STA 4
FEB 03 1995

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

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1	WHC-SD-SNF-WP-012	All	0	GAS AND LIQUID SAMPLING FOR CLOSED CANISTERS IN KW BASIN - Work Plan	Q	1	1	1

16. KEY

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1	1	Cog. Mgr.JR Frederickson	J.R. Frederickson	2/2/95	B3-86						
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CC Pitkoff 2/2/95 Signature of EDT Originator / Date	CC Pitkoff 2/2/95 Authorized Representative for Receiving Organization / Date	JR Frederickson 2/2/95 Cognizant Manager / Date	Ctrl. No. [] Approved [] Approved w/comments [] Disapproved w/comments

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Document Number:	WHC-SD-SNF-WP-012, REV 0
Document Title:	Gas and Liquid Sampling for Closed Canisters in KW Basin - Work Plan
Release Date:	2/3/95

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

APPROVED FOR PUBLIC RELEASE

WHC Information Release Administration Specialist:

Kara M. Broz — February 3, 1995

SUPPORTING DOCUMENT

1. Total Pages 14

2. Title

Gas and Liquid Sampling for Closed Canisters in KW Basin - Work Plan

3. Number

WHC-SD-SNF-WP-012

4. Rev No.

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work plan
closed canisters
k basins

6. Author

Name: CC Pitkoff

Signature 2/2/95

Organization/Charge Code 8M710/LD11C

7. Abstract

Work Plan for the design and fabrication of gas/liquid sampler for closed canister sampling in KW Basin.

8. RELEASE STAMP

OFFICIAL RELEASE
BY WHC
DATE FEB 03 1995

Gas/Liquid Sampler for Closed Canisters in KW Basin

Work Plan

WHC-SD-SNF-WP-012 Rev. 0

May 17,1994

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1.0 INTRODUCTION

1.1 Objective

This document defines the tasks associated with the design, fabrication, assembly, and acceptance testing equipment necessary for gas and liquid sampling of the Mark I and Mark II canisters in the K-West basin. The sampling of the gas space and the remaining liquid inside the closed canisters will be used to help understand any changes to the fuel elements and the canisters.

Specifically, this work plan will define the scope of work and required task structure, list the technical requirements, describe design configuration control and verification methodologies, detail quality assurance requirements, and present a baseline estimate and schedule.

1.2 Authority

The design of the gas/liquid sampling equipment will be conducted under the authority of the U.S. Department of Energy (DOE).

1.3 Summary Description

1.3.1 Background

Currently, 958 MTU (metric tons of Uranium) of irradiated N Reactor fuel is stored in 3821 sealed canisters in K-West basin. Encapsulation (packaged into sealed canisters) of the fuel was initiated in 1980 to prevent the release of fission products from corroding fuel rods to the basin water system. The encapsulation process involved sealing the elements inside a canister nearly full of water and a dilute potassium-nitrite solution with a nitrogen-filled vapor space. The canisters are vented through traps that allow gases (produced from corrosion) to escape while maintaining the water in the canister.

1.3.2 Systems Description

This sampling task is to provide a sampling device that will remove small amounts of gas and liquid from a closed Mark I and Mark II canister without disturbing other canisters or the basin water system. The equipment will be designed to remove either the head space gas or liquid contained in the canister through a valve in the canister lid.

The sampling device is envisioned to stand 7.01 meters tall (the developmental sampler is 5.49 meters tall) and fit over a valve on top of the lid and seal so as not to release any of the gas/liquid in the closed canister to the basin water when opened. A gas sample will be removed from the off-set

valve and the liquid sample will be taken from the center valve if the liquid in the canister is above the dip leg.

The equipment will be able to disengage from the canister with the valves resealed to the canister lid. The samples will then be packaged for shipping and transported to an analytical lab.

2.0 SCOPE

This section identifies the tasks to be completed and the deliverables required to develop, install, operate the equipment, and ship samples for the gas and liquid sampling task.

