ENCLOSURE 4

BRUNSWICK STEAM ELECTRIC PLANT, UNITS 1 AND 2
NRC DOCKET NOS. 50-325 & 50-324
OPERATING LICENSE NOS. DPR-71 & DPR-62
REQUEST FOR LICENSE AMENDMENT
SERVICE WATER SYSTEM

1-PT-24.6.4

SERVICE WATER SYSTEM HYDRAULIC PERFORMANCE TEST (INCLUDING RESULTS)

DATE COMPLETED _____
UNIT 1 % POWER 0 GMWE 0
FOREMAN/SUPERVISOR James M Lawson
REASON FOR TEST (check one or more) :
_____ Routine Surveillance
_____ OWP # _____
_____ WR/JO # _____
✓ Other (Explain)
A at Frequency below.

CAROLINA POWER & LIGHT COMPANY

BRUNSWICK STEAM ELECTRIC PLANT

UNIT 1

PROCEDURE TYPE:	PERFORMANCE TEST
NUMBER:	PT-24.6.4
PROCEDURE TITLE:	SERVICE WATER SYSTEM HYDRAULIC PERFORMANCE TEST
FREQUENCY:	A. Once every Refueling B. Heat Exchanger Performance Monitoring as required

REVISION 1

APPROVED BY: R E Helme — General Manager/ Manager - Technical Support

1/15/91 — Date

LIST OF EFFECTIVE PAGES

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1.0 PURPOSE

1.0.1 The purpose of this Performance Test is to demonstrate, at refueling outage frequency, the Service Water System is hydraulically capable of meeting the design basis flow requirements to safety related components and provide a data source for non-modification performance trending of the Service Water System and individual components thereof. This test is not intended to demonstrate particular set flow values at each component, but will collect data from which performance can be extrapolated. This test will also quantify Service Water leakage from the Nuclear to Conventional Header.

Flow measurement at individual components will be accomplished utilizing Controlotron portable (temporary) ultrasonic flow metering systems. To observe system trending from performance to performance of this test the locations where the flow measurement are taken and the equipment set up must be duplicated as close as possible every time this procedure is performed. Attachments 1 through 17 provide the means to accomplish this by establishing and recording initial setup locations and documenting any deviations thereafter.

2.0 REFERENCES

2.0.1 Technical Specification Interpretation, TSI 84-06 (Rev. 10)

2.0.2 FSAR Section 5.4.7, Residual Heat Removal System

2.0.3 FSAR Section 7.4.3, Residual Heat Removal (RHR) System, Reactor Shutdown Cooling System Mode

2.0.4 FSAR Section 9.2.1, Service Water System

2.0.5 FSAR Section 9.2.2, Reactor Building Component Cooling Water System

2.0.6 FSAR Section 15.0, Accident Analysis

2.0.7 Operating Procedure OP-43, Service Water System

2.0.8 Operating Procedure OP-43.1, Chlorination System

2.0.9 Operating Procedure OP-44, Turbine Building Closed Cooling Water System

2.0.10 Operating Procedure OP-29, Circulating Water System

2.0.11 System Description SD-43, Service Water System

2.0.12 Drawings

D-20041, Sheets 1, 2 and 3, Service Water System, Unit 1

D-02274, Sheets 1 and 2, Diesel Generator Service Water and Demineralized Water System, Units 1 and 2

D-25037, Sheets 1 and 2, Reactor Building Service Water System, Unit 1

2.0.13 The Following Controlotron™ Field Manuals, Bulletins and Technical Advisories.

2.0.13.1 Field Manual 990PFM-1C-A

2.0 REFERENCES(continued)

2.0.13.2 Field Manual 990PFM-2

2.0.13.3 Bulletin 991XA

2.0.13.4 Technical Advisories #8, #3 & #1.

3.0 GENERAL PREREQUISITES

3.0.1 No other testing or maintenance is in progress that will adversely affect the performance of this test.

4.0 GENERAL PRECAUTIONS AND LIMITATIONS

4.0.1 When taking readings to be recorded during the performance of this procedure, the indicator/pointer fluctuation should be reduced to a minimum. An instrument isolation valve upstream of the instrument may be throttled to reduce fluctuation.

4.0.2 One RHR Pump Room Cooler shall be aligned to the NSW Header whenever the NSW Header is in service.

4.0.3 Unit 1 shall be in Mode 4 or 5 during the performance of this procedure.

4.0.4 Steps can be performed out of sequence with the concurrence of the Shift Foreman and the responsible engineer.

5.0 RESPONSIBILITIES

5.1 Responsible Engineer: Determine system components which require flow monitoring during the performance of this procedure, direct the performance of this procedure to include mobilization of forces for setup of temporary flow monitoring instrumentation, collection of data and transmit the collected data to NED for analysis.

5.2 Operations: Operate plant systems, equipment and valves as directed by this procedure.

5.3 Maintenance: Install appropriate test equipment and gauges as directed by the responsible engineer.

5.4 NED: Analyze collected data and determine if system capabilities are within the system design basis.

6.0 SPECIAL TOOLS AND EQUIPMENT

6.1 The following test gauges:

			Preferred Range	Acceptable Range
6.1.1	Test Gauge #1	Heisse	0 - 150 psig	0 - 100 psig
6.1.2	Test Gauge #2	Heisse	0 - 150 psig	0 - 100 psig
6.1.3	Test Gauge #3	Heisse	0 - 150 psig	0 - 100 psig
6.1.4	Test Gauge #4	Heisse	0 - 150 psig	0 - 100 psig

6.2 Uniflow Ultrasonic Flowmeter System 990 Portable Computers (Controlotron) SP version (115 VAC Power) Group 4 (operates transducers sizes 1, 2, 3 and 4) with the appropriate transducer, cables and mounting tracks as necessary to support flow data collection during this procedure.

6.0 SPECIAL TOOLS AND EQUIPMENT(continued)

6.3 Ultrasonic wall thickness measuring instruments.

NOTE:

A suitable test gauge shall have a total range of less than or equal to three times the reference value for the parameter being monitored and an adequate range to prevent damage during use.

6.4 A suitable test instrument may be installed in place of any instrument to obtain data.

6.4.1 Instrument replaced by test instrument _____

6.4.2 Shift Foreman's permission to replace Instrument _____

6.4.3 Range of test instrument _____

6.4.4 Instrument I.D. No. _____

6.4.5 Calibration due Date _____

6.5 The following installed instruments with the required data recorded below:

6.5.1	1-SW-PDIC-138	Calibration Date	4/9/90
6.5.2	1-SW-PDIC-138	Calibration Due Date	4/8/91
6.5.3	1-SW-PDIC-140	Calibration Date 1-1-91	~~4/10/90~~ 1-24-91
6.5.4	1-SW-PDIC-140	Calibration Due Date	4/8/91
6.5.5	1-SW-PI-131-1	Calibration Date	3/8/90
6.5.6	1-SW-PI-131-1	Calibration Due Date	3/4/91
6.5.7	1-SW-PI-144	Calibration Date	7/27/90
6.5.8	1-SW-PI-144	Calibration Due Date	3/11/91
6.5.9	1-SW-PI-145	Calibration Date	7/28/90
6.5.10	1-SW-PI-145	Calibration Due Date	3/11/91
6.5.11	1-SW-PI-143-1	Calibration Date	3/8/90
6.5.12	1-SW-PI-143-1	Calibration Due Date	3/4/91
6.5.13	1-SW-FI-5114	Calibration Date	2/13/90
6.5.14	1-SW-FI-5114	Calibration Due Date	8/21/91
6.5.15	1-SW-FI-5115	Calibration Date	2/13/90
6.5.16	1-SW-FI-5115	Calibration Due Date	8/21/91
6.5.17	1-SCW-LT-285	Calibration Date	5/25/89
6.5.18	1-SCW-LT-285	Calibration Due Date	6/1/92
6.5.19	1-SW-FT-1158	Calibration Date	1/4/91

6.5.20	1-SW-FT-1158	Calibration Due Date	11/4/91
6.5.21	1-E11-FT-N007A	Calibration Date	7/31/89
6.5.22	1-E11-FT-N007A	Calibration Due Date	1/28/91
6.5.23	1-E11-FI-R602A	Calibration Date	11/25/90
6.5.24	1-E11-FI-R602A	Calibration Due Date	4/29/91
6.5.25	1-E11-FT-N007B	Calibration Date	7/31/89
6.5.26	1-E11-FT-N007B	Calibration Due Date	1/28/91
6.5.27	1-E11-FI-R602B	Calibration Date	10/11/90
6.5.28	1-E11-FI-R602B	Calibration Due Date	2/25/91

7.0 ACCEPTANCE CRITERIA

7.1 As such, there is no set flow rate established for the individual Service Water System components or the system as a whole. Ongoing modifications and system degradation due to age, corrosion and wear alter flow not only at the individual components, but throughout the whole system. Data collected by this procedure will be analyzed by NED for permissible near and long term operability.

8.0 TEST EQUIPMENT SETUP

8.0.1 Obtain permission form the Shift Foreman to perform this section

8.0.2 Setup the Controlotron flow measuring equipment at the required sites and perform the zero flow calibrations as instructed in section 11.0 of this procedure.

8.0.3 Install Test Gauge #1 at Pressure Switch 1-SW-PS-3213 by performing the following:

8.0.3.1 Remove the compression cap and attach temporary tubing to SW-PS-3213 Instrument Drain Valve, 1-SW-PS-3213-6. JWM

8.0.3.2 Temporarily install Test Gauge #1 at a convenient location on the horizontal centerline of the Conventional Header pipe. JWM

8.0.3.3 Route the temporary tubing installed in step 8.0.3.1 to Test Gauge #1. JWM

****

CAUTION

The next step may initiate the auto start of the standby Nuclear Service Water Pump or the standby Conventional Service Water Pump, depending on present system alignment. Flush rate should be kept to a very low flow rate and volume.

