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		Design Agent									
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**Maintenance Plan
for the
Hanford Immobilized Low-Activity
Tank Waste
Performance Assessment**

Frederick M. Mann

February 2000

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EXECUTIVE SUMMARY

The new DOE order on radioactive waste management (DOE O 435.1) requires that a performance assessment be maintained. This document describes the plan for maintaining the *Hanford Immobilized Low-Activity Tank Waste Performance Assessment*, which was initially issued in 1998⁽¹⁾ and has been recently approved⁽²⁾. This document also implements the requirements on the Office of River Protection (the responsible field office) and its contractors.

Besides providing current plans for the disposal of immobilized low-activity waste, this document describes the expected work on

- performance assessment reviews and revisions
- waste receipts
- monitoring
- other operational activities
- testing and research activities and
- interfaces with other Hanford Site activities.

Because waste is not expected to be disposed until 2007, the main emphasis of the current plan is additional data collection to better support the analyses in the current performance assessment. Major improvements are expected in the knowledge of waste form performance, site-specific geotechnical data, inventory, and disposal facility design.

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- 1 F.M. Mann, R.J. Puigh II, P.D. Rittmann, N.W. Kline, J.A. Voogd, Y. Chen, C.R. Eiholzer, C.T. Kincaid, B.P. McGrail, A.H. Lu, G.F. Williamson, N.R. Brown, and P.E. LaMont, *Hanford Immobilized Low-Activity Tank Waste Performance Assessment*, DOE/RL-97-69, Rev. 0, U.S. Department of Energy, Richland, Washington, March 1998.
 - 2 Letter from J. Fiore (Acting Deputy Assistant Secretary for Environmental Restoration) and M. Frei (Acting Deputy Assistant Secretary for Waste Management) to Manager for Hanford Office of River Protection and Manager for Richland Operations, "Conditional Acceptance of the Immobilized Low-Activity Tank Waste Disposal Facility Performance Assessment and the Hanford Site 200 Plateau Composite Analysis," U.S. Department of Energy, Washington, D.C., dated October 20, 1999.

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Acronyms

CA	Composite Analysis
DOE	U.S. Department of Energy
EMSP	Environmental Management Science Program
ERC	Environmental Remediation Contractor
LFRG	Low-Level Waste Disposal Facility Federal Review Group
ILAW	immobilized low-activity waste
ORP	Office of River Protection
PA	performance assessment

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1.0 INTRODUCTION

1.1 Background

DOE Order 435.1 (DOE 1999a) and its associated manual (DOE 1999b) set the requirements for radioactive waste management for operations undertaken by the U.S. Department of Energy (DOE). The low-level waste chapter (Chapter 4) of the manual contains the requirements for the creation and maintenance of a performance assessment that analyzes the long-term effect of disposing of low-level waste. DOE has also issued guidance on the manual (DOE 1999c) and a guide dealing with the maintenance of performance assessments (DOE 1999d).

DOE is currently storing about 210,000 m³ (54 million gallons) of high-level waste in 177 near-surface underground tanks in the central plateau area of the Hanford Site. DOE plans (DOE 1997)

- 1) to retrieve this waste,
- 2) to separate the waste into two streams (one containing the bulk of the waste and relatively few radionuclides – known as low-activity waste – and the other containing most of the radionuclides but consisting of little of the volume – known as high-activity waste),
- 3) to immobilize both streams,
- 4) to store the immobilized high-activity waste on-site until it is transported to a federal repository, and
- 5) to dispose of the immobilized low-activity waste (ILAW) fraction in the central plateau of the Hanford central plateau.

To support the disposal of the ILAW, the *Hanford Immobilized Low-Activity Tank Waste Performance Assessment*, referred to as the 1998 ILAW PA, (Mann 1998) was issued. DOE provided conditional approval of the 1998 ILAW PA in 1999 (DOE 1999e). Therefore, following requirements of DOE Order 435.1 this maintenance plan has been prepared for the ILAW PA.

1.2 Facility Schedule

The purpose of the 1998 ILAW PA was to establish a regulatory basis for facility design and waste form specifications as early as possible. ILAW packages are not expected to be created and disposed of until about 2007 (DOE/BNFL 1998). The current plan (Burbank 1999, Taylor 1999) is to construct new facilities, trench-like in design with the capability to handle ILAW packages with a contact dose greater than 200 mrem/hr. Operations would continue until the retrieval of tank waste is complete and the last ILAW package created, presently considered to be around 2026. Important dates are displayed in Table I. These dates may change because of the current renegotiations of the Tri-Party Agreement (TPA 1989) which sets the cleanup schedule for the Hanford Site and because of contract renegotiations dealing with the extension of the treatment contract.

**Table I.
Important Dates for ILAW Disposal**

Description	Date
Disposal Authorization Statement Issued by DOE	October 1999
Decision to extend contract to make ILAW	August 2000
Start design of first trench	April 2002
Start construction of remote handled trench	August 2004
Complete construction of first trench	August 06
Start use of first set of trenches	September 2007
Fill first set of trenches	December 2118
Construct and use additional sets of trenches	...
Receive last ILAW package	September 2026
Close last set of trenches	September 2028

1.3 Related ILAW Activities

1.3.1 Overview

The ILAW PA activity is tightly integrated with a series of activities and other organizations dealing with ILAW. Some of these are the responsibility of the tank farm contractor (presently CH2M Hill Hanford Group) such as disposal operations, facility design, and tank inventory. The separation of the waste into the two waste streams and the immobilization of each waste stream are the responsibility of the treatment contractor (presently BNFL, Inc.). The vitrification studies being conducted by the Environmental Management Science Program is coordinated and used by the ILAW program. The ILAW PA activity is also involved with other Hanford Site activities, which are discussed in Section 1.4.

1.3.2 ILAW Disposal Operations

As noted in the section above, the first ILAW packages for disposal are not expected until 2007. Therefore, there is currently no official operations group. Once disposal starts, the ILAW PA activity will rely on the operations activity for

- a) the as-built design for each facility,
- b) the disposed inventory,
- c) monitoring reports, and
- d) any occurrence that might impact long-term performance.

