★#19
JAN 9 1997

ENGINEERING DATA TRANSMITTAL

Page 1 of 1
1. EDT 619677

2. To: (Receiving Organization) SNF K-Basin Projects		3. From: (Originating Organization) SNF K-Basin Projects		4. Related EDT No.: 140396	
5. Proj./Prog./Dept./Div.: SNF/Debris Removal A-2		6. Design Authority/ Design Agent/Cog. Engr.: J.B. Crystal		7. Purchase Order No.: N/A	
8. Originator Remarks: The attached OTR is being submitted for approval				9. Equip./Component No.: N/A	
				10. System/Bldg./Facility: 105-KE Basin	
11. Receiver Remarks: 11A. Design Baseline Document? ☐ Yes ☒ No				12. Major Assm. Dwg. No.: H-1-81455	
				13. Permit/Permit Application No.: N/A	
				14. Required Response Date: 10/31/96	

15. DATA TRANSMITTED					(F)	(G)	(H)	(I)
(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	Approval Design- ator	Reason for Trans- mittal	Origina- tor Dispo- sition	Receiv- er Dispo- sition
1	WHC-SD-SNF-OTR-003	A11	0	Operability Test Report for the K East Basin Canister Cleaning System	ESQ	1	1	

16. KEY			
Approval Designator (F)	Reason for Transmittal (G)		Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 2. Release 3. Information	4. Review 5. Post-Review 6. Dist. (Receipt Acknow. Required)	1. Approved 2. Approved w/comment 3. Disapproved w/comment 4. Reviewed no/comment 5. Reviewed w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)											
(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN
1	1	Design Authority JB Crystal	<i>[Signature]</i>	12-23-96	X3-85	1	1	Ops Mgr CT Miller	<i>[Signature]</i>	12/11/96	X3-71
		Design Agent n/a	<i>[Signature]</i>			1	1	Ops Mgr JR Gregory	<i>[Signature]</i>	12/11/96	X3-72
1	1	Cog.Eng. MJ Langevin	<i>[Signature]</i>	12/14/96	X3-74			Project Files		X3-85	
1		Cog. Mgr. CS Haller	<i>[Signature]</i>	12/14/96	X3-75						
1	1	QA JI Diehl	<i>[Signature]</i>	12-16-96	X3-80						
1		Safety CD Jackson	<i>[Signature]</i>	12/12/96	X3-80						
1		Env. RG Gant	<i>[Signature]</i>	12/12/96	X3-79						

18. <i>[Signature]</i> JB Crystal Signature of EDT Originator Date 12-23-96		19. <i>[Signature]</i> CT Miller Authorized Representative Date for Receiving Organization 4/7/97		20. <i>[Signature]</i> CS Haller Design Authority/ Cognizant Manager Date 1-7-97		21. DOE APPROVAL (if required) Ctrl. No. ☐ Approved ☐ Approved w/comments ☐ Disapproved w/comments	
---	--	---	--	--	--	---	--

Operability Test Report for the K East Basin Canister Cleaning System

Jeremy B. Crystal

Westinghouse Hanford Company, Richland, WA 99352

U.S. Department of Energy Contract DE-AC06-87RL10930 96 RL 13200 (JICB 1/9/97)

EDT/ECN: 619677

UC: 510

Org Code: 2T240

Charge Code: LD137

B&R Code: EW3135040

Total Pages: 5150 (JICB 1/9/97)

Key Words: K Basins, Debris Removal, Debris, OTR, Canister

Abstract: This document summarizes test data compiled during the operability test procedure for the K East Basin Canister Cleaning System. Test Results show that the canister cleaning system successfully lowered the dose of each canister tested so that each canister could be disposed of as low level waste.

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

Printed in the United States of America. To obtain copies of this document, contact: WHC/BCS Document Control Services, P.O. Box 1970, Mailstop H6-08, Richland WA 99352, Phone (509) 372-2420; Fax (509) 376-4989.

Janis Braden
Release Approval

1/9/97
Date

Approved for Public Release

WHC-SD-SNF-OTR-003 Rev. 0

OPERABILITY TEST REPORT
FOR THE
K EAST BASIN CANISTER CLEANING SYSTEM

ABSTRACT

The objective of this document is to summarize test data compiled during Operability Test Procedure For the K East Basin Canister Cleaning System. This was performed at K East Basin in accordance with WHC-SD-SNF-OTP-003, Operability Test Procedure K East Basin Canister Cleaning System. The purpose of the test was to determine if the canister cleaning system would successfully decontaminate canisters of various types so they could be removed and staged for disposal as low level waste. Test results show that the canister cleaning system successfully lowered the dose of each canister tested so that the canisters could be disposed of as low-level waste. Furthermore, the test demonstrated that the Canister Cleaning System met the criteria as identified in the Operability Test Procedure K East Basin Canister Cleaning System, WHC-SD-SNF-OTP-003. Although two test discrepancies were experienced, both were resolved allowing successful completion of the test.

TABLE OF CONTENTS

1.0 INTRODUCTION	1
2.0 TEST COMPONENTS	1
2.1 Equipment	1
2.2 Accessories	2
2.3 Supplies	2
3.0 TEST METHOD	3
3.1 Criteria	3
3.2 Test Process	3
4.0 TEST RESULTS	5
4.1 Measurements	5
4.1.1 Underwater Measurements	5
4.1.2 In Air Measurements	7
4.2 Discrepancies	7
4.3 Recommendations	8
5.0 CONCLUSION	9
6.0 DISPOSITION OF TEST ITEM	9
7.0 REFERENCES	11
Appendix A: Fuel Storage Canister Drawing	A-1
Appendix B: Log Activities	B-1
Appendix C: OTP Validation	C-1

LIST OF TABLES

TABLE 1- Dose Rate Summaries	5
TABLE 2 - Dose Survey In Low Background	7

1.0 INTRODUCTION

The Operability Test Procedure (OTP) was conducted by K East Basin project engineering, vendor technical representatives, and K Basins operations (4/4/96-4/9/96). See Appendix A for detailed logs and supporting data. The test was witnessed and validated by K Basins quality assurance/quality control (QA/QC) personnel and K Basins health physics technicians (HPT).

