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Title/Desc:

ACCEPTANCE TEST REPORT FOR THE HIGH PRESSURE WATER  
JET SYSTEM FEED PUMP

Pages: 15



sta # 19

# ENGINEERING DATA TRANSMITTAL

MAR 11 1996

1. EDT 140399

|  |  |   |
|--|--|---|
| 2. To: (Receiving Organization)<br>SNF K-BASINS PROJECTS | 3. From: (Originating Organization)<br>SNF K-BASINS PROJECTS | 4. Related EDT No.:<br>140394             |
| 5. Proj./Prog./Dept./Div.:<br>Spent Nuclear Fuel         | 6. Cog. Engr.:<br>J. B. Crystal                              | 7. Purchase Order No.:<br>N/A             |
| 8. Originator Remarks:<br>For Release                    |  | 9. Equip./Component No.:<br>N/A           |
|  |  | 10. System/Bldg./Facility:<br>105-KE      |
| 11. Receiver Remarks:                                    |  | 12. Major Assm. Dwg. No.:<br>N/A          |
|  |  | 13. Permit/Permit Application No.:<br>N/A |
|  |  | 14. Required Response Date:<br>N/A        |

| 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 Designator | Reason for Transmittal | Originator Disposition | Receiver Disposition |
| 1                    | WHC-SD-SNF-ATR-016       | ALL           | 0            | Acceptance Test Report High Pressure Water Jet System Feed Pump | Q                   | 2                      | 1                      |                      |
|                      |                          |               |              |   |                     |                        |                        |                      |
|                      |                          |               |              |   |                     |                        |                        |                      |
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| 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                | 4. Review                           | 1. Approved              | 4. Reviewed no/comment  |
|   |  | 2. Release                 | 5. Post-Review                      | 2. Approved w/comment    | 5. Reviewed w/comment   |
|   |  | 3. Information             | 6. Dist. (Receipt Acknow. Required) | 3. Disapproved w/comment | 6. Receipt acknowledged |

| (G)    | (H)  | 17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures) |                      |          |          |                  |                      |          |          | (G)    | (H)  |
|--------|------|--|----------------------|----------|----------|------------------|----------------------|----------|----------|--------|------|
| Reason | Disp | (J) Name   | (K) Signature        | (L) Date | (M) MSIN | (J) Name         | (K) Signature        | (L) Date | (M) MSIN | Reason | Disp |
| 1      | 1    | Cog. Eng. J.B. Crystal   | <i>J. B. Crystal</i> | 2/8/96   | X3-85    | SNF Project File |                      |          | X3-85    | 3      |      |
| 1      | 1    | Cog. Mgr. B.S. Tokasmit  | <i>B.S. Tokasmit</i> | 2/26/96  | X3-85    | M.J. Schliebe    | <i>M.J. Schliebe</i> | 3/7/96   | 6-13     | 3      | 1    |
| 1      | 1    | QA RE Lacey  | <i>RE Lacey</i>      | 3/11/95  | X3-85    | G.E. Dixson      | <i>G.E. Dixson</i>   | 3-4-96   | N1-41    | 1      | 1    |
|        |      | Safety   |                      |          |          |                  |                      |          |          |        |      |
|        |      | Env.   |                      |          |          |                  |                      |          |          |        |      |

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|--|--|--|---|
| 18. <i>J. Crystal</i><br>Signature of EDT Originator<br>Date: 2/8/96 | 19. <i>J. Crystal</i><br>Authorized Representative Date for Receiving Organization<br>Date: 2/8/96 | 20. <i>D.L. Chase</i><br>Cognizant Manager<br>Date: 3/8/96 | 21. DOE APPROVAL (if required)<br>Ctrl. No. N/A<br><input type="checkbox"/> Approved<br><input type="checkbox"/> Approved w/comments<br><input type="checkbox"/> Disapproved w/comments |
|--|--|--|---|

# Acceptance Test Report for the High Pressure Water Jet System Feed Pump

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

140394 (JEB 3/11/96)

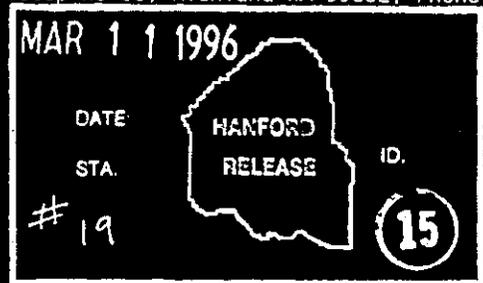
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Abstract: This document summarizes results of WHC-SD-SNF-ATP-016, Rev. 0, Acceptance Test Procedure High Pressure Water Jet System, conducted on December 20, 1995 and December 22, 1995.