1.3.3 Facility Design

Disposal operations are expected to last twenty years or more. A series of disposal structures will be built as needed. Also, each structure will be closed separately. It is expected that these designs will change as more is learned concerning improvements to operations and the minimization of environmental impacts.

For the next few years in particular, the ILAW PA activity will maintain close contact with both the program staff and the architect engineer. This will ensure that environmental impacts due to potential changes in the initial facility design are investigated and updated as needed.

1.3.4 Tank Inventory

The source of all the material that will end up in the ILAW disposal facility is in the underground storage tanks at the Hanford Site managed by the Office of River Protection. The In-Tank Characterization Program, within the Office of River Protection is responsible for determining the inventory within those tanks due to safety, retrieval, and operational concerns. The ILAW PA activity will maintain its interface with this program.

1.3.5 Treatment Contractor

The ILAW disposal program will only receive ILAW product from the treatment contractor(s). The processes that the treatment contractor uses will greatly impact the inventory (as the contractor will send most of the radionuclides to the high-level waste stream) and the waste form performance (as the contractor will determine the immobilization process to be used and will perform the product certification quality control).

Therefore, the ILAW PA activity is maintaining close contact with the present treatment contractor (i.e. BNFL, Inc.). Such interactions include separation and immobilization technologies. These interactions will continue as it is expected that even after BNFL, Inc. makes the initial selection of technologies, changes will be made to improve the processes.

It should be noted that waste (as contrasted to product) from the treatment contractor(s) will go to other Hanford Site organizations.

1.3.6 Environmental Management Science Program

The Environmental Management Science Program (EMSP) has established a multi-year task to investigate the dependence of glass composition on long-term low-level radioactive glass performance. The ILAW PA is maintaining close contact with this activity and expects to continue this interface as long as EMSP funds activities in this area.

1.4 Related Hanford Site Activities

1.4.1 Overview

There are many programs at the Hanford Site unrelated to immobilized tank waste that could provide information useful to the ILAW PA program. Among the most important of these are the other active performance assessment programs at Hanford as well as the Hanford Site Composite Analysis. In addition, there are a series of other major assessments and data collection efforts that are planned on the Hanford Site that should provide useful data to the ILAW PA activity.

1.4.2 Other Performance Assessments

A number of performance assessments have been written at the Hanford Site (Stewart 1987, Wood 1994, Kincaid 1995, Wood 1995, and Wood 1996). However, besides the ILAW PA (Mann 1998) there are only two that are still active and both deal with the disposal in the low-level solid waste burial grounds: *Performance Assessment for the Disposal of Low-Level Waste in the 200 West Area Burial Grounds* (Wood 1994) and *Performance Assessment for the Disposal of Low-Level Waste in the 200 East Area Burial Grounds* (Wood 1996). DOE (Cowan 1996 and Frei 1997) has approved both of these performance assessments. A single maintenance plan for these performance assessments has been created (Wood 1997). The Solid Waste PA activity is sponsoring geochemical work; of particular interest to the ILAW PA activity is the work related to near-field releases.

1.4.3 Composite Analysis (CA)

The *Composite Analysis for the Low-Level Waste Disposal in the 200 Areas of the Hanford Site* (Kincaid 1998) deals with the environmental impact from all waste that will be disposed in the Central Plateau of the Hanford Site at the time of site closure. The CA was recently approved (DOE 1999e) and its maintenance plan is being written. Data collection for future versions of the CA will be done under the Hanford Integrated Groundwater / Vadose Zone Program (see section 1.4.5).

1.4.4 Other Major Assessments

1.4.4.1 Overview. The Hanford Site has produced a wide variety of documents estimating environmental impacts, including environmental impact statements and remedial facility investigation reports. However, none of these activities are on-going. The documents described below are activities that are expected to occur in the future and with which the ILAW PA will interact.

1.4.4.2 System Assessment Capability. The Hanford Integrated Groundwater / Vadose Zone Program (the Integration Project) was created (Bauer 1997) to coordinate and integrate the various activities at the Hanford Site dealing with the vadose zone, groundwater, and river media that might be impacted by Hanford Site operations. A major part of this program (DOE/RL

1999a) is the creation of a set of computer codes that can be used to estimate the cumulative impacts of all Hanford Site activities. This activity is expected to produce future versions of the Hanford Site Composite Analysis.

The ILAW PA activity is actively working with the System Assessment Capability staff to determine requirements and to implement those requirements. These interactions are expected to continue through the life of the two activities.

1.4.4.3 Tank Farm Vadose Zone. Some of the tanks which presently contain the waste that will be placed into ILAW packages are known to have leaked. In addition, during retrieval phase, additional waste may leak and not all waste will be retrieved. This program is investigating the amount of leaks, its environmental impact, as well as the impact of future releases. Initially, the program will produce facility investigation reports and then remedial facility investigation reports. The tank farm environmental impact statement (DOE 1996) will be supplemented in the future to include tank closure.

The Tank Farm Vadose Zone Program is also actively obtaining data concerning the impact of tank wastes on the vadose zone. The tank farm conditions are much more extreme than any expected in ILAW disposal; therefore data obtained from the tank farms should bound those expected during ILAW disposal.

1.4.4.4 ERC Activities. The Hanford Site Environmental Remediation Contractor (ERC) is responsible for closing most of the contaminated areas at the Hanford Site. This includes massive liquid discharges, solid waste landfills, and contaminated buildings and grounds. The present plan (DOE/RL 1999b) is to group the sites into a limited number (23) of waste groups and perform limited analysis on representative sites. The ILAW PA activity is and will continue to work closely with the ERC activity and, in particular, the 200 Area Remediation activity, which is responsible for these activities in the 200 Areas. The ILAW PA will work through the ERC to understand their activities in other Hanford Site areas that may be of importance to ILAW disposal.

