

DOE WEST VALLEY PROJECT OFFICE
OPERATIONAL READINESS REVIEW PLAN
for
RESUMPTION OF IRTS OPERATIONS

High Level Waste Treatment
Phase II - Sludge Wash

July 11, 1991

Concurrence:

for W.S. Ketola
J. A. Yeazel, IRTS & Vitrification
Operations Manager
West Valley Project Office

7/24/91
Date

Tom Rowland
T. J. Rowland, Director
West Valley Project Office

7/24/91
Date

D.B. Engelman, Director
Waste Management Division

Date

Plan Approval:

T.F. Burns, Acting Assistant Manager
Environmental Restoration and
Waste Management, Authorizing Official

Date

REVIEWED ACTIVITY

1. Facility: West Valley Demonstration Project
IRTS (Integrated Radwaste Treatment System)
Phase II, High Level Waste Treatment - Sludge Wash
2. Cognizant Division Director: D.Engelman, Director,
Waste Management Division
3. Completion Milestone: Final report and recommendation
submitted to ID Manager on
Wednesday, October 2, 1991
4. ORR Number:

PURPOSE

By DOE Order 5480.5, Safety of Nuclear Facilities, DOE Idaho Order 5480.5A, Safety of Nuclear Facilities, and as described by ER&WM Procedure 603, DOE is required to review the operational readiness of a high/moderate hazard system or facility which is to be "operated in a new or significantly different mode".

This is an "independent" DOE review and is in addition to the internal readiness review conducted by the on site operating contractor West Valley Nuclear Services Co., Inc.

SCOPE

This Plan addresses the resumption of IRTS Operations for sludge wash pretreatment of high-level waste (HLW). Pretreatment of the HLW Supernatant was the first of several radioactive waste treatment steps, or phases, planned for the IRTS which is composed of several subsystems three of which began operations in May of 1988. Sludge Wash follows as the next step of HLW treatment. For Supernatant treatment the feedstock was the HLW liquid covering the sludge stored in tank 8D2 since the days of fuel reprocessing in the '60's. Approximately 70% of the supernatant was successfully stripped of its high-level Cesium component with the resultant low-level stream converted to a Class C cement waste form.

The feedstock for the second phase of the operations will originate from the same waste tank (8D2), however, the feed will be the water used to "wash" the HLW sludge mixed with the remnant "heel" of supernatant remaining from the first processing step. The washing process, driven by several in-tank mixing pumps, will cause certain chemical "salts" now in the sludge, to dissolve. The resultant liquid, after sludge settling, will again be fed to the IRTS as in the supernatant phase. And again the high-level waste components, which now include not only cesium remnants but also Plutonium, and other possible radionuclides, will be stripped out of the feedstock and the resultant low-level waste converted to a Class C cement waste form.

It is important to recognize that this proposed operation is not a start-up of a new operational facility, nor is it the re-start of a previous operation shut down for safety reasons or equipment failure. Both of these conditions are explicitly covered in the DOE Orders and have prescribed authorizations for start-up. In this case, the proposed operation is the resumption of an existing operation with a few minor modifications of the process chemistry and equipment added to handle the wash water feedstock. Two new subsystems have been added: The Sludge Mobilization Pumps and the Caustic Addition system. New replacement equipment has been added to repair failed parts or subsystem elements where needed. In addition, the ion exchange material has been changed by adding a titanium coating to the base material (zeolite) to capture dissolved plutonium. These items will receive additional scrutiny by the ORRB since they represent changes to the approved operational baseline.

The DOE Operational Readiness Review (ORR) Plan is designed to allow the members of an ORR Board to systematically examine the readiness of the West Valley organization, facilities, and equipment needed to proceed with the sludge washing operation. Even though this is an "independent" and separate review by DOE, it will take advantage of much of the work being done by the operating contractor - WVNS (West Valley Nuclear Services). The work scope will focus on two levels of review: First, the work performed by WVNS will be "overviewed" to ascertain its coverage, completeness, and depth of readiness assessment; second, the review will "sample" specific items in depth, i.e., detailed assessments of the condition of selected items of equipment, procedures, technology or personnel will be done.

READINESS REVIEW ORGANIZATION

To determine "readiness" a team of reviewers will be assembled forming an official DOE Operational Readiness Review Board (ORRB). The team will consist of a variety of experts in a wide range of disciplines - safety, nuclear criticality, environment, engineering design/construction, operations, etc. In addition to the official Board members, a number of "observers" will be invited to participate in the process.