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Yanis Braden 3/12/96  
Release Approval Date

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TABLE OF CONTENTS

|     |   |     |
|-----|---|-----|
| 1.0 | INTRODUCTION . . . . .                    | 1   |
| 2.0 | DESCRIPTION OF TEST . . . . .             | 1   |
| 3.0 | TEST METHOD AND TEST EQUIPMENT . . . . .  | 2   |
| 4.0 | TEST RESULTS . . . . .                    | 2   |
| 5.0 | CONCLUSIONS AND RECOMMENDATIONS . . . . . | 3   |
| 6.0 | DISPOSITION OF TEST ITEM . . . . .        | 3   |
| 7.0 | REFERENCES . . . . .                      | 3   |
|     | APPENDIX A . . . . .                      | A-i |
|     | APPENDIX B . . . . .                      | B-i |

## 1.0 INTRODUCTION

Acceptance testing of the High Pressure Water Jet System, without a skid mounted feed pump, was performed earlier in the year under a separate acceptance test procedure (WHC-SD-SNF-ATP/ATR-010, Rev. 0). For this earlier testing the HPWJS configuration consisted of a skid supporting a Butterworth high pressure water pump, surge tank, electrical disconnect and controller, pressure adjustment controls, and associated hoses.

The HPWJS supplies water at high pressure (15,000 psi @ 15 gpm) to nozzles specially designed to clean the surfaces of empty fuel storage canisters. The nozzles are part of a Canister Cleaning Station consisting of metal girder framework, foot pedal manifold to direct water, associated hoses, operating controls, and an underwater support table designed to hold empty fuel storage canisters during cleaning. The skid and it's attached equipment will be remotely located and connected to the canister cleaning station by a high pressure water supply hose.

Acceptance testing of the High Pressure Water Jet System (HPWJS) Feed Pump was performed in the 305 Building Cold Test Facility on the 20th and 22nd of December, 1995. Testing was conducted for the Spent Nuclear Fuel group per WHC-SD-SNF-ATP-016, Rev. 0. The following personnel were involved in the test:

- \* Greg Dixon, Engineer, FMEF Operations/Engineering (work ordered to SNF Engineering Support)--Test Engineer.
- \* Dennis Larson, Technician, Engineering Test Lab (305 Building)--HPWJS Technician.
- \* Bob Loper, Technician, Engineering Test Lab (305 Building)--Safety Observer.
- \* Art Fleming, Engineer, Master-Lee Company--HPWJS Operator.

## 2.0 DESCRIPTION OF TEST

Subsequent to the original acceptance testing of the HPWJS, a feed pump was installed to ensure a positive suction head to the Butterworth pump during system operation. A submersible pump was used previously as a temporary method of supplying feed water to the HPWJS. Technical data for the pump is as follows:

|                             |  |
|-----------------------------|--|
| Manufacturer or supplier:   | March Manufacturing, Inc.                |
| Manufacturer's designation: | TE-7.5K-MD "Orbital" Magnetic Drive Pump |
| Model number:               | 2VF182TTFR5501BEP                        |
| Part number:                | 156-008-10                               |
| Serial number:              | KK-77224                                 |

This test was performed to verify that the model TE-7.5K-MD "Orbital" Magnetic Drive Pump complied with acceptance criteria defined in Section 2.3 of WHC-SD-SNF-ATP-016, Rev. 0. The pump was required to: (1) maintain pressure in the skid mounted surge tank at greater than 30 psi for the duration of the test, while (2) having no visual signs of leakage for the duration of the test.

### 3.0 TEST METHOD AND TEST EQUIPMENT

The acceptance test consisted of starting up the HPWJS and verifying proper system response prior to entering into the testing. Electrical indications were as expected on the pump's controller. The white "Power On" light was lit with power to the controller. Starting the feed pump caused the green "Run" light to illuminate, and shutting down the pump caused the light to extinguish.

With the initial system operation as expected the testing began. The HPWJS was brought up to pressure (12,000-15,000 psi) and each foot pedal was depressed (allowing flow through the corresponding nozzles) in alternating 3 minute increments. During each 3 minute period the surge tank pressure was observed and recorded. During this time the piping and feed pump were monitored for leaks.

Surge tank pressure was monitored using the surge tank pressure gage, PI-100 (Standard's Lab Calibration sticker number 752-31-04-084). The lights in question were mounted on the feed pump control station.