1.4.5 Other Major Data Gathering Activities

As noted in Section 1.4.4, many of the assessment activities have associated data collection activities. The Characterization of Systems activity of the Integration Project was set up (DOE 1999a) to integrate these activities. In addition, the Integration Project's Science and Technology activity gathers data of interest to the ILAW PA activity (DOE/RL 1999c). The ILAW PA activity will maintain close contact with these Integration Project activities. A third activity under the Integration Project, the Hanford Groundwater Program, collects and analyzes groundwater samples.

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2.0 PERFORMANCE ASSESSMENT REVIEWS AND REVISION

2.1 Annual Review

2.1.1 Requirements

The manual for DOE O 435.1 (DOE 1999b and see appendix A) requires the field office (in this case, the Office of River Protection [ORP]) to make an annual determination of the PA and what types of revisions, if any are needed. This determination will be documented in a memorandum consisting of the determination that was made, the basis for the determination, and any specific actions to be taken as a result of the review. The determination shall consider the results of data collection and analysis from research, field studies, and monitoring. Appendix B contains the format and contents of this annual review. As required by the "Disposal Authorization Statement for the Department of Energy Hanford Site Low-Level Radioactive Waste Disposal Facilities" (DOE 1999f), this determination shall be provided to the Low-Level Waste Disposal Facility Federal Review Group (LFRG).

To allow ORP to make a determination, the contractor shall provide to ORP information on data collection and analysis from research, field studies, and monitoring.

2.1.2 Status

On December 31, 1999, the contractor provided ORP with published data packages (Fayer 1999, Kaplan 1999, Khaleel 1999, Mann 1999a, Mann 1999b, McGrail 1999, Meyer 1999, Puigh 1999a, Reidel 1999, Rittmann 1999, and Wootan 1999) describing the current state of knowledge. This information will be used in calculations for the next version of the ILAW PA to be issued in fiscal year 2001.

2.1.3 Plans

The program is currently undergoing rapid change; therefore annual reviews will be part of larger documents and will not be published separately. In April 2000, the ILAW PA contractor will submit to ORP an analysis (based on best available data) of the impacts of ILAW disposal. The analysis will be used to support the DOE decision on whether to extend the treatment contract to actual operations. In the spring of 2001 and again in 2003 the contractor will supply to ORP an updated version of the performance assessment. In the years (2000, 2001, and 2003), ORP will use these formal documents to judge adequacy.

In FY2002 and then starting in FY2004, annually thereafter, the contractor will prepare smaller packages (the annual reviews themselves) as the quantity of new information becomes less. Each fiscal year (by September 30), the manager of the Office of River Protection shall issue a letter (to LFRG and to the president of the contractor responsible for preparing the performance assessment) documenting the adequacy of the ILAW PA and the need for any revisions. The letter shall summarize any data collection (including that from operations) or

analysis that might bring the conclusions of the ILAW PA into question. This letter will contain an attachment prepared by the contractor of the important information obtained since the last determination.

2.2 Performance Assessment Revision

2.2.1 Requirements

The manual for DOE O 435.1 (DOE 1999b and see appendix A) requires that the performance assessment be revised when significant new information alters the conclusions or conceptual models of the performance assessment. The manual specifically mentions changes in waste forms or containers, radionuclide inventories, facility design and operations, closure concepts, or improved understanding.

2.2.2 Status

The ILAW PA recently approved by DOE-HQ in October 1999 was written in 1998. Significant data have since been obtained in the areas of waste form performance, inventory, facility design, and geotechnical data (Fayer 1999, Kaplan 1999, Khaleel 1999, McGrail 1999, Meyer 1999, Puigh 1999a, Reidel 1999, Rittmann 1999, and Wootan 1999). The impacts of this new information will be documented in the 2001 ILAW PA.

Informal analysis of the new data indicates that the results of the 1998 ILAW PA are conservative. In particular, the waste form performance (which is the major determining factor in PA performance) is expected to be much better than the base case analyzed or for the LD6-5412 glass used in the sensitivity calculations. The geotechnical data, likewise, show that the 1998 ILAW PA used data that were conservative.

2.2.3 Plans

Because of the rapid changes in designs (waste form and disposal facility), the ILAW PA is expected to be revised more frequently than other performance assessments in the next few years. After the first two revisions, the schedule for revision is expected to follow a more typical pattern.

As noted above in Section 2.2.2, significant new information since the 1998 ILAW PA has already been obtained and a new ILAW PA is scheduled to be released in early 2001. This performance will focus on

- waste forms likely to be produced by the treatment contractor (McGrail 1999)
- site-specific geotechnical data (Fayer 1999, Kaplan 1999, Khaleel 1999, Meyer 1999, and Reidel 1999)
- new in-tank characterization, retrieval sequence, and separation data (Wootan 1999)
- new disposal facility and waste container designs (Puigh 1999a)
- new requirements set by the August 1998 contract (DOE/BNFL 1998)

The current record of decision (DOE 1997) is on disposal of ILAW in near-surface underground vaults. However, recent informal studies indicate that other disposal facility designs may achieve equal environmental protection at much lower cost. In addition, much more information on waste form performance and site-specific geotechnical data are expected to be collected. Therefore, the second revision of the ILAW PA is expected in FY2003 and will support National Environmental Policy Act requirements.

The third revision of the ILAW PA is expected in 2007 and will support start of the ILAW disposal facility. Future ILAW PAs are planned to occur on a five-year cycle until closure of all the ILAW structures. The performance assessments will include operational information (especially disposed inventory) and closure information as individual units close.

2.3 Special Analyses

2.3.1 Requirements

Special analyses are needed if new information, data, changes in the waste stream to be disposed, or additional modeling results are generated that indicate the potential for waste disposal practices to fall out of compliance with the PA's performance objectives.

2.3.2 Status

No special analyses have been performed outside of preparing for the 2001 ILAW PA. As noted above, the analyses done preparing for the 2001 ILAW PA indicate the results of the 1998 ILAW PA are conservative.

