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"Work Plan for Development of K-Basin Fuel Handling Tools," WHC-SD-SNF-WP-011 / L2102		ECN No.

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ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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16. KEY					
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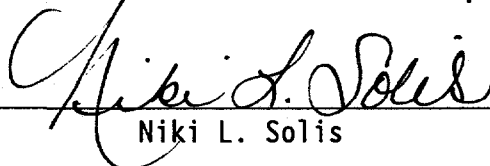
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WORK PLAN FOR DEVELOPMENT OF K-BASIN FUEL HANDLING TOOLS

November 1994

PREPARED BY:

A. E. Bridges
Nuclear Fuel Evaluations

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TABLE OF CONTENTS

TABLES	3
1.0 INTRODUCTION	4
2.0 SCOPE	4
2.1 OBJECTIVES	4
2.2 DELIVERABLES	4
2.2.1 Design Documents	4
2.2.2 Hardware	4
3.0 DESCRIPTION	4
3.1 Physical Description	4
3.2 Engineering Tasks	4
3.3 Verification	4
3.4 Procurement Tasks	4
3.5 Installation Tasks	4
3.6 Pre-Operational and Operational Tests	4
4.0 ORGANIZATION	5
5.0 WORK BREAKDOWN AND SCHEDULE	5
5.1 Work Breakdown	5
5.1.1 Conceptual Design (WBS 1.0)	5
5.1.2 Prototype Fabrication (WBS 2.0)	5
5.1.3 Prototype Testing (WBS 3.0)	5
5.1.4 Final Design (WBS 4.0)	6
5.1.5 Final Testing (WBS 5.0)	6
4.2 Schedule	6
6.0 COST ESTIMATE	6
7.0 QUALITY ASSURANCE	7
8.0 REFERENCES	7
Table 1. Schedule for Development of K-Basins Fuel Handling Tools	10

1.0 INTRODUCTION

The purpose of this document is to provide the engineering work plan for the development of handling tools 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 are required since previous fuel movement has involved grasping the fuel in a horizontal position. These tools are required to lift an element from the storage canister.

2.0 SCOPE

2.1 Objectives

The primary objective of this work plan is to provide 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 purpose of shipping these fuel elements to the Hot Cell is to permit examination (destructive and nondestructive). These data are needed to characterize the current status of the fuel. The tools shall be design 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.

2.2 Deliverables

2.2.1 Design Documents

- Released design drawings.
- Supporting documents that describe the design analysis and testing.

2.2.2 Hardware

- Prototype fuel handling tools for testing purposes.
- Final fuel handling tools for use in the K Basins.

3.0 DESCRIPTION

3.1 Physical Description

The fuel handling tools must meet the following criteria and requirements:

- The fuel handling tool shall satisfy the interface requirements of the Single Fuel Element Canister (H-1-80394), the Irradiated Fuel Storage Canister (H-1-36935, H-1-42594), the Fuel Encapsulation Storage and MK II Canisters (H-1-42793, H-1-46215), and the N-Reactor inner and outer

fuel elements (H-1-39775).

- The fuel handling tool shall be capable of lifting 100 lbs (the maximum fuel element mass is approximately 60 lbs).
- The fuel handling tool shall be designed to withstand a radiation field of 1000 R/hr with a minimum lifetime exposure of 50,000 R.
- The fuel handling tool shall be designed to satisfy the interface requirements of the 105 K-East and K-West basins.
- The fuel handling tool shall be designed with ease of use in mind, ie, quick-disconnect capability.
- The fuel handling tool shall be constructed from materials compatible with the N-Reactor fuel elements and the K-Basins environment.

3.2 Engineering Tasks

The primary engineering tasks include:

- Conceptual design of the Fuel Handling Tool prototypes will be in accordance to WHC-CM-6-1, *Standard Engineering Practices*, latest revision and WHC-IP-1026, *Engineering Practices Guidelines*, latest revision.
- Fabrication of prototypes.
- Testing of prototypes shall be in accordance to WHC-CM-6-1, *Standard Engineering Practices*, latest revision.
- Completion of the final design of the fuel handling tools will be performed in accordance to WHC-CM-6-1, *Standard Engineering Practices*, latest revision.
- Fabrication of the Fuel Handling Tools and delivery to the K-Basins Operations for training.

3.3 Verification

Verification of the Fuel Handling Tool design and performance will be in accordance with EP-4.1, Design Verification Requirements, and EP-4.2, Testing Requirements. Primarily, verification will be by qualification testing of Fuel Handling Tool prototypes.

3.4 Procurement Tasks

Purchase requests shall be initiated by Nuclear Fuel Evaluations and in accordance with WHC-CM-2-1, *Procurement Manual and Procedures*, PP 1, Purchase Requisition.