### 4.0 TEST RESULTS

The pump's controller displayed the proper electrical indications. Power applied to the controller lit the white "Power On" light. When the start button was depressed, the green "Run" light illuminated, and when the pump was stopped the green "Run" light extinguished.

For all three nozzles operating with a Butterworth pump discharge pressure of 15,000 psig, the surge tank pressure (PI-100) was 38 psig. This pressure remained constant throughout the test.

The feed pump and its piping were inspected at the start of the test and each time the technician shifted nozzles. At the end of the three minute operation of the hand lance (step 6.5 of the acceptance test traveler) the last of the nozzles to be operated, a small leak, or "weep", was noted on the union on the discharge side of the feed pump.

Having already completed step 6.5 and recorded the data for step 6.6, the Test Engineer decided to proceed to step 6.7, shut down the HPWJS and the feed pump and repair the leak, then retest the pump for leaks as an "Exception". The Test Technician located a new union the next day and

replaced the leaking union. The leaking union had a scored mating surface. The next morning December the 22nd, the Test Engineer and Test Technician ran the feed pump for 10 minutes on it's own. There were no leaks on the feed pump or it's associated piping or fittings. This "Exception" was recorded in the Notes column of the test traveler (Appendix B) next to Operation 7.0.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

The Test Engineer was satisfied that the newly installed TE-7.5K-MD "Orbital" Magnetic Drive High Pressure Water Jet System Feed Pump satisfied all acceptance test criteria, as listed in section 2.3 of WHC-SD-SNF-ATP-016, Rev. 0.

## 6.0 DISPOSITION OF TEST ITEM

The HPWJS skid is destined for eventual relocation to the 105-KE Basin in support of the Debris Removal Project. Use of the HPWJS in the KE Basin may occur following the release of the Acceptance Test Report and revising the drawings to "as-built".

## 7.0 REFERENCES

WHC-SD-SNF-ATP-016, Rev. 0; Acceptance Test Procedure High Pressure Water Jet System Feed Pump

WHC-IP-1026, Rev. 1; Engineering Practice Guidelines, Appendix K, Figure 4

APPENDIX A  
COMPLETED SAFETY CHECKLIST  
FOR THE HIGH PRESSURE WATER JET SYSTEM

ATTACHMENT A - SAFETY CHECKLIST FOR THE HPWJS

DATE: 12-20-95 TIME: 9:00 AM

INSPECTION PERFORMED BY: \_\_\_\_\_ SIGNATURE: D. C. Larson

|     |  | 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.  | Has the work area and the skid area both 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) <i>Nozzles used @ 15K, but undranked.</i> | ✓   |    |
| 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. | Have the Filter and Y-strainer been checked for cleanliness and in good operating condition?   | ✓   |    |
| 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. | Has 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?   | ✓   |    |

| ATTACHMENT A - SAFETY CHECKLIST FOR THE HPWJS   |  |                                     |    |
|---|--|-------------------------------------|----|
| DATE: <u>12-20-95</u> TIME: <u>9:00 AM</u>  |  |                                     |    |
| INSPECTION PERFORMED BY:  |  | SIGNATURE: <u>D. C. [Signature]</u> |    |
|   |  | Yes                                 | No |
| 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?   | ✓                                   |    |
| <p><b>REMARKS:</b></p> <p>Step 7:<br/>                     Nozzles are undervalued for ISK, but been used @ ISK for all testing done w/ them @ ETL 305<br/>                     DCY</p> |  |                                     |    |

