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U.S. Department of Energy

~~Office of River Protection~~

P.O. Box 450
Richland, Washington 99352

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02-TOD-069

OCT 02 2002

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

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Dear Mr. Wilson:

CONDITIONAL APPROVAL OF TANK 241-C-104 WASTE RETRIEVAL PROJECT AND TANK 241-S-112 WASTE RETRIEVAL PROJECT FUNCTIONS AND REQUIREMENTS DOCUMENTS

Reference: Ecology letter from Suzanne Dahl to James Rasmussen, ORP "Conditional Approval of the C-104 and S-112 Functions and Requirements (F&R) Documents RPP-7807, Rev 0 and Document RPP-7825, Rev 0., deliverables of HFFACO Milestone M-45-03-T04 and M-45-03-T03," dated July 19, 2002.

The purpose of this letter is to:

- Respond to Washington State Department of Ecology's (Ecology) letter, Referenced above.
- Transmit to Ecology Review Comment Record (RCR) dispositions and resolutions for both the Tank 241-C-104 F&R and the Tank 241-S-112 F&R, and;
- Transmit to Ecology the revised F&R documents for both the Tank 241-C-104 and the Tank 241-S-112 Waste Retrieval Projects.

As documented in the Reference, Ecology granted the U.S. Department of Energy, (DOE) Office of River Protection (ORP) conditional approval of the F&R documents for the Tank 241-C-104 and Tank 241-S-112 Waste Retrieval Projects. Per the conditions of the Hanford Federal Facility Agreement and Consent Order (HFFACO), Ecology's approval of the F&R documents was necessary for ORP to proceed with the final designs for the Tank 241-C-104 and Tank 241-S-112 Waste Retrieval Projects.

Ecology's approval of the F&R documents was subject to six conditions. The following paragraphs contain each condition followed by the proposed resolution for each condition.

Condition 1. Resolve all non- Retrieval Performance Evaluation (RPE) specific RCR comments and submit related corrections, missing information, etc., to Ecology's satisfaction no later than three weeks after the receipt of this letter. This includes providing plans to Ecology for groundwater monitoring and dry well logging for the periods prior to, during, and following retrieval.

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Proposed Resolution for Condition 1. On July 24, 2002, ORP and Ecology agreed that ORP would provide Ecology with a presentation that would describe the approaches being taken to retrieve Tanks 241-C-104, 241-S-102, and 241-S-112. One week after completing a retrieval approach presentation, ORP and Ecology would meet and resolve RCR comments on the tank/project specific F&R document. The first meeting occurred on July 24, 2002, and Ecology was presented with the retrieval approach for Tank 241-S-112. On July 31, 2002, ORP and Ecology met and resolved all non-RPE specific RCR comments on the Tank 241-S-112 Retrieval Project F&R document. Attachments one and two contain the resolution of the non-RPE specific RCR comments and the revised F&R document for the Tank 241-S-112 Waste Retrieval Project, respectively.

As agreed to in the July 31, 2002 meeting, no benefit results from modification of the Tank 241-S-112 F&R document to include further resolution of RPE comments. Therefore, the Tank 241-S-112 F&R is to be approved pending incorporation of the non-RPE resolutions as agreed to at the July 31, 2002, meeting. The Tank 241-S-112 F&R shall also be modified to reflect the proposed changes recommended by ORP for the RPE resolutions in the original RCR responses. The RPE comments by Ecology on the Tank 241-S-112 F&R shall form part of the basis for resolution of the issues on the overall RPE process, further discussed in Condition 2.

On July 31, 2002, ORP and Ecology scheduled the retrieval approach presentation for the Tank 241-C-104 Waste Retrieval Project for August 14, 2002. A meeting to resolve all non-RPE specific RCR comments on the Tank 241-C-104 Waste Retrieval Project F&R document was completed on August 21, 2002. Attachments three and four contain the resolution of the non-RPE specific RCR comments and the revised F&R document for the Tank 241-C-104 Waste Retrieval Project, respectively.

During the week of September 23, 2002, ORP will send the F&R for the Tank 241-S-102 Waste Retrieval Project to Ecology. Once Ecology has finished its review, ORP will schedule meetings to resolve Ecology's comments, obtain approval of the RCR dispositions, and obtain approval of the F&R.