2.3.3 Plans

No special analyses are expected until after the 2003 ILAW PA is released, because extensive analysis will be done as part of the 2001 and 2003 ILAW PA analyses. A special analysis will occur if new data are obtained that are not bounded by the previous ILAW PA analysis.

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3.0 WASTE RECEIPTS

3.1 Requirements

Section IV.G of the manual for DOE O 435.1 (DOE 1999b) requires that waste acceptance requirements be established. These requirements are partially based on the PA analyses.

Traditionally, waste receipts are an important part of PA compliance as the waste to be disposed of is usually not well known at the time of the initial PA analysis. Therefore, continual attention will be paid to the cumulative amount of waste disposed of in the facility and the affects will be weighed against the PA performance objectives.

3.2 Status

Waste is not expected in the facility until 2007.

3.3 Plans

The ILAW PA is nearly unique in the DOE complex in the sense that its source is well defined and bounded. The wastes will come from the Hanford underground tanks and the material to be disposed will come from only one source, the tank waste treatment contractor. Although additional waste could be added to these tanks, any additional material is expected to be very small compared to the present quantity of materials in the tanks.

Once operations begin, the ILAW PA activity will monitor the receipt of wastes to determine that the waste form and waste inventory requirements of the current ILAW PA are being met.

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4.0 MONITORING

4.1 Requirements

Section IV.R(3) of the manual for DOE O 435.1 (DOE 1999b) requires that a monitoring plan be prepared. The field office shall use the results from the monitoring activity in its determination of the adequacy of the performance assessment.

4.2 Status

The *Hanford Site Groundwater Protection Management Plan* (DOE/RL 1995) describes the monitoring of groundwater at the Hanford Site. An unpublished preliminary monitoring plan exists for the ILAW disposal facility.

Currently the only contamination found is tritium at the ILAW disposal site. The source of this contamination is from discharges from the PUREX reprocessing plants in the 50s, 60s, and 70s.

4.3 Plans

As required by the "Disposal Authorization Statement for the Department of Energy Hanford Site Low-Level Radioactive Waste Disposal Facilities" (DOE 1999f), a monitoring plan shall be sent to the Hanford Office of River Protection by October 2000 for their approval. Monitoring will be performed consistent with the approved plan.

The ILAW borehole placed in 1998 is currently part of the Hanford Site Groundwater network as will be future ILAW boreholes. The ILAW PA activity will use the results of the site-wide monitoring program to determine the adequacy of groundwater models.

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5.0 OTHER OPERATIONAL ACTIVITIES

5.1 Requirements

The manual for DOE O 435.1 (DOE 1999b and see appendix A) requires that other operational information be included in the PA analysis. For the ILAW PA, this information could include how the facilities are built, how the ILAW packages are placed (may affect waste density), how voids are filled, and whether any accidents occur (may affect waste form release performance).

5.2 Status

Since no new facilities have been constructed or old facilities have yet been modified and hence no waste received, no information from operations has been received.

5.3 Plans

Once construction and waste receipts begin, the ILAW PA activity will monitor the information produced by the operations activity. Specific information to be tracked will be indicated in future revisions to this document.

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6.0 TESTING AND RESEARCH ACTIVITIES

6.1 Requirements

The manual for DOE O 435.1 (DOE 1999b and see appendix A) requires that the PA activity conduct research and fill activities to address uncertainties or data gaps in existing knowledge.

6.2 Status

The ILAW PA activity has collected large amounts of data since the issuance of the 1998 ILAW PA. This knowledge has been collected in a series of data packages for the 2001 ILAW PA:

- waste form performance (McGrail 1999)
- geology (Reidel 1999)
- recharge (Fayer 1999)
- hydraulics (Meyer 1999 and Khaleel 1999)
- geochemistry (Kaplan 1999)
- inventory (Wootan 1999)
- disposal facility design (Puigh 1999a)

This knowledge is based on laboratory experiments (for example, testing of glass samples, and measurement of soil sample properties), field experiments (for example, lysimeter measurements, boreholes), and calculational studies (recharge, effect of homogeneities, and waste form performance).

Informal analysis of the new data indicates that the results of the 1998 ILAW PA (Mann 1998) are conservative. In particular, the waste form performance (the major determining factor in PA performance) is expected to be much better than the base case analyzed or for the LD6-5412 glass used in the deterministic calculations. The geotechnical data, likewise, show that the 1998 ILAW PA used conservative data.

6.3 Plans

Because of the uncertainties in estimating performance over the long times considered in the ILAW PA (1,000 years, 10,000 years, and longer), scientific understanding is crucial to acceptance of the ILAW PA. Future activities are documented in Section 6.4 of the 1998 ILAW PA as well as in planning documents (Puigh 1999b). The activities includes extensive work in understanding

- waste form performance as a function of glass composition, environmental conditions, and secondary phases,
- spatial heterogeneities in the vadose zone and their affect on moisture flow and contaminant transport,

- current and future recharge rates as a function of climate and plant communities, and
- the effect on moisture flow and contaminant transport of degraded materials.

As stated in the *Maintenance Guide for U.S. Department of Energy Low-Level Waste Disposal Facility Performance Assessments and Composite Analyses* (DOE 1999d), cognizance of research and development activities in the DOE complex will be monitored and analyzed for the implications to ILAW disposal.

Specific testing and research activities driven by ORP annual reviews will be incorporated into multi-year work plans and approved by ORP.

7.0 INTERFACE AND INTEGRATION ACTIVITIES

7.1 Requirements

The manual for DOE O 435.1 (DOE 1999b and see appendix A) requires that the PA activity monitor information that may alter the conceptual model(s) used in the PA. As noted in Section 1.4 (Related Hanford Site Activities), there are a variety of Hanford Site activities that could provide this type of information.

