

START

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ENGINEERING CHANGE NOTICE

1. ECN **168799**

Page 1 of 2

Proj.
ECN

2. ECN Category (mark one)	Supplemental <input type="checkbox"/>	Change ECN <input type="checkbox"/>	Supersedure <input type="checkbox"/>
Cancel/Void <input type="checkbox"/>	Direct Revision <input checked="" type="checkbox"/>	Temporary <input type="checkbox"/>	Discovery <input type="checkbox"/>

3. Originator's Name, Organization, MSIN, and Telephone No. J. W. Roberts, Environmental Division, H4-55, 6-5164	81221	4. Date 6/24/92
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5. Project Title/No./Work Order No. Description of Work for the 100-NR-2 Groundwater Operable Unit	6. Bldg./Sys./Fac. No. 100-N Area	7. Impact Level 3Q
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8. Document Number Affected (include rev. and sheet no.) WHC-SD-EN-AP-088, Rev. 0	9. Related ECN No(s). NA	10. Related PO No. NA
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11a. Modification Work <input type="checkbox"/> Yes (fill out Blk. 11b) <input checked="" type="checkbox"/> No (NA Blks. 11b, 11c, 11d)	11b. Work Package Doc. No. NA	11c. Complete Installation Work NA _____ Cog. Engineer Signature & Date	11d. Complete Restoration (Temp. ECN only) NA _____ Cog. Engineer Signature & Date
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12. Description of Change
General

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13a. Justification (mark one)	Criteria Change <input type="checkbox"/>	Environmental <input type="checkbox"/>	Facilitate Const. <input type="checkbox"/>
Design Error/Omission <input type="checkbox"/>	Design Improvement <input type="checkbox"/>	As-Found <input checked="" type="checkbox"/>	Const. Error/Omission <input type="checkbox"/>

13b. Justification Details

Revised per regulator comments.

14. Distribution (include name, MSIN, and no. of copies)
See Attached

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ENGINEERING CHANGE NOTICE

Page 2 of 2

1. ECN (use no. from pg. 1)

168799

15. Design Verification Required
 Yes
 No

16. Cost Impact

ENGINEERING	CONSTRUCTION
Additional <input type="checkbox"/> \$	Additional <input type="checkbox"/> \$
Savings <input type="checkbox"/> \$	Savings <input type="checkbox"/> \$

17. Schedule Impact (days)

Improvement
 Delay

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	<input type="checkbox"/>	Seismic/Stress Analysis	<input type="checkbox"/>	Tank Calibration Manual	<input type="checkbox"/>
Functional Design Criteria	<input type="checkbox"/>	Stress/Design Report	<input type="checkbox"/>	Health Physics Procedure	<input type="checkbox"/>
Operating Specification	<input type="checkbox"/>	Interface Control Drawing	<input type="checkbox"/>	Spares Multiple Unit Listing	<input type="checkbox"/>
Criticality Specification	<input type="checkbox"/>	Calibration Procedure	<input type="checkbox"/>	Test Procedures/Specification	<input type="checkbox"/>
Conceptual Design Report	<input type="checkbox"/>	Installation Procedure	<input type="checkbox"/>	Component Index	<input type="checkbox"/>
Equipment Spec.	<input type="checkbox"/>	Maintenance Procedure	<input type="checkbox"/>	ASME Coded Item	<input type="checkbox"/>
Const. Spec.	<input type="checkbox"/>	Engineering Procedure	<input type="checkbox"/>	Human Factor Consideration	<input type="checkbox"/>
Procurement Spec.	<input type="checkbox"/>	Operating Instruction	<input type="checkbox"/>	Computer Software	<input type="checkbox"/>
Vendor Information	<input type="checkbox"/>	Operating Procedure	<input type="checkbox"/>	Electric Circuit Schedule	<input type="checkbox"/>
OM Manual	<input type="checkbox"/>	Operational Safety Requirement	<input type="checkbox"/>	ICRS Procedure	<input type="checkbox"/>
FSAR/SAR	<input type="checkbox"/>	IEFD Drawing	<input type="checkbox"/>	Process Control Manual/Plan	<input type="checkbox"/>
Safety Equipment List	<input type="checkbox"/>	Cell Arrangement Drawing	<input type="checkbox"/>	Process Flow Chart	<input type="checkbox"/>
Radiation Work Permit	<input type="checkbox"/>	Essential Material Specification	<input type="checkbox"/>	Purchase Requisition	<input type="checkbox"/>
Environmental Impact Statement	<input type="checkbox"/>	Fac. Proc. Samp. Schedule	<input type="checkbox"/>		<input type="checkbox"/>
Environmental Report	<input type="checkbox"/>	Inspection Plan	<input type="checkbox"/>		<input type="checkbox"/>
Environmental Permit	<input type="checkbox"/>	Inventory Adjustment Request	<input type="checkbox"/>		<input type="checkbox"/>

