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Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

JUL 9 2003

03-RCA-0302

Mr. Nicholas Ceto, Program Manager
Office of Environmental Cleanup
Hanford Project Office
U.S. Environmental Protection Agency
712 Swift Boulevard, Suite 5
Richland, Washington 99352

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EDMC

Mr. Michael A. Wilson, Program Manager
Nuclear Waste Program
State of Washington
Department of Ecology
1315 W. Fourth Avenue
Kennewick, Washington 99336

Addressees:

SUBMITTAL OF THE EXPLANATION OF SIGNIFICANT DIFFERENCES (ESD) FOR THE
300-FF-2 OPERABLE UNIT RECORD OF DECISION (ROD)

As previously discussed with members of your staff, attached for your review is the ESD for the
"Record of Decision for the 300-FF-2 Operable Unit, Hanford Site" (300-FF-2 ROD). Briefly
stated this ESD serves to provide notice of four changes to the 300-FF-2 ROD:

- Changes the uranium cleanup level from 350 to 267 pCi/gm:
- revises the Remedial Design Report/Remedial Action Work Plan (RDR/RAWP) performance periodicity:
- synchronized the annual institutional controls reporting date with the "Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions:" and
- changes the language regarding the use of noncontiguous facilities at the Hanford Site for waste treatment and disposal.

Review and submittal of comments is 45 calendar days from receipt of the ESD. If you have any questions, please contact Owen Robertson, Environmental Restoration Division, on (509) 373-6295.

Sincerely,

Joel Hebdon, Director
Regulatory Compliance and Analysis Division

RCA:EBD

Attachment

cc: See page 2

Addressees
03-RCA-0302

-2-

JUL 9 2003

cc w/attach:

R. A. Carlson, BHI
L. D. Crass, FHI
J. W. Donnelly, BHI
M. Goldstein, EPA
J. A. Hedges, Ecology
J. S. Hertz, FHI
R. Jim, YN
T. M. Martin, HAB
E. J. Murhphy-Fitch, FHI
K. Niles, Oregon Energy
P. Sobotta, NPT
R. F. Stanley, Ecology
J. Price, Ecology
Admin. Record

cc w/o attach:

V. R. Dronen, BHI

Draft 06/30/03

**EXPLANATION OF SIGNIFICANT DIFFERENCES
FOR THE 300-FF-2 OPERABLE UNIT RECORD OF DECISION**

June 2003

**EXPLANATION OF SIGNIFICANT DIFFERENCES
FOR THE 300-FF-2 OPERABLE UNIT RECORD OF DECISION
June 2003**

SITE NAME AND LOCATION

USDOE Hanford 300 Area
300-FF-2 Operable Unit
Hanford Site
Benton County, Washington

INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE

The U.S. Environmental Protection Agency (EPA—the lead regulatory agency), the Washington State Department of Ecology (Ecology—the support regulatory agency), and the U.S. Department of Energy (DOE—the responsible agency), hereafter referred to as the Tri-Parties, are issuing this Explanation of Significant Differences (ESD) to provide notice of a change to the uranium cleanup level identified in the *Record of Decision for the 300-FF-2 Operable Unit, Hanford Site*¹ (hereafter referred to as the 300-FF-2 Record of Decision [ROD]). Additionally, this ESD serves to clarify three key points: (1) Revisions of the Remedial Design Report/Remedial Action Work Plan (RDR/RAWP) will be performed annually, or as appropriate, but not more frequently than once per calendar year; (2) The annual institutional controls reporting date shall be consistent with and included in the *Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions* (DOE/RL-2001-41, Rev. 0, July 2002); and, (3) Language regarding the use of noncontiguous facilities at the Hanford Site for waste treatment and disposal will be clarified in this ESD.

Notice of Change to Uranium Cleanup Level

This ESD serves to provide notice of a change to the uranium cleanup level identified in the 300-FF-2 ROD¹. The original 300-FF-2 ROD identified a uranium cleanup level (350 pCi/g) but also required an engineering study to more accurately define the leachability and mobility of uranium in the 300 Area soils in the 300 Area and verify that the uranium soil cleanup level is protective of groundwater and Columbia River exposure pathways. The engineering study was conducted during fiscal years 2000, 2001, and 2002. The results of the study resulted in changing the uranium cleanup level from 350 pCi/g to 267 pCi/g. This value is stated in Tables 5 and 6 of the 300-FF-2 ROD¹.

