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FINAL

Meeting Minutes Transmittal/Approval
Unit Manager's Meeting: 100 Aggregate Area/100 Area Operable Units
3000 George Washington Way, Walkley Boardroom, Richland, Washington
September 28, 1994

FROM/APPROVAL: Nancy Werdel Date 3/16/95
Nancy Werdel, 100 Area Unit Manager, RL (A5-19)

APPROVAL: [Signature] Date 3/15/95
Phil Staats, 100 Aggregate Area Unit Manager, WA Department of Ecology

APPROVAL: [Signature] Date 3-16-95
Dennis Faulk, 100 Aggregate Area Unit Manager, EPA (B5-01)

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

- Attachment #1 - Meeting Summary
- Attachment #2 - Attendance Record
- Attachment #3 - Agenda
- Attachment #4 - Action Item Status List
- Attachment #5 - September Unit Manager's Meeting 100 Area Status Package
- Attachment #6 - Dust Suppressant and Wash Water Recycling Tests on 116-D-1B Trench Soil
- Attachment #7 - 100-HR-3 Pump & Treat
- Attachment #8 - Groundwater/River Interaction in the 100 Areas

Prepared by: Kay Kimmel Date: 3-21-95
Kay Kimmel, Bob Scheck GSSC (B1-42)

Concurrence by: [Signature] Date: 3/16/95
~~Bob Henckel, BHI Coordinator (H6-02)~~
Greg Eidam



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Attachment #1
Meeting and Summary of Commitments and Agreements

Unit Manager's Meeting: 100 Aggregate Area/100 Area Operable Units
September 28, 1994

1. SIGNING OF THE AUGUST 100 AREA UNIT MANAGER'S MEETING MINUTES - Minutes were approved with no changes.
2. ACTION ITEM UPDATE: (See Attachment #4 for complete status, items listed below indicate the update to Action Items made during the meeting):

1AAMS.15 Still being pursued.

3. NEW ACTION ITEMS:

No new action items were initiated.

4. 100 AREA ACTIVITIES:

100 Area Status

- Operable Unit Status: Attachment #5 was provided for general information on the 100 Areas Operable Units.
- 100-D Area - Joan Woolard provided the general status.

SOIL WASHING STATUS - Shas Mattigod provided an update on the status of soil washing activities. He provided a handout (see Attachment #6) and noted that the soil washing objectives are listed on page 2. He noted that the effect of the use of dust suppressants on the recyclability of wash water is unknown.

Regarding the soil washing milestone and RL's change package request for an extension, RL does not consider the milestone to have slipped until such time as the regulators inform RL in writing that they don't agree with the submitted change package. At that time RL would go into dispute resolution. The TPA requires that regulators provide written rejection of any change request within 14 days. Otherwise, RL will continue with soil washing study.

HR-3 PUMP & TREAT - Douglas Vaught provided a handout (see Attachment #7) on the status of 100-HR-3 Pump and Treat activities. A meeting was scheduled for October 12, 1994 to discuss the Phase II work activities.

- 118-B-1 Excavation - Jil Frain provided the status of activities at the 118-B-1 burial ground excavation treatability test. She indicated that 1800 cubic yards of overburden were removed. She noted that mockups have been useful tools to provide means to pre-plan and anticipate many field problems.
- 100-B/C Area - Greg Eidam noted a change to Attachment #5 for the B Area. He relayed that the schedules for the Focused Feasibility Studies and Proposed Plans are being accelerated for 100-BC-1 and 100-BC-5 Operable Units.

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- Vortec Vitrification Testing - Joan Woolard noted that there is no funding for the Vortec project in fiscal year 1995.
- 100-K Area - Alan Krug noted that the Focused Feasibility Studies for 100-KR-1 and 100-KR-4 would be issued to the regulators by the end of October.
- 100-F Area - Alan Krug noted that the 100-FR-3 Focused Feasibility Study report is due to the regulators by the end of September.
- 100-H Area - Dick Biggerstaff indicated that slug tests are ongoing.

5. INFORMATION ITEMS:

- Groundwater/River Interaction in the 100 Areas - Bob Peterson provided a handout (see Attachment #8) which summarizes the activities performed in response to Milestone M-30-00. He provided explanations of certain points, such as, why we are interested in river stage. He indicated that the water moving in and out can act as pump, possibly affecting contaminant migration. One method of determining whether water is moving in or out in a particular well is via Electrical Conductance, or Conductivity. The conductivity of river water is around 100 microsiemens/cm ($\mu\text{S}/\text{cm}$). A groundwater monitoring well about 150 feet from the river maintains a conductivity of 400 $\mu\text{S}/\text{cm}$. Bob Peterson provided an application of this information: if a low contaminant level is observed in a well, which is unexpected, a comparison of the conductivities in the well and in river water could indicate that river water is flowing into, or influencing, the well.
- Changes in the RL Organization - Nancy Werdel provided an update on the organizational changes within the River Sites Restoration Division. She noted that CERCLA, D&D, and TSD activities are now all combined under one RL manager. This change enables RL to integrate all activities possible. N. Werdel advised the tri-parties to begin resolving integration issues. She asked the regulators if they would now like additional updates on all TSD and D&D activities at the CERCLA Unit Manager meeting (UMM). Ecology requested a specific update on the DQO session to be held 09/29/94 be provided to them at the next UMM.

6. NEXT MEETINGS: The next meetings are scheduled for October 20, 1994.

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2. INFORMATION ITEMS

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3. NEXT MEETING: The next meeting is scheduled for October 20, 1984

100 Aggregate Area Unit Manager's Meeting
 Official Attendance Record
 September 28, 1994

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PRINTED NAME	ORGANIZATION	O.U. ROLE	TELEPHONE
BOB SCHECK	Dames + Moore	GSSC	946-3688
Randy Beck	DOE-RL	100 GWOU	376-9031
Erin Aresel	PNL	6-W surveillance	376-8341
Bill Lum	USGS	EPASupport	206 5936510
Anoret Bunn	Dames + Moore	GSSC	946-3695
Karen Jones	Dames & Moore	GSSC	503-497-9071
Stephanie Johansen	Dames + Moore	GSSC	946-3693
Alan D. Krus	BHI	F & K	376-5634
Greg Eidson	BHI	PM	375-4650
BOB HENCKEL	BHI	PM	376-2091
Larry Gadbois	EPA	U.M.	376-9884
Wayne Sparr	Ecology	UM	736-3079
Wayne Sparr	Ecology	UM	736-3049
Ted Wesley	Ecology	U.M.M.	736-3012
JOAN WOOLARD	BHI	PM 100-D	376-2539
N.M. Naiknimbalkar	CHI	OU coordinator	372-9031
Diana Sietke	BHI	BHI Support/PA Coord	375-9422
Nancy Werdel	DOE-RL	100 Area Source	
Dick Biggenstaff	BHI	PM 100 H	372 3729
Nicole Kimball	DOE-RL	100 Area Source	376-4670
Doug Vaught	CH2M Hill	100-HR-3 P&T Cg Engr	373-5033
ARI TRAYN	Dames & Moore	100-BW issues	946-3690
Ron Belden	CH2M Hill	SW Support	372-1226
Kelly Cook	CHI	SW Task lead	373-3234
Jill Frain	CHI		376-8941
Ralph Wilson	CHI	Projects	375-9432
RE Day	"	" BC Area	372-9478

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Attachment #3
Agenda

Unit Manager's Meeting: 100 Aggregate Area/100 Area Operable Units
September 28, 1994

100 Area General Discussions

- * 100 Area General Status - R. Henckel

- * ROD Working Group

- * Project Managers Meeting

- * 100-DR-2 and IRM Burial Ground Issue

- * 100 Area Treatability Studies - J. Woolard
 - Soil washing laboratory testing of dust control products - Shas Mattigod

 - Vortec vitrification testing - John Ludowise

Operable Unit Status - Questions - N. Naiknimbalkar/J. Ayres/
D. Biggerstaff/A. Krug/J. Roberts

Action Item Status

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Attachment #4

Unit Manager's Meeting: 100 Aggregate Area/100 Area Operable Units
September 28, 1994

Action Item Status List

ITEM NO.	ACTION	STATUS
1AAMS.15	Provide response to April 2 EPA letter concerning river seeps. Action: Mike Thompson (RL) 07/27/94.	Open (7/29/92). In DOE for transmittal (8/26/92). Letter is pending (03/31/94).
1AAMS.16	DOE should transmit Revision 1 of M-30-01.	Closed 07/27/94.
1AAMS.19	Meet, before the end of the month, with RL, EPA and Ecology concerned parties to discuss ERDF waste acceptance criteria and expected volumes. Action: Bryan Foley	Closed 07/27/94. Paul Beaver is arranging a meeting to discuss waste acceptance criteria for the ERDF.
1AAMS.20	Confirm that all persons requesting addition to the UMM agenda distribution list from the Washington Department of Ecology have been included. Action: Diana Sickle	Closed 08/24/94.

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100 AREA UNIT MANAGERS' MEETING

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

STATUS PACKAGE

September 28, 1994

100 AREA TREATABILITY TEST STATUS**Co-Disposal**

Westinghouse Hanford Company Geotechnical Engineering Laboratory (WHC-GEL) has completed casting of the formulations in Phase 1, Stage 1 of the test plan. Phase 1 Stage 1 formulations used non-contaminated soils. Phase 1, Stage 2 experiments, which spike the non-contaminated soils with radioactive (Sr-90 and Cs-137) and hazardous [Cr (VI)] materials is on hold due to a serious accident (unrelated to this project) that occurred in the facility in which the work is to be conducted. As a result of the accident, the codisposal testing is undergoing a readiness review activity before access can be granted to the hoods where the work will be conducted.

Ex Situ VitrificationVortec Combustion and Melting System

Vortec analyzed the design presented at the 30% design review and eliminated some non-critical sub-systems to bring the cost in line with the estimate prepared in the summer of 1993. The design eliminates the feed grinding, bag house and acid gas scrubber sub-systems from the design for cost saving measures. The design will retain the capability to process fines produced from the soil washing system.

Design of the electrical feed to the site was begun in September.

The EPA-Risk Reduction Engineering Laboratory (RREL) has provided assistance in drafting a letter agreement between DOE-RL and the EPA-RREL. The letter agreement, if approved, would allow the EPA Superfund Innovative Technology Evaluation (SITE) program to sponsor the preparation of the test plan and the analytical work.

A preliminary hazards analysis (PHA) was conducted on the 30% design of the vitrification facility. The analysis, in draft form, classified the vitrification facility as a "general use" facility where only standard industrial hazards need be anticipated.

Soil Washing Treatability Test

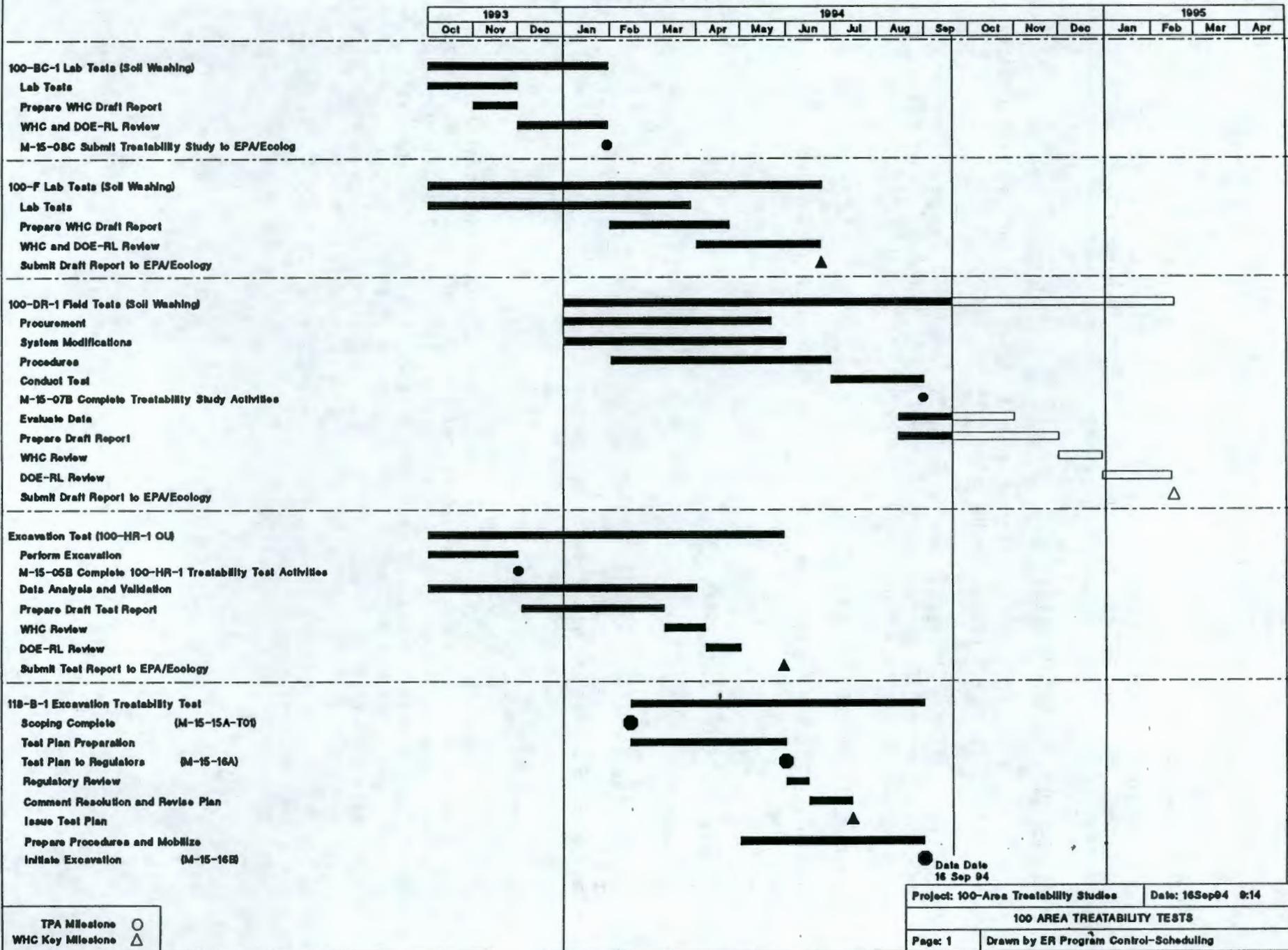
A Letter of Instruction has been issued to Kaiser on for site preparation and electrical work and this work is currently underway.

