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"Test Report for K Basins Vertical Fuel Handling Tools," WHC-SD-SNF-TRP-003 / LD11B		ECN No. N/A

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ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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1. EDT

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Name: T. A. Meling

Signature

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7. Abstract

This document is a test report, covering the testing of the K Basins Vertical Fuel Handling Tools in the 305 Building Cold Test Facility. This testing consisted of the following areas: (1) functionality, (2) load capability, and (3) operations acceptance.

8. RELEASE STAMP

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DATE MAR 03 1995
35 Station 21

TEST REPORT FOR K BASINS VERTICAL FUEL HANDLING TOOLS

T. A. Meling

Testing Engineers:

A. E. Bridges
P. J. MacFarlan
T. A. Meling

February 1995

MASTER

TEST REPORT FOR K BASINS VERTICAL FUEL HANDLING TOOLS

T. A. Meling

Testing Engineers:
A. E. Bridges
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T. A. Meling

Drawing # H-1-80543
H-1-80544

TESTING INCLUDED:
Functional Test
Load Test
Operations Acceptance Test

ABSTRACT

The vertical fuel handling tools, for moving N Reactor fuel elements, were tested in the 305 Building Cold Test Facility (CTF) in the 300 Area. After fabrication was complete, the tools were functionally tested in the CTF using simulated N Reactor fuel rods (inner and outer elements). The tools were successful in picking up the simulated N Reactor fuel rods. These tools were also load tested using a 62 pound dummy to test the structural integrity of each assembly. The tools passed each of these tests, based on the performance objectives. Finally, the tools were subjected to an operations acceptance test where K Basins Operations personnel operated the tool to determine its durability and usefulness. Operations personnel were satisfied with the tools. Identified open items included the absence of a float during testing, and documentation required prior to actual use of the tools in the 100 K fuel storage basin.

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TEST REPORT FOR K BASINS VERTICAL FUEL HANDLING TOOLS

I. INTRODUCTION

The vertical fuel handling tools made for retrieving N Reactor fuel stored in 100 K fuel storage basins were functionally tested, load tested, and acceptance tested in the 305 Building Cold Test Facility (CTF) located in the 300 Area. The tests were conducted in three parts on two tools. The tool design, fabrication, and testing were all performed or authorized and coordinated by Nuclear Fuel Evaluations.

II. DESCRIPTION OF TEST

The vertical fuel handling tools consist of an inner fuel element handler (H-1-80543) and an outer fuel element handler (H-1-80544). The tested items are prototypes and were produced under development control.

III. TEST METHOD AND TEST EQUIPMENT

The first test conducted on each Fuel Handling Tool was a functional test. This test occurred in the CTF. Rods of steel were machined to functionally simulate the size (but not weight) of N Reactor inner and outer fuel elements. Another machined steel rod was used to simulate the entire fuel assembly (where an inner and outer are locked together). Dimensions for the simulated fuel rods (or dummy fuel elements) are contained in Appendix A. The mandrel end of the fuel handling tool was inserted into the hole of a dummy fuel element, the expanding collar was expanded (the handwheel was tightened hand tight to retract the mandrel), and the dummy fuel element was lifted. To disengage the tool from the dummy fuel element, the handwheel was used to drive the tapered mandrel down, reversing the collar expansion. A light strike from a rubber headed hammer to the top of the tool then completes the release. This operation was performed at least two times with each tool. The completed test procedure package for the functional test is included in Appendix A.

The second test conducted on each tool was a load test. In this test, two of the dummy fuel rods were joined end to end using a threaded stud. The total weight of the combined dummy fuel rods is approximately 62 pounds. This weight is 125% of the actual maximum load that the small diameter tool could encounter in its intended use and approximately 200% of what the large diameter tool could encounter in its intended use. Each tool was also weighed using a calibrated load cell attached to an overhead crane. Each tool weighed

26 pounds. Both the inner and outer tools engaged the 62 pound dummy fuel rod combination, and each lifted the load. Two methods were used to lift the load.

1. The load was lifted manually by grasping the outer tube. This lift simulated the lifts that will be made in practice.
2. The load was lifted by the inner rod to verify its strength.

All weights and loads were measured via the Dynator, Griphoist Incorporated, a 4,000 pound scale (load cell Number A2596, calibration expiration date November 15, 1995). The initial load test of the small diameter tool failed due to the inability of the expanding collar to engage the dummy fuel element.

This failure resulted from a modification made to the mandrel between the functional test and the load test. This problem was corrected, and the tool was retested successfully. The completed test procedure and retest sheets are contained in Appendix B.

The third test conducted on each of the fuel handling tools was an operations acceptance test. Personnel from K Basins Operations were enlisted to operate the tool. This test was conducted according to the steps in the functional test. The completed test procedure for this test is included in Appendix C.

IV. TEST RESULTS

Open issues identified during testing included the absence of floats on the tools, as well as documentation required to clear the tools for use in the 100 K Fuel Storage Basins.

The tests that were conducted on the fuel handling tools demonstrated success in meeting the testing performance criteria. Corrective actions taken during the test included:

1. Shortening the handling tools by two feet.
2. Adding hose clamps and a larger roll pin (due to undesired mandrel movement during insertion of small diameter tool into dummy fuel rod), which lock the mandrel at full extension.
3. Tapering the end of the small diameter mandrel to allow easier insertion into the fuel element.
4. Modifying the small mandrel tool after a failure to engage the dummy fuel element in the load test. The engagement failure was due to a post-functional test change (corrective Action 2) made to the mandrel.

The initial bronze expanding collar was also replaced by an inconel collar before load testing. This had no affect on the testing because the design of the two pieces were identical. The performance criteria for each test are contained in Attachment 2 of each test procedure.

V. CONCLUSIONS

The testing of the vertical fuel handling tools proved the effectiveness of the fuel handling tools by meeting the performance criteria of each test. Some design changes were determined to be necessary prior to the tools being released for use. Upon completion of these changes and acceptance of appropriate documentation, the tools will be approved for use in the K Basins.

VI. DISPOSITION OF THE TEST ITEM

The vertical fuel handling tools and dummy fuel elements have been transferred to 100 K for use in the Dry Run at the K West Basin.

APPENDIX A: TEST PROCEDURE FOR FUNCTIONAL TESTING

TEST PLAN FOR K-BASIN FUEL HANDLING TOOLS

February 1995

PREPARED BY:

A. E. Bridges
Nuclear Fuel Evaluations

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1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this document is to provide the test plan and procedures for the acceptance testing of the handling tools enveloped for the removal of an N-Reactor fuel element from its storage canister in the K-Basins storage pool and insertion into the Single Fuel Element Can for subsequent shipment to a Hot Cell for examination. Examination of these N-Reactor fuel elements is part of the overall characterization effort. New hand tools were required since previous fuel movement has involved grasping the fuel in a horizontal position.

1.2 SCOPE

The primary objective of this test plan is to complete acceptance testing of hand tools for the K-Basins' operators to use in removing N-Reactor fuel elements from storage canisters and place them in Single Fuel Element cans for subsequent shipping to a Hot Cell. The tools were designed to Safety Class 3 with safety and quality assurance approvals, in accordance with WHC-CM-3-5, *Document Control and Records Management Manual*, Section 12.7, Approval of Environmental, Safety, and Quality Affecting Documents.

2.0 APPLICABLE/REQUIRED DOCUMENTS

The following documents are applicable and/or required for the acceptance testing of the fuel handling tools:

- WHC-SD-SNF-PCP-001, Rev. 1, *305 Building Cold Test Facility Management Plan*.
- WHC-SD-SNF-FRD-005, *305 Building Cold Test Facility Functions and Requirements*.
- WHC-SD-SNF-WP-011, *Work Plan for Development of K-Basin Fuel Handling Tools*.
- WHC-CM-6-1, *Standard Engineering Practices*.
- WHC-IP-1026, *Engineering Practices Guidelines*.
- WHC-CM-2-1, *Procurement Manual and Procedures*, PP 1, Purchase Requisition.
- WHC-CM-3-5, *Document Control and Records Management Manual*, Section 12.7, Approval of Environmental, Safety, and Quality Affecting Documents.
- WHC-CM-4-2, *Quality Assurance Manual*.
- WHC-CM-4-3, *Industrial Safety Manual*.
- Signature Verification Data Sheet (Appendix A).
- Test Configuration Documentation List (Appendix B).

