** "Treatment Plan for Treatment of 100-C-7 Remaining Pipelines and Sewers (RPAS) Chromium Contaminated Soils" and "Treatment Plan and Protocols for Treatment of Lead Contaminated Soils and Other Lead Contaminated Waste Matrices" were distributed to EPA and Ecology review. Dennis Faulk, EPA, stated he would review them over the next week and give comments back.

- ***In Process Soil Sampling at Burial Grounds, Discuss Proposed Change***
  Jack Donnelly (BHI) reported on proposing a change to remove the 150 cubic yard in process soil sampling at 100 Area burial grounds. Jack described the background, rationale, existing in process soil data taken to date, and the proposed recommendation. Jack concluded with asking for EPA and Ecology concurrence based on the existing data, and the sorting and segregation processes. Dennis Faulk and Larry Gadbois, EPA concurred with the approach for the 100 Area burial grounds, and John Price, Ecology, concurred for all Ecology 100 Areas. Larry Gadbois, EPA, did ask if any in process soil samples would be taken. Jack indicated that as the generator of the waste, in process soil samples would be taken as determined by the project engineer or waste designation specialist to verify profile parameters -- Status provided in ***Attachment 12.***

  The Tri-Parties, Department of Health, Fish and Wildlife would like to include a rough map of the monument in the Environmental Impact Statement (EIS). The map would be color coded as follows: green = areas of no contamination, yellow = areas of some contamination, and red = areas with significant contamination. It would show monument workers areas they should avoid. There would also be signage in contaminated areas. The EIS will be out in approximately 8 months. This will need to be discussed with the tribes. EPA and Ecology approve the strategy.

D&D FACILITIES DECOMMISSIONING PROJECT

- ***105-H Reactor*** Jim Golden (BHI) stated surveillance and maintenance at the reactor is 50 percent complete. He will email responses on the surveillance and maintenance plan to the U.S. Environmental Protection Agency (EPA).

- ***Final Surplus Reactor Decommissioning*** Engineering Evaluation: Comments received from the EPA and are being discussed with BHI and RL.

- ***100-K Ancillary RAWP*** Approved, obtaining final signatures from RL and EPA, will be

issued next week.

- ***183-KW Hazards Material Removal*** Pre-demolition preparation (i.e., characterization) is ongoing.

- ***183.1-KW Characterization*** Report is 70% complete.

- ***1900-N Tanks Demolition*** The overall project is 65% complete.

- ***163-N Facility characterization*** is at 20%.

- ***184-N Asbestos removal*** is currently at 80% complete

- ***107-N RFP*** RFP being drafted for treating that portion of the waste in the building that will require treatment. Dennis Faulk requested he be notified when the 107 Facility is going to be demolished as he would like to see it go down.

- ***105/109-N ISS*** The RAWP is being finalized and will be provided to RL and the regulators for review within the next 3 weeks.

- ***166-N*** Characterization is beginning to accommodate asbestos removal.

- ***183-N*** Pre-demoliton characterization activities have begun.

RISK ASSESSMENT AND SITE CLOSURE PROJECT

- ***100-B/C Pilot Risk Assessment***

- ***100/300 Area Risk Assessment*** The 110-day notification (per the Tri-Party Agreement [TPA] to provide status of a milestone) is being prepared in the event the comment and resolution process delays regulator approval of the 100/300 Area Sampling and Analysis Plan (SAP).

- ***River Corridor Risk Assessment***

GENERAL CROSSOVER ITEMS

- ***100-F Orphan Site Evaluation*** Mike Schwab (ERC) stated the work continued on the evaluation and summary of the historical and field walkdown data and information for the 100-F Area.

- ***Water Pipe Asbestos Wrapping*** The status of the final wording for the Water Pipe Asbestos Wrapping was addressed earlier in the meeting by Jack Donnelly (ERC).

- ***Cleanup of hazardous/dangerous surface debris*** EPA and Ecology agreed to support the

cleanup of hazardous/dangerous surface debris removal during orphan site walk downs under the Investigation-Derived Waste (IDW) Strategy, and drafting a Waste Control Plan (WCP) for approval. A presentation of this approach was presented in the June UMM. The existing Sampling and Analysis Plans (SAPs) will be utilized. This will pave the way for the expeditious cleanup of debris using existing subcontractors during the orphan site evaluation process instead of leaving the debris in the field longer awaiting for declaring such distributed waste as a Waste Information Data System (WIDS) discovery waste, adding to a ROD, and then coordinating the cleanup and disposal through the full-blown remedial action process. Dennis noted that he was the only one that previously had reservations and as the others supported the concept, he agreed as well. This process improvement for the Orphan Sites Evaluation will be implemented by the RA Project. Jack Donnelly (ERC) indicated future details on the central storage locations and number of Waste Certification Plans (WCPs) would still need to be discussed. Larry Gadbois (EPA) supported one WCP for the entire WCP, and Jack indicated there were some issues but those were more implementation issues that can be worked out at a later date and in the future WCPs for EPA or Ecology approval.

- ***Status on the 5 year review*** John Sands (RL) requested a status on the 5 year review from both groundwater and source OUs at next months meeting.

NEW OPEN ACTION ITEMS

- ***Bob Petersen*** (ERC) to set up the meeting on August 22 at 1:00 PM. for Aquifer Sampling Tube Task
- ***Ron Jackson*** (FH) will send an email to Arlene Tortoso (RL) giving more information about installation of smaller diameter ISRM wells.
- ***Jane Borghese*** (FH) talk with Mike Thompson (RL) about the ecological risk assessment review for 100-NR-2 Groundwater
- ***Jane Borghese*** (FH) set up a review of FY 2006 work scope for 100-HR-3 Groundwater OU
- ***Groundwater and Source OUs,*** status the 5 year review from both groundwater and source OUs at next months meeting.

100 AREA UNIT MANAGERS' MEETING

Groundwater/ Remedial Action Unit / Source Operable Units

July 28, 2005

ATTACHMENT 4

Groundwater Operable Unit Status

Attachment 4

100 UMM
Groundwater Operable Unit Status
July 28, 2005

100-NR-2

- The pump and treat system operated at ~60 gpm.
- Although all four ion exchange vessels were back on line during the report period, average removal efficiency was still less than 90% (average of 80% during report period). Average Sr-90 influent concentration was 1800 pCi/L vs average effluent concentration of 300 pCi/L. A test batch of clino from a different supplier was ordered to determine if efficiency can be improved using an alternative source.
- Work on tie-in of the backup injection well (N-31) continued.
- Sampling for the aquatic/riparian ecorisk assessment continues. High river stage has prevented collection of the remaining samples (periphyton, milfoil and sediment) needed for the risk assessment. These data will be incorporated into October deliverable.
- Apatite laboratory studies continued. Findings are being incorporated in the revised TTP.
- Draft revisions of the RDRA and TTP for the proposed apatite sequestration barrier test were prepared in response to RL and Ecology's comments and recommendations. As a result, the TTP will be an appendix to the revised RDRA. Both are undergoing internal review.

100-KR-4 Groundwater OU

- Remediation Treatment Status
  - Pump and treat system operated normally.
  - For the period June 13 – July 17, 2005:
    - Total average flow through the system was approximately 181 gpm.
    - Lower pumping rates attributed to Transfer building #2 down for about three weeks (+) for maintenance and to address lock and tag issues.
    - In addition transfer building #1 down for three days due to an AFD fault.
    - System now running at about 270 gpm.
    - Average influent hexavalent chromium concentrations approximately 0.042 mg/L.
- Calcium Polysulfide Treatability Test Status (TPA M-016-28B, July 1, 2005)
  - Started treatability test on June 28, 2005. Test is expected to last about 2 months. Treatability test is due in March 2006.
  - Summary of test results presented by Scott Petersen.

100 UMM
Groundwater Operable Unit Status
July 28, 2005

100-HR-3 Groundwater OU

- Remediation Treatment Status
  - Pump and Treat system operated normally.
  - For the period June 13 - July17, 2005:
    - Total average flow through the system is approximately 221 gpm
    - Average influent chromium concentration for H Area approximately 0.053 mg/L.
    - Average influent chromium concentration for D Area approximately 0.082 mg/L.
  - Planning was initiated in modifying well network to accelerate cleanup of the chromium plume in H Area.

- DR-5 Treatment Status
  - For the period June 13 - July17, 2005:
  - Current flow through the system approximately 26 gpm.
    - Average influent concentration is approximately 0.788 mg/L.
    - Planning is progressing to tie-in one additional extraction well and the relocation of another for the 100-DR-5 system.

- Summary of ISRM Status
  - Study to evaluate the role of nitrate in ISRM performance is complete, and being distributed (PNNL report).
  - Study to evaluate the feasibility of adding iron to the aquifer is in progress.
  - Field work for the surface geophysical survey (SP and IP) to help map the chromium in the groundwater and the reduced zone is complete. The data are currently being evaluated at MIT.
  - Completed June monthly sampling of the ISRM wells. Fourteen wells were sampled; there were no unexpected changes.

100 AREA UNIT MANAGERS' MEETING

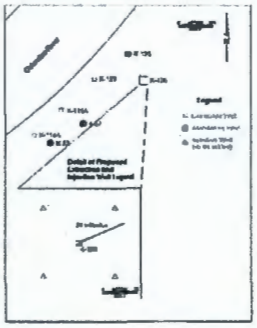
Groundwater/ Remedial Action Unit / Source Operable Units

July 28, 2005

ATTACHMENT 5

100KR-4 Treatability Test and Test Startup

100-KR-4 Treatability Test



- Concept
  - Remove hexavalent chromium (Cr^{6+}) from groundwater
  - Reduce aquifer to produce a permeable reactive barrier (similar to ISRM)
- Approach
  - Treat groundwater with calcium polysulfide
    - Precipitate Cr^{6+} in above-ground tank
  - Inject treated groundwater to reduce aquifer

100-KR-4 Test Startup

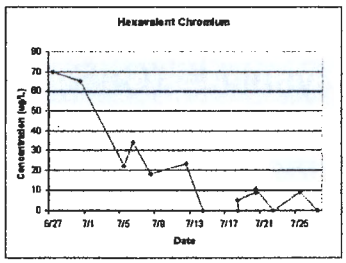
- Pumping began 6/27/2005
  - Lithium bromide added to upgradient well as tracer
- Injection of calcium polysulfide (CaS_x) began 6/28
  - Extraction rates from 199-K-126 have been <10-20 gpm

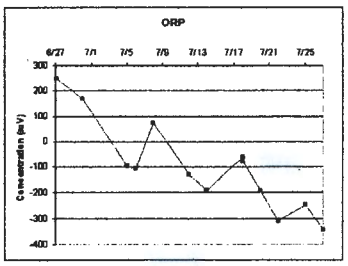
100-KR-4 Treatability Test Status

- Tracer Test
  - First arrival of bromide was detected on 6/30, three days after injection
  - Test data are currently being evaluated by PNNL
- Monitoring
  - Samples collected every other day analyzed for Cr, ORP, DO, pH, conductivity, nitrate, nitrite, and sulfate
  - Submitting samples to the laboratory once a week for metals and other constituents
  - The Florida International University automated sensor that was to analyze for bromide, DO, & pH will not be used in this test
  - Water level in the extraction well is being monitored

Chemical Monitoring Data

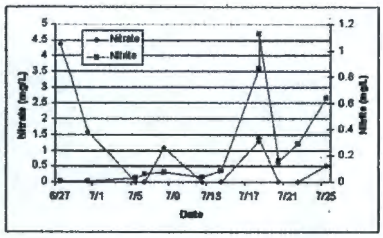
- $Cr6^+$ and ORP began falling within 4 days of injection

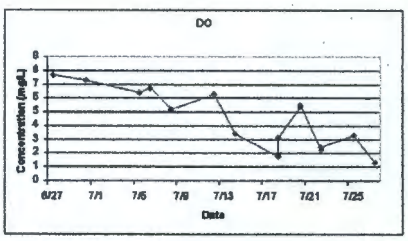


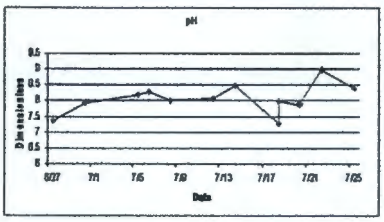


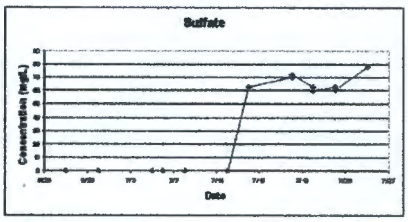
•As of last Friday rebound was still occurring after weekend shutdowns

More Data







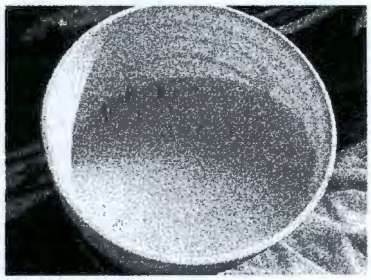


Lessons Learned (so far)

- Problems with plugging of pump screen
  - Reduced capacity toward end of the week
  - Maintenance issues
- Carbonate is precipitating on some of the piping
  - Not an issue with CaS_x <5%

Lessons Learned (so far)

- No precipitate in the reaction tank, although the in-line filters are plugging
  - May eliminate filters in the future
- Fast arrival of tracer and reducing front indicates heterogeneity of aquifer



Termination of Test

- Samples collected after rebound period should have the following chemical parameters
  - ORP <-200
  - Hexavalent chromium and nitrate near detection limit
- After the above criteria are met, circulate and inject calcium polysulfide for another week to assure complete reduction of affected area

Post Shutdown Tasks

- Receive and evaluate laboratory data for metals, especially arsenic and lead
- Inspect injection wells for precipitation/plugging
  - Rerun slug tests on all wells
- Monitor up- and down-gradient injection wells and 199-K-130

100 AREA UNIT MANAGERS' MEETING

Groundwater/ Remedial Action Unit / Source Operable Units

July 28, 2005

ATTACHMENT 6

Influence of Nitrate Reduction on the 100D Area ISRM
Barrier Longevity and Nitrate Plume in 100D Area

Pacific Northwest National Laboratory
Operated by Battelle for the U.S. Department of Energy

Influence of Nitrate Reduction on the 100D Area ISRM Barrier Longevity

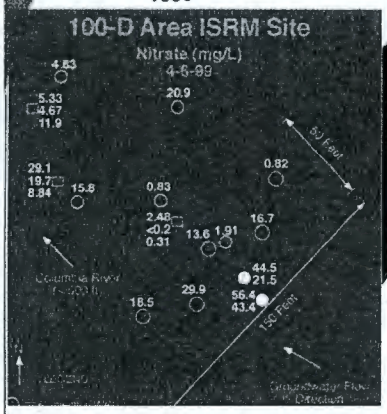
Jim Szecsody, Jerry Phillips, Vince Vermeul, John Fruchter, Mark Williams
Pacific Northwest National Laboratory
Richland, Washington

July 2005

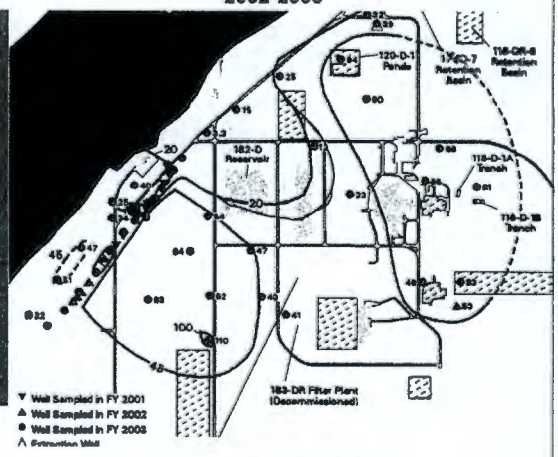
Battelle

Nitrate Plume in 100D Area

1999



2002-2003



downgradient wells:
11 mg/L NO_3 in 1999, increasing trend

upgradient wells 1999 to 2004:
wells D4-15, 22: constant 60 mg/L NO_3
wells D4-20, 38: increasing 45->60 mg/L NO_3

Key Questions

- nitrate reduction to what products (influences capacity)
- rate of nitrate reduction (influences capacity)
- are microbes involved? (purely abiotic capacity)
- long-term barrier performance

Barrier Longevity in Field

electron donor: Fe(2+) in the reduced sediment

Fe^{2+} -> e- + Fe^{3+}

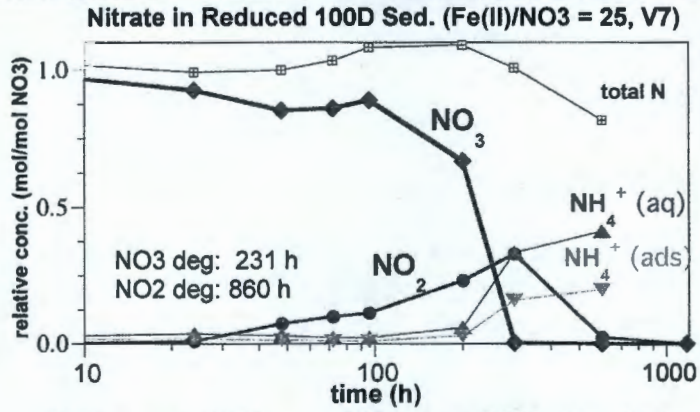
electron acceptors: CrO_4, O_2, NO_3

CrO_4- + 3e- =>
O_2 + 4e- =>
NO_3 + 2e- =>
NO_2 + 6e- =>

longevity:

- only chromate and oxygen: 160 pv/ 20 years
- chromate, oxygen, 60 ppm nitrate: 85 pv/10 years
- nitrate reduction slow, so barrier capacity depends on flow rate in field

Nitrate Reduction in 100D Sediments



NO_3 -> NO_2 -> NH_4^+ + NH_4^+(ads)