****

8.0.3.4 Slowly throttle open 1-SW-PS-3213 Instrument Drain Valve, 1-SW-PS-3213-6, and flush the tubing until the discharge is clear, then close the valve. JWM

8.0 TEST EQUIPMENT SETUP(continued)

8.0.3.5 Attach Test Gauge #1 to the tubing installed in the above step. JWM

8.0.3.6 Fully open 1-SW-PS-3213 Instrument Drain Valve, 1-SW-PS-3213-6. JWM

8.0.3.7 Vent the tubing to Test Gauge #1 until a steady stream of water is emitted. JWM

8.0.3.8 Close 1-SW-PS-3213 Instrument Drain Valve, 1-SW-PS-3213-6. JWM

8.0.4 Install Test Gauge #2 at Pressure Switch 1-SW-PS-3214 by performing the following:

8.0.4.1 Remove the compression cap and attach temporary tubing to 1-SW-PS-3214 Instrument Drain Valve, 1-SW-PS-3214-6. JWM

8.0.4.2 Temporarily install Test Gauge #2 at a convenient location on the horizontal centerline of the Unit 1 Nuclear Header pipe. JWM

8.0.4.3 Route the temporary tubing installed in step 8.0.4.1 to Test Gauge #2. JWM

****

CAUTION

The next step may initiate the auto start of the standby Nuclear Service Water Pump or the standby Conventional Service Water Pump, depending on present system alignment. Flush rate should be kept to a very low flow rate and volume.

****

8.0.4.4 Slowly throttle open 1-SW-PS-3214 Instrument Drain Valve, 1-SW-PS-3214-6, and flush the tubing until the discharge is clear, then close the valve. JWM

8.0.4.5 Attach Test Gauge #2 to the tubing installed in the above step. JWM

8.0.4.6 Fully open 1-SW-PS-3214 Instrument Drain Valve, 1-SW-PS-3214-6. JWM

8.0.4.7 Vent the tubing to Test Gauge #2 until a steady stream of water is emitted. JWM

8.0.4.8 Close 1-SW-PS-3214 Instrument Drain Valve, 1-SW-PS-3214-6. JWM

8.0.5 Install Test Gauge #3 at Pressure Indicator 1-SW-PI-819 by performing the following:

8.0.5.1 Remove the compression cap and attach temporary tubing to 1-SW-PI-819 Instrument Drain Valve, 1-SW-PI-819-6. DCW

8.0.5.2 Slowly throttle open 1-SW-PI-819 Instrument Drain Valve, 1-SW-PI-819-6 and flush the tubing until the discharge is clear, then close the valve. DCW

8.0 TEST EQUIPMENT SETUP(continued)

8.0.5.3 Attach Test Gauge #3 to the tubing installed in the above step. DLV

8.0.5.4 Fully open 1-SW-PI-819 Instrument Drain Valve, 1-SW-PI-819-6. DLV

8.0.5.5 Vent the tubing to Test Gauge #3 until a steady stream of water is emitted. DLV

8.0.5.6 Close 1-SW-PI-819 Instrument Drain Valve, 1-SW-PI-819-6. N/A

8.0.6 Install Test Gauge #4 at Pressure Indicator 1-SW-PI-821 by performing the following:

8.0.6.1 Remove the compression cap and attach temporary tubing to 1-SW-PI-821 Instrument Drain Valve, 1-SW-PI-821-6. CR

8.0.6.2 Slowly throttle open 1-SW-PI-821 Instrument Drain Valve, 1-SW-PI-821-6 and flush the tubing until the discharge is clear, then close the valve. CR

8.0.6.3 Attach Test Gauge #4 to the tubing installed in the above step. CR

8.0.6.4 Fully open 1-SW-PI-821 Instrument Drain Valve, 1-SW-PI-821-6. CR

8.0.6.5 Vent the tubing to Test Gauge #4 until a steady stream of water is emitted. CR

8.0.6.6 Close 1-SW-PI-821 Instrument Drain Valve, 1-SW-PI-821-6. N/A

8.0.7 Inform the Shift Foreman that setup per this section is complete. TMS

9.0 PROCEDURE STEPS

9.1 Prerequisites

9.1.1 The Service Water System is lined up for normal operation per OP-43 with any deviation from the normal lineup affecting this procedure noted on this procedure's Certification and Review Form.

9.1.2 Both NSW Pumps are available.

9.2 Precautions and Limitations

9.2.1 The RBCCW Service Water flow rate shall not be decreased below 2500 gpm nor exceed 5500 GPM indicated at 1-SW-FI-1158-1 on RTGB Panel XU-2.

9.2.2 TBCCW and RBCCW temperatures should be closely monitored while this test is being performed. If temperatures start to rise or fall excessively, they should be allowed to return to normal before this test is continued.

9.2.3 The data generated by this procedure shall be analyzed by NED and approval given prior to unit start-up.

9.0 PROCEDURE STEPS(continued)

9.2.3 The data generated by this procedure shall be analyzed by NED and approval given prior to unit start-up.

9.2.4 Unit 1 shall be in Mode 4 or 5 during the performance of this procedure.

9.3 Procedure Steps

9.3.1 Ensure that all prerequisites listed in Section 9.1 are met. NL

9.3.2 Obtain permission from the Shift Foreman to perform this test. NL

9.3.3 Open 1-SW-PS-3213 Instrument Drain Valve, 1-SW-PS-3213-6. NLD

9.3.4 Open 1-SW-PS-3214 Instrument Drain Valve, 1-SW-PS-3214-6. NLD

9.3.5 Open 1-SW-PI-819 Instrument Drain Valve, 1-SW-PI-819-6. DLW

9.3.6 Open 1-SW-PI-821 Instrument Drain Valve, 1-SW-PI-821-6. GR

9.3.7 Open, or verify open, Nuclear Service Water Pump A Discharge Pressure Indicator Root Valve to 1-SW-PI-144, 1-SW-V61. NLD

9.3.8 Open, or verify open, Nuclear Service Water Pump B Discharge Pressure Indicator Root Valve 1-SW-PI-145, 1-SW-V62. NLD

9.3.9 Verify as aligned, or align the Vital Header to the Nuclear Header per OP-43. NL

9.3.10 At RTGB Panel P601 place, or verify as placed, the WELL WATER TO VITAL HEADER VLV 1-SW-V141 control switch in the CLOSE position. NL

9.3.11 Fail open Core Spray Pump Room B Cooler Service Water Outlet Valve, 1-SW-V123, by deenergizing Circuit 18 on 120/208 VAC Dist. Pnl. 1D-HY1. 20

9.3.12 Fail open RHR Pump Room B Cooler Service Water Outlet Valve, 1-SW-V124, by deenergizing Circuit 20 on 120/208 VAC Dist. Pnl. 1D-HY1. 20

9.3.13 Fail open RHR Pumps B and D Coolers Service Water Outlet Valves,1-SW-V125 and 1-SW-V126, by deenergizing Circuit 21 on 120/208 VAC Dist. Pnl. 1B-HO7. 21

9.3.14 Fail open Core Spray Pump Room A Cooler Service Water Outlet Valve, 1-SW-V128, by deenergizing Circuit 18 on 120/208 VAC Dist. Pnl. 1C-HYO. 20

9.3.15 Fail open RHR Pump Room A Cooler Service Water Outlet Valve, 1-SW-V129, by deenergizing Circuit 20 on 120/208 VAC Dist. Pnl. 1C-HYO. 20

9.3.16 Fail open RHR Pumps A and C Coolers Service Water Outlet Valves,1-SW-V130 and 1-SW-V131, by deenergizing Circuit 18 on 120/208 VAC Dist. Pnl. 1A-HO6. 20

9.0 PROCEDURE STEPS(continued)

****

CAUTION

For pump protection, a Nuclear Service Water Pump should not be continuously operated with a flow rate of less than 2500 gpm or greater than 8000 gpm. A flow rate of 2500 gpm corresponds to a Nuclear Header pressure of 78 psig and a flow rate of 8000 gpm corresponds to a Nuclear Header pressure of 48 psig. (As indicated on Panel XU-2 at SW-PI-143-1)

****

NOTE:

Start a second Nuclear Service Water Pump when required.

9.3.17 Initiate Service Water flow through the #1 Diesel Generator Jacket Water Cooler by performing the following:

9.3.17.1 Deenergize #1 Diesel Generator SW to Jacket Water Cooler Isolation Valve, 1-SW-V210, by placing the breaker at compartment EC0 at MCC DGA in the OFF position.

9.3.17.2 Manually OPEN valve 1-SW-V210.

9.3.18 Initiate Service Water flow through the #2 Diesel Generator Jacket Water Cooler by performing the following:

9.3.18.1 Deenergize #2 Diesel Generator SW to Jacket Water Cooler Isolation Valve, 1-SW-V211, by placing the breaker at compartment EC4 at MCC DGB in the OFF position.

9.3.18.2 Manually OPEN valve 1-SW-V211.

9.3.19 Align the Nuclear Header to supply RBCCW Service Water at a flow rate of 3500 gpm as indicated at Panel XU-2, FLOW TO RBCCW HX indicator 1-SW-FI-1158-1 by throttling the RBCCW Heat Exchanger Service Water Outlet Flow Control Valve 1-SW-V382.

NOTE:

Unit 1 TBCCW will be diverted to the 2C TBCCW Heat Exchanger where it will be cooled by Unit 2 service water. This iteration is necessary since flow through the Unit 1 Conventional service water header will be secured by this procedure.

****

CAUTION

For pump protection, a Conventional Service Water Pump should not be continuously operated with a flow rate of less than 2500 gpm or greater than 8000 gpm. A flow rate of 2500 gpm corresponds to a Conventional Header pressure of 78 psig and a flow rate of 8000 gpm corresponds to a Conventional Header pressure of 48 psig. (As indicated at Panel XU-2 on SW-PI-131-1)

****

9.3.20 Verify, or place, the 2C TBCCW Heat Exchanger in service on Unit 2 per 2-OP-43.

9.3.21 Verify, or place, the 2C TBCCW Heat Exchanger in service on Unit 1, and isolate TBCCW Heat Exchangers 1A and 1B, per OP-44.

9.0 PROCEDURE STEPS(continued)

NOTE:

The RHR SW Loops will be fed by the Nuclear Header in this procedure. Either Unit 1 RHR SW Loop may be put into service at this time for this test. Loop swap per Steps 9.3.30 through 9.3.33 must be performed if the RHR SW Booster Pump Motor Coolers SW flow on the standby loop require flow monitoring. If flow monitoring on RHR SW Booster Pump Motor Coolers is to be observed on one RHR SW Loop only, the loop swap per step 9.3.30 through 9.3.33 need not be performed and the signoffs at these steps and the appropriate data sheet blocks should be N/A'ed.