2.0 TEST COMPONENTS

2.1 Equipment

Equipment used during the test included the following:

- HEPA filtered Canister Cleaning Fixture Assembly, Drawing no. H-1-81455
- Greenhouse Assembly, Roller Conveyor Table, DWG no. H-1-50436 sht. 1&2
- Accuseal Bag Sealer, model no. 60-734
- Canister Transfer Cart
- R07 Underwater/Waterproof Gamma Radiation Dectector Probe and meter
- Tri Nuclear Vacuum System, model UFV-260; with Accessories and Hoses
- Four Underwater Lights
- Underwater Camera and Monitor
- High Pressure Water Jet System (HPWJS), see below for description
- Eberline R0-3B "Cutiepie" R03 Beta/Gamma radiation detector, max range 5rad

The HPWJS contained the following skid mounted components:

- Butterworth T375H, Model 615 ES Pump, 15,000 PSI @ 15 GPM
- Reliance Electric Motor, Model P44G00, 150 HP, 460V, 170A, 3 phase, 60Hz
- Suction Surge Tank, Galvanized 33 gal with stand, 0-160 psig
- Stainless Steel Filter Assembly, 10 micron, 42 GPM
- Discharge Pressure Control Vessel, rated 15000 psi

- Contactor/Starter, NEMA enclosure, 3R/4 ½ ATL Starter with stand & conduit, full voltage, reduced voltage, low amperage draw, slow start
- March Feed Pump, M/N TE-7.5K MD - 2 HP, 460V, 2.6A, 3 phase motor

2.2 Accessories

The following accessories were utilized in various combinations to direct and control the water flow from the HPWJS Skid:

- High pressure hose ½ in. ID, 20,000 psi working pressure, 60,000 psi burst pressure, protective outer cover, 9/16 Autoclave Medium Pressure fittings
- Hand held Wand with 10 ft. shielded hose and slimline fitting quick disconnect, 9/16 MP (15,000 psi) Autoclave Medium Pressure fittings, DWG no. H-1-82086
- Three Foot Control Valves 15,000 psi (shut off style) with manifold, piping, fittings mounted on a work stand, DWG no. H-1-82087
- Skid Stainless Steel Drip Pan
- Feed and drain hoses
- Air manifold and hoses

2.3 Supplies

Supplies that were used during the test included:

- Cylinder of Nitrogen (stored outside of basin only)
- 6 mil Flat plastic sleeving, 48 in. dia x 50 ft. long (three rolls)
- Shipping containers
- Indelible marker

3.0 TEST METHOD

3.1 Criteria

The Operability Test had the following requirements:

- Clean the surface of at least ten(10) canisters to below category three (3), Low Level Waste by reducing the dose rate to less than 100mrem/hr at contact out of water and less than 20mrem/hr at one meter
- Demonstrate a controlled process for the cleaning/decontamination of canisters underwater with minimal water surface disturbance thereby maintaining air quality within the basin limits
- Perform the step-by-step operating procedures to accomplish OTP demonstrating the effective combinations of fixture nozzles and associated removal equipment
- No leaks on the HPWJS and hoses during the OTP evaluation
- Validate that routine (prerequisite) facility systems remain operational during the OTP
- Hand held wand and HPWJ skid shall maintain a pressure of 12000 psi (visual at pump) and will not leak

3.2 Test Process

Underwater and in-air background dose rate measurements were taken in the vicinity of the canister cleaning system and greenhouse by the HPT and recorded. Canisters were retrieved from various locations in the basin and transferred to the cleaning station canister holder. Fuel storage canisters of type MK0, MKI, and MKII were used for testing. Canister categories are shown in Appendix A. Five canisters of each material type, stainless steel and aluminum were cleaned. At least one of the canisters were open bottom style. Additionally, a finned style canister was cleaned for information purposes only.

Once the canister was positioned for cleaning, a pre-cleaning underwater measurement of the dose rate with both cylinders of the canister were taken using the R07 probe. Each measurement was recorded in the log entries (See Appendix A: Log Entries). The canister cleaning system was then used to clean the inside and outside of the canister. A post-cleaning underwater

measurement of the dose rate within both cylinders was recorded and compared to pre-cleaning measurements. These measurements are shown in TABLE 1, Dose Rate Summaries.

Cleaning was repeated when necessary until the in-water dose rate readings inside the bottom of both cylinders indicated less than 100mrem/hr, or the dose could not be decreased (See table 1). If the post cleaning measurement was less than 100mrem/hr at contact, the canister was removed from the water into the drip dry greenhouse and surveyed. If canister doses were measured greater than 100mrem/hr, the canister was returned to the water to be recleaned. If repeated cleaning did not lower the dose count, the canister was to be transferred to a designated storage area for later processing, however this was never necessary during the OTP. Note that MKII stainless steel canisters had to be stood upright on the greenhouse roller conveyor to drain the trunnions.

Once the canister drip dried, it was removed from the hoist and placed on a roller conveyor. Each canister was numbered 1 through 10 with an indelible marker. The right and left cylinders were annotated with "R" and "L" respectively. An HPT obtained two smear samples from each canister: (1) center of the right cylinder, external surface. (2) center of left cylinder, external surface. The locations are shown for clarification in FIGURE 1, Smear Locations.

Figure 1 - Smear Locations

The smear samples were bagged and transferred to 183 K East lab for count analysis and confirmation of radiological characterization as stipulated in document no. WHC-SD-SNF-TI-019, Characterization of Empty Fuel Storage Canisters in 105KE Basin. The canister was then sealed in a plastic bag

through the bag-sealer and placed into the transfer cart. Finally, the canister was transferred to corridor 7 for final dose measurements. Corridor 7 was used because of the low radiation levels in that area. The canister dose rates are shown in TABLE 2.

4.0 TEST RESULTS

4.1 Measurements

Tables 1 and 2 shows summary of dose rates measured as described in section 3.2.

4.1.1 Underwater Measurements

In Table 1, the "In Water Dose Rate Pre-clean" and "Post-clean" columns are of the format left cylinder/right cylinder. Values in these columns indicate gamma dose rates and were taken using an R07 underwater probe.

In air dose rate units $\gamma(cw)$ and $\beta(ow)$ are closed window and open window dose CP readings respectively, where closed window indicates that Beta particles are filtered from the total rate, and open window indicates rates that include both Beta and Gamma particles. Data in the In Air Dose Rate column indicate the hottest spot on a canister. Measurements for this column were taken after the canister was heat sealed in a bag and placed in the transfer cart.

TABLE 1- Dose Rate Summaries

Test no.	Canister Category & Type	In Water Dose Rates		In Air Dose Rate $\gamma(cw)mRem/\beta(ow)mRad$	No. Of Cleanings Req'd
		Pre-clean L(mR)/R(mR)	Post-clean L(mR)/R(mR)		
1	MK0 A1	100/75	23/16	11/60	1
2	MKII SSt	1000/920	27/49	7/50	1
3	MK0 A1	68/105	13/18	45/255	1

Test no.	Canister Category & Type	In Water Dose Rates		In Air Dose Rate $\gamma(\text{cw})\text{mRem}/\beta(\text{ow})\text{mRad}$	No. Of Cleanings Req'd
		Pre-clean $L(\text{mR})/R(\text{mR})$	Post-clean $L(\text{mR})/R(\text{mR})$		
4	MKI SSt	60/46	23/14	5/5	1
5	MK0 A1	72/62	34/22	25/100	1
6	MK0 A1	121/62	50/21	120/600	1
7	MK0 A1	47/40	14/9	25/200	1
8	MKII SSt	53/790	17/17	6/50	3
9	MKII SSt	32/34	9/25	4.3/15	1
10	MKII SSt	93/59	31/26	9/18	1
11	MK0 A1 (Fin/Slot)	51/48	12/23	16/90	1
$\gamma(\text{cw})$ = Gamma dose, closed window CP $\beta(\text{ow})$ = Beta and Gamma dose rate, open window CP A1 = Aluminum SSt = Stainless Steel Note: all doses are on contact readings.					