Revision of the Annual Institutional Controls Reporting Date

The 300-FF-2 ROD states that a report shall be submitted to EPA and Ecology summarizing the results of an evaluation of the implementation and effectiveness of institutional controls for the 100 Area Operable Units (OUs) for the preceding calendar year. The *Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions* requires submittal of a sitewide institutional controls report in July 2003 and annually by September 30 beginning in 2004. This ESD revises the reporting date to make it consistent with the sitewide institutional controls reporting dates (i.e., July 2003 and September 30 for subsequent

¹ EPA, April 2001, *Record of Decision for the 300-FF-2 Operable Unit, Hanford Site*, U.S. Environmental Protection Agency, Region 10, Seattle, Washington.

years) and allows for the evaluation to be included in the sitewide annual institutional controls report rather than requiring issuance of a separate report.

Clarification of Onsite Determination Language

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) Section 104(d) allows the EPA to treat noncontiguous related facilities as a single CERCLA site for response purposes. This provision allows waste to be transferred between such noncontiguous "onsite" facilities without having to obtain permits. This ESD serves to clarify that the Central Waste Complex (CWC) and Effluent Treatment Facility (ETF) are considered noncontiguous onsite facilities for purposes of managing remediation waste from sites included in the 300-FF-2 ROD. Prior to treatment or disposal of waste from an individual waste site to the CWC or ETF, EPA will determine the acceptability of facility use, and Ecology will be notified.

Statutory Citation for an Explanation of Significant Difference

The Tri-Parties are issuing this ESD in accordance with Section 117(c) of CERCLA and Section 300.435(c)(2)(i) of the CERCLA "National Oil and Hazardous Substances Pollution Contingency Plan" (National Contingency Plan). The purpose of this ESD is to provide public notice of the decision to amend the 350 pCi/g cleanup level for uranium in 300 Area soils to a more conservative value of 267 pCi/g to be more protective of groundwater and Columbia River exposure pathways for the 300-FF-2 OU, and to clarify three key points:

- (1) Revisions of RDR/RAWP will be performed annually, or as appropriate, but not more frequently than once per fiscal year;
- (2) The annual institutional controls reporting date shall be consistent with and included in the *Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions* (DOE/RL-2001-41, Rev. 0, July 2002); and,
- (3) Clarification will be made to language regarding the use of noncontiguous facilities at the Hanford Site for waste treatment and disposal.

This ESD will become part of the Administrative Record for the cleanup decision for the Hanford Site. The Administrative Record is available for review at the following location:

Administrative Record
2440 Stevens Center Place, Room 1101
Richland, Washington 99352
509/376-2530
Attention: Debbi Isom

SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

The 300-FF-2 OU is composed of 56 waste sites that fall into four general categories: waste sites in the 300 Area industrial complex (40 sites); outlying waste sites north and west of the 300 Area industrial complex (7 sites); general content burial grounds (7 sites); and transuranic-contaminated burial grounds (2 sites). The major components of the selected remedy in the 300-FF-2 ROD include the following:

- Remove contaminated soil, structures, and associated debris
- Treat these wastes as required to meet disposal facility requirements
- Dispose of contaminated materials at the Environmental Restoration Disposal Facility (ERDF) or other approved facility
- Backfill excavated areas with clean material, followed by revegetation
- Maintain groundwater and ecological monitoring through the 300-FF-5 OU to ensure effectiveness of the remedial actions and to support the 300-FF-2 final ROD and 5-year remedy reviews.

BASIS FOR THE DOCUMENT

During the preparation of the 300-FF-2 ROD, there were concerns regarding the protectiveness of the preliminary 350 pCi/g soil cleanup level established for groundwater and the Columbia River. Because of these concerns, the Tri-Parties agreed to conduct the *300 Area Uranium Leach and Adsorption Project*^{2,3}. The project was initiated to define the potential for residual uranium in soil to leach and impact groundwater. The results of the study indicated that site-specific distribution coefficient (K_d) values were more representative than literature-derived K_d values. Modeling, using conservative site-specific K_d values, indicated that a residual soil concentration of 267 pCi/g is protective of groundwater and Columbia River exposure pathways within the 300-FF-2 OU. The rationale for this change is detailed in subsequent sections of this ESD.

The 350 pCi/g Preliminary Remediation Goal/Remedial Action Goal Origin

The RESidual RADioactivity (RESRAD) computer model was developed by Argonne National Laboratory for the DOE to estimate radiation dose and risk from radioactive materials, and is used widely for deriving cleanup goals for radionuclides in soil.