9.3.22 Per OP-43 start, or verify operating, RHR SW A(B) Loop with both RHR SW Booster Pumps A and C (B and D) operating supplied by the Nuclear Header at a flow rate of 3000 gpm indicated at 1-E11-FI-R602A(B), RHR SW FLOW, on Panel P601. ml

9.3.23 At Panel P601 position, or verify as positioned, the WELL WATER SUPPLY VALVE 1-SW-V143 control switch in the CLOSE position. ml

9.3.24 Per OP-29 Shutdown, or verify shutdown the Unit 1 Circulating Water System. ml

9.3.25 Close, or verify closed, 1-SW-V36, using the SW TO CW PUMPS INB VLV 1-SW-V36 control switch at Panel XU-2. ml

9.3.26 Align Unit 2 to supply service water to the Chlorination System per the following:

9.3.26.1 Open, or verify open, Chlorination System Service Water Supply Valves, 2-SW-V294 and 2-SW-V295. ml

9.3.26.2 Close, or verify closed, Chlorination System Service Water Supply Valves, 1-SW-V294 and 1-SW-V295. ml

9.3.27 Throttle TBCCW Heat Exchanger A Service Water Outlet Valve, 1-SW-V9, and/or TBCCW Heat Exchanger B Service Water Outlet Valve, 1-SW-V10, to establish a Conventional header pressure of 60 psig as indicated at 1-SW-PI-131-1. 20

9.3.28 Record Test Performance Site Setup Verification data per Section 11.5 on the site attachments for components in service. ml

9.3.29 Perform Test Data Acquisition per Section 11.6 for the sites being monitored for flow. Record all data required on Data Sheets 1 through 5. ml

NOTE:

The RHR SW Loop swap per Steps 9.3.30 through 9.3.33 must be performed if either of the RHR SW Booster Pump Motor Coolers SW flow on the standby loop require flow monitoring. If flow monitoring on RHR SW Booster Pump Motor Coolers is to be observed only on the RHR SW Loop presently operating, the loop swap per steps 9.3.30 through 9.3.33 need not be performed and the signoffs at these steps and the appropriate data sheet blocks should be N/A'ed.

9.0 PROCEDURE STEPS(continued)

****

CAUTION

For pump protection, a Nuclear Service Water Pump should not be continuously operated with a flow rate of less than 2500 gpm or greater than 8000 gpm. A flow rate of 2500 gpm corresponds to a Nuclear Header pressure of 78 psig and a flow rate of 8000 gpm corresponds to a Nuclear Header pressure of 48 psig. (As indicated on SW-PI-143-1)

****

NOTE:

Shutdown one of the operating Nuclear Service Water Pumps when it is not required.

9.3.30 Per OP-43 shutdown RHR SW A(B) Loop operation.

NOTE:

Start a second Nuclear Service Water Pump when it is required.

9.3.31 Per OP-43 place RHR SW B(A) Loop in operation, with both RHR SW Booster Pumps B and D (A and C) operating, supplied by the Nuclear Header at flow rate of 3000 gpm as indicated at 1-E11-FI-R602B(A).

9.3.32 Record Test Performance Site Setup Verification data on the site Attachments for RHR SW Booster Pump Cooler flow for RHR SW B(A) Loop.

9.3.33 Perform Test Data Acquisition per Section 11.5 for the sites being monitored for flow. Record all data required on Data Sheets 1 through 5.

****

CAUTION

The following step will depressurize the Unit 1 Conventional Header. Ensure all loads off of the Unit 1 Conventional Header are shutdown or aligned to an alternate source of cooling. If Nuclear Header pressure drops below 40 psig as indicated at 1-SW-PI-143-1, indicating excessive leakage from the Nuclear, to the Conventional Header, immediately restart the Conventional Service Water Pump(s).

****

9.3.34 Place all Unit 1 Conventional Service Water Pump mode selector switches in the MAN position.

9.3.35 Depressurize the Unit 1 Conventional Header by stopping the operating Unit 1 Conventional Service Water Pump(s).

9.3.36 Deenergize the Conventional Service Water Pump A Discharge Valve to Conventional Header, 1-SW-V13, by placing the breaker at compartment E45 at MCC 2PB in the OFF position.

9.0 PROCEDURE STEPS(continued)

9.3.37 Deenergize the Conventional Service water Pump B Discharge Valve to Conventional Header, 1-SW-V15, by placing the breaker at compartment BU7 at MCC 1PA in the OFF position. JO

9.3.38 Deenergize the Conventional Service Water Pump C Discharge Valve to Conventional Header, 1-SW-V17, by placing the breaker at compartment BX8 at MCC 1PB in the OFF position. JO

9.3.39 Manually open Conventional Service Water Pump A Discharge Valve to Conventional Header, 1-SW-V13. JO

9.3.40 Manually open Conventional Service Water Pump B Discharge Valve to Conventional Header, 1-SW-V15. JO

9.3.41 Manually open Conventional Service Water Pump C Discharge Valve to Conventional Header, 1-SW-V17. JO

9.3.42 Perform Test Data Acquisition per Section 11.6 for the sites being monitored for flow. Record all data required on Data Sheets 1 through 5. N/A

9.3.43 Place the discharge valve breakers for the two Conventional Service Water Pumps to remain idle in the ON position. N/A signoffs below for the Conventional Service Water Pump to be started in Step 9.3.46. JO

9.3.43.1 Breaker ON at compartment E45 at MCC 2PB for Conventional Service Water Pump A Discharge Valve to Conventional Header, 1-SW-V13. N/A, N/A
Ind. Ver.

9.3.43.2 Breaker ON at compartment BU7 at MCC 1PA for Conventional Service Water Pump B Discharge Valve to Conventional Header, 1-SW-V15. JO MD
Ind. Ver.

9.3.43.3 Breaker ON at compartment BX8 at MCC 1PB for Conventional Service Water Pump C Discharge Valve to Conventional Header, 1-SW-V17. JO MD
Ind. Ver.

9.3.44 Verify (locally) the respective valves for the breakers placed in the ON position in the above steps are CLOSED. N/A the signoffs for the valve for the breaker that remained deenergized.

9.3.44.1 Conventional Service Water Pump A Discharge Valve to Conventional Header, 1-SW-V13. N/A, N/A
Ind. Ver.

9.3.44.2 Conventional Service Water Pump B Discharge Valve to Conventional Header, 1-SW-V15. JO MD
Ind. Ver.

9.3.44.3. Conventional Service Water Pump C Discharge Valve to Conventional Header, 1-SW-V17. JO MD
Ind. Ver.

9.3.45 Manually close the Conventional Service Water Pump Discharge Valve to Conventional Header for the Conventional Service Water Pump to be placed in service. JO

9.0 PROCEDURE STEPS(continued)

****

CAUTION

The Conventional Service Water Pump Discharge Valve to Conventional Header for the Conventional SW Pump must be manually opened slowly as the pump is started to prevent water hammer.

****

9.3.46 Perform the following for the Conventional SW Pump to be placed in service (Conventional Service Water Pump Discharge Valve to Conventional Header breaker open).

9.3.46.1 Align pump discharge selector switch to Conventional Header. ML

9.3.46.2 Start the pump. ML

9.3.46.3 Slowly (manually) open the Conventional Service Water Pump Discharge Valve to Conventional Header to the fully open position. 20

9.3.47 Place the breaker for the Conventional Service Water Pump Discharge Valve to Conventional Header opened in step 9.3.46.3 in the ON position and record the following:

MCC No.	Bkr. Compt.	Position	
2PB	E45	ON	20 MD Ind. Ver.

9.3.48 Open 1-SW-V36 using the SW TO CW PUMPS INB VLV SW-V36 control switch on Panel XU-2. 12 MD Ind. Ver.

9.3.49 Align SW Chlorination Supply as directed by Shift Foreman. (U/1 or U/2 supplying) ML

9.3.50 Throttle TBCCW Heat Exchanger Service Water Outlet Valves 1-SW-V9 and/or 1-SW-V10 until the Conventional header pressure is 48 to 78 psig, as indicated on 1-SW-PI-131-1 on Panel XU-2. ML

9.3.51 Energize #1 Diesel Generator SW to Jacket Water Cooler Isolation Valve, 1-SW-V210, by placing the breaker at compartment EC0 at MCC DGA in the ON position. 20 MD Ind. Ver.

9.3.52 Verify the Green CLOSED indicator at MCC DGA Compartment EC0 for Valve 1-SW-V210 is illuminated. 20 MD Ind. Ver.

9.3.53 Energize #2 Diesel Generator SW to Jacket Water Cooler Isolation Valve, 1-SW-V211, by placing the breaker at compartment EC4 at MCC DGB in the ON position. 20 MD Ind. Ver.

9.3.54 Verify the Green CLOSED indicator at MCC DGB Compartment EC4 for Valve 1-SW-V211 is illuminated. 20 MD Ind. Ver.

9.3.55 Restore Unit 1 RBCCW flow as per the Shift Foreman's instruction. ML

9.3.56 Place the Conventional Service Water Pump mode selector switches for the idle Conventional Service Water Pumps to the AUTO position. ML MD Ind. Ver.

9.0 PROCEDURE STEPS(continued)

9.3.57 Place the idle Conventional Service Water Pump Discharge Valve Selector Switches to the header position (CONV/NUC HDR) as directed by the Shift Foreman. Ind. Ver.

9.3.58 Restore Unit 1 RHR SW as per the Shift Foreman's instructions.

****

CAUTION

One RHR Pump Room Cooler shall be aligned to the NSW Header whenever the NSW Header is in service.

****

9.3.59 Energize Core Spray Pump Room B Cooler Service Water Outlet Valve, 1-SW-V123, by placing Circuit 18 on 120/208 VAC Dist. Pnl. 1D-HY1 in the ON position. Ind. Ver.

9.3.60 Energize RHR Pump Room B Cooler Service Water Outlet Valve, 1-SW-V124, by placing Circuit 20 on 120/208 VAC Dist. Pnl. 1D-HY1 in the ON position. Ind. Ver.

9.3.61 Energize RHR Pumps B and D Coolers Service Water Outlet Valves, 1-SW-V125 and 1-SW-V126, by placing Circuit 21 on 120/208 VAC Dist. Pnl. 1B-HO7 in the ON position. Ind. Ver.

9.3.62 Energize Core Spray Pump Room A Cooler Service Water Outlet Valve, 1-SW-V128, by placing Circuit 18 on 120/208 VAC Dist. Pnl. 1C-HYO in the ON position. Ind. Ver.