Concurrence was received on September 14, 1994 from the State of Washington, Department of Health that the project will meet the BARCT ARARs regarding air emissions.

Comments on the Test Procedures have been received from DOE/RL and EPA and are being addressed. Ecology has indicated they will not supply comments until the negotiations for the milestone are resolved.

The TPA Milestone (M-15-07B) to complete the test by August 31, 1994 was not met. Negotiations between the Project Managers to resolve this issue continue.

100-Area Treatability Tests



Date Date
16 Sep 94

Project: 100-Area Treatability Studies Date: 16Sep94 9:14

100 AREA TREATABILITY TESTS

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TPA Milestone ○
WHC Key Milestone △

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#5/Page 3 of 20

B AREA

100-BC-1 FFS Report

DOE/RL review comments on the 100-BC-1 FFS and IRM Proposed Plan have been addressed. The reports are expected to be released in November.

100-BC-2 QRA and LFI Reports

TASK 11: The 100-BC-2 QRA was initiated in January, 1994 and was subsequently combined with the LFI, producing one document.

TASK 13: The 100-BC-2 LFI was initiated in January, 1994 and was subsequently combined with the QRA, producing one document. The document is currently under regulator review, with comments due by October 15, 1994.

100-BC-2 FFS Report

Work on the Focused Feasibility Study and IRM Proposed Plan has been initiated.

100-BC-5 QRA and LFI Reports

Completed

100-BC-5 FFS Report

The 100-BC-5 FFS is currently under DOE review.

Riverland ERA/100-IU-1

On July 26, 1994 a PNL archeologist conducting a cultural resources field survey on the Riverland ERA Site discovered a suspect waste site. The suspect site is located in the southwest portion of the Riverland ERA Boundary. The site is approximately 360 yards southwest of Well 6-49-111. Suspect waste herbicide/pesticide metal 5-gallon containers were found covering an approximate area of 8 ft. x ft.

100-BC-1 OPERABLE UNIT

1993			1994								
Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep

FOCUSED FEASIBILITY STUDY

Treatability Study

Report Issuance to Regulators January 1994

Focused FS

Focused FS Report Issue as a primary document

FS Report Preparation

WHC Review and Incorporation

DOE Review and Incorporation

FS Report to Regulators November 1994

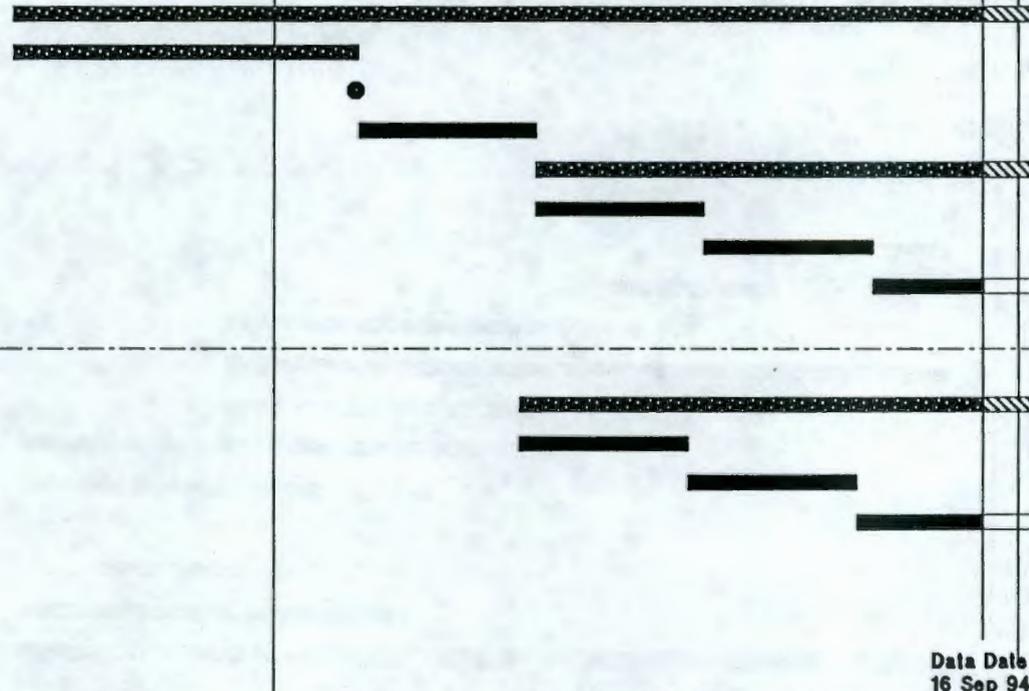
IRM PROPOSED PLAN Issue as a primary document

IRM Plan Preparation

WHC Review and Incorporation

DOE Review and Incorporation

IRM Proposed Plan to Regulators



Data Date
16 Sep 94

Project: 100-BC-1	DOE-RL 90-07	Date: 16Sep94 3:17
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100-BC-1 OPERABLE UNIT WORK PLAN

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Summary	▨
Progress	■

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100-BC-2 OPERABLE UNIT

1993			1994								
Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep

LIMITED FIELD INVESTIGATION

Task 5-Vadose Investigation

Data Validation

Validated Data to the Regulators

Data Evaluation

Task 10-Data Evaluation

Task 11-Qualitative Risk Assessment

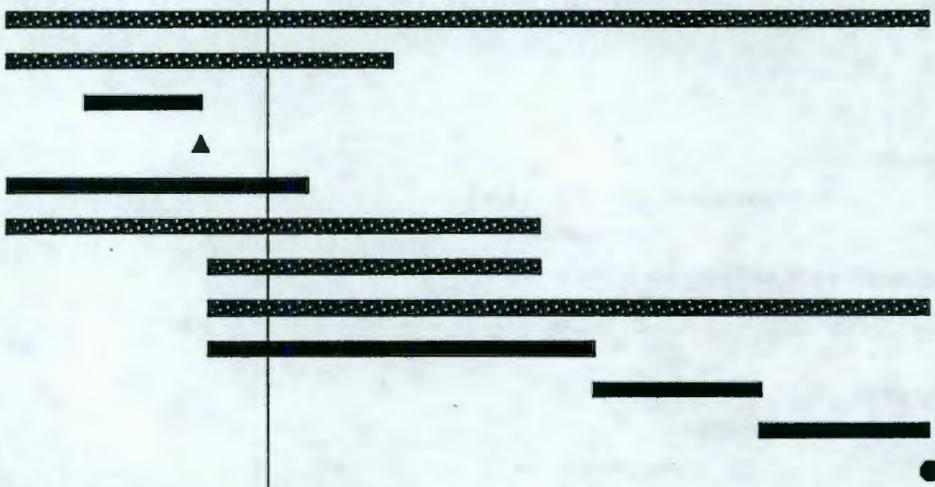
Task 13-LFI Report

LFI Report Preparation

WHC Review and Incorporation

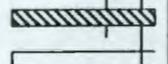
DOE Review and Incorporation

M-15-16D LFI Report to the Regulators Aug 31, 1994



FOCUSED FEASIBILITY STUDY

Focused FS



Summary	
Progress	

Project: 100-BC-2	DOE-RL 91-07	Date: 16Sep94 12:49
100-BC-2 OPERABLE UNIT WORK PLAN		
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Data Date
16 Sep 94

100-BC-5 OPERABLE UNIT

1993			1994								
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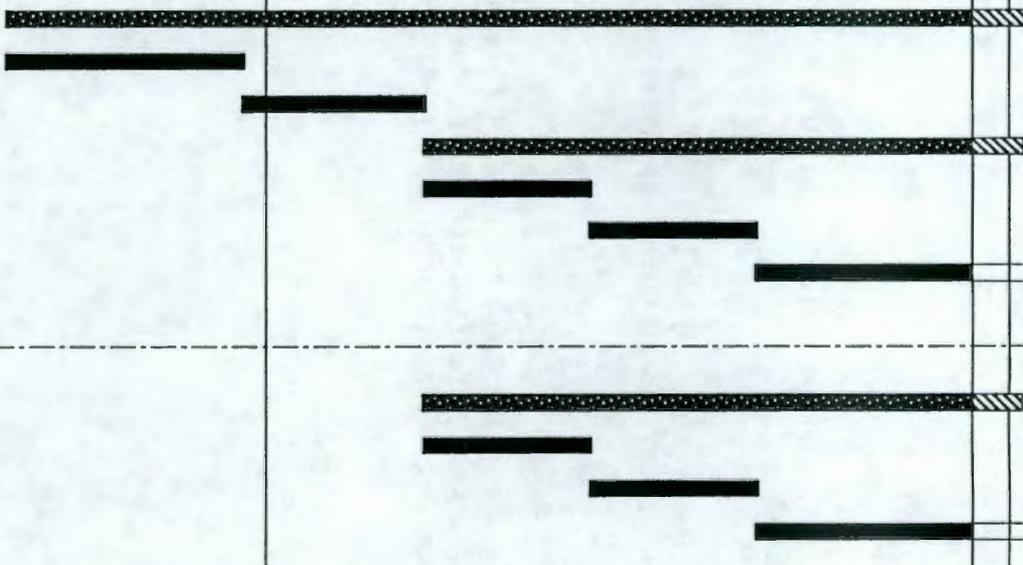
FOCUSED FEASIBILITY STUDY

- Analogus Data Gathering
- Focused FS
- ▨ FS Report
- FS Report Preparation
- WHC Review & Incorporation
- DOE Review & Incorporation
- M-15-09C FFS Report to the Regulators

IRM PROPOSED PLAN (Issue as Primary Document)

- ▨ IRM Plan Preparation
- WHC Review & Incorporation
- DOE Review & Incorporation
- M-15-09D IRM Proposed Plan to the Regulators

Summary	▨
Progress	■



Data Date
16 Sep 94

Project: 100-BC-5	DOE-RL 90-08	Date: 16Sep94 11:04
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100-BC-5 OPERABLE UNIT WORK PLAN

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K AREA

100-KR-1 QRA and LFI Reports

Task 11: Responses to regulator comments on 100-KR-1 QRA (WHC-SD-EN-RA-009, Rev. 0) were resolved and the document submitted to DOE/RL on August 12, 1994, for transmittal to EPA/Ecology.

Task 13:

Responses to regulator comments on 100-KR-1 LFI (DOE/RL 93-78, Draft A) were resolved and the document submitted to DOE/RL on August 12, 1994 for transmittal to EPA/Ecology.

Focused Feasibility Study

Work continued on the 100-KR-1 and 100-KR-4 Focused Feasibility Studies. The 100-KR-1 and 100-KR-4 FFSs were submitted for DOE/RL review on August 11, 1994. Comment resolution and incorporation is underway.

