COMPLETE

# ENGINEERING CHANGE NOTICE

Page 1 of 2

1. ECN 603848

Proj. ECN

| 2. ECN Category (mark one) | 3. Originator's Name, Organization, MSIN, and Telephone No. | 4. Date |
|---|---|---|
| Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void [] | David J Tedeschi/8D220/H5-70/372-1485/Chrg D2DE3 | December 6, 1994 |
| | 5. Project Title/No./Work Order No.: W-151/Retrieval | 6. Bldg./Sys./Fac. No.: N/A |
| | 7. Approval Designator: Q DST 1/19/95 | |
| | 8. Document Numbers Changed by this ECN (includes sheet no. and rev.): WHC--SD-W151-ATP-001, REV 0 | 9. Related ECN No(s).: N/A |
| | 10. Related PO No.: N/A | |

| 11a. Modification Work | 11b. Work Package No. | 11c. Modification Work Complete | 11d. Restored to Original Condition (Temp. or Standby ECN only) |
|---|---|---|---|
| [] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d) | N/A | N/A Cog. Engineer Signature & Date | N/A Cog. Engineer Signature & Date |

12. Description of Change

Additional Gamma Assay units were purchased under Purchase Requisition 380260. This ECN will add in the purchase requisition so units can be tested. ~~It also changes the location of the testing from the 305 building to the cold test facility. Changes to testing location and~~ The addition of the new units have not affected safety and therefore will not need the review of safety. 1/12/95

This ECN will make a new revision to WHC-SD-W151-ATP-001.

| 13a. Justification (mark one) | | | | | | | |
|---|---|---|---|---|---|---|---|
| As-Found | [] | Criteria Change | [X] | Design Improvement | [] | Environmental | [] |
| | | Facilitate Const. | [] | Const. Error/Omission | [] | Design Error/Omission | [] |

13b. Justification Details

This document was already used and approved for testing the first Gamma Assay units. Therefore, it was upgraded to be used to test additional units and thus save money of from developing/reviewing/approving a new document.

This has been assigned an Approval Designator of Q per Westinghouse Controlled Manual WHC-CM-3-5, Sec 12.7 REV 0, T5.2b.

14. Distribution (include name, MSIN, and no. of copies)

| | | | | | |
|---|---|---|---|---|---|
| D.E. Legare | H5-68 | 1 | M.N. Islam | R3-08 | 1 |
| R.K. Brown | H5-68 | 1 | OSTI - Central Files | L8-07 | (2) |
| G.L. Troyer | T6-50 | 1 | | L8-04 | (2) |
| E.M. Nordquist | R3-27 | 1 | | | |
| S.B. Warren | N2-10 | 1 | | | |
| R.E. Clayton | R3-27 | 1 | | | |
| D.J. Tedeschi | H5-68 | 1 | | | |

RELEASE STAMP

OFFICIAL RELEASE BY WHC DATE JAN 20 1995 Sta. 21

A-7900-013-2 (06/94) GEF095

MASTER

A-7900-013-1 (06/92)

# ENGINEERING CHANGE NOTICE



1. ECN (use no. from pg. 1): 603848

| 15. Design Verification Required | 16. Cost Impact | | | | 17. Schedule Impact (days) | |
|---|---|---|---|---|---|---|
| | ENGINEERING | | CONSTRUCTION | | | |
| [] Yes | Additional | [] $ | Additional | [] $ | Improvement | [] |
| [X] No | Savings | [X] $500.0 | Savings | [] $ | Delay | [] |

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1) that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