9.3.63 Energize RHR Pump Room A Cooler Service Water Outlet Valve, 1-SW-V129, by placing Circuit 20 on 120/208 VAC Dist. Pnl. 1C-HYO in the ON position. Ind. Ver.

9.3.64 Energize RHR Pumps A and C Coolers Service Water Outlet Valves, 1-SW-V130 and 1-SW-V131, by placing Circuit 18 on 120/208 VAC Dist. Pnl. 1A-HO6 in the ON position. Ind. Ver.

9.3.65 Close Nuclear Service Water Pump A Discharge Pressure Root Valve to 1-SW-PI-144, 1-SW-V61. Ind. Ver.

9.3.66 Close Nuclear Service Water Pump B Discharge Pressure Root Valve to 1-SW-PI-145, 1-SW-V62. Ind. Ver.

9.3.67 Close 1-SW-PS-3213 Instrument Drain Valve, 1-SW-PS-3213-6. Ind. Ver.

9.3.68 Close 1-SW-PS-3214 Instrument Drain Valve, 1-SW-PS-3214-6. Ind. Ver.

9.3.69 Close 1-SW-PI-819 Instrument Drain Valve, 1-SW-PI-819-6. Ind. Ver.

9.3.70 Close 1-SW-PI-821 Instrument Drain Valve, 1-SW-PI-821-6. Ind. Ver.

9.3.71 Place the WELL WATER SUPPLY VALVE SW-V143 control switch, on Panel P601, to the AUTO/OPEN position. Ind. Ver.

9.0 PROCEDURE STEPS(continued)

9.3.72 If desired, place TBCCW Heat Exchangers 1A and/or 1B in service, and shut down TBCCW Heat Exchanger 2C, per OP-43. N/A

9.3.73 If desired, isolate Unit 2 service water from the 2C TBCCW Heat Exchanger per 2-OP-43. N/A

9.3.74 Restore Unit 1 Vital Header lineup per OP-43 and the Shift Foreman's instruction. NL

9.3.75 Per OP-29 and the Shift Foreman's instruction place the Unit 1 Circulating Water System into service. (if required, otherwise N/A signoff) N/A

9.3.76 Inform the Shift Foreman that the test portion of this procedure is complete. JO

10.0 RESTORATION

10.0.1 Obtain the Shift Foreman's permission to perform this section. JO

10.0.2 Remove Test Gauge #1 installed at pressure switch 1-SW-PS-3213 per the following:

10.0.2.1 Close, or verify closed, 1-SW-PS-3213 Instrument Drain Valve, 1-SW-PS-3213-6. JK

10.0.2.2 Remove Test Gauge #1 and associated temporary tubing and fittings. JK

10.0.2.3 Reinstall the compression cap to the instrument tubing at 1-SW-PS-3213 Instrument Drain Valve, 1-SW-PS-3213-6. JK

10.0.3 Remove Test Gauge #2 installed at pressure switch 1-SW-PS-3214 per the following:

10.0.3.1 Close, or verify closed, 1-SW-PS-3214 Instrument Drain Valve, 1-SW-PS-3214-6. JK

10.0.3.2 Remove Test Gauge #2 and associated temporary tubing and fittings. JK

10.0.3.3 Reinstall the compression cap to the instrument tubing at 1-SW-PS-3214 Instrument Drain Valve, 1-SW-PS-3214-6. JK

10.0.4 Remove Test Gauge #3 installed at pressure indicator 1-SW-PI-819 per the following:

10.0.4.1 Close, or verify closed, 1-SW-PI-819 Instrument Drain Valve, 1-SW-PI-819-6. BZ

10.0.4.2 Remove Test Gauge #3 and associated temporary tubing and fittings. BZ

10.0.4.3 Reinstall the compression cap to the instrument tubing at 1-SW-PI-819 Instrument Drain Valve, 1-SW-PI-819-6. BZ

10.0.5 Remove Test Gauge #4 installed at pressure indicator 1-SW-PI-821 per the following:

10.0 RESTORATION(continued)

10.0.5.1 Close, or verify closed, 1-SW-PI-821 Instrument Drain Valve, 1-SW-PI-821-6. BZ

10.0.5.2 Remove Test Gauge #4 and associated temporary tubing and fittings. BZ

10.0.5.3 Reinstall the compression cap to the instrument tubing at 1-SW-PI-821 Instrument Drain Valve, 1-SW-PI-821-6. BZ

10.0.6 Remove all Controlotron test equipment used for this procedure. TMS

10.0.7 Inform the Shift Foreman that this section is complete. TMS

11.0 CONTROLOTRON FLOW INSTRUMENTATION SETUP AND DATA ACQUISITION GUIDELINES

NOTE:

Attachments 1 through 17 contain the information required for programming the Uniflow flowmeter and appropriate locations to record the site specific information from the following instructions. After the first performance of this procedure track and transducer installation at each specific site shall be as close as possible to that recorded for the first performance of this procedure. The following instructions do not contain each line item in setting up the Controlotron, as some are intrinsic to the operation of the machine and should be known to a proficient technician. The instructions given are intended to ensure each site is identified and appropriate information collected to ensure duplication of the site can be achieved and verified in future performances of this procedure and that the correct flow data is stored and is retrievable in the Controlotron during the performance of the test section of this procedure.

11.1 Enter the SITE NAME as given on the attachment.

11.2 TEST EQUIPMENT

NOTE:

Track and transducer installation shall conform to Controlotron installation instructions and drawings. To ensure that exact as possible location of the transducers is accomplished for each performance of this procedure the upstream transducer shall always be located with the letter index track.

11.2.1 Record the Controlotron serial number on the Site Attachment.

11.2.2 Record the Track/Transducer size and serial number to be used at the site on the Site Attachment.

11.2.3 Record Track/Transducer Mounting Mode on the Site Attachment.

11.3 PIPE DATA

11.3.1 From the site attachment sketch determine the approximate site location. Clean the pipe (remove paint to the pipe surface) to a clean, smooth surface at the anticipated transducer and pipe O.D. measurement locations.

11.0 CONTROLOTRON FLOW INSTRUMENTATION SETUP AND DATA ACQUISITION GUIDELINES(continued)

11.3.2 Determine the pipe outside diameter by performing the following:

NOTE:

For the first performance of this procedure initial transducer locations can be determined by setting up the tracks and transducer at the site and put the Controlotron into service using standard nominal pipe data and appropriate Controlotron default settings. A Valc of 50 or greater is acceptable for the initial location of tracks and transducers, but every effort should be made to obtain Valc readings of 60 or greater. For subsequent performances of this procedure install identical tracks and transducers at each site at the location noted on each site attachment sketch using the dimensions recorded in the first performance of this procedure.

11.3.2.1 Using micrometers or calipers, measure the O.D. of the pipe at the upstream transducer location. Record this dimension on the Site Attachment.

11.3.2.2 At a position 90° around the pipe from the above location measure the pipe O.D. Record this dimension on the Site Attachment.

11.3.2.3 Measure the O.D. of the pipe at the downstream transducer location. Record this dimension on the Site Attachment.

11.3.2.4 At a position 90° around the pipe from the above location measure the pipe O.D. Record this dimension on the Site Attachment.

11.3.2.5 Average the measured O.D.'s and record this number on the Site Attachment and enter as PIPE O.D. in the Controlotron site setup.

11.3.3 Enter the PIPE MATERIAL as given on the Site Attachment.

11.3.4 Determine the pipe wall thickness by performing the following:

NOTE:

The greater the degree of accuracy of the UT pipe wall thickness measuring instrument, the greater the accuracy of the flow measurement, particularly in the small bore pipe, obtained by the Controlotron. The UT instrument used should have the greatest accuracy practically achievable for a given site. Actual UT instrument used shall be determined by the UT Examiner based on site parameters. An appropriate data sheet from the NDE procedure for the UT instrument used to determine pipe wall thickness shall be completed for each site.

11.3.4.1 Using a ultrasonic pipe wall thickness measuring instrument, measure the pipe wall thickness at the upstream transducer location. Record this on the Site Attachment.

11.3.4.2 Using a ultrasonic pipe wall thickness measuring instrument, measure the pipe wall thickness at the downstream transducer location. Record this on the Site Attachment.

11.3.4.3 Average the upstream and downstream pipe wall thicknesses and record the results on the Site Attachment. Enter this as the WALL THICKNESS in the Controlotron setup.

11.0 CONTROLOTRON FLOW INSTRUMENTATION SETUP AND DATA ACQUISITION GUIDELINES(continued)

11.3.5 Enter LINER MATERIAL and LINER THICKNESS as given on the Site Attachment, if applicable.

11.3.6 Enter Sea Water as LIQUID TYPE. Leave ESTIMATED Vs and VISCOSITY (CS) at the default settings.

11.3.7 Enter, or verify, VOLUME UNITS as gallons.

11.3.8 Enter, or verify, TIME UNITS as minutes.

11.3.9 Verify that the flow total setup RESOLUTION (0000x000, 00000x00, etc.) is appropriate for the anticipated flow rates.

11.3.10 Enter the following from the DATA SELECTED menu for datalogger setup: SITE NAME, DATE, TIME, FLOW TOTAL, Vs and Valc.

11.3.11 Enter the LOG INTERVAL SET in the datalogger setup as 1M.

11.3.12 In the Controlotron Site Setup Site Load Menu move the cursor to SAVE SITE, then cursor right and press ENTER to save this site in the AFAC memory of the Controlotron.

11.4 Zero Flow Calibration

NOTE:

Site track/transducer setup and cables shall remain in place after zero flow calibration and through test completion. Transducer couplant should be checked prior to the test initiation and if dried up the transducer and pipe shall be cleaned of residue and new couplant applied.

11.4.1 Setup the tracks and transducers at the location shown and described on the Site Attachment. Record the reference dimension on the Site Attachment.

11.4.2 RECALL the desired site in the Controlotron Site setup menu. Initiate flow measuring with the Controlotron using the default zero flow set and parameters generated in Sections 11.1, 11.2 and 11.3.

11.4.3 Record the Letter/Number Spacing Index established for this site.

11.4.4 Establish and verify the zero flow system line up.

11.4.5 Record the present flow reading as the Zero Offset on the Site Attachment.

11.4.6 In the installation menu of the Controlotron enter ACTUAL ZERO as the zero flow set.

11.4.7 From the diagnostics menu of the Controlotron record Vs, Valc, fx, Vfmax, and Vsmax at Diagnostic Data on the Site Attachment.