100-KR-1 OPERABLE UNIT

1993			1994								
Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep

LIMITED FIELD INVESTIGATION

M-15-10A Validated Data to the Regulators

Task 10-Data Evaluation

Task 11-Qualitative RA

Task 13-LFI Report

LFI Report Preparation

WHC Review and Incorporation

DOE Review and Incorporation

M-15-10B LFI Report to the Regulators

FOCUSED FEASIBILITY STUDY

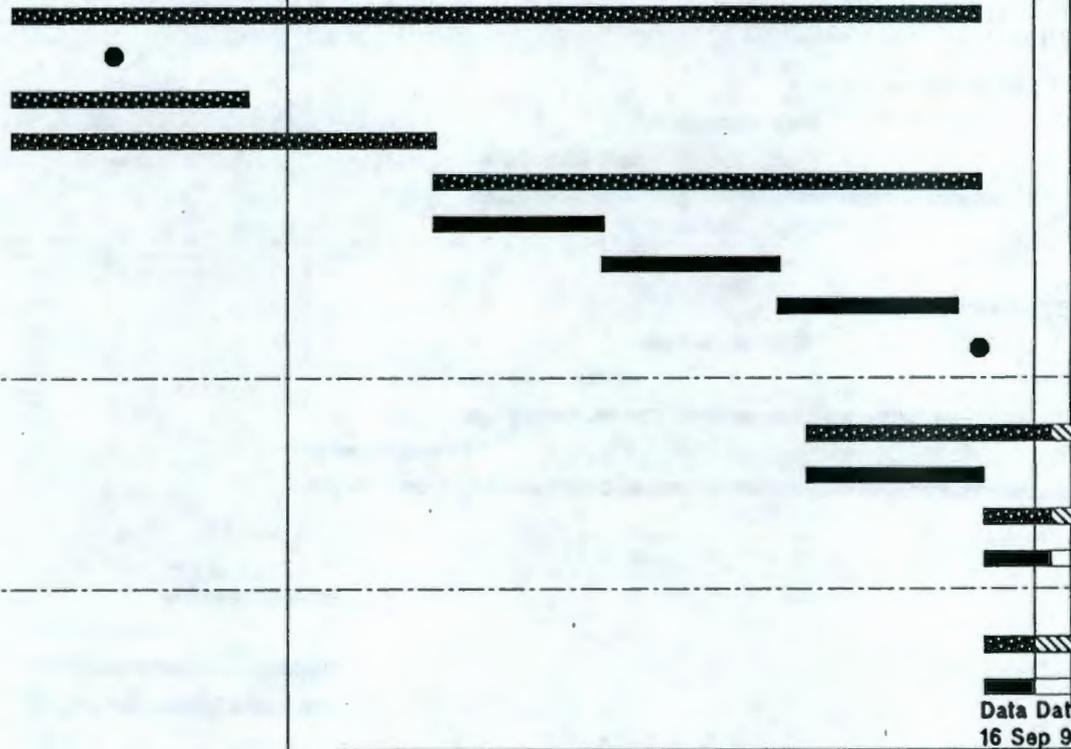
Focused FS

FS Report

FS Report Preparation

IRM PROPOSED PLAN

IRM Proposed Plan Preparation



Data Date
16 Sep 94

Project: 100-KR-1 DOE-RL 90-20 Date: 16Sep94 10:12

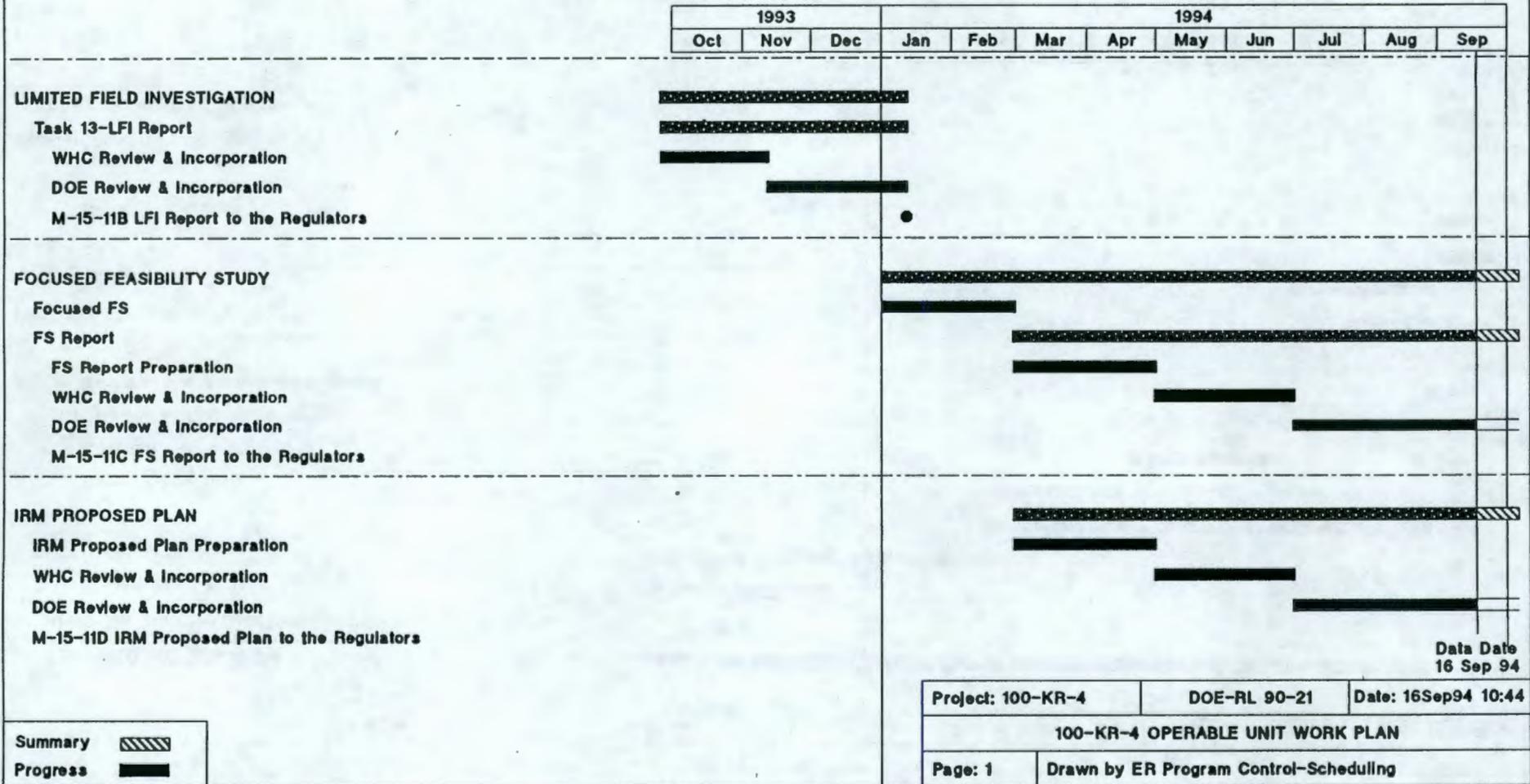
100-KR-1 OPERABLE UNIT WORK PLAN

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Summary
 Progress

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100-KR-4 OPERABLE UNIT



100-KR-4 OPERABLE UNIT

D AREA

100-DR-1

100-DR-1 Focused Feasibility Study

o 100-DR-1 Focused Feasibility Study report comment disposition meeting was held with DOE-RL and agreements were reached on the dispositions. The document is in the process of being transmitted to DOE-RL for submittal to the Regulators to meet September 30, 1994 date for the TPA milestone M-15-07C.

100-DR-1 Interim Remedial Measures Proposed Plan

o 100-DR-1 IRM Proposed Plan comment disposition meeting was held with DOE-RL and agreements were reached for incorporation of the dispositions into the document. The document is in the process of being transmitted to DOE-RL for submittal to the Regulators to meet September 30, 1994 TPA milestone M-15-07D.

100-DR-2

100-DR-2 Work Plan

o The 100-DR-2 Work Plan, DOE/RL-93-46, Draft B was submitted for Regulatory review on July 7, 1994, over 7 weeks ahead of the scheduled milestone (M-13-09) date of September 6, 1994.

Resolutions for the comments were prepared and submitted to the Regulators with redlined pages, on August 30, 1994. The document will be revised upon agreements with the Regulators and resubmitted for public review through DOE-RL.

100-DR-2 LFI (LFI/QRA) Report

o The internal review has been completed and the comments are being addressed.

H AREA

100 HR-1

- FFS AND IRM PP: The 100 HR-1 FFS and IRM PP documents were submitted to DOE July 15, 1994 for review and comment.

100 HR-2

- PLANNING DOCUMENT: The 100 HR-2 Work Plan (DOE/RL-93-20 Draft A-1) is still at USEPA/WDOE for review of comment responses prior to release of the document. The TPA change form (M-15-94-07) for HR-2 Interim Milestones was approved in August. Milestones M-15-18A, M-15-18B, and M-15-18C were established for the LFI/QRA (Sept 30, 1994), FFS and IRM PP (Jan 31, 1995), respectively.
- LFI/QRA REPORTS: BHI responses to DOE comments on the Decisional Draft of the 100-HR-2 LFI/QRA Report (DOE/RL-94-53) have been completed and a comment resolution meeting scheduled for August 19, 1994.
- FOCUSED FEASIBILITY REPORT: The Decisional Draft of the 100-HR-2 FFS Report (DOE/RL-94-65) is being prepared for submittal to DOE in late August.
- RADIOLOGICAL SURVEY: The survey report for the overflow trench extension is currently undergoing BHI internal review.

100 HR-3

- LFI AND QRA REPORTS: The 100 HR-3 LFI Report (DOE/RL-93-43, Rev 0) and the QRA Report (WHC-SD-EN-RA-007, Rev 0) will be released in late August.
- GROUNDWATER SAMPLING: 100 HR-3 Round 7 groundwater sampling was completed August 5, 1994.
- FFS REPORT: The 100 HR-3 FFS Report (DOE/RL-94-67) was submitted to DOE on July 15, 1994 for review and comment.

100-HR-1 OPERABLE UNIT

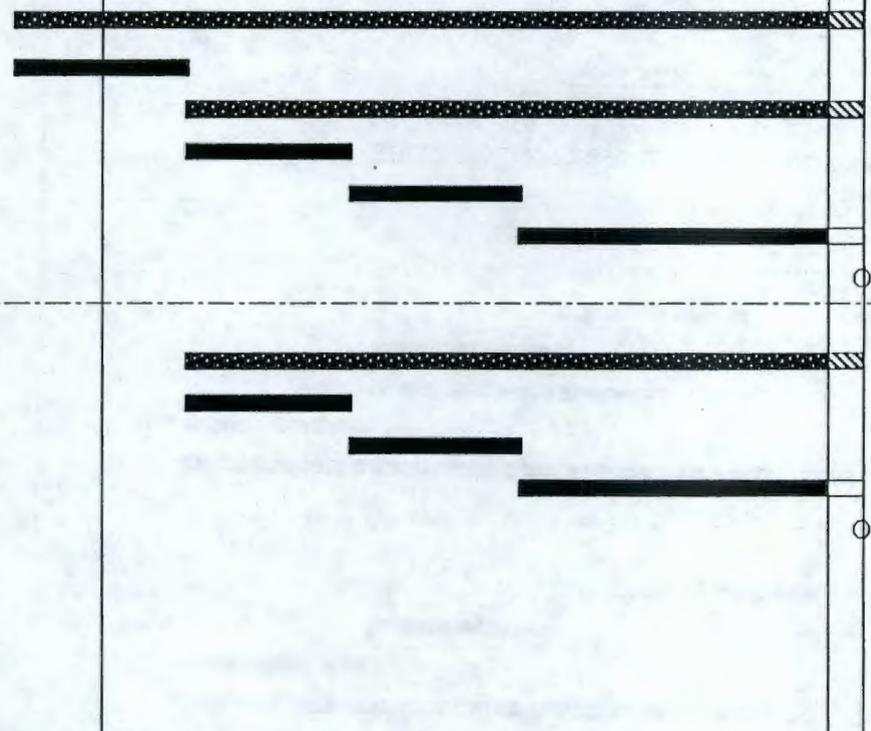
1993			1994								
Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep

FOCUSED FEASIBILITY STUDY

- Focused FS
- FS Report
- FS Report Preparation
- WHC Review & Incorporation
- DOE Review & Incorporation
- M-15-05C FFS Report to the Regulators

IRM PLAN

- IRM Plan Preparation
- WHC Review & Incorporation
- DOE Review & Incorporation
- M-15-05D IRM Proposed Plan to the Regulators



Data Date
16 Sep 94

Summary	
Progress	

Project: 100-HR-1	DOE-RL 88-35	Date: 16Sep94 14:41
100-HR-1 OPERABLE UNIT WORK PLAN		
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F Area

100-FR-1

TASK 11: 100-FR-1 QRA (WHC-SD-EN-RA-013, Rev. 0) was submitted to DOE/RL on september 2, 1994 for transmittal to EPA/Ecology.

TASK 13: 100-FR-1 LFI (DOE/RL-93-82, Draft A) was submitted to DOE/RL on september 2, 1994 for transmittal to EPA/Ecology.

100-FR-3

Task 11: Regulator review comments on the 100-FR-3 QRA have been received and comment resolutions submitted to DOE.

Task 13: Regulator review comments on the 100-FR-3 LFI have been received and comment resolutions submitted to DOE.

Focused Feasibility Study

- The Focused Feasibility Study has been initiated and the ERC review completed. The FFS was submitted to DOE for Review.