| | | | | | |
|---|---|---|---|---|---|
| SDD/DD | [] | Seismic/Stress Analysis | [] | Tank Calibration Manual | [] |
| Functional Design Criteria | [] | Stress/Design Report | [] | Health Physics Procedure | [] |
| Operating Specification | [] | Interface Control Drawing | [] | Spares Multiple Unit Listing | [] |
| Criticality Specification | [] | Calibration Procedure | [] | Test Procedures/Specification | [] |
| Conceptual Design Report | [] | Installation Procedure | [] | Component Index | [] |
| Equipment Spec. | [] | Maintenance Procedure | [] | ASME Coded Item | [] |
| Const. Spec. | [] | Engineering Procedure | [] | Human Factor Consideration | [] |
| Procurement Spec. | [] | Operating Instruction | [] | Computer Software | [] |
| Vendor Information | [] | Operating Procedure | [] | Electric Circuit Schedule | [] |
| OM Manual | [] | Operational Safety Requirement | [] | ICRS Procedure | [] |
| FSAR/SAR | [] | IEFD Drawing | [] | Process Control Manual/Plan | [] |
| Safety Equipment List | [] | Cell Arrangement Drawing | [] | Process Flow Chart | [] |
| Radiation Work Permit | [] | Essential Material Specification | [] | Purchase Requisition | [] |
| Environmental Impact Statement | [] | Fac. Proc. Samp. Schedule | [] | Tickler File | [] |
| Environmental Report | [] | Inspection Plan | [] | | [] |
| Environmental Permit | [] | Inventory Adjustment Request | [] | | [] |

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below indicate that the signing organization has been notified of other affected documents listed below.

| Document Number/Revision | Document Number/Revision | Document Number Revision |
|---|---|---|
| None | | |

20. Approvals

| Signature | Date | Signature | Date |
|---|---|---|---|
| OPERATIONS AND ENGINEERING | | ARCHITECT-ENGINEER | |
| Cog. Eng. D.E. Legare *D.E. Legare* | 1/19/95 | PE | |
| Cog. Mgr. R.K. Brown *R.K. Brown* | 1-19-95 | QA | |
| QA R.E. Clayton *R.E. Clayton* | 1/13/95 | Safety | |
| Safety N/A | | Design | |
| Environ. N/A | | Environ. | |
| Other | | Other | |
| Lead Technical Engineer | | | |
| G.L. Troyer *G.L. Troyer* | 1/12/95 | | |
| Project | | DEPARTMENT OF ENERGY | |
| E.M. Nordquest *E.M. Nordquest* | 1/12/95 | Signature or a Control Number that tracks the Approval Signature | |
| | | ADDITIONAL | |
| | | | |
| | | | |
| | | | |

## RELEASE AUTHORIZATION

| | |
|---|---|
| **Document Number:** | WHC-SD-W-151-ATP-001, Rev. 0 / |
| **Document Title:** | Project W-151 Flexible Receiver Radiation Detector System Acceptance Test Plan |
| **Release Date:** | 1/19/95 |

**This document was reviewed following the procedures described in WHC-CM-3-4 and is:**

**APPROVED FOR PUBLIC RELEASE**

**WHC Information Release Administration Specialist:**

V. L. Birkland — 1/19/95

V.L. Birkland

# SUPPORTING DOCUMENT

1. Total Pages 19

| 2. Title | 3. Number | 4. Rev No. |
|---|---|---|
| Project W-151 Flexible Receiver Radiation Detector System Acceptance Test Plan | WHC-SD-W151-ATP-001 | 1 |

5. Key Words

Flexible Receiver Radiation Detector System (FRRDS), Flexible Receiver Housing, Gamma-Ray Detectors, Two-Source Test, Pulser Injection Circuitry

6. Author

Name: G. L. Troyer

Signature 1/12/95

Organization/Charge Code 8E400/C09657

7. Abstract

The attached document is the Acceptance Test Plan for the portion of Project W-151 dealing with acceptance of gamma-ray detectors and associated electronics manufactured at the Idaho National Engineering Laboratory (INEL). The document provides a written basis for testing the detector system, which will take place in the 305 building (300 Area).

8. RELEASE STAMP

OFFICIAL RELEASE
BY WHC
DATE JAN 20 1995
Stg. 21

| RECORD OF REVISION | (1) Document Number WHC-SD-W151-ATP-001 Rev. 1 | Page 2 |
|---|---|---|

(2) Title
Project W-151 Flexible Receiver Radiation Detector System Acceptance Test Plan

CHANGE CONTROL RECORD

| (3) Revision | (4) Description of Change - Replace, Add, and Delete Pages | Authorized for Release | |
|---|---|---|---|
| | | (5) Cog. Engr. | (6) Cog. Mgr. Date |
| 1<br><br>RS | (7) Additional Gamma Assay units were purchased under Purchase Requisition 380260. This ECN will add in the purchase requisition so units can be tested. Minor changes were made in test plan to reflect locations, availablity of support equipment and procurement specifications changes. Changes and the addition of new units have not affected safety and therefore safety review is not needed. | GL Troyer<br>GL Troyer | CT Narquis 1/12/95<br>CT Narquis |
| | ECN-603848 | | |