3.5 Installation Tasks

The final task defined by this engineering work plan will be delivery of the final Fuel Handling Tool(s) to K-Basins Operations.

3.6 Pre-Operational and Operational Tests

Prior to delivery of the final Fuel Handling Tool(s) to K-Basins Operations, pre-operational testing will be performed in the Cold Test Facility (Building 305).

4.0 ORGANIZATION

The Design and Procurement tasks are the responsibility of Nuclear Fuel Evaluations, managed by RP Omberg. The final approval authority for the design of the Fuel Handling Tool(s) resides with Nuclear Fuel Evaluations. Drafting and checking services will be provided by 400 Area Design Services, managed by LA Watson. The Fabrication and Testing tasks are the responsibility of Equipment Design and Fabrication, managed by JR Thielges. Quality Assurance is the responsibility of Spent Nuclear Fuel Project QA, managed by DW Smith.

5.0 WORK BREAKDOWN AND SCHEDULE

5.1 WORK BREAKDOWN

The work breakdown structure (WBS) of this project is described in the following subsections. Each of the items are described in detail in this section as to the work to be performed, deliverables, and the resource requirements.

5.1.1 Conceptual Design (WBS 1.0)

This task will clearly define concepts for the N-Reactor fuel handling tool(s) planned for use in retrieving elements from K-Basins canisters and inserting them in Single Fuel Element cans for shipment to Hot Cells. Deliverables include sketches and sufficient documentation to permit prototype fabrication. Nuclear Fuel Evaluations is responsible for this task.

5.1.2 Prototype Fabrication (WBS 2.0)

This task requires the fabrication of prototypes of the aforementioned concepts for N-Reactor fuel handling tools. The deliverable for this task are the prototype tools. This task is the responsibility of Equipment Development.

5.1.3 Prototype Testing (WBS 3.0)

This task requires qualification testing of the prototypes of WBS 2.0. Deliverables of this task include test plan, test procedures, and test reports. This task is the responsibility of Equipment Development.

5.1.4 Final Design (WBS 4.0)

This task requires incorporation of results of the qualification testing into the final design. Deliverables include released drawings and supporting document(s). This task is the responsibility of Nuclear Fuel Evaluations.

5.1.5 Final Fabrication and Testing (WBS 5.0)

This task will require the fabrication of the final tools and their final testing. Deliverables include the tools and a test report. This task is the responsibility of Equipment Development.

5.2 SCHEDULE

Each task identified in the work breakdown structure is displayed on Table 1. Most of this effort is planned for completion in early December 1994.

6.0 COST ESTIMATE

	<u>Time</u>		<u>Hardware</u>
Conceptual Design	20 days	\$10,000	
Prototype Fabrication	15 days	\$ 7,500	\$ 5,000
Prototype Testing	15 days	\$ 7,500	
Final Design	23 days	\$11,500	
Final Fabrication and Testing	13 days	<u>\$ 6,500</u>	<u>\$ 5,000</u>
Total Cost		\$43,000	\$10,000

7.0 QUALITY ASSURANCE

The document WHC-CM-4-2, *Quality Assurance Manual*, will be used for guidance on quality assurance aspects of this project. This document provides the management systems necessary to assure overall compliance with requirements applicable to development of the fuel handling tools.

8.0 REFERENCES

- H-1-39775, S. A. R. 4.2-5 Fuel Element Assy.
- H-1-36935, Irradiated Fuel Storage Canister.
- H-1-42594, Irradiated Fuel Storage Canister.
- H-1-42793, Fuel Encapsulation Program, Storage Canister.
- H-1-46215, Fuel Encapsulation MK II Canister Assembly.

WHC-CM-3-5, Document Control and Records Management Manual, Westinghouse Hanford Company, Richland, Washington,

WHC-CM-4-2, Quality Assurance Manual, Westinghouse Hanford Company, Richland, Washington, November 2, 1994.

WHC-CM-6-1, Standard Engineering Practices, Westinghouse Hanford Company, Richland, Washington, September 30, 1994.

WHC-IP-1026, Engineering Practice Guidelines, Westinghouse Hanford Company, Richland, Washington, September 30, 1994.

Table 1. Fuel Handling Tool Development Schedule.

WBS	TASK NAME	START DATE	TIME (DAYS)	END DATE	PERSON RESPONSIBLE
00	Develop Fuel Handling Tools	10/3/94	53	12/16/94	AE Bridges
01	Conceptual Design	10/3/94	25	11/4/94	AE Bridges
02	Prototype Fabrication	10/31/94	15	11/18/94	JR Thielges
03	Prototype Testing	11/21/94	8	12/2/94	JR Thielges
04	Final Design	11/7/94	28	12/16/94	AE Bridges
05	Final Fabrication and Testing	12/5/94	10	12/16/94	JR Thielges