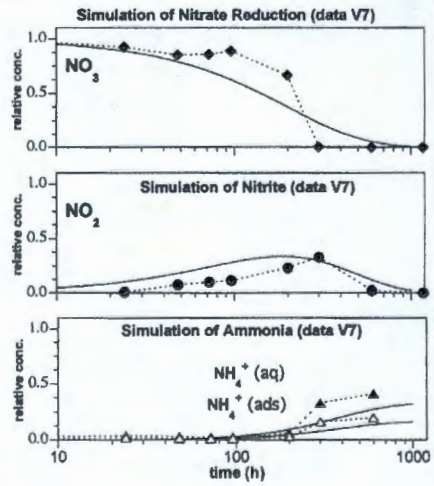
microbes unimportant (same rate with bactericide)

Nitrate Reduction Rates

Field relevant rates
(16°C, full sediment):

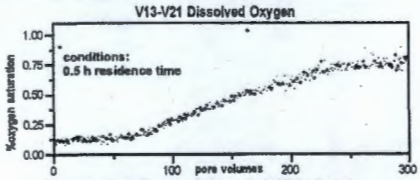
nitrate reduction
202 ± 50 h

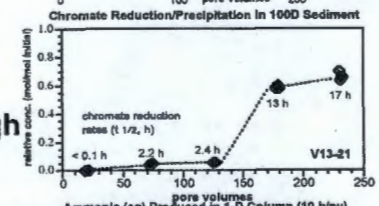
ammonia production
650 ± 300 h

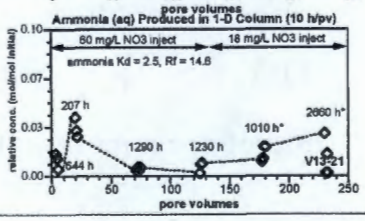


Long-Term Barrier Performance

- 1-D column, inject 2 ppm CrO_4 8 ppm O_2, 60 ppm NO_3
- barrier capacity 220 pv (O_2)
- chromate reduction slowing after 150 pv, still rapid enough after 250 pv for removal
- ammonia production slowing after 30 pv

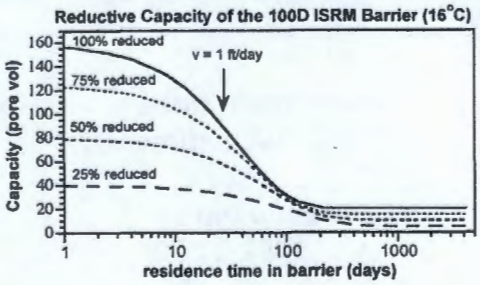






Summary

- NO_3 is reduced to nitrite and ammonia in reduced sediment
- barrier capacity:
  160 pv no nitrate
  85 pv with 60 ppm nitrate
- high-K zones not as influenced by NO_3
- nitrate issue not causing point Cr breakthrough in barrier



100 AREA UNIT MANAGERS' MEETING

Groundwater/ Remedial Action Unit / Source Operable Units

July 28, 2005

ATTACHMENT 7

Jack Donnelly email on Asbestos Paragraph

Donnelly, Jack W

From: Price, John [Jpri461@ECY.WA.GOV]
Sent: Wednesday, July 20, 2005 3:20 PM
To: Donnelly, Jack W
Cc: Faulk.Dennis@epamail.epa.gov; Douglas_C_Chris_Smith@RL.gov; jamie_zeisloft@RL.gov; 'Gadbois.Larry@epamail.epa.gov'
Subject: RE: FW: Asbestos Paragraph

I also concur.

-----Original Message-----
From: Gadbois.Larry@epamail.epa.gov [mailto:Gadbois.Larry@epamail.epa.gov]
Sent: Wednesday, July 20, 2005 9:24 AM
To: Donnelly, Jack W
Cc: Faulk.Dennis@epamail.epa.gov; Price, John; Douglas_C_Chris_Smith@RL.gov; jamie_zeisloft@RL.gov
Subject: Re: FW: Asbestos Paragraph

I concur with this asbestos paragraph.
Please add this to the list of changes for the next version of the 100 Area RDR/RAWP.
Thanks for working to get this clarified.
--Larry--

"Donnelly, Jack W" <JWDonnel@mail.bhi-erc.com>
07/19/2005 12:33 PM

To: Larry Gadbois/R10/USEPA/US@EPA
cc:
Subject: FW: Asbestos Paragraph

Welcome back Larry:

Dennis and Ecology agree with the approach below for asbestos, but wanted to verify you were ok with the language as well. If so, please get back with me and we can document in the next 100 Area UMM. Thanks.

Sidenote: DOE sent you the IU2/IU6 air plan.....they forgot the attachment but I sent that to you. An approval letter from you would close out this item for me.....thanks.

From: Donnelly, Jack W
Sent: Tuesday, July 12, 2005 8:50 AM

To: Faulk, Dennis
Subject: FW: Asbestos Paragraph

Good morning Dennis:

ACTION REQUESTED.....MY NUMBER IS 373-9299.

Just trying to close out this item on asbestos that you and Rich Carlson were working on.....if you can look at the attached and get back with us that would be appreciated. Thanks.

<<Approach for Addressing Asbestos Piping in 100 OU.doc>>

From: Carlson, Richard A
Sent: Tuesday, July 12, 2005 8:37 AM
To: Donnelly, Jack W
Cc: Dittmer, Lorna M
Subject: RE: Asbestos Paragraph

None

From: Donnelly, Jack W
Sent: Tuesday, July 12, 2005 8:36 AM
To: Carlson, Richard A
Cc: Dittmer, Lorna M
Subject: FW: Asbestos Paragraph

Good morning Rich:

Did you ever get any feedback or response from Dennis on this so we can close it out at this months UMM?

From: Carlson, Richard A
Sent: Wednesday, June 15, 2005 12:03 PM
To: Faulk, Dennis
Cc: Smith, Douglas C (Chris); Donnelly, Jack W; Feist, Ella T; Schwab, Michael R
Subject: Asbestos Paragraph

Dennis,

We promised at the last 100 Area UMM to revive the text we provided for your review at a 100 Area UMM earlier this year. John Price has concurred with the text as written. I know you were thinking of some additional language. Let us know your thoughts as we would like to get your concurrence or comments ASAP so we can document final concurrence at the next 100 Area UMM.

Thanks

Rich

<< File: Approach for Addressing Asbestos Piping in 100 OU.doc >> (See attached file: Approach for Addressing Asbestos Piping in 100 OU.doc)

Approach for Addressing Asbestos Piping in 100 OU's

Asbestos is identified in the 100 Area ROD's as a "waste media" anticipated to be unearthed and disposed during remedial action of 100 Area OU waste sites. In fact, this is a true statement. Excavation of waste containing contaminated (friable and non-friable) asbestos is being removed and disposed to ERDF. This paragraph is written to clarify the ROD requirements for asbestos found in the shallow zone that is not contaminated and is a non-friable form. This situation exists at 100 Area OU's where there are miles of underground pipelines that previously transported steam (100 B/C), water, or other non-hazardous liquids that either contain or are wrapped in asbestos media in non-friable form (i.e., asbestos in the pipe matrix, asbestos wrapped (asbestos impregnated in tar paper, etc.). It is in these cases, where there is no CERCLA hazardous waste associated with the pipelines other than asbestos in a non-friable form, that clarification is requested that remediation of such pipelines is not required.

100 AREA UNIT MANAGERS' MEETING

Groundwater/ Remedial Action Unit / Source Operable Units

July 28, 2005

ATTACHMENT 8

Jack Donnelly-100F Staging Pile Maps

100-F
Patty

Attachment 8

Donnelly, Jack W

From: Gadbois.Larry@epamail.epa.gov
Sent: Monday, July 25, 2005 8:15 AM
To: Douglas_C_Chris_Smith@RL.gov; JWDonnel@bhi-erc.com; JALerch@bhi-erc.com
Subject: Staging Piles, 100 F Area

I have reviewed the proposed staging pile locations provided to EPA on July 7. Dennis has already approved 126-F-2.
I approve without any comments the staging pile locations as proposed for sites:
118-F-1
118-F-6
118-F-2
118-F-3
118-F-7
128-F-3
118-F-9
100-F-20
120-F-1
100-F-36
116-F-15
100-F-38
100-F-33
132-F-1
1607-F7
141-C
100-F-31
128-F-2

I do have a question/concern with the proposed location for the staging pile for 118-F-5. Based on the map, it does not appear appropriate to state waste to the east of the waste site in the near proximity to the Columbia River.
I would propose no waste staging piles east of the AOC for this site 118-F-5.

If you have any questions, please contact me at 376-9884.
Thanks for the opportunity to review this.
--Larry--

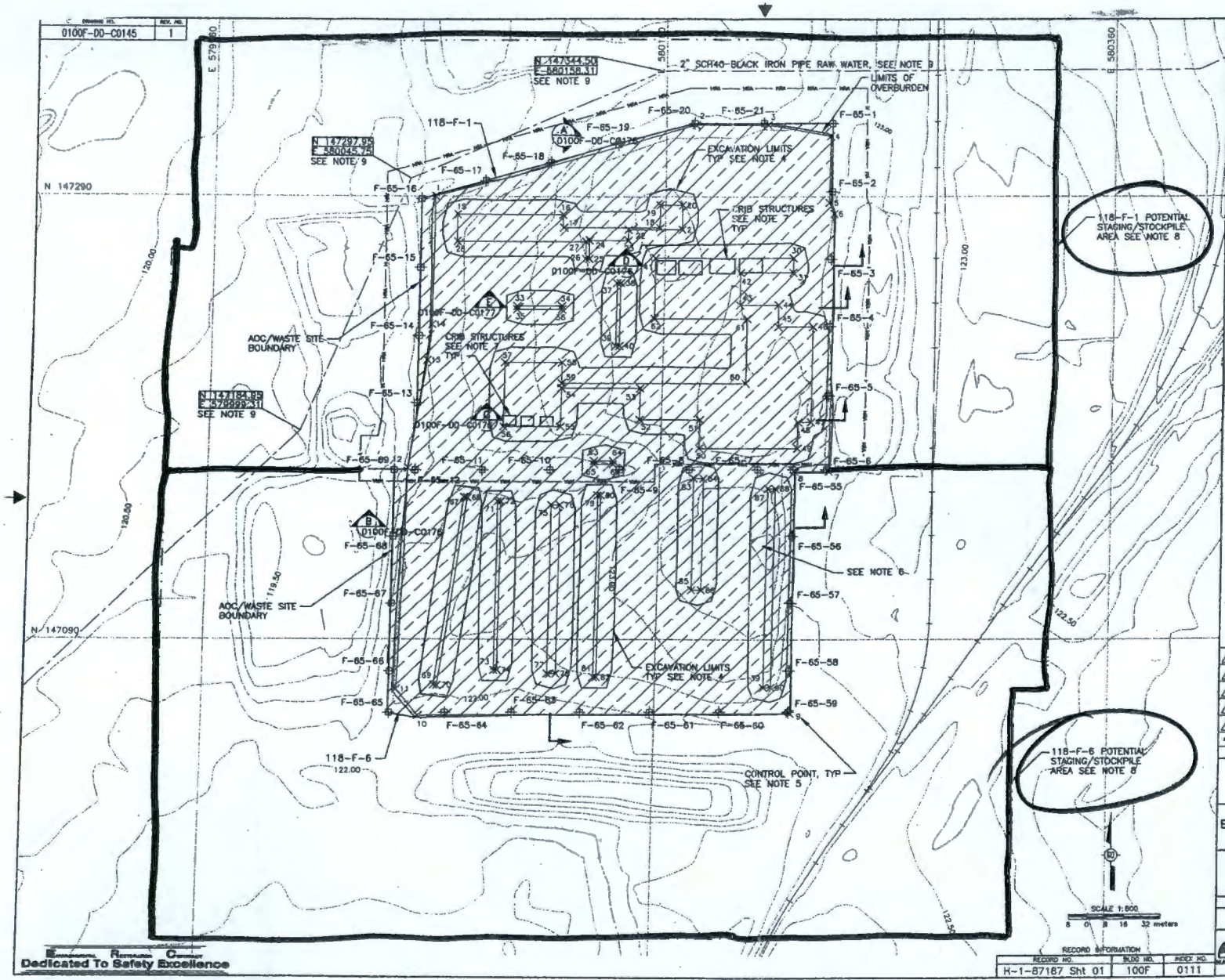
Donnelly, Jack W

From: Faulk.Dennis@epamail.epa.gov
Sent: Monday, July 11, 2005 9:34 AM
To: JAlerch@mail.bhi-erc.com
Cc: Donnelly, Jack W
Subject: Re: FW: Clarification (samples and sample waste)

Jeff,

In Larry's absence I have reviewed the staging pile information for 126-F-2 and EPA concurs with the location.

Dennis



NOTES

1. SEE DRAWING 0100F-DD-G0003 FOR GENERAL ABBREVIATIONS AND SYMBOLS LIST.
2. BENCHMARKS HAVE BEEN ESTABLISHED. SUBCONTRACTO SHALL VERIFY CONTROL POINTS PRIOR TO COMMENCING WORK.
3. CONTOUR INTERVAL IS 0.5 METERS.
4. LIMITS OF EXCAVATION ARE BASED ON A 1.5 HORIZONTA TO 1.0 VERTICAL CUT SLOPE. THE ACTUAL EXCAVATION LIMITS SHALL BE ESTABLISHED IN ACCORDANCE WITH CIVIL SPECIFICATION 0100F-SP-C0003.
5. SEE DRAWING NO. 0100F-DD-C0186 FOR BURIAL GROUNDS SURVEY CONTROL POINT COORDINATE DESIGN TABLE.
6. LINEAR FEATURE DETECTED BY GEOPHYSICAL MEASUREMENTS. THE GEOPHYSICAL INTERPRETATION OF THIS FEATURE INDICATES THAT IT IS 2 TO 3 METERS WIDE AND 15 METERS LONG AND PREDOMINANTLY METALLIC. THIS FEATURE MAY BE A SINGLE FEATURE OR MULTIPLE FEATURES THAT ARE OF SIMILAR CHARACTER. THIS FEATURE MAY POTENTIALLY BE A RAIL CAR IN WHICH ANIMAL CARCASSES WERE INCINERATED, BUT THIS HAS NOT BEEN CONFIRMED, SEE BHI CCN 096523.
7. CRIB STRUCTURES MADE OF STACKED RAILROAD TIES.
8. STAGING OF WASTE SHALL OCCUR WITHIN THE AOC/WASTE SITE BOUNDARY UNLESS DIRECTED BY CONTRACTOR. ANY STAGING OUTSIDE THE AOC/WASTE SITE BOUNDARY, SHALL HAVE PRIOR APPROVAL BY THE CONTRACTOR BEFORE PROCEEDING.
9. COORDINATE LOCATION CALL OUT FOR CAUTION PURPOSES ONLY. SUBCONTRACTOR SHALL ENSURE RAW WATER PIPE IS NOT DISTURBED DURING REMEDIAL ACTION ACTIVITIES.

BHI-DIS 4-22-05

REV.	DATE	DESCRIPTION	DRAWN BY	DATE	CHKD BY	DATE	APP	DATE
1	4/21/05	ISSUED FOR AWARD	GC					
0	1/28/05	ISSUED FOR BID	GC	CAD	BDC	BMC	JMW	RAC

SCALE: AS SHOWN

U.S. DEPARTMENT OF ENERGY
DOE FIELD OFFICE, RICHLAND
RICHLAND ENVIRONMENTAL RESTORATION PROJECT

BECHTEL HANFORD INC. RICHLAND, WASHINGTON | CH2M HILL HANFORD INC. RICHLAND, WASHINGTON

100 F AREA
BURIAL GROUNDS AND REMAINING SITES
CIVIL PLOT PLAN - 1

BECHTEL JOB NO.	DOE CONTRACT NO.	CADD FILENAME
22192	DE-AC06-93RL12367	1FDC0145.DWG

TASK	DRAWING NO.	REV. NO.
100F	0100F-DD-C0145	1

RECORD INFORMATION

RECORD NO.	BLDG NO.	INDEX NO.
H-1-87187 Sht 01	100F	0111

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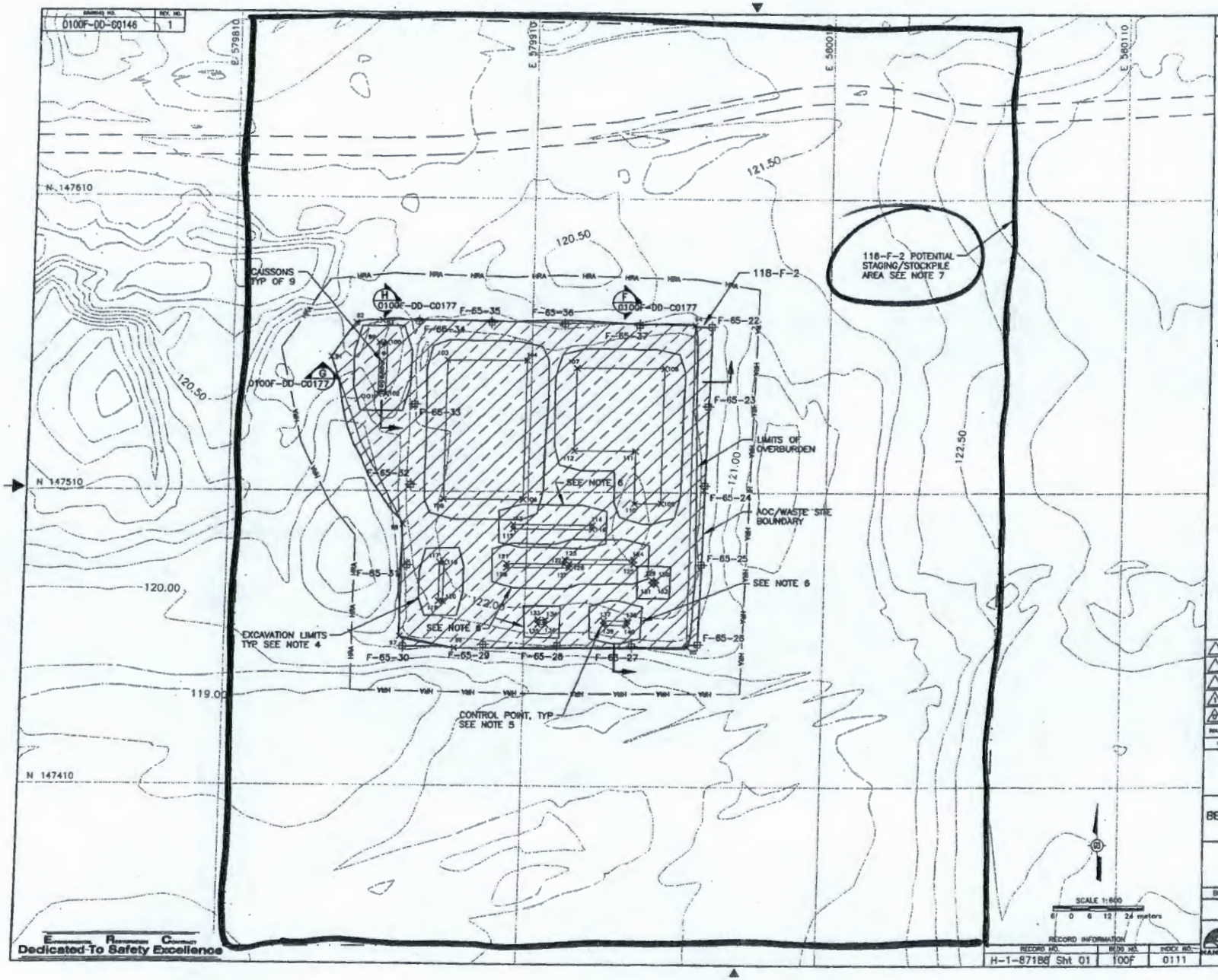