2.1 WHC Scope and Deliverables

Westinghouse Hanford Company is to lead the gas and liquid sampling program by providing appropriate management and funding support. Westinghouse Hanford Company is to develop the definitive design and documentation to build, and test the hardware. Westinghouse is also to provide adequate training to those personnel that will install the equipment, operate the equipment, and store equipment.

The WHC deliverables, as a minimum, include:

- This engineering work plan, and a Functional Design Criteria.
- Installation work plans, packages, procedures, test plan, and design documentation.
- Acceptance test procedure/report which combines report findings and all calibration-type information.

2.2 Functions and Requirements

The definitive design criteria will be developed throughout the course of the program. The initial design guidance is provided herein.

- The gas and liquid sampling equipment must be able to take a both vapor space sample and, if the liquid is above the drop leg on the center valve, a liquid sample without significantly changing the chemical and radiological constituent concentrations of either the gas or the liquid inside the canisters.
- The equipment shall be designed to sample the canisters with minimal disturbance to the basin water system.

2.3 Document approval levels and Safety Classification

Determination of safety classification and document approvals are in accordance with WHC-CM-1-3, MRP 5.46, WHC-CM-3-5, Section 12.7 and WHC-CM-4-46.

Document Approval

Selection of approval levels for all documents and changes related to design, procurement, fabrication, assembly, and installation of equipment shall be in accordance with WHC-CM-3-5, Section 12.7, Table 1 and WHC-CM-7-5 Section 13.5.

2.4 Safety Assessment

An Unreviewed Safety Question (USQ) evaluation, per WHC-CM-1-3, MRP 5.12, is required prior to sample equipment installation in the K West fuel storage Basin. K Basin Technical Safety will perform this scope of work.

3.0 ORGANIZATIONAL RESPONSIBILITIES

The task responsibilities are outlined in the following sections. Signatures on the EDT of this document indicate agreement for the task.

3.1 Operational Activity Support/ Performance Responsibilities

3.1.1 Process Systems

Lead Design Manager: J.R. Frederickson
Cognizant Engineer: C.C. Pitkoff

- Provide cost and schedule estimates.
- Design or modify existing design for the gas and liquid sampler to meet design criteria in the Functional Design Criteria.
- Follow preparation of fabrication and I&C system sketches and drawings.
- Plan fabrication and assembly operations for test apparatus, as required.
- Coordinate on-site or off-site component fabrication.
- Coordinate assembly operations for gas and liquid sampler and miscellaneous tooling.

- Identify, initiate, and complete procurement of vendor-supplied materials, detail components, and equipment.
- Prepare acceptance test procedure and perform acceptance testing as required. Provide acceptance test report.
- Generate design criteria
- Design verification
- Determine approval designator and safety classifications for all systems and/or subsystems.

Documentation included as required:

- Cost and schedule.
- Work plan, acceptance test plan/ calibration, acceptance test report, installation/operation manual, system design description, and functional design criteria.
- Design sketches and as-built drawings for sample equipment.
- Instructions for fabrication and assembly.

4.0 TECHNICAL REQUIREMENTS

Materials, components fabrication, inspection of test hardware shall conform to applicable WHC Specifications listed in Section 4.1 and as defined in the fabrication drawings. Quality assurance program requirements for the gas liquid sampling task shall be in accordance with WHC-CM-4-2.

The gas and liquid sampling equipment shall be designed, fabricated, assembled, and tested in accordance with WHC-IP-1026. Specific tasks to be performed for the gas and liquid sampling system are listed in Section 3.1.

All materials used will be called out on the drawings. The materials used will be compatible with the basin water system.