7.2 Status

The Richland Operations Office of DOE (Bauer 1997) set up the Hanford Integrated Groundwater / Vadose Zone Program to coordinate and integrate the various activities at the Hanford Site dealing with the vadose zone, groundwater, and river media that might be impacted by Hanford Site operations. The ILAW PA activity has active contacts in each of the Integration Project's major activities:

- 200 Area Remediation
- Characterization of Systems
- Data Management
- Hanford Groundwater Program
- Regulatory Path Forward
- System Assessment Capability

In addition, the ILAW PA maintains close coordination with the activities not strictly underneath the Integration Project's control, i.e. the Tank Farm Vadose Zone Program and the Solid Waste Burial Ground PA activity.

7.3 Plans

The ILAW PA activity will stay fully involved with the Hanford Site integration activities. Formal integration teams have been set up in many areas and the ILAW PA is an active member in many of them, and is chairing the team on vadose zone numeric code criteria. The ILAW PA activity is committed to finding information that might affect conceptual models or results of the ILAW PA activity.

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8.0 REFERENCES

- Bauer 1997, *Site-Wide Groundwater / Vadose Zone Integration*, letter from L.K. Bauer (assistant Manager for Environmental Restoration) to S.D. Liedle (President, Bechtel Hanford, Inc.) [similar letters were sent to other contractor presidents], U.S. Department of Energy, Richland, Washington, December 3, 1997.
- Burbank 1999, D.A. Burbank and T.M. Holm, *Reanalysis of Alternatives for Immobilized Low-Activity Waste Disposal*, HNF-4003, Rev. 0, Coegma Engineering Corporation, Richland, Washington, March 1999.
- Cowan 1996, S.P. Cowan, *Conditional Acceptance of the Hanford 200 West Area Burial Ground Performance Assessment*, memorandum to Charles Hansen, U.S. Department of Energy, Washington, D.C., June 27, 1996.
- DOE 1996b, *Environmental Impact Statement for the Tank Waste Remediation System*, DOE/EIS-0189, U.S. Department of Energy and the Washington State Department of Ecology, Washington, D.C., August 1996.
- DOE 1997, *Record of Decision for the Tank Waste Remediation System, Hanford Site, Richland, Washington*, Federal Register, Volume 62, page 8693, February 26, 1997.
- DOE 1999a, *Radioactive Waste Management*, DOE Order 435.1, U.S. Department of Energy, Washington, D.C., July 9, 1999.
- DOE 1999b, *Radioactive Waste Management manual*, DOE M 435.1-1, U.S. Department of Energy, Washington, D.C., July 9, 1999.
- DOE 1999c, *Implementation Guide for Use with DOE M 435.1-1*, DOE G 435.1-1, U.S. Department of Energy, Washington, D.C., July 9, 1999.
- DOE 1999d, *Maintenance Guide for U.S. Department of Energy Low-Level Waste Disposal Facility Performance Assessments and Composite Analyses*, DOE G 435.1-3, U.S. Department of Energy, Washington, D.C., November 10, 1999.
- DOE 1999e, Letter from J. Fiore (Acting Deputy Assistant Secretary for Environmental Restoration) and M. Frei (Acting Deputy Assistant Secretary for Waste Management) to Manager for Hanford Office of River Protection and Manager for Richland Operations, *Conditional Acceptance of the Immobilized Low-Activity Tank Waste Disposal Facility Performance Assessment and the Hanford Site 200 Plateau Composite Analysis*, U.S. Department of Energy, Washington, D.C., dated October 20, 1999.

- DOE 1999f, *Disposal Authorization Statement for the Department of Energy Hanford Site Low-Level Radioactive Waste Disposal Facilities*, attachment to the letter from Carolyn L. Huntoon (Assistant Secretary for Environmental Management, U.S. Department of Energy) to John T. Conway (chairman, Defense Nuclear Facilities Safety Board), U.S. Department of Energy, Washington, D.C., dated October 25, 1999.
- DOE/BNFL 1998, contract between BNFL, Inc. and the U.S. Department of Energy regarding TWRS Privatization, Contract number DE-AC06-96RL13308, Modification No. A005, July 25, 1998.
- Part 1, Section C, Item 2.2.2 contains the Immobilized Low-Activity Waste product requirements.
- DOE-RL 1995, *Hanford Site Ground Water Protection Management Plan*, DOE-RL-89-12, Rev. 2, U.S. Department of Energy, Richland, Washington, July 1995.
- DOE/RL 1999a, *Groundwater/Vadose Zone Integration Project, Summary Description*, DOE/RL-98-48, Vol. I, Rev. 0, U.S. Department of Energy, Richland, Washington, June 1999.
- DOE/RL 1999b, *200 Areas Remedial Investigation / Feasibility Study Implementation Plan – Environmental Restoration Program*, DOE/RL-98-28, U.S. Department of Energy, Richland, Washington, April 1999.
- DOE/RL 1999c, *Groundwater/Vadose Zone Integration Project, Science and Technology Summary Description*, DOE/RL-98-48, Vol. III, Rev. 0, U.S. Department of Energy, Richland, Washington, June 1999.
- Fayer 1999, M.J. Fayer, *Recharge Data Package for the Immobilized Low-Activity Waste 2001 Performance Assessment*, PNNL-13033, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington, December 1999.
- Frei 1997, M.W. Frei, *Conditional Acceptance of the Hanford 200 East Area Burial Ground Performance Assessment*, letter from Mark W. Frei (Acting Deputy Assistant Secretary for Waste Management, Department of Energy) to Charles Hansen (Assistant Manager for Waste Management, Richland Operations Office) dated June 30, 1997.
- Kaplan 1999, D.L. Kaplan and R.J. Serne, , *Geochemical Data Package for the Immobilized Low-Activity Waste Performance Assessment*, PNNL –13037, Rev .1, Pacific Northwest National Laboratory, Richland, Washington, December 1999.
- Khaleel 1999, R. Khaleel, , *Far-Field Hydrology Data Package for the Immobilized Low-Activity Waste Performance Assessment*, HNF-4769, Rev. 2, Fluor Daniel Northwest, Richland, Washington, December 1999.