NOTES

1. SEE DRAWING 0100F-DD-G0003 FOR GENERAL ABBREVIATIONS AND SYMBOLS LIST.
2. BENCHMARKS HAVE BEEN ESTABLISHED. SUBCONTRACTOR SHALL VERIFY CONTROL POINTS PRIOR TO COMMENCING WORK.
3. CONTOUR INTERVAL IS 0.5 METERS.
4. LIMITS OF EXCAVATION ARE BASED ON A 1.5 HORIZONTAL TO 1.0 VERTICAL CUT SLOPE. THE ACTUAL EXCAVATION LIMITS SHALL BE ESTABLISHED IN ACCORDANCE WITH CIVIL SPECIFICATION 0100F-SP-C0003.
5. SEE DRAWING NO. 0100F-DD-C0186 FOR BURIAL GROUNDS SURVEY CONTROL POINT COORDINATE DESIGN TABLE.
6. LINEAR FEATURES DETECTED BY GEOPHYSICAL MEASUREMENTS. THE GEOPHYSICAL INTERPRETATION OF THESE FEATURES INDICATES THAT THEY ARE 3 TO 4 METER WIDE TRENCHES CONTAINING AN ABUNDANCE OF METALLIC MATERIAL OR OTHER FEATURES OF SIMILAR CHARACTER. THE GEOPHYSICAL DATA SUGGEST THAT THESE FEATURES MAY BE PIPES OR OTHER LONG METALLIC STRUCTURES OR POSSIBLY ROWS OF DRUMS, SEE BHI CCN 096523.
7. STAGING OF WASTE SHALL OCCUR WITHIN THE AOC/WASTE SITE BOUNDARY UNLESS DIRECTED BY CONTRACTOR. ANY STAGING OUTSIDE THE AOC/WASTE SITE BOUNDARY, SHALL HAVE PRIOR APPROVAL BY THE CONTRACTOR BEFORE PROCEEDING.

BHI-DIS 04-22-05

REV	DATE	DESCRIPTION	DRAWN BY	CHKD BY	CHKD CKV	CHKD DATE	CHKD CKV	CHKD DATE	AS	APPR DATE
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0	1/26/00	ISSUED FOR IFD	GC	CHB	MDC	SRC	JWV	RKC		

SCALE: AS SHOWN

U.S. DEPARTMENT OF ENERGY
DOE FIELD OFFICE, RICHLAND
RICHLAND ENVIRONMENTAL RESTORATION PROJECT

BECHTEL HANFORD INC. RICHLAND, WASHINGTON | CH2M HILL HANFORD INC. RICHLAND, WASHINGTON

100-F AREA
BURIAL GROUNDS AND REMAINING SITES
CIVIL PLOT PLAN - 2

BECHTEL JOB NO.	DOE CONTRACT NO.	CADD FILENAME
22192	DE-AC06-93RL12367	1FD00146.DWG

TASK	DRAWING NO.	REV. NO.
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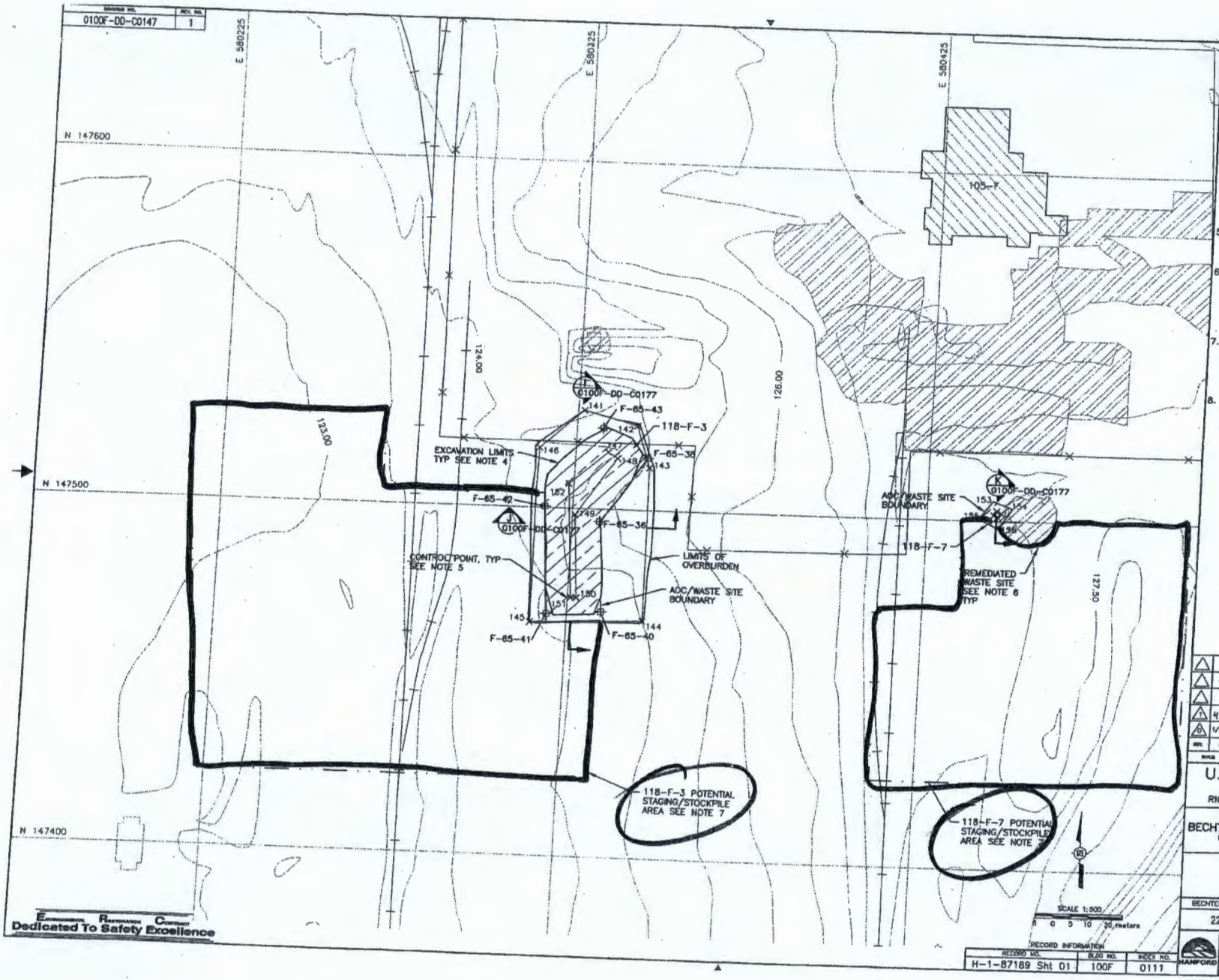
Environmental Restoration Company
Dedicated To Safety Excellence

DRAWING NO.	REV. NO.
0100F-DD-C0147	1



NOTES

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2. BENCHMARKS HAVE BEEN ESTABLISHED. SUBCONTRACTO SHALL VERIFY CONTROL POINTS PRIOR TO COMMENCING WORK.
3. CONTOUR INTERVAL IS 0.5 METERS.
4. LIMITS OF EXCAVATION ARE BASED ON A 1.5 HORIZONTA TO 1.0 VERTICAL CUT SLOPE. THE ACTUAL EXCAVATION LIMITS SHALL BE ESTABLISHED IN ACCORDANCE WITH CIVIL SPECIFICATION 0100F-SP-C0003.
5. SEE DRAWING NO. 0100F-DD-C0186 FOR BURIAL GROUNDS SURVEY CONTROL POINT COORDINATE DESIGN TABLE.
6. THESE WASTE SITES HAVE BEEN PREVIOUSLY REMEDIATED AND HAVE BEEN BACKFILLED AND/OR REVEGETATED. SUB CONTRACTOR SHALL KEEP EQUIPMENT OUT OF THESE AR EAS AND WILL NOT BE ALLOWED TO STAGE CONTAMINATE WASTE IN THESE AREAS. THESE WASTE SITES ARE SHOWN FOR INFORMATION AND ARE NOT IN THIS SCOPE OF WOR
7. STAGING OF WASTE SHALL OCCUR WITHIN THE AOC/ WASTE SITE BOUNDARY UNLESS DIRECTED BY CONTRAC- TOR. ANY STAGING OUTSIDE THE AOC/WASTE SITE BOUNDARY, SHALL HAVE PRIOR APPROVAL BY THE CONTRACTOR BEFORE PROCEEDING.
8. THIS DRAWING WAS GENERATED USING INFORMATION BASED ON HANFORD SITE DRAWINGS: H-1-19625 (5-14-59) REV 3, MAP 2938 SHT 8, AND W-71192 (10-1-43) REV 31.

BHI-D.S 4.22.05

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT DATE	CHKD CHK'L	CHK'D DATE	GS	RIS DATE
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0	1/28/05	ISSUED FOR IRD	GC	CAB	NDC	SWC	JHW	RAC

SCALE: AS SHOWN

U.S. DEPARTMENT OF ENERGY
DOE FIELD OFFICE, RICHLAND
RICHLAND ENVIRONMENTAL RESTORATION PROJECT

BECHTEL HANFORD INC. RICHLAND, WASHINGTON | CH2M HILL HANFORD INC. RICHLAND, WASHINGTON

100-F AREA
BURIAL GROUNDS AND REMAINING SITES
CIVIL PLOT PLAN - 3

BECHTEL JOB NO.	DOE CONTRACT NO.	CADD FILENAME
22192	DE-AC06-93RL12367	1FDC0147.DWG

TASK	DRAWING NO.	REV. NO.
100F	0100F-DD-C0147	1

RECORD NO.	BLDG NO.	INDEX NO.
H-1-87189 Sht 01	100F	0111

Environmental Restoration Company
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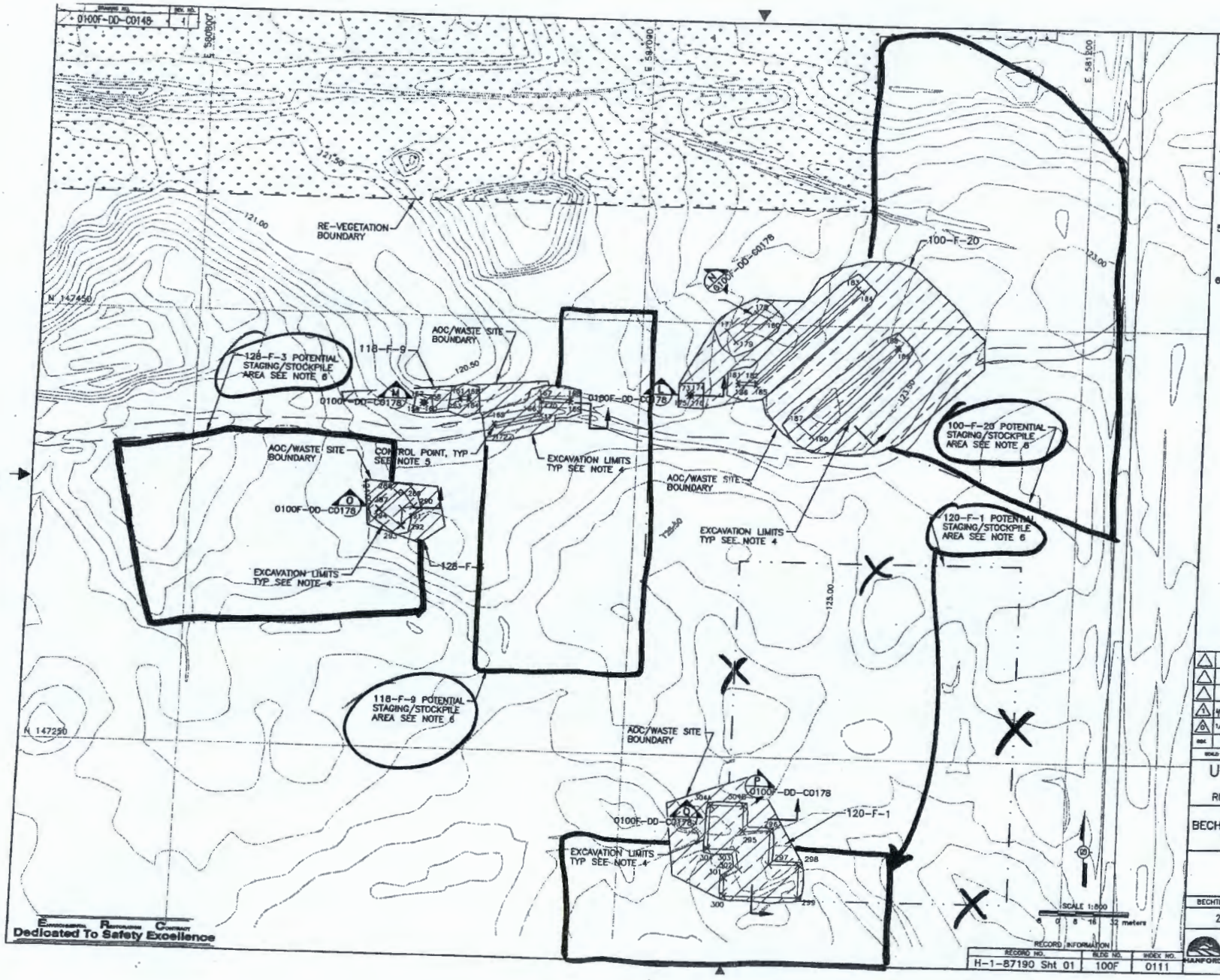

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2. BENCHMARKS HAVE BEEN ESTABLISHED. SUBCONTRACTO SHALL VERIFY CONTROL POINTS PRIOR TO COMMENCING WORK.
3. CONTOUR INTERVAL IS 0.5 METERS.
4. LIMITS OF EXCAVATION ARE BASED ON A 1.5 HORIZONT TO 1.0 VERTICAL CUT SLOPE. THE ACTUAL EXCAVATION LIMITS SHALL BE ESTABLISHED IN ACCORDANCE WITH CIVIL SPECIFICATION 0100F-SP-C0003.
5. SEE DRAWING NO. 0100F-DD-C0186 FOR BURIAL GROUNDS AND DRAWING NO. 0100F-DD-C0187 FOR REMAINING SITES SURVEY CONTROL POINT COORDINATE DESIGN TABLE.
6. STAGING OF WASTE SHALL OCCUR WITHIN THE AOC/WASTE SITE BOUNDARY UNLESS DIRECTED BY CONTRACTOR. ANY STAGING OUTSIDE THE AOC/WASTE SITE BOUNDARY, SHALL HAVE PRIOR APPROVAL BY THE CONTRACTOR BEFORE PROCEEDING. 100-F-20 SITE SHOULD ONLY USE AREA TO THE NORTH AND WEST OF THE SITE, IN ORDER TO ELIMINATE FURTHER ECOLOGICAL DISTURBANCES.