100-HR-3 OPERABLE UNIT

1993			1994								
Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep

LIMITED FIELD INVESTIGATION

- Task 13-LFI Report
- DOE Review & Incorporation
- M-15-06A LFI Report to Regulators
- Initiate Evaluation of New Groundwater Wells

FOCUSED FEASIBILITY STUDY

- Focused FS
- FS Report
- FS Report Preparation
- WHC Review & Incorporation
- DOE Review & Incorporation
- M-15-06C FFS Report to the Regulators

IRM PLAN

- IRM Plan Preparation
- WHC Review & Incorporation
- DOE Review & Incorporation
- M-15-06D IRM Proposed Plan to the Regulators

Summary	
Progress	

Data Date
16 Sep 94

Project: 100-HR-3	DOE-RL 88-36	Date: 16Sep94 9:41
100-HR-3 OPERABLE UNIT WORK PLAN		
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Dust Suppressant and Wash Water Recycling Tests on 116-D-1B Trench Soil

**S. V. Mattigod and R. J. Serne
Pacific Northwest Laboratory**

Unit Managers' Meeting , September 28, 1994

Attachment #6

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Dust Suppressant and Wash Water Recycling Tests on 116-D-1B-Soil

- **Effects of dust suppressants on wet-sieving and radionuclide distribution.**
- **Test contaminant distribution during wet sieving wash water recycling (10 cycles).**
- **Test contaminant distribution during attrition scrubbing (with water and with electrolyte) wash water recycling (5 cycles each).**

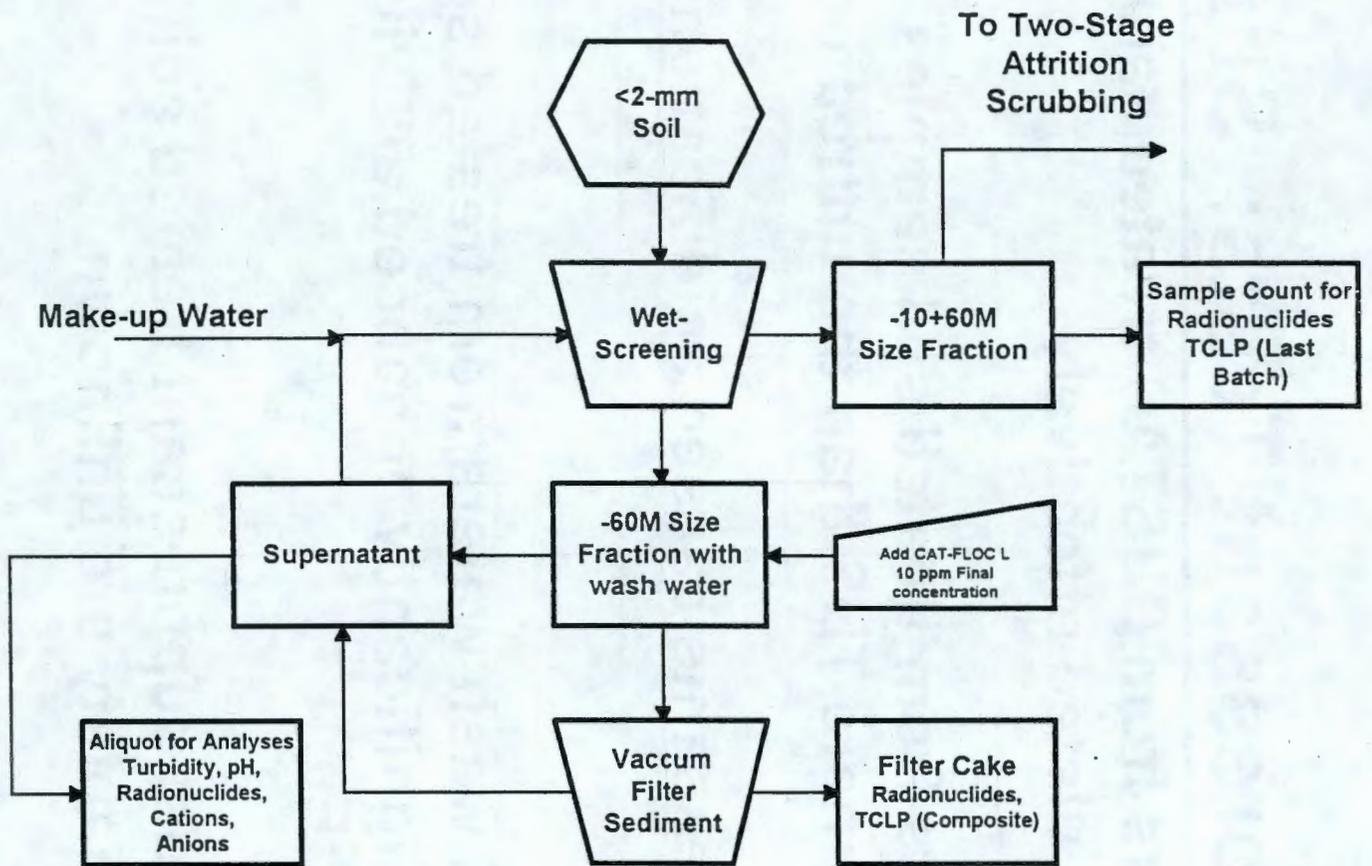
Dust Suppressant Tests: Preliminary Radionuclide Data (pCi/L) for Wash Waters.

Water Treatment	Radio-nuclide	Soil Treatment				
		Control	XDCA 2 L/m ²	XDCA 4 L/m ²	DUSTAC 2 L/m ²	DUSTAC 4 L/m ²
10 ppm CAT-FLOC L	⁶⁰ Co	92	228	772	790	934
	¹³⁷ Cs	426	1359	2318	5027	5613
	¹⁵² Eu	417	2486	5152	10790	12130
20 ppm CAT-FLOC L	⁶⁰ Co	56	365	1032	1072	1091
	¹³⁷ Cs	59	1772	3096	7216	5977
	¹⁵² Eu	167	3157	7130	15270	13290

Dust Suppressant Tests: Summary

- Wash waters from DUSTAC treated samples could not be flocculated effectively.
- Wash waters from treated soil samples had about 5 to 10 times more TDS than the untreated sample.
- Dust suppressants caused acidification of wash waters.
- Flocculated wash waters from treated soil samples contained significantly enhanced activities of ^{60}Co , ^{137}Cs , and ^{152}Eu .
- Effects of dust suppressant treated soil on wash water recyclability are unknown.

Test Scheme for Recycling Washwater from Wet-Sieving Trench 116-D-1B Soil



Wet Sieving Wash Water Recycling Tests: 116-D-1B Soil Wash Water Characteristics: Major Elements (mg/L)

Element	Tap Water	Recycling Step										PWCC*
		I	II	III	IV	V	VI	VII	VIII	IX	X	
Ca	21.6	20.2	15.6	14.7	12.6	15.7	12.9	19.0	15.0	19.5	18.1	--
Mg	4.8	4.3	3.4	3.3	2.9	3.4	2.9	4.2	3.4	4.2	4.0	--
K	1.3	4.5	4.7	4.6	4.2	4.9	4.1	6.3	5.0	6.2	6.1	--
Na	5.5	9.0	10.5	12.3	12.4	15.8	14.2	20.9	18.8	23.6	22.9	--
Cl	8.7	18.0	4.8	4.0	5.6	6.3	20.0	7.3	11.0	8.0	11.0	2500
NO ₃	7.2	28.0	2.2	2.2	19.0	18.0	16.0	9.2	11.0	13.0	17.0	450
SO ₄	16.0	17.0	15.0	14.0	16.0	15.0	19.0	15.0	15.0	16.0	18.0	2500
HCO ₃	55.1	84.4	74.6	76.6	79.2	82.7	86.4	88.5	85.3	87.4	92.7	--

*Purge Water Collection Criteria (WHC-CM-7-5, 1993)

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Wet Sieving Wash Water Recycling Tests: 116-D-1B Soil Trace Elemental Composition ($\mu\text{g/L}$).

Element	Tap Water	Recycling Step										PWCC
		I	II	III	IV	V	VI	VII	VIII	IX	X	
Be	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	53
Fe	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	3000
Mn	4.1	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	2.5	<2.0	<2.0	<2.0	500
Ni	<1.0	<1.0	1.2	<1.0	<1.0	1.1	<1.0	5.4	<1.0	<1.0	1.1	1600
Sb	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	1.0	1.3	1.1	1.1	1.3	16000
Tl	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	400
U	1.2	3.9	7.1	6.8	7.5	9.0	10.0	13.0	7.6	11.5	11.2	590
V	2.4	7.5	24.0	11.0	12.0	18.0	14.4	16.0	14.2	14.1	20.8	400
Zn	9.4	7.7	10.2	6.9	32.3	18.0	24.8	12.0	9.6	16.0	18.0	1100

PWCC: Purge Water Collection Criteria. WHC-CM-7-5, 1993.

Wet Sieving Wash Water Recycling Tests: 116-D-1B Soil Trace Elemental Composition ($\mu\text{g/L}$).

Element	Tap Water	Recycling Step										PWCC*
		I	II	III	IV	V	VI	VII	VIII	IX	X	
Ag	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	10
As	1.2	3.8	24.0	4.0	5.6	12.0	7.6	9.9	7.6	8.0	21.3	480
Ba	18.1	26.3	33.0	30.0	31.0	34.0	30.0	34.0	24.9	30.0	32.0	10000
Cd	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	11
Cr	<1.0	4.5	10.3	12.0	12.5	16.1	17.2	20.5	21.8	22.0	26.4	110
Cu	4.3	3.1	5.0	4.8	6.2	7.0	6.8	9.3	10.9	9.6	19.0	120
Hg	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	0.1
Pb	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	32
Se	<5.0	<2.0	<2.0	5.2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	100

*PWCC: Purge Water Collection Criteria. WHC-CM-7-5, 1993.

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Wet Sieving Wash Water Recycling

Tests: Summary

- Radionuclide (^{60}Co , ^{137}Cs , and ^{152}Eu) distribution between soil and wash water remained relatively constant during wash water recycling.
- Wash water from each recycling step was readily flocculated by using 10 ppm of CAT-FLOC L (a polymeric flocculent).
- Radionuclide (^{60}Co , ^{137}Cs , and ^{152}Eu) activities in recycled wash water were very low.
- Concentrations of all trace elements in flocculated recycled wash water remained low.

Attrition Scrubbing (Water Medium) Wash Water Recycling Tests: 116-D-1B Soil. Preliminary Data: Wash Water Characteristics

Parameter	Tap Water	Recycling Step				
		I	II	III	IV	V
pH (SU)	7.3	7.5	8.6	7.9	7.6	7.9
Conductivity (µS/cm)	142	222	277	452	533	563
Turbidity (NTU)	2.79	0.10	0.14	16.0	12.7	11.6
⁶⁰ Co (pCi/L)	--	<8.7	<8.7	<8.7	<8.7	<8.7
¹³⁷ Cs (pCi/L)	--	<9.3	43.9	26.1	35.8	31.4
¹⁵² Eu (pCi/L)	--	<25.6	<25.6	<25.6	<25.6	<25.6

Purge Water Collection Criteria (WHC-CM-7-5, 1993) ⁶⁰Co, and ¹³⁷Cs are 1000, and 2000 pCi/L respectively.

Two-Stage Attrition Scrubbing (water medium) Wash Water Recycling Tests: Summary

- Radionuclide (^{60}Co , ^{137}Cs , and ^{152}Eu) distribution between soil and wash water remained relatively constant during wash water recycling.
- Wash water from each recycling step was readily flocculated by using 5 ppm each of AQUAFLOC 460 and 456C (polymeric flocculents).
- Radionuclide (^{60}Co , ^{137}Cs , and ^{152}Eu) activities in recycled wash water were very low.

**Attrition Scrubbing (Water Medium) Wash Water
 Recycling Tests: 116-D-1B Soil.
 Preliminary Data: Radionuclide Activity in 2 - 0.25-mm
 Size Fraction (pCi/g)**

Radionuclide	Recycling Step/Scrubbing Stage									
	I		II		III		IV		V	
	1	2	1	2	1	2	1	2	1	2
⁶⁰ Co	0.48	0.41	0.54	0.50	0.60	0.45	0.71	0.62	0.70	0.53
¹³⁷ Cs	63	59	61	61	67	64	65	64	68	64
¹⁵² Eu	15.8	14.9	15.0	14.9	17.1	14.7	17.8	16.5	18.0	16.0

100-HR-3 PUMP & TREAT**STATUS**

- *Met TPA milestone M-15-06E (8/31/94) on August 26 by initiating extraction from well 199-D5-15.*
- *Initiated ion exchange operation on August 29.*
- *Initiated injection into well 199-D5-18 on September 6.*
- *Initiated injection into well 199-D5-19 on September 21.*
- *Initiated extraction from well 199-D5-14 on September 23.*
- *Ion exchange operation:*
 - *3-column series configuration*
 - *operating at maximum config. flow rate of 56 gpm*
 - *no chromium-VI breakthrough observed to date*
- *Phase II construction complete except for:*
 - *electrical instrumentation wiring*
 - *heat tracing*
 - *line power tie-in*
 - *other electrical work*
 - *minor pipefitting work*

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100-HR-3 PUMP & TREAT

Phase I Operations

August 26 to November 15

TEST OBJECTIVES

- *Determine individual extraction well capacities and Cr-VI concentration vs. time.*
- *Determine the effectiveness of the IX unit to consistently treat Cr-VI to less than 50 ppb.*
- *Estimate the zone of influence due to 8 hour/day extraction.*
- *Measure injection well capacities.*
- *Verify IX column life vs. flow rate/concentration of influent.*
- *Refine operation configurations, requirements and procedures.*
- *Determine treated concentration levels of co-contaminants, i.e. reduced analyte list constituents.*
- *Complete at least one resin canister cycle to evaluate sampling protocols and verify Cr-VI break-through estimates.*
- *Analyze spent resin for disposal/regeneration requirements, e.g. very low uranium may not yield a mixed waste designation.*
- *Upgrade system for 24 hour and winter operations.*

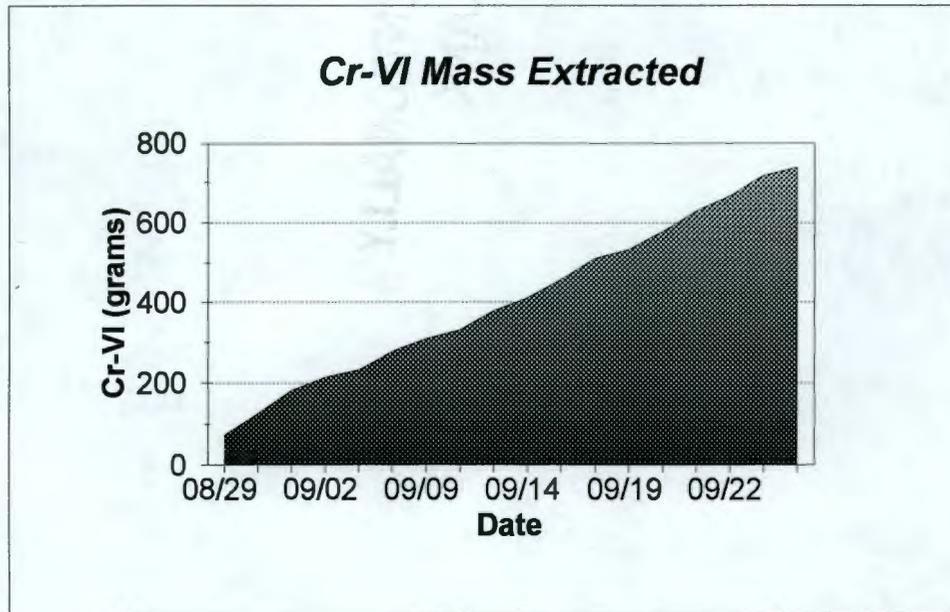
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100-HR-3 Pump and Treat Chromium-VI Mass Removed