11.4.8 In the Controlotron Site Setup Site Load Menu move the cursor to SAVE SITE, then cursor right and press ENTER to save this site in the AFAC memory of the Controlotron.

11.5 Test Performance Site Setup Verification.

11.5.1 RECALL the desired site in the Controlotron Site setup menu.

11.0 CONTROLOTRON FLOW INSTRUMENTATION SETUP AND DATA ACQUISITION GUIDELINES(continued)

11.5.2 From the diagnostics menu of the Controlotron record Vs, Valc, fx, Vfmax, and Vsmax at Test Diagnostic Data on the Site Attachment.

NOTE:

If, during the performance of the procedure steps it appears that the zero flow calibration for the site has been lost or the present setup at a site is questionable as determined from the diagnostic information or desired plant valve alignment cannot be achieved, the tracks and transducers may be moved, reset and the site zero calibrated by the transducer reversal method and noted as such in the comment section of the appropriate Site Attachment.

11.6 Test Data Acquisition

11.6.1 Record the appropriate Site Attachment number on the Data Acquisition Sheet.

11.6.2 RECALL the desired site in the Controlotron Site setup menu.

NOTE:

The Net Totalizer Register may be reset to zero prior to performing the next step by pressing and holding the function key for the channel being used (F1 for Channel 1, F2 for Channel 2) and then press numeric key 1 on the hand held CDU.

11.6.3 At the Data Logger Setup in the Controlotron site setup menu, cursor to DataLogger Mode, cursor right to level D, scroll to MEMORY and press ENTER.

11.6.4 Return cursor to level A of the Controlotron menus, then scroll to Operation Setup, cursor right to level B and scroll (down) to Display Select, cursor right to level C then scroll to DATALOGGER and press ENTER. The Datalogger display should appear on the Graphic Screen.

11.6.5 Press and hold the down cursor button on the CDU until the data on the Graphics Display Screen stops scrolling.

11.6.6 Record the Attachment No., Site Name, Step No. and Date on the Data Acquisition Sheet.

11.6.7 Observe the Graphic Display on the Controlotron and as new updates are displayed at 1 minute intervals (this requires occasionally scrolling the down cursor on the CDU) record the data on the Data Acquisition Sheet. At each subsequent update calculate the difference of the displayed Flow Total and record this in the appropriate box of the Flow Total Difference Column.

11.6.8 Continue recording each update until at least 5 Flow Total Differences have been calculated. Average the flow total differences and record the results in the appropriate box for that site for the procedure step being performed on the appropriate data sheet.

11.6.9 Review recorded data on the Data Acquisition Sheet with the data displayed on the Graphics Display Screen for accuracy.

11.6.10 When sufficient data has been recorded on the Data Acquisition Sheet, return to the Datalogger Setup menu, go into Datalogger Mode and Enter OFF. Proceed to the next site for data acquisition or to the next test procedure step.

ATTACHMENT 1 1A NUCLEAR SERVICE WATER PUMP DISCHARGE SITE SETUP

1.0 SITE NAME: 1ANPMP

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. U0679

1.1.2 Track/Transducer size: 4

1.1.3 Transducer Serial Nos.: (up) U1793A (ST-3)
(down) U1793B (ST-4)

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) DIRECT

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 19.985 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 19.998 in.

1.2.1.3 O.D. at downstream transducer location. 19.948 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 19.996 in.

1.2.1.5 Average of measured O.D.'s: 19.982 in.

Micrometers/Calipers:
CP&L No.: ZM022 Cal Date: 10/29/90 Cal Due Date: 4/29/91

1.2.2 Pipe Material: STEEL

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.361 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.384 in.

1.2.3.3 Average pipe wall thickness. 0.373 in.

1.2.4 Liner Material: Cement Thickness: .313 in.

NOTE: INSIDE MICROMETER AND CALIPERS USED TO MEASURE O.D. OF PIPE.

ATTACHMENT 1 1A NUCLEAR SERVICE WATER PUMP DISCHARGE FLOW

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 The 1A Nuclear Service Water Pump can be removed from service.

2.2 System Lineup

2.2.1 Setup the tracks and transducers on line 1-SW-4-20-157 at the location shown on the 1A Nuclear Service Water Pump Discharge Site Setup Sketch. Measure and record below and on the sketch the reference dimension from the floor (El. 4'-0") to the upstream edge of the track.
REFERENCE DIMENSION: 126 5/8"

2.2.2 Record the axial displacement in inches on the pipe surface from the centerline of the Nuclear Header to the nearest edge of the track holding the upstream transducer on the Site Setup Sketch and below.
REFERENCE DIMENSION: 4 13/16"

2.2.3 Remove from service, or verify as such, 1A Nuclear Service Water Pump. ~~IWM~~

2.2.4 Verify the Nuclear Header Service Water Pump A Discharge Valve, 1-SW-V19, is closed. ~~IWM~~

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B 14

2.3.2 Zero Offset: -80 gpm

2.3.3 Diagnostic Data:

Vs 1423 m/s Valc 57 fx 342,857

Vfmax 55.9 Vsmax 1583.5

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

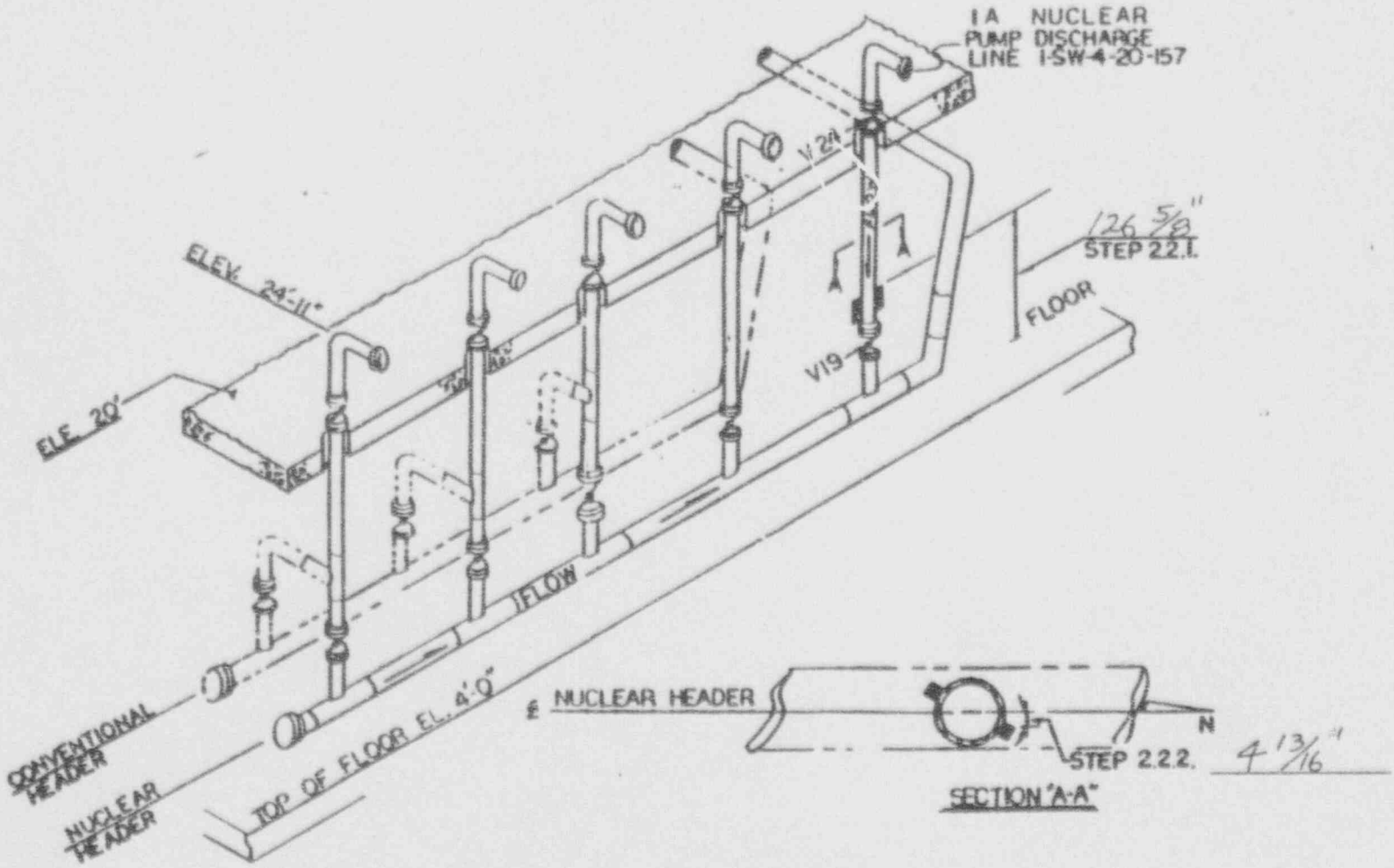
3.0.1 Test Diagnostic Data: ~~DD~~ 1/18/91 ~~DD~~ 1/18/91

~~1424.06~~ 1425.31 Vs ~~m/s~~ Valc ~~58~~ 57 fx 342,857

Vfmax 55.92 Vsmax 1583.52

COMMENTS:

ATTACHMENT 1



1A NUCLEAR SERVICE WATER PUMP DISCHARGE SITE SETUP SKETCH
UNIT 1 SERVICE WATER BUILDING

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 1

SITE NAME: IANPMP

STEP No.: 9.3.29

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
11:20	1425	57	6040	
11:21	1425	57	11,700	5660
11:22	1425	57	17,330	5630
11:23	1425	57	23,010	5680
11:24	1425	57	28,710	5700
11:25	1425	57	34,390	5680
11:26	1425	57	40,040	5650
11:27	1425	57	45,670	5630
11:28	1425	57	51,350	5680
				AVERAGE 5664

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 1

SITE NAME: LANPMP

STEP No.: 9.3.33

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
13:42	1422	58	8,900	
13:43	1422	58	14,300	5,400
13:44	1422	58	19,710	5,410
13:45	1422	58	25,100	5,390
13:46	1422	58	30,510	5,410
13:47	1422	57	35,870	5,360
13:48	1422	58	41,220	5,350
				AVERAGE 5387

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 1

SITE NAME: LANPMP

STEP No.: 9.3.4.2

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
1450	1432	57	6,570	
1451	1431	57	12,290	5,720
1452	1431	57	17,990	5,700
1453	1431	57	23,700	5,710
1454	1431	57	29,360	5,660
1455	1431	57	35,040	5,680
1456	1431	57	40,740	5,700
1457	1431	57	46,420	5,680
				AVERAGE 5693

ATTACHMENT 2 1B NUCLEAR SERVICE WATER PUMP DISCHARGE SITE SETUP

1.0 SITE NAME: 1BNPMP

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. U0235 ~~U0679~~ 1

1.1.2 Track/Transducer size: 4 ~~AB 1/7/91~~ U0407A(ST-1)

1.1.3 Transducer Serial Nos.: (up) ~~U1788A (ST-1)~~ U0407B(ST-1)
(down) ~~U1788B (ST-2)~~ AB 1/17/91

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) DIRECT

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 19.948 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 20.000 in.