HHI-D.S 04.22.05

1	4/21/05	ISSUED FOR AWARD	SC	CAB	NRC	RSC	JMW	RAC
0	1/28/05	ISSUED FOR BID	SC	CAB	NRC	RSC	JMW	RAC
REV.	DATE	DESCRIPTION	DRAWN BY	CHKD BY/DATE	REV'D BY/DATE	APP'D BY/DATE	KS	KS APP'D BY/DATE

SCALE: AS SHOWN

U.S. DEPARTMENT OF ENERGY
DOE FIELD OFFICE, RICHLAND
RICHLAND ENVIRONMENTAL RESTORATION PROJECT

BECHTEL HANFORD INC. RICHLAND, WASHINGTON | CH2M HILL HANFORD INC. RICHLAND, WASHINGTON

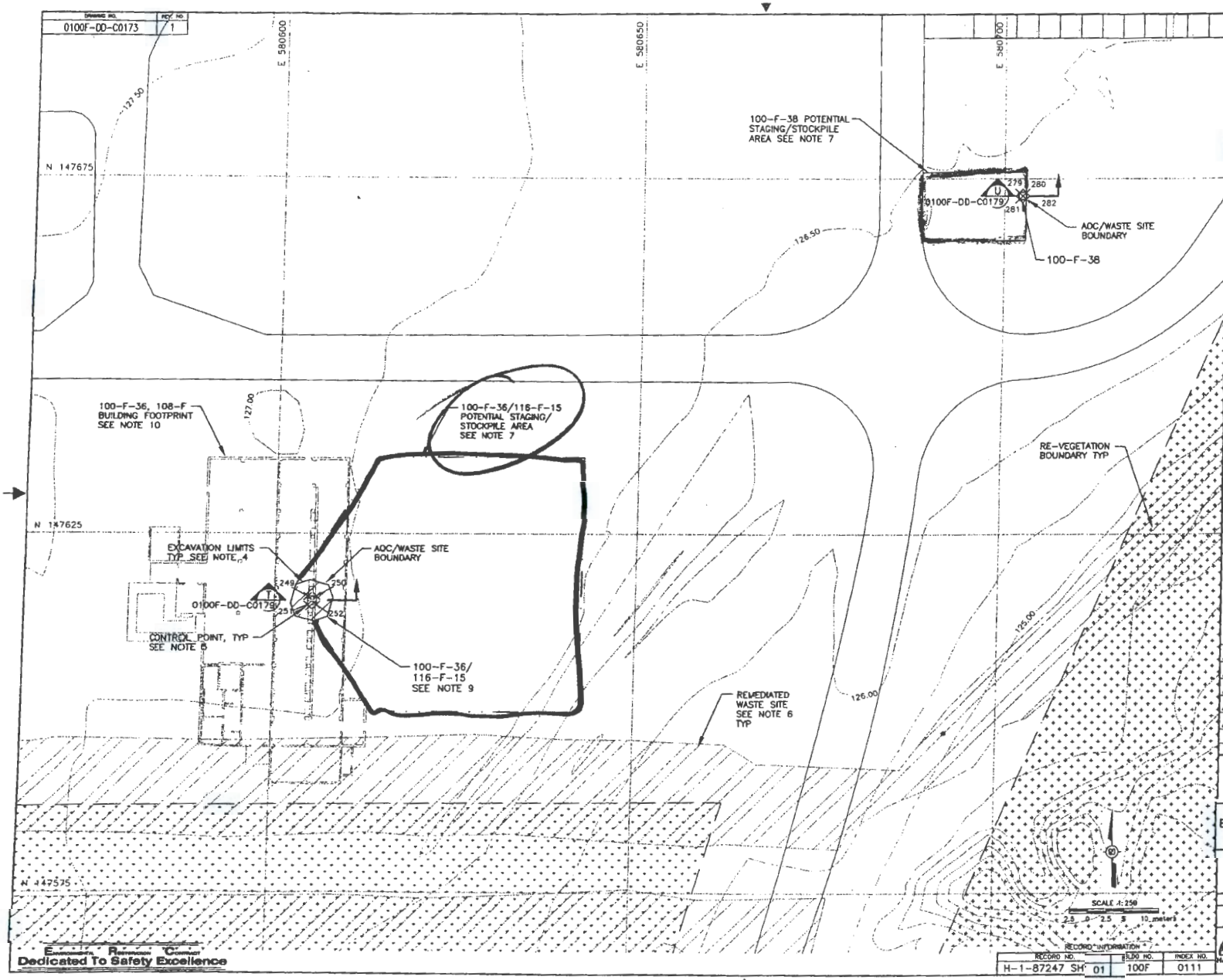
100-F AREA
BURIAL GROUNDS AND REMAINING SITES
CIVIL PLOT PLAN - 4

BECHTEL JOB NO.	DOE CONTRACT NO.	CADD FILENAME
22192	DE-AC06-93RL12367	1FDC0148.DWG

TASK	DRAWING NO.	REV. NO.
100F	0100F-DD-C0148	1

RECORD INFORMATION

RECORD NO.	BLDG NO.	INDEX NO.
H-1-87190 Sht 01	100F	0111



NOTES

1. SEE DRAWING 0100F-DD-G0003 FOR GENERAL ABBREVIATIONS AND SYMBOLS LIST.
2. BENCHMARKS HAVE BEEN ESTABLISHED. SUBCONTRACTOR SHALL VERIFY CONTROL POINTS PRIOR TO COMMENCING WORK.
3. CONTOUR INTERVAL IS 0.5 METERS.
4. LIMITS OF EXCAVATION ARE BASED ON A 1.5 HORIZONTAL TO 1.0 VERTICAL CUT SLOPE. THE ACTUAL EXCAVATION LIMITS SHALL BE ESTABLISHED IN ACCORDANCE WITH CIVIL SPECIFICATION 0100F-SP-C0003.
5. SEE DRAWING NO. 0100F-DD-C0187 FOR REMAINING SITES SURVEY CONTROL POINT COORDINATE DESIGN TABLE.
6. THESE WASTE SITES HAVE BEEN PREVIOUSLY REMEDIATED AND HAVE BEEN BACKFILLED OR REVEGETATED. SUBCONTRACTOR SHALL KEEP EQUIPMENT OUT OF THESE AREAS AND WILL NOT BE ALLOWED TO STAGE CONTAMINATED WASTE IN THESE AREAS. THESE WASTE SITES ARE SHOWN FOR INFORMATION AND ARE NOT IN THIS SCOPE OF WORK.
7. STAGING OF WASTE SHALL OCCUR WITHIN THE AOC/WASTE SITE BOUNDARY UNLESS DIRECTED BY CONTRACTOR. ANY STAGING OUTSIDE THE AOC/WASTE SITE BOUNDARY, SHALL HAVE PRIOR APPROVAL BY THE CONTRACTOR BEFORE PROCEEDING.
8. THIS DRAWING WAS GENERATED USING INFORMATION BASED ON HANFORD SITE DRAWINGS: H-1-1979 (9-6-49) SHT 20 REV 4, H-1-2025 (7-22-49) SHT 1 REV 6, H-1-1-2025 (8-2-49) SHT 5 REV 3, H-1-2025 (8-5-49) SHT 6 REV 3, H-1-12628 (1-30-61) REV 1, H-1-12628 (2-3-61) REV 1, AND H-1-12635 (2-3-61) REV 1.
9. 116-F-15 IS A FLOOR DRAIN WITHIN THE 100-F-36 (FORMER 108-F BUILDING) WASTE SITE. ACCORDING TO BHI-01399, D&D PROJECT CLOSEOUT REPORT, THIS DRAIN AND THE BUILDING FOUNDATION HAS BEEN REMOVED. PREVIOUS VERIFICATION SAMPLING EFFORTS WERE HALTED BASED ON UNKNOWN PIPING FOUND. AT THE DIRECTION OF THE CONTRACTOR, REMOVE ALL PIPING IN THIS AREA TO SUPPORT CONFIRMATORY SAMPLING EFFORTS.
10. CONTRACTOR DIRECTED TRENCHING AND SAMPLING WITHIN THE 100-F-36 WASTE SITE.

REV.	DATE	DESCRIPTION	DRAWN BY	SHEET SUPV	SHEET DATE	SHEET DATE	CK	DWG DATE
1	9/21/05	ISSUED FOR AWARD	CC	CAB	MDC	KRC	MAH	RAW
0	1/26/05	ISSUED FOR BID	CC	CAB	MDC	SWC	JMW	RAC

SCALE: AS SHOWN

U.S. DEPARTMENT OF ENERGY
DOE FIELD OFFICE, RICHLAND
RICHLAND ENVIRONMENTAL RESTORATION PROJECT

BECHTEL HANFORD INC. RICHLAND, WASHINGTON | CH2M HILL HANFORD INC. RICHLAND, WASHINGTON

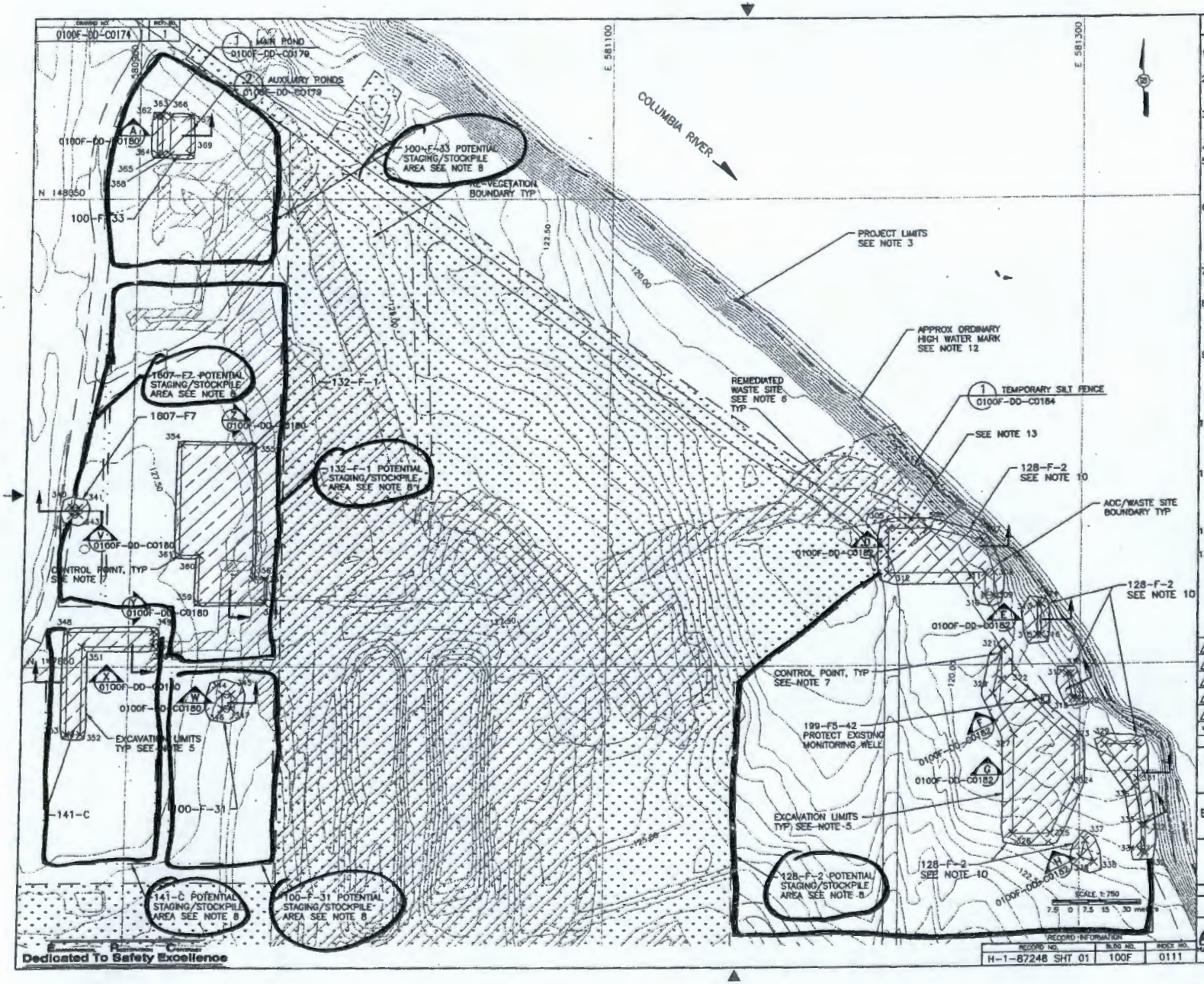
100-F AREA
BURIAL GROUNDS AND REMAINING SITES
CIVIL PLOT PLAN - 6

BECHTEL JOB NO.	DOE CONTRACT NO.	CADD FILENAME
22192	DE-AC06-93RL12367	1FDC0173.DWG

TASK	DRAWING NO.	REV. NO.
100F	0100F-DD-C0173	1

RECORD INFORMATION

RECORD NO.	SUB NO.	INDEX NO.
H-1-87247 SH 01	100F	0111



Dedicated To Safety Excellence

NOTES

1. SEE DRAWING 0100F-DD-G0003 F ABBREVIATIONS AND SYMBOLS LIST.
2. BENCHMARKS HAVE BEEN ESTABLIS SHALL VERIFY CONTROL POINTS PR WORK.
3. NO PROJECT ACTIVITIES MAY TAKE PLACE, INCLUDING PEDESTRIAN TRAFFIC, OUTSIDE OF THE PROJECT LIMITS WITHOUT WRITTEN AUTHORIZATION FROM THE CONTRACTOR
4. CONTOUR INTERVAL IS 0.5 METERS.
5. LIMITS OF EXCAVATION ARE BASED ON A 1.5 HORIZONTAL TO 1.0 VERTICAL CUT SLOPE. THE ACTUAL EXCAVATION LIMITS SHALL BE ESTABLISHED IN ACCORDANCE WITH CIVIL SPECIFICATION 0100F-SP-C0003.
6. THESE WASTE SITES HAVE BEEN PREVIOUSLY REMEDIATED AND HAVE BEEN BACKFILLED OR REVEGETATED. SUBCONTRACTOR SHALL KEEP EQUIPMENT OUT OF THESE AREAS AND WILL NOT BE ALLOWED TO STAGE CONTAMINATED WASTE IN THESE AREAS. THESE WASTE SITES ARE SHOWN FOR INFORMATION AND ARE NOT IN THIS SCOPE OF WORI
7. SEE DRAWING NO. 0100F-DD-C0187 FOR REMAINING SITES SURVEY CONTROL POINT COORDINATE DESIGN TABLE.
8. STAGING OF WASTE SHALL OCCUR WITHIN THE AOC/WASTE SITE BOUNDARY UNLESS DIRECTED BY CONTRACTOR. ANY STAGING OUTSIDE THE AOC/WASTE SITE BOUNDARY, SHALL HAVE PRIOR APPROVAL BY THE CONTRACTOR BEFORE PROCEEDING.
9. THIS DRAWING WAS GENERATED USING INFORMATION BASED ON HANFORD SITE DRAWINGS: H-1-448 (11-20-45), H-1-503 (4-15-47) REV 1, H-1-1518 (9-1-48) REV 3, H-1-1522 (9-27-48) REV 7, H-1-11492 (11-10-58) REV 4, H-1-12235 (1-26-60) REV 1, H-1-12236 (1-26-60) REV 2, H-1-14122 (11-3-63) REV 0 , AND H-1-14123 (11-11-63) REV 0.
10. EXCAVATION OF 128-F-2 BURNING PIT SHALL REQUIRE USE OF A TEMPORARY SILT FENCE BETWEEN EXCAVATION AND RIVER TO PREVENT SOIL AND DEBRIS FROM REACHING THE SHORELINE. LOCATION AND EXTENT SHALL BE COORDINATED WITH CONTRACTOR.
11. TEMPORARY SILT FENCE SHALL MEET THE REQUIREMENTS OF WSDOT M41-10, SECTION 2-12.3(5) AND SECTION 9-33.2. SUPPORTS SHALL BE EITHER STEEL OR WOOD POSTS. WOOD POSTS SHALL BE TREATED AND HAVE A MINIMUM DIMENSION OF 102mm x 102mm [4" x 4"]. STEEL POSTS SHALL BE A DIAMETER OF 25mm [1"], U.N.O.
12. CONSTRUCTION ACTIVITIES ON THE SHORELINE SHALL BE PROHIBITED BELOW THE ORDINARY HIGH WATER MARK.
13. DISTURBED AREA SHALL BE RE-VEGETATED BY OTHERS FOLLOWING REMEDIAL ACTION ACTIVITIES.