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number/Revision

20. Approvals

Signature	Date	Signature	Date
OPERATIONS AND ENGINEERING		ARCHITECT-ENGINEER	
Cog./Project Engineer J.W. Roberts	<u>6/24/92</u>	PE	_____
Cog./Project Engr. Mgr. R.P. Henckel	<u>6/24/92</u>	QA	_____
QA G. Corrigan	<u>6-24-92</u>	Safety	_____
Safety	_____	Design	_____
Security	_____	Other	_____
Proj. Prog./Dept. Mgr.	_____		_____
Def. React. Div.	_____		_____
Chem. Proc. Div.	_____		_____
Def. Wst. Mgmt. Div.	_____	DEPARTMENT OF ENERGY	_____
Adv. React. Dev. Div.	_____		_____
Proj. Dept.	_____		_____
Environ. Div.	_____	ADDITIONAL	_____
IRM Dept.	_____		_____
Facility Rep. (Ops.)	_____		_____
Other	_____		_____

SUPPORTING DOCUMENT

1. Total Pages 13

2. Title

DESCRIPTION OF WORK FOR THE 100-NR-2 GROUNDWATER OPERABLE UNIT

3. Number

WHC-SD-EN-AP-088

4. Rev No.

1

5. Key Words

100-NR-2
DESCRIPTION OF WORK
GROUNDWATER
OPERABLE UNIT

APPROVED FOR
PUBLIC RELEASE

6. Author

Name: J.W. ROBERTS

Signature

Organization/Charge Code 81221/PHNIAA PHIAA

7. Abstract

6/24/92 N. Jones

This description of work details the field activities to be conducted for the 100-NR-2 Operable Unit and will serve as a field guide for those performing the work.

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9. Impact Level 3Q

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1.0 SCOPE OF WORK

This description of work details the field activities associated with cable tool drilling of groundwater wells in the 100-NR-2 Operable Unit (Task 6) and will serve as a field guide for those performing the work. It should be used in conjunction with the *RCRA Facility Investigation/Corrective Measures Study Work Plan for the 100-NR-2 Operable Unit, Hanford Site, Richland, Washington* (DOE/RL 1991) for general investigation strategy and with *Environmental Investigations and Site Characterization Manual* (WHC 1988c) for specific procedures. Well locations are shown on Figure 1.

The coordinates used on Figure 1 are by USGS (1983). All wells on the map are prefixed with a 199, but the prefix has been dropped for clarity.

2.0 GENERAL REQUIREMENTS

2.1 HEALTH AND SAFETY

All personnel working to this description of work will have completed the 40-h Hazardous Waste Site Worker training program and will perform all work in accordance with the following:

- WHC-EP-0383, *Environmental Engineering, Technology, and Permitting Function Quality Assurance Program Plan* (WHC 1990)
- WHC-CM-4-10, *Radiation Protection* (WHC 1988d)
- WHC-IP-0692, *Health Physics Procedures Manual* (WHC 1991b)
- WHC-CM-4-11, *ALARA Program* (WHC 1988a)
- WHC-CM-4-3, *Industrial Safety Manual*, Vol. 1 through 3 (WHC 1987)
- WHC-CM-7-5, *Environmental Compliance Manual* (WHC 1988b)
- WHC-CM-7-7, *Environmental Investigations and Site Characterization Manual* (WHC 1988c)
- WHC-SD-EN-SAD-002, Rev 0, *100 Area Low Hazard Characterization Activities Safety Assessment* (Taylor 1991)
- Site-specific health and safety plan/job safety analysis.

