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1	1	Cog.Eng. JB Crystal	<i>Jeremy B. Crystal</i>	5/24/95	X3-85	305 Test Coordinator GE Dixon	<i>GE Dixon</i>	5/24/95	N1-41	4	
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1	1	QA RE Lacey	<i>R E Lacey</i>	6/5/95	X3-85	SEG Proj. Mgr. CD May	<i>[Signature]</i>		X3-85	4	
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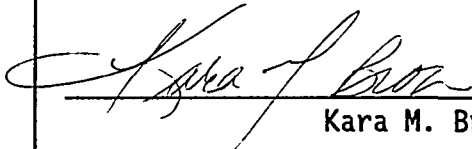
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June 5, 1995

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**ACCEPTANCE TEST PROCEDURE
HIGH PRESSURE WATER JET SYSTEM**

1.0 TEST ITEM IDENTIFICATION

The test items are a specially designed water jet cleaning fixture and the associated support equipment. These include the High Pressure Water Jet System (HPWJS), hoses, control valves, associated nozzles, handling tools, positioning and support equipment to retrieve, hold and transfer canisters.

2.0 GENERAL DESCRIPTION

The overall objective of the acceptance test is to demonstrate a combined system. This includes associated tools and equipment necessary to perform cleaning in the 105 K East Basin (KE) for achieving optimum reduction in the level of contamination/dose rate on canisters prior to removal from the KE Basin and subsequent packaging for disposal. Acceptance tests shall include necessary hardware to achieve acceptance of the cleaning phase of canisters.

This acceptance test procedure will define the acceptance testing criteria of the high pressure water jet cleaning fixture. The focus of this procedure will be to provide guidelines and instructions to control, evaluate and document the acceptance testing for cleaning effectiveness and method(s) of removing the contaminated surface layer from the canister presently identified in KE Basin. Additionally, the desired result of the acceptance test will be to deliver to K Basins a thoroughly tested and proven system for underwater decontamination and dose reduction.

3.0 TEST OBJECTIVES

Utilizing the HPWJS connected to specially designed water jet cleaning fixture:

- Clean surfaces of canister with simulated contamination ensuring safe and efficient decontamination process.
- Demonstrate a controlled process for the decontamination of canisters, equipment and miscellaneous materials underwater with minimal water surface disturbance.
- Demonstrate the best combination of water jet nozzle configuration, water pressure, water flow rate and cleaning speed to decontaminate canisters.
- Perform the acceptance testing for the most effective combinations of fixtures and nozzles as determined during development testing.

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3.1 DESIGN CRITERIA

The following design criteria shall be considered in changes to the designs developed during the development testing phase:

- As Low As Reasonably Achievable (ALARA), engineered into the process.
- Minimize handling of items to be 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.

3.2 ACCEPTANCE TEST CRITERION FOR DECONTAMINATION

The following acceptance test criterion for cleaning shall be utilized in evaluation for effectiveness of the HPWJS fixture and nozzles:

- Removal of 80% of the simulate (dye coating) from the inner and outer surfaces of each of the canisters.

3.3 TEST METHOD

The test shall be performed under water within a mocked up controlled radiological environment to simulate normal work conditions at KE Basin.

The cleaning fixture and/or water pressure and water flow may require adjustment if acceptance is not reached during the first test. The tests may be performed as many times as necessary to reach the expected results of removing 80% of the simulated contamination (dye coating) from the canisters in an effective and efficient manner. Each test re-test shall require a newly coated canister.

4.0 TEST CONDITION LIMITS

Personnel involved in these tests shall use, wear and employ required safety equipment and practices during the operation of the HPWJS and associated tools and equipment. Protective equipment shall be provided for the eyes, ears, face, head and feet.

At the start of each test and before starting the HPWJS, the Safety Checklist (Attachment A) will be completed by the Scientific Ecology Group (SEG) Technical Advisor after a walkdown of the system is completed to ensure and verify that tools and equipment are safe to operate.

Only trained and qualified personnel shall start-up and operate the HPWJS. During these tests, SEG personnel shall be present and provide overall technical direction for the set up of cleaning fixture and associated hardware. (See Section 10.2 for responsibilities)

The simulated coating material criteria is that 98% of the surfaces be coated with dye to simulate the contaminated surface.

5.0 INSTRUMENTS AND CALIBRATION

Pressure gauges are calibrated by the vendor prior to shipping. No other calibration is required.