Note, that except for one canister, canister no. 6, the desired limit for a maximum contact in-air dose (100 mR) was achieved as indicated in the system criteria. The resolution for the high dose on canister 6 was recorded and resolved on test discrepancy no. 1, see section 4.2 for details. Canister 8 in water dose rate was also high, (350/33) after one cleaning. This was corrected by recleaning the MKII SST canister two additional times. Once with the fixture, and once using the hand wand. Using the fixture did not improve the dose count; however, cleaning was more effective with the hand wand. The final in-water-dose rate after the additional cleanings was 17/17.

4.1.2 In Air Measurements

TABLE 2 shows the dose counts from the side of each canister in a low dose area. As was the case in TABLE 1 values $\gamma(cw)$ and $\beta(ow)$ are closed window and open window dose readings respectively.

TABLE 2 - Dose Survey In Low Background

Test no.	Canister Category & Type	Dose Rate, Left Cylinder $\gamma mRem(cw)/\beta mRad(ow)$	Dose Rate, Right Cylinder $\gamma mRem(cw)/\beta mRad(ow)$
1	MK0 A1	6/30	5/20
2	MKII SST	<0.5/2	<0.5/2
3	MK0 A1	5/30	6/30
4	MKI SST	<0.5/2	<0.5/3
5	MK0 A1	6/5	5/12
6	MK0 A1	7/21	10/15
7	MK0 A1	2/10	1.5/8
8	MKII SST	2/2.5	2/2.5
9	MKII SST	1.5/2	1/1.5
10	MKII SST	2/3	2.5/2.6
11	MK0 A1 (Fin/Slot)	15/27	5/14

From this data, it can be seen that most of the dose count readings shown in TABLE 1 one are due to background radiation. The background dose was measured to be 4mRem. Note, the dose rates in table 2 are on the sides of the cylinders, whereas the in-air dose rates in TABLE 1 were the hottest spot on the canisters, typically the bottoms.

4.2 Discrepancies

There were two test discrepancies during the testing phase. A test discrepancy was defined as a step in the operability test that failed to meet the test criteria. The test criteria is identified in the OTP and summarized in section 3.1.

The first discrepancy occurred at 10:30pm, 4/5/96 when canister #6 had a hot spot on its bottom measuring 120mR on contact. This was not discovered until after a bag had been sealed around the canister. After consulting with the HPT this was deemed acceptable since the average canister dose was 10-20mR, and the 120mR only contributed 2mR at 1ft. to the background dose. Furthermore, there was no violation of the RWP which allowed 100mR whole body dose.

The second discrepancy occurred at 9:00pm, 4/9/96 when the high pressure water jet pump pressure dropped to 10,000psi. The inner nozzles being used were specified at 12,000psi. The HPWJS continued to decontaminate canisters just as well as the specified 12,000psi. The system achieved the same cleaning effectiveness and successfully decontaminated canisters below the 100mR/hr limit; however, the inner cleaning nozzles were replaced to restore the pressure to the proper operating pressure specification.

The test discrepancy log and test discrepancy forms are attached in Appendix B.

4.3 Recommendations

To resolve future occurrences where a canister dose measures above the acceptable maximum limit, similar canisters should be examined more thoroughly for dose while in the Green House where it is easier to return the canister to the basin for additional cleaning.

The operating pressure should be modified to allow pressure drops on the HPWJ to 10,000psi or until cleaning effectiveness is lost. If the pressure drops below the specified pressure, changing the nozzles will correct the problem.

It should be also be noted that the heat sealer was not always making a complete, or satisfactory seal around the bag edge. Heating time had to be adjusted at the start up to produce satisfactory seals. The operating

procedure should be corrected to instruct operations to make several seals to warm up the bag sealer, and to always check the bag edges to insure a proper seal.

Several modifications to the system should be considered for greater efficiency and a safer operability:

- The hoist handle for the hoist inside the greenhouse needs to be cut back so operators do not injure their heads.
- Presently the greenhouse pendant interferes with the ability to raise a can. The pendant should be pulled out further to correct this inconvenience.
- The canister transfer cart needs a neoprene pad on the bottom to avoid damaging the canister during transport. A thicker bag (10 mil) will also aid in avoiding tears.
- A work table, or cart for staging supplies is needed near the cleaning area.
- The roller conveyor needs to be rinsed every shift so that smear sample counts will not be affected by previous canister runs and to control build up of contamination.

5.0 CONCLUSION

Although there are adjustments that must be made to the cleaning process, the requirement to clean, seal, and store ten canisters from the basin was met. All results clearly show that the canister cleaning system will decontaminate canisters in the KE Basin such that the contact dose rate is less than 100mrem. All criteria described in section 3.1 were met and validated as evidenced in WHC-SD-SNF-OTP-003, Operability Test Procedure K East Basin Canister Cleaning System. Copies of the signatures used to validate the OTP have been provided for reference in this report and can be found in Appendix C.

6.0 DISPOSITION OF TEST ITEM

Since the Canister Cleaning System Operability Test was successful, all

components discussed in the report may remain in the Basin until approximately 5600 canisters have been removed from the water pool, and stored for later staging. It is estimated that this process will not be finished until February in the year 2000. Until all canisters are cleaned the HPWJ, greenhouse, pumps, etc. should remain in the basin for continual use.

7.0 REFERENCES

WHC-SD-SNF-OTP-003, Operability Test Procedure K East Basin Canister Cleaning System.

Dwg. H-1-81455, Canister cleaning Fixture Assembly and Fabrication Sections and Details.

Dwg. H-1-50436, Canister Cleaning Drip-Dry Greenhouse.

Dwg. H-1-82086, Hand Held Wand.

Dwg. H-1-82087, Foot Control, Air control, Operation Station.

WHC-SD-SNF-TI-019 Rev.0, Characterization of Empty Fuel Storage Canisters in 105-KE Basin.