3.0 DEFINITIONS

The engineering practice EP-4.2, Testing Requirements, of WHC-CM-6-1 lists applicable definitions for testing of the fuel handling tools. The following additional definitions were taken from WHC-SD-SNF-TP-007, *Test Plan for Sludge Retrieval and Packaging* and WHC-SD-SNF-TC-001, *Test Procedure Forms for Sludge Retrieval and Packaging*.

- Outside Vendor Acceptance Testing - Testing completed by vendors or non-WHC personnel which verifies the operation of components to perform intended function.
- Signature Verification - The act of acknowledging the completion of a step, response, action, data, recording, etc., by signature (or initial) as required by a test procedure.
- Development Testing - Development testing is performed to provide or develop ideas, concepts, design information, or criteria. Development testing shall require a 305 Building Work Plan and a JHA if testing is beyond the normal routine of the facility.
- Feature Testing - Feature testing is performed to test certain features of a piece of equipment or system to demonstrate that fabrication, assembly, installation, and/or operation requirements have been met for that feature. Feature testing shall require a 305 Building Work Plan and a JHA if testing is beyond the normal routine of the facility.
- Functional Test - Functional testing is performed to test the final equipment configuration or system of assembled equipment items in preparation for acceptance testing. During functional testing, all components of the equipment or system are operated as a whole to determine that the equipment or system satisfactorily meets the overall functional, operational, and design requirements. Functional testing is used to determine if final changes are required before acceptance testing. Functional testing shall utilize this test plan and require a test procedure.
- Acceptance Test - Acceptance testing is performed with the equipment or system in the final in-service configuration (in the Cold Test Facility) to verify that functional, operational, and design requirements have been met. Acceptance testing shall utilize this test plan and require a test procedure. This testing may be performed by Cold Test Facility personnel or by KE Basin Operations. This acceptance testing may be performed in conjunction with operation training. For equipment destined for K Basins, the acceptance criteria for use in K Basins will be delineated and approved by K Basins Operations.
- Test Index Logbook - A controlled logbook for recording the test number, description, and date of each test or activity in sequence, whether controlled by a work plan or test procedure.
- Test Logbook - A logbook for recording all data and observations by

the test performer which are not included in a test procedure.

- Test Control Copy - The single copy of all record documentation maintained at the test facility and used for all required signatures, approvals, and data recording.
- Performance Criteria - All functions, requirements and operating criteria for measuring the successful performance of test equipment.
- Work Instruction - What is to be accomplished.
- Approvals - Test engineer and building administrator approval is required on all 305 Building Work Plans.
- Restrictions/Conditions - Any mechanical/electrical safety concern that may affect personnel. Equipment operating limitations.
- Hold Points/Inspections/Verifications - Test witnesses required, QA/QC involvement, material, drawing or dimensional checks.
- Supporting Documents - Drawings, procedures, vendor specifications, test plans, etc.
- Materials Required - Material for fabrication or testing.
- Special Tools, Building Modifications - Lifting or handling equipment or anything unique to the work requested.
- Test Layout/Schematic - A layout showing configuration of test setup, including all mechanical, electrical, and instrumentation systems. This layout should simulate, where possible, the actual operating conditions of the test.
- Equipment List - A list of all materials, equipment, instrumentation, and tools required to complete the test.
- Acceptance Criteria - Requirements for equipment destined for use in K Basins to be used for accepting the equipment, to be delineated and approved by K Basin Operations.

4.0 MANAGEMENT/PERSONNEL RESPONSIBILITIES

4.1 MANAGER - NUCLEAR FUEL EVALUATIONS

- Approve the test plan, test procedure, and final test report.

4.2 COGNIZANT ENGINEER - NUCLEAR FUEL EVALUATIONS

Note: The cognizant engineer may perform test engineer activities.

- Provide specific equipment for cold testing.

- Provide all documentation of equipment being tested.
- Provide a hazards list for equipment being tested.
- Prepare performance criteria for equipment.
- Prepare and approve test procedures.
- Review and evaluate test results.
- Review and approve outside vendor test procedures and test data.

4.3 TEST ENGINEER - NUCLEAR FUEL EVALUATIONS

- Overall responsibilities for maintaining and controlling testing.
- Provide liaison with facility used for testing.
- Provide liaison with Safety and Quality Assurance for testing activities and reviews of Job Hazard Analysis (JHA) related to testing, as required.
- Assist in preparing test procedures.
- Obtain test documentation identification numbers.
- Overall testing responsibilities and assignment of responsibilities.
- Review test results and prepares and issues test report.
- Monitor testing for compliance with the test procedures.

4.4 TEST PERFORMER

- Perform test in accordance with approved test plan and procedure.
- Maintain a file of documented information pertinent to the test(s).

4.5 QUALITY ASSURANCE ENGINEER

- Review and approve the test plan, test procedure, and test report for both WHC and outside vendor testing.
- Ensure that quality requirements are defined and satisfied for the test.
- Ensure that inspection planning is adequate for the test.

4.6 QUALITY CONTROL INSPECTORS

- Monitor test activities and provides signature verification as required at WHC and outside vendor facilities.

4.7 SAFETY

- Provides review of JHA per WHC-CM-4-3, *Industrial Safety Manual*, Standard A-3, "Pre-Job Planning/Job Hazard Analysis."
- Reviews and approves all test-related documents in accordance with WHC-CM-3-5, *Document Control and Records Management*, Section 12.7, "Approval of Environment, Safety, and Quality-Affecting Documents."

5.0 TESTING REQUIREMENTS

5.1 TEST CONTROLS

All persons responsible for signature verification(s) during testing will complete a portion of the Signature Verification Data Sheet (Appendix A).

5.2 TEST DATA

- Data shall be recorded on the data sheets provided in this document using indelible ink.
- All changes to the configuration of tested items will be documented by markups of the controlled design documentation (drawings, procedures, etc.) using indelible ink. Changes will be approved by the test engineer who will initial and date the markup item. It is not necessary for the test performer to stop the testing when the test engineer is not available to approve these changes. Elimination or addition of a step which requires QC verification will require a hold point for QA review and approval.
- The test performer shall maintain a test logbook which will contain all pertinent observations, off-normal events, sketches, photographs, test data, etc. This logbook should list the testing in chronological order with the logged entries signed and dated.

5.3 TEST CONFIGURATION

- Engineering documents such as drawings and sketches that define the test configuration shall be recorded on the Test Configuration Documentation List (Appendix B).
- Documents that are not released at the time of the test shall be marked TEST CONTROL COPY and included in the test procedure package.

5.4 PROCEDURE CONTROL

- A controlled test procedure package shall be used in the conduct of the testing described in this document. This package shall include: 1) this test plan and procedure; 2) items identified in Section 5.3 as necessary for defining the test configuration; 3) the test logbook; and 4) other data sheets, travelers, etc. that

provide information necessary for conducting the test. The test procedure package will be stamped TEST CONTROL COPY.

- The items in the test procedure package shall be dated prior to completing the Test Readiness Review Checklist required in Section 9.2. All items that are deficient shall be noted on the checklist.

5.5 RETEST PROCEDURE CONTROL

- Retesting is permitted by using either additional copies of this test plan and procedure or by using new procedures per Section 9.0.
- Any new procedures required for retesting shall be included in this test plan and procedure as Appendix F (Retest Procedure and Data Sheets). These sheets must be stamped TEST CONTROL COPY.
- Minor changes or revisions to the test plan and procedure may be made by redlining the text or figure and having the test engineer initial and date it.
- Only documentation marked TEST CONTROL COPY shall be used in the testing area.

5.6 OPEN ITEMS

Items or actions identified during the conduct of the testing which require future resolution/completion shall be noted on the data sheets and in the test logbook. These open items shall be identified in the test completion report.

6.0 TEST DESCRIPTION

6.1 TEST EQUIPMENT

Test equipment lists, descriptions, and drawings/sketches shall be included with the Test Traveler (Appendix E) if they are not released items (See the Test Configuration Documentation List in Appendix B).