6.0 FACILITIES, EQUIPMENT AND MATERIALS

6.1 FACILITIES

The 305 Cold Test Facility test basin will be utilized for the acceptance test program.

The HPWJS will provide water at the desired pressures and flow rate. The system can provide up to 15,000 psi with a flow rate of up to 15 gpm. The water jet skid will be located outside of the 305 building on the south east corner. Electrical service to the skid will be provided by a portable diesel generator unit connected directly to the motor control panel and grounded to a building ground. Feed water will be pumped from the test basin to the water jet pump through a 2 inch PVC line from an auxiliary feed pump. Electrical service to the feed pump will be provided via a control panel from the 480 volt, 3 phase outlet near the test basin. The high pressure hose will be run to and be discharged through a control valve and the fixtures and/or heads to the test basin. Bypass water and drains will be routed back to the basin.

A work station will be set up in the test basin on the east side at the 305 Cold Test Facility. The item to be cleaned will be placed into the test basin. A high pressure water jet nozzle with varying discharge pressures and flow rates will be directed at the surfaces to be cleaned through nozzles on the water jet fixtures. An assortment of tools and equipment will be utilized to lift, hold, place, position and manipulate canisters under water during cleaning activities. Additionally, mockups of the associated process equipment and tools may be set up separately (mocked up) to verify process flow and operability.

Any one of the following type canisters can be used for the acceptance test and shall be stained with dye to simulate surface contaminants: Mark 0, Mark I, and Mark II Fuel Storage Canisters. Both a stainless steel and aluminum canister shall be tested.

NOTE: The dye to be used is SLIDE ® Thin-line Layout Blue

6.2 EQUIPMENT SYSTEM DESCRIPTION

The HPWJS contains the following skid mounted components:

- Butterworth T375H, Model 615 ES Pump, 15,000 PSI @ 15 gpm
- 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 psi Pressure Gauge
- 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

6.3 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 inch ID X 50 foot, 15,000 psi working pressure, 60,000 psi burst pressure, protective outer cover, 9/16 MP ends (4 hoses, total of 200 ft.)
- Hand held control gun 15,000 psi (shut off style) with 10 foot shielded hose and slimline fitting quick disconnect, 9/16 MP (15,000 psi)
- Foot control valve 15,000 psi (shut off style)

7.0 OPERATION PROCEDURE

The HPWJS Operating Procedure (SEG #HPWJOPR5.GA) and/or vendor manuals shall be used for operation of the HPWJS in support of these test activities.

- 7.1 A Job Hazard Analysis (JHA) form specific to these tests will be required in accordance with WHC-CM-4-3, Standard A-3. Existing JHAs may be applicable.
- 7.2 Applicable JHAs and Material Safety Data Sheets (MSDS) shall be posted or located in the 305 Cold Test Facility test area.
- 7.3 Test area personnel shall observe safety precautions outlined in the JHA and MSDS.

WARNING!!!

If malfunction occurs, immediately stop all water jet cleaning activity and relieve system pressure per the operating procedure. Follow manufacturer's repair instructions.

8.0 MAINTENANCE AND FAILURES

Use only products intended for high pressure water jetting. Do not use damaged items. Inspect condition of all parts prior to use. Immediately inform test supervision of any water or oil leakages. Failure to do so may result in equipment damage. A logbook will be kept by the operator of the HPWJS concerning all breakdowns, repairs, or leaks. The log book will be located at or near the unit; it shall be reviewed and initialed at the end of each shift by the SEG Technical Advisor to ensure proper maintenance is performed.

- Do not alter products. Products should be used only as intended.
- Do not touch water coming from weep holes on fittings and parts with bare hands or try to stop the leakage by plugging the holes. Water coming from the weep holes is at high pressure and will cause injury by penetrating the skin.
- Check condition of all high pressure threads. Use Teflon tape only on male threads on low pressure pipe and fittings before connection. Do not let tape overlap and block end of tubing. Use "Never Seize" thread lubricant on high pressure pipe and fittings. Be sure there is a minimum engagement of four threads. Do not use pipe wrenches on high pressure pipe or fittings.
- Any protective shielding removed from high pressure tubing and hoses during servicing must be replaced when servicing is complete. Failure to replace shielding may result in serious injury to personnel or damage to the equipment.
- Prior to water jet cleaning, operate pump at low flow and low pressure (500 psi) to flush debris from system before attaching nozzle. Stop pump and relieve all pressure if adjustments are needed and prior to installing nozzle. If properly working, install nozzle, slowly increase flow and pressure until operating pressure is reached.
- Only trained personnel should perform maintenance or repair.
- In case of freezing conditions, drain water from all components.