4.1 Specification

4.1.1 WHC Procedures

Procedures	WHC Procedure Number
Quality Assurance Manual	WHC-CM-4-2
Standard Engineering Practices	WHC-CM-6-1
Procurement Manual and Procedures	WHC-CM-2-1
Job Control System	WHC-CM-8-8
Environmental Compliance	WHC-CM-7-5
Management Requirements and Procedures	WHC-CM-1-3
Radiological Control Manual	WHC-CM-1-6
ALARA Program Manual	WHC-CM-4-11
Industrial Safety Manual	WHC-CM-4-3
Industrial Hygiene Manual	WHC-CM-4-40
Document Control and Records Management Manual	WHC-CM-3-5
Hazardous Material Packaging and Shipping	WHC-CM-2-14
K-Basin Administrative Procedures	

4.2 Procurement Tasks

All material and components shall be procured in accordance with WHC-CM-2-1.

Advance procurement are encouraged. It is accepted that some equipment procured may not be used (or useful) in the final assembly due to the development nature of the task.

4.3 Fabrication and Assembly of Equipment

Fabrication of components shall meet the requirements established by the drawings and this work plan. Drawings, sketches, and specifications shall be identified as "Development Control" per EP-2.4. Changes to the drawing requirements shall be markings of the drawing in "red" and/or the addition of supplementary sketches. All modifications shall be signed and dated by the cognizant fabrication engineer.

Two complete independent sets of uniquely numbered fabrication drawings shall be maintained with identical information, updated on a daily bases at a minimum. One set is to be in the cognizant engineer's possession; the other set in the fabrication package. All redline changes are to be circled signed, and dated by the cognizant engineer. A log of changes and their locations are to be maintained with both sets of drawings. The two sets are to be clearly identified as originals with the cognizant engineer's signature and date.

4.3.1 Acceptance Testing

The gas and liquid sampling system, including all ancillary systems, will be fully tested prior to installation to assure compliance with customer's (Characterization) requirements. Testing will be in accordance with an approved acceptance test plan. Quality Assurance will verify all acceptance testing.

4.3.2 Fabrication Drawings

All fabrication shall be completed per WHC drawings or sketches. All changes shall be approved by the cognizant engineer's dated signature next to each change. Approval and release of the engineering documents shall be in accordance with EP-1.7, Engineering Document Approvals and Release Requirements.

4.4 Verification

Design verification for the gas and liquid sampling equipment shall be accomplished at the minimum through use of independent technical reviews and testing in accordance with WHC-CM-6-1, EP-4.1.

No hold points have been determined at this time.

4.5 Test Performance

Equipment cognizant engineer will be designated by J.R. Frederickson. Tool operation will be performed by operations and engineering technicians under the direct supervision of the equipment cognizant engineer.

4.6 Documentation

A general data file shall be established and maintained by SNF K-Basin Engineering Projects for the gas and liquid sampling task. The gas and liquid sampling general file shall contain the complete, legible, and reproducible copies of documents such as overcheck reports, drawings, engineering analysis, inspection data (inspection/test plans and inspection data sheets), repair procedures, and progress reports, as required. The general file shall be turned over to WHC Document Control in a format ready for release as a supporting document in the IRM system. Document Control will release this document as a supporting document for permanent record availability and traceability.

5. SNF QUALITY ASSURANCE REQUIREMENTS

5.1 Design Verification and Control

Design verification shall be accomplished through independent reviews between the cognizant engineer and Quality Assurance in accordance with WHC-CM-6-1, EP-2.4, the acceptance test procedure, and the as-built data package.

5.2 Quality Assurance Program Requirements

The design documents generated for the tasks identified in this work plan shall be prepared and verified in accordance with WHC-IP-1026, Engineering Practice Guidelines, "Development Control". The tasks associated with this work plan shall meet the requirements of WHC-CM-4-2, "Quality Assurance Manual".

6.0 COST AND SCHEDULE

The baseline task breakdown and associated cost and schedule estimates are given in attachments A and B. The conditions and assumptions listed in Section 6.1 provide a baseline for cost and schedule estimates.

6.1 Baseline Cost and Schedule Estimate Assumptions

- All cost based on FY94 rates.
- Schedule based on single shifts and standard holidays.
- All cost include organizational adders.
- Personnel required to support the activities/responsibilities outlined in Section 3.0 will be available.
- Schedule is a working schedule and will be updated to reflect changes and completion of each task.