- Kincaid 1995, C.T. Kincaid, J.W. Shade, G.A. Whyatt, M.G. Piepho, K. Rhoads, J.A. Voogd, J.H. Westsik, Jr., K.A. Blanchard, and B.G. Lauzon, *Performance Assessment of Grouded Double-Shell Tank Waste Disposal at Hanford*, WHC-SD-WM-EE-004, Revision 1, Westinghouse Hanford Company, Richland, Washington, May 1995.
- Kincaid 1998, C.T. Kincaid, M.P. Bergeron, C.R. Cole, M.D. Freshley, D.L. Strenge, P.D. Thorne, L.W. Vail, and S.K. Wurnster, *Composite Analysis for the Low-Level Waste Disposal in the 200 Area Plateau of the Hanford Site*, PNNL-11800, Pacific Northwest National Laboratory, Richland, Washington, March 1998.
- Mann 1998, F.M. Mann, R.J. Puigh II, P.D. Rittmann, N.W. Kline, J.A. Voogd, Y. Chen, C.R. Eiholzer, C.T. Kincaid, B.P. McGrail, A.H. Lu, G.F. Williamson, N.R. Brown, and P.E. LaMont, *Hanford Immobilized Low-Activity Tank Waste Performance Assessment*, DOE/RL-97-69, Rev. 0, U.S. Department of Energy, Richland, Washington, March 1998.
- Mann 1999a, F.M. Mann, *Performance Objectives for the Hanford Immobilized Low-Activity Waste (ILAW) Performance Assessment*, HNF-EP-0826, Rev. 3, Lockheed Martin Hanford Company, Richland, Washington, August 1999.
- Mann 1999b, F.M. Mann, *Scenarios for the Hanford Immobilized Low-Activity Waste (ILAW) Performance Assessment*, HNF-EP-0828, Rev. 3, Lockheed Martin Hanford Company, Richland, Washington, August 1999.
- McGrail 1999, B.P. McGrail, J.P. Icenhower, D.H. Bacon, J.D. Vienna, A. Jiricka, W.L. Ebert, P.F. Martin, H.T. Schaeff, M.J. O'Hara, and E.A. Rodriguez, *Waste Form Release Data Package for the 2001 Immobilized Low-Activity Waste Performance Assessment*, PNNL-13043, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington, December 1999.
- Meyer 1999, P.D. Meyer and R.J. Serne, *Near-Field Hydrology Data Package for the Immobilized Low-Activity Waste 2001 Performance Assessment*, PNNL-13035, Pacific Northwest National Laboratory, Richland, Washington, December 1999.
- Puigh 1999a, R.J. Puigh II, *Disposal Facility Data for the Hanford Immobilized Low-Activity Tank Waste*, HNF-4950, Rev. 1, Fluor Daniel Northwest, Inc. Richland, Washington, December 1999.
- Puigh 1999b, R.J. Puigh II and F.M. Mann, *Statements of Work for FY 2000 to 2005 for the Hanford Low-Level Tank Waste Performance Assessment Project*, HNF-SD-WM-PAP-062, Revision 4, Fluor Daniel Northwest, Richland, Washington, July 1999.
- Reidel 1999, S.P. Reidel and D.G. Horton, *Geologic Data Packages for 2001 Immobilized Low-Activity Waste Performance Assessment*, PNNL-12257, Rev. 1, Pacific Northwest National Laboratory, Richland, Washington, December 1999.

Rittmann 1999, P.D. Rittmann, *Dosimetry Data Package for the 2001 Immobilized Low-Activity Waste Performance Assessment*, HNF-SD-WM-TI-707, Rev. 1, Fluor Daniel Northwest, Inc., Richland, Washington, December 1999.

Stewart 1987, G.H. Stewart, W.T. Farris, D.G. Huizenga, A.H. McMakin, G.P. Streile, and R.L. Treat, *Long-Term Performance Assessment of Grouted Phosphate/Sulfate Waste from N Reactor Operations*, PNL-6512, Pacific Northwest Laboratory, Richland, Washington, April 1987.

Taylor 1999, W.J. Taylor (Acting Director, Tank Waste Processing and Disposal Division) to Ms. M.P. DeLozier (President, Lockheed Martin Hanford Company), *Decision to Change the Immobilized Low-Activity Waste (ILAW) Disposal Baseline to Proceed with the Remote-Handled Trench Alternative*, letter number 99-DPD-066, Office of River Protection, U.S. Department of Energy, Richland, Washington, December 1, 1999.

TPA 1989, *Hanford Facility Agreement and Consent Order*, Washington State Department of Ecology, United States Environmental Protection Agency, United States Department of Energy, as amended (Current version is the fifth amendment 89-10). The document is available from any of the parties.

- [1. Appendix D lists the activities and associated milestones. Activities 45 (closure of single-shell tanks), 50 (pretreatment processing), 60 (vitrification of Hanford low-level waste), and 90 (disposal of the immobilized low-activity waste) cover areas of concern for this performance assessment.]
- [2. Activity D lists the activities and associated milestones. Activity 50 deals with pretreatment processing.]
- [3. Milestone 45-0 in Appendix D describes retrieval criteria.]

Wood, 1994, M.I. Wood, R. Khaleel, P.D. Rittmann, A.H. Lu, S.H. Finfrock, R.J. Serne, and K.J. Cantrell, *Performance Assessment for the Disposal of Low-Level Waste in the 200 West Area Burial Grounds*, WHC-EP-0645, Westinghouse Hanford Company, Richland, Washington, November, 1994.

Wood 1995, M.I. Wood, R. Khaleel, P.D. Rittmann, A.H. Lu, S.H. Finfrock, and T.H. DeLorenzo, *Environmental Remediation Disposal Facility Performance Assessment*, BHI-00169, Revision 00, Bechtel Hanford Company, Richland, Washington, August 1995.

Wood 1996, M.I. Wood, *Performance Assessment for the Disposal of Low-Level Waste in the 200 East Area Burial Grounds*, WHC-EP-0875, Westinghouse Hanford Company, Richland, Washington, September 1996.