6.2 ANCILLARY EQUIPMENT AND TOOLS

All ancillary equipment and tools required for the conduct of the test will be listed in an attachment to the Test Traveler (Appendix E).

7.0 TEST FACILITY

The 305 Building Cold Test Facility will be used to conduct the acceptance testing of the Fuel Handling Tools. Upon completion of this acceptance testing and any subsequent training of operators, the tools will be transferred to the 105 KW Basin for installation and use.

8.0 SAFETY

The following items describing safety requirements are based on the document WHC-SD-SNF-TC-001, *Test Procedure Forms for Sludge Retrieval and Packaging*:

- A Job Hazard Analysis (JHA) form specific to this test may be required in accordance with WHC-CM-4-3, Standard A-3. Existing JHAs may also be applicable.
- The applicable JHAs for this test are listed in Appendix D (Job Hazard Analysis and Material Safety Data Sheets).
- The applicable Material Safety Data Sheets (MSDSs) for this test are listed in Appendix D.
- All applicable JHAs and MSDSs shall be posted or located in the Cold Test Facility test area.
- All test area personnel shall observe all safety precautions outlined in the MSDS and JHA.
- Pre-job briefings for personnel involved in the testing shall be conducted and documented in Appendix G.

9.0 TEST PROCEDURE

9.1 TEST PERFORMER ASSIGNMENT

The test performer for this test plan and procedure is DC Larson

9.2 TEST READINESS REVIEW

The Test Readiness Review shall be conducted in accordance to the checklist in Appendix C prior to proceeding with Section 9.3.

9.3 TEST PROCEDURE STEPS

The Test Traveler forms that are required in the following steps are in Appendix E.

- Perform the pre-operational checkout steps per Test Traveler operation 1.0, *Pre-operational Checkout*.

Completed:

DC Larson
Test Performer

2/9/95
Date

- Perform calibration steps per Test Traveler operation 2.0, *Calibration Checks*.

- Attach equipment list per Test Traveler operation 3.0,

Completed:

DC Larson
Test Performer

2/9/95
Date

- Attach Test Layout/Schematic per Test Traveler operation 4.0

Completed: DC Lawson 2/9/95
Test Performer Date

- Perform equipment setup per Test Traveler operation 5.0,

Completed: DC Lawson 2/9/95
Test Performer Date

- Perform test per Test Traveler operation 6.0,

Completed: DC Lawson 2/9/95
Test Performer Date

- Perform final verification per Test Traveler operation 7.0,

Completed: DC Lawson 2/9/95
Test Performer Date

- Training objectives may be accomplished during the conduct of this test plan and procedure. The Test Traveler shall include a hold point on equipment removal to assure completion of the training objectives.

Completed: DC Lawson 2/9/95
Test Performer Date

APPENDIX A

SIGNATURE VERIFICATION DATA SHEET

APPENDIX A

SIGNATURE VERIFICATION DATA SHEET

NAME (PRINT)	POSITION	COMPANY	SIGNATURE	INITIALS	DATE
GREG DIXON	CTF COORDINATOR/ INTEGRATOR	WHC	Greg Dixon	GD	2/9
Frank Bolson	Eng Tech	WHC	Frank Bolson	FB	2/9
SA Norling	Safety	WHC	SA Norling	SA	2-9
UW CLAYTON	Safety	WHC	UW Clayton	UW	2-9
M.T. Langevin	K-BASINS Eng. Co-Ord. Eng.	WHC	M.J. Langevin	MJ	2/9
J.A. Title	K-BASIN QA ENG	WHC	JA Title	JAT	2-9
DC Larson	Eng. Tech	WHC	DC Larson	DC	2-9
J.J. Jandberg	SNF Eng. Tech	WHC	J.J. Jandberg	JJ	2/9
P.J. MacFarlan	EEEDL	WHC	P.J. MacFarlan	PM	2/9
J.D. Matthews	Asst. Mgr K Basins Ops	WHC	J.D. Matthews	JDM	2/9

APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST

APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST

Item: This may be major equipment, tooling, instrumentation, facility, etc. Use equipment name (and number if assigned).

Document Title: Title of drawing, sketch, figure, publication, vendor information, etc. More than one document may be applicable to a given item. List each document separately.

Document Number: Drawing, sketch, figure, vendor publication numbers, etc. Include revision if released.

Released: Enter YES, NO, or N/A (Not Applicable).

Included: Enter YES or NO. Copies of all documents not released shall be included.

ITEM	DOCUMENT TITLE	DOCUMENT NO.	RELEASED	INCLUDED
1	Handling tool-inner	H-1-80543	No	Sketch
2	Handling tool-outer	H-1-80544	No	Sketch
3	Simulated Fuel Rods (6)	Sketches	No	Sketches

APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST (CONTINUED)

[illegible]

APPENDIX C

TEST READINESS REVIEW CHECKLIST

APPENDIX C

TEST READINESS REVIEW CHECKLIST

Date: 2/9/95

REVIEWERS

NAME (PRINT)	POSITION	SIGNATURE	DATE
J.A. Meling	Proj. Engineer	J.A. Meling	2-9-95
D.J. MacFarlan	TECH. / TEST ENG.	D.J. MacFarlan	2-9-95
J.A. Tittle	QA ENG.	J.A. Tittle	2-9-95
J.S. Jernberg	SNF ENG.	J.S. Jernberg	2/9/95
D.C. Larson	Eng Tech.	D.C. Larson	2/9/95

CHECKLIST

1. Is this test procedure released?

Yes ☒ No ☐Comments: _____

2. Are there any open items which need to be addressed prior to start of testing?

Yes ☒ No ☐Comments: FUEL ARRANGEMENTS.

TEST CONTROL COPY

APPENDIX C

TEST READINESS REVIEW CHECKLIST (CONTINUED)

3. Is the test procedure package complete per Section 5.4 and are all pages, attachments, etc., marked TEST CONTROL COPY?

Yes ☒ No ☐

Comments: _____

4. Are all JHAs and MSDSs required by the procedure posted or located in the test area?

Yes ☒ No ☐

Comments: SEE ATTACHED JHA

5. Is all equipment per Section 6.1 installed or available at the test area for installation?

Yes ☒ No ☐

Comments: Everything here as of 1:00 pm

6. Are all test materials per Section 6.2 available at the test area?

Yes ☒ No ☐

Comments: 1:00 pm everything arrived.

7. Are the facility support systems available in the test area?

Yes ☒ No ☐

Comments: Shared crane with other test.

APPENDIX C

TEST READINESS REVIEW CHECKLIST (CONTINUED)

8. Pre-job briefing complete.

Yes ☒ No ☐

Comments: _____

APPENDIX D

**JOB HAZARD ANALYSIS
AND
MATERIAL SAFETY DATA SHEETS**

TEST CONTROL COPY

APPENDIX D
JOB HAZARD ANALYSIS
AND
MATERIAL SAFETY DATA SHEETS

The following JHAs and MSDSs are posted in the test area:

(List by title and number as applicable; this may be a hand-written entry, initialed, and dated.)

NUMBER	TITLE	DATE
N/A #1	Perform hands on testing of 16 Basin fuel handling tools. - 305 Bldg	2/9/95

HANFORD JOB HAZARD ANALYSIS CHECKLIST

Page 1 of 21

Prepared By P. J. MacFarlan

Date 02/08/95

Area 300

Bldg. 305

Scope/Description: Perform hands on testing of K Basin fuel handling tools.

☒ New☐ Revised

Emergency Contact Person(s):

Primary: Tom Giffin

Secondary:

Emergency Radio/Phone Number: 376-2989

JHA Number (not required):

N/A #1

Specific Work Location(s): 300 Area/305 Facility

KNOWN OR POTENTIAL HAZARDS

	Yes	No	✓	•	Reference		Yes	No	✓	•	Reference
1. Radiation Area Work		X	✓	•		10. Respiratory Hazards		X	✓	•	
2. Hazardous Waste Operations		X	✓	•		11. Electrical Hazards		X	✓	•	
3. Confined Space Entry		X	✓	•		12. Lock and Tag		X	✓	•	
4. Cutting/Welding		X		•		13. Scaffolding		X			
5. Roof Work		X				14. Aerial Lifts	X	X	✓		Sheet 2-P7M
6. Fall Hazards (> = 10')		X				15. Asbestos Removal		X	✓	•	
7. Excavation/Trenching		X		•		16. Other (see JHA Sht. 2):	X	X			
8. Asbestos Inspection Report		X		•		✓ = Formal training required.					
9. Hazardous Materials		X	✓			• = Items than require a permit/form/report.					