2.2 PREREQUISITES

Each item on the Drilling Planning Form (EII 6.7, Resource Protection Well and Test Borehole Drilling) (WHC 1988c) will be signed and dated by the cognizant engineer or field team leader prior to the start of work. A readiness review, if required, will be conducted according to EII 1.13, Readiness Review (WHC 1988c).

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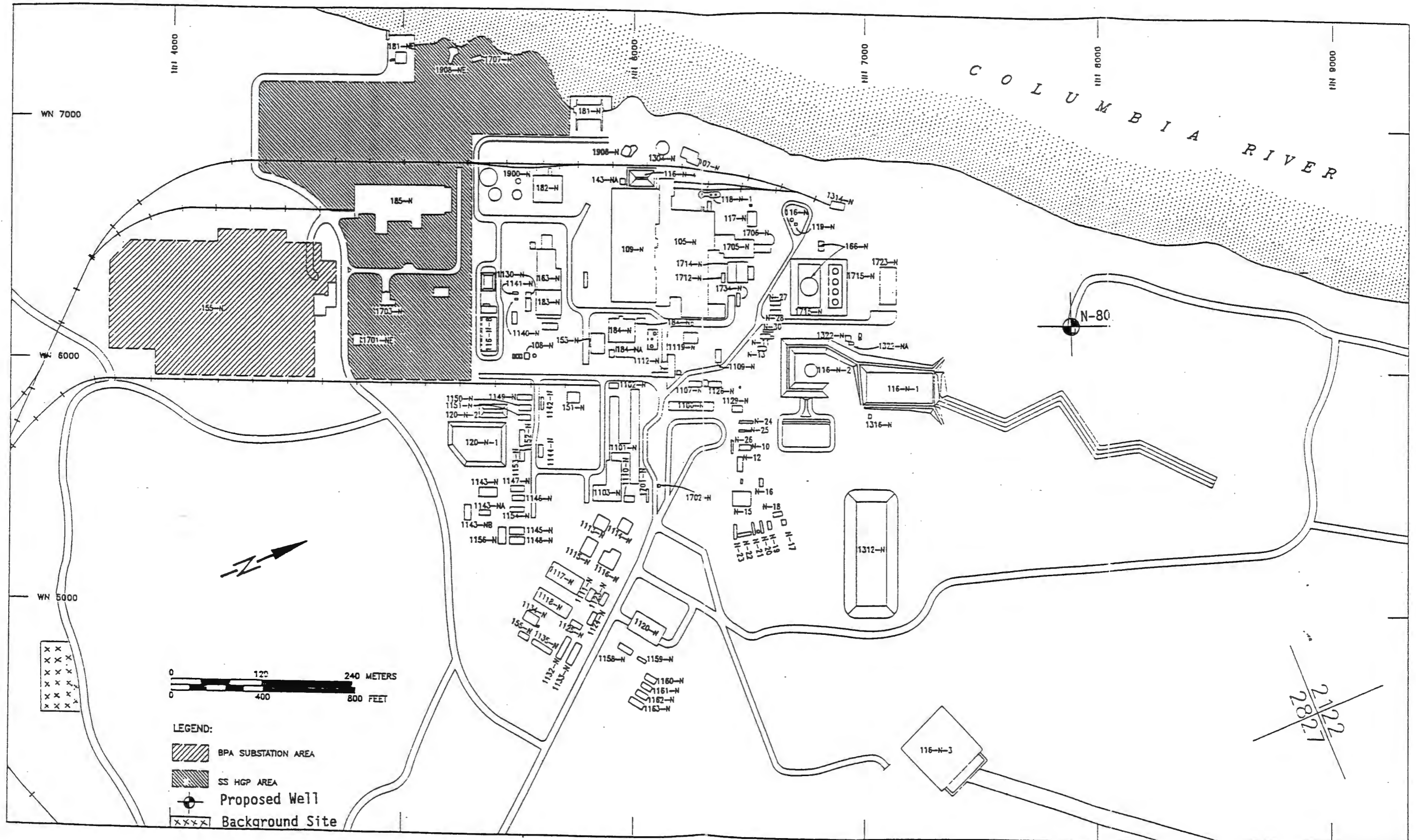


Figure 1. Location of Proposed Well and Background Site in 100-NR Area.