APPENDIX B  
COMPLETED TEST TRAVELER  
FOR THE HIGH PRESSURE WATER JET SYSTEM

|  |   |                                   |  |
|--|---|-----------------------------------|--|
| ATTACHMENT B - TEST TRAVELER   |   | Page<br>1 of 4                    | Number   |
| Job Description<br>Testing of the March TE-7.5K-MD Feed Pump for the HPWJS |   | Work Order No.<br>N/A             | Prepared by<br>D. B. Teachout  |
| Test Engineer Approval   | Phone   | Date Required                     | Approval Designator<br>Q   |
| System Manager Approval<br>D. S. Takasumi<br>See EDT # 140394              | Phone<br>2-0249   | 305 Bldg Manager Approval<br>Date | QA Approval<br>See EDT # 140394  |
| Operation Number   | Test Instruction  | Ref., Dwg., Proc., Spec.          | Completion Sig/Stamps  |
| 1.0  | Conduct a "pre-job briefing" of operations and procedures required to complete the test. Verify completion of Attachment A, Safety Checklist for the HPWJS. |                                   | <u>T O C R</u><br><u>E G O</u>   |
| 2.0  | Verify nozzle, hose, and fitting configurations are established similar to the configuration that will be delivered to the basin.                           |                                   | <u>T O C R</u><br><u>E G O</u>   |
| 3.0  | Verify the March TE-7.5K-MD feed pump is mounted to the HPWJS skid with all connections, electrical and mechanical, made.                                   |                                   | <u>T O C R</u><br><u>E G O</u>   |
|  |   | Date                              | Notes  |
|  |   | 12-20-95                          | ATTENDED PRE-JOB BRIEF:<br>D. S. Takasumi, D. C. Pearson<br>D. B. Teachout<br>W. H. [Signature]  |
|  |   | 12-20-95                          |  |
|  |   | 12-20-95                          | White "power on" indication light illuminated on the feed pump control panel?<br>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> |

TEST CONTROL COPY

| TEST TRAVELER (Continuation Sheet) |  | Page                     | 2 of 4                    | Number   |  |
|------------------------------------|--|--------------------------|---------------------------|----------|--|
| Operation Number                   | Test Instruction   | Ref., Dwg., Proc., Spec. | Completion Sig/Stamps     | Date     | Notes  |
| 4.0                                | Calibration Checks: Verify that the surge tank pressure gauge, PI-100, has valid calibration data.   |                          | <u>TDCZ</u><br><u>E60</u> | 12-20-95 | STANDARD LAB STRICKER #<br>752-31-04-084   |
| 5.0                                | Start up the HPWJS per standard operating procedure and raise pressure to greater than 13,000 psi. Maintain pressure between 13,000 - 15,000 psi throughout the test.<br><br>Conduct a quick visual check of the system and indicate the appropriate responses to the questions in the NOTES column. |                          | <u>TDCZ</u><br><u>E60</u> | 12-20-95 | Green "run" light illuminated on the feed pump control<br>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/><br><br>Any leakage noted from the feed pump?<br>Yes <input type="checkbox"/> No <input checked="" type="checkbox"/><br><br>Gauge PI-100 reading in the range of 30-60 psi?<br>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> 38 PSI |
| 6.0                                | Run the HPWJS per the following sequence.  |                          |                           |          |  |
| 6.1                                | Depress the foot pedal for the interior cleaning nozzle. Hold in this position for 3 minutes.  |                          | <u>TDCZ</u><br><u>E60</u> | 12-20-95 | 38 PSI<br>0910-0915  |

TEST CONTROL COPY

| TEST TRAVELER<br>(Continuation Sheet) |  | Page<br>3 of 4           | Number                   |          |   |
|---------------------------------------|--|--------------------------|--------------------------|----------|---|
| Operation Number                      | Test Instruction   | Ref., Dwg., Proc., Spec. | Completion Sig/Stamps    | Date     | Notes                                   |
| 6.2                                   | Verify surge tank pressure, as indicated on gauge PI-100, indicates between 30-60 psi. Record surge tank pressure in the NOTES column.                     |                          | <u>TDC</u><br><u>E60</u> | 12-20-95 | Record surge tank pressure.<br>38 psi   |
| 6.3                                   | Release the foot pedal for the interior cleaning nozzle and depress the foot pedal for the exterior cleaning nozzles. Hold in this position for 3 minutes. |                          | <u>TDC</u><br><u>E60</u> | 12-20-95 | USED DENNIS LABS'S STOP WATCH FOR TIME. |
| 6.4                                   | Verify surge tank pressure, as indicated on gauge PI-100, indicates between 30-60 psi. Record surge tank pressure in the NOTES column.                     |                          | <u>TDC</u><br><u>E60</u> | 12-20-95 | Record surge tank pressure.<br>38 psi   |
| 6.5                                   | Release the foot pedal for the exterior cleaning nozzles and depress the foot pedal for the hand lance. Hold in this position for 3 minutes.               |                          | <u>TDC</u><br><u>E60</u> | 12-20-95 | USED DENNIS LABS'S STOP WATCH FOR TIME. |
| 6.6                                   | Verify surge tank pressure, as indicated on gauge PI-100, indicates between 30-60 psi. Record surge tank pressure in the NOTES column.                     |                          | <u>TDC</u><br><u>E60</u> | 12-20-95 | Record surge tank pressure.<br>38 psi   |

TEST CONTROL COPY