Appendix A: Fuel Storage Canister Drawing

MARK 0 CANISTERS
(H-2-36935)

MARK I CANISTERS
(H-2-42793)

MARK II CANISTERS
(H-2-46215)

105-N REACTOR FUEL STORAGE CANISTERS

(FB10009A)

Appendix B: Log Activities

TEST DATA SHEET						
Safety Walk Down Completed By Project Technical Representative: <u>Ronald Nassau</u>						
						PTR DATE
BACKGROUND DOSE RATE ON WORK TABLE						WO N/A WE 4 uRem
BACKGROUND DOSE RATE IN AIR ABOVE WATER						WO N/A WE 4 uRem
TEST #	CANISTER MATERIAL TYPE	IN WATER DOSE RATE BEFORE ¹	IN WATER DOSE RATE AFTER ¹	IN AIR DOSE RATE ¹ (Highest)	NUMBER OF CLEANING	HPT Initial
1	MXO AL	100/75uR	25/16uR	8.11 uRem/60uRad	1	87
Comments: <u>each cylinder inside</u> <u>2nd/4th</u> <u>Hottest dose on bottom</u>						
2	MX-II SST	1,000/920	27/49	3/11	1	87
Comments: <u>7uR/50uRad</u> <u>Hot Spot</u>						
3	MXO AL	68/105	13/18	45/255	1	87
Comments: <u>Hottest spot Bottom Screen</u>						
4	MX-I SST	60/46	23/14	5/5	1	87
Comments:						
5	MXO AL	72/62	34/22	25/100	1	87
Comments:						
6	MX-O AL	121/62	50/21	120/100	1	87
Comments: <u>Hot Spot discovered when canister was</u>						
7	MXO AL	47/40	14/9	25/200	1	EW
Comments:						
8	MX-II SST	53/790	385/33	6/50	3	EW
Comments: <u>Re clean: 300/17</u> <u>Re clean w/ Handwound 17/17</u>						
9	MX-II SST	32/34	9/25	4.3/15	1	EW
Comments: <u>Left hanging 4/8/96</u> <u>Hottest on bottom</u>						
10	MX-II SST	93/59	31/26	9/18	1	EW
Comments: <u>See log for #11 AL-Finned canister</u> <u>Hottest on bottom</u>						
SIGNATURES: Verifies concurrence of test data.						
QC Witness: <u>John D. Dill</u>				Date: <u>6-18-96</u>		
WHC Test Technician: <u>Chris</u>				Date: <u>6/18/96</u>		
WHC Test Engineer: <u>Jimmy Cristofari</u>				Date: <u>6/11/96</u>		

¹ Dose rate readings are "on contact" readings.

* Highest reading $\gamma(cw)/\beta(cw)$ uncorrected

$CW = \text{closed window (Background subtracted out)}$
 $B-2$
 $OW = \text{open window} - \text{closed window}$

side canister low background in corridor.

SMEAR SURVEY SUPPORTING DATA				
Date: See below		HPT: _____		
NO.	CANISTER MATERIAL TYPE	DOSE RATE, LEFT* CYLINDER	DOSE RATE, RIGHT* CYLINDER	HPT Initial
4/4/96 4/5/96 ↓ 4/8/96 4/8/96 4/9/96 4/9/96	1. Aluminum MKO	6 mrem/30 m lead	5 mrem/20 m lead	SI
	2. SST MK II	<0.5 / 2	<0.5 / 2	SI
	3. ALUM. MKO	5 / 30	6 / 30	SI
	4. SST MK I	<0.5 / 2	<0.5 / 3	SI
	5. ALUM. MKO	6 / 5	5 / 12	SI
	6. ALUM. MKO	7 / 21	10 / 15	SI
	7. MKO Aluminum	2 / 10	1.5 / 8	SI
	8. MK II SST	2 / 2.5	2 / 2.5	SI
	9. MK II SST	1.5 / 2	1.0 / 1.5	SI
	10. MK II SST	2 / 3.0	2.5 / 2.6	SI

$$* \gamma (CW) / \beta (OW, \text{uncorrected})$$

CW = closed window

OW = open window - closed window

11. MKO AL
Finned &
Slotted

Left *

15/27

Right *

5/14

HPT

ACCEPTANCE SHEET	
☒	The following items have been demonstrated successfully for acceptance of this OTP:
☐	Validate that routine facility systems are operational during the OTP.
☒	Clean the surface of ten (10) canisters below Category III, Low Level Waste. Reduce the dose rate to less than 100 mrem/hr at contact in air and less than 20 mrem/hr at one meter.
☒	Minimal water surface disturbance, maintaining air quality within the basin limits.
☒	Maintain a minimum of 12,000 psi at the HPWJS Skid during cleaning.
☒	Verify the step-by-step operations procedures used to accomplish operability testing.
☒	Maintain no leaks on the high pressure water system and hoses during the test evaluation.
Acceptance is endorsed by the following organizations and personnel:	
The Operability Test Procedure for the HPWJS Canister Cleaning Fixture and associated tools and equipment has been satisfactorily completed.	
Signatures	Date
Test Engineer: <i>James E. Gentry</i>	6/11/96
Project Cognizant Engineer: <i>James E. Gentry</i>	6/11/96
K Basin Operations Manager: <i>DM/CL</i>	6/25/96
Plant Engineer: <i>M. J. Longman</i>	6/18/96
Radiological Controls: <i>John E. Hopkins</i>	6/18/96
Safety: <i>Greg. Johnson</i>	6/18/96
QA: <i>Jack R. Butcher</i>	6/18/96
Environmental: <i>Jack R. Butcher</i>	6/18/96
Project Technical Representative: <i>William H. Gentry</i>	06/31/96

Instructions

1. Enter time, date and OTP test section(s).
2. Enter discrepancy number obtained from the test discrepancy log.
3. Enter description and disposition/justification of discrepancy.
4. Obtain applicable approval signatures as described below.
5. Implement the disposition.
6. Test Engineer sign and date the "completed" block when disposition has been implemented.

Disposition Approval Signatures

- A. Manager: Only if disposition does not meet original intent of the OTP or if discrepancy form is being used to change the OTP instructions.
- B. Test Director: All discrepancies not completed within 8 hours.
- C. Test Engineer: All discrepancies.
- D. Safety: For dispositions that change safety related OTP test instructions.

Test Discrepancy Report Form				
Time 10:30 pm	Date 4/5/96	Test Section S.S.G.1	#1 Test Discrepancy Number	
Description: There was a hot spot on canister #6 on the bottom screen of 120 mR on contact, 600 mRad (β). This was not discovered until after the bag was on the canister & sealed. The underwater survey was only 5 mR. Removing the canister from dose was only 22 mR.				
Disposition & Justification: After consulting with the HPT the decision was made to leave the canister out of the water & stage it in corridor 7. This was because the average dose on contact was well below 100 mR, approximately 10-20 mR and the hot spot was only contributing 2 mR to background. The canister was considered to have passed the 100 mR on contact criteria. However, similar canisters				
Manager	Test Director	Test Engineer	QA	Safety
N/A	<i>[Signature]</i>	<i>[Signature]</i>	NA	N/A
Completed	4/6/96		Date	4/6/96

Should be cleaned twice and checked more ~~thorough~~ thoroughly when on the green house for dose. The higher dose canister will be completely assayed & if it does not meet cal. III CCW criteria it will be put back in the bath.

Instructions

1. Enter time, date and OTP test section(s).
2. Enter discrepancy number obtained from the test discrepancy log.
3. Enter description and disposition/justification of discrepancy.
4. Obtain applicable approval signatures as described below.
5. Implement the disposition.
6. Test Engineer sign and date the "completed" block when disposition has been implemented.