Resolution of the groundwater monitoring and dry well logging for the periods prior to, during, and following retrieval for the projects was resolved during the July 31, 2002 RCR comment resolution meeting. Resolution actions are documented in Attachment 1 of this letter.

Condition 2. Ecology requires all RPE related corrections, requested changes, and additional information, etc., as appropriate/applicable to other tanks/tank farms, be incorporated into all future RPE and Single-Shell Tank (SST) Closure documentation. To this end, Ecology and ORP need to meet and develop agreements concerning level of risk analysis needed for retrieval actions, level of risk analysis needed for individual tank closure/HFFACO Appendix H determinations, and level of risk analysis needed for tank farm closure.

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Proposed Resolution for Condition 2. During the comment resolution meeting of July 31, 2002, it became apparent that a miscommunication had occurred between ORP and Ecology concerning the development and application of the risk analyses to the tank waste retrieval projects. Therefore, on September 6, 2002, ORP presented a briefing to Ecology which provided an overview of the fundamentals of RPEs and answered questions concerning:

- Development and applications of the risk analyses used in the retrieval projects' RPE,
- Historical agreements between Ecology and ORP on the uses of the risk analyses,
- Risk model inputs and outputs, and
- Application of the results of the risk analyses as they relate to tank waste retrieval.

ORP agrees that the agencies need to develop formal agreements concerning the use and application of the results of risk analyses for tank waste retrieval actions, individual tank closures including application of risk analyses to HFFACO Appendix H, and tank farm closure. Much of this definition will be developed as the agencies work through the demonstration closure activity on tank 241-C-106 as discussed during the Challenges and Constraints to Cleanup Team (C3T) meetings regarding Accelerated Tank Retrieval and Closure Demonstrations. Therefore, ORP proposes that the Agencies use the C3T forum to lay the ground work that will lead to formal agreements on the application of risk analyses to closure activities.

Conditions 3 and 4. Because Conditions 3 and 4 address the application of Leak Detection Monitoring and Mitigation (LDMM) technologies to the retrieval projects, the conditions are shown below followed by the proposed resolution.

Condition 3. Ecology understands that ORP is currently planning field testing to ex-tank LDMM technologies and plans to deploy an ex-tank technology at S-112 and then at C-104 if the technologies prove to add value. Ecology requires that ORP maintain design flexibility to incorporate at least one viable ex-tank LDMM technology for each of the retrievals. Ecology expects that ORP will continue to seek out and invest in technology to improve the capability to detect and mitigate leaks during retrieval.

Condition 4. The March 2002 construction project schedule indicated Technology Insertion Points (TIP) for LDMM in May 2002 (preliminary design) and March 2002 (final design) for C-104. Within two weeks of receipt of this letter, DOE will provide Ecology the latest information regarding the ex-tank technology(s) DOE chooses to incorporate into the S-112 and C-104 designs.

Proposed Resolution for Conditions 3 and 4. On July 22, 2002, the Tank Farm Contractor, CH2M HILL Hanford Group, Incorporated (CHG), with the assistance of Pacific Northwest National Laboratory (PNNL), began testing commercially available ex-tank leak detection systems at the Hanford Mock-Tank Facility. Testing is being conducted on three systems to determine the ability, sensitivity, and accuracy of the systems to detect leaks and quantify the amount of material leaked. Tests are being conducted under controlled conditions using

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non-hazardous waste simulants. Testing is scheduled to continue through November 18, 2002. During this time, ORP proposes that an information meeting and site tour be scheduled so Ecology can obtain information on the testing approach and results to date, and to visit the test facility.

In addition, ORP proposes that the selection of ex-tank leak detection systems be based upon the results of the on going ex-tank leak detection operational evaluation. At this juncture, ORP does not have enough performance data to determine if any of these systems will meet or exceed the performance criteria established in the F&R documents. Therefore, once the ex-tank leak detection systems performance tests are completed, ORP will provide Ecology with the results of the evaluation. Based upon this engineering evaluation, ORP will decide which systems, if any, can and should be deployed as part of the Tank 241-C-104 and Tank 241-S-112 waste retrieval technology demonstrations and will share the rationale for that decision with Ecology as part of our ongoing dialogue.