# PROJECT W-151 FLEXIBLE RECEIVER RADIATION DETECTOR SYSTEM

# ACCEPTANCE TEST PLAN

WHC-SD-W151-ATP-001

Rev. 1

Approval Designator T3.6

Issued by:

Process and Analytical Laboratories

and

Instrumentation and Data Acquisition Engineering

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# PROJECT W-151 FLEXIBLE RECEIVER RADIATION DETECTOR SYSTEM ACCEPTANCE TEST PLAN

## 1.0 PURPOSE

The purpose of this document is to verify through testing that the Flexible Receiver Radiation Detector System (FRRDS), system 2, is constructed and operates per the procurement specification. System 1 was described in a Statement of Work; Internal Memo 28220-91-062 from V. B. Subrahmanyam to J. S. Lott, dated September 5, 1991, and procurement request 164321 as modified. System 1 was received and tested August 1993 and reported (WHC-SD-W151-ATR-001 Rev 0). System 2 is described by procurement specification 380260. Actual test procedures are described in sections 6.0 and 7.0.

The results of the test shall be used to establish criteria for operating and installation procedures. This test will establish baseline parameters that shall be used for operationg comparisons during actual field use.

This test activity shall not include the testing the system during removal of an item from a waste tank environment.

## 1.1 APPROVAL DESIGNATOR

The approval designation is based on guidance from WHC-CM-3-5, Section 12.7, Table 1-T3.6, and on information contained within the Preliminary Safety Analysis for Project W-151 (WHC-SD-W151-PSAR-001), and also upon the Project Specific Quality Assurance Plan for Project W151 (WHC-SD-W151-QAPP-001). Test results obtained from performing tests outlined in this procedure will be used for developing requirements in later stages of design.

## 2.0 BACKGROUND

The W-151 Flexible Receiver Radiation Detector System (FRRDS) shall provide a remote and automated method of identifying gamma-ray emitting radio-isotopes in the waste remaining on an object. The FRRDS shall be able to quantify the radioisotopes within geometry calibration limits.

The FRRDS uses 3 radiation detectors, nuclear instrumentation, a computer, a modified amplifier/data multiplexer and control/analysis software with a user interface.

The Tank 101-AZ Waste Retrieval System W-151 Project is designed to demonstrate that mixer pumps will sufficiently mobilize the sludge at the bottom of the tank for future tank content removal. To support these ends, the Flexible Receiver has been developed to remove and dispose of existing tank components which could be damaged by operation of mixer pumps. The FRRDS is a sub-system of the Flexible Receiver that shall identify the radioisotopic content of the waste remaining on the component (after washing) as it is

withdrawn from the tank. The quantity of specific isotopes on the items removed from the tank shall determine the waste classification (for disposal purposes) of the items. The identification and quantification of the radioisotope content of the remaining sludge is the required function of the FRRDS. This test plan and procedure shall only verify the first function (qualitative analysis), not the second (quantitative). However, the procedure shall provide a base quantification calibration limited to standard reference source configurations, such that future performance could be assessed.

## 3.0 RESPONSIBILITIES

Each organization participating in the conduct of this Acceptance Test Plan (ATP) shall designate personnel for the responsibilities and duties as defined herein for their respective roles. The names of these designees are provided in section 8.0.

### 3.1 COGNIZANT ENGINEER

1) Designate a Test Director.

2) Coordinate testing with facility management.

3) Act as liaison between the participants in acceptance testing.

4) Distribute the approved testing schedule in a timely manner.

5) Ensure field testing and inspection has been completed.

6) Schedule and conduct a pre-ATP meeting with test participants prior to start of testing.

7) Notify the persons performing and witnessing the test prior to the start of testing.

8) Notify all concerned parties when a change is made in the testing schedule.

9) Work in conjunction with the Test Director to clear resolvable exceptions to the ATP.

10) Sign copies of Execution/Data, Exception, and Test Completion Sheets as they are completed. These sheets are described in section 3.2.

11) Provide a distribution list for the approved and accepted ATP.