The Board will meet periodically in accordance with the established schedule, and will prepare, approve and utilize an ORR "tree" and a "checklist" covering the proposed operations. The Board's objective will be to issue a recommendation of acceptance of the state of readiness of WVNS and the proposed Sludge Wash Operation to the approving official. Final recommendations will be by majority vote; however, minority opinions will not be precluded from the record.

Appendix A is the makeup of the Board showing both members and observers.

APPROVAL AUTHORITY

Authority to start or restart operations of nuclear facilities is described in DOE Order 5480.5, Safety of Nuclear Facilities. Other recent orders, letters, and SEN-16A-90 also address the issue of start-up of nuclear facilities. None of these explicitly address the concept of resumption of operations where the same system is to be used with a different feed, or with modifications not related to Safety.

To be conservative, the WVPO has chosen to utilize the provisions of DOE Order 5480.5, para: 7.e.(5)&(6) which authorize the Field Office Manager to approve the:

"initial operation of a new high/ moderate hazard nuclear facility ..." or "Authorize... modifications that involve an unreviewed safety question only after assuring that:
(c) Approval has been obtained from the cognizant PSO with selected moderate hazard facilities when an unreviewed safety question exists."

The proposed Sludge Wash System doesn't fit either of these conditions, i.e., it is not a new system, nor does an unreviewed safety question exist. However, DOE Idaho, ER&WM Procedure 503 does address operations of systems which are to be "operated in a new or significantly different mode". The original authorization for IRTS operations was provided by the Field Office Manager in 1988. This Plan follows the precedent established in 1988 and the currently available guidance on readiness reviews.

Therefore, for the purpose of resuming IRTS Operations for HLW Sludge Washing, the DOE-WVPO ORR Board will prepare an independent report characterizing the readiness condition of the proposed operations for presentation to the ID Field Office Manager for his approval.

SUMMARY WORK PLAN

The readiness review work plan is laid out in accordance with a logical sequence of steps commonly referred to as an ORR "tree", designed to examine "readiness" from the top down and over a broad range of interrelated areas. These will cover operations management; equipment and hardware; traceability of documentation from requirements to design, to as-built conditions and equipment; technology; safety and environmental protection analysis; emergency provisions, as well as procedures and training.

Table 1 provides a summary breakdown of the areas to be reviewed:

1. Organization and Personnel: Both the DOE and WVNS organizations will be examined to determine whether the responsible groups have sufficient resources to provide sustained support for the operations of the sludge wash system. This will include the status of the management control and reporting systems, "off-normal" reporting, emergency control, and procedures by which management and support groups provide assistance to the operations of the sludge wash process.

Engineering support will be examined to ascertain if sufficient technical support is available to provide technical resolution of upset conditions, corrective action needs, and technical consultation on a sustained basis.

Operations itself will be reviewed to determine if sufficient manpower is dedicated to sustain full scale operations and if sufficient resources are provided to properly maintain and upgrade the system as needed.

2. Facilities and Hardware: The Integrated Radwaste Treatment System (IRTS), the system proposed for sludge washing, will be evaluated from a "mechanical readiness" viewpoint keeping in mind the fact that this system is currently "operational" and is not a new system. Documentation assuring that the IRTS has been maintained during the period of modification and changeover to

TABLE I (Rev. 2)

S L U D G E W A S H				
ORGANIZATION & PERSONNEL		FACILITIES & HARDWARE	PROCEDURAL READINESS	TECHNOLOGY ASSESSMENT
DOE	WVNS	IRTS	IRTS	PROCESS
OPS.	WG.M.T.	STANDBY SYSTEMS	STS	- Chemistry
		o STS	Drum Cell	- Testing
		o CCS	Tank Farm	
		o Evap.	Evap.	
		o Drum Cell	Transporter	TA - ZEOLITE
		o Transporter	Mobil. Pumps	- Chemistry
			Caustic System	- Testing
ES&H	ENGR.	MODIFIED SYSTEMS		
		o STS	TECHNOLOGY	QA
		o Aux. Equip.	CEMENT	
QA	OPS.	MOBIL. PUMP SYSTEM	IX	
		o Pumps	o Ti-Zeolite	
		o Facility Mod's.	o Corrosion	
TECH. SUPPORT	ES&H - Rad Tech's	CAUSTIC ADD. SYS.	SLUDGE WASH	REGULATORY COMPLIANCE
			o Process	
			o	
WV	J. Devoe	T. Sonntag	A. Yeazel	S. Ketola
				A. Schneider
				R. Provencher
ID	J. Orr	B. Hinckley	J. Sanders	J. Case