#7/ Page 3 of 7

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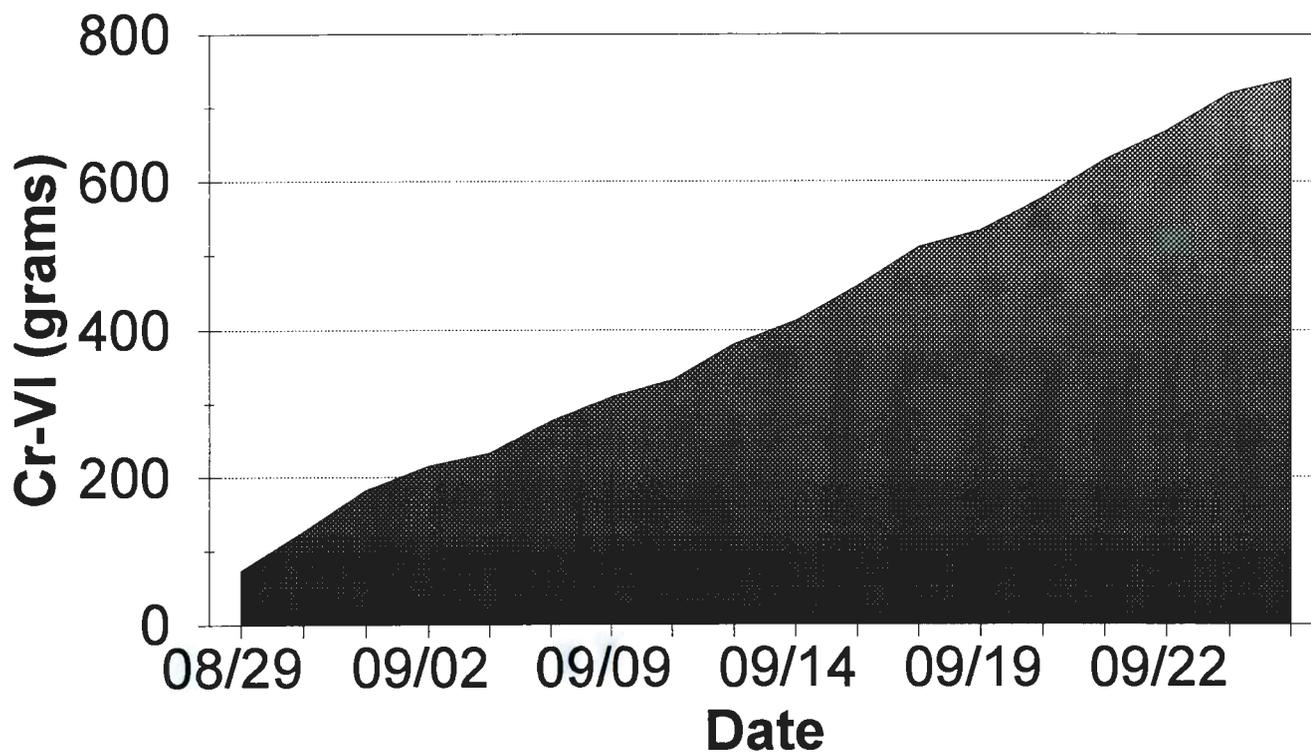
Date	Well 14				Well 15				Well 16				Effl. Cr-6 conc ppb	Total Mass grams	Cum. Mass grams	Cum. Flow gal
	Time hrs	Flow gpm	Cr-6 conc. ppb	Mass mg	Time hrs	Flow gpm	Cr-6 conc. ppb	Mass grams	Time hrs	Flow gpm	Cr-6 conc. ppb	Mass mg				
08/26					3.50	20	1674	26.6					0	26.6	27	4.20E+03
08/29					6.25	20	1674	47.5					0	47.5	74	1.17E+04
08/31					6.50	21	1674	51.8					0	51.8	126	1.99E+04
09/01					7.18	21	1674	57.2					0	57.2	183	2.89E+04
09/02					3.83	21	1780	32.5					0	32.5	216	3.38E+04
09/07					2.25	20	1681	17.2					0	17.2	233	3.65E+04
09/08					5.25	20	1839	43.8					0	43.8	277	4.28E+04
09/09					3.85	20	1819	31.8					0	31.8	308	4.74E+04
09/12					2.92	20	1740	23.1					0	23.1	331	5.09E+04
09/13					6.42	19	1760	48.7					0	48.7	380	5.82E+04
09/14					4.67	19	1582	31.8					0	31.8	412	6.35E+04
09/15					6.83	19	1582	46.6					0	46.6	458	7.13E+04
09/16					6.83	19	1780	52.4					0	52.4	511	7.91E+04
09/19					3.00	19	1760	22.8					0	22.8	534	8.25E+04
09/20					5.67	19	1786	43.6					0	43.6	577	8.90E+04
09/21					6.70	19	1786	51.6					0	51.6	629	9.66E+04
09/22					4.90	19	1850	39.1					0	39.1	668	1.02E+05
09/23	4.75	4	1600	6.9	5.96	19	1716	44.1					0	51.0	719	1.10E+05
09/26	4.72	4.5	1625	7.8	1.67	19	1840	13.2					0	21.1	740	1.13E+05



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Cr-VI Mass Extracted



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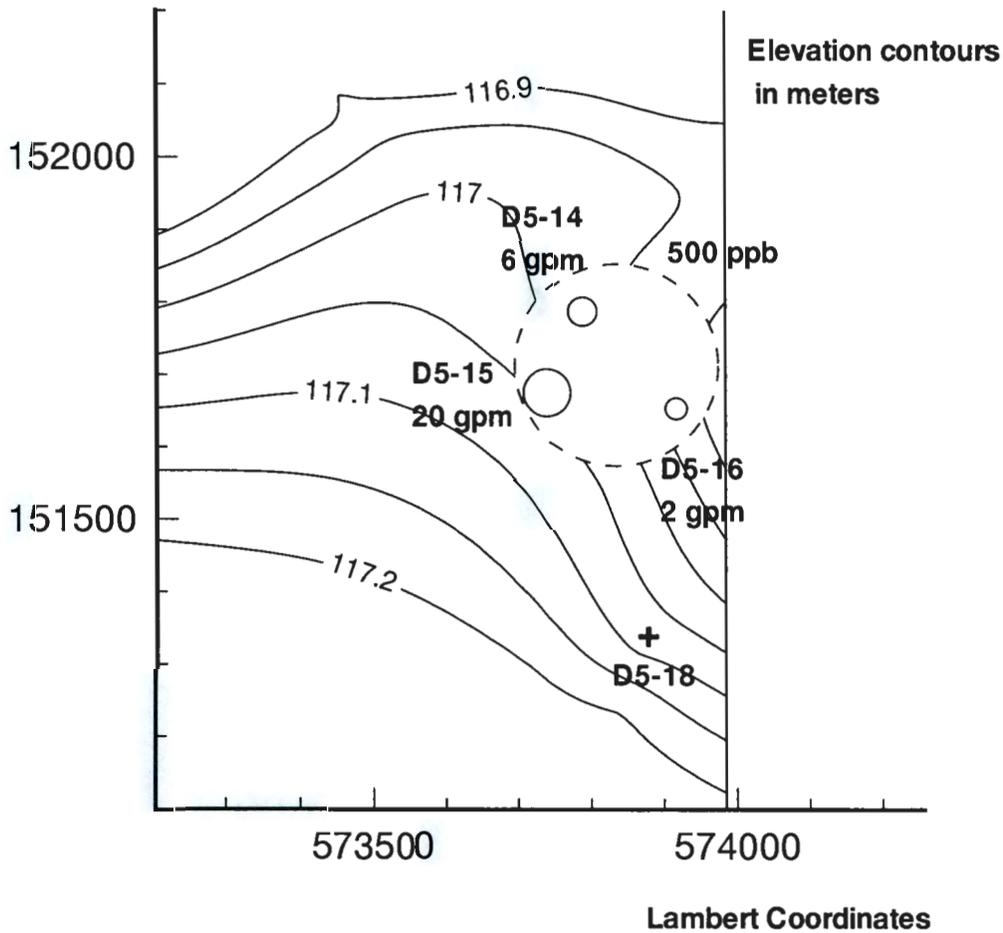
100-HR-3 Ion Exchange Loading Time Log

Date	Time on	Time off	Lead	1st Lag	2nd Lag	S/B	Run Time	Flow rate (gpm)	Total Flow (gal.)	Cum. Flow (gal.)	Total C/V (col. vol.)	Cum. C/V (col. vol.)	Conc. Cr (ppb)
08/29	14:20	15:35	T-100	T-200	T-300	T-400	01:15	35	2625	2.63E+03	16.9	17	0
08/31	09:55	12:38	T-100	T-200	T-300	T-400	02:43	36	5868	8.49E+03	37.8	55	0
09/07	11:50	15:15	T-100	T-200	T-300	T-400	03:25	36	7380	1.59E+04	47.5	102	0
09/08	09:50	11:43	T-100	T-200	T-300	T-400	01:53	50	5650	2.15E+04	36.4	139	0
09/12	12:00	14:50	T-100	T-200	T-300	T-400	02:50	50	8500	3.00E+04	54.7	193	0
09/12	14:58	15:25	T-100	T-200	T-300	T-400	00:27	50	1350	3.14E+04	8.7	202	0
09/13	08:29	10:34	T-100	T-200	T-300	T-400	02:05	53	6625	3.80E+04	42.6	245	0
09/14	11:25	11:52	T-100	T-200	T-300	T-400	00:27	53	1431	3.94E+04	9.2	254	0
09/14	11:55	14:55	T-100	T-200	T-300	T-400	03:00	53	9540	4.90E+04	61.4	315	0
09/14	14:58	15:22	T-100	T-200	T-300	T-400	00:24	53	1272	5.02E+04	8.2	323	0
09/15	08:20	09:53	T-100	T-200	T-300	T-400	01:33	53	4929	5.52E+04	31.7	355	0
09/16	11:30	12:55	T-100	T-200	T-300	T-400	01:25	53	4505	5.97E+04	29.0	384	0
09/19	10:32	12:02	T-100	T-200	T-300	T-400	01:30	53	4770	6.44E+04	30.7	415	0
09/19	12:02	12:56	T-100	T-200	T-300	T-400	00:54	56	3024	6.75E+04	19.5	434	0
09/19	12:59	14:50	T-100	T-200	T-300	T-400	01:51	56	6216	7.37E+04	40.0	474	0
09/20	11:25	11:35	T-100	T-200	T-300	T-400	00:10	50	500	7.42E+04	3.2	477	0
09/20	11:35	12:30	T-100	T-200	T-300	T-400	00:55	56	3080	7.73E+04	19.8	497	0
09/20	12:35	15:30	T-100	T-200	T-300	T-400	02:55	56	9800	8.71E+04	63.1	560	0
09/21	08:37	09:12	T-100	T-200	T-300	T-400	00:35	56	1960	8.90E+04	12.6	573	0
09/22	11:04	14:36	T-100	T-200	T-300	T-400	03:32	56	11872	1.01E+05	76.4	649	0
09/22	14:42	15:30	T-100	T-200	T-300	T-400	00:48	56	2688	1.04E+05	17.3	667	0
09/23	09:20	09:38	T-100	T-200	T-300	T-400	00:18	56	1008	1.05E+05	6.5	673	0
09/26	09:02	10:30	T-100	T-200	T-300	T-400	01:28	56	4928	1.10E+05	31.7	705	0
09/26	11:00	12:10	T-100	T-200	T-300	T-400	01:10	56	3920	1.13E+05	25.2	730	0
09/26	12:36	13:12	T-100	T-200	T-300	T-400	00:36	56	2016	1.15E+05	13.0	743	0