REV	DATE	DESCRIPTION	DRAWN BY	PROJ ENG	DISC ENG	PROJ CTR	CS	DOE APPR.
1	4/21/05	ISSUED FOR AGAND	BG	CAB	NDC	LKZZ	GAL	Rev
0	1/26/05	ISSUED FOR BID	CC	CAB	NDC	SWC	JRW	RAC

SCALE AS SHOWN

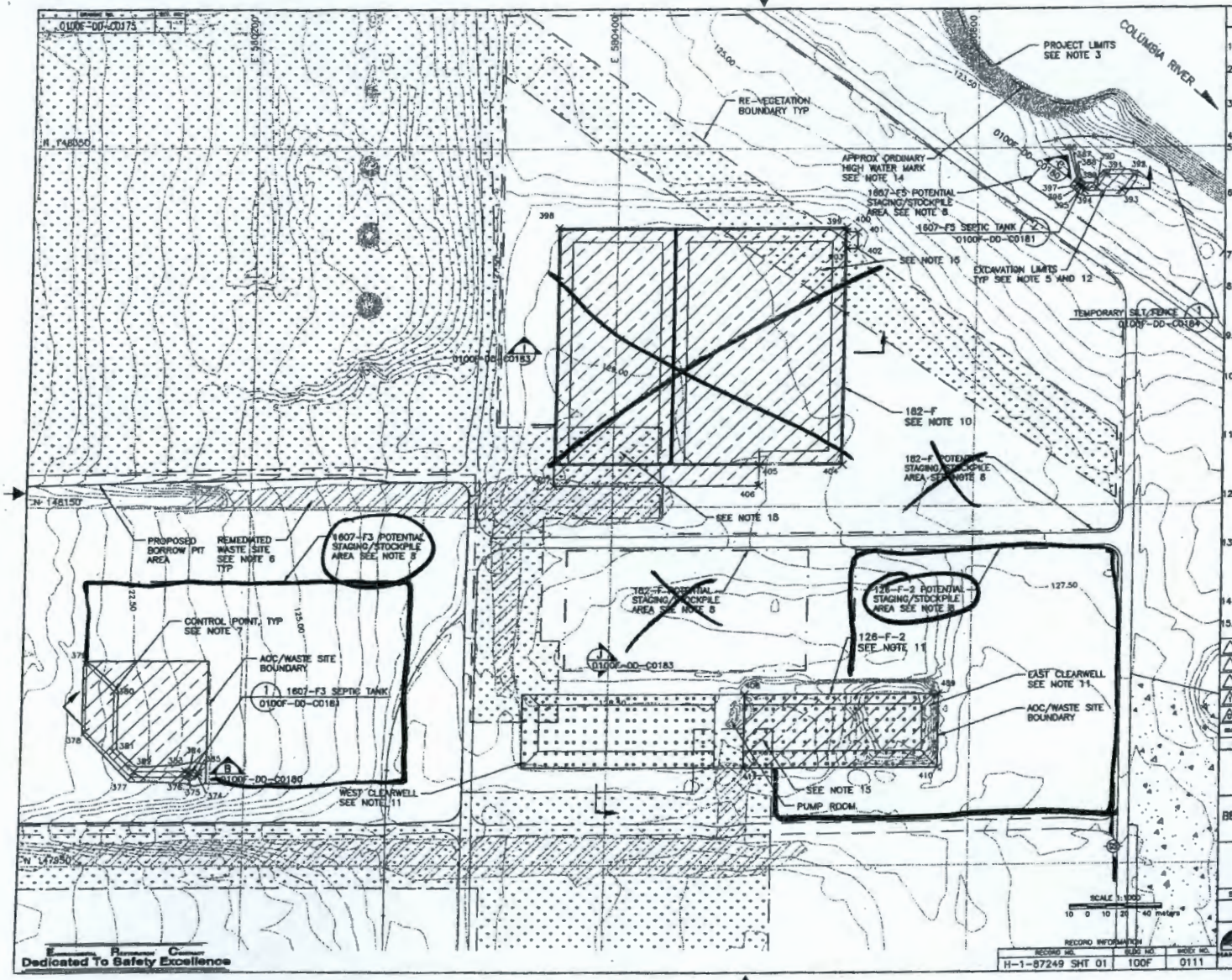
U.S. DEPARTMENT OF ENERGY
DOE FIELD OFFICE, RICHLAND
RICHLAND ENVIRONMENTAL RESTORATION PROJECT

BECHTEL HANFORD INC. RICHLAND, WASHINGTON | CH2M HILL HANFORD INC. RICHLAND, WASHINGTON

100-F AREA
BURIAL GROUNDS AND REMAINING SITES
CIVIL PLOT PLAN - 7

BECHTEL JOB NO.	DOE CONTRACT NO.	CADD FILENAME
22192	DE-AC06-93RL12367	1FDC0174.DWG

TASK	DRAWING NO.	REV. NO.
100F	0100F-DD-C0174	1



NOTES

1. SEE DRAWING 0100F-DD-C0003 FOR GENERAL ABBREVIATIONS AND SYMBOLS LIST.
2. BENCHMARKS HAVE BEEN ESTABLISHED. SUBCONTRACTOR SHALL VERIFY CONTROL POINTS PRIOR TO COMMENCING WORK.
3. NO PROJECT ACTIVITIES MAY TAKE PLACE, INCLUDING PEDESTRIAN TRAFFIC, OUTSIDE OF THE PROJECT LIMITS WITHOUT WRITTEN AUTHORIZATION FROM THE CONTRACTOR.
4. CONTOUR INTERVAL IS 0.5 METERS.
5. LIMITS OF EXCAVATION ARE BASED ON A 1.5 HORIZONTAL TO 1.0 VERTICAL CUT SLOPE. THE ACTUAL EXCAVATION LIMITS SHALL BE ESTABLISHED IN ACCORDANCE WITH CIVIL SPECIFICATION 0100F-SP-C0003.
6. THESE WASTE SITES HAVE BEEN PREVIOUSLY REMEDIATED AND HAVE BEEN BACKFILLED OR REVEGETATED. SUBCONTRACTOR SHALL KEEP EQUIPMENT OUT OF THESE AREAS AND WILL NOT BE ALLOWED TO STAGE CONTAMINATED WASTE IN THESE AREAS. THESE WASTE SITES ARE SHOWN FOR INFORMATION AND ARE NOT IN THIS SCOPE OF WORK.
7. SEE DRAWING NO. 0100F-DD-C0187 FOR REMAINING SITES SURVEY CONTROL POINT COORDINATE DESIGN TABLE.
8. STAGING OF WASTE SHALL OCCUR WITHIN THE AOC/WASTE SITE BOUNDARY UNLESS DIRECTED BY CONTRACTOR. ANY STAGING OUTSIDE THE AOC/WASTE SITE BOUNDARY, SHALL HAVE PRIOR APPROVAL BY THE CONTRACTOR BEFORE PROCEEDING.
9. THIS DRAWING WAS GENERATED USING INFORMATION BASED ON HANFORD SITE DRAWINGS: W-71192 (10-1-43) REV 31, W-71748 (12-4-43), W-72052 (12-6-43), AND W-72157 (11-22-43).
10. THE GEOPHYSICAL INTERPRETATION FOR THIS SITE INDICATE MULTIPLE FEATURES THAT ARE OF SIMILAR CHARACTER OF BURIED ANOMALIES WITHIN THE 182-F RESERVOIR. THE 182-F RESERVOIR STRUCTURE IS STILL INTACT, HANFORD SITE DRAWING W-72157 PROVIDES A TYPICAL RESERVOIR CONSTRUCTION DETAIL.
11. THE EAST CLEARWELL STRUCTURE HAS BEEN DEMOLISHED AND HAS DEMOLITION DEBRIS WITHIN THE STRUCTURE. THE WEST CLEARWELL STRUCTURE AND PUMP ROOM BUILDING ARE STILL INTACT. HANFORD SITE DRAWINGS W-72053 AND W-72052 PROVIDE TYPICAL CONSTRUCTION DETAILS.
12. EXCAVATION OF 1607-F5 SEPTIC SYSTEM SHALL REQUIRE USE OF A TEMPORARY SILT FENCE BETWEEN EXCAVATION AND RIVER TO PREVENT SOIL AND DEBRIS FROM REACHING THE SHORELINE. LOCATION AND EXTENT SHALL BE COORDINATED WITH CONTRACTOR.
13. TEMPORARY SILT FENCE SHALL MEET THE REQUIREMENTS OF WSDOT M41-10, SECTION 2-12.3(5) AND SECTION 9-33.2. SUPPORTS SHALL BE EITHER STEEL OR WOOD POSTS. WOOD POSTS SHALL BE TREATED AND HAVE A MINIMUM DIMENSION OF 102mm×102mm [4"×4"]. STEEL POSTS SHALL BE A DIAMETER OF 25mm [1"]. U.N.O.
14. CONSTRUCTION ACTIVITIES ON THE SHORELINE SHALL BE PROHIBITED BELOW THE ORDINARY HIGH WATER MARK.
15. DISTURBED AREA SHALL BE RE-VEGETATED BY OTHERS FOLLOWING REMEDIAL ACTION ACTIVITIES.

△		HHT, JS 4.22.05						
△								
△								
△	11/21/04	ISSUED FOR AWARD	GC					
△	1/26/05	ISSUED FOR IFD	GC	CHM	MCC	BRC	JHM	BAC
SYM	DATE	DESCRIPTION	STAMP BY	PROJ ENG	DRG ENG	PROJ MGR	CE	DIR CONS

SCALE AS SHOWN

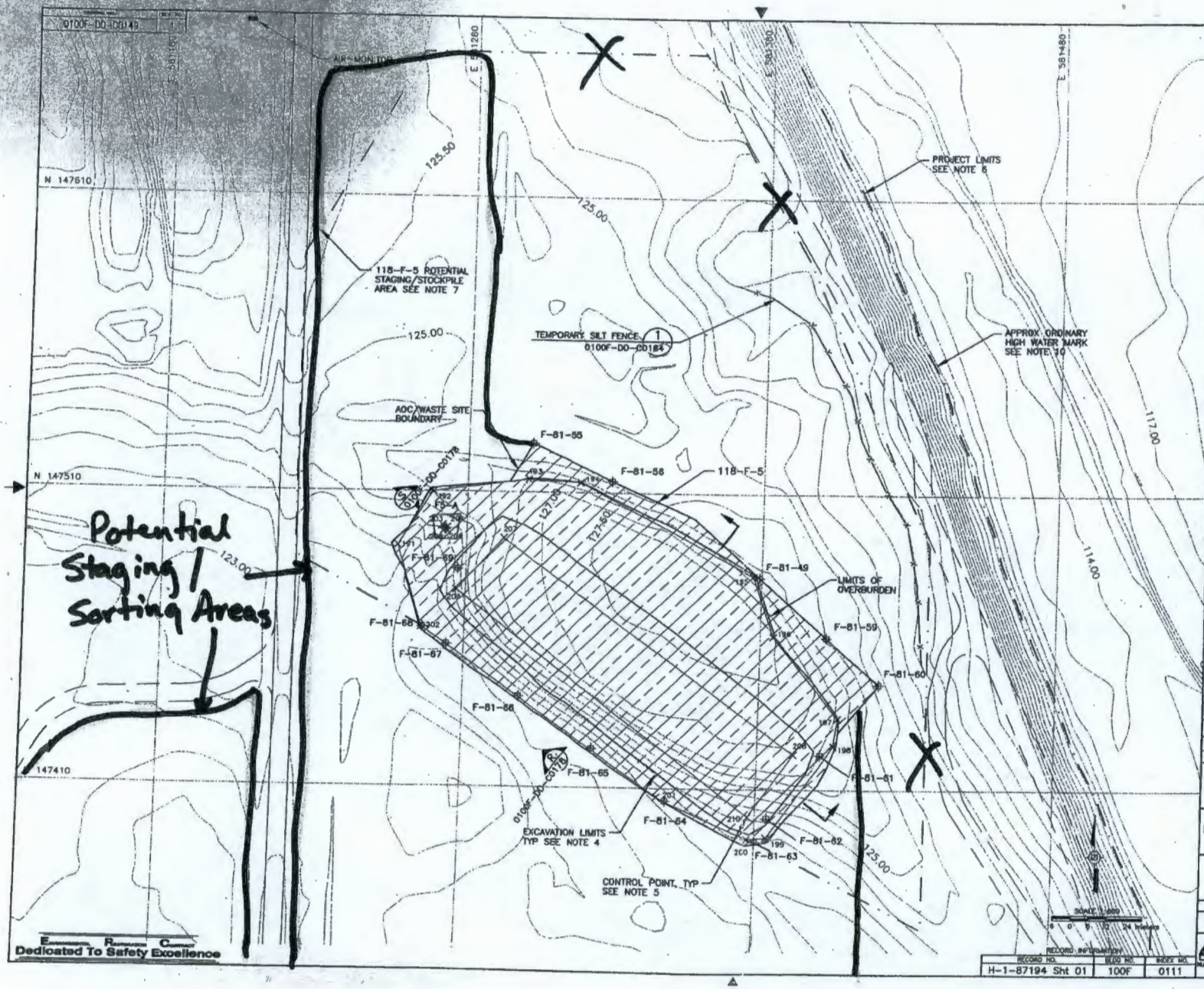
U.S. DEPARTMENT OF ENERGY
DOE FIELD OFFICE, RICHLAND
RICHLAND ENVIRONMENTAL RESTORATION PROJECT

BECHTEL HANFORD INC. RICHLAND, WASHINGTON | CH2M HILL HANFORD INC. RICHLAND, WASHINGTON

100-F AREA
BURIAL GROUNDS AND REMAINING SITES
CIVIL PLOT PLAN - 8

BECHTEL JOB NO.	DOE CONTRACT NO.	CADD FILENAME
22192	DE-AC06-93RL12367	1FDC0175.DWG

TASK	DRAWING NO.	REV. NO.
100F	0100F-DD-C0175	1



NOTES

1. SEE DRAWING 0100F-DD-G0003 FOR GENERAL ABBREVIATIONS AND SYMBOLS LIST.
2. BENCHMARKS HAVE BEEN ESTABLISHED. SUBCONTRACTOR SHALL VERIFY CONTROL POINTS PRIOR TO COMMENCING WORK.
3. CONTOUR INTERVAL IS 0.5 METERS.
4. LIMITS OF EXCAVATION ARE BASED ON A 1.5 HORIZONTAL TO 1.0 VERTICAL CUT SLOPE. THE ACTUAL EXCAVATION LIMITS SHALL BE ESTABLISHED IN ACCORDANCE WITH CIVIL SPECIFICATION 0100F-SP-C0003.
5. SEE DRAWING NO. 0100F-DD-C0186 FOR BURIAL GROUNDS SURVEY CONTROL POINT COORDINATE DESIGN TABLE.
6. NO PROJECT ACTIVITIES MAY TAKE PLACE, INCLUDING PEDESTRIAN TRAFFIC, OUTSIDE OF THE PROJECT LIMITS WITHOUT WRITTEN AUTHORIZATION FROM THE CONTRACTOR.
7. STAGING OF WASTE SHALL OCCUR WITHIN THE AOC/WASTE SITE BOUNDARY UNLESS DIRECTED BY CONTRACTOR. ANY STAGING OUTSIDE THE AOC/WASTE SITE BOUNDARY, SHALL HAVE PRIOR APPROVAL BY THE CONTRACTOR BEFORE PROCEEDING.
8. THIS WASTE SITE IS WITHIN A HIGHLY SENSITIVE CULTURAL RESOURCE AREA. INTERMITTANT MONITORING BY CONTRACTOR CULTURAL RESOURCE STAFF SHALL BE COORDINATED WITH SUBCONTRACTOR.
9. TEMPORARY SILT FENCE SHALL MEET THE REQUIREMENTS OF WSDOT M41-10, SECTION 2-12.3(5) AND SECTION 9-33.2. SUPPORTS SHALL BE EITHER STEEL OR WOOD POSTS. WOOD POSTS SHALL BE TREATED AND HAVE A MINIMUM DIMENSION OF 102mmx102mm [4"x4"]. STEEL POSTS SHALL BE A DIAMETER OF 25mm [1"], U.N.O.
10. CONSTRUCTION ACTIVITIES ON THE SHORELINE SHALL BE PROHIBITED BELOW THE ORDINARY HIGH WATER MARK.

HHI J.B. 4.22.05

REV.	DATE	DESCRIPTION	DRAWN BY	CHECKED BY	APPV. BY	DSGN. ENGR.	PM	CM
1	4/20/05	ISSUED FOR ASBUILT	GC	CAB	KDC	KDC	MD	CMC
0	1/26/05	ISSUED FOR IFD	GC	CAB	KDC	BKC	JMW	BKC

SCALE AS SHOWN

U.S. DEPARTMENT OF ENERGY
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BECHTEL HANFORD INC. RICHLAND, WASHINGTON | CH2M HILL HANFORD INC. RICHLAND, WASHINGTON

100-F AREA
BURIAL GROUNDS AND REMAINING SITES
CIVIL PLOT PLAN - 5

BECHTEL JOB NO.	DOE CONTRACT NO.	CADD FILENAME
22192	DE-AC06-93RL12367	1FDC0149.DWG

TASK	DRAWING NO.	REV. NO.
100F	0100F-DD-C0149	1

RECORD INFORMATION

RECORD NO.	BLDG NO.	INDEX NO.
H-1-87194 Sht 01	100F	0111

100 AREA UNIT MANAGERS' MEETING

Groundwater/ Remedial Action Unit / Source Operable Units

July 28, 2005

ATTACHMENT 9

100N Color Coded Design

Attachment 9

Donnelly, Jack W

From: Fancher, Jonathan D (Jon)
Sent: Monday, July 18, 2005 1:02 PM
To: Donnelly, Jack W
Cc: Parnell, Scott E
Subject: Samples

Jack
This is a follow up to our discussion last week.

Our SAP DOE/RL-2000-07 Rev 1, Table 3 lists sample locations and frequencies. Based on current conditions I think we could sample:

10 samples Trench deep zone
10 samples Trench shallow zone
10 samples Crib deep zone
10 samples Crib Shallow zone
Defer UPR sampling until UPR plumes can be excavated
Pipelines: Approximately 23 m of pipeline corridor on the N-3 side was remediated and 8 m on the UPR side was remediated. This makes ~31 m of pipe corridor that needs sampling. Instead of collecting 10 deep and 10 shallow samples I propose including these pipe corridor segments within the crib sample design so they are covered.
When the bulk of the pipelines are excavated those pipe corridors will have 10 deep and 20 shallow samples collected according to the SAP.