Disposition Approval Signatures

- A. Manager: Only if disposition does not meet original intent of the OTP or if discrepancy form is being used to change the OTP instructions.
- B. Test Director: All discrepancies not completed within 8 hours.
- C. Test Engineer: All discrepancies.
- D. Safety: For dispositions that change safety related OTP test instructions.

Test Discrepancy Report Form				
Time	Date	Test Section	Test Discrepancy Number	
9:00pm	4/9/96	S.S.G	(2)	
Description: High Pressure Water Jet Pump was only reading 10,000 psi when the inside nozzles were being used, not the 12,000 psi specified.				
Disposition & Justification: The HAWJ continued to decontaminate canisters just as well as when the pressure was greater than 12,000 psi. The system still performed the desired function therefore should be accepted. The operating procedure should be modified accordingly to allow pressure drops until HAWJ no longer				
Manager	Test Director	Test Engineer	QA	Safety
N/A	P.D. Varrill	J. Cristofari	NA	N/A
Completed	P.D. Varrill		Date	4/9/96

→ achieves desired cleaning effectiveness.

The HAWJ needs to be run for additional time to determine if pressure will continue to drop indicating a problem. If the pressure continues to drop the fixture/pump needs to be fixed & achieve the required pressure 10,000 - 15,000 psi without dropping.

Resolution: Inner cleaning nozzles were replaced, pressure was restored to 14,000 - 15,000 psi. B-7

4-10-96

WHC-SD-SNF-OTR-003 rev 0

Pressure gauge
2F-220-14
(1xm outlet)

start	22 psi
opened 1xMV 229	pressure dropped to 18psi & climbed back to 22 psi
started feedwater pump	22 psi
started High press. pump	19 psi
inside peddle depressed	19 psi & 10,000 psi on High press gauge
outside peddle depressed	19 psi
Hand wand depressed	19 psi

- At this point, we throttled 1xMV 209 (1xm outlet discharge) to bring pressure up to 22 psi. (from 19 psi)

inside peddle depressed - after 5 minutes to pressure dropped for about a second to 6,000 psi & then back up to 10,000 psi. (1xm flow = 105 gpm)

Throttled 1xm outlet up to 25 psi. The ^{1xm} flow dropped to 91 gpm. 1xm inlet = 27 psi. Recirc. press went from 54 psi to 59 psi.

Throttled 1xm outlet back to 19 psi. Recirc. = 56 psi. Pressure dropped to 7500 psi for one second & back up to 10,000 psi

inside peddle depressed for all of this period (20-25 min)

shut high press. pump off

1xm outlet = 22 psi

1xm inlet = 26 psi

flow = 103 gpm.

Recirc. pressure = 58 psi

[illegible]

J-5		CRAFT/RESOURCE USAGE LOG AND MAINTENANCE RECORD	1. Document Number 01KJ-96-280111		
Date	Turnover, Problem Description, Action Taken	Name	Craft/ Resource Type	Hours	
4/4/96	Performed equipment check out. Every thing was fine. Cleaned bagged & removed an Aluminium canister from the basin	J. Crystal	Ops	20	
			HPT	10	
			Eng.	5	
			Sup	5	
4/5/96	Dose rates are taken on normal contact surfaces not between canisters were dose would be expected to be higher & focused	J. Crystal			
4/5/96	Cleaned 5 Canisters in 5 hours 1 Canister exceeded 100mR/hr in one spot. HPT decided it would not be a hazard w.r.t. background (this was after the can was bagged.) Picked to do a more thorough cleanup in the containment	J. Crystal	Ops	20	
			HPT	10	
			Eng	5	
			Sup	5	
4/8/96	In basin 3 1/2 hours. 2 Canisters cleaned and removed from the basin. One canister cleaned and hooked up removal hoist, but not removed, ran out of time. Left hanging in the basin. Average dose is 5mR/hr in basin even for those handling canisters.	J. Crystal	Ops	14	
			HPT	7	
			Eng	3 1/2	
			Sup	3.5	
4/9/96	Basin Time 2 hrs 3 Canister pulled from basin, (1) was already cleaned, (2) were cleaned underwater.	J. Crystal	Ops	20	
			HPT	20	
			Eng	2	
			Sup.	2	
	Need a support for bagout port near heat sealer				
Summary by Craft/Resource Type					
Craft/Resource Type	Total Hours	Craft/Resource Type	Total Hours		

TEST LOG

Date	Log shift activities and events	
	Dose @	1 foot (mR), 1 meter (mR)
	1.	2.5 < 1.0
	2.	0.5 0.0
	3.	6 0.5
	4.	0.5 0
	5.	5 1.5
	6.	10 2
	7.	0.5 < 0.5
	8.	1.6 < 0.5
	9.	0.7 < 0.5
	10.	2 0.6
	11.	3.5 0.5
4/5/96	Note (A) Canister dose rate on bottom was 12.0 mR / 600 mRad at one spot discovered after canister was sealed in bag, @ one foot it was 2 mR. HFT was consulted & decided to leave bag out because average dose was 1.0 mR and no dose rate problem would be caused by to back-problem.	
4/8/96	SST Canister #8 had to be cleaned twice w/ the fixture → no improvement. The hand wand was then used on the hot side and it went from 300 mR to 17 mR underwater	

TEST LOG	
Date	Log shift activities and events
4/9/96	Aluminum Finned container was cleaned as called for in the GTP. The results were as follows In water in air In water Dose Below Material MC 0 AL 5 Ltr / 48 Ltr 12/25 Ltr 4/18/96 Finned & stored No Cloning!
4/10/96	It should be noted that the heat sealer was not always making a complete or good seal at the edges of the bag. Once a few seals were made it worked fine, but it had to be adjusted (last time) just a little upon start up. The operating procedure should be modified to instruct operators to make a couple of seals to warm up the machine and always check the edges to ensure a proper seal.
4/18/96	Replaced inner nozzles
4/19/96	Cleaned a canister & checked pressure, maintained $\approx 15,000$ psi.
4/22/96	4/22/96 ADD AL TO HPM'S PUMP AND CAL (1) OF 150 EXXON OIL.

