West Valley Demonstration Project

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TEST REQUEST

LONG TERM COMPRESSIVE STRENGTH TESTING OF THE
SLUDGE WASH LIQUID/PORTLAND TYPE I CEMENT WASTE FORM

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RECORD OF REVISION

PROCEDURE

If there are changes to the controlled document, the revision number increases by one. Depending on the document type (per WV-100) changes are indicated by:

- a heavy vertical black line located in the right-hand margin adjacent to the sentence or paragraph which was revised
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- identifying as GENERAL REVISION

Example:

The vertical line in the margin indicates a change. |
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Rev. No.	Description of Changes	Revision On Page(s)	Dated
0	Original Issue	All	12/10/93

RECORD OF REVISION (CONTINUATION SHEET)

Rev. No.	Description of Changes	Revision On Page(s)	Dated

Long Term Compressive Strength Testing of the
Sludge Wash Liquid/Portland Type I Cement Waste Form

WVNS-TRQ-062
Rev. 0

1.0 This work is to be performed to satisfy the NRC Branch Technical Position on Waste Form, Rev. 1, and a letter from the NRC (DW:92:0822). The long term test plan will include compressive strength testing of cement cores retrieved from product drums. Also requested is a 14-day immersion test followed by a compressive strength test. Both of these tests will be performed once every six months for a five-year period. After this time period, a report will be issued to the NRC with this information.

2.0 OBJECTIVES

2.1 Set aside twenty (20) Sludge Wash #1 - Portland Type I drums for long term testing. Ten (10) will be used in WVNS-TP-062. See section 2.2 and 2.3 for further details. The remaining ten (10) will be set aside for possible future testing not identified at this time. The drum numbers used in this Test Request shall be identified in WVNS-TP-062.

2.2 Perform compressive strength testing of three (3) cores once every six months. This will include one (1) core each from the lower, middle (interface), and upper sections of the drum. This will be performed for five years (a total of ten times).

2.3 Perform a 14-day immersion per NRC Branch Technical Position on Waste Form, Rev. 1, section VII of Appendix A to include:

2.3.1 Removal of one (1) core specimen once every six months for five years from either the lower or upper section of the drum.

2.3.2 Fourteen-day immersion in simulated seawater. Simulated seawater is chosen because it was found to be the most aggressive in WVNS-TSR-044, section 3.5.

2.3.3 Upon removal of the core from immersion liquid and allowing the core to dry in ambient air for a minimum of 48 hours, the specimen should be visually examined for cracking, spalling, or bulk disintegration. The specimen may be photographed.

2.3.4 If there is no evidence of significant degradation following the immersion, the specimen should be subjected to an ASTM C39 compressive strength test.

2.4 At six and twelve months, both tests described in sections 2.2 and 2.3 will display a minimum mean compressive strength test of not more than two standard deviations below the mean of the as-cured strength values obtained with the qualification test specimens (NRC Branch Technical Position on Waste Form, Rev. 1, section VII of appendix A).

2.5 Three (3) core specimens, one (1) each from the lower, middle, and lower sections of the drum are bagged and stored in the Drum Cell environment for visual examination at six (6) month intervals for signs of cracking or spalling.

2.6 The work performed under this Test Request will be Quality Level C.

3.0 SAFETY

3.1 Industrial hygiene practices shall be as described in the WVNS Hygiene and Safety Manual, WVDP-011.

3.2 Radiological work will be performed in accordance with the WVDP Radiological Controls Manual, WVDP-010.

4.0 PREREQUISITES

4.1 Twenty (20) drums are produced at the Cement Solidification System in a full scale production mode.

4.2 The twenty (20) drums are cured in the Drum Cell environment.

5.0 STANDARD PRACTICES AND GENERAL TEST APPROACHES

5.1 Each core is visually examined for indications of cracking or spalling and then photographed. The core identification number, drum serial number, and date labeled should be included in the photograph.

5.2 As test specimens are generated, they are bagged and uniquely identified to include the date, drum serial number, and core location, i.e., (A&B-top, C&D-middle, E&F-bottom, etc.) in accordance with SOP 70-44, Attachment D.

5.3 No "standard method of test" for immersion testing has been adopted for low-level radioactive waste. The applicable steps of ACM-6400 (see section 10.4) are in compliance with the Branch Technical Position, Appendix A.II.G.