Condition 5. Ecology does not accept or approve the suggested allowable leak volume of 36,000 gallons. Ecology is concerned that the results of the screening level risk assessment for C-104 may lead to the belief that an allowable leak volume of 36,000 gallons is acceptable. DOE should make reasonable efforts to prevent leaks of any kind, regardless of what the risk assessment results show as acceptable. Ecology expects that DOE will continue to develop and implement technology to improve on the 19,000 gallon detection limit specified for C-104 and the 8,000 gallon detection limit specified for S-112, both of which are based on in-tank/in-line methodology. Ecology's position is that leak detection should be based on the limits of best available technology, not risk.

Proposed Resolution for Condition 5. Condition Five contains two related but separate issues. Therefore, the following response addresses the concern on risk and retrieval system leak volume followed by the concern on risk and leak detection.

Risk and Leak Volume. The use of the HFFACO language, "Allowable Leak Volume" is misleading and has lead to a miscommunication between ORP and Ecology on the application of the results of risk analyses to the tank waste retrieval projects. ORP wants to ensure Ecology that all of the systems for the Tanks 241-C-104 and 241-S-112 Waste Retrieval Projects are designed to perform their functions without intentionally leaking waste to the environment. As specified in the HFFACO M-45 milestones, ORP is obligated to implement retrieval systems that improve upon the past-practice sluicing baseline in the areas of retrieval efficiency, leak loss during retrieval, and LDMM. The primary means to accomplish this improvement is through aggressive reductions in the free liquid inventory in the tank during retrieval. The best way to prevent a leak is to limit the amount of material that can leak. This approach is supplemented by the integration of leak detection devices into the design of the retrieval systems. Limiting the inventory in the tank during retrieval, coupled with integrated leak detection systems, enables ORP to detect and correct leaks as required by the applicable regulations and requirements. Therefore, ORP and Ecology agree that the systems will be designed to prevent retrieval system leaks from occurring.

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Risk assessments are employed by ORP to determine the relative environmental condition of the Tank Farm in which retrieval actions are to take place. This information helps ORP identify which constituents of concern pose the greatest risk to the public and the environment. The data forms one part of the technical basis used to select process monitoring instrumentation, and assists in determining response measures to be taken in case a leak is identified in either the retrieval systems or the tank being retrieved.

For Tank 241-S-112 Retrieval Project, the results of the risk assessments showed that the S Tank Farm is in poor environmental condition. The analyses showed that any additional leak of waste will continue to increase the already unacceptable risks to the identified receptor (residential farmer located at the waste management area boundary). As described in the July 24, 2002 briefing to Ecology, to minimize additional impacts, ORP is adding additional process instrumentation to the retrieval system to more accurately monitor the retrieval of the constituents of concern.

For Tank 241-C-104 Retrieval Project, the results of the risk analyses showed that the C Tank Farm is in relatively good environmental condition. The analyses showed that the C Farm could sustain a substantial environmental insult before exceeding performance metrics. Regardless, ORP will design and operate a retrieval system for Tank 241-C-104 that is designed to perform its function without intentionally leaking waste to the environment. The results of the C Farm risk analyses will form one part of the technical basis for selecting process monitoring instrumentation, and will assist in determining response measures to be taken in case a leak is identified in either the retrieval systems or the tank being retrieved.

A specific situation illustrates the need to employ risk assessments as part of retrieval planning, system development, and operation. If a leak were to occur during retrieval, ORP would ensure that all appropriate safety and environmental reporting obligations are fulfilled. Then a decision to either suspend or continue retrieval operations would be made:

- If the decision is to suspend operations, it is likely that there will be less waste released to the environment in the short term. However, the risk of losing any remaining waste to the environment remains until another retrieval approach can be deployed – if any can be deployed at all.
- If the decision is to continue operations, ORP would need to know the relative benefits of continuing operations to leave a smaller residual in the tank as compared to the negative impacts of the leak.

Understanding the current risk of the tank farm and the potential positive and negative impacts of the retrieval action is critical for making informed decisions in this situation.

In short, not all tanks or tank farms are alike. Each tank in the context of each tank farm will require similar retrieval process instrumentation, and leak response actions that are tailored to be

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protective of human health and the environment. ORP is committed to developing and deploying systems that minimize additional insult to the environment.

Risk and Leak Detection. ORP agrees with Ecology that risk assessments are not the sole basis to select in-tank, in-line, or ex-tank leak detection devices. Selection of leak detection approaches for use in tank waste retrieval operations shall be based upon the ability and accuracy of the approach to detect a leak while operating in a simulated tank farm environment.