Jon Fancher ☺
100N Remedial Action STR
☎(509) 373-9556/ (509) 531-0700
page 373-PAGE, 7345
jdfanche@bhi-erc.com

Donnelly, Jack W

From: Fancher, Jonathan D (Jon)
Sent: Monday, July 18, 2005 1:02 PM
To: Donnelly, Jack W
Cc: Parnell, Scott E
Subject: Samples

Jack
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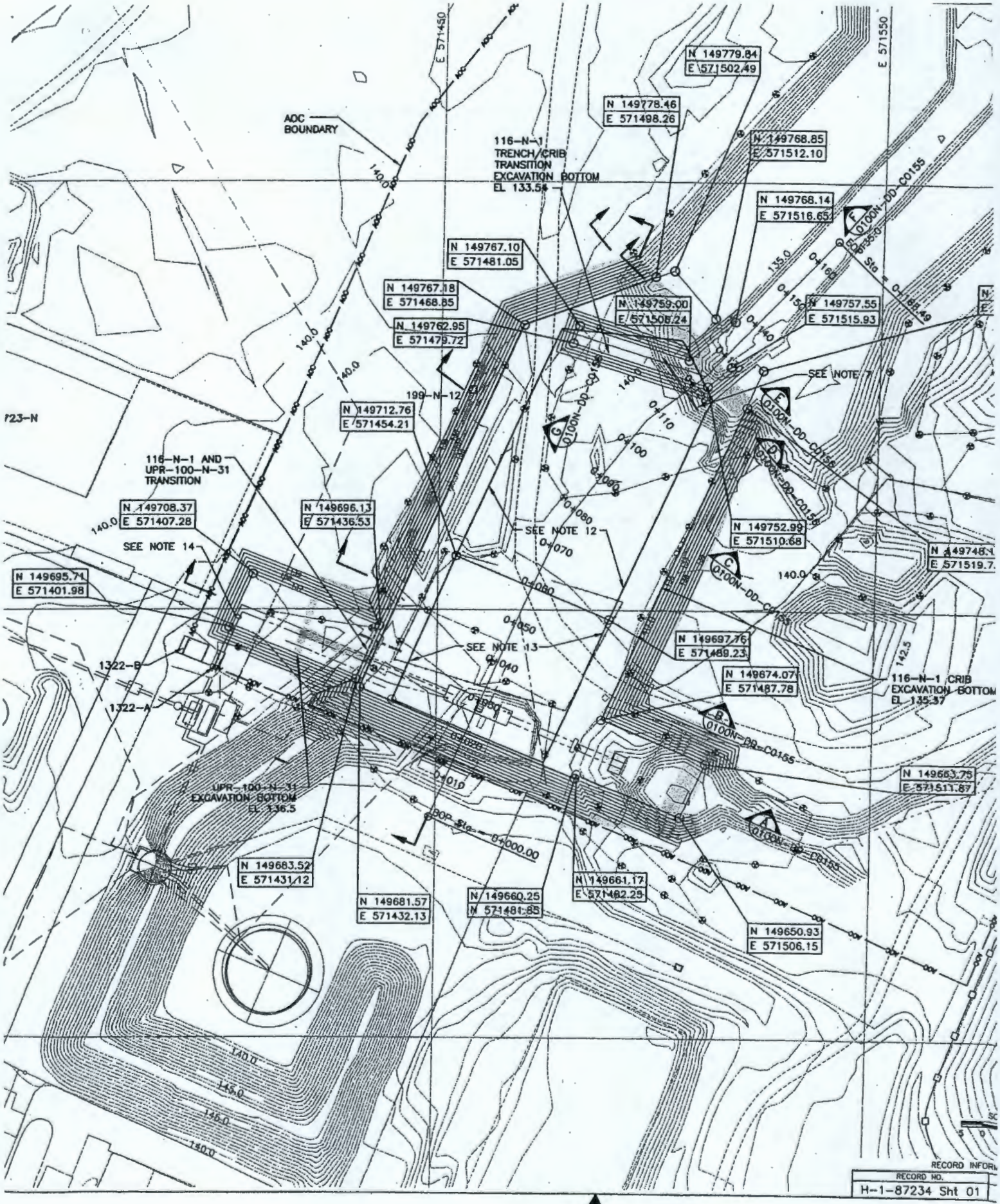
Jon Fancher ☺
100N Remedial Action STR
☎(509) 373-9556/ (509) 531-0700
page 373-PAGE, 7345
jdfanche@bhi-erc.com



pipes removed.
Want to sample as part of crib design (w/I green area)

— UPR 4 deferred piping

Area within 116-N1 Crib design

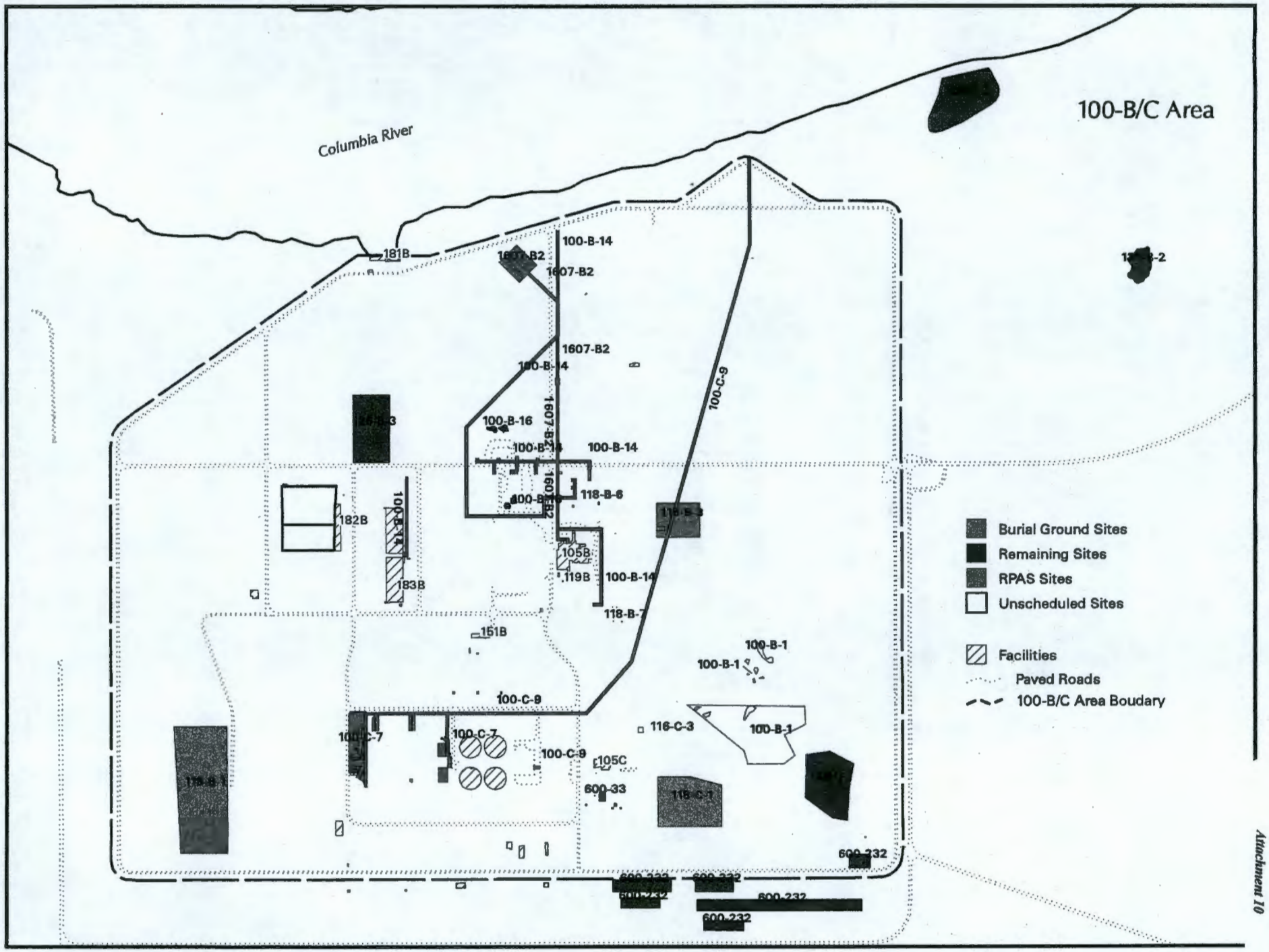
100 AREA UNIT MANAGERS' MEETING

Groundwater/ Remedial Action Unit / Source Operable Units

July 28, 2005

ATTACHMENT 10

Dean Strom Map 100 B/C Area


100-B/C Area
Columbia River
181B
1607-B2
100-B-14
1607-B2
1607-B2
100-B-14
100-C-9
100-B-16
100-B-14
100-B-14
118-B-6
182B
105B
119B
100-B-14
183B
118-B-7
151B
100-B-1
100-B-1
100-C-9
116-C-3
100-B-1
100-C-7
100-C-7
100-C-9
105C
600-33
118-C-1
600-232
600-232
600-232
600-232
600-232
Burial Ground Sites
Remaining Sites
RPAS Sites
Unscheduled Sites
Facilities
Paved Roads
100-B/C Area Boudary

Burial Grounds:

118-B-1:

Continue to load-out material from pre-sorted staging piled area. Still updating documentation to re-continue remedial activities. Waiting MOC review from DOE.

118-C-1:

Still updating documentation to re-continue remedial activities.
Waiting on MOC review from DOE.

118-B-6:

Need to secure FY06 funding to re-continue at this site. Another 5 ft in depth is targeted.

Remaining Sites:

126-B-3:

Sample design should be approved soon for the staging pile area.

128-B-3:

New scope to remediate the slide slope near the river has been initiated. Walkdown with USWFS and EPA was completed. Waiting on letter from SHPO.

128-B-2:

Close-out samples taken 6-8-05.

600-233:

Developing a sample design.

100-B-1:

Developing a sample design.

RPAS:

100-B-14 N Box Culvert:

Developing a sample design.

100-C-7:

Borehole sampling effort ETA = ~1st of Aug..
Including a discovered 3" chromium line into funding.
SEWER LINE ASSOCIATED WITH 1607-B10 TO LEAVE AS PART OF THE HEAD HOUSE FOOTPRINT

Monolith:

Removed ~7 feet. We will take samples to determine the extent of the contamination.

1607-B2:

WI for the sample design is complete.
Manhole sample completed.

Miscellaneous:

Horseshoe:

Re-excavation is complete. Should sample next week.

100 AREA UNIT MANAGERS' MEETING

Groundwater/ Remedial Action Unit / Source Operable Units

July 28, 2005

ATTACHMENT 11

Rev. 0- Treatment Plan for Treatment of 100-C-7 Remaining Pipelines and Sewers (RPAS) Chromium Contaminated Soils

Krueger, Patricia E

From: Hynes, Robert T
Sent: Thursday, July 28, 2005 4:00 PM
To: Krueger, Patricia E
Subject: FW:

Importance: High

Attachments: TREATMENT PLAN FOR FOR chromium SOILS.7-26-05.doc; TREATMENT PLAN FOR FOR LEAD SOILS.7-26-05.doc

Patricia

Here are electronic copies of the treatment plans that were presented at the UMM today.

Bob

From: Casbon, Michael A (Mike)
Sent: Thursday, July 28, 2005 8:22 AM
To: Donnelly, Jack W
Cc: Little, Nelson C; Lazarski, Thomas J; Hynes, Robert T; James, Jeff R
Subject: FW:

Jack,

Attached are the two treatment plans for lead and Chrome. The lead plan is different from previous plans in that it allows us to use the reduction ratio from a single bench scale testing against other 100 area waste streams, potentially eliminating a number of bench scale tests. It also streamlines the bench scale test routine (should we need to perform any) by allowing us to perform the test without needing to write a new treatment plan for every waste stream. We would simply perform the test and submit the results to EPA for their approval prior to treating. Treatment would then proceed according to the attached plan.

The Chrome plan does not incorporate these changes and is limited to the 100-C-7 RPAS site. It might be applied to other sites with regulator approval. At this time the EPA (i.e. Dave Einan) is not comfortable applying the streamlined approach in the lead plan to chrome. We will be doing another chrome treatment plan for the mega-chrome sample that Bob Hynes has mentioned. That treatment plan will incorporate the changes necessary to streamline future bench scale tests, but it will not eliminate them.

Please contact me if you have any questions.
Michael Casbon
ERDF Resident Engineer
373-4012
531-0752

From: Burnside, Michael E
Sent: Thursday, July 28, 2005 8:08 AM
To: Casbon, Michael A (Mike)
Subject:

TREATMENT PLAN FOR FOR chromiu... TREATMENT PLAN FOR FOR LEAD SO...

Revision 0, dated 07-26-05

TREATMENT PLAN FOR TREATMENT OF 100-C-7 REMAINING PIPELINES AND SEWERS (RPAS) CHROMIUM CONTAMINATED SOILS

1.0 Introduction

Bechtel Hanford, Inc. (BHI) is the Environmental Restoration Contractor (ERC) for the U.S. Department of Energy – Richland Operations (DOE-RL) at the Hanford Site. As the ERC, BHI is responsible for performing site investigations, characterization, remediation, and restoration of all locations identified as Remedial Action Sites at Hanford. As a result of remedial activities performed at various burial grounds, several small waste streams will require stabilization treatment of Resource Conservation and Recovery Act (RCRA) metals with concentrations above Land Disposal Restriction (LDR) limits found in 40 CFR 268.48[1] Universal Treatment Standards (UTS).

One such waste stream is the 100-C-7 Remaining Pipelines and Sewers (RPAS) site. The waste stream requires stabilization treatment of chromium prior to disposal in the Environmental Restoration Disposal Facility (ERDF) at the Hanford Site. The contribution from chromium in the waste exceeds the Land Disposal Restriction (LDR) limit in 40 Code of Federal Regulations (CFR) 268.48.

2.0 Background

Stabilization treatment has been completed at the ERDF on the basis of treatability experiments that demonstrate reduction in leachability of the RCRA metals present in the waste to levels below the UTS. The treatability experiments have been documented in Environmental Protection Agency (EPA) approved treatment plans that described the treatability experiments to be done and the full-scale treatment process. Comparison of the treatability experiment results to base-line analysis of the untreated waste via toxicity characteristic leaching procedure (TCLP)[2] yields a reduction ratio in leachability (expressed in mg/l) between the treated and untreated waste matrices. This comparison is an indication of successful treatment capacity inherent in the mixture of reagents and waste. The higher the reduction ratio, the more successful the mix will be in the full scale treatment process for rendering the waste below UTS.

This stabilization treatment process has been completed at the ERDF on a case-by-case basis – one waste stream at a time. Each individual treatment plan, documenting treatability experiment mix ratio(s) and full-scale treatment processes, has been pre-approved by EPA with careful consideration being given to the calculated reduction ratio.

3.0 Purpose

The purpose of this treatment plan is to obtain approval by EPA for stabilization of 100-C-7 RPAS waste. This treatment plan will establish a stabilization mixture for chromium and describe the actual process to stabilize the waste.

4.0 Scope

The scope of this treatment plan involves the treatment of chromium contaminated waste from the 100-C-7 RPAS site. The plan covers analysis of the treatment method, the treatability experiments, and the full-scale treatment process.

5.0 Methodology

The treatability experiments once analyzed will determine a reduction ratio between the baseline (untreated sample) waste and a treatability experiment (waste + stabilization reagent). The reduction ratio yielded in the analysis of the mixture of 100-C-7 RPAS waste and the selected reagent, if sufficient to stabilize the chromium component by reduction of leachability, will be applied in full scale treatment. For purposes of this discussion, the reduction ratio is the ratio between the analyzed baseline sample (TCLP) described above and the results of the treatability experiment (TCLP). The reduction ratio demonstrates the ultimate treatment capability of a given mixture.

As a part of this process, a baseline sample (untreated waste) will be analyzed along with a minimum of two (2) treatability experiments (waste + weighted ratio of reagent). More than one mix can be selected for comparison purposes to determine the least amount of reagent that can be successfully used in treatment to reduce cost. Two experiments with different mixtures of reagents and waste will be placed in the extraction vessel (see Table 2, SW-846, Method 1311) immediately after passing the paint filter test (a complete mix) identified in Table 2 (SW-846, Method 9095) of this treatment plan. When treatment of any constituent (in this case – Chromium) achieves a 90% reduction in concentration as measured by TCLP, that treated waste may be land disposed. The basis of this decision is found in 40 CFR 268.49 (c) (1) (B), "Alternative LDR treatment standards for contaminated soil"[3] where metals in soil must be treated to 90% reduction of leach-ability. Any treatability experiment that does not achieve a 90% reduction in comparison to the baseline sample will not be considered for stabilization of the waste.

6.0 Treatment Plan for Chromium Contaminated Waste

6.1 Waste Description

The wastes covered by this treatment plan are from the 100-C-7 waste stream. The waste is primarily made up of soil. The pile contains chromium in concentrations up to 137.0 mg/l (TCLP). No Underlying Hazardous Constituents (UHC) are present above UTS.

6.2 Hazardous Characteristics

The 100-C-7 waste is designated as mixed waste. The waste is in a solid form, primarily soil and is considered inert material. With the exception of Chromium, all other hazardous constituents are identified in quantities less than the maximum treatment standards for these contaminants in the UTS. Due to the concentrations of chromium in the soil, this waste must be treated to meet the standards in 40 CFR 268.48, or meet the

conditions identified in 40 CFR 268.49 **(c) (1) (B)** prior to land disposal. The highest detected levels of hazardous constituents in the waste and treatment standards are shown in Table 1.

Table 1. Hazardous Constituents

Constituent	Analysis	Heavy Metals (Highest value detected)	Treatment Standard (TCLP) (mg/l) 40CFR 268.48
Chromium	TCLP (mg/l)	137.0	0.6 mg/l TCLP

6.3 Treatment Standards

The treatment standard for this waste is a stabilization process for the heavy metals present utilizing a technology identified in 40 CFR 268.42[4]. Stabilization is a treatment technology that reduces the hazard potential of the waste by converting the contaminants into a less soluble mobile or toxic form.

6.4 Treatment Method

Ferrous Sulfate Heptahydrate will be used as the primary reducing reagent. Portland cement will also be used to produce a pH in the range of 9 to 11 in the TCLP leachate and to solidify the waste for disposal into the ERDF cell. The Portland cement shall conform to ASTM C150. Type I or Type II cement as defined in ASTM C150.

Water is controlled to achieve the desired consistency. Water addition to the waste matrix is done using a fire hose. Testing and suitability of the treatment technology is discussed in Section 7.0 of this treatment plan.