RESRAD calculations to predict uranium concentrations in groundwater and direct exposure radionuclide doses from remediated waste sites are dependent on numerous inputs, including site-specific parameters. Most of the RESRAD input parameters within Hanford Site OUs are identical from site to site. Examples of inputs that are identical from site to site within the 300 Area include parameters based on land use and hydrogeologic conditions. Parameters that are site-specific include contaminant concentrations, depth of contamination, size of the site, and depth to groundwater.

² PNNL, 2002, *300 Area Uranium Leach and Adsorption Project*, PNNL-14022, Pacific Northwest National Laboratory, Richland, Washington.

³ BHI, 2002, *Protection of 300 Area Groundwater from Uranium-Contaminated Soils at Remediated Sites*, BHI-01667, Bechtel Hanford, Inc., Richland, Washington.

The 350 pCi/g direct exposure remedial action goal (RAG) for total uranium is based on a RESRAD evaluation of the 300 Area generic site model, which equated to a 15 mrem/yr direct dose. All of the other inputs are non-site-specific parameters, which are based on land use or on 300 Area hydrogeologic conditions. For uranium, a literature-derived K_d value of 2 mL/g was used to describe uranium transport. Using the K_d value of 2 mL/g for the selected generic site model, RESRAD predicts no groundwater impact from the generic site within a 1,000-year time frame. This was the basis for concluding in the 300-FF-2 ROD that 350 pCi/g total uranium in soil was protective of groundwater.

Necessity of the Uranium Leachability/Mobility Study and Background of the Single K_d Approach

Comments received on the 300-FF-2 ROD questioned whether the 350 pCi/g uranium concentration for soil cleanup is protective of groundwater. The literature-derived K_d value of 2 mL/g is used in the generic site model for RESRAD modeling. The contaminant desorption or leach rate from the soil into water is equal to the adsorption rate from the water onto the soil. In reality, this is rarely the case for the soil column underlying heterogeneous systems such as waste sites.

Using a single K_d value to describe contaminant mobility has provided a relatively simple and conservative method for assessing RAG attainment at remediated sites. This approach has been successful to date primarily because the contaminants at remedial action sites have generally not been highly mobile.

Uranium is more mobile in the environment than most other waste site contaminants. The approach of using a single K_d in the RESRAD model to describe the uranium transport may not adequately represent uranium mobility in vadose zone soil. Because this approach is too simple for uranium, the uranium K_d /leach study was initiated to more accurately define the potential for residual uranium in soil to leach and impact groundwater.

Uranium K_d /Leach Study

In 2000, the uranium K_d /leach study was initiated to more accurately assess and represent the leachability and mobility of uranium in soil in the 300 Area. The study was initiated with the *Data Quality Objectives Summary Report for the 300 Area Uranium Leach/ K_d Study*⁴ followed by the *Sampling and Analysis Plan for the 300 Area Uranium Leach/ K_d Study*, Rev. 0, through the most current Rev. 2⁵. Pacific Northwest National Laboratory conducted the study during fiscal years 2000, 2001, and 2002.

As a result of the *300 Area Uranium Leach and Adsorption Project* (PNNL 2002), a revision has been made to the generic site model used to evaluate compliance with the remedial action objective specified in the 300-FF-2 ROD (EPA 2001) for cleanup actions to be protective of groundwater and the Columbia

⁴ BHI, 2000, *Data Quality Objectives Summary Report for the 300 Area Uranium Leach/ K_d Study*, BHI-01441, Rev. 0, Bechtel Hanford, Inc., Richland, Washington.

⁵ DOE-RL, 2002, *Sampling and Analysis Plan for the 300 Area Uranium Leach/ K_d Study*, DOE/RL-2000-75, Rev. 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

River. The change is to use the conservative K_d values and a general site model that is representative of the observations made during the *300 Area Uranium Leach and Adsorption Project* (PNNL 2002).

Applying the revised generic site model, RESRAD predicted that a total uranium residual soil concentration of up to 267 pCi/g is protective of groundwater at the drinking water standard of 30 µg/L (21.2 pCi/L).

Additionally, this ESD clarifies three key points: (1) the revision schedule for the 300 Area Remedial Design Report/Remedial Action Work Plan; (2) the reporting period for the effectiveness of institutional controls within the 300-FF-2 OU; and (3) the use of noncontiguous facilities for waste treatment and disposal.