Transcription error
to North Star
on bottom

[illegible]

5	CRAFT/RESOURCE USAGE LOG AND MAINTENANCE RECORD	1. Document Number 11K-916-0028010		
Date	Turnover, Problem Description, Action Taken	Name	Craft/ Resource Type	Hours
5-8-96	Set tank in demin line coming from Inchongden 1706. The tank is outside the 105 KE building. Air was injected into tank to simulate IXM water (see J7#2). The pump cavitated slightly during operation then shut off.	Inchongden		
5-9-96	AM - Installed gasket under high pressure switch. Ran HPWJS with unpressurized demin feed water. The HPWJS pump cavitated. Also ran pump with IXM water and the pump cavitated excessively. PM - Ran pump with pressurized demin water (~40 PST). The pump did not cavitate.	Inchongden		
5-10-96	Fitters were about 30 min late for pre-job. Pre-job safety meeting started about 1:15 PM and lasted until 2:15 PM. Fitters and Art Fleming got dressed in SWP's and were going to enter basin to change out HPWJS filter. They forgot to bring locks for lock	Inchongden		
Summary by Craft/Resource Type				
Craft/Resource Type	Total Hours	Craft/Resource Type	Total Hours	

J-5	CRAFT/RESOURCE USAGE LOG AND MAINTENANCE RECORD	1. Document Number 11K-916-0028010			
Date	Turnover, Problem Description, Action Taken	Name	Craft/ Resource Type	Hours	
5-10-96 Continued	tag steps in MP-07-001. The KEH lock tag book is at 100N. At this point (~2:45 PM) there will not be enough time to send fitters to 100N, so their lock tag paper work and return. It was agreed with KEH superintendent Larry Formo that all lock tags will be ready to be applied Monday morning.				
5-13-96	<p>AM: Changed suction filter bag on HPWJS per JT#3. The HP supervisor (Tod Hopkins) did not require that the filter change out be performed in a containment bag. Friday 5/10 the HP supervisor (Tony Razo) required that filter change out be contained entirely in a plastic bag. Also had shift manager make field changes to MP-07-001 section 4.1 to allow KEH to sign-off for application and removal of danger tags. A field change was also made to make the electrical lock out at power panel 200.</p> <p>PM: Started HPWJS and ran on demin water from 1706 with the tank vented and unvented. Also ran the HPWJS with IXM water.</p>	Matheson			
Summary by Craft/Resource Type					
Craft/Resource Type	Total Hours	Craft/Resource Type	Total Hours		

[illegible]

Appendix C: OTP Validation

Operability Test Procedure K East Basin Canister Cleaning System

Jeremy B. Crystal
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

EDT/ECN: 140396 UC: 510
Org Code: 2G000 Charge Code: LD054
B&R Code: EW3135040 Total Pages: *22-24 cdp 3/4/96*

Key Words: OTP, Canister, Debris, K East

Abstract: This document provides the guidance necessary to complete the operability testing of the High Pressure Water Jet System installed in KE Basin. Satisfactory test results will enable the equipment to be used in support of the Debris Removal Project.

TRADEMARK DISCLAIMER. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors.

Printed in the United States of America. To obtain copies of this document, contact:
WHC/BCS Document Control Services, P.O. Box 1970, Mailstop H6-08, Richland WA 99352, Phone
(509) 372-2420; Fax (509) 376-4989.

Janis Braden
Release Approval

3/5/96
Date

Approved for Public Release

TABLE OF CONTENTS

1.0	INTRODUCTION	1
1.1	Background	1
1.2	Purpose	1
1.3	Scope	1
2.0	RESPONSIBILITIES	1
2.1	Test Director (Operations PIC)	1
2.2	Test Engineer	2
2.3	Project Technical Representative	2
2.4	Test Performers	3
2.5	Quality Assurance	3
3.0	PREREQUISITES	3
3.1	Completion of Supporting Activities	3
3.2	Operating Procedures	3
3.3	Safety	3
3.4	Special Tools, Equipment, and Supplies	4
3.5	Qualifications/Training	5
4.0	TEST CONTROL	5
4.1	Test Discrepancies	5
4.2	Test Changes	6
4.3	Test Log	7
5.0	PROCEDURE	7
5.1	Design Criteria	7
5.2	System Criteria	7
5.3	Test Process	8
5.4	Pre-Test Inspection	9
5.5	Test Procedure Steps	9
APPENDIX A		A-1
APPENDIX B		B-1
APPENDIX C		C-1
APPENDIX D		D-1
APPENDIX E		E-1

Butterworth is a registered trademark of Butterworth.

March is registered trademark of March Manufacturing, Inc.

OPERABILITY TEST PROCEDURE FOR THE K EAST BASIN CANISTER CLEANING SYSTEM

1.0 INTRODUCTION

1.1 BACKGROUND

The operability testing shall demonstrate the capability of the High Pressure Water Jet System (HPWJS) to reduce contamination levels and dose rate on empty fuel canisters prior to removal from the basin and subsequent packaging for disposal.

The HPWJS and the Clean, Remove and Package Empty Canisters Operating Procedures (CC) will be utilized in support of the step-by-step instructions for functionally testing the performance of the specified equipment/system. Facility modifications were completed via the Engineering Change Notice (ECN) process for Electrical Services, IXM Discharge Header, and Grating/Handrail to support and provide a workstation for installation of HPWJS skid and canister cleaning equipment.

The full fuel storage canisters located under the workstation have been moved and relocated to a new area in the basin to provide room for the underwater work table. The basin floor area under the workstation has been vacuumed to remove sludge. The CC equipment has been installed at the workstation located in the center bay of the basin. The HPWJS skid has been installed in the rail/truck bay.

1.2 PURPOSE

This operability test provides the instructions to demonstrate a combined canister cleaning system functionality.

1.3 SCOPE

The overall scope of the Operability Test Procedure (OTP) is to demonstrate the operability of the Canister Cleaning System installed in the 105 K East Basin on the Hanford Site. The system was developed and tested per WHC-SC-SNF-TC-004, Development Test Procedure-High Pressure Water Jet System.

2.0 RESPONSIBILITIES

2.1 TEST DIRECTOR (OPERATIONS PIC)

The Test Director is responsible for the following:

- Functioning as the Person In Charge (PIC) for performance as delineated in this procedure.
- Controlling testing activities.
- Assigning responsibilities.
- Monitoring testing for compliance with the test procedures.
- Ensuring Hanford Job Hazards Analysis checklist is complete.
- Conducting prejob briefing/readiness review prior to initiating test and at the beginning of each shift.

The Test Director for this activity is:

Juan Aguilar ~~2/5/96~~ ~~2/14/96~~ ^{Should have} 4/3/96
Jeff Conley 2/6/96 4/4/96
Don White 2/8/96 4/5/96
Rod Hamilton 2/9/96 4/8/96
 4/9/96
 JBC 7/17/96

2.2 TEST ENGINEER

The Test Engineer is responsible for the following:

- Providing project engineering support during testing activities.
- Preparing test report.
- Providing liaison with the Test Director, Cognizant Engineer, Safety, QA, Environmental, and Project Technical Representative for the sign off of the OTP in Appendix C, as required.
- Reviewing test results.
- Ensuring all items requiring operational testing per this procedure are tested.

The Test Engineer for this activity is: Jeremy Crystal.

2.3 PROJECT TECHNICAL REPRESENTATIVE

The Project Technical Representative(s) (PTR) is responsible for the following:

- Overall technical coordination and direction of the special fixtures and equipment including interfacing with equipment vendors.
- Ensuring proper equipment set up, safe operation, and trouble shooting of the system as required.
- Performing a safety walk down of the system prior to the test and record completion of the walk down on the Test Data Sheet, Appendix A.

2.4 TEST PERFORMERS

Test Performers are responsible for performing test activities in accordance with this procedure.