Several mixtures of reagents and waste were tested. The mixtures in Table 2 of this treatment plan were successful in reducing the concentration of leachable Chromium as prescribed in 40 CFR 268.49 (c) (1) (B). The lowest-cost mixture that passes the acceptance test process is typically used to treat that waste stream. Once a mixture is selected, the mixture ratios will be controlled in the field to ensure the characteristics of the production material matches the characteristics of the successful treatability experiment. Therefore, no subsequent testing of the production material is required. All sample mixtures produced during mixture development will be subjected to the acceptance tests shown in Table 2.

Table 2. Acceptance Test Program

Test	Procedure	Reference	Acceptance Limit
Free Liquid	Method 9095[5]	SW-846[6]	No free liquids
TCLP	Method 1311	SW-846	Metal concentrations less than UTS limits in 40 CFR 268.48 or 40 CFR 268.49 (c) (1)(B)

7.0 Treatability Experiments

The purpose of the treatability experiment is to establish baseline treatment parameters for stabilizing the waste. The TCLP levels for Chromium present in the untreated samples represent the baseline for determining if additional treatability experiments are needed, and to validate the mixture options prescribed in Table 3., section 7.2 of this treatment plan.

7.1 Representative Samples

The full-scale treatment may consist of mixing one (1) roll-off container of waste; one (1) drum or box of waste; or several drums or boxes of waste in a single stabilization run. Samples (in containers approximately 5 gallons in size) will be taken from the 100-C-7 RPAS site with the highest detected concentration of Chromium present as indicated in Table 1. Portions of these samples will be used as representative samples for baseline analysis and treat-ability experiments. Samples will be retrieved using appropriate sampling equipment and transported to the Waste Sampling and Characterization Facility (WSCF). Samples will be managed in accordance approved Duratek Federal Services procedures and WSCF procedures.

7.2 Treatability Experiment Test Plan

Weighted samples will be taken from the generator supplied container with the highest detected concentration of Chromium present as indicated in Table 1. This operation will be performed under a WSCF Test Plan.

Table 3 shows the successful ratios for each sample in weight percent. There are three (3) constituents - waste, Portland cement, and Ferrous Sulfate Heptahydrate.

TABLE 3. 100-C-7 RPAS Treatability Experiments

Mixture	Ferrous Sulfate Heptahydrate (Wt %)	Waste (Wt %)	Portland cement (Wt %)	Water (Wt %)
1	10	70	10	Note 1
2	10	60	20	Note 1

Note 1: Weigh out water (Wt%=10) by waste weight, but only add enough water to achieve a desired consistency in the mixture, and enough water necessary for dissolving Ferrous Sulfate Heptahydrate.

Stoichiometric calculations (Conner [7]) were initially performed to determine the ratios in Table 3. It was determined that the Chromium level in the 100-C-7 RPAS TCLP leachate was fairly high – 137 mg/l – and was likely to be primarily in the Cr^{+6} valence state. Due to the 20:1 dilution in the test, the actual dissolved Chromium would be approximately 2740 mg/l, or 93% of the total Chromium available. Nearly all of the Chromium would be leachable. In this situation, stabilization of the Chromium can not be achieved without reduction of Cr^{+6} to Cr^{+3}, followed by addition of sufficient alkali in the form of cement to produce a pH in the preferred range of 9 to 11 in the TCLP leachate. The cement addition is determined experimentally, based on previous experience.

The preferred reducing agent was determined to be Ferrous Sulfate Heptahydrate ($FeSO_4 \cdot 7H_2O$), because of its low cost, ease of use and safety in use. Thus, reduction of all of the Cr^{+6} to Cr^{+3} would require about 47 grams of Ferrous Sulfate Heptahydrate per kilogram of soil or 4.7% by weight on a stoichiometric basis. Since the presence of other reducible species in the soil is unknown, an excess of reductant should be used; generally, a 10% excess is sufficient if no other reducible species is present. Since some of the Chromium is likely in the Cr^{+6} valence state already, the addition of 5% reductant was assumed to be sufficient if all assumptions were correct.

After an unsuccessful attempt to achieve the proper reduction of leachable Chromium in the first two treatability experiment mixtures, the laboratory test plan was modified to increase the reduction of Cr^{+6} to Cr^{+3}. Two changes were made in the test plan: 1) Increasing the set time after mixing the Ferrous Sulfate Heptahydrate and waste and prior to adding Portland cement from 10 minutes to one (1) hour. 2) The weight percent of Ferrous Sulfate Heptahydrate was increased from 5% to 10% and the waste weight was reduced in both mixtures by 5%. The changes in set time, increase in Ferrous Sulfate Heptahydrate loading, and reduction in waste loading achieved a sufficient reductant capability in both Mix 1 and 2 to reduce TCLP levels sufficiently to meet the requirements of 40 CFR 268.49 (c) (1) (B).

Water was added as required to dissolve the Ferrous Sulfate Heptahydrate, and for hydration of the Portland cement. The amount added depended on the water content of the soil, the requirement for proper mixing, and the amount of Portland cement used.

The WSCF laboratory test plan utilized to prepare and analyze the two successful mixtures is summarized as follows:

7.2.1 Weight out the ratioed amounts for each sample in accordance with Table 3 to give a final weight of 120 grams.

7.2.2 Dissolve the Ferrous Sulfate Heptahydrate in water (add water slowly) then add the solution to the soil and mix. Allow the mixture to set for one (1) hour before adding the Portland cement. Obtain a pH of the mixture after the Ferrous Sulfate Heptahydrate is added, but before adding Portland cement. This standing time is necessary to allow the reduction reaction to approach completion before adding cement, which raises the pH and slows or stops reduction.

7.2.4 After one (1) hour, add the required amount of Portland cement and mix the materials. Then remove five (5) grams of the mixture and follow Method 1311 for determination of pH.

7.2.5 A Paint Filter Test will be performed on the mixture of waste, Ferrous Sulfate Heptahydrate, and Portland cement immediately after finishing the mixing process and every 5 minutes thereafter, if needed to determine when the mixture contains no free liquids

7.2.6 As soon as the materials pass the paint filter test, place them in the TCLP extraction vessel, sizing as necessary to meet the requirements of Method 1311.

7.2.7 Add the proper extraction fluid (fluid 1 or 2) as determined from step 7.2.4 determination of pH.

7.2.8 Place the extraction vessels in the TCLP rotator for the time required by Method 1311, note the time, temperature and rotation speed and record in the TCLP logbook as required by Method 1311.

7.2.8 When the extraction period has finished, remove the vessels from the rotator, note the time and temperature and record in the TCLP logbook. Filter approximately 250mL of the fluid, into a properly labeled poly bottle; measure and record the pH, then acidify < 2 pH and store in the appropriate refrigerator.

7.2.9 Analyze the filtered TCLP extract.

NOTE: The material will be mixed by hand with a spoon. Any unused sample material will be bagged and placed back into an appropriate waste container. A Paint Filter Test (PFT) (Method 9095 of SW 846) will be conducted in five-minute intervals and will be performed on each mixture. The PFT will establish the time at which the mixture has no free liquids. This will establish the disposal time of the mixture in the full-scale process.

7.3 Evaluation of Test Results

The treatability experiment results were analyzed against the baseline untreated TCLP results .from a large waste sample contained in the 5 gallon container from the 100-C-7 RPAS site. Any mixture that produced an analytical result below regulatory limits and that demonstrated that substantial treatment has been accomplished by comparing treatability experiment test results with regulatory limits is provided below for regulatory

agencies concurrence that the mixture provides successful treatment. Any mixture that is determined to not be successful cannot be used for the treatment of the waste. Verification sampling will not be required for successful treatment mixes that regulatory agencies have concurred with.

The successful mixtures (from Table 3) are identified in Table 4 along with the baseline, untreated TCLP results from the soil sample, and the resulting reduction ratio.

TABLE 4. 100-C-7 RPAS Treat-ability Experiments (Including Results and Reduction Ratios)

Mixture	Ferrous Sulfate Heptahydrate (Wt %)	Waste (Wt %)	Portland cement (Wt %)	Water (Wt %)	Result (TCLP – mg/l)	Reduction Ratio
Baseline	-	-	-	-	94.8	-
1	10	70	10	10% or to desired consistency	5.51	17:1
2	10	60	20	10% or to desired consistency	2.82	34:1

The UTS for Chromium is 0.6 mg/l TCLP. Based on the TCLP results identified in Table 4, treatment of Chromium using either Mix 1 or Mix 2 would result in a concentration that achieves 90% reduction required by 40 CFR 268.49 (c) (1) (B), "Alternative LDR treatment standards for contaminated soil"[3] where metals in soil must be treated to 90% reduction of leach-ability. In addition, 90% reduction of leachable Chromium is achieved in both Mix 1 and Mix 2 when their respective reduction ratios are applied to the highest detected concentration (Table 1).

8.0 Stabilization of 128B2 Chromium Waste

The stabilization of the 100-C-7 RPAS Chromium contaminated waste will be completed using a mixing box at the ERDF site (section 8.4).

8.1 Determine Mixture Volumes and Weights

The bounding net waste weight of a container will be established for the 100-C-7 RPAS waste and will be used to establish the proper mix ratio. Water will be added to a desired consistency. Ferrous Sulfate Heptahydrate and Portland cement will be added according to the successful treatability experiment test(s) (see section 7.2 of this treatment plan).

8.2 Equipment and Supplies for Stabilization in the Mix Box

- Mix box
- Portland cement mix (1 or 2 ton Ag bags)
- Ferrous Sulfate Heptahydrate
- Water supply
- Track hoe
- Dozer
- Fork lift and drum attachments
- Hand tools, rope, and appropriate signage.

8.3 Mobilization for Stabilization in the Mix Box

- Procedures, including work plans, Radiation Work Permits (RWPs), job specific Activity Hazards Analyses (AHA) will be developed and/or current for mixing operations.
- Perform training of personnel to procedures/equipment and complete dry-run(s) with inert material as needed.

8.4 Stabilization Process using the Mix Box

- Prepare the mix box area with access and egress points for haul trucks transporting roll-off cans or fork lift with drum attachments.
- Ensure that personnel have inspected the area for soil fissures and run off.
- Inspect the mix box for cracks and other damage. Note: If damage is observed, do not start treatment operations.
- Dump waste into the mix box. Ensure that water is available as dust suppressant.
- Verify that the waste container is visibly clean.
- Waste will be mixed in accordance with section 8.5 of this treatment plan.
- Clean the mix box after mixing using Daily Operations Cover (DOC).
- If waste is in the mix box and cannot be mixed until the next day, cover with fixative prior to stopping mix box operations.

8.5 Mixing the Waste

The calculated volume of water may be added to the waste using a totalizer to ensure the correct addition of water. The actual amount of water may vary dependent upon the moisture content of the waste. Water will be added at pressures that do not allow spread of material outside of the mix box. The calculated amount of Ferrous Sulfate Heptahydrate will be dissolved in water and added to the soil as determined by the successful treatability experiment. After the one (1) hour wait time, Portland cement will then be added to the mix. The mixing process will be monitored by operations supervision to ensure proper mixing and to ensure that incomplete or improper mixing such as dry spots and/or excessive wet mixtures do not occur. Dry spots require further mixing and/or additional water. Excessively wet mixtures will be allowed additional

time to cure inside the mix box prior to disposal, or may require additional Portland cement.

8.6 Disposal of Stabilized Waste

After such time that the waste can be handled without dripping from excessively wet mixtures, or particulate resulting from excessive dry mixtures, the mixture will be removed from the mix box and placed into in the ERDF landfill. The minimum set-up time within the mix box is based upon the time established in the treatability experiment as when the mixture passed the paint filter test. The minimum set up time is 10 minutes.

8.7 Sampling

The stabilization reagents, waste, and process used in the treatability experiments are meant to represent the process for full-scale treatment. The results of the successful treatability experiments will constitute the LDR compliance for disposal per 40 CFR 268.7 (c) (2)[8].

8.8 Spill Response

In the event of a spill outside the mix box, follow the ERDF Health and Safety Plan (DFS-ERDF-002.1, current revision[9]) to implement initial spill control. The cleanup will be accomplished by using available ERDF equipment (i.e., shovels, drums etc.). Radiological controls will be used to protect personnel from any radiological hazards associated with the spill cleanup.

Loss of waste (a spill) within the ERDF cell is not considered a spill to the environment, but will be cleaned up in the same manner. In both cases, the waste will be placed into containers, the weight of the containers will be re-verified on the ERDF truck scale, and transported back to the Contamination Area (CA) set up for treatment operations to resume treatment operations for proper disposal.

9.0 References

The following references were used in the preparation of this treatment plan.

1. 40 Code of Federal Regulations (CFR) 268.48, "Universal Treatment Standards."
2. SW-846, 1998, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, Rev. 5., U.S. Environmental Protection Agency, Method 1311.
3. 40 CFR 268.49 (c) (1) (B), "Alternative LDR treatment standards for contaminated soil."
4. 40 CFR 268.42, "Treatment Standards Expressed as Specified Technologies."
5. SW-846, 1998, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, Rev. 5., U.S. Environmental Protection Agency, Method 9095.
6. SW-846, 1998, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, Rev. 5., U.S. Environmental Protection Agency, Method 9095.
7. Stoichiometirc Calculation and Determination of Recipes to Immobilize Chromium in a Contaminated Soil, Jesse R. Conner, February 26, 2005
8. 40 CFR 268.7, "Testing, Tracking, and Recordkeeping Requirements for Generators, Treaters, and Disposal Facilities."
9. ERDF Health and Safety Plan, DFS-ERDF-002.1, Section 14.0, Spill Response Plan.
10. Decontamination Procedure, DFS-ERDF-002.10 (D).

Revision 0, Dated 7/26/2005

TREATMENT PLAN AND PROTOCOLS FOR TREATMENT OF LEAD CONTAMINATED SOILS AND OTHER LEAD CONTAMINATED WASTE MATRICES

1.0 Introduction

Bechtel Hanford, Inc. (BHI) is the Environmental Restoration Contractor (ERC) for the U.S. Department of Energy – Richland Operations (DOE-RL) at the Hanford Site. As the ERC, BHI is responsible for performing site investigations, characterization, remediation, and restoration of all locations identified as Remedial Action Sites at Hanford. As a result of remedial activities performed at various burial grounds, several small waste streams will require stabilization treatment of Resource Conservation and Recovery Act (RCRA) metals with concentrations above Land Disposal Restriction (LDR) limits found in 40 Code of Federal Regulations (CFR) 268.48[1] Universal Treatment Standards (UTS).

There are a number of these small waste streams at the 100 Areas, including the Remaining Pipelines and Sewers (RPAS) site. The waste streams require stabilization treatment of lead prior to disposal in the Environmental Restoration Disposal Facility (ERDF) at the Hanford Site. The contribution from lead in the waste exceeds the Land Disposal Restriction (LDR) limit in 40 CFR 268.48.

2.0 Background

Stabilization treatment has been completed at the ERDF on the basis of treatability experiments that demonstrate reduction in leachability of the RCRA metals present in the waste to levels below the UTS. The treatability experiments have been documented in Environmental Protection Agency (EPA) approved treatment plans that described the treatability experiments to be done and the full-scale treatment process. Comparison of the treatability experiment results to base-line analysis of the untreated waste via toxicity characteristic leaching procedure (TCLP)[2] yields a reduction ratio in leachability between the treated and untreated waste matrices. This comparison is an indication of successful treatment capacity inherent in the mixture of reagents and waste.

This stabilization treatment process has been completed at the ERDF on a case-by-case basis – one waste stream at a time. Each individual treatment plan, documenting treatability experiment mix ratio(s) and full-scale treatment processes, has been pre-approved by EPA with careful consideration being given to the calculated reduction ratio.

Lead contamination in various waste matrices has been successfully stabilized at the ERDF via the described treatment process. A soil and Portland cement mixture analyzed in 1999 yielded a reduction ratio of 280:1 upon completion of the mixing process – and a reduction ratio of 1000:1 - 20 minutes after complete mixing.

A Uranium-Oxide (UOx) and Portland cement mix analyzed in 2003 yielded a reduction ratio of 53:1 upon completion of mixing. Note that the Method Detection Limits (MDL) established for the analytical method prescribed for the UOx and Portland cement mixture limited the true analytical results and corresponding reduction ratio at 53:1. It is, however, postulated that the actual reduction ratio was likely much greater than 53:1. The reduction ratios described above indicate that lead can be treated with confidence using Portland cement as a stabilization reagent.

For comparison purposes, it is assumed that waste streams in the 100 Areas will be similar in the type of media (e.g. soils) and lead will be similar in composition within the waste matrices.

3.0 Purpose

The purpose of this treatment plan is to establish a pre-approval by EPA for stabilization of lead when analysis indicates that the reduction ratio generated from the treatability experiments described in this treatment plan is sufficient to assure treatment of similar waste streams. In addition, this treatment plan will establish stabilization mixtures for lead and describe the actual process to stabilize the waste.

4.0 Scope

The scope of this treatment plan involves the treatment of lead contaminated waste from 100 Areas. The plan covers analysis of the treatment method, the treatability experiments, full-scale treatment process, and the protocol for establishment of the reduction ratio that could allow approval of similar 100 Area waste streams to be stabilized under this treatment plan.

5.0 Protocol

The treatability experiments completed for a given waste stream [e.g., Remaining Pipelines and Sewers (RPAS)] can be used to establish a reduction ratio that can be compared to other 100 Area waste streams baseline analyses (TCLP) in order to determine if the treatability experiment mixtures from that waste stream could successfully stabilize lead in the other 100 Area waste streams to concentrations below UTS. The reduction ratio yielded in the analysis of the mixture of that waste stream and the selected reagent must, however, demonstrate a sufficient reduction in leachability for stabilization of the lead component before being applied to other 100 Area waste streams.