A work order has been written for drawings from KEH the number is E33600. The Charge code for the Work is L2113.

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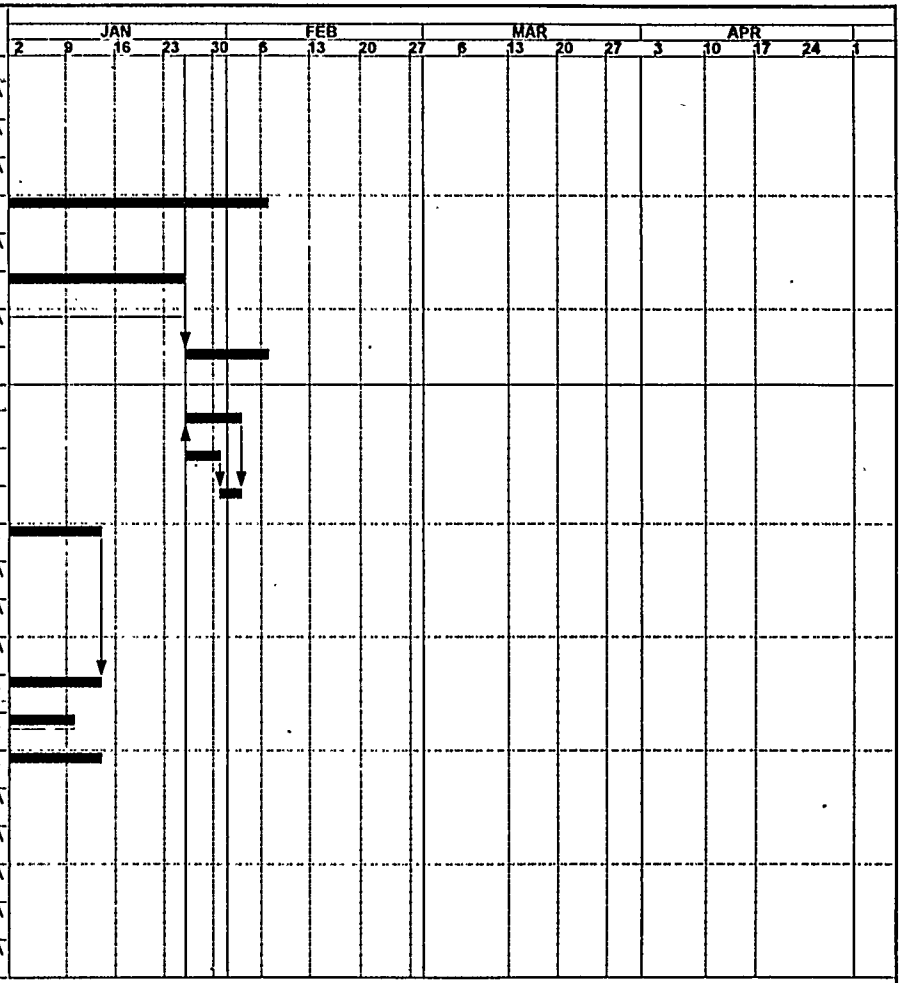
Rev 0