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3.0 SAMPLING AND FIELD ACTIVITIES

3.1 SOIL SCREENING

All samples and cuttings will be field screened for evidence of volatile organics and radionuclides (Section 5.1.6.2.3 of the 100-NR-2 work plan) (DOE/RL 1991). Volatiles will be screened by the field geologist using an organic vapor monitor (OVM) that will be used, maintained, and calibrated consistent with EII 3.2, Health and Safety Monitoring Instruments (WHC 1988c) and EII 3.4, Field Screening (WHC 1988c). Radionuclide screening will be performed by the field geologist per EII 3.4, Field Screening (1988c). The field geologist will record screening results in the borehole log (EII 9.1, Geologic Logging) (WHC 1988c).

The action level for radionuclide screening is twice background. The action level for volatile organic screening is 5 ppm above background. Prior to initiating drilling, determine a one time instrument background reading using the above instruments at the background site located on Figure 1. Instrument background will be measured on freshly disturbed surface soil, holding the instruments less than 1 in. from the soil. The field geologist will record the background levels in the borehole log per EII 9.1, Geologic Logging (WHC 1988c) prior to the start of drilling.

3.2 GEOLOGIC SAMPLING

Geologic samples will be taken at 5-ft intervals and at major stratigraphic changes for the preparation of borehole logs, per Section 5.1.6.2.3 of the 100-NR-2 work plan (DOE/RL 1991) and EII 9.1, Geologic Logging (WHC 1988c). The field geologist shall archive the nonradioactive geologic samples per EII 5.7A, Hanford Geotechnical Sample Library Control (WHC 1988c).

At the completion of the groundwater well two composite samples will be collected (from unsaturated sediments): one from archive samples in the top half of the well and one from archive samples in the bottom half. An equal volume will be taken from each archive sample, composited in a stainless steel bowl, and placed in a 500-ml glass bottle. Each composite sample will be analyzed for Gamma Spec only, as a check on the radiation detection instrument. Results will be stored in the project files.

All waste generated during drilling activities will be handled according to EII 4.3, Control of CERCLA and Other Past-Practice Investigation Derived Waste (WHC 1988a).

3.3 SOIL SAMPLING (PHYSICAL PROPERTY)

Collect four samples for physical property analysis per Section 5.1.5.3 of DOE/RL (1991) and EII 5.2, Appendix B, Soil and Sediment Sampling (WHC 1988c). Samples that do not meet the physical properties testing lab radiological acceptance criteria will not be collected for physical property testing.

The goal for selecting physical property samples is to collect one sample from the top third, one from the middle third, and one from the bottom third of the unsaturated zone, and one within the saturated zone. The sample collected from the bottom third of the unsaturated zone must be collected as close as possible to the water table. The field geologist must use professional judgement to select samples that are representative of the principle soil types that can be sampled with the split-spoon sampler. Two 6-in. sleeves and one moisture tin will be collected. The field geologist will record the selected samples in the borehole log per EII 9.1, Geologic Logging (WHC 1988c).

These samples will be analyzed for the following parameters using American Society for Testing and Materials (ASTM) methods. Bulk density will be calculated. K_{unsat} will be both measured and calculated, for comparative purposes.

- Bulk density
 - Samples in the unsaturated zone only
- Particle Size Distribution (ASTM D422-63)
 - All samples
- Moisture Content (ASTM D2216)
 - Samples in the unsaturated zone only
- Moisture Retention (ASTM D2325-68, D3152-72)
 - Samples in the unsaturated zone only. Performed only on samples in which 25% of the sample passes the #10 screen.
- Saturated Hydraulic Conductivity (K_{sat}) (ASTM D2434-68)
 - All samples
- Unsaturated Hydraulic Conductivity (K_{unsat}) at 10% moisture content after full saturation
 - Samples in the unsaturated zone only. Performed only on samples in which 25% of the sample passes the #10 screen.