2.5 QUALITY ASSURANCE

Witnessing by quality assurance/quality control (QA/QC) personnel may be required for the validated test results and shall be indicated by sign offs on Appendix A, Test Data Sheets.

3.0 PREREQUISITES

3.1 COMPLETION OF SUPPORTING ACTIVITIES

The following activities must be complete prior to beginning this procedure:

1. Field work completed on 1K-95-845.
2. Field work completed on 1K-95-846.
3. Field work completed on 1K-95-847.
4. Field work completed on 1K-95-848.
5. Field work completed on 1K-95-849.
6. Field work completed on 1K-96-00006/W.

J. M. Lantz 4/2/96
Test Director Date

3.2 OPERATING PROCEDURES

The following procedures will be utilized for operating equipment during implementation of this OTP, therefore, must be available:

1. HPWJS Operating Procedure, OP 07-101
2. Clean, Remove and Package Empty Canisters Procedure, OP 07-103
3. Tri-Nuc Operating Procedure, OP 07-104

3.3 SAFETY

Note: Call 911 in the event of an injury. Inform Emergency Response personnel of cause of injury. To ensure notification for high pressure water injury, operations personnel shall possess a card that is easily accessible and that outlines possible nature of the injury. These cards shall be available at the Shift Manager's office.

- 3.3.1 Report to PIC any unsafe operations and any possible pinch points.

- 3.3.2 At the beginning of each shift, conduct a prejob safety meeting to discuss Radiation Work Permit (RWP), Job Hazard Analysis (JHA), other permits/limits, and the work anticipated during the shift.
- 3.3.3 Comply with applicable RWPs and approved Radiation Area Entry Permit.
- 3.3.4 A JHA form will be required in accordance with WHC-CM-1-10, WKS 6; Pre Job Safety Planning. Existing JHAs may be applicable.
- 3.3.5 Applicable JHAs and Material Safety Data Sheets (MSDS's) shall be located in the facility test area.

3.4 SPECIAL TOOLS, EQUIPMENT, AND SUPPLIES

3.4.1 Equipment

- Canister Cleaning Fixture Assembly, Drawing No. H-1-81455
- Greenhouse Assembly and Roller Conveyor Table
- Bag Sealer
- Canister Transfer Cart
- R07 underwater/waterproof Radiation Detector Probe and Meter
- Tri Nuclear Vacuum System with Accessories and Hoses
- Underwater Lights (four each)
- Underwater Camera and Monitor
- HEPA Filter/Blower Unit with Hose

The HPWJS contains the following skid mounted components:

- Butterworth T375H, Model 615 ES Pump, 15,000 PSI @ 15 G.P.M.
- Electric Motor, Model P44G00 - Reliance Electric, 150 HP, 460 Volts, 170 Amps, 3 Phase, 60 Hz.
- Suction Surge Tank. (Galvanized, 33 gal with stand, 0-160 psig).
- Stainless Steel Filter Assembly. (10 Micron, 42 g.p.m.).
- Discharge Pressure Control Vessel. (rated 15,000 psi).
- Contactor/Starter - NEMA enclosure, 3R/4 ½ ATL Starter with stand & conduit, full voltage, reduced voltage, low amperage draw, slow start.
- March Feed Pump, M/N TE-7.5K MD, 2 HP/460V/3PH Motor-2.6 running amps.

3.4.2 Accessories

The following accessories may be utilized in various combinations to direct and control the water flow from the HPWJS Skid:

- High pressure hose .50 in. ID, 20,000 psi working pressure, 60,000 psi burst pressure, protective outer cover, 9/16 Autoclave Medium Pressure Fittings.

- Hand Held Wand with 10 ft. shielded hose and Slimline Fitting Quick disconnect, 9/16 MP (15,000 psi) Autoclave Medium Pressure Fittings.
- Three Foot Control Valves 15,000 psi. (shut off style) with manifold, piping, fittings mounted on a work stand.
- Skid Stainless Steel Drip Pan.
- Feed and Drain Hoses.
- Air Manifold and Hoses.

3.4.3 Supplies

- Cylinder of Nitrogen (to be stored outside of basin only).
- Flat Plastic Tubing (48 inches x 50 feet, three rolls).
- Shipping Containers.
- Indelible marker.

3.5 QUALIFICATIONS/TRAINING

- 3.5.1 The operators shall have completed training for the operation of the HPWJS, Canister Cleaning Fixture, and associated tooling prior to the start of this OTP.
- 3.5.2 Personnel performing these tests shall be trained and qualified by the HPWJS vendor representative or a vendor certified person for the safe start up, operation, and shutdown of the HPWJS.
- 3.5.3 Training records will be maintained by the K Basins Training organization located in MO442.

4.0 TEST CONTROL

The OTP is normally performed in the order written. Completion (successful or not) of each major section must be signed by the Test Engineer and a test log (Appendix E) entry must be made. At the discretion of the Test Director, some procedure sections may be performed out of order.

Test procedure administrative or editorial changes required during testing may be accommodated as exceptions in the released test report if the changes cannot affect operating facility safety, function or performance and will not compromise test data (WHC-CM-6-1, EP-4.2 Section 2.5).

4.1 TEST DISCREPANCIES

Test steps that fail to meet the testing criteria are dispositioned per the instructions listed below.

NOTE: It should be noted that completing a test discrepancy form is the preferred method of changing the test procedure instructions. In this case, the instructions in Section 4.2 apply.

1. Record the discrepancy in the discrepancy log (Appendix D). A discrepancy that halts the performance of the OTP or otherwise adversely affects the performance schedule will be immediately reported to the Test Engineer.
2. Determine whether to immediately correct the discrepancy, accept the discrepancy as is, or postpone correction to a later date. Record decision for disposition in the space provided on the discrepancy form (Appendix D). A discrepancy correction must meet the original intent of the OTP step unless authorized and documented on the Test Discrepancy Form.
3. Record justification for disposition in the space provided.
4. Obtain necessary signatures to postpone correction or accept condition as is. Corrections performed immediately (within the same shift) do not require approval signatures.
5. Obvious typographical or other clerical errors may be corrected immediately without completing a discrepancy sheet by simply crossing out and initialing by the Test Engineer.

4.2 TEST CHANGES

Changes to test instructions may be performed in the field by following these instructions.

1. Test instructions may be changed using the test discrepancy method or by using the ECN method. The test discrepancy method is preferred due to the ease of implementing the change in the field. It should be noted that the field copy of the OTP (including all discrepancy reports) will be released as an Operational Test Report (OTR); therefore, issuance of an ECN against the original OTP would duplicate the effort involved in releasing the OTR.
2. See Appendix D for the test discrepancy form and specific instructions related to the form.
3. Obtain all required signatures as specified in WHC-CM-6-1, *Standard Engineering Practices*, Section EP-2.2, "Change Control." Minimum requirements are specified in Appendix D, Test Discrepancy Form.
4. Obvious typographical or other clerical errors may be corrected immediately without completing a discrepancy sheet by simply crossing out and initialing by the Test Engineer.