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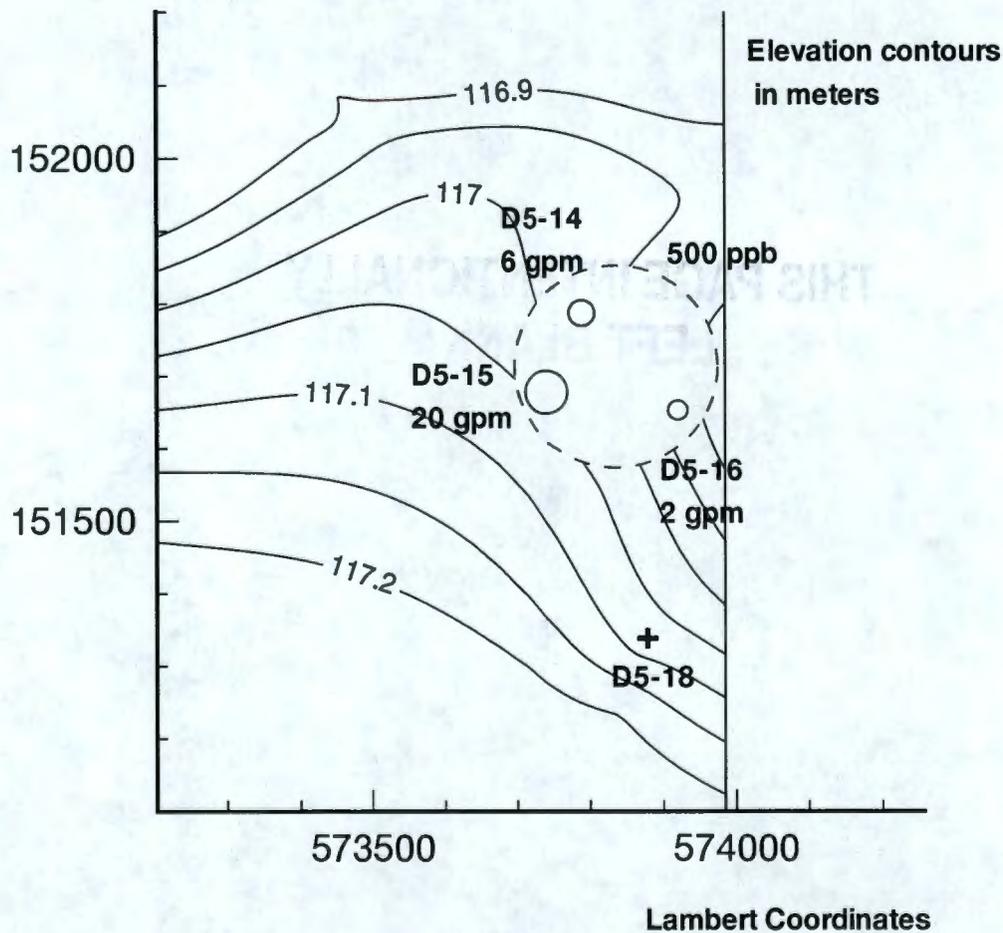
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**Two and One Half Month Capture Zone Analysis at 100-D Area
Pumping Eight Hours per Day, Five Days per Week
Porosity = 0.10, Aquifer Thickness = 5 m
Hydraulic Conductivity = 15 m/day**



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**Two and One Half Month Capture Zone Analysis at 100-D Area
Pumping Six Hours per Day, Five Days per Week
Porosity = 0.10, Aquifer Thickness = 5 m
Hydraulic Conductivity = 15 m/day**



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GROUNDWATER/RIVER INTERACTION IN THE 100 AREAS

**R. E. Peterson
CH2M Hill Hanford, Inc.**

September 28, 1994

Attachment #8

Page 1 of 21

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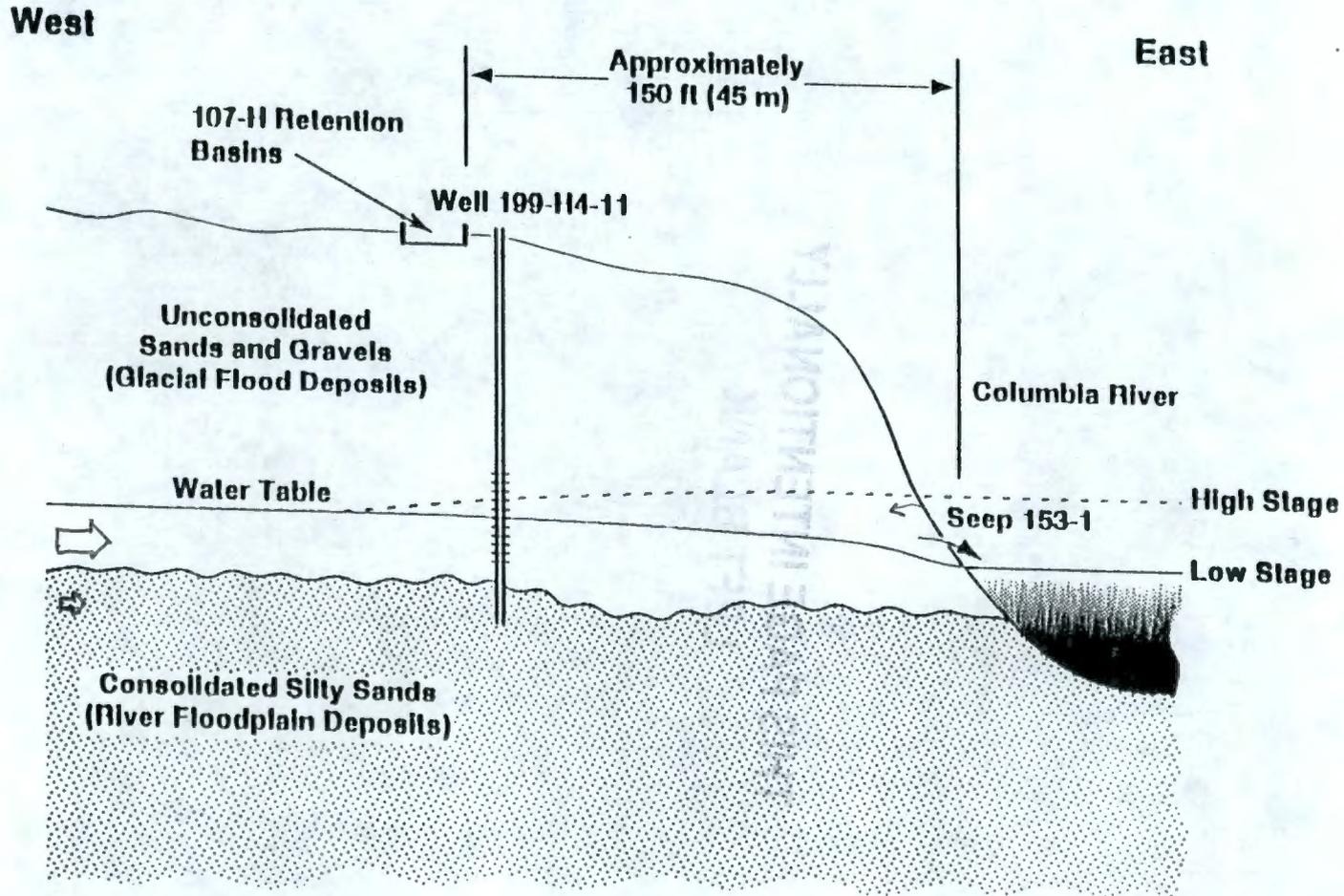
Unit Managers Meeting (9/28/94)

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100-H Cross Section Through Shoreline:



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OUTLINE FOR UNIT MANAGER MEETING BRIEFING

- **Tri-Party Agreement Milestone M-30-00**
- **River Stage Fluctuation and Water Table**
- **River Stage Fluctuation and Water Quality**
- **River Stage Fluctuation and Contaminant Migration**
- **FY95 Direction of Project**
- **Long-Term Evaluation Objectives**

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TRI-PARTY AGREEMENT MILESTONE M-30-00

- **Determine Influence of 100 Areas on River**
- **Characterize Flow of Contamination to River**
- **Establish Monitoring Equipment Capability**
- **Set Up Long-Term Evaluation of Interaction**

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INFLUENCE OF RIVER STAGE ON:

- **Water Table in Reactor Areas**
- **Water Quality Along Shoreline**
- **Contaminant Migration via Groundwater**

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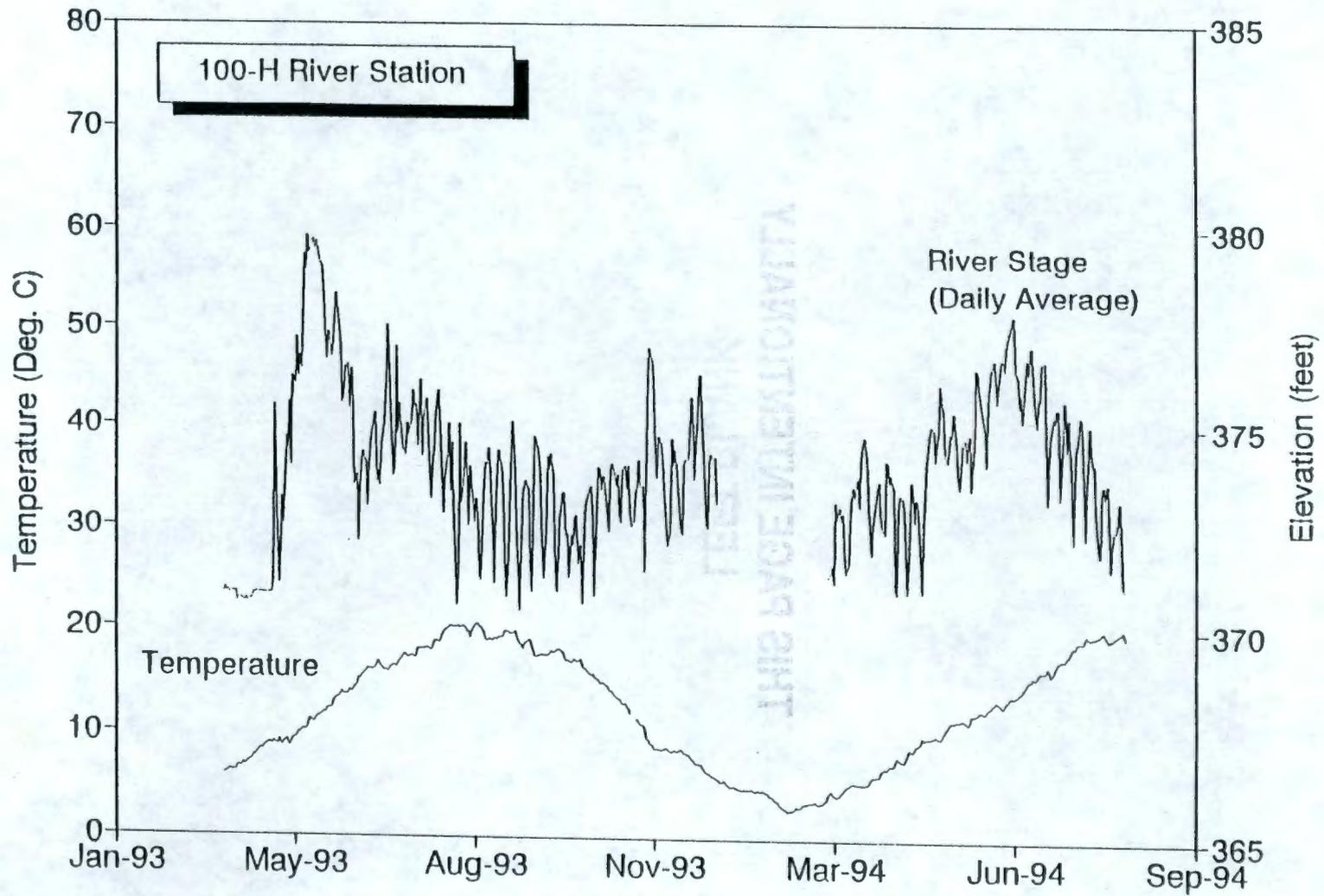
RIVER STAGE FLUCTUATION AND WATER TABLE

- **Fluctuation Cycles--Daily, Weekly, Seasonal**
- **Range of River Fluctuations**
- **Inland Influence**

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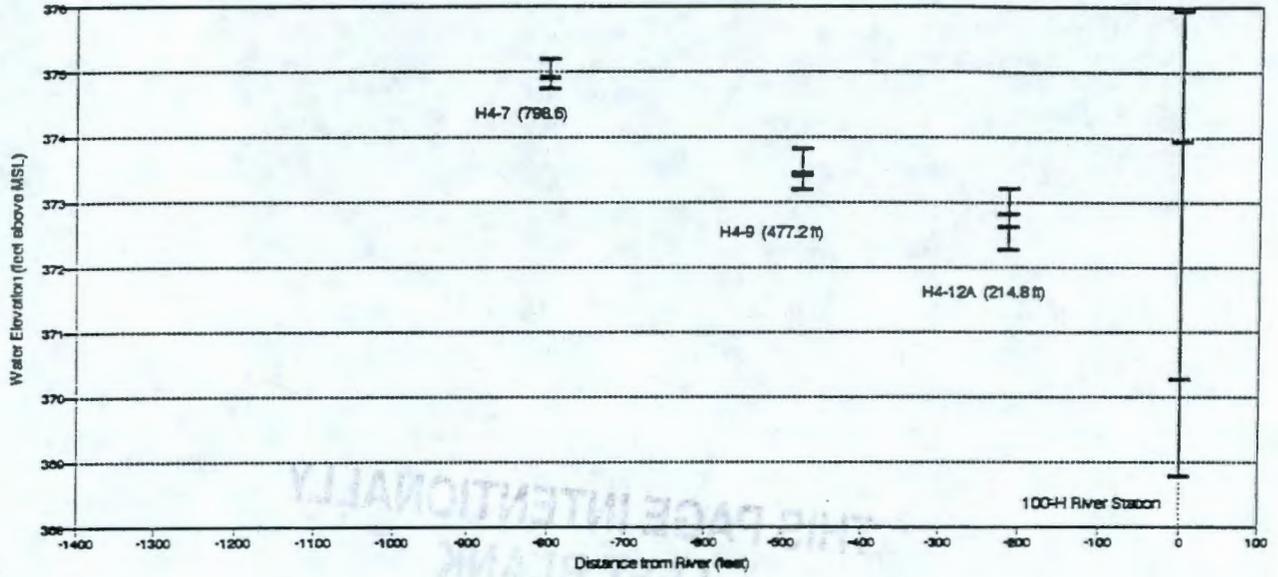
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Fig. 3

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Water Level Elevation In the 100-H Area
September 1962