Other Hazards

Yes No

Control Measures

1. Temperature Extremes		X			
2. Noise		X			
3. Poor Lighting		X			
4. Animals/Insects		X			
5. Process Chemicals/Steam		X			
6. Dust		X			
7. Flammable/Combustible Materials		X			
8. Ladders		X			
9. Wet/Slippery Floors	X				Be aware of wet floors near test pool.
10. Uneven Terrain		X			
11. Open Excavations/Trenches		X			
12. Adjacent Water Hazard	X				Use proper fall protection equipment near test pool
13. Vehicle Traffic		X			
14. Heavy Equipment	X				Use proper lifting techniques.
15. Rigging Operation	X				Be aware of overhead lifting activities.
16. Manual Lifting	X				Use proper lifting techniques.
17. Power Tools		X			
18. Pinch Points	X				Wear proper protective clothing, gloves.
19. Falling Objects	X				Be aware of other activities.
20. Sharp Objects	X				Wear proper protective clothing, gloves.
21. Overhead Obstructions	X				Wear proper protective clothing, gloves, HARD HAT
22. Site Control (Signs/Barricades)	X				Be aware of facility postings.
23. Remote Work Area		X			
24. Other (see JHA Sht. 2):	X	X			

MINIMUM DRESS REQUIREMENTS: Observe facility dressing requirements.

APPROVALS

Does further evaluation of the job steps, associated hazards, or safety measures need to be performed?

☐ Yes☒ No

If Yes, continue job hazard analysis on the following pages.

Supervisor, Person in Charge P. J. MacFarlan

(Signature)

P. J. MacFarlan - 2/9/95

29

Industrial Safety/Hygiene

(Signature)

SA Harding 2-9-95

TEST CONTROL COPY

HC-3000-1 (1/95)

HANFORD JOB HAZARD ANALYSIS (Sheet 2)

Page 2 of 2[illegible]

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APPENDIX E
TRAVELER FORM

TEST CONTROL COPY

APPENDIX E

TEST TRAVELER				Page	1 of 5	Number
Job Description: Vertical Fuel Handling Tool				Work Order No. E16857		Prepared by: AE Bridges
System Engineer Approval: <i>David Bridges</i>		Phone: B-1337	Date Required: 2/9/95	Approval Designator: Q		QA Approval: <i>Little</i> Date: 2-9-95
System Manager Approval:		Phone:	Bldg Manager Approval:	Date: 2/9/95	Safety Approval: <i>St. Morling</i> Date:	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes	
1.0	Pre-operational Checkout		Q NA T <i>ACZ</i> N NA E <i>TAM</i> C NA	2/09/95	2 tools are to be tested on 3 fuel elements. Notes for discrepancies on inner fuel element outer fuel element and lambi fuel element will be listed if any.	
1.1	Verify all test performer blanks in Section 8.0 and Appendices A, B, C, and D are completed. Stamp "TEST CONTROL COPY" on entire procedure per Section 5.4.		Q NA T <i>ACZ</i> N NA E <i>TAM</i> C NA	2/09/95		
1.2	Conduct the "pre-job briefing" of operations, including a review of all procedures, drawings, and other engineering documents required to complete the test. Signoff Appendix G.		Q NA T <i>ACZ</i> N NA E <i>TAM</i> C NA	2/09/95		
1.3	Verify that the performance criteria is included as Attachment 1 of this traveler.		Q <i>AT</i> T <i>ACZ</i> N NA E <i>TAM</i> C NA	2-9-95		

Q = QC Inspector, T = Technician, N = NDE Inspector, E = Engineer, and C = Craft

APPENDIX E

TEST TRAVELER (Continuation Sheet)		Page	2 of 5	Number	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamps	Date	Notes
2.0	Calibration Checks: Verify that all instruments and equipment have current calibration stickers.	Scale	Q NA T <u>OCZ</u> N NA E <u>TAM</u> C NA	2/9/95	Scale to measure weight of dummy-fuel elements was verified as calibrated
3.0	Issue and verify the equipment list (Attachment 2).		Q NA T <u>OCZ</u> N NA E <u>TAM</u> C NA	2/9/95	
4.0	Complete and verify the test layout/schematic (Attachment 3).		Q NA T <u>OCZ</u> N NA E <u>TAM</u> C NA	2/9/95	
5.0	Set up the test equipment per the test layout/schematic. Inner - Combi Auto		Q <u>JAT</u> T <u>OCZ</u> N NA E <u>TAM</u> C	29.95	Inner ✓ Duter ✓ Combi ✓

Q = QC Inspector, T = Technician, N = NDE Inspector, E = Engineer, and C = Craft

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APPENDIX E

TEST TRAVELER (Continuation Sheet)		Page	3 of 5	Number	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes
6.0	Perform Test(s)				
6.1	Ensure the fuel handling tool collar is at its minimum diameter.		Q JAT T OCZ N NA E TAM C NA	2-9-95	Inner ✓ } (tool) Combi ✓ } Outer
6.2	Insert the fuel handling tool into the dummy element. Note: Care must be taken when inserting the end of the handling tool into the annulus of the fuel element to not bend the collar sections.		Q JAT T OCZ N NA E TAM C NA	2-9-95	Inner ✓ } 1 tool Combi ✓ } Outer - outer tool
6.3	Engage the fuel handling tool by turning the knurled wheel clockwise until it is hand tight. Do not use any tool to increase the torque on the wheel.		Q JAT T OCZ N NA E TAM C NA	2-9-95	Inner ✓ Combi ✓ Outer
6.4	Lift the dummy element at least 3 feet and move it laterally 5 feet. This simulates the movement of a fuel element from the storage canister to the Single Fuel Element Can.		Q JAT T OCZ N NA E TAM C NA	2-9-95	Combi - moved only 3 ft due to Space Constraint (Lateral)

Q = QC Inspector, T = Technician, N = NDE Inspector, E = Engineer, and C = Craft

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APPENDIX E

TEST TRAVELER (Continuation Sheet)		Page	4 of 5	Number	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes
6.5	Place the dummy element back in the canister.		Q JAT T DCZ N NA ETAM C NA	2-9-95	Inner ✓ Combi ✓ Outer ✓
6.6	Disengage the fuel handling tool by turning the knurled wheel counterclockwise until at least 1 inch of thread is exposed. Strike the top of the handle with a soft hammer to drive the mandrel out of the collar. After the fuel handling tool is disengaged from the dummy element, it can be lifted out of the element.		Q JAT T DCZ N NA ETAM C NA	2-9-95	Inner Outer Combi
6.7	Steps 6.1 through 6.6 can be repeated for additional test/training purposes.		Q JAT T DCZ N NA ETAM C NA	2-9-95	BOTH LARGE + SMALL MANDREL TOOLS TESTED

Q = QC Inspector, T = Technician, N = NDE Inspector, E = Engineer, and C = Craft

APPENDIX E

TEST TRAVELER (Continuation Sheet)		Page	5 of 5	Number	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes
7.0	Verify that all steps in this traveler have been completed.		QJAT T <u>CCZ</u> N NA E <u>TAM</u> C NA	2-9-95	
List of Required Attachments: 1. Performance Criteria 2. Equipment List 3. Test Layout/Schematic Optional Attachments: 4. Acceptance Criteria for K Basin Equipment					

Q = QC Inspector, T = Technician, N = NDE Inspector, E = Engineer, and C = Craft

WHC-SD-SNF-TRP-003, Rev. 0

APPENDIX F

RETEST PROCEDURE AND DATA SHEETS

APPENDIX F

RETEST PROCEDURE AND DATA SHEETS

Q = Quality Assurance T = Technician E = Test Engineer O = Other DEFINED _____

Index additions by hand-written entries, initial, and date.