Activity ID	Activity Description	RESP	OD	RD	Early Start	Early Finish
DOCUMENTATION						
BC3010	Write Modifications to FDC	PCC	5	0	14NOV94A	18NOV94A
BC3020	Review/Release Modifications to FDC		20*	0*	21NOV94A	20DEC94A
BC3030	Write Modifications to Work Plan	PCC	5	0	14NOV94A	18NOV94A
BC3040	Review/Release Modifications to Work Plan		51*	8*	21NOV94A	06FEB95
BC3050	WriteTest Plan	PCC	5	0	21NOV94A	29NOV94A
BC3060	Review/ReleaseTest Plan		38*	0*	30NOV94A	25JAN95A
BC3062	Safety Evaluation	ALD	10*	0*	01DEC94A	14DEC94A
BC3064	Write Safety Eval Docs	ALD	8*	8*	26JAN95	06FEB95
SAMPLER I						
BC40000	UPDATE DWGS	PCC	6*	6*	26JAN95	02FEB95
BC40010	check		3	3	26JAN95*	30JAN95
BC40020	release	PCC	3*	3*	31JAN95	02FEB95
BC40030	MODS	PCC	27*	0*	05DEC94A	13JAN95A
BC40040	Vacutimer holder		15	0	05DEC94A	27DEC94A
BC40050	parts		10	0	05DEC94A	16DEC94A
BC40060	fabrication		5	0	19DEC94A	27DEC94A
BC40070	"O" rings		20	0	05DEC94A	13JAN95A
BC40080	parts		10	0	12DEC94A	09JAN95A
BC40090	fabrication		4	0	28DEC94A	13JAN95A
BC40100	Handle		10	0	05DEC94A	26DEC94A
BC40110	fabrication		7*	0*	12DEC94A	20DEC94A
BC40120	Crane attachments		15	0	05DEC94A	27DEC94A
BC40130	parts		10	0	05DEC94A	16DEC94A
BC40140	fabrication		5	0	19DEC94A	27DEC94A



Project Start 01NOV94
Project Finish 10JAN95
Data Date 26JAN95
Plot Date 26JAN95
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Early Bar
Progress Bar
Critical Activity

DOH

Sheet 1 of 2

Westinghouse Hanford Company
Spent Nuclear Fuels Project
Engineering Support

A1

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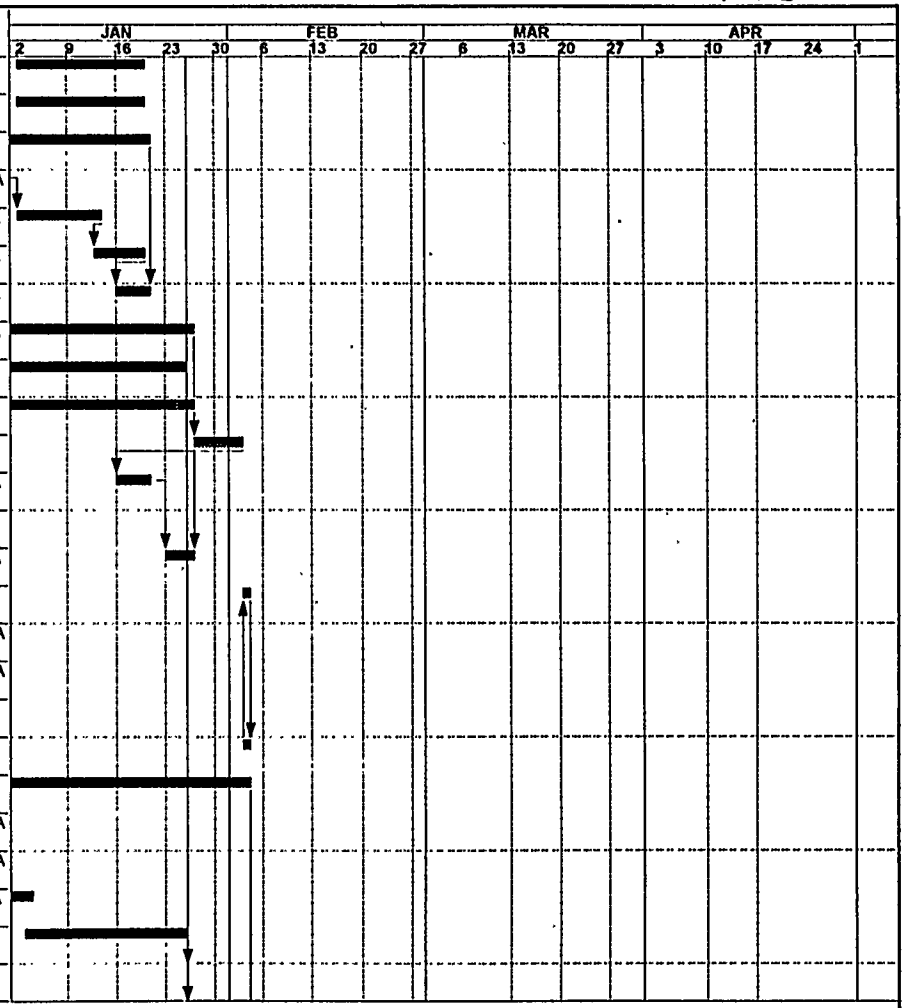
Rev 0