Data collected from these analyses will be stored in the 100-NR-2 project files.

3.4 ANALYTICAL SAMPLING

3.4.1 Soil

Collect analytical soil samples per Section 5.1.6.2.3 of the 100-NR-2 work plan (DOE/RL 1991) and EII 5.2, Appendix B, Soil and Sediment Sampling (WHC 1988c). Collect these at 10 ft above the expected unconfined groundwater, one 5 ft above and one 5 ft below the groundwater, and one at the bottom of the unconfined aquifer. In addition, if screening values (including borehole cuttings and geologic samples) exceed screening action levels, collect analytical samples with a split-spoon sampler at 5-ft intervals until either: (1) two consecutive screening values fall below the screening action limits outlined above or (2) until 5 ft below groundwater.

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The integrity of the well seal will be tested according to the test plan written for the 300-FF-5 operable unit (EMO-1029, AD-940).

The estimate depth and screened interval are shown in Table 1.

Table 1. Well Depth and Installation Information.

Well number	Est. depth (ft)	Design type	Est. screened interval (ft)	Physical prop. samples
199-N-80	200	deep	190 - 200	yes (4)

3.4.2 Groundwater

Groundwater samples will be collected from the well per EII 5.8 Groundwater Sampling (WHC 1988c) and analyzed for the full suite of parameters listed below for the first two rounds of sampling (Section 5.1.6.3 of the 100-NR-2 work plan) (DOE/RL 1991).

3.4.3 Analyses

Samples collected for chemical analysis will be analyzed for the full suite of CERCLA Contract Laboratory Program (CLP) Target Compound List (TCL) and Target Analyte List (TAL) constituents, specific anions that may be present, and for radionuclides. Estimated quantity of material needed for analyses are shown in Tables 2 and 3, but may vary depending on the laboratory doing analyses. The laboratory will use existing Level IV CLP methods for nonradioactive constituents and methods approved under their contract for radiological analyses (Level V). Sample custody will follow procedures as outlined in EII 5.1, Chain of Custody (WHC 1988c).

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Table 2. List of Analytes (Soil).

Analyte	Method	Holding Time	Container/Volume
ICP/AA metals Mercury Cyanide	CLP	6 months 28 days 14 days	G 250 ml
VOA	CLP	14 days	G 125 ml
Semi-VOA	CLP	7 days ¹	aG 1000 ml
PCB's/Pesticides	CLP	7 days ¹	
Anions			
Fluoride	EPA 300.0	28 days	
Nitrate	EPA 353.3	28 days	
Sulfate	EPA 300.0	28 days	
Gross alpha Gross beta Gamma spec. Sr-90 C-14 U-235, 238 Pu-239, 240 Am-241	lab SOP	6 months	G 1,000 ml
Total Activity (222-S Lab)	lab SOP	6 months	G or P small vial (at least 1 gram)

¹ 7 days for extraction, 40 days after analysis for extraction.

AA = atomic absorber
 CLP = Contract Laboratory Program
 ICP = inductively coupled plasma
 PCB = polychlorinated biphenyl
 N/A = not applicable

SOP = standard operating procedures
 VOA = volatile organic analyses
 G = glass
 aG = amber glass
 P = plastic

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Table 3. List of Analytes (Groundwater).

Analyte	Method	Holding Time	Container/Volume
ICP/AA metals Mercury	CLP	6 months 28 days	P 3X1000 ml ²
Cyanide	CLP	14 days	P 3X1000 ml ²
VOA	CLP	14 days	Gs 3X40 ml
Semi-VOA PCB's/Pesticides	CLP	7 days ¹	aG 3X2000 ml ²
Anions F, SO ₄ pH Conductivity	EPA 300.0 9040 9050	48 hours 28 days	P 1000 ml
NO ₃	353.2	28 days	P 500 ml
Gross alpha Gross beta Gamma spec. Sr-90 U-235, 238 Pu-239, 240 Am-241	lab SOP	6 months	P 6000 ml
C-14	lab SOP	6 months	P 500 ml
Tritium	lab SOP	6 months	Gs 250 ml
Tc-99	lab SOP	6 months	P 1000 ml
Total Activity	N/A	6 months	G or P small vial (at least 1 ml)

¹ 7 days for extraction, 40 days after analysis for extraction.