12) See section 3.7.

### 3.2 TEST DIRECTOR

Testing shall be conducted in the 305 building by a test director with experience in gamma spectroscopy systems development.

1) Coordinate and be present at all acceptance testing.

2) Confirm that field testing and inspection of the system or portion of the system to be tested has been completed.

3) Stop any test which may cause damage to the system until the test procedure has been revised.

4) Maintain a regulated field logbook. An overview of data, sketches, descriptions of individual tests, and testing chronologies shall be included. References to the Execution/Data and Exception Sheets (described below; attached as appendix B and C) shall be made as appropriate. These forms shall contain test descriptions and test exception dispositions.

5) Complete and sign the Test Completion Sheet (appendix A). This sheet provides a listing of each test to be performed and a location to date and check-off each test as it is completed. The Test Completion Sheet shall be included as part of the final Acceptance Test Report (ATR) covering the FRRDS system.

6) Complete and sign the Test Execution/Data Sheets (appendix B). These sheets shall be used to describe the testing being performed, and shall contain the data gathered from said testing. Upon completion, each sheet shall also be signed and dated by the cognizant engineer, and by an individual who witnessed the testing. A notation shall be made regarding any test that involves an exception. The Test Execution/Data Sheets shall be included as part of the final Acceptance Test Report (ATR) covering the FRRDS system.

7) Complete and sign the Test Exception Sheet(s) (appendix C). These sheets shall be used if exceptions to the ATP exist. The test involved shall be noted, as well as the disposition agreed upon by the cognizant engineer, the test director, and the test witness. It shall be noted if the disposition to the ATP is resolved or unresolved. Upon completion, each sheet shall also be signed and dated by the cognizant engineer, and by an individual who witnessed the testing. The Test Exception Sheet(s) shall be included as part of the final Acceptance Test Report (ATR) covering the FRRDS system.

8) It shall be the discretion of test director at the time of testing that determines whether or not any (or all) of the detector system is to be rejected based on performance that is out of the original specification range(s).

### 3.3 WITNESS

The test witness shall observe the individual tests and shall sign the sheets described in section 3.2 when he/she is satisfied that they accurately and completely describe the tests, data gathered, and exception(s) discovered through testing.

### 3.4 SAFETY

Safety personnel shall review the test plan to insure that proper safety concerns have been addressed. Preliminary Safety Analysis Report (PSAR) WHC-SD-W151-PSAR-001 addresses safety considerations concurrent with this project. Safety personnel may, or may not, be present during acceptance testing at their discretion.

### 3.5 QUALITY ASSURANCE

Quality Assurance (QA) shall review the test plan to insure that proper QA concerns have been addressed. Quality Assurance Project Plan (QAPP) WHC-SD-W151-QAPP-001 addresses quality assurance considerations concurrent with this project. QA personnel may, or may not, be present during acceptance testing at their discretion.

### 3.6 CONSTRUCTION CONTRACTOR (INEL PERSONNEL)

The assembly and operation of the FRRDS and the test instruments shall be the responsibilities of both the WHC test director and INEL personnel.

1) Organize and perform this acceptance test under coordination of the Test Director.

2) Confirm that all equipment required for performing this test shall be available at start of testing.

3) Provide equipment required for performing this acceptance test, such as the spectrometer equipment (hardware and software) and the necessary cabling.

4) Request in writing from the Project Engineer those services, materials, or equipment that have been designated as being supplied by the Department of Energy (DOE) or others.

5) Assist WHC Test Director in performing specification testing outlined in section 6.0. Time permitting, INEL personnel may assist with informational testing outlined in section 7.0.

6) Be present during testing outlined in section 6.0 (specification) testing. Also be present for all of section 7.0 (informational) testing, if time permits.

### 3.7 FACILITY MANAGERS

The cognizant engineer shall perform scheduling functions with the facility manager for the 305 building to arrive at an appropriate time for testing to take place.

## 4.0 TEST ITEMS

The system under test is the FRRDS purchased per procurement request 164321 (as modified). The FRRDS is composed of the following sub-assemblies:

1) Nuclear Instrumentation consisting of:
   - 3 HPGe radiation detector, preamp and dewar assemblies
   - One cabinet of nuclear instrumentation electronics
   - Various interconnecting cables

2) VAX 4000 computer substation configured and programmed to support instrumentation described in 4.1.1.