Wood, M.I., 1997, *Program Plan for Maintenance of Hanford Burial Ground Performance Assessment (PA) Analyses*, Letter Report from Waste Management Federal Services of Hanford, Inc. to Department of Energy-Richland Office, Richland, Washington.

Wootan 1999, D.W. Wootan, *Immobilized Low Activity Tank Waste Inventory Data Package*, HNF-4921, Rev. 0, Fluor Daniel Northwest, Inc., September 1999.

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Appendix A

DOE Guidance on PA Maintenance

The following text is quoted from the *Implementation Guide for use with DOE M 435.1-1* (DOE 1999c). The text in bold also appears in the **Radioactive Waste Management Manual** (DOE 1999b) and are the actual requirements for maintaining a performance assessment. Further guidance is in *Maintenance Guide for U.S. Department of Energy Low-Level Waste Disposal Facility Performance Assessments and Composite Analyses* (DOE 1999d).

- IV. P.(4) Performance Assessment and Composite Analysis Maintenance. The performance assessment and composite analysis shall be maintained to evaluate changes that could affect the performance, design, and operating bases for the facility. Performance assessment and composite analysis maintenance shall include the conduct of research, field studies, and monitoring needed to address uncertainties or gaps in existing data. The performance assessment shall be updated to support the final facility closure. Additional iterations of the performance assessment and composite analysis shall be conducted as necessary during the post-closure period.**
- (a) Performance assessments and composite analyses shall be reviewed and revised when changes in waste forms or containers, radionuclide inventories, facility design and operations, closure concepts, or the improved understanding of the performance of the waste disposal facility in combination with the features of the site on which it is located alter the conclusions or the conceptual model(s) of the existing performance assessment or composite analysis.**

Objective:

The objective of these requirements is to ensure that performance assessments and composite analyses are updated as appropriate, whenever changes in their bases (assumptions, parameters, etc.) are contemplated or effected in order to maintain the validity and effectiveness of the controls which are based on the performance assessment and composite analysis.

Discussion:

As discussed in Section I.2.F.(15) of the guidance for Chapter I, General Requirements, since a low-level waste disposal facility will be in operation for many years, and waste receipts and knowledge concerning the disposal facility environs could change, maintaining the performance assessment and composite analysis through a regular schedule of evaluations is required by the manual.

The performance assessment provides a means whereby the long-term efficacy of the disposal facility is evaluated and provides input to disposal facility design, operational requirements, and waste acceptance criteria. The composite analysis is a planning tool to ensure that low-level waste disposal, in consort with other activities at the site, is not likely to compromise future

radiological protection of the public. Because the performance assessment and composite analysis results are projections based on estimated waste and facility characteristics, they are technically uncertain. A maintenance program is needed to, over time, improve confidence in the results of the analysis and in the long-term plans for protecting public health and safety. Through the conduct of an assessment maintenance program, site operators can technically justify reducing the conservatism in the analysis based on acquiring data which support revising the analyses. The results of the revised performance assessment and composite analysis can result in revised waste acceptance criteria which could result in a lessening of constraints on waste receipts, less costly remediation alternatives, or in revised land-use controls.

Acquisition and consideration of field data represents a necessary component of the maintenance program. Performance assessment and composite analysis development and refinement represents a continuous process during the operational life of a disposal facility. Over the lifetime of the disposal facility, the performance assessment and composite analysis must be maintained and upgraded as additional information about the waste, environmental setting, and site is obtained. At closure of the disposal facility, a final performance assessment which analyzes all of the waste that has been disposed must be prepared and approved. During the post-closure period, it may also be necessary to revise the performance assessment and composite analysis according to the criteria stated above.

As discussed above, the improvement of performance assessments, the addition of the composite analysis to the required evaluations of low-level waste disposal facilities, and their reviews and approvals has been the aim of much of the improvements to low-level waste management resulting from Defense Nuclear Facilities Safety Board Recommendation 94-2. Similarly, maintenance of performance assessments and composite analyses has also been modified to improve the upkeep of the analyses and controls based on the assessments. Consequently, detailed guidance on maintaining performance assessments and composite analyses is being developed for inclusion in DOE G 435.1-3, Maintenance Guide for U.S. Department of Energy Low-Level Waste Disposal Facility Performance Assessments and Composite Analyses. The Maintenance Guide will need to be consulted for additional detailed discussions of the maintenance of performance assessments and composite analyses once issued.

Compliance with this requirement is demonstrated by the implementation of a site-specific performance assessment and composite analysis maintenance program that includes research projects, field studies, and the results of monitoring to update the analyses.

- (b) A determination of the continued adequacy of the performance assessment and composite analysis shall be made on an annual basis, and shall consider the results of data collection and analysis from research, field studies, and monitoring.**
- (c) Annual summaries of low-level waste disposal operations shall be prepared with respect to the conclusions and recommendations of the performance assessment and composite analysis and a determination of the need to revise the performance assessment or composite analysis.**

Objective:

The objective of these requirements is to ensure that the bases of the performance assessment and composite analysis (e.g., assumptions, parameters, waste inventory) remain valid and to ensure that results of testing, research, and development, and monitoring are considered in this determination and summary.

Discussion:

Because the analyses in the performance assessments and composite analyses are based on projections of waste receipts and parameter values that predict site behavior, annual summaries of actual disposal operations that include actual waste receipts and results of site research projects and monitoring, can assist in calibrating the performance assessment and composite analysis to be more accurate as the life of the facility goes on. The annual summaries are to tie the annual summaries to the conclusions of the performance assessment and composite analysis, and determine whether they continue to be the correct conclusions. As more and more of these annual summaries are factored appropriately into the maintenance of the performance assessment and composite analysis, the more the results are based on actual facility performance, and the more the conclusions can be relied on to provide a reasonable expectation that the performance objectives will continue to be met.