² 3X is required for QA/QC in the CLP protocol.

AA = atomic absorber

CLP = Contract Laboratory Program

ICP = inductively coupled plasma

PCB = polychlorinated biphenyl

N/A = not applicable

SOP = standard operating procedures

VOA = volatile organic analyses

G = glass

aG = amber glass

P = plastic

If full sample volume requirements cannot be met, the sampling scientist will record the volume obtained in the sampling scientists logbook per EII 1.5, Field Logbooks (WHC 1988c) and analyze in the following order:

1. Volatiles
2. Semivolatiles/PCB's/Pesticides
3. Target Analyte List
4. Radioisotopes
5. Anions
6. Total Activity

3.5 GEOPHYSICAL LOGGING

Gross-gamma log the groundwater well, performing the work in three stages: Stage 1 after completing the first 20 ft of drilling with 12-in. casing before reducing to a smaller casing. If the gross-gamma tool is not available within 4 h of when needed, skip logging the first 20 ft. Stage 2 after reaching total depth with 10-in. casing and stage 3 after reaching total

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depth with 8-in. casing but before completing the well (EII 11.1, Geophysical Logging) (WHC 1988c). Spectral-gamma log the well only if contamination is indicated by the gross-gamma log (survey exceeds 100 cps for any depth interval) or by field screening.

3.6 AQUIFER TESTING

Perform a slug test on the well per Section 5.1.6.2.5 of the 100-NR-2 work plan (DOE/RL 1991) and EII 10.1, Aquifer Testing (WHC 1988c).

4.0 QUALITY ASSURANCE/QUALITY CONTROL REQUIREMENTS

Internal quality control samples shall be collected by the sampling scientist as stated below, per Appendix A, Quality Assurance Project Plan (DOE/RL 1991) and documented in the sampling logbook per EII 1.5, Field Logbooks (WHC 1988c). The trip blank and field blank have been deleted for soil sampling per EPA/540/G-87/004 Appendix C, Section C.6.

Groundwater:

1. Collect one duplicate for every 10 groundwater samples or a minimum of 1 per reactor area.
2. Collect one split sample per reactor area.
3. Collect field blanks at the same frequency as duplicates.
4. Collect one (VOA) trip blank per cooler that contains samples that will be analyzed for volatiles. Only analyze for volatiles.
5. Collect equipment blanks at the same frequency as duplicates.

Soil:

1. Collect one duplicate for every 20 soil samples.
2. Collect one split sample per reactor area.
3. Field blanks are not required.
4. Collect one sample each month from any source of water introduced into the hole during drilling. Only one sample is required for both groundwater and vadose borings. Analyze for the full suite of water parameters.
5. Collect one (VOA) trip blank for each batch of containers shipped to the sampling (site) facility and analyze for volatiles only. The media shall be silica sand.
6. Collect equipment blanks at the same frequency as duplicates and analyze for the constituents listed in Table 1. The media shall be silica sand.

5.0 SCHEDULE

Well 199-N-80 is scheduled for drilling in early November - late November 1993. This schedule is subject to change and the operable unit

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coordinator should be contacted for current status. An Agreement Activity Notification form will be issued at least 5 days prior to start of field work.

6.0 CHANGES TO THE DESCRIPTION OF WORK

Major changes to this description of work, such as analyzing different parameters, using different analytical methods, or changing the sampling interval will be submitted on the attached form (Attachment 1) and kept on file with the operable unit coordinator. Copies will be submitted to the lead regulatory agency and appropriate field personnel.