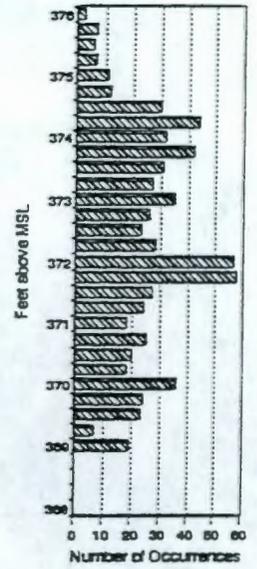
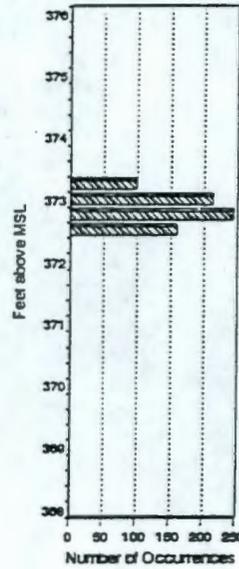
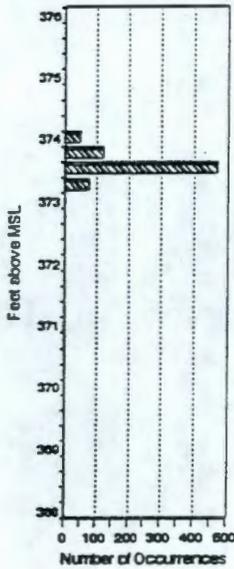
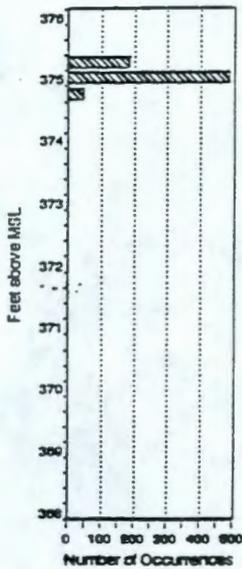


Well H4-7

Well H4-9

Well H4-12A

100-H River Station



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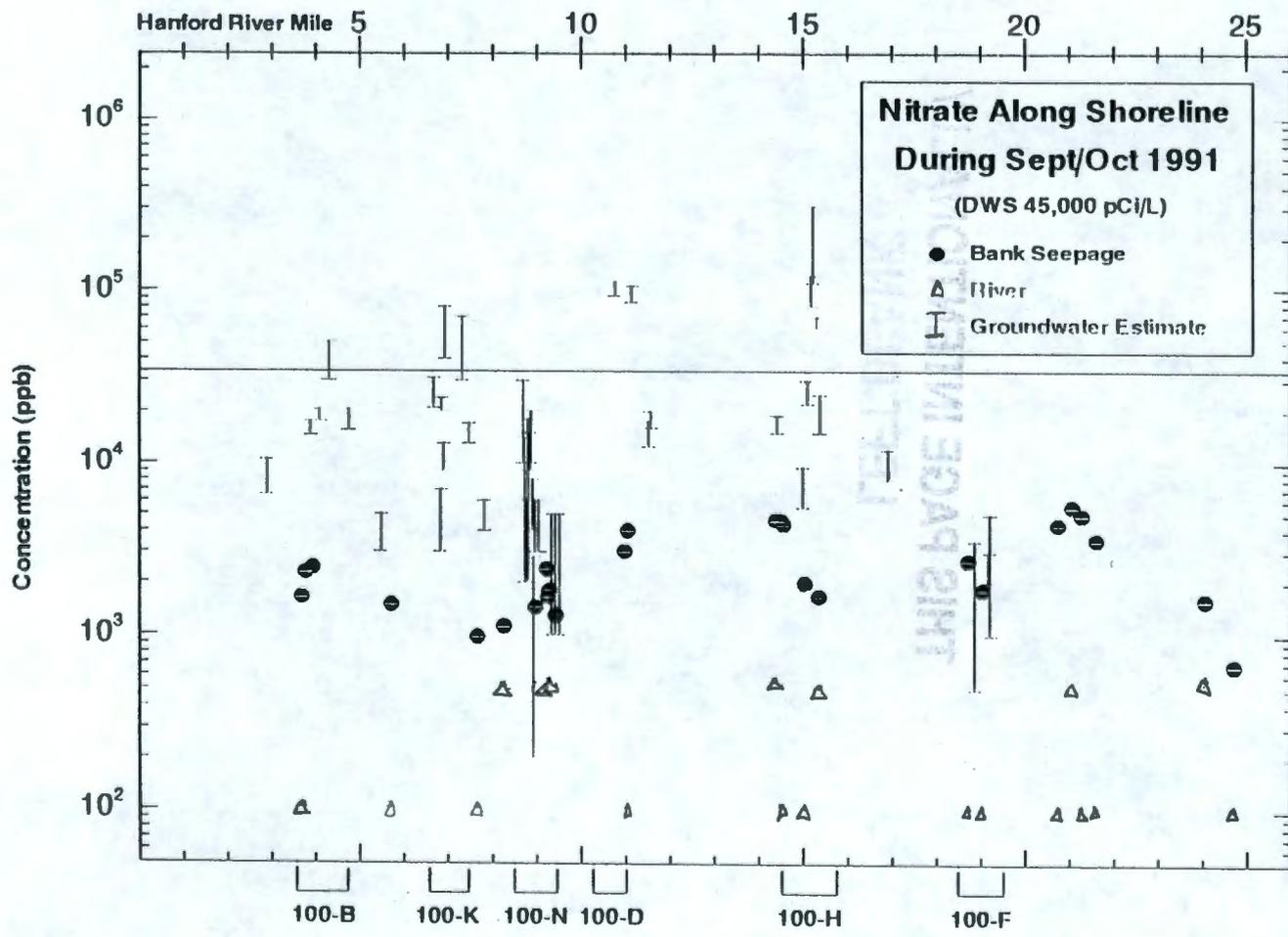
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RIVER STAGE FLUCTUATION AND WATER QUALITY

- **Bank Storage of River Water**
- **Mixing Between River and Groundwater**
- **Layering of River and Groundwater**
- **Potential Sampling Bias**

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Fig 5

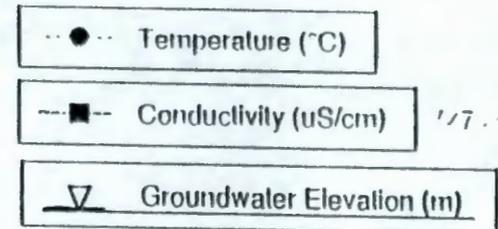
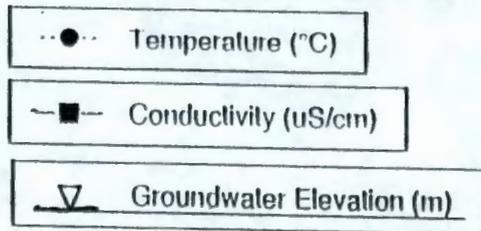
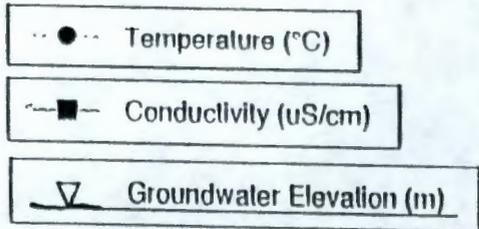
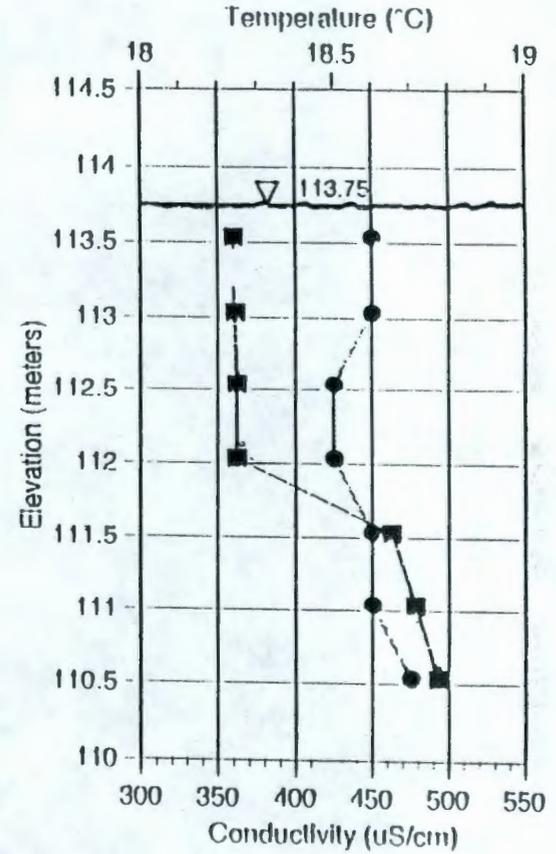
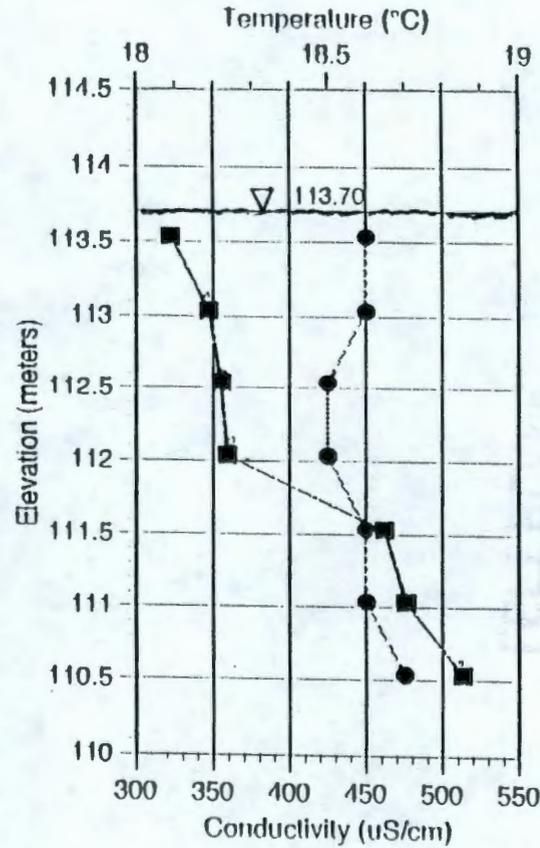
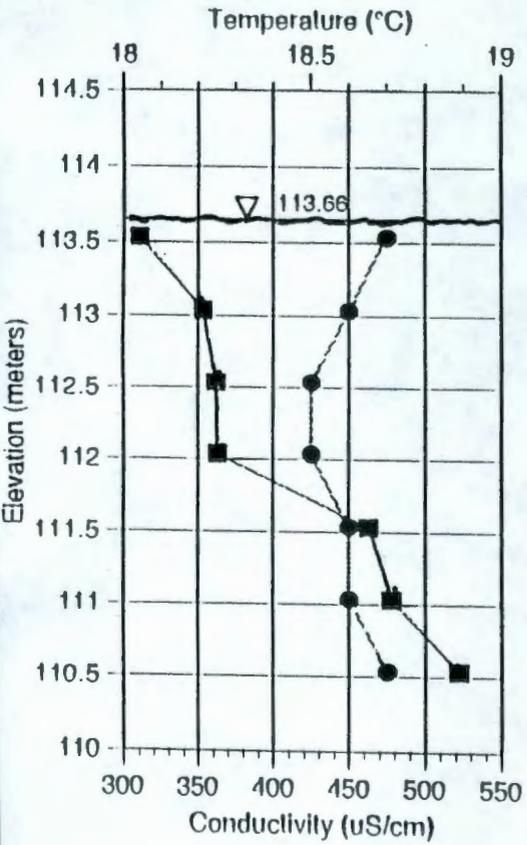
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199-H4-12A
8/8/94
07:03 PST