5.4 Cores produced have an approximate length-over-diameter ratio of 2:1.

6.0 PERSONNEL QUALIFICATIONS

6.1 Operations shall have their work, i.e., coring or compressive testing performed by qualified personnel.

6.2 Surveillance activity and compressive strength testing shall be performed by qualified Quality Assurance personnel.

7.0 DATA

7.1 Within ten (10) working days after compression of immersion cores Quality Assurance will issue a Surveillance Report (or equal type of Quality Record) stating the results of the compressive strength testing and visual inspection of tests described in section 2.2 and 2.3.

7.2 After receipt of data in section 7.1, the Cognizant Engineer shall issue a formal letter with the following content:

7.2.1 QA Surveillance Report or equivalent type of Quality Record as an attachment (typically an IIDS).

7.2.2 SOP 70-44, Attachment D, drum core position data sheets as an attachment.

7.2.3 List all drums numbers with pre and post immersion compressive strength data to date in a table format.

7.2.4 Line graph of the data in section 7.2.2 above with time on the X-axis and compressive strength in PSI on the Y-axis.

7.2.5 References to Waste Management Operations and Analytical and Process Chemistry log books. References should include log book designator, page numbers, and dates.

7.2.6 Cognizant Engineer and Cognizant Quality Engineer signatures.

7.2.7 If this is the six month or twelve month test, additional data to be reported from section 2.4 will be included in the letter.

7.3 The Test Summary Report WVNS-TSR-063 shall contain the following information:

7.3.1 All pertinent Surveillance Reports and/or other Quality Assurance documentation.

7.3.1 All pertinent SOP 70-44, Attachment D, Drum Core Position data sheets.

7.3.2 Final list of all drums cored with pre and post immersion results in a table format.

7.3.3 Final line graph of pre and post immersion results.

8.0 ORGANIZATION RESPONSIBILITIES

8.1 Operations Technical Support Engineering will provide engineering support in identifying drums, issuing Test Procedures, and Test Summary Reports, producing letters mentioned in section 7.2, and issuing Test Exceptions per EP-11-003. The cognizant OTS engineer will serve as the test exception authority per EP-11-003.

8.2 Quality Assurance will provide destructive testing services involved with compressive strength testing waste form cores. Quality Assurance will also provide surveillance activities to assure the work performed agrees with work documents.

8.3 Waste Management Operations will provide support for drum movements from the Drum Cell to the core boring set up, operation of core boring equipment, and storage of the core bored drum.

8.4 Radiation and Safety will provide support for work in the core boring and compressive strength testing tents, and release samples and drums.

8.5 IRTS Operations will possibly supply space for storage of 14-day immersion cores.

8.6 Analytical and Process Chemistry Laboratories will possibly supply space for storage of 14-day immersion cores, provide immersion buckets and fluids, and disposal of these materials.

9.0 POST RUN REPORTING REQUIREMENTS

9.1 Approximately every six months a letter will be issued with data described in section 7.0

9.2 After the completion of coring ten (10) drums (five years) the cognizant engineer will produce the Test Summary Report.

10.0 REFERENCES

10.1 USNRC Branch Technical Position on Low-level Waste Form, Rev. 1, dated January, 1991.

10.2 WVPO Letter DCC:023:92-0990:92:10, DW:92:0822, "Nuclear Regulatory Commission Letter of Support for the Development of Waste Forms for the West Valley Sludge Wash Waste", Dated 06/17/92.

10.3 SOP 70-44, Core Sampling of CSS Product Drums

10.4 ACM-6400, Immersion Testing, applicable sections: 5.0, 6.1, 7.1, 7.2, 10.1-10.8, 10.10, 10.12, 10.14, Attachment A.

10.5 ASTM C39, Compressive Strength of Cylindrical Concrete Specimens

10.6 ASTM C617, Standard Practice for Capping Cylindrical Concrete Specimens

EXPERIMENTAL AND DEVELOPMENT TEST ACCEPTANCE SHEET

PREPARED BY:

COG TRQ ENGR: _____ / _____ QUALITY ENGINEER: _____ / _____

CRITERIA FOR ACCEPTANCE OF DATA	RESULTS/COMMENTS
1) All Test Exceptions issued have been completed and ECN issued.	
2) Table of drum numbers, pre and post immersion compressive strength data present.	
3) Line graph of pre and post immersion compressive strength data present.	
4) All surveillance reports issued by Quality Assurance are referenced in the report.	
5) Six month and twelve month compressive strength requirements for section 2.4 have been included in report.	

ACCEPTED BY:

COG TRQ ENGR: _____ / _____ QUALITY ENGINEER: _____ / _____