1.2.1.3 O.D. at downstream transducer location. 19.933 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 20.038 in.

1.2.1.5 Average of measured O.D.'s: 19.980 in.

Micrometers/Calipers:
CP&L No.: EM022 Cal Date: 10/29/90 Cal Due Date: 4/29/91

1.2.2 Pipe Material: STEEL

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.377 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.342 in.

1.2.3.3 Average pipe wall thickness. 0.354 in.

1.2.4 Liner Material: Cement Thickness: .313 in.

ATTACHMENT 2 1B NUCLEAR SERVICE WATER PUMP DISCHARGE FLOW

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 The 1B Nuclear Service Water Pump can be removed from service.

2.2 System Lineup

2.2.1 Setup the tracks and transducers on line 1-SW-5-20-157 at the location shown on the 1B Nuclear Service Water Pump Discharge Site Setup Sketch. Measure and record below and on the sketch the reference dimension from the floor (El. 4' 0") to the upstream edge of the track.
REFERENCE DIMENSION: 130½"

2.2.2 Record the axial displacement in inches on the pipe surface from the conterline of the Nuclear Header to the nearest edge of the track holding the upstream transducer on the Site Setup Sketch and below.
REFERENCE DIMENSION: 4¼"

2.2.3 Remove from service, or verify as such, 1B Nuclear Service Water Pump. JWM

2.2.4 Verify the Nuclear Header Service Water Pump B Discharge Valve, 1-SW-V20, is closed. JWM

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B / 4

2.3.2 Zero Offset: (-)30 JWM 1-18-91 ~~110~~ cpm

2.3.3 Diagnostic Data:

Vs ~~1412~~ 1424 m/s JWM 1-18-91 Valc ~~50~~ 50 JWM 1-18-91 fx ~~521,739~~ 292,683 JWM 1-18-91

Vfmax ~~70.8~~ 65.6 JWM 1-18-91 Vsmax 1588.9

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

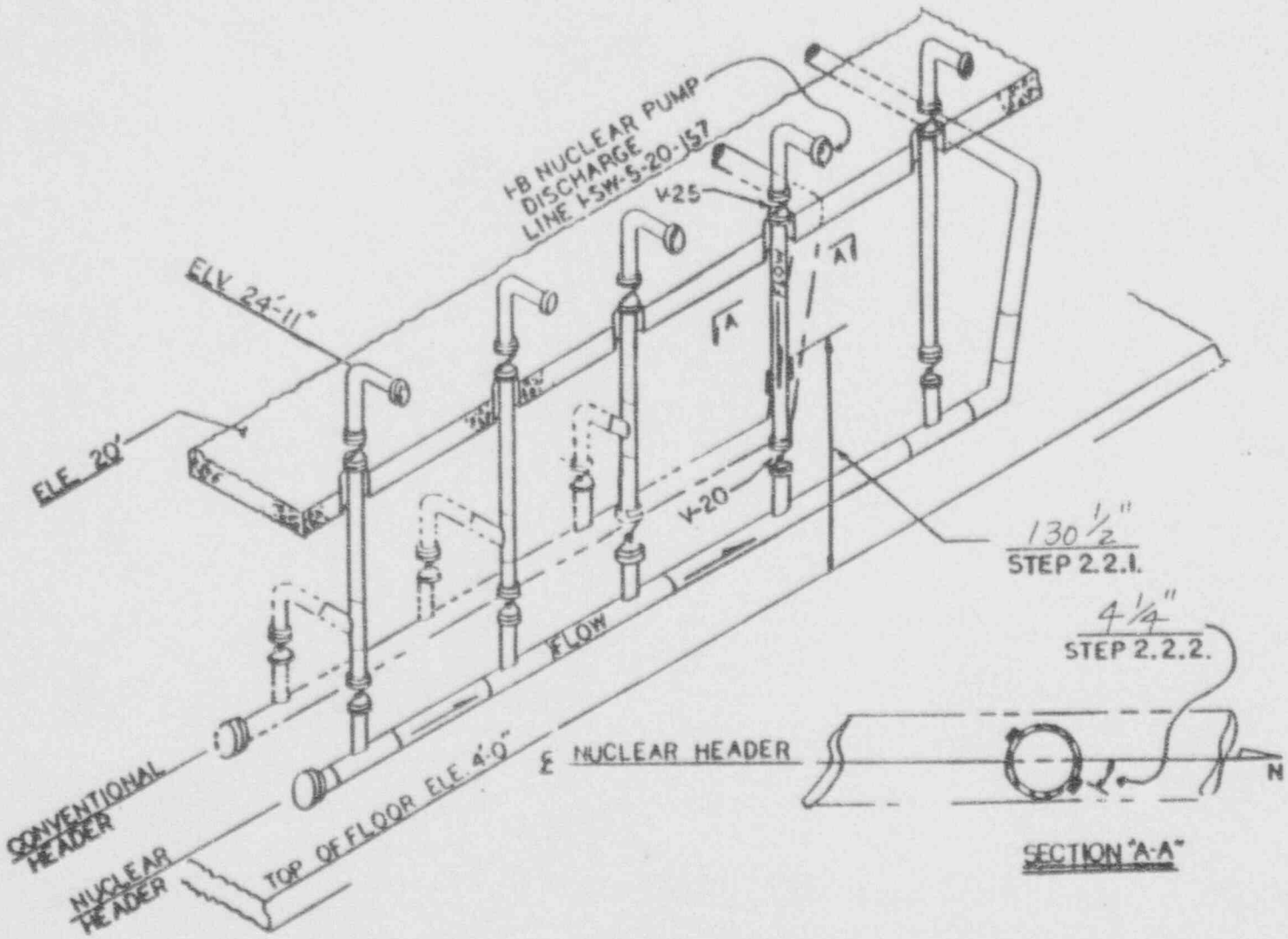
3.0.1 Test Diagnostic Data:

Vs 1407.13 m/s Valc 50 fx 292,693

Vfmax 64.41 Vsmax 1588.94

COMMENTS:

ATTACHMENT 2



1B NUCLEAR SERVICE WATER PUMP DISCHARGE SITE SETUP SKETCH
UNIT 1 SERVICE WATER BUILDING

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 2

SITE NAME: 1BNPMP

STEP No.: 9.3.29

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
11:06	1407	50	13,550	
11:07	1407	51	18,190	4640
11:08	1407	51	22,840	4650
11:09	1407	50	27,410	4570
11:10	1407	51	31,990	4580
11:11	1407	51	36,590	4600
11:12	1407	51	41,190	4600
11:13	1407	51	45,770	4580
11:14	1407	50	50,360	4590
				AVERAGE 4601.25

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 2

SITE NAME: 10NPMP

STEP No.: 9.3.33

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
13:26	~~1485~~ 1427	~~49~~ 52	13,710	
13:27	1426	52	18,370	4660
13:28	1426	52	23,080	4710
13:29	1426	52	27,730	4650
13:30	1426	52	32,380	4650
13:31	1426	52	37,080	4700
13:32	1426	52	41,720	4640
13:33	1426	52	46,390	4670
13:34	1426	52	51,010	4660
				AVERAGE 4668

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 2

SITE NAME: 1BAUXMP

STEP No.: 9.3.42

DATE: 1/16/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
1439	1427	51	16,990	
1440	1427	51	21,820	4830
1441	1427	51	26,570	4750
1442	1426	51	31,350	4780
1443	1426	51	36,160	4810
1444	1426	51	41,010	4850
1445	1426	51	45,850	4840
				AVERAGE 4810

ATTACHMENT 3 SERVICE WATER PUMP LUBE WATER SITE SETUP

1.0 SITE NAME: LUBWTR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. 40679

1.1.2 Track/Transducer size: 2

1.1.3 Transducer Serial Nos.: (up) 40369
(down) 40369

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) DIRECT

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 4.535 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 4.533 in.

1.2.1.3 O.D. at downstream transducer location. 4.538 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 4.531 in.

1.2.1.5 Average of measured O.D.'s: 4.534 in.

Micrometers/Calipers:
CP&L No.: OM-117 Cal Date: 9/21/90 Cal Due Date: 3/18/91

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.310 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.303 in.

1.2.3.3 Average pipe wall thickness. 0.307 in.

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 Service Water Pump Lube Water will be cross tied to Unit 2, with the Unit 2 SW Lube Water Pumps supplying all lube water.