Performance assessment and composite analysis maintenance includes the routine review and revision, as appropriate, of the analyses. Reviews provide a mechanism for routine assessment of the controls derived from the analyses on waste disposal, source remediation, or land-use controls so that potential problems are identified and managed. The revisions ensure that there is cohesive documentation providing a reasonable expectation of meeting the performance measures. This use of the analyses is similar to the use of a safety analysis report. The assumptions and analyses in the performance assessment are used to establish a performance envelope and are translated into administrative and engineering controls (e.g., procedures, waste acceptance criteria, designs, land-use controls).

The reviews should include an assessment of relative test, research and development, and monitoring data that may have been obtained. This part of the review is two-fold. First, it ensures that the conceptual model(s), assumptions, parameters, etc. remain valid. Second, it enhances

confidence in the model results and may result in a lessening of the degree of conservatism in the analyses. The annual reviews should be documented and retrievable.

As discussed above, the improvement of performance assessments, the addition of the composite analysis to the required evaluations of low-level waste disposal facilities, and the reviews and approvals for these analyses are among the improvements to low-level waste management resulting from Defense Nuclear Facilities Safety Board Recommendation 94-2. Similarly, maintenance of performance assessments and composite analyses has also been modified to improve the upkeep of the analyses and controls based on the assessments.

Compliance with this requirement is demonstrated by a documented process that results in annual summaries of the low-level waste disposal operations and a determination of the continued adequacy of the analyses.

Supplemental References:

1. DOE, 1996. Maintenance of US Department of Energy Low-Level Waste Performance Assessments, U.S. Department of Energy, Washington, D.C., September 1996.
2. DOE. Maintenance Guide for U.S. Department of Energy Low-Level Waste Disposal Facility Performance Assessments and Composite Analyses, DOE G 435.1-3, U.S. Department of Energy, Washington, D.C. (Under preparation.)

Appendix B

Format and Contents of Annual Summary

B.1 Overview

Section 2.2 of the *Maintenance Guide for U.S. Department of Energy Low-Level Waste Disposal Facility Performance Assessments and Composite Analyses* (DOE 1999d) provides the format and contents of the Annual Summary. The items covered will include assessments of

- 1) Whether conclusions of the performance assessment have changed
- 2) Waste receipts
- 3) Monitoring Results
- 4) Research and Development Results
- 5) Summary of Changes
- 6) Recommended Changes

B.2 Summary Statement

The annual summary report shall contain a summary statement as to whether the information reviewed resulted in any changes to the conclusion of the performance assessment (i.e., whether, in the light of the new information reviewed, there is still reasonable expectation that the performance objectives of DOE M 435.1-1 will be met). This statement should reflect one of four possible scenarios:

- 1) there is no change to the conclusion of the performance assessment;
- 2) the conclusions remain valid, but new information indicates less conservatism in the results than previously believed;
- 3) the conclusions remain valid, but new information indicates more conservatism in the results than previously believed;
- 4) the conclusions are no longer valid.

B.3 Waste Receipts

The assessment of waste receipts should summarize the waste receipt information reviewed during the annual determination. The primary purpose of this section is to inform Headquarters how the waste received over the past year compare to what was analyzed in the performance assessment. The disposal of radionuclides that require special waste forms should be summarized.

B.4 Monitoring

The results of monitoring required under the monitoring plan as well as any other monitoring should be summarized and interpreted. The interpretation should address whether the monitoring results indicate that the performance of the facility is as expected based on the performance assessment. The interpretation should also address the consistency of the monitoring results with the conceptual model(s) that form the basis of the performance assessment. Variances should be discussed, particularly with their relevance to the conclusion of the performance assessment.

B.5 Research and Development

The annual report should summarize the research and development results that were conducted, the research and development results that were evaluated, and an interpretation of the significance of these results. Research and development efforts that were reviewed should be categorized as

- 1) research and development required by the facility's disposal authorization statement
- 2) research and development contained in the Site-Wide Radioactive Waste Management Plan, but not required by the disposal authorization statement
- 3) ILAW-disposal related research and development not contained in the Site-Wide Radioactive Waste Management Plan
- 4) other Hanford Site research and development not contained in the Site-Wide Radioactive Waste Management Plan
- 5) off-site research and development contained in the database maintained by the Mixed Low-Level Waste Center of Excellence
- 6) other off-site research and development efforts.

The annual summary should present the status of ILAW-related research and development, including those completed during the previous year, those that are ongoing, those that will be started during the next year, and future efforts included in the Project Baseline Summaries. The evaluation of significance should indicate whether the results indicate a change to the conclusions of the performance assessment, and whether the results indicate more or less conservatism in the performance results.

B.6 Summary of Changes

The annual summary shall contain a section that summarizes the changes affecting the performance assessment that have occurred over the past year. Such changes include changes to the disposal facility design, operations, or maintenance program, as well as expected changes to future conditions, such as site land-use plans. This section should include the status of information needs (e.g., data gaps, uncertainties) identified in the performance assessment and previous annual reviews. The status of such information shall be categorized as follows:

- 1) previously existing information needs that have been satisfied by monitoring and research and development efforts completed during the previous year;
- 2) previously existing information needs that are no longer relevant due to changes in facility design, operations, or expected future conditions; and
- 3) new information needs identified as a result of the annual review, including those resulting from changes in facility design operation, or expected future conditions.

B.7 Recommended Changes

The annual report shall advise Headquarters of planned or contemplated changes in disposal facility design or operations or in the performance assessment maintenance program. Implementation of these changes does not require Headquarters approval unless changes affect conditions specified in the disposal authorization statement. The discussion of the recommended changes should include the expected significance of the changes with respect to the performance assessment results and conclusions. If significant changes to the results or conclusions are expected, the summary should recommend whether or not the performance assessment should be revised. This section should also address recommended changes to monitoring and research and development activities associated with the ILAW disposal facility and performance assessment. Any recommended changes to monitoring or research and development activities required by the disposal authorization statement should be highlighted as these will require Headquarters approval.

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