3) Software that controls and analyzes the data acquired by the FRRDS and presents it to the operator.

The specific test equipment, components and sub-assemblies used shall be identified on the Execution/Data Sheets.

## 5.0 TEST CONDITIONS

No unique or unusual chemical, fire, release of energy, or criticality safety hazards are involved with performing or supporting these tests. Normal WHC laboratory and facility safety rules shall be followed during these tests. All electrical and mechanical apparatus shall be operated as designed. The operation of the radiation detectors requires the use of liquid nitrogen and appropriate safety measures shall be taken.

All testing with the exception of Flexible Receiver geometry measurements will occur in the 305 building. 300 area Health Physics personnel shall be responsible for preparing the necessary RWP which will be required to allow work to be performed with radioactive sources. The sources used shall consist of a $^{137}Cs$ sealed point source (200 mrem/hr on contact) and other, smaller sealed gamma point standards (less than 20 mrem/hr. on contact). A radiological hold point is incorporated within this test plan regarding the use of the 200 mrem/hr source (section 7.1). It is not expected that any person involved in this testing shall receive more than 5 mrem whole-body dose as a consequence of the work.

The test items, equipment and facilities used in this test procedure are not expected to be affected permanently by this procedure. Test equipment that has been damaged shall be repaired or replaced.

Geometry measurement or in place efficiency calibration will be performed at a separate time and location. This measurement requires access to the Flexible Receiver framework for detector placement.

### 5.1 EQUIPMENT AND FACILITIES

Equipment listed below will be used within the 305 building to complete the testing outlined in sections 6.0 and 7.0. The primary focus of these tests shall be on the operation of the nuclear instrumentation by the computer, collection of data and the system's ability to analyze and present the results, as per sections 6.0 and 7.0. The need for certified and calibrated test equipment is limited. However, equipment used for quantitative measurements shall be calibrated and identified on the Test Execution/Data Sheets.

The following radioactive standard will be required for use during section 6.0 specification testing:

1 microcurie $^{60}Co$ sealed gamma-ray point standard (I.D. #Co-1; <20 mrem/hr contact) sealed in a small plastic "button".

The following radioactive standards/sources will be required for use during section 7.0 informational testing:

$^{137}Cs$ gamma-ray point source (I.D. #G23942E; approximately 4 millicuries; 200 mrem/hr contact) sealed in a small stainless steel capsule.

$^{228}Th$ gamma-ray point standard (I.D. #Th-1; approximately 1 microcurie; <20 mrem/hr contact) sealed in a small plastic "button".

Tongs and tweezers shall be used to handle the sources/standards mentioned above.

### 5.2 SPECIFICATION TESTING

The first phase of testing shall consist of the tests listed in section 6.0. After the initial setup and informal checkout, testing of detector system efficiency, system resolution, and response peak shapes, shall be performed to determine if the system meets the original procurement specifications. These tests are described in section 6.0. These tests will need to be performed, regardless of how much informational testing is completed.

As stated in section 3.2, it shall be the discretion of test director at the time of testing that determines whether or not any (or all) of the detector system is to be rejected based on performance that is out of the original specification range(s).

### 5.3 INFORMATIONAL TESTING

Testing outlined in section 7.0 shall be performed (time permitting) for informational purposes only. The purpose of this testing will be to establish baseline data for the system. This data can then be used for comparison with data obtained during actual use of the FRRDS within the tank farms.

## 6.0 SPECIFICATION TESTING

All portions of the specification testing outlined below shall be completed before the system is either accepted or rejected.

### 6.1 SYSTEM SETUP AND INFORMAL CHECK-OUT

The detector system and associated electronics will first be turned on and operated to ensure that the system is in good general working order before proceeding to the individual testing outlined below.