2.2 System Lineup

2.2.1 Setup the tracks/transducers Line 1-SW-72-4-157B as shown on the Service Water Pump Lube Water Supply Site Setup Sketch. Measure and record below and on the sketch the reference dimension from the upstream support U-bolt to the upstream edge of the Transducer/Track assembly. REFERENCE DIMENSION: 10 3/4"

ATTACHMENT 3 SERVICE WATER PUMP LUBE WATER FLOW

2.2.2 Per Unit 2 OP 43, Cross-tie Service Water Lube Water with Unit 2 Supplying Unit 1 (Section 8.17.B.1). 20

2.2.3 Close the Conventional Header Supply Valve to Lube Water Pumps, 1-SW-V96. 20

2.2.4 Close the Nuclear Header Supply Valve to Lube Water Pumps, 1-SW-V97. 20

2.2.5 Close the Service Water Lube Water Pump A Discharge Valve, 1-SW-V99. 20

2.2.6 Close the Service Water Lube Water Pump B Discharge Valve, 1-SW-V98. 20

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B 19

2.3.2 Zero Offset: 35 rpm

2.3.3 Diagnostic Data:

Vs 1470 m/s Valc 66 fx 1.333.333

Vfmax 70.4 Vsmax 1849

2.4 System Restoration

2.4.1 Open the Conventional Header Supply Valve to Lube Water Pumps, 1-SW-V96. 20 C (Ind. Ver.)

2.4.2 Open the Nuclear Header Supply Valve to Lube Water Pumps, 1-SW-V97. 20 C (Ind. Ver.)

2.4.3 Open the Service Water Lube Water Pump A Discharge Valve, 1-SW-V99. 20 C (Ind. Ver.)

2.4.4 Open the Service Water Lube Water Pump B Discharge Valve, 1-SW-V98. 20 C (Ind. Ver.)

2.4.5 Restore Service Water Pump Lube Water lineup per the Shift Foreman's instructions.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

3.0.1 Test Diagnostic Data: 1/17/91

Vs ~~1470 m/s~~ ~~1451.94~~ DB 1/17/91 Valc ~~66~~ 67 DB 1/17/91 fx 1333333

Vfmax ~~70.4~~ DB 1/17/91 Vsmax 1848.34

68.12

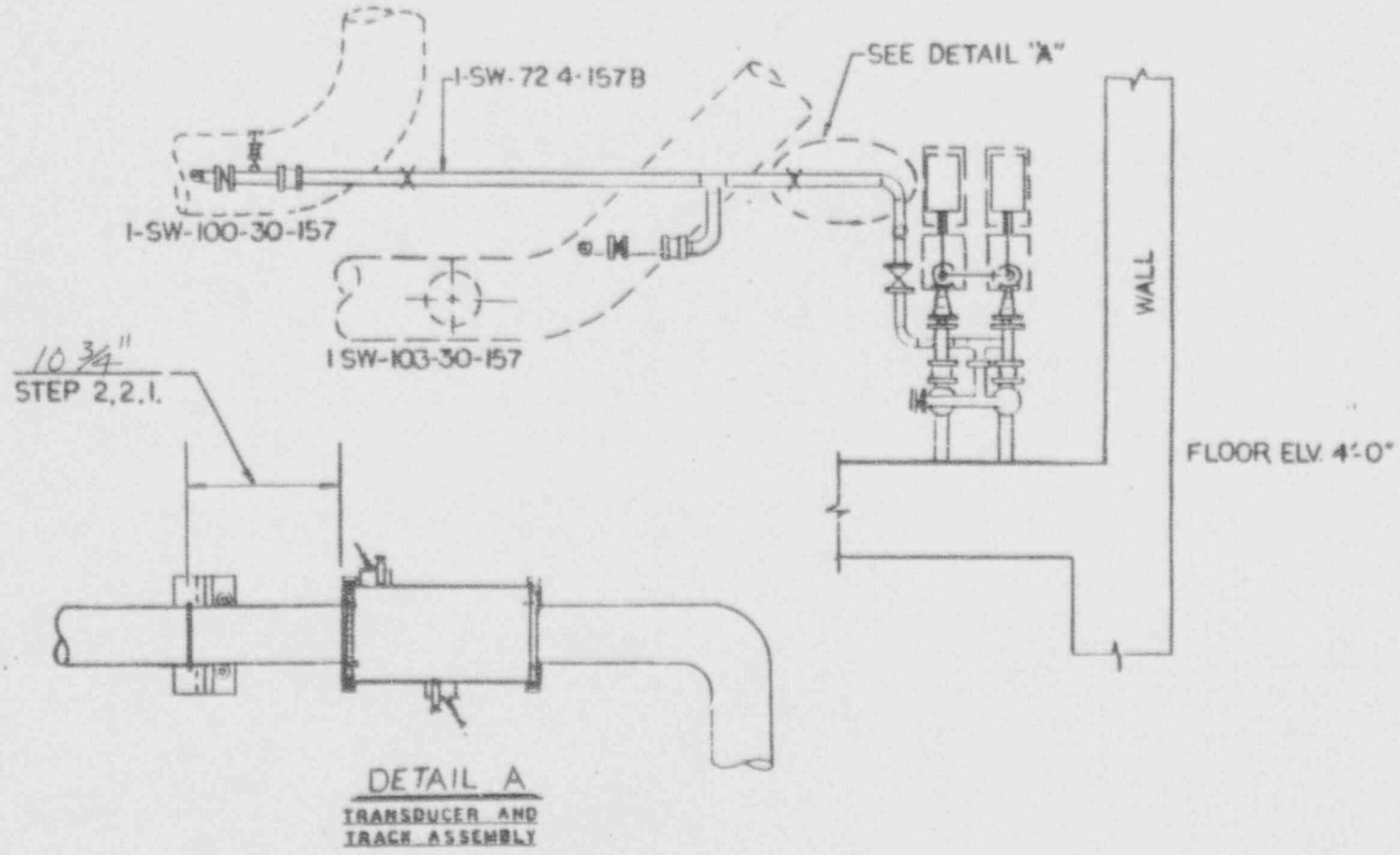
COMMENTS:

Vs 1441.84 VALC 66 Fx 1,333,333

VFMAX 68.12 VSMAX 1848.34

- Upstream Transducer on west side of pipe

ATTACHMENT 3



SERVICE WATER PUMP LUBE WATER SUPPLY SITE SETUP SKETCH
UNIT 1 SERVICE WATER BUILDING

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 3

SITE NAME: LUBSTR

STEP No.: 9.3.29

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
~~11:31~~	~~1470~~	~~57~~	08:1/8/91 ~~620~~	
11:32	1442	67	116	132
11:33	1442	67	242	132
11:34	1442	67	374	130
11:35	1442	67	504	131
11:36	1442	67	635	129
11:37	1442	66	764	131
11:38	1442	67	895	131
11:39	1442	66	1,026	AVERAGE 131

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 3

SITE NAME: LCBWTR

STEP No.: 5.3.13

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
13:51	1443	66	295	
13:52	1443	67	417	122
13:53	1443	67	541	124
13:54	1443	66	664	123
13:55	1443	67	787	123
13:56	1444	67	912	125
13:57	1443	67	1035	123
				AVERAGE 124

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 3

SITE NAME: LUBWTR

STEP No.: 9.3.42

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
1502	1455	66	142	
1503	1455	67	268	126
1504	1455	67	395	127
1505	1455	67	520	125
1506	1455	67	647	127
1507	1455	67	774	127
1508	1455	67	901	127
				AVERAGE 127

ATTACHMENT 4 No. 1 DIESEL GENERATOR JACKET WATER COOLER SW SITE SETUP

1.0 SITE NAME: 1DGJKT

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. 110314

1.1.2 Track/Transducer size: 3

1.1.3 Transducer Serial Nos.: (up) 110414
(down) 110414

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) DIRECT

1.2 PIPE DATA

NOTE:

Remove grating as necessary to access piping.

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 6.647 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 6.642 in.

1.2.1.3 O.D. at downstream transducer location. 6.647 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 6.642 in.

1.2.1.5 Average of measured O.D.'s: 6.645 in.

Micrometers/Calipers:
CP&L No.: IM-011 Cal Date: 7/26/90 Cal Due Date: 1/21/91

1.2.2 Pipe Material: STEEL

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.280 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.275 in.

1.2.3.3 Average pipe wall thickness. 0.278 in.

1.2.4 Liner Material: Cement Thickness: 0.250 in.

NOTE: INSIDE MICROMETER AND CALIPERS USED TO MEASURE PIPE O.D. DUE TO INTERFERENCES.

ATTACHMENT 4 No. 1 DIESEL GENERATOR JACKET WATER COOLER SW FLOW

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 The piping configuration at the primary setup location may not leave this pipe full of service water at all times. If empty pipe indications are obtained with the Controlotron at this location, or flow anomalies are anticipated due to piping configuration, duplicate the setup at the alternate location.

2.2 System Lineup

2.2.1 Setup the tracks and transducers as shown on the No. 1 Diesel Generator Jacket Water Cooler SW Flow Setup Sketch. Measure and record the reference dimension from the U-bolt on the horizontal pipe support noted on the sketch to the upstream edge of the track.
REFERENCE DIMENSION 127"

2.2.2 Measure and record below and on the site setup sketch the axial location of the transducer track assembly from the components noted on the sketch. REFERENCE DIMENSION 3½"