9.0 ACCEPTANCE TEST DATA

The acceptance test data shall be recorded for the effectiveness and rate of surface area cleaned at the associated flow and pressure for each of the identified simulated tests per section 11.0, Acceptance Test Execution.

10.0 PERSONNEL REQUIREMENTS

10.1 Qualifications/Training

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.

10.2 Responsibilities

10.2.1 Test Technician

The Test Technician (305 Facility Technician) is responsible for performing the physical hands on manipulation of tools and equipment and for general facility support.

10.2.2 WHC Test Engineer

The Test Engineer is responsible for ensuring that the test is performed per the Acceptance Test Procedure and shall sign off on the Test Data Sheets verifying that the test was performed, validated and acceptable.

10.2.3 SEG Technical Advisor

The SEG Technical Advisor(s) are responsible for the overall coordination of the special fixtures and equipment including interfacing with equipment vendors for SEG procured equipment. A major role is to ensure proper equipment set up and safe operation. Prior to the acceptance test he shall perform the Safety Checklist (Attachment A) of the system and complete the initial input to the Acceptance Test Data Sheet (Attachment B).

10.2.4 Quality Assurance

Witnessing by quality assurance/quality control (QA/QC) personnel shall be required for the validated test results; and shall be indicated by sign offs on Attachment B, Acceptance Test Data Sheet.

11.0 TEST EXECUTION

11.1 Safety Meeting

A pre-job safety meeting will be conducted with test personnel prior to starting acceptance testing.

11.2 Safety Walk Down

A Pre-test safety walk down will be performed by the SEG Technical Advisor prior to starting the acceptance test.

11.3 Water Jet Fixture Configuration

The water jet fixture design is the result of the development testing. Any adjustments and/or changes to the fixture during the acceptance testing shall be noted on an "as-built" drawing to identify the final acceptance test configuration.

11.4 Test Conduct

Testing shall be documented by recording acceptance test data. The Acceptance Test Data Sheet (Attachment B) will be utilized to record specific test information. The water jet fixture and associated support equipment configurations will be tested for process flow and compatibility with interfaces. The water pressures and flows for the test configuration along with nozzle size, type and arrangement shall be recorded. Manifolds, control valve type and hose arrangement will also be included and recorded in a sketch or an as-built drawing.

11.5 Set Up

The operations procedure for the HPWJS and/or vendor manual shall be utilized in conjunction with this acceptance test procedure. This skid mounted pump system provides water at various pressures and flow rates. The high pressure hose will be connected through a manifold to 2 foot control valves. High pressure hose/pipe will be connected to the under water jet cleaning fixtures from the foot control valves.

Special handling tools and equipment will be used for positioning and manipulating the canister through the cleaning jet fixture. These fixtures may be supported from the hand rail of the test basin. A crane or jib may be used to manipulate the canisters.

11.6 Scope

Test the effectiveness of fixtures configuration for cleaning the simulated surface contamination on a canister underwater. The test will be performed on at least one of both stainless steel and aluminum material type canisters.

12.0 TEST STEPS

The following test steps require QA/QC validation on the Acceptance Test Data Sheet (Attachment B):

- 12.1 Connect hoses and place the water jet fixture into the test basin work station.
- 12.2 Place the pre-coated canister into the test basin work station holder.
- 12.3 Start-up the HPWJS following the detailed steps in the HPWJS Operation Procedure.
- 12.4 Set the water pressure at the skid and control water flow to the fixture by operating the foot control valve(s).
- 12.5 Position and manipulate the canister and/or the water jet fixture until the item appears to be clean.
- 12.6 Record time, number of passes and pressure and flow rate for each test.
- 12.7 Remove the cleaned canister from the water and inspect.
- 12.8 Document level of "decontamination" on the Acceptance Test Data Sheet (Attachment B) percentage of paint/dye removed from the surface of the canister. Acceptance is removal of 80% of the dye.
- 12.9 Repeat steps 12.1 through 12.8 as necessary for each of the canister material type acceptance tests.

13.0 DISPOSITION OF DEBRIS ITEM

Save for reuse in future testing.