Activity ID	Activity Description	RESP	OD	RD	Early Start	Early Finish
BC40144	Valve for Compressed Air to Cylinder		5	0	02JAN95A	19JAN95A
BC40146	Air tool system - Compressed air Connection		5	0	02JAN95A	19JAN95A
BC40150	COLD TEST	PCC	32*	0*	05DEC94A	20JAN95A
BC40160	update test procedures		5	0	05DEC94A	09DEC94A
BC40170	test		6*	0*	02JAN95A	13JAN95A
BC40180	update test procedures		5*	0*	13JAN95A	19JAN95A
BC40190	acceptance test		2	0	16JAN95A	20JAN95A
BC40200	TRAINING		36*	0*	05DEC94A	26JAN95A
BC40210	Operating procedures	BLL	35*	0*	05DEC94A	
BC40220	write procedures		20	1	05DEC94A	26JAN95
BC40230	review/release procedures		5	5	27JAN95	02FEB95
BC40240	Training checklist	ASC	5	0	16JAN95A	20JAN95A
BC40250	Schedule operators		0*	0*	26JAN95*	25JAN95
BC40260	complete training		0*	0*	23JAN95A	26JAN95A
BC40270	TRANSFER SAMPLER		1*	1*	03FEB95	03FEB95
BC40271	Design Strongback	PCC	5*	0*	12DEC94A	16DEC94A
BC40272	Parts		1	0	19DEC94A	19DEC94A
BC40273	Fabrication		0*	0*	26JAN95*	25JAN95
BC40280	prepare JCS	JJJ	1*	1*	03FEB95*	03FEB95
BC40290	TABLE I - II	PCC	33*	7*	16DEC94A	03FEB95
BC40300	Design/Draw		3*	0*	16DEC94A	20DEC94A
BC40310	Check		1*	0*	27DEC94A	27DEC94A
BC40320	Review/Release Drawings		5*	0*	27DEC94A	03JAN95A
BC40340	Parts		17*	0*	03JAN95A	
BC40350	Fabrication		0*	0*	26JAN95*	25JAN95



Project Start 01SEP94 | Early Bar
Project Finish 15JAN96 | Progress Bar
Data Date 30JAN96 | Critical Activity
Plot Date 30JAN96