### 6.2 DETECTOR EFFICIENCY

Detector efficiencies shall be tested in a standard manner explained below. The detectors shall be positioned facing each other radially, and be tested for efficiency simultaneously. $^{60}Co$ source (I.D. #Co-1) shall be placed in the center of the circle formed by the detectors, so that it is 25 cm. from the end cap face of each detector. A spectrum will be collected having adequate counts in the 1.33 MeV photopeak. Efficiency shall be determined by dividing the total number of counts in the 1.33 MeV photopeak by the total number of gamma rays emitted by the source in that time period. This absolute efficiency is divided by $1.2 \times 10^{-3}$, which is the absolute efficiency of a

standard 3x3 inch NaI(Tl) detector with the source 25 cm. from the detector. Specifications call for an efficiency of 15%.

### 6.3 PEAK-TO-COMPTON RATIO

Using the data obtained from section 6.1 above, the height of the 1.33 MeV $^{60}Co$ photopeak will be divided by the average Compton plateau height between 1.040 and 1.096 MeV. Specifications call for a peak-to-compton ratio 40:1 or better.

### 6.4 PEAK RESOLUTION AND RESPONSE PEAK SHAPE

Both of these values can be obtained by the supplied spectra collection software. Specifications call for peak resolution of $\leq$1.75 keV at 1.33 MeV, and response peak shape of $\leq$2 for FW10th Max/FWHM, <2.7 for FW50th Max/FWHM.

## 7.0 INFORMATIONAL TESTING

This testing will be conducted to provide baseline information only. The testing will be performed only as time permits.

### 7.1 HEALTH PHYSICS HOLD POINT

The following hold point applies only to the use of the 200 mrem/hr $^{137}Cs$ source. This source will only be used during the two-source test described in sections 7.2 and 7.3. Health Physics personnel shall establish dose rates during the test and monitor personnel when working with the 200 mrem/hr $^{137}Cs$ source. The source will not be used for testing purposes until Health Physics has performed work it deems necessary to inform/protect personnel involved with this testing. The 200 mrem/hr source shall be handled with tongs. The other two sources described in this test plan shall be handled with tongs or tweezers, if reasonably possible. When not in use, the sources shall be stored appropriately and away from test personnel.

### 7.2 TWO-SOURCE TEST

This testing will illustrate the maximum count rate level at which the detectors can operate. In other words, the level at which the count rate is high enough to cause most of the incoming photons to go unaccounted and possibly cause degradation of spectral resolution. The pulser injection system will be used during this test to determine baseline performance.

#### 7.2.1 Description of Test

The three detectors shall be positioned so that they face each other radially. The $^{228}Th$ standard shall be positioned directly in front of the detectors and shall remain stationary throughout the test. The pulser injection system will be used during this test to determine baseline performance. The cesium source will be suspended by a small string or wire

and lowered (with spectra gathered at discrete locations) toward the detectors until the count rate of the thorium standard is severely affected. If this point is reached (it may not be due to the amount of real time counting involved), it will represent the maximum count rate that can be handled by the detectors and the associated electronics without affecting data quality.

Plots shall be generated representing counts per second of the 2614 keV line of $^{228}$Th versus input count rate, and also of the 2614 keV FWHM versus input count rate. Gain stability can be monitored by plotting the centroid of a $^{228}$Th peak and the pulser-calculated energy of that peak versus the input count rate. The energy value should remain correct for varying count rates, while the peak itself undergoes a gain shift. The amount of spectral pulse pile-up and the quality of spectral peak shapes shall also be noted throughout this testing. The 238 keV/241 keV doublet can be observed at higher count rates in order to gain an understanding of the amount of spectral degradation to expect.

### 7.3 GAIN AND RESOLUTION STABILITY

The results of the two-source testing described above will show if there are problems associated with either gain or resolution stability.

### 7.4 POSSIBLE ELECTRICAL NOISE INTERFERENCE

The effect of running Flexible Receiver equipment while operating the detector equipment shall be noted and recorded if possible. To perform this testing (if time permits), the detectors will need to be positioned in the Flexible Receiver housing. Hydraulic components may be operated, for example, while gathering spectra to check for any possible noise interferences. This testing does NOT represent a part of the formal specification testing, but should provide an indication of the microphonic rejection stability of the detectors and associated electronics. This test requires the availability of the full Flexible Reciever framework and system.

### 7.5 ENERGY-VERSUS-EFFICIENCY PLOT

The $^{228}$Th standard will be used to generate an energy-versus-efficiency curve for the detector system if time permits. It is recognized that this work may need to be performed at a later date due to time constraints.