This image shows a single sheet of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page. There is no handwriting or other markings on the paper.

APPENDIX G

PRE-JOB BRIEFING ATTENDANCE FORMS

PREJOB SAFETY PLANNING/JOB HAZARD ANALYSIS SIGNOFF

Job Description Fuel Handling tool Cold test at 305

Job Location 305 Test Facility

[illegible]

ATTACHMENT 1

Performance Criteria for Fuel handling tool Cold Test in 305

To functionally test components and equipment as a whole to determine that the equipment or systems satisfactorily meet the overall functional, operational, and design requirements. This includes inserting the expanding collet of the fuel handling tool into a simulated fuel element and lifting the fuel element as described in the test traveller.

ATTACHMENT 2

EQUIPMENT LIST FOR K BASINS HANDLING TOOL TEST PLAN

EQUIPMENT NEEDS:

PROVIDED BY 305 TEST FACILITY

1. (1) Underwater camera system (local monitor) for use in pool.
VCR and TV must be included in this system.
2. (1) Double barrel canister for use in pool
3. Crane
4. Stiffback

PROVIDED BY NUCLEAR FUEL EVALUATIONS

1. (2) Fuel handling tools *calibration Code 750-66-66-001*
2. (3) Simulated (dummy) fuel rods
Exp 10/22/95
Weight of inner 9.5, 9.5 lbs
Weight of outer 29.25, 28.0 lbs
Weight of inner/outer combo 34.25, 34.25 lbs
3. (1) Rubber mallet
4. Video Tapes

TEST CONTROL COPY

305 Test Facility: Fuel handling Tool Testing Schematic

ATTACHMENT 4

TEST CONTROL COPY

DUMMY N REACTOR MARK IV FUEL ASSEMBLY

300 SERIES STAINLESS STEEL

ATTACHMENT 4

DUMMY N REACTOR MARK IV INNER FUEL ELEMENT

DUMMY N REACTOR MARK IV OUTER FUEL ELEMENT

ATTACHMENT 4

Paul B. B. B.

Page
Current Day

ATTACHMENT 4

Parts list

Mandrel	inconel 718 - <u>Tapered Mandrel</u>
2 Collet	inconel 718 <u>Expanding Collar</u>
3 Collet Holder	316 S/S
4 adaptor Sleeve	
5 tube	316 S/S
6 Bushing	Brass
7 wheel	316 S/S
3 Handle	BRASS / steel
7 draw Rod	316 S/S , 3/8" Ø
2 index Rod	
Screw Rod	3/8" allthread S/S

inner fuel

ATTACHMENT 4

028
2 places

1/4"-20 UNF UNC?

ATTACHMENT 4

5/8-18

(H)

⑧

HANDLE
BRASS

ATTACHMENT 4

316 S/S

WHEEL

53

⑦

APPENDIX B: TEST PROCEDURE FOR LOAD TEST

APPENDIX A

SIGNATURE VERIFICATION DATA SHEET

ADDITION TO ORIGINAL
TRAVELER TO COVER
ADDITIONAL WORK ON
~~FRIDAY~~ FRIDAY. THIS
IS UNDER THE SAME WORK
PLAN, BUT INCLUDES
A NEW JHT FOR
LOAD TEST GUT
OF WATER.
TEST CONTROL COPY 2/10/10
G. J. D. J.

TEST CONTROL COPY

APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST

APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST

Item: This may be major equipment, tooling, instrumentation, facility, etc. Use equipment name (and number if assigned).

Document Title: Title of drawing, sketch, figure, publication, vendor information, etc. More than one document may be applicable to a given item. List each document separately.

Document Number: Drawing, sketch, figure, vendor publication numbers, etc. Include revision if released.

Released: Enter YES, NO, or N/A (Not Applicable).

Included: Enter YES or NO. Copies of all documents not released shall be included.

ITEM	DOCUMENT TITLE	DOCUMENT NO.	RELEASED	INCLUDED
1	Handling tool-inner	H-1-80543	No	in test Plan Sketch
2	Handling tool-outer	H-1-80544	No	In test Plan Sketch
3	Simulated fuel Rods (6) sketches		No	In test Plan sketches

APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST (CONTINUED)

[illegible]

APPENDIX C

TEST READINESS REVIEW CHECKLIST

REVIEWERS

[illegible]

1. Is this test procedure released?

Yes X No

Comments: Traveler that this is enclosed in is a separate attachment to the released ~~for~~ test plan

2. Are there any open items which need to be addressed prior to start of testing?

Yes _____ No ✓

Comments: _____

APPENDIX C

TEST READINESS REVIEW CHECKLIST (CONTINUED)

3. Is the test procedure package complete ~~per Section 5.4~~ and are all pages, attachments, etc., marked TEST CONTROL COPY?

Yes ☒ No ☐

Comments: _____

4. Are all JHAs and MSDSs required by the procedure posted or located in the test area?

Yes ☒ No ☐

Comments: No MSDS's needed - JHA signed off by SA Norling

5. Is all equipment per Section 6.1 installed or available at the test area for installation?

Yes ☒ No ☐

Comments: _____

6. Are all test materials per Section 6.2 available at the test area?

Yes ☒ No ☐

Comments: _____

7. Are the facility support systems available in the test area?

Yes ☒ No ☐

Comments: _____

APPENDIX C

TEST READINESS REVIEW CHECKLIST (CONTINUED)

8. Pre-job briefing complete.

Yes ☒ No ☐

Comments: _____

TEST CONTROL COPY

APPENDIX D

JOB HAZARD ANALYSIS AND MATERIAL SAFETY DATA SHEETS

APPENDIX D

JOB HAZARD ANALYSIS
AND
MATERIAL SAFETY DATA SHEETS

The following JHAs and MSDSs are posted in the test area:

(List by title and number as applicable; this may be a hand-written entry, initialed, and dated.)

NUMBER	TITLE	DATE
H/A #2	LOAD TESTING FUEL HANDLING TOOLS	2/10/95

HANFORD JOB HAZARD ANALYSIS CHECKLIST

Page 1 of 1

Prepared By TA Meling	Date 02/10/95	Area 300	Bldg. 305
Scope/Description: Load testing fuel handling tools.			☒ New ☐ Revised
Emergency Contact Person(s): Primary: Tom Griffin Secondary: Emergency Radio/Phone Number: 376-2989			JHA Number (not required):

Specific Work Location(s): 300 Area/ 305 building

KNOWN OR POTENTIAL HAZARDS											
	Yes	No	✓	•	Reference		Yes	No	✓	•	Reference
1. Radiation Area Work		X	✓	•		10. Respiratory Hazards		X	✓		
2. Hazardous Waste Operations		X	✓	•		11. Electrical Hazards		X	✓		
3. Confined Space Entry		X	✓	•		12. Lock and Tag		X	✓	•	
4. Cutting/Welding		X		•		13. Scaffolding		X			
5. Roof Work		X				14. Aerial Lifts		X	✓		
6. Fall Hazards (> = 10')		X				15. Asbestos Removal		X	✓	•	
7. Excavation/Trenching		X		•		16. Other (see JHA Sht. 2):		X			
8. Asbestos Inspection Report		X		•		✓ = Formal training required.					
9. Hazardous Materials		X	✓			• = Items that require a permit/form/report.					

Other Hazards	Yes	No	Control Measures
1. Temperature Extremes		X	
2. Noise		X	
3. Poor Lighting		X	
4. Animals/Insects		X	
5. Process Chemicals/Steam		X	
6. Dust		X	
7. Flammable/Combustible Materials		X	
8. Ladders		X	
9. Wet/Slippery Floors	X		NEAR THE 305 POOL, BEWARE OF WET FLOORS
10. Uneven Terrain		X	
11. Open Excavations/Trenches		X	
12. Adjacent Water Hazard	X		WATER COMPLETELY SURROUNDED BY GUARDRAIL
13. Vehicle Traffic		X	
14. Heavy Equipment		X	
15. Rigging Operation	X		BE AWARE OF OVERHEAD LIFTING OPERATIONS, HARDHATS REQUIRED.
16. Manual Lifting	X		USE PROPER LIFTING TECHNIQUES
17. Power Tools		X	
18. Pinch Points	X		WEAR APPROPRIATE PROTECTIVE CLOTHING, GLOVES.
19. Falling Objects		X	
20. Sharp Objects	X		WEAR PROTECTIVE CLOTHING, GLOVES
21. Overhead Obstructions	X		WEAR PROTECTIVE CLOTHING, HARDHAT
22. Site Control (Signs/Barricades)	X		BE AWARE OF FACILITY POSTINGS
23. Remote Work Area		X	
24. Other (see JHA Sht. 2):		X	

MINIMUM DRESS REQUIREMENTS: OBSERVE FACILITY DRESSING REQUIREMENTS. Safety Glasses, hard hat

APPROVALS

Does further evaluation of the job steps, associated hazards, or safety measures need to be performed? ☐ Yes ☒ No

If Yes, continue job hazard analysis on the following pages.