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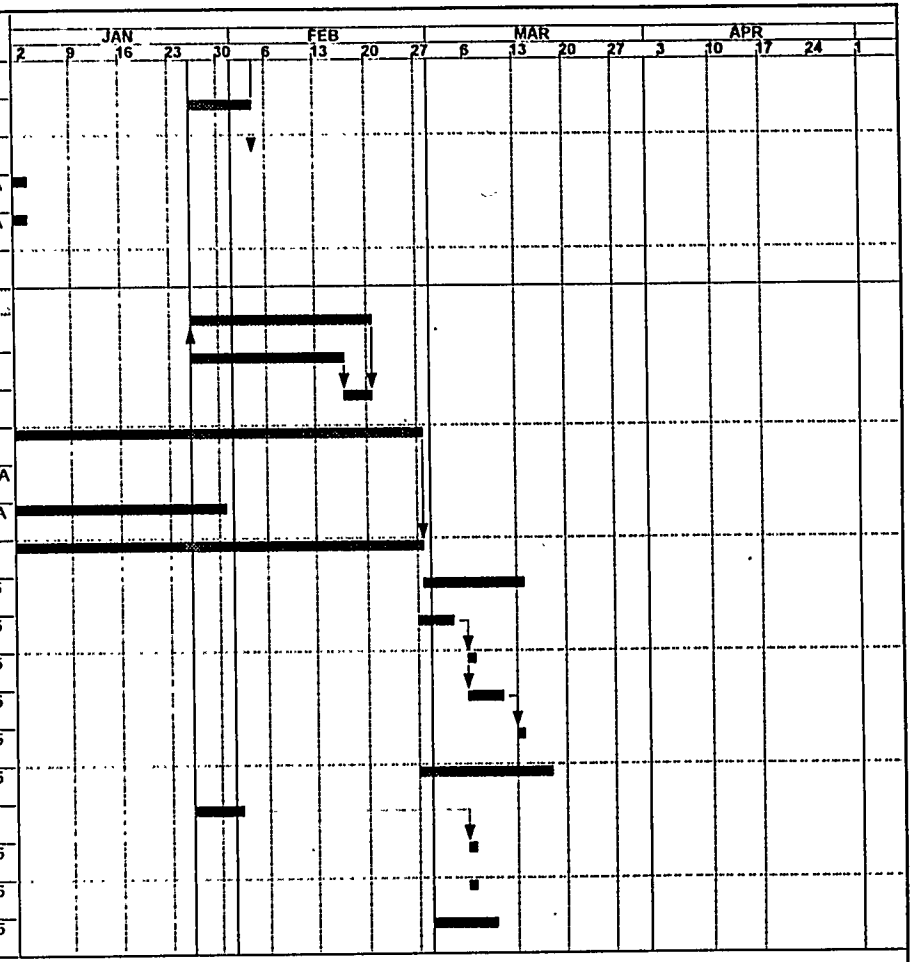
Sheet 2 of 3

Westinghouse Hanford Company
Spent Nuclear Fuels Project
Engineering Support

A-2

Activity ID	Activity Description	RESP	OD	RD	Early Start	Early Finish
BC40360	Test		0*	0*	26JAN95*	25JAN95
BC40370	Transfer to Basin		7*	7*	26JAN95	03FEB95
BC40372	Racks		0*	0*	26JAN95*	25JAN95
BC40374	Drawings/Sketch		0*	0*	28DEC94A	02JAN95A
BC40376	Parts		0*	0*	28DEC94A	02JAN95A
BC40378	Fabrication		10	0		
SAMPLER III						
BC40760	UPDATE DWGS	PCC	18*	18*	26JAN95	20FEB95
BC40770	check		16*	16*	26JAN95*	16FEB95
BC40780	release		2*	2*	17FEB95	20FEB95
BC40790	FAB	PCC	58*	23*	05DEC94A	27FEB95
BC40800	order parts		6*	0*	05DEC94A	12DEC94A
BC40810	receive parts		35*	0*	05DEC94A	30JAN95A
BC40820	fabrication		52*	23*	13DEC94A	27FEB95
BC40910	COLD TEST	PCC	10*	10*	28FEB95*	13MAR95
BC40920	update test procedures		5	5	27FEB95*	03MAR95
BC40930	test		1*	1*	06MAR95*	06MAR95
BC40940	update test procedures		5	5	06MAR95*	10MAR95
BC40950	acceptance test		1	1	13MAR95*	13MAR95
BC41030	TRANSFER SAMPLER	PCC	15*	15*	27FEB95*	17MAR95
BC41031	Design Strongback		5	5	26JAN95	01FEB95
BC41032	Parts		1	1	06MAR95*	06MAR95
BC41033	Fabrication		1	1	06MAR95*	06MAR95
BC41040	Prepare JCS	JJJ	7	7	01MAR95*	09MAR95



Project Start 01SEP94
Project Finish 15JAN96
Data Date 30JAN96
Plot Date 30JAN96
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Early Bar
Progress Bar
Critical Activity

BC01

Westinghouse Hanford Company
Spent Nuclear Fuels Project
Engineering Support