As a part of this process, a baseline sample (untreated waste) will be analyzed along with a minimum of two (2) treatability experiments (waste + weighted ratio of reagent). More than one mix can be selected for comparison purposes to determine the least costly, successful mix. The first experiment will require the mixture to be placed in the extraction vessel (see Table 2, SW-846, Method 1311) immediately after it passes the paint filter test (a complete mix) identified in Table 2 (SW-846, Method 9095) of this treatment plan. The second experiment will require a 20 minute wait time after passing

the same paint filter test before placing the mixture in the extraction vessel. Any treatability experiment that reduces the leachability of lead by 90% of the baseline will be considered a successful mixture for full scale treatment operations. Any treatability experiment that does not achieve a 90% reduction in comparison to the baseline sample will not be considered for stabilization of the waste. The basis of this decision is found in 40 CFR 268.49 (c) (1) (B), "Alternative LDR treatment standards for contaminated soil"[3] where metals in soil must be treated to 90% reduction of leachability.

For the purposes of determining applicability of this treatment plan to other 100 Area waste streams, reduction ratios developed from the experimental process described above will be applied to other similar 100 Area waste streams contaminated with lead. It will be assumed that the waste matrices are similar in nature, and the composition of lead is also similar. One half (50%) of the reduction ratio from any successful treatability experiment described above may be applied to other 100 Area waste streams to achieve the required 90% reduction of leachability. For purposes of this discussion, the reduction ratio is the ratio between the analyzed baseline sample (TCLP) described above and the results of the treatability experiment (TCLP). The reduction ratio demonstrates the ultimate treatment capability of a given mixture. For conservatism, only 50% of that capability will be applied to other waste streams.

For example, assume that a new 100 Area waste site has a lead concentration that leaches at of 80 mg/l (TCLP). Further assume that 50% of the reduction ratio of one of the experiments described above is 100:1. This ratio would be applied to reduce the leachability of the lead from 80 mg/l to 0.8 mg/l which is greater than a 90 % reduction of the leachability of lead (7.2 mg/l) from the new 100 Area waste stream. Therefore. The reagent mixture used to generate that particular reduction ratio would be approved for treatment of new 100 Area waste streams.

6.0 Treatment Plan for Lead Contaminated Waste

6.1 Waste Description

The wastes covered by this treatment plan can be for any given 100 Area waste streams that require stabilization of lead. The waste is primarily made up of soil and has lead in similar composition. As a starting point, soil contaminated with lead in concentrations up to 53 mg/l (TCLP) from the RPAS will be analyzed.

6.2 Hazardous and Radiological Characteristics

The waste may be designated as mixed waste. The radiological constituents will be assumed to be any concentration acceptable in the ERDF landfill as prescribed in BHI-00139, "Environmental Restoration Disposal Facility Waste Acceptance Criteria"[4]. The waste is in a solid form, primarily soil – but may be comprised of other media (e.g., garnet from sand blasting operations, other media that is not considered debris) and is considered inert material. With the exception of lead, the heavy metals present, and other constituents present such as organics, are identified in quantities less than the maximum

treatment standards for these contaminants in Subpart D, Code of Federal Regulations (CFR) 40 CFR 268.40[5], "Treatment Standards for Hazardous Waste." Due to the concentrations of lead in the soil, this waste must be treated to meet the standards in 40 CFR 268.49 prior to land disposal. The highest detected levels of hazardous constituents in the waste and treatment standards are shown in Table 1.

Table 1. Hazardous Constituents

Constituent	Analysis	Heavy Metals (Highest value detected)	Treatment Standard (TCLP) (mg/l)
Lead	TCLP (mg/l)	53.0	5.3 mg/l TCLP

Note: Actual baseline samples analyzed may yield a different concentration.

6.3 Treatment Standards

The treatment standard for this waste is a stabilization process for the heavy metals present utilizing a technology identified in 40 CFR 268.42[6]. Stabilization is a treatment technology that reduces the hazard potential of the waste by converting the contaminants into their least soluble mobile or toxic form.

6.4 Treatment Method

A Portland cement-based stabilization method will be used. The Portland cement shall conform to ASTM C150. Type I or Type II cement as defined in ASTM C150 is acceptable.

Water is controlled to achieve the desired consistency. Water addition to the waste matrix is done using a fire hose. Testing and suitability of the treatment technology is discussed in Section 7.0 of this treatment plan.

The mixtures will be analyzed in accordance with Table 2 of this treatment plan. The lowest-cost mixture that passes the acceptance test process will be used to treat that waste stream. Once a mixture is selected, the mixture ratios will be controlled in the field to ensure the characteristics of the production material matches the characteristics of the treatability experiment. Therefore, no subsequent testing of the production material is required. All sample mixtures produced during mixture development will be subjected to the acceptance tests shown in Table 2.

Table 2. Acceptance Test Program

Test	Procedure	Reference	Acceptance Limit
Free Liquid	Method 9095[7]	SW-846[8]	No free liquids
TCLP	Method 1311	SW-846	Metal concentrations less than UTS limits in 40 CFR 268.48

7.0 Treatability Experiments

The purpose of the treatability experiment is to establish baseline treatment parameters for stabilizing the waste. The TCLP levels for heavy metals present in the treatability experiment samples represent the baseline for determining if additional treatability experiments are needed, and to validate the mixture options prescribed in Table 3., section 7.2 of this treatment plan.

7.1 Representative Samples

The full-scale treatment will consist of mixing one (1) roll-off can of waste in a single stabilization run. Samples for the treatability experiments (in containers up to 5 gallons full) will be taken from a selected pile with the highest detected concentration of heavy metals present as indicated in Table 1. Portions of these samples will be used as representative samples for baseline analysis and treatability experiments. Samples will be retrieved using appropriate sampling equipment and transported to the Waste Sampling and Characterization Facility (WSCF). Samples will be managed in accordance with approved Duratek Federal Services procedures and WSCF procedures.

7.2 Treatability Experiment Test Plan

Weighted samples will be taken from each generator supplied container with the highest detected concentration of heavy metals present as indicated in Table 1. This operation will be performed under a WSCF Test Plan.

Table 3 shows the ratios for each sample in weight percent. There are two (2) constituents - Portland cement and Waste.

Table 3. Treatability Experiments

Mixture	Waste (Wt %)	Cement (Wt %)	Water (Wt %)
1	79	21	Note 1
2	70	30	Note 1

Note 1: Water will be added to achieve a desirable consistency in the finished mixture.

7.2.1 Weight out the ratio-ed amounts for each sample in accordance with Table 3 to give a final weight of 120 grams. Mix the materials, remove five (5) grams of the mixture and follow Method 1311 for determination of pH.

7.2.2 Add water to the mixture to achieve desired consistency.

7.2.3 A Paint Filter Test will be performed on the mixture immediately after finishing the mixing process and every 5 minutes thereafter, if needed to determine when the mixture contains no free liquids As soon as the materials pass the paint filter test, place them in the TCLP extraction vessel, sizing as necessary to meet the requirements of Method 1311.

7.2.4 For both mixes (Mixtures 1 and 2, Table 3) duplicate the mix ratio and mixing process. Allow the mixture (100 grams) to cure for 20 minutes after passing the paint filter test and then place the cured mixture in to the TCLP extraction vessel.

7.2.5 Add the proper extraction fluid (fluid 1 or 2) as determined from step 7.2.1 to determine a pH.

7.2.6 Place the extraction vessels in the TCLP rotator for the time required by Method 1311, note the time, temperature and rotation speed and record in the TCLP log-book as required by Method 1311.

7.2.7 When the extraction period has finished, remove the vessels from the rotator, note the time and temperature and record in the TCLP logbook. Filter approximately 250mL of the fluid, into a poly bottle properly labeled; acidify < 2 pH and store in an approved refrigerator.

7.2.8 Analyze filtered TCLP extract. Any unused sample material will be bagged and placed back into an appropriate waste container.

7.3 Evaluation of Test Results

The treatability experiment results will be analyzed against the baseline untreated TCLP results for the original TCLP results regulating the soil pile, the baseline sample results prepared from waste contained in the 5 gallon container, and the regulatory limits. Any mixture/duration that produces an analytical result below regulatory limits (e.g., a reduction of 90%) and that demonstrates that substantial treatment has been accomplished by comparing treatability experiment test results with regulatory limits will be provided to the regulatory agencies for concurrence that the mixture provides successful treatment. The mixture that is determined by the regulatory agencies to not be successful cannot be used for the treatment of the waste. Verification sampling will not be required for successful treatment mixes that regulatory agencies have concurred with. NOTE: Results of the treatability experiments will be provided in a separate report.

8.0 Stabilization of Lead Contaminated Waste

The stabilization of the lead contaminated waste will be completed using a mixing box at the ERDF site (section 8.4).

8.1 Determine Mixture Volumes and Weights

The bounding net waste weight of a container will be established for the lead contaminated waste and will be used to establish the proper mix ratio. Water will be added to a desired consistency. Portland cement will be added according to the successful treatability experiment test(s) (see section 7.2 of this treatment plan).

8.2 Equipment and Supplies for Stabilization in the Mix Box

- Mix box
- Cement mix (1 or 2 ton Ag bags)
- Water supply
- Track hoe
- dozer
- Hand tools, rope, and appropriate signage.

8.3 Mobilization for Stabilization in the Mix Box

- Procedures, including work plans, Radiation Work Permits (RWPs), job specific Activity Hazards Analyses (AHA) will be developed and/or current for mixing operations.
- Perform training of personnel to procedures/equipment and complete dry-run(s) with inert material as needed.

8.4 Stabilization Process using the Mix Box

- Prepare the mix box are with access and egress points for haul trucks transporting roll-off cans or drums of lead contaminated waste.
- Ensure that personnel have inspected the area for soil fissures and run off.
- Ensure that the mix box is inspected for cracks and other damage from prior mixing operations. Note: Do not proceed with mixing operations if damage is present.
- Dump waste from the roll-off can or drum(s) into the mix box. Ensure that water is available as dust suppressant.
- Add Portland cement in the percent specified based on the selected successful treatability experiment.
- Waste will be mixed in accordance with section 8.5 of this treatment plan.
- Clean the mix box after mixing using Daily Operations Cover (DOC).
- If waste is in the mix box and cannot be mixed until the next day, cover with fixative prior to stopping mix box operations.

8.5 Mixing the Waste

Add water using a fire hose. The actual amount of water may vary dependent upon the moisture content of the waste. Water will be added at pressures that do not allow spread

of material outside of the mix box. The calculated amount of Portland cement will then be added to the mix. The mixing process will be monitored by operations supervision to ensure proper mixing. Signs of incomplete or improper mixing are dry spots and/or excessive wet mixtures. Dry spots require further mixing and/or additional water. Excessively wet mixtures will be allowed additional time to cure inside the mix box prior to disposal, or may require additional cement.

8.6 Disposal of Stabilized Waste

After such time that the mixture passes the paint filter test, as determined during the treatability experiments, dispose of the mixture in the ERDF cell. The minimum set-up time within the mix box will be based upon the time established in the treatability experiment and visual observations (see section 7.0 of this treatment plan). Only after the proper set-up time (cure time) for the mixture has elapsed, the waste will be placed in the ERDF landfill.

8.7 Sampling

The stabilization reagents, waste, and process used in the treatability experiments are meant to represent the process for full-scale treatment. The results of the successful treatability experiments will constitute the LDR compliance for disposal per 40 CFR 268.7 (c) (2)[9].

8.8 Spill Response

In the event of a spill outside the mix box, follow the ERDF Health and Safety Plan (DFS-ERDF-002.1, current revision[10]) to implement initial spill control. The cleanup will be accomplished by using available ERDF equipment (i.e., shovels, drums etc.). Radiological controls will be used to protect personnel from any radiological hazards associated with the spill cleanup.

Loss of waste (a spill) within the ERDF cell is not considered a spill to the environment, but will be cleaned up in the same manner. In both cases, the waste will be placed into containers, the weight of the containers will be re-verified on the ERDF truck scale, and transported back to the ERDF cell for proper disposal.

8.9 Breakdown of Mixing Operation

The used mix box may be retrieved and dragged to a location for future use, using the excavator and bulldozers. The excavator will be de-contaminated (if not a regulated machine, and if used) using dry decontamination methods and release. Decontamination will be performed in accordance with DFS-ERDF-002-10 (D), *Decontamination Procedure*[11].

9.0 References

The following references were used in the preparation of this treatment plan.

1. 40 Code of Federal Regulations (CFR) 268.48, "Universal Treatment Standards."
2. Toxicity Characteristic Leaching Procedure (TCLP)SW-846, 1998, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, Rev. 5., U.S. Environmental Protection Agency, Method 1311.
3. 40 CFR 268.49 (c) (1) (B), "Alternative LDR treatment standards for contaminated soil."
4. BHI-00139, "Environmental Restoration Disposal Facility Waste Acceptance Criteria," current revision.
5. 40 CFR 268.40, "Applicability of Treatment Standards."
6. 40 CFR 268.42, "Treatment Standards Expressed as Specified Technologies."
7. SW-846, 1998, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, Rev. 5., U.S. Environmental Protection Agency, Method 9095.
8. SW-846, 1998, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*, Rev. 5., U.S. Environmental Protection Agency.
9. 40 CFR 268.7, "Testing, Tracking, and Recordkeeping Requirements for Generators, Treaters, and Disposal Facilities."
10. ERDF Health and Safety Plan, DFS-ERDF-002.1, Section 14.0, Spill Response Plan.
11. Decontamination Procedure, DFS-ERDF-002.10 (D).

100 AREA UNIT MANAGERS' MEETING

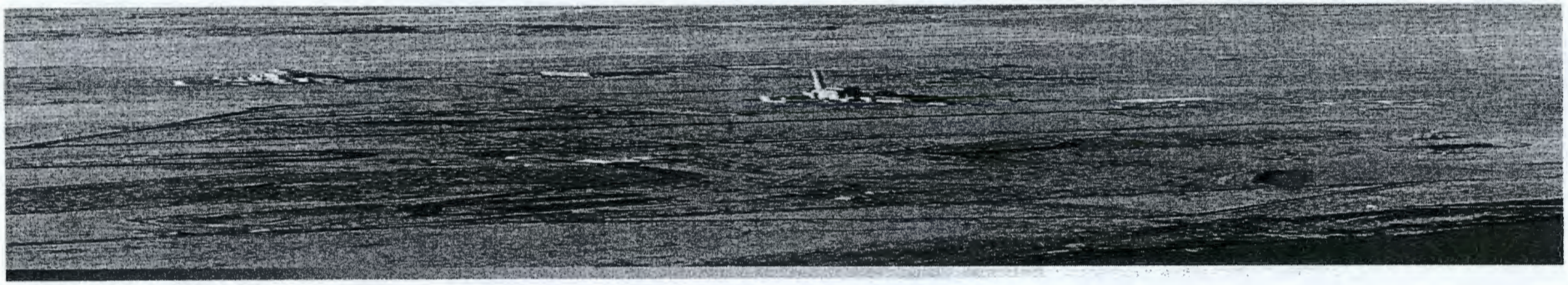
Groundwater/ Remedial Action Unit / Source Operable Units

July 28, 2005

ATTACHMENT 12

100 Area Burial Ground in Process Soil Sampling

Paddy



100 Area Burial Ground In Process Soil Sampling

Bechtel Hanford, Inc.
Environmental Restoration Contractor

7/28/05 100 UMM

Attachment 12

Background

100 Area Burial Ground Sampling

- Section III.1.5 is the waste designation sampling section. This section of the plan states, "Waste designation is presented for information purposes only and the generator is responsible for proper waste designation.
- Table III-7 identifies one in process soil sample every 150 cubic yards.
- In process soil data has been gathered on 100-B/C burial grounds

Waste Characterization

Data Evaluation of In Process Soil Sampling

Table shows approximate number of in process soil samples

Location	Data	Total
100 BC decon pad	Totals - Metals	1
	TCLP - Metals	
118-B-1	Totals - Metals	397
	TCLP - Metals	119
118-B-3	Totals - Metals	120
	TCLP - Metals	3
118-B-4	Totals - Metals	14
	TCLP - Metals	1
118-B-5	Totals - Metals	24
	TCLP - Metals	6
118-B-6	Totals - Metals	9
	TCLP - Metals	1
118-B-7	Totals - Metals	5
	TCLP - Metals	1
118-C-1	Totals - Metals	48
	TCLP - Metals	
118-C-2	Totals - Metals	1
	TCLP - Metals	1
Total Totals - Metals		619
Total TCLP - Metals		132

Waste Characterization

Sampling Results

	Totals (mg/kg)								TCLP (mg/L)							
	Ba	Ag	As	Cd	Cr	Hg	Se	Pb	Ba	Ag	As	Cd	Cr	Hg	Se	Pb
AVERAGE	78.8625	0.0320	1.6384	4.8949	11.0501	50.8176	0.1647	20.8521	0.2583	0.0048	0.0228	0.0177	0.0051	0.0048	0.0262	0.0863
STDEV	55.3130	0.0761	5.4579	3.6640	9.7145	99.9151	0.3797	118.4532	0.1374	0.0008	0.0030	0.0464	0.0021	0.0058	0.0056	0.4867
MAX	518.7000	0.7200	132.7000	29.4700	159.9000	576.0000	2.4000	2832.0000	0.9320	0.0079	0.0371	0.3590	0.0151	0.0289	0.0451	5.5600
MIN	26.0700	0.0003	0.0030	0.0000	1.6000	0.0100	0.0035	1.6000	0.0969	0.0030	0.0170	0.0018	0.0024	0.0001	0.0170	0.0114
LIMIT									100	5	5	1	5	0.2	1	5

Conclusion

- *In process soil data are within Land Disposal Restriction Limits as expected due to:*
  - *Anomalous material or suspect material is segregated out*
  - *Stained soils are sampled separately and stockpiled separately for potential treatment*
- *Existing segregation and sorting process are working*
- *Waste designation data are sufficient for waste streams*
- *As the generator, we will not take additional in process soil samples except as directed by our waste management specialist*