4.3 TEST LOG

A test log (Appendix E) will be maintained by the Test Engineer. The test log will be a running narrative of test activities and status.

5.0 PROCEDURE

5.1 DESIGN CRITERIA

The following design criteria were considered and included in the design during the development phase:

- ALARA, engineered into the process.
- Minimize handling of items to be cleaned/decontaminated.
- Minimize the moving parts of the special support equipment and water jet fixture heads.
- Ease of operation by the operators.
- Ease of maintenance, replacement of degraded nozzles.
- Minimize cleaning time for each canister.

5.2 SYSTEM CRITERIA

The cleaning fixture and/or water pressure may require adjustment if acceptance is not reached during the first test. Tests may be performed as many times as necessary to reach the expected results. The following items shall be demonstrated successfully for acceptance of this OTP:

- Clean the surface of at least ten (10) canisters below Category III, Low Level Waste by reducing the dose rate to less than 100 mrem/hr at contact out of water and less than 20 mrem/hr at one meter.
- Demonstrate a controlled process for the cleaning/decontamination of canisters underwater with minimal water surface disturbance thereby maintaining air quality within the basin limits.
- Perform the OTP for cleaning/decontamination of canisters, maintaining a minimum of 12,000 psi at the HPWJS skid during the process.
- Perform the step-by-step operating procedures to accomplish OTP demonstrating the effective combinations of fixture nozzles and associated removal equipment.
- No leaks on the HPWJS and hoses during the OTP evaluation.
- Validate that routine (prerequisite) facility systems remain operational during the OTP.
- Hand held wand shall maintain a pressure of 12000 psi (visual at pump) and not leak.

In order to clean finned canisters thoroughly, it may be necessary to use the hand wand in conjunction with the nozzle cleaning cycle.

Successful completion of the OTP and acceptance of the equipment will be documented in Appendix C, Acceptance Sheet.

5.3 TEST PROCESS

Underwater and in-air dose rate measurements will be taken by the Health Physics Technicians (HPT) and recorded in Appendix A. Canisters will be retrieved from various locations in the basin and transferred to the work station table canister holder. A pre-cleaning underwater measurement of the dose rate within both cylinders of the canister will be attained and recorded. The cleaning fixture will be manipulated to clean inside and outside of the canister. A post cleaning underwater measurement of the dose rate within both cylinders will be recorded and compared to pre-cleaning measurements. These readings will provide the decontamination factor (DF). Cleaning may be repeated as necessary until the in-water dose rate reading inside the bottom of both cylinders are reading less than 100 mrem/hr or no decrease in dose rate is realized. If the post cleaning measurement is less than 100 mrem/hr at contact the canister will be removed from the water into the Drip Dry Greenhouse and surveyed as the canister breaks the water surface. If canister measurement is greater than 100 mrem/hr at contact, return to water for recleaning. If the hand held wand is utilized, note under comments section on the Test Data Sheet. If repeated cleaning is not successful, transfer to a designated storage area for later processing.

NOTE: Mark II Stainless Steel canister will require standing upright to drain the trunnions.

The following type canisters may be used for the acceptance test: Mark O, Mark I, and Mark II fuel storage canisters. Five canisters of each material type, stainless steel and aluminum, will be cleaned. At least one of the canisters will be an open bottom style and one will be a finned style for information only.

Once the canister has drip dried (no visible water), it will be removed from the hoist and placed on the roller conveyor. Each canister will be numbered 1 through 10, with an indelible marker, and the right and left cylinders annotated with "R" and "L," respectively. The HPT will obtain two smear samples from each canister; (1) center of the right cylinder, external surface, and (2) center of the left cylinder, external surface. Additionally the HPT will perform a radiation survey of each canister exterior surface. Dose rate readings of each cylinder center (in the vicinity of the smear sample locations) will be recorded in Appendix B. Smears will be bagged and transferred to the 183 K East lab for counting analysis. Analytical data obtained from the 183 K East lab will be summarized under separate report.

The canister is then bagged out through the bag-sealer into a plastic bag and placed into the transfer cart. The above process is repeated for each of the 10 canisters.

The transfer cart will hold four bagged canisters. When the cart is full it will be moved to the packaging area for unloading where the canisters will be placed into a shipping container.

5.4 PRE-TEST INSPECTION

5.4.1 The PIC, Test Engineer, and PTR shall perform a system walk down prior to start of test to ensure:

- All equipment and tools are properly installed.
- Feed water from the IXM discharge header is connected and valve IXMV-229 is in full OPEN position.
- High pressure hose connections are verified and there are no visible leaks.
- Drain hoses are properly routed and flat plastic is installed at the grating and extends to the water surface.
- Verify that all safety shields and guards are installed.
- Verify that operating procedure steps are implemented and hold points have been signed off.

5.4.2 A satisfactory walk-through shall be documented by the PTR in Appendix A.

5.5 TEST PROCEDURE STEPS

These steps may be repeated and/or rearranged at the direction of the Test Engineer/PIC/PTR as necessary to complete the cleaning of at least 10 canisters.

5.5.1 Take a background dose rate in air above water where canister will be removed at base of greenhouse and record in Appendix A.

/ 0.3.96
HPT DATE

5.5.2 Place underwater radiation detector at the canister holder, measure the background dose rate and record in Appendix A.

/ 4.3.96
HPT DATE

5.5.3 Start the Tri Nuclear Vacuum System per the operating procedure, OP 07-104.

5.5.4 Start the HPWJS per the operating procedure (OP 07-101). Then use the steps in the Clean, Remove and Package Empty Canisters Procedure (OP 07-103) for cleaning the canisters

5.5.5 Verify that water pressure is set to a minimum of 12,000 psi and sign off in Appendix A.

5.5.6 Position and manipulate the water jet fixture through one full cleaning cycle for both inside and outside of canister using the Clean, Remove and Package Empty Canisters Procedure (OP 07-103) completing step-by-step. In addition, the following details were added to procedure steps:

5.5.6.1 The pre-cleaning survey performed in Section 4.2 of OP-07-103, shall be recorded in Appendix A. Similarly, the post cleaning survey in step 14 of Section 4.3 shall be recorded in Appendix A.

Jed E. Phillips 16/18/96
HPT Supervisor DATE

NOTE: Before removing the canister from the water, the dose rate should be less than 100 mrem/hr at contact. If not, reclean until <100 mrem/hr at contact and record number after each cleaning on data sheet. If after several cleanings the dose rate is still >100 mrem/hr, contact the PIC before transferring canister to the designated storage area. The PIC will record dose rates and maintain an inventory of the rejected canisters.

5.5.6.2 Following Section 4.4, Step 6, of OP-07-103, perform smear surveys and radiation surveys as described in Section 5.3 of this procedure.

Jed E. Phillips 16/18/96
HPT Supervisor DATE

5.5.7 Repeat Sections 4.2 through 4.6 in OP-07-103 as necessary for each of the 10 canisters.

5.5.8 Shut down HPWJS and Tri-Nuclear pump per operating procedure(s).