sludge wash will be reviewed. New equipment and systems such as the Mobilization Pumps and Caustic Addition System will be examined for documentation beginning with the approved requirements such as Functional and Operational Requirements (or equivalent), followed by design criteria, and final approved construction and fabrication documents will be reviewed for completeness, approvals, change control, quality and the incorporation of the appropriate DOE requirements derived from Orders, standards, regulations, etc.

3. Procedural Readiness: Procedural readiness will be examined by reviewing the procedures, technical requirements (Tech. Reqmts.), operational safety requirements (OSR's), as well as operator training and certification.

The procedures will include a full set for each of the process steps involved in the process. For example, sludge mobilization, operational control and monitoring or the waste tank, the ion exchange system (STS), the evaporator cycle, cement solidification system (CSS), cross site waste transfer, Drum Cell storage operations, etc. Integration of the procedures for each of the interrelated operational steps will be examined, and the provisions for handling operational upsets, or "disconnects" between steps will be considered. Provisions for Emergency responses and tie-ins to the West Valley Emergency Plan will be examined.

The Tech Specs and OSRs will be compared to the proposed operations and procedures. A systematic review to judge the operational options available for "workarounds" and recovery from upset conditions will be done.

Training and certification of operators will be examined. Training records and operator certifications will be reviewed for currency and technical application. The composition of shift crews will be evaluated for the proper mix of experienced and novice operators.

4. Technology Assessment: A review of the "technical record" leading to the selection of the proposed operational process will be done. The documentation and selection logic for the foundation chemistry and support testing for sludge washing will be reviewed.

Similar reviews for the selection of Titanated Zeolite as the STS ion exchange media will be done. The technical basis and testing will be reviewed for comprehensiveness and "close-out" of other options.

The development process for the cement waste form will be examined. The methodology and scientific approach used to perform the testing and qualification of the "recipe" will be judged from a risk basis. The completeness of the documentation will be evaluated as well.

5. Documentation Compliance Review - ES and H/QA: In this area, the review will focus on the adequacy of the implementation of DOE Orders, ES&H requirements, Quality Assurance and related regulatory requirements throughout the proposed system. Satisfactory "closure" of environmental/NEPA issues will be examined. Adequacy of the quality assurance programs applied to the sludge wash activities will be reviewed. Approvals and closure of all Safety Analysis work and documentation will be included.

Appendix B is the ORRB Checklist to be used by the Board to assist in examining each of the areas described above. The checklist is as comprehensive as can be done in advance, however, additions may be made during the review process as new information is made available to the Board.

SCHEDULE

The ORR will be scheduled to coincide with the development of documents needed by WVNS to fully characterize the "state of readiness" of the Sludge Washing Process. Appendix C is the proposed schedule. As the readiness of the Sludge Wash system matures, this schedule may change; the DOE Board will be required to adjust accordingly.

APPENDIX A
DOE WEST VALLEY PROJECT OFFICE
OPERATIONAL READINESS REVIEW BOARD

for

RESUMPTION OF IRTS OPERATIONS -SLUDGE WASH

MEMBERS

Members are assigned "official" board status and responsibility which includes one vote each to be used for reaching final decisions on recommendations for operational readiness.

Chairman

W. Stephen Ketola

DOE-WVPO

Members

Alan Yeazel

DOE-WVPO, Operations

Rick Provencher

DOE-WVPO, ES&H/QA

Joe Desormeau

DOE-WVPO

Dr. Alfred Schneider

N.Y.State Consultant

Ted Sonntag

NYSERDA

John Orr

DOE-ID

Boyd Hinkcley

DOE-ID

Jack Sanders

DOE-ID

Joel Case

DOE-ID

Observers

Ted McIntosh

DOE-EM-30, Program

DOE-EM-20, QA

John Psaras - ?

DOE-NS-??, Nuclear Safety

DOE-EH-??, ES&H

Davis Hurt, others?

NRC- ??, 1 or more??

A P P E N D I X B

Checklist to be provided at "Orientation"

REPORT OF THE COMMISSION OF THE EUROPEAN COMMUNITIES