14.0 ACCEPTANCE DATA SHEETS

Data will be recorded on the Test Data Sheet. An SEG Technical Advisor is responsible for initially filling out the Test Data Sheet. It is the responsibility of the WHC Test Engineer to maintain the test records and a daily shift log of test activities.

A Test Data Sheet Index Log (Attachment C) shall also be maintained by the WHC Test Engineer starting with number 001.

ATTACHMENT A
SAFETY CHECKLIST

* SAFETY CHECK LIST *		Test Log Number _____	
FOR HIGH PRESSURE WATER JETTING SYSTEM			
Date _____		SEG Technical Advisor _____	
TIME: _____			
INSPECTION PERFORMED BY: _____			
		YES	NO
1.	Has the Pre-job briefing been completed?	—	—
2.	Are personnel trained and qualified to operate the HPWJS?	—	—
3.	Is personnel safety equipment available at the job site?	—	—
4.	Have the work area and the skid area been roped off with proper signs posted?	—	—
5.	Have precautions been taken to protect electrical equipment?	—	—
6.	Is the area cleared of tripping hazards?	—	—
7.	Is the operating pressure of the fittings greater than the planned test pressure? (max test pressure is 15,000 psi)	—	—
8.	Are all hoses, lances, guns and foot control valves rated for the maximum operating pressure?	—	—
9.	Are all fittings, hoses, lances, guns and foot control valves in good working condition?	—	—
10.	Is the feed water pump properly placed in the basin and connected to the pump skid and has it been flushed?	—	—
11.	Has the filter and Y-strainer been checked for cleanness and is it in good operating condition?	—	—

		YES	NO
12.	Are the skid drains, cooling water and dump water properly routed?	___	___
13.	Are the safety shrouds on guns, valves and hoses?	___	___
14.	Confirm electrical service connections are properly connected and power from the Portable Generator is available?	___	___
15.	Have the high pressure hoses been flushed and all air removed prior to nozzle being installed?	___	___
16.	Is the cooling water to the plungers operating properly?	___	___
17.	Has the oil level been checked on the sight glass for the power end?	___	___
18.	Has the Pressure Regulator been charged with nitrogen to the desired operating pressure?	___	___
19.	Has hookup, including pipes, hoses and connections, been pressure tested with water at the maximum operating pressure?	___	___
20.	Is the dump pressure regulator drain line connected properly?	___	___
21.	Has Job site been examined for environmental considerations, with action as appropriate?	___	___
22.	Are all control systems operational?	___	___

REMARKS:

ATTACHMENT B
ACCEPTANCE TEST DATA SHEET

ACCEPTANCE TEST DATA SHEET	
HIGH PRESSURE WATER JET SYSTEM -	Test Log Number _____
SAFETY WALK DOWN COMPLETED and PREPARED BY: _____ (Print)	
Signature of SEG Technical Advisor _____	
Date _____	Time _____
Test Engineer _____	Test Technician _____
Test Debris Item _____	Material Type _____
Water Jet Fixture Configuration Number _____	
Nozzle Size and Type _____	
Control Valve Configuration _____	
TEST DATA:	
Pressure _____ psi	Flow Rate _____ g.p.m.
Cleaning Time _____ minutes	Number of Passes _____
Test Objectives: Have the following test objectives have been met?	
* Clean surfaces with simulated contamination to ensure safety and efficient decontamination process.	Yes ___ No ___
* Demonstrate a controlled process for the decontamination of canisters, equipment, and miscellaneous materials underwater with minimal water surface disturbance.	Yes ___ No ___
* Demonstrate the best combination of nozzle configuration, water pressure, water flow rate and cleaning speed to clean canisters as identified during the development testing.	Yes ___ No ___
* Perform the acceptance testing for the most effective combinations of fixtures and nozzles as determined during the development testing.	Yes ___ No ___
Acceptance Test Criterion:	
The following acceptance test criterion has been met?	
1. Removal of 80% of the simulate (dye coating) from the debris surface of each of the canisters.	Yes ___ No ___

Remarks on cleanness _____

Other Remarks _____

Single Line Sketch of Fixture and Control Valve Arrangement or Drawing Number # _____

Signatures

QC Witness (When required)

Date:

WHC Test Technician

Date:

WHC Test Engineer

Date:

ATTACHMENT C
* ACCEPTANCE TEST DATA SHEET INDEX LOG *

Test Log Number	Date	Test Engineer
001		
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