DESCRIPTION OF SIGNIFICANT DIFFERENCES

Changing to a total uranium residual soil concentration of 267 pCi/g for the RAG does not change the performance of the remove/treat/dispose remedy or the overall schedule for remediation of waste sites currently included in the ROD. The revised RAG (267 pCi/g) results in a more stringent cleanup value for sites in the 300-FF-2 OU.

Implications of lowering the uranium cleanup level used to guide remediation from 350 pCi/g to 267 pCi/g for future remedial actions in the 300 Area are anticipated to be relatively minimal. Most of the remaining sites to be remediated include burial grounds, buildings, and pipelines. Uranium contamination at these sites is expected to be localized. Identified implications of the new uranium cleanup level used for guiding remediation include slightly longer field screening times and lower volumes of excavated soil identified as suitable for use as backfill.

Through this ESD, the Tri-Parties also concur with the following clarifications:

- (1) Revisions to the RDR/RAWP will be performed annually, or as appropriate, but not more frequently than once per fiscal year;
- (2) The annual institutional controls reporting date shall be consistent with and included in the *Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions* (DOE/RL-2001-41, Rev. 0, July 2002); and,
- (3) Clarification will be made to language regarding the use of noncontiguous facilities at the Hanford Site for waste treatment and disposal.

ASSESSMENT OF IMPACTS TO 300-FF-1 WASTE SITES

An assessment of the 300-FF-1 waste sites that were previously remediated was performed to identify impacts to groundwater/river protectiveness predictions based on the new total uranium cleanup level of 267 pCi/g. The assessment was based on evaluation of data from the uranium K_d /leach study (DOE-RL 2002 and PNNL 2002), data from a site-specific leach test conducted by contract laboratories on samples

from the North Process Pond (waste site 316-2), and residual soil concentrations at the 300-FF-1 sites. Consistent with the selected remedy prescribed by the ROD, it was assumed that the sites were revegetated. Results of the assessment indicate that all previously remediated 300-FF-1 waste sites are predicted to be protective of groundwater and the river at the new cleanup level without further action.

SUPPORT AGENCY COMMENTS

By issuance of this ESD, the Tri-Parties concur with the changes described above to the 300-FF-2 ROD. Additionally, the Tri-Parties concur that the uranium soil RAG of 350 pCi/g will be changed to the more conservative and site-appropriate value of 267 pCi/g for the sites in the 300-FF-2 OU.

STATUTORY DETERMINATIONS

This modified remedy satisfies CERCLA Section 121. The interim remedy selected in the 300-FF-2 ROD, as modified by this ESD through the change to the RAG of total uranium, remains protective of human health and the environment, complies with federal and state requirements that are applicable or relevant and appropriate to remedial actions, is cost-effective, and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable. In addition, the remedy employs treatment, as appropriate, to meet Environmental Restoration Disposal Facility waste acceptance criteria.

The response action selected by this ESD and the 300-FF-2 interim action ROD is necessary to protect the public health and welfare of the environment from actual or threatened releases of hazardous substances into the environment. Such a release or threat of release may present an imminent and substantial endangerment to public health and welfare or the environment.

PUBLIC PARTICIPATION COMPLIANCE

The public participation requirements set out in Section 300.435(c)(2)(i) of the National Contingency Plan are met through issuance of this ESD and through notification to the public by a newspaper publication.

Signature sheet for the Explanation of Significant Differences to the Record of Decision for the 300-FF-2 Operable Unit, Hanford Site, Benton County, Washington, between the United States Department of Energy and the United States Environmental Protection Agency, with concurrence by the Washington State Department of Ecology.

Mike Gearheard
Director, Office of Environmental Cleanup
United States Environmental Protection Agency Region 10

Date

Signature sheet for the Explanation of Significant Differences to the Record of Decision for the 300-FF-2 Operable Unit, Hanford Site, Benton County, Washington, between the United States Department of Energy and the United States Environmental Protection Agency, with concurrence by the Washington State Department of Ecology.

Keith Klein
Manager
Richland Operations Office
United States Department of Energy

Date

Signature sheet for the Explanation of Significant Differences to the Record of Decision for the 300-FF-2 Operable Unit, Hanford Site, Benton County, Washington, between the United States Department of Energy and the United States Environmental Protection Agency, with concurrence by the Washington State Department of Ecology.

Mike Wilson
Program Manager, Nuclear Waste Program
Washington State Department of Ecology

Date