Supervisor, Person in Charge T. A. Meling
(Signature)Industrial Safety/Hygiene
(Signature)

TEST CONTROL COPY

66

T.A. Meling

2-10-95

BC-3000-717 (01/95)

APPENDIX E

TRAVELER FORM

APPENDIX E

TEST TRAVELER			Page 1 of 5		Number 2	
Job Description: Load Testing of the Vertical Fuel Lifting Tools			Work Order No. E16587		Prepared by: AE Bridges	
System Engineer Approval: AE Bridges		Phone: 376-1337	Date Required: 2/10/95		Approval Designator: Q	QA Approval: Date:
System Manager Approval:		Phone:	Bldg Manager Approval:		Date:	Safety Approval: Date:
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes	
1.0	Pre-operational Checkout		Q NA T ☒ O NA E TAM C NA	2/10/95 2/10/95 2/10/95		
1.1	Verify all test performer in "Notes" column. Stamp "TEST CONTROL COPY" on entire procedure.		Q NA T ☒ O NA E TAM C NA	2/10/95 2/10/95		
1.2	Conduct the "pre-job briefing" of operations, including a review of all procedures, drawings, and other engineering documents required to complete the test. Signoff Appendix G.		Q NA T ☒ O NA E TAM C NA	2/10/95 2/10/95		
1.3	Verify that the performance criteria is included as Attachment 1 of this traveler.		Q ☒ T ☒ O NA E TAM C NA	2-10-95 2/10/95 2/10/95		

Q = QC Inspector, T = Technician, N = Operations, E = Engineer, and C = Craft

TEST CONTROL COPY

APPENDIX E

TEST TRAVELER (Continuation Sheet)		Page	2 of 5	Number	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes
2.0	Calibration Checks: Verify that all instruments and equipment have current calibration stickers.		Q NA T ☒ O NA E TAM C NA	2-10-95 2/10/95	Dynator, Grapoist Inc. Load Cell # A 2596 Code # 750-29-06-004 Calibration Expiration 8/15/95 P&E Standards Lab 4000 lb Scale
3.0	Issue and verify the equipment list (Attachment 2).		Q NA T ☒ O NA E TAM C NA	2-10-95 2/10/95	
4.0	Complete and verify the test layout/schematic (Attachment 3).		Q NA T ☒ O NA E TAM C NA	2-10-95 2/10/95	
5.0	Set up the test equipment per the test layout/schematic.		Q ☒ T ☒ O NA E TAM C NA	2-10-95 2-10-95 2-10-95	

Q = QC Inspector, T = Technician, O = Operations, E = Engineer, and C = Craft

TEST CONTROL COPY

APPENDIX E

TEST TRAVELER (Continuation Sheet)		Page	3 of 5	Number	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes
6.0	Perform Load Test(s)				
6.1	Attach the tool to the crane and load cell. Record the the load cell reading to determine the weight of the fuel handling tool.		 Q T O NA E TAM C NA	2-10-95 2-10-95 2/10/95	Small tool - 24 lbs Large tool - 26 lbs
6.2	Ensure the fuel handling tool collar is at its minimum diameter. Insert the fuel handling tool into the dummy element with the attached weight(s). Note: Care must be taken when inserting the end of the handling tool into the annulus of the fuel element to not bend the collar sections.		 Q T O NA E TAM C NA	2-10-95 2-10-95 2/10/95	
6.3	Engage the fuel handling tool by turning the knurled wheel clockwise until it is hand tight. Do not use any tool to increase the torque on the wheel.		 Q T O NA E TAM C NA	2-10-95 2-10-95 2/10/95	
6.4	Lift the dummy element and weight(s) at least 1 foot and hold long enough to obtain and record the reading from the load cell. Return the dummy element to the initial lifting point.		 Q T O NA E TAM C NA	2-10-95 2-10-95 2/10/95	Small one failed - did not even engage fuel element. 88 1/2 lbs (tool included) picked with large tool.

Q = QC Inspector, T = Technician, O = Operations, E = Engineer, and C = Craft

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TEST CONTROL COPY

APPENDIX E

TEST TRAVELER (Continuation Sheet)		Page 4 of 5	Number	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Signatures Date	Notes
6.5	Disengage the fuel handling tool by turning the knurled wheel counterclockwise until at least 1 inch of thread is exposed. Strike the top of the handle with a soft hammer to drive the mandrel out of the collar. After the fuel handling tool is disengaged from the dummy element, it can be lifted out of the element.		Q <u>NA</u> T <u>NA</u> O <u>NA</u> E <u>CEB</u> C <u>NA</u> 2-13-95 2-13-95 2/18/95	
6.6	Steps 6.1 through 6.5 can be repeated for additional load test readings.		Q <u>NA</u> T <u>NA</u> O <u>NA</u> E <u>TAM</u> C <u>NA</u> 2-10-95 2/10/95	will need to retest small tool.

Q = QC Inspector, T = Technician, O = Operations, E = Engineer, and C = Craft

TEST CONTROL COPY

APPENDIX E

TEST TRAVELER (Continuation Sheet)		Page	5 of 5	Number	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes
7.0	Verify that all steps in this traveler have been completed.		<div style="border: 1px solid black; border-radius: 50%; padding: 2px; display: inline-block;"> 65 100 </div> Q T O NA E <u>QEB</u> C NA	2-13-95 2/10/95	
List of Required Attachments: 1. Performance Criteria 2. Equipment List 3. Test Layout/Schematic Optional Attachments: 4. Acceptance Criteria for K Basin Equipment					

Q = QC Inspector, T = Technician, O = Operations, E = Engineer, and C = Craft

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APPENDIX F

RETEST PROCEDURE AND DATA SHEETS

APPENDIX F

RETEST PROCEDURE AND DATA SHEETS

Q = Quality Assurance T = Technician E = Test Engineer O = Other DEFINED

Index additions by hand-written entries, initial, and date.

Steps 1.0 through 7.0 were repeated for the ~~small~~ tool for lifting inner elements (2/13/95). This ^{retest} was necessary because the tool didn't engage during earlier tests. The tool was ~~secured and removed~~ ^{shortened}. Also, the tool was shortened from 22' overall. The inner tool was lifted by hand to make the 62.5 lbs - weight of dummy fuel

26 lbs - weight of inner tool alone.

Also, the inner tool was ^{lifted} by hand to load the outer pole rather than the inner rod.

Steps 1.0 through 7.0 were repeated for the ~~small~~ tool for lifting outer elements (2/13/95). This is a repeat of the previous test (2/10/95) plus the lifting of the tool by hand to load the outer pole rather than the inner rod.

26 lbs - weight of tool

62 lbs - weight of dummy fuel

at 2/13/95 ✓ ^{WHD 650} 2-13-95 *MR 2-13-95*

APPENDIX G

PRE-JOB BRIEFING ATTENDANCE FORMS

PREJOB SAFETY PLANNING/JOB HAZARD ANALYSIS SIGNOFF

Job Description Fuel Handling Load Test

Job Location 305 Test Facility

[illegible]

Performance Criteria

Traveler Attachment 1

The performance criteria for the load test of the FUEL HANDLING TOOLS is as follows:

The fuel handling tools must prove to be strong enough to hold a weight equal to or greater than what each may hold in practice.

The small diameter tool must hold approximately 61 lbs. This is the approximate weight of one fuel assembly.