As discussed in the proposed resolution of Conditions 3 and 4, the Tank Farm Contractor, CHG is testing three ex-tank leak detection systems at the Hanford Mock-Tank Facility. Testing is being conducted to determine the ability, sensitivity, and accuracy of the systems to detect leaks and quantify the amount of material leaked. Tests are being conducted under controlled conditions using non-hazardous waste simulants. Testing is scheduled to continue through November 18, 2002. During this time, ORP proposes that an information meeting and site tour be scheduled so that Ecology can obtain information on the testing approach and results to date, and visit the test facility.

Current Leak Detection Limit. Current leak detection limits are based upon the resolution of material and mass balance estimates of historical past practice sluicing and retrieval data. As described in the July 24, 2002 briefing to Ecology, the uncertainty associated with volumetric mass balance for past practice sluicing is approximately 8,000 gallons. The current 8,000 gallon limit is based upon maintaining a free liquid surface across the tank diameter so that an in-tank liquid volumetric measuring device can be employed. This is a static in-tank liquid level measuring device. Uncertainties that will contribute to the detection limit are:

- Tolerances in tank construction tanks may vary plus or minus 2 inches in diameter leading to a volumetric variation;
- Waste type;
- Entrained gas within the tank waste; and
- Tolerances of static retrieval process instrumentation.

All of these factors were used to determine the degree of accuracy that could be expected while trying to detect an in-tank leak during tank waste retrieval operation that employed sluicing. ORP is not stating that the 8,000 gallon limit is good or bad, only that it represents the limits of our current technology to detect leaks using in-tank and in-line systems. Therefore, ORP agrees with Ecology that leak detection should be based on the limits of best available technology.

Leak Detection Limit for Tank 241-S-112. As described in the July 24, 2002 briefing to Ecology, the retrieval systems to be employed in retrieving waste from Tanks 241-C-104, 241-S-102, and 241-S-112 uses as little water as possible. Unlike past practice sluicing, this approach eliminates the standing liquid level in these tanks, and eliminates the use of conventional static liquid volumetric measuring devices during retrieval of these tanks. This approach will add

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considerably more uncertainty to the leak detection process because dynamic instrumentation will need to be employed rather than the static standing liquid volumetric devices. Although there is more uncertainty in the application of dynamic instrumentation, there is less waste volume at risk to leak at any given time.

In order to better understand the uncertainty associated with the application of dynamic instrumentation, CHG is performing an engineering analysis to quantify the uncertainty associated with these instruments. Once the analysis is completed, ORP will share the results with Ecology.

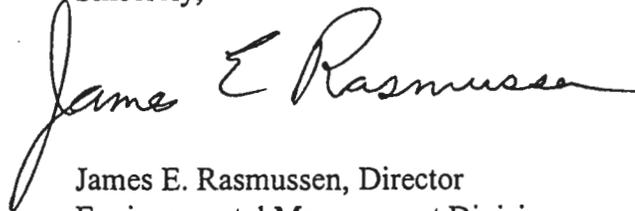
Condition 6. Ecology shall be included in the process control program, including the development of process controls and review of documentation.

Proposed Resolution for Condition 6. During the comment resolution meeting of July 31, 2002, for Tanks 241-C-104 and 241-S-112, ORP agreed to:

- Involve Ecology in the review of the process control program documentation, '
- Either include Ecology in meetings where the development of process controls are being discussed, or provide Ecology with briefings on the process controls and their functions, and
- Include Ecology in the review of process control documentation.

If you have any questions, please contact me, or your staff may contact James Thompson, Tank Farm Project Management (509) 373-9757.

Sincerely,



James E. Rasmussen, Director
Environmental Management Division

TOD:JFT

Attachments (4):

cc: See page 8

Michael A. Wilson
02-TOD-069

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cc: w/attachments

S. L. Dahl-Crumpler, Ecology
R. V. Heggen, Ecology
J. J. Lyon, Ecology
D. B. Bartus, EPA c/o Ecology
N. Ceto, EPA
J. S. Hertzell, FHI
O. S. Kramer, FHI
T. Martin, HAB
P. Sobotta, NPT
R. Jim, YN
K. Niles, OR Dept. of Energy
TPA Administrative Record

cc: w/o attachments

R. E. Bauer, CHG
K. E. Carpenter, CHG
S. G. Fowler, CHG
M. H. Sturges, CHG
R. C. Wilson, CHG