199-H4-12A
8/7/94
08:03 PST

199-H4-12A
8/6/94
08:56 PST



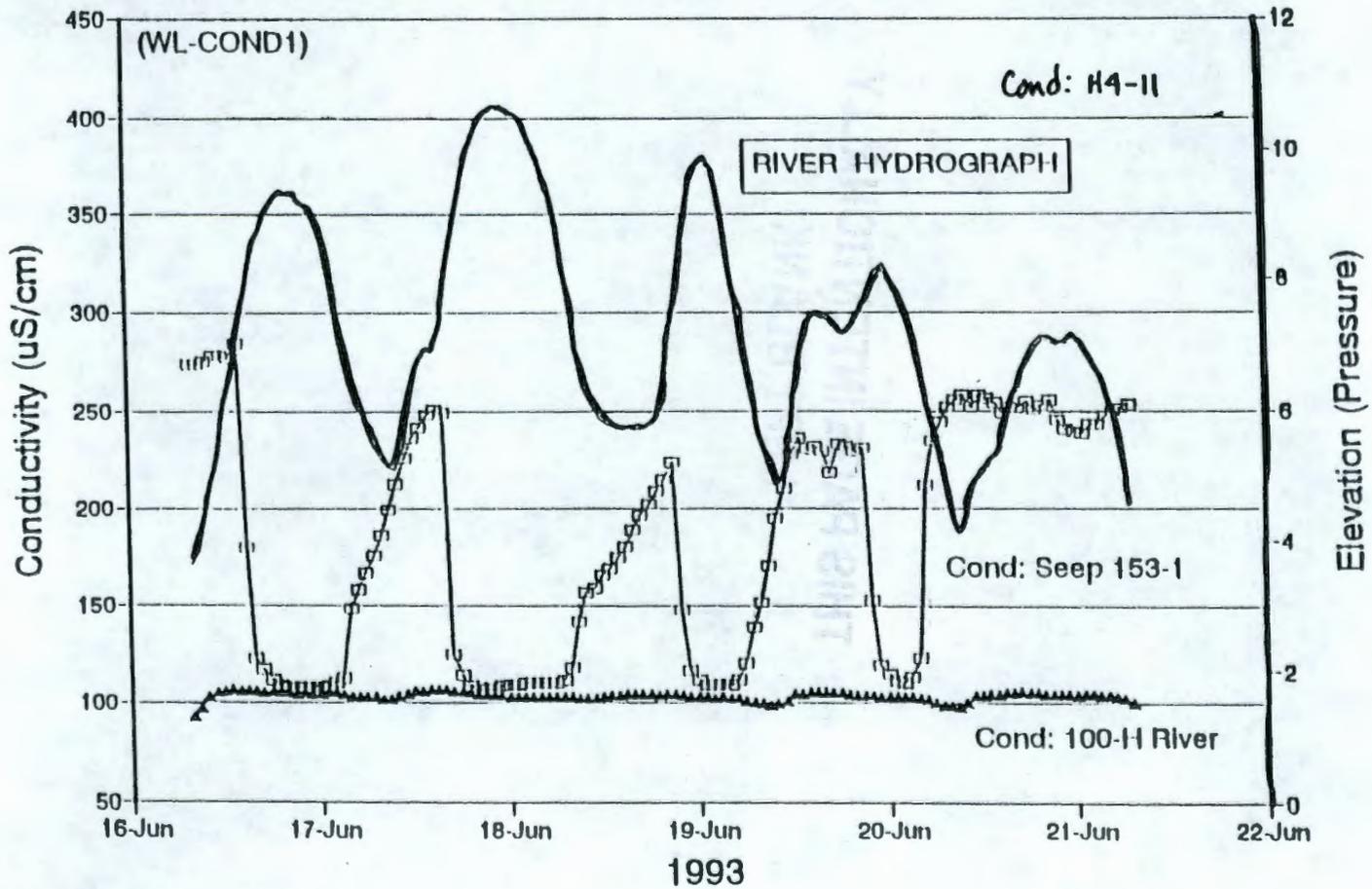
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Conductivity: Seep vs River Level:

SHORELINE CONDUCTIVITY (100-H Area)



Unit Managers Meeting 7/28/93

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MOST RECENT TRITIUM RESULTS
FOR SHORELINE SEEPAGE SAMPLES

February 9, 1994

Data Source: Laboratory analytical results stored in notebooks by
HEIS data entry personnel.

<u>Seep Location</u>	<u>Seep Identifier</u>	<u>Sample Date</u>	<u>Tritium (pCi/L)</u>	<u>Seep Cond. (uS/cm)</u>	<u>River Cond. (uS/cm)</u>
100-B	037-1	9/22/93	12,000	318	138
100-K	077-1	9/28/93	140 U ^a	185	140
100-D	110-1	9/15/93	5,300	345	140
100-H (up)	145-2	9/20/93	2,600	316	151
100-H	153-1	9/15/93	380 J ^a	120	144
100-F	189-1	9/28/93	29 U ^a	144	140
F-Slough	205-1	9/22/93	1,200	316	NA

Notes: ^{a/} Probably not representative of groundwater; low seep conductivity indicates sample represents bank stored river water that is returning to the river.

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RIVER STAGE FLUCTUATION AND CONTAMINANT MIGRATION

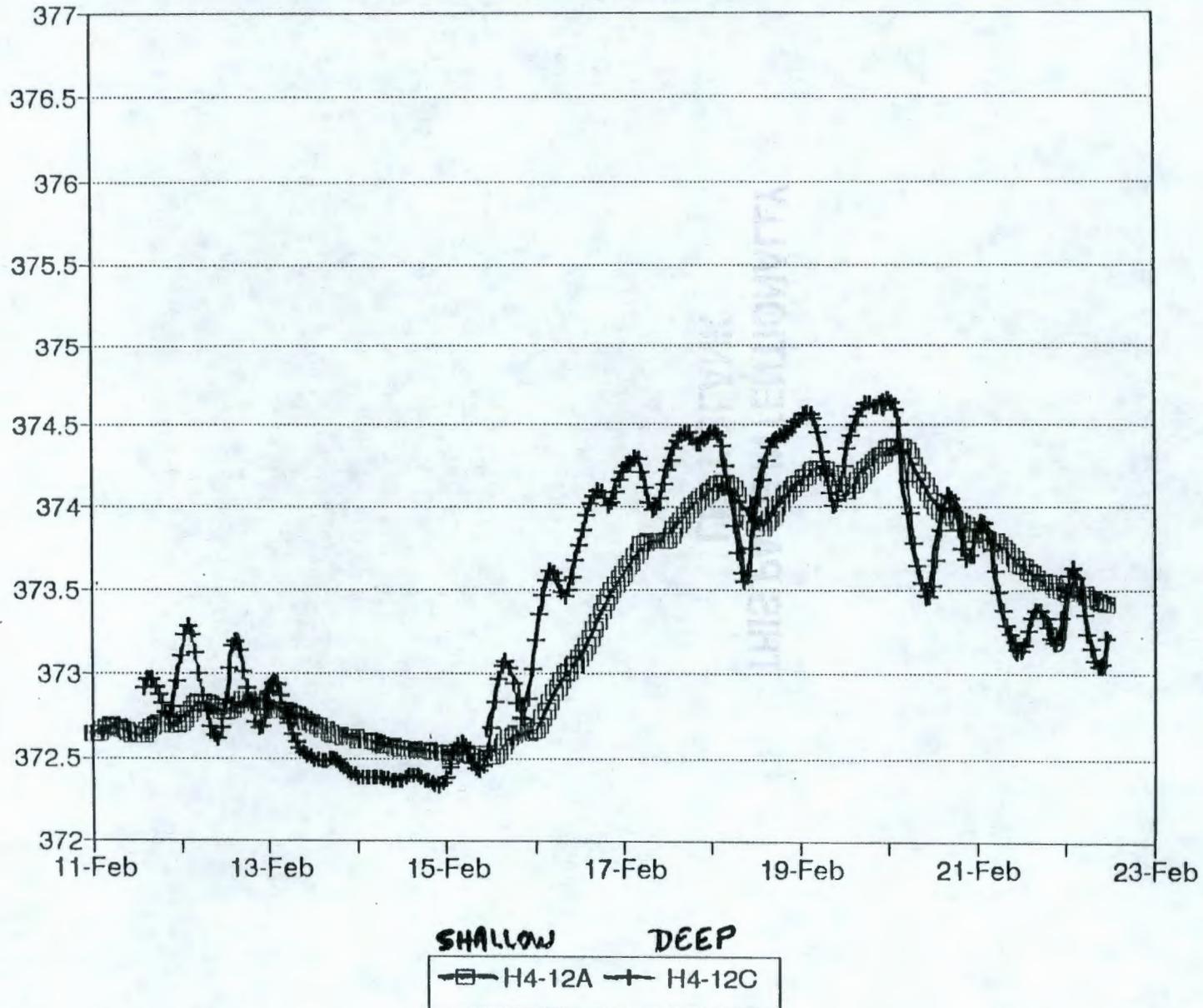
- **Variable Horizontal Gradients Along Shoreline**
- **Influence on Downward Migration of Contamination**

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Water Elevation at H4-12 Cluster



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Fig. 8

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FY95 DIRECTION OF GROUNDWATER/RIVER INTERACTION PROGRAM

- **Summarize 18 Months of Hourly Water Level Data**
- **Re-deploy Automated Stations to Remediation Sites**
- **Continue to Monitor Water Quality in Shoreline Wells and at Riverbank Seepage Locations**

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FILE INDEX:

The table below identifies the available files containing groundwater elevation data. An "X" means there is a processed, an extract, and an average file for the indicated calendar quarter corresponding to the particular Well ID. The superscript "c"'s and "t"'s mean the file contains hourly (extract file) and daily average (average file) conductivity and/or temperature data, respectively.

WELL ID	FILENAME	FILES AVAILABLE												
		91	92				93				94			
		4	1	2	3	4	1	2	3	4	1	2	3	4
B2-12	B47797Q?.WQI							X	X	X	X	X		
B2-13	B13797Q?.WQI							X	X	X	X	X		
B3-1	B31797Q?.WQI	x ^c	x ^c	x ^c	x ^c	x ^c								
B3-46	B46797Q?.WQI							X	X	X	X	X		
B3-47	B47797Q?.WQI							X	X	X	X	X		
B4-1	B41797Q?.WQI	X	X	X	X	X	X	X	X	X	X	X		
B4-4	B44797Q?.WQI	X	X	X	X	X								
B5-2	B52797Q?.WQI							X	X	X	X	X		
B-R1V	BRV797Q?.WQI		X	X	X	X	X	X	X	X	X	X		
D5-13	D13797Q?.WQI							X	X	X	X	X		
D5-15	D15797Q?.WQI							X	X	X	X	X		
D5-20	D20797Q?.WQI							X	X	X	X	X		

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Table 2

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D8-54A	D54?9?Q?.WQ!							x	x	x	x	x		
D8-54B	D54?9?Q?.WQ!							x	x	x	x	x		
F1-2	F12?9?Q?.WQ!							x	x	x	x	x		
F5-1	F51?9?Q?.WQ!	x ^t												
F5-4	F54?9?Q?.WQ!	x ^t												
F5-6	F56?9?Q?.WQ!	x ^t												
F5-43A	F43?9?Q?.WQ!							x	x	x	x	x		
F5-43B	F43?9?Q?.WQ!							x	x	x	x	x		
F5-44	F44?9?Q?.WQ!							x	x	x	x	x		
F5-46	F46?9?Q?.WQ!							x	x	x	x	x		
F6-1	F61?9?Q?.WQ!							x	x	x	x	x		
F-RIV	FRV?9?Q?.WQ!					x	x	x	x	x	x	x		
H3-2A	H32?9?Q?.WQ!					x	x	x	x	x	x	x		
H3-2C	H32?9?Q?.WQ!					x	x	x	x	x	x	x		
H4-7	H47?9?Q?.WQ!	x ^t	x ^t	x ^t	x ^t	x ^t	x ^t	x ^t						
H4-9	H49?9?Q?.WQ!	x ^t	x	x	x	x	x	x						
H4-10	H10?9?Q?.WQ!							x	x	x	x	x		
H4-11	H11?9?Q?.WQ!						x ^{c,t}							
H4-12A	H12?9?Q?.WQ!	x ^t	x ^t	x ^t	x ^t	x ^t	x ^t	x ^t						
H4-12C	H12?9?Q?.WQ!	x ^t	x ^t	x ^t	x ^t	x ^t	x ^t	x ^t						
H6-1	H61?9?Q?.WQ!							x	x	x	x	x		

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Table 2 cont.

H-RIV	HRV?9?Q?.WQ!	x	x	x	x	x	x	x ^t	x ^{c,t}	x ^{c,t}	x ^{c,t}	x ^{c,t}		
O.f.152-2	152?9?Q?.WQ!									x ^{c,t}	x ^{c,t}	x ^{c,t}		
Seep153-1	153?9?Q?.WQ!							x ^{c,t}						
K-18	K18?9?Q?.WQ!							x	x	x	x	x		
K-30	K30?9?Q?.WQ!							x ^t	x ^t	x ^t	x ^{c,t}	x ^{c,t}		
K-31	K31?9?Q?.WQ!							x	x	x	x	x		
K-32A	K32?9?Q?.WQ!							x	x	x	x	x		
K-32B	K32?9?Q?.WQ!							x	x	x	x	x		
K-37	K37?9?Q?.WQ!							x	x	x	x	x		
N-RIV	NRV?9?Q?.WQ!									x	x	x		

^t File contains temperature data.

^c File contains conductivity data.

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Table 2 cont.

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LONG-TERM EVALUATION OBJECTIVES

- **Up-to-Date Descriptions of Contaminated Groundwater Plumes Adjacent to the Columbia River, Including . . .**
 - **Nature of contamination, areal extent, migration characteristics, and exposure along shoreline**
- **Estimates for Quantity of Contamination and Rate of Influx into the River**

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Distribution

Unit Manager's Meeting: 100 Aggregate Area/100 Area Operable Units
September 28, 1994

Nancy Werdel	DOE-RL, RSD (A5-19)
Mike Thompson	DOE-RL, RSD (A5-19)
Bryan Foley	DOE-RL, PRD (A5-19)
Heather Trumble	DOE-RL, RSD (A5-19)
Steve Balone	DOE-HQ (EM-442)
Dennis Faulk	100 Aggregate Area Manager, EPA (B5-01)
Bill Lum, USGS	Support to EPA
Jim Pankanin, PRC	Support to EPA
Phil Staats	100 Aggregate Area Manager, WDOE (Kennewick)
Chuck Cline	WDOE (Lacey)
Lynn Albin	Washington Dept. of Health
G. R. Eidam, BHI /A. D. Krug (H6-02)	(H4-79)
Bob Henkel, BHI	(H6-02)
Diana Sickle, BHI	(H6-27)
Kay Kimmel	MAC (B1-42)
R. Scott Hajner	BHI (H4-79)
Andrea Hopkins	BHI (H4-79)
Tom Page (Please route to:)	PNL (K1-31)
Cheryl Thornhill	PNL (K1-19)
Mark Hanson	PNL (K1-51)
Steve Slate	PNL (K1-19)
Bill Stillwell	PNL (K1-30)
Ben Johnson	PNL (K1-78)

Original Sent to: ADMINISTRATIVE RECORD: 100 AAMS; Care of EDMC, WHC (H6-08)

Please inform Kay Kimmel (946-3692) of Mactec/Dames & Moore
of deletions or additions to the distribution list.

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