The large diameter tool must hold approximately 40 pounds. This is the approximate weight of one outer element of an assembly

Equipment list

Attachment 2 for Traveler

TEST: Load Testing Fuel Handling Tools

Equipment Needed:

Provided by 305 Test Facility:

1. Crane
2. Calibrated Load Cell
3. Rubber headed Mallet
4. Weight

Provided by Nuclear Fuel Evaluations:

1. Fuel Handling tools to be tested
2. Dummy elements (mock fuel elements)

305 Test Facility: Fuel handling Tool Testing Schematic

APPENDIX C: TEST PROCEDURE FOR OPERATIONS ACCEPTANCE TEST

APPENDIX A

SIGNATURE VERIFICATION DATA SHEET

APPENDIX A

SIGNATURE VERIFICATION DATA SHEET

[illegible]

APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST

APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST

Item: This may be major equipment, tooling, instrumentation, facility, etc. Use equipment name (and number if assigned).

Document Title: Title of drawing, sketch, figure, publication, vendor information, etc. More than one document may be applicable to a given item. List each document separately.

Document Number: Drawing, sketch, figure, vendor publication numbers, etc. Include revision if released.

Released: Enter YES, NO, or N/A (Not Applicable).

Included: Enter YES or NO. Copies of all documents not released shall be included.

ITEM	DOCUMENT TITLE	DOCUMENT NO.	RELEASED	INCLUDED
1	HANDLING TOOL - INNER	H-1-80543	NO	SKETCHES
2	HANDLING TOOL - OUTER	H-1-80544	NO	SKETCHES
3	Simulated fuel Rods(2)	SKETCHES	NO	SKETCHES

APPENDIX B

TEST CONFIGURATION DOCUMENTATION LIST (CONTINUED)

[illegible]

APPENDIX C

TEST READINESS REVIEW CHECKLIST

APPENDIX C
TEST READINESS REVIEW CHECKLIST

Date: 2/13/95

REVIEWERS

NAME (PRINT)	POSITION	SIGNATURE	DATE
P.J. MacFARLAN	TEST Eng.	<i>P.J. MacFarlan</i>	2-13-95

CHECKLIST

1. Is this test procedure released?

Yes ☒ No ☐

Comments: _____

2. Are there any open items which need to be addressed prior to start of testing?

Yes ☒ No ☐

Comments: _____

APPENDIX C

TEST READINESS REVIEW CHECKLIST (CONTINUED)

3. Is the test procedure package complete per Section 5.4 and are all pages, attachments, etc., marked TEST CONTROL COPY?

Yes ☒ No ☐

Comments: STAMPED TRAVELER ONLY

4. Are all JHAs and MSDSs required by the procedure posted or located in the test area?

Yes ☒ No ☐

Comments: _____

5. Is all equipment per Section 6.1 installed or available at the test area for installation?

Yes ☒ No ☐

Comments: _____

6. Are all test materials per Section 6.2 available at the test area?

Yes ☒ No ☐

Comments: _____

7. Are the facility support systems available in the test area?

Yes ☒ No ☐

Comments: _____

APPENDIX C

TEST READINESS REVIEW CHECKLIST (CONTINUED)

8. Pre-job briefing complete.

Yes ☒ No ☐

Comments: _____

APPENDIX D

JOB HAZARD ANALYSIS AND MATERIAL SAFETY DATA SHEETS

APPENDIX D

JOB HAZARD ANALYSIS
AND
MATERIAL SAFETY DATA SHEETS

The following JHAs and MSDSs are posted in the test area:

(List by title and number as applicable; this may be a hand-written entry, initialed, and dated.)

NUMBER	TITLE	DATE
#1	Perform hands on TESTING of K-BASIN fuel Handling tools - 325 Pdg	2/13/95

HANFORD JOB HAZARD ANALYSIS CHECKLIST

Page 1 of 21

Prepared By P. J. MacFarlan

Date 02/08/95

Area 300

Bldg. 305

Scope/Description: Perform hands on testing of K Basin fuel handling tools.

☒ New☐ Revised

Emergency Contact Person(s):

Primary: Tom Giffin

Secondary:

Emergency Radio/Phone Number: 376-2989

JHA Number (not required):

N/A #1

Specific Work Location(s): 300 Area/305 Facility

KNOWN OR POTENTIAL HAZARDS

	Yes	No	✓	•	Reference		Yes	No	✓	•	Reference
1. Radiation Area Work		X	✓	•		10. Respiratory Hazards		X	✓	•	
2. Hazardous Waste Operations		X	✓	•		11. Electrical Hazards		X	✓	•	
3. Confined Space Entry		X	✓	•		12. Lock and Tag		X	✓	•	
4. Cutting/Welding		X		•		13. Scaffolding		X			
5. Roof Work		X				14. Aerial Lifts	X	X	✓		Sheet 2-P7M
6. Fall Hazards (> = 10')		X				15. Asbestos Removal		X	✓	•	
7. Excavation/Trenching		X		•		16. Other (see JHA Sht. 2):	X	X			
8. Asbestos Inspection Report		X		•		✓ = Formal training required.					
9. Hazardous Materials		X	✓			• = Items that require a permit/form/report.					

Other Hazards

Yes No

Control Measures

1. Temperature Extremes		X			
2. Noise		X			
3. Poor Lighting		X			
4. Animals/Insects		X			
5. Process Chemicals/Steam		X			
6. Dust		X			
7. Flammable/Combustible Materials		X			
8. Ladders		X			
9. Wet/Slippery Floors	X				Be aware of wet floors near test pool.
10. Uneven Terrain		X			
11. Open Excavations/Trenches		X			
12. Adjacent Water Hazard	X				Use proper fall protection equipment near test pool. <i>WHITE LINE extended by GORDON LALIT</i>
13. Vehicle Traffic		X			
14. Heavy Equipment	X				Use proper lifting techniques.
15. Rigging Operation	X				Be aware of overhead lifting activities.
16. Manual Lifting	X				Use proper lifting techniques.
17. Power Tools		X			
18. Pinch Points	X				Wear proper protective clothing, gloves.
19. Falling Objects	X				Be aware of other activities.
20. Sharp Objects	X				Wear proper protective clothing, gloves.
21. Overhead Obstructions	X				Wear proper protective clothing, gloves, <i>HARD HAT</i>
22. Site Control (Signs/Barricades)	X				Be aware of facility postings.
23. Remote Work Area		X			
24. Other (see JHA Sht. 2):	X	X			

MINIMUM DRESS REQUIREMENTS: Observe facility dressing requirements.

APPROVALS

Does further evaluation of the job steps, associated hazards, or safety measures need to be performed?

☐ Yes☒ No

If Yes, continue job hazard analysis on the following pages.

Supervisor, Person in Charge P. J. MacFarlan

(Signature)

P. J. MacFarlan - 2/9/95

Industrial Safety/Hygiene

(Signature)

P. J. MacFarlan - 2-9-95

HANFORD JOB HAZARD ANALYSIS (Sheet 2)

Page 2 of 2[illegible]

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APPENDIX E

TRAVELER FORM

APPENDIX E

TEST TRAVELER			Page	1 of 5	Number	3
Job Description: <i>Operations Acceptance of New Fuel Handling Tools</i>			Work Order No. <i>E16587</i>		Prepared by: <i>AE Bridges</i>	
System Engineer Approval: <i>AE Bridges</i>	Phone: <i>876/1337</i>	Date Required: <i>2/13/95</i>	Approval Designator:		QA Approval: <i>NA</i>	Date:
System Manager Approval:	Phone:	Bldg Manager Approval:	Date:		Safety Approval: <i>NA</i>	Date:

Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes
1.0	Pre-operational Checkout		Q NA T <i>A</i> O <i>ADL</i> E <i>QEB</i> C NA	<i>2-13-95</i> <i>2/13/95</i> <i>2/13/95</i>	
1.1	Verify all test performer blanks in Appendices A, B, C, and D are completed.		Q NA T <i>A</i> O <i>ADL</i> E <i>QEB</i> C NA	<i>2/13/95</i> <i>2/13/95</i> <i>2/13/95</i>	
1.2	Conduct the "pre-job briefing" of operations, including a review of all procedures, drawings, and other engineering documents required to complete the test. Signoff Appendix G.		Q NA T <i>A</i> O <i>ADL</i> E <i>QEB</i> C NA	<i>2-13-95</i> <i>2/13/95</i> <i>2/13/95</i>	
1.3	Verify that the performance criteria is included as Attachment 1 of this traveler.		Q NA T <i>A</i> O <i>ADL</i> E <i>QEB</i> C NA	<i>2-13-95</i> <i>2/13/95</i> <i>2/13/95</i>	

Q = QC Inspector, T = Technician, O = Operations, E = Engineer, and C = Craft

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APPENDIX E

TEST TRAVELER (Continuation Sheet)		Page	2 of 5	Number	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes
2.0	Calibration Checks: Verify that all instruments and equipment have current calibration stickers.		Q NA T <i>[Signature]</i> O <i>[Signature]</i> E <i>[Signature]</i> C NA	2-13-95 2/13/95 2/13/95	
3.0	Issue and verify the equipment list (Attachment 2).		Q NA T <i>[Signature]</i> O <i>[Signature]</i> E <i>[Signature]</i> C NA	2-13-95 2/13/95 2/13/95	
4.0	Complete and verify the test layout/schematic (Attachment 3).		Q NA T <i>[Signature]</i> O <i>[Signature]</i> E <i>[Signature]</i> C NA	2-13-95 2/13/95 2/13/95	
5.0	Set up the test equipment per the test layout/schematic.		Q NA T <i>[Signature]</i> O <i>[Signature]</i> E <i>[Signature]</i> C NA	2-13-95 2/13/95 2/13/95	

Q = QC Inspector, T = Technician, O = Operations, E = Engineer, and C = Craft

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APPENDIX E

TEST TRAVELER (Continuation Sheet)		Page	3 of 5	Number	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes
6.0	Perform Test(s)				
6.1	Ensure the fuel handling tool collar is at its minimum diameter.		Q NA T <i>[initials]</i> O <i>[initials]</i> E <i>[initials]</i> C NA	2-13-95 2/13/95 2/13/95	
6.2	Insert the fuel handling tool into the dummy element. Note: Care must be taken when inserting the end of the handling tool into the annulus of the fuel element to not bend the collar sections.		Q NA T <i>[initials]</i> O <i>[initials]</i> E <i>[initials]</i> C NA	2-13-95 2/13/95 2/13/95	
6.3	Engage the fuel handling tool by turning the knurled wheel clockwise until it is hand tight. Do not use any tool to increase the torque on the wheel.		Q NA T <i>[initials]</i> O <i>[initials]</i> E <i>[initials]</i> C NA	2-13-95 2/13/95 2/13/95	
6.4	Lift the dummy element at least 3 feet and move it laterally 5 feet. This simulates the movement of a fuel element from the storage canister to the Single Fuel Element Can.		Q NA T <i>[initials]</i> O <i>[initials]</i> E <i>[initials]</i> C NA	2-13-95 2/13/95 2/13/95	

Q = QC Inspector, T = Technician, O = Operations, E = Engineer, and C = Craft

TEST CONTROL COPY

APPENDIX E

TEST TRAVELER (Continuation Sheet)		Page	4 of 5	Number	
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes
6.5	Place the dummy element back in the canister.		Q NA T NA O AD E QEB C NA	2-13-95 2/13/95 2/13/95	
6.6	Disengage the fuel handling tool by turning the knurled wheel counterclockwise until at least 1 inch of thread is exposed. Strike the top of the handle with a soft hammer to drive the mandrel out of the collar. After the fuel handling tool is disengaged from the dummy element, it can be lifted out of the element.		Q NA T NA O AD E QEB C NA	2-13-95 2/13/95 2/13/95	
6.7	Steps 6.1 through 6.6 can be repeated for additional test/training purposes.		Q NA T NA O AD E QEB C NA	2-13-95 2/13/95 2/13/95	

Q = QC Inspector, T = Technician, O = Operations, E = Engineer, and C = Craft

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APPENDIX E

TEST TRAVELER (Continuation Sheet)		Page	5 of 5		Number
Operation Number	Test Instruction	Ref., Dwg., Proc. Spec.	Completion Sign/Stamp	Date	Notes
7.0	Verify that all steps in this traveler have be completed.		Q NA T NA O NA E NA C NA	2-13-95 2/13/95 2/13/95	
List of Required Attachments: 1. Performance Criteria 2. Equipment List 3. Test Layout/Schematic Optional Attachments: 4. Acceptance Criteria for K Basin Equipment					

Q = QC Inspector, T = Technician, O = Operations, E = Engineer, and C =Craft

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APPENDIX F

RETEST PROCEDURE AND DATA SHEETS

APPENDIX F

RETEST PROCEDURE AND DATA SHEETS

Q = Quality Assurance T = Technician E = Test Engineer O = Other DEFINED _____

Index additions by hand-written entries, initial, and date.

[illegible]

APPENDIX G

PRE-JOB BRIEFING ATTENDANCE FORMS

PREJOB SAFETY PLANNING/JOB HAZARD ANALYSIS SIGNOFF

Job Description Fuel Handling Tool Cold TEST 305 Building

Job Location 300/305 TEST FACILITY

[illegible]

ATTACHMENT 1

Performance Criteria for Fuel handling tool Cold Test in 305

To functionally test components and equipment as a whole to determine that the equipment or systems satisfactorily meet the overall functional, operational, and design requirements. This includes inserting the expanding collet of the fuel handling tool into a simulated fuel element and lifting the fuel element as described in the test traveller.

ATTACHMENT 2

EQUIPMENT LIST FOR K BASINS HANDLING TOOL TEST PLAN

EQUIPMENT NEEDS:

PROVIDED BY 305 TEST FACILITY

1. (1) Underwater camera system (local monitor) for use in pool.
VCR and TV must be included in this system.
2. (1) Double barrel canister for use in pool
3. Crane
4. Stiffback

PROVIDED BY NUCLEAR FUEL EVALUATIONS

1. (2) Fuel handling tools calibration Code 750-66-66-001
2. (3) Simulated (dummy) fuel rods Exp 10/22/95
Weight of inner 9.5, 9.5 lbs
Weight of outer 29.25, 28.0 lbs
Weight of inner/outer combo 34.25, 34.25 lbs
3. (1) Rubber mallet
4. Video Tapes

ATTACHMENT 3

305 Test Facility: Fuel handling Tool Testing Schematic

ATTACHMENT 4

DUMMY N REACTOR MARK IV FUEL ASSEMBLY

ATTACHMENT 4

DUMMY N REACTOR MARK IV INNER FUEL ELEMENT

ATTACHMENT 4

DUMMY N REACTOR MARK IV OUTER FUEL ELEMENT

300 SERIES STAINLESS STEEL

Paul Bruce

ATTACHMENT 4

paper
Current Day

Need length of outer Tube
Inner Rod
Dimensions of Handwheel
Picture of Collet Connection
" Mandrel Connection
" Handwheel
Dimensions of threads

Lower Assembly

ATTACHMENT 4

Parts list

1	Mandrel	inconel 718 - <u>Tapered Mandrel</u>
2	Collet	inconel 718 <u>Expanding Collar</u>
3	Collet Holder	316 $\frac{5}{8}$
4	adaptor Sleeve	
5	tube	316 $\frac{5}{8}$
6	Bushing	Brass
7	wheel	316 $\frac{5}{8}$
3	Handle	BRASS / steel
7	draw Rod	316 $\frac{5}{8}$, $\frac{3}{8}$ " $\varnothing$
2	index Rod	
1	SCREW Rod	$\frac{3}{8}$ " allthread $\frac{5}{8}$

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MEM 4
2 places
1/4 20 UNF
UNC?

5/8-18 UNF

UNF 1

$$.875 \times .065$$

tubing, 3/6 ⁵/₈

hole size -
Thread

4 is inserted between 3 and 5.

~~Copy made for~~
Traveler
Attachment

3/4 roll pin

ATTACHMENT 4

ATTACHMENT 4

⑧

HANDLE
BRASS

ATTACHMENT 4

316 S/S

WHEEL

(7)