7.0 REFERENCES

- 9
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- DOE/RL 1991, *Remedial Investigation/Feasibility Study Work Plan for the 100-NR-2 Operable Unit, Hanford Site, Richland, Washington*, DOE/RL-90-08, U.S. Department of Energy, Richland Field Office, Richland, Washington.
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 - WHC, 1987, *Industrial Safety Manual*, Vol. 1 through 3, WHC-CM-4-3, Westinghouse Hanford Company, Richland, Washington.
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 - WHC, 1988d, *Radiation Protection*, WHC-CM-4-10, Westinghouse Hanford Company, Richland, Washington.
 - WHC, 1990, *Environmental Engineering, Technology, and Permitting Function Quality Assurance Program Plan*, WHC-EP-0383, Westinghouse Hanford Company, Richland, Washington.
 - WHC, 1991a, *Generic Well Specification*, WHC-S-014, Westinghouse Hanford Company, Richland, Washington.
 - WHC, 1991b, *Health Physics Procedures Manual*, WHC-IP-0692, Westinghouse Hanford Company, Richland, Washington.

ATTACHMENT 1

**100-NR-2 DESCRIPTION OF WORK
PROJECT CHANGE FORM**

Date: _____

Person Initiating Change: _____

Change: _____

Reason for Change: _____

APPROVAL:

Field Team Leader: _____

Operable Unit Coordinator: _____

Quality Assurance: _____

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Date Received:

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WHC-CM-3-4

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 - Software/Database
 - Controlled Document
 - Other

ID Number (include revision, volume, etc.)

WHC-SD-EN-AP-088, Rev. 1

List attachments.

Date Release Required

June 24, 1992

Title Description of work for the 100-NR-2 Groundwater Operable Unit

Unclassified Category

UC-

Impact Level

3Q

New or novel (patentable) subject matter? No Yes

If "Yes", has disclosure been submitted by WHC or other company? No Yes Disclosure No(s).

Information received from others in confidence, such as proprietary data, trade secrets, and/or inventions?

No Yes (Identify)

Copyrights? No Yes

If "Yes", has written permission been granted? No Yes (Attach Permission)

Trademarks?

No Yes (Identify)

Complete for Speech or Presentation

Title of Conference or Meeting

na

Group or Society Sponsoring

na

Date(s) of Conference or Meeting

na

City/State

na

Will proceedings be published? Yes No

Will material be handed out? Yes No

Title of Journal

na

CHECKLIST FOR SIGNATORIES

Review Required per WHC-CM-3-4

Yes

No

Reviewer - Signature Indicates Approval

Name (printed)

Signature

Date

Classification/Uncontrolled Nuclear Information

Patent - General Counsel

S.W. Bergin *S.W. Bergin* 6/29/92

Legal - General Counsel

B.D. Williamson *B.D. Williamson* 6/24/92

Applied Technology/Export Controlled Information or International Program

WHC Program/Project

T.M. Wintczak *T.M. Wintczak* 6/24/92

Communications

RL Program/Project

J.K. Erickson *J.K. Erickson* 6-24-92

Publication Services

L. Hermann for DES *L. Hermann* 6-24-92

Other Program/Project

Information conforms to all applicable requirements. The above information is certified to be correct.

Yes

No

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References Available to Intended Audience

Stamp is required before release. Release is contingent upon resolution of mandatory comments.

Transmit to DOE-HQ/Office of Scientific and Technical Information

Author/Requestor (Printed/Signature)

Date

J. W. Roberts *J.W. Roberts* 6/24/92

Intended Audience

Internal Sponsor External

Responsible Manager (Printed/Signature)

Date

R. P. Henckel *R.P. Henckel* 6/24/92



Date Cancelled

Date Disapproved

DISTRIBUTION SHEET

To:
DistributionFrom:
J.W. RobertsDate:
June 24, 1992

Project Title/Work Order:

Description of work for the 100-NR-2 Groundwater Operable Unit

EDT No.:

ECN No.: 168799

Name	MSIN	With Attachment	EDT/ECN & Comment	EDT/ECN Only
G. S. Corrigan	H4-16	X		
R. E. Day	H4-55	X		
J. D. Fancher	N3-05	X		
K. A. Gano	X0-21	X		
B. A. Gilkeson	L4-78	X		
E. D. Goller	A5-19	X		
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