## 8.0 ORGANIZATION AND FUNCTION RESPONSIBILITIES

Tank Waste Remediation Systems (TWRS) or Analytical Services (AS) shall be the cognizant organization for this task and shall provide the test director. The test director is authorized to change test parameters to exceed listed requirements provided all such changes (and results) are recorded on data sheets. Testing may be interrupted at the discretion of the test director, to perform maintenance or repair failed equipment. Testing may restart when the test director has determined that the equipment is in working order

(calibrated where necessary). TWRS or AS is responsible for all phases of testing and documentation.

TWRS is the customer and shall be the responsible activity and cost account management organization for this activity.

Engineered Electrical Instrumentation & Characterization Systems (EEI&C) shall provide the technical and administrative interfaces.

Specific personnel identified for various responsibilities include:

| | | |
|---|---|---|
| Project W151 Manager | EM Nordquist | 2-2923 |
| Test Director | GL Troyer | 3-1572 |
| Alternate Test Directors | GR Blewett | 3-6922 |
| Cognizant Engineer | DE Legare | 6-3489 |
| Witness | DJ Tedeschi | 2-1485 |
| Customer Contact | DW Crass | 2-2034 |
| 305 Facility Manager | DL Dutt | 6-9336 |
| Radiological Contact | DR Ekstrom | 6-1135 |
| Safety Contact | SB Warren | 3-0920 |
| Quality Assurance Contact | RE Clayton | 3-0127 |

## 9.0 SCHEDULE

Testing is expected to take approximately one week to complete. The start of testing is contingent on both delivery of the FRRDS and radio-isotopic standards which have been ordered.

## 10.0 REPORTS

TWRS or AS shall prepare and release (as a support document) a final test report covering the FRRDS test, the data, the test exceptions, and the exception dispositions. The report shall be identified as WHC-SD-W151-ATR-001, "FRRDS System Evaluation and Test Report". Data from succeeding performances of the test plan will be included as appendices. This report shall address the quality of the data, the format of the data, and any changes in the procedure followed.

## 11.0 REFERENCES

1. System requirements outlined in Internal Memo 28220-91-062 (Statement of Work written by V. B. Subrahmanyam to J. S. Lott, dated September 5, 1991).
2. Procurement Request 164321.
3. WHC-SD-W151-PSAR-001.
4. WHC-SD-W151-QAPP-001.
5. WHC-CM-6-1, Standard Engineering Practices.
6. ANSI/IEEE 325-1986.
7. Procurement Request 380260
8. WHC-CM-3-5.

## 12.0 DATA SHEETS

The test procedure shall use the Execution/Data, Exception, and Test Completion Sheets described in section 3.2. Examples are contained in appendices A,B and C. All computer-generated data shall be magnetically stored on disk and a hard copy shall also be printed and included as part of the test report.

## APPENDIX A

TEST COMPLETION SHEET

| Date Completed | Exceptions (Y/N) | Test Director Initials | Test Section |
|---|---|---|---|
| **6.0 SPECIFICATION TESTING (See Execution/Data Sheets for Values Obtained)** | | | |
| _____ | _____ | _____ | 6.1 System Setup and Informal Checkout |
| _____ | _____ | _____ | 6.2 Detector Efficiency |
| _____ | _____ | _____ | 6.3 Peak-To-Compton Ratio |
| _____ | _____ | _____ | 6.4 Peak Resolution and Response Peak Shape |
| **7.0 INFORMATIONAL TESTING** | | | |
| _____ | _____ | _____ | 7.1 Health Physics Hold Point |
| _____ | _____ | _____ | 7.2 Two-Source Test |
| _____ | _____ | _____ | 7.3 Gain and Resolution Stability |
| _____ | _____ | _____ | 7.4 Electrical Noise Interference |
| _____ | _____ | _____ | 7.5 Energy-Versus-Efficiency Plot |

All tests completed either with, or without, exception on _____.
Date

SIGNATURES

Cognizant Engineer _____

Test Director _____

Witness _____

## APPENDIX B

## EXECUTION/DATA SHEET

| Test | Date | Description | Exception Y/N | Org. | Initials | Date |
|---|---|---|---|---|---|---|
| | | | | | | |

Cognizant Engineer: _____

Test Director: _____

Witness: _____

## APPENDIX C

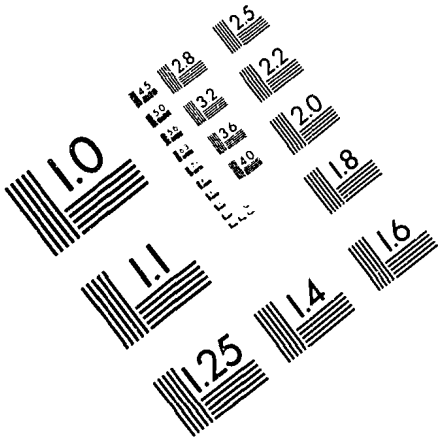
## EXCEPTIONS TO ACCEPTANCE TEST

| EXCEPTIONS | | | | | CORRECTION APPROVAL | | |
|---|---|---|---|---|---|---|---|
| Test | Date | Description | Disposition | Resolved Y/N | Org. | Initials | Date |
| | | | | | | | |

Compliant Engineer: _____

Test Director: _____

Witness: _____



**Association for Information and Image Management**

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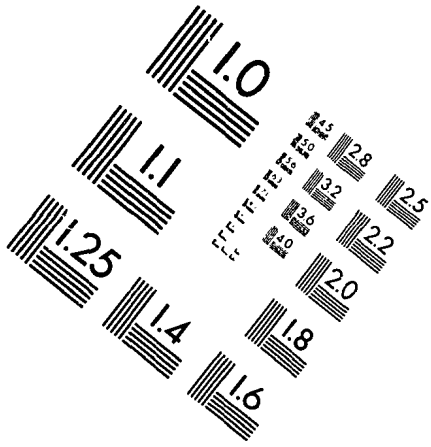
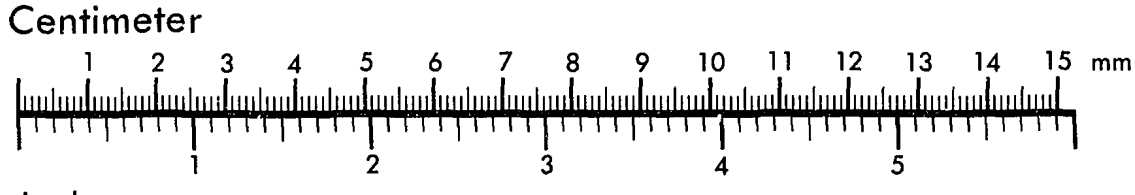
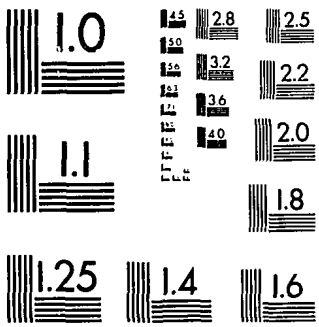
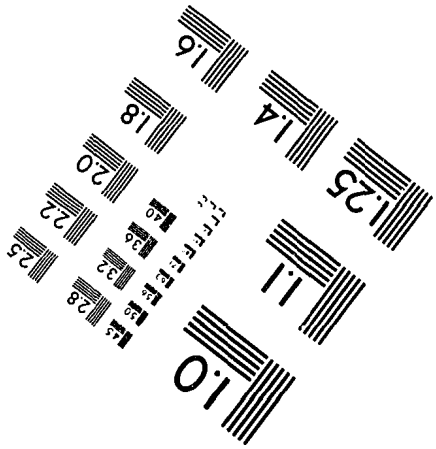
Silver Spring, Maryland 20910
301/587-8202







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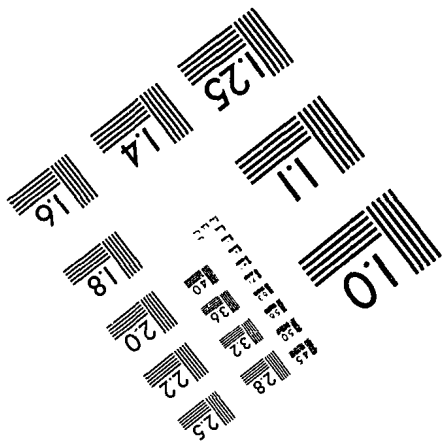

DATE
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