2.2.3 Verify No. 1 Diesel Generator is not running. JM

2.2.4 Verify the No. 1 Diesel Generator Jacket Water Cooler SW Isolation Valve, 1-SW-V210, is closed. JM

2.2.5 Verify the No. 1 Diesel Generator Jacket Water Cooler SW Isolation Valve, 2-SW-V210, is closed. JM

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B 14

2.3.2 Zero Offset: (-)10.0 gpm

2.3.3 Diagnostic Data:

Vs 1489.32 m/s Valc 65 fx 750,000

Vfmax 87.33 Vsmax 1770.02

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

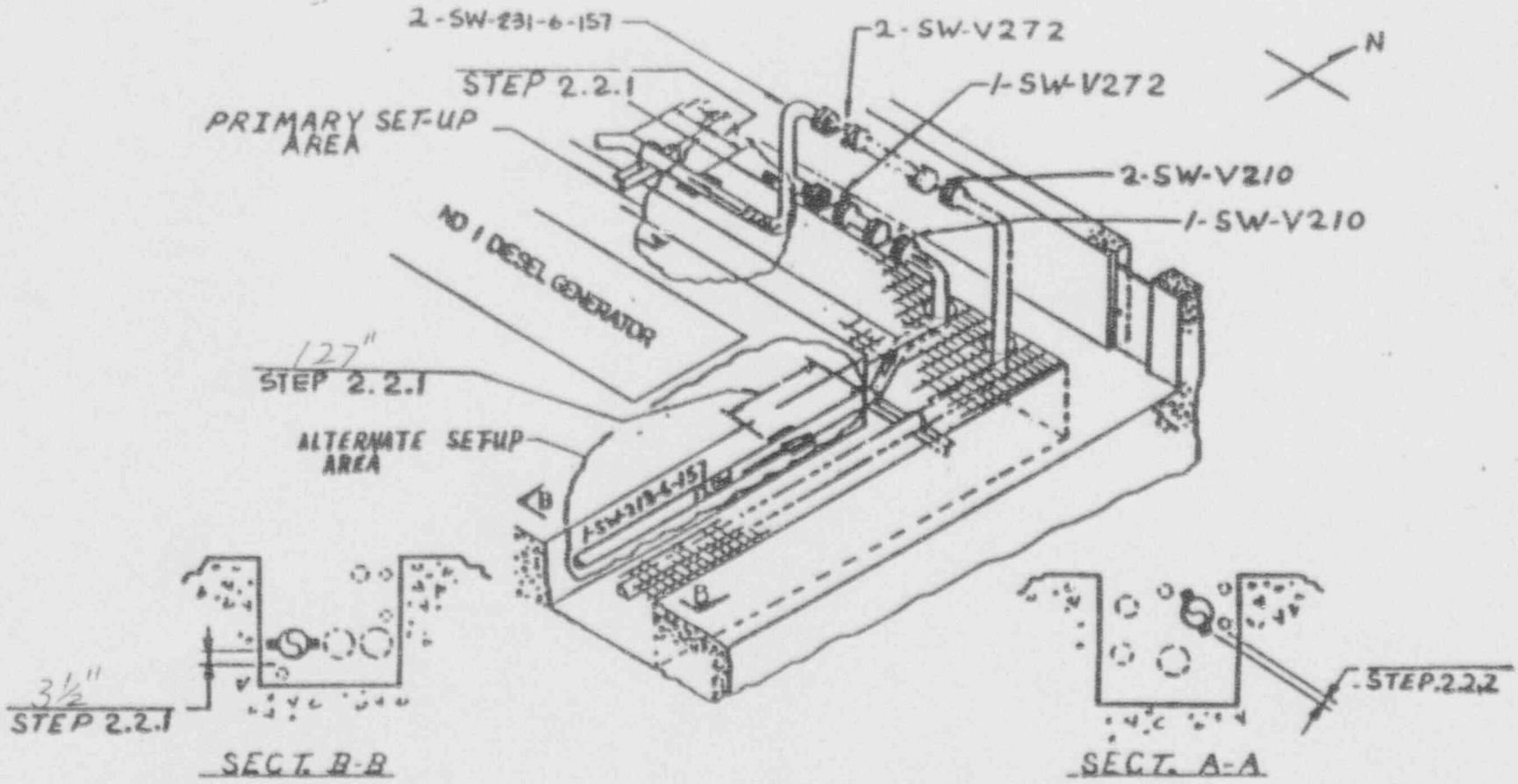
3.0.1 Test Diagnostic Data:

Vs 1412.58 m/s Valc 65 fx 750,000

Vfmax 84.42 Vsmax 1770.02

COMMENTS: upstream transducer on west side of pipe

ATTACHMENT 4



NO. 1 DIESEL GENERATOR JACKET WATER COOLER SW INLET SETUP SKETCH
DIESEL GENERATOR BUILDING

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 4

SITE NAME: 1DGJKT

STEP No.: 9.3.29

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
11:05	1431	65	3166	
11:06	1431	65	4552	1386
11:07	1431	65	5942	1390
11:08	1431	65	7327	1385
11:09	1431	65	8710	1383
11:10	1431	65	10094	1384
11:11	1431	65	11,481	1387
				AVERAGE 1386

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 4

SITE NAME: IDG-KT

STEP No.: 9.3.33

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
13:27	1430	65	1443	
13:28	1429	66	2736	1293
13:29	1429	66	4035	1299
13:30	1430	65	5341	1306
13:31	1430	66	6638	1297
13:32	1429	65	7940	1302
13:33	1429	65	9242	1302
				AVERAGE 1300

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 4

SITE NAME: 1DGJKT

STEP No.: 9.3.42

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
14:35	1429	65	2416	
14:36	1429	65	3713	1297
14:37	1428	65	5013	1300
14:38	1428	65	6316	1303
14:39	1429	65	7618	1302
14:40	1428	65	8919	1301
14:41	1428	65	10,213	1294
				AVERAGE 1300

ATTACHMENT 5 No. 2 DIESEL GENERATOR JACKET WATER COOLER SW SITE SETUP

1.0 SITE NAME: 2DGJKT

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. 40314

1.1.2 Track/Transducer size: 3

1.1.3 Transducer Serial Nos.: (up) 40760
(down) 40760

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) DIRECT

1.2 PIPE DATA

NOTE:

Remove grating as necessary to access piping.

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 6.646 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 6.615 in.

1.2.1.3 O.D. at downstream transducer location. 6.644 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 6.606 in.

1.2.1.5 Average of measured O.D.'s: 6.627 in.

Micrometers/Calipers:
CP&L No.: EM-011 Cal Date: 7/26/90 Cal Due Date: 1/21/91

1.2.2 Pipe Material: STEEL

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.250 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.300 in.

1.2.3.3 Average pipe wall thickness. 0.275 in.

1.2.4 Liner Material: Cement Thickness: 0.250 in.

NOTE: INSIDE MICROMETER AND CALIPERS USED TO MEASURE PIPE O.D. DUE TO INTERFERENCES.

ATTACHMENT 5 No. 2 DIESEL GENERATOR JACKET WATER COOLER SW FLOW

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 The piping configuration at the primary setup location may not leave this pipe full of service water at all times. If empty pipe indications are obtained with the Controlotron at this location, or flow anomalies are anticipated due to piping configuration, duplicate the setup to the alternate location.

2.2 System Lineup

2.2.1 Setup the tracks and transducers as shown on the No. 2 Diesel Generator Jacket Water Cooler SW Flow Setup Sketch. Measure and record the reference dimension from the U-bolt on the horizontal pipe support noted on the sketch to the upstream edge of the track.

REFERENCE DIMENSION 130 1/4"

2.2.2 Measure and record below and on the site setup sketch the axial location of the transducer track assembly from the components noted on the sketch.

REFERENCE DIMENSION 3 1/2"

2.2.3 Verify No. 2 Diesel Generator is not running.

2.2.4 Verify the No. 2 Diesel Generator Jacket Water Cooler SW Isolation Valve, 1-SW-V211, is closed.

2.2.5 Verify the No. 2 Diesel Generator Jacket Water Cooler SW Isolation Valve, 2-SW-V211, is closed.

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B,4

2.3.2 Zero Offset: (-)20.0 gpm

2.3.3 Diagnostic Data:

Vs 1485.7 m/s Valc 66 fx 800,000

Vfmax 82.40 Vsmax 1777.12

3.0 TEST PERFORMANCE SUTE SETUP VERIFICATION

3.0.1 Test Diagnostic Data:

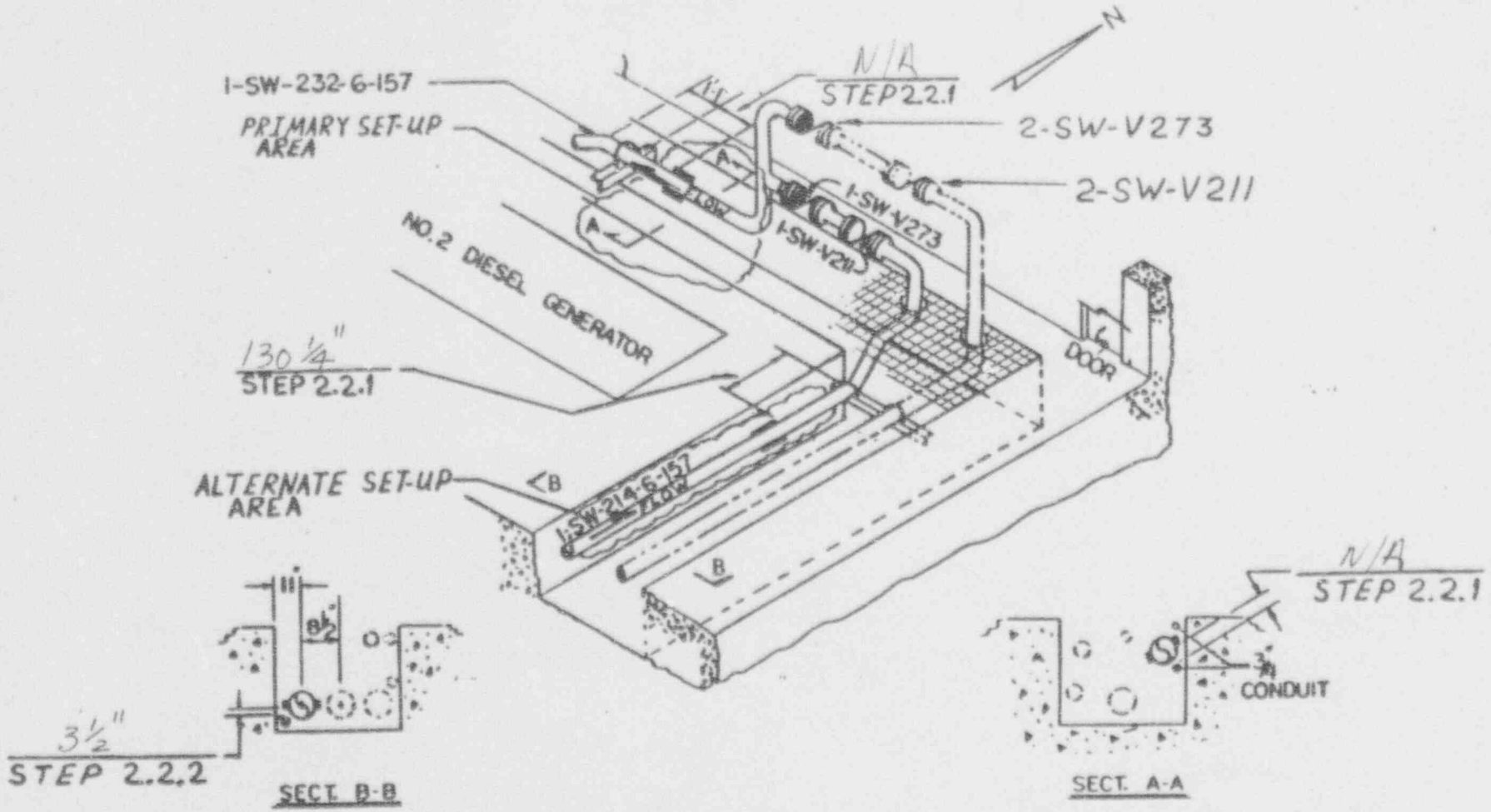
Vs 1410.58 m/s Valc 66 fx 800,000

Vfmax 79.67 Vsmax 1777.12

COMMENTS:

Upstream Transducer on west side of pipe.

ATTACHMENT 5



NO. 2 DIESEL GENERATOR JACKET WATER COOLER SW INLET SETUP SKETCH
DIESEL GENERATOR BUILDING

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 5

SITE NAME: 2DGJKT

STEP No.: 9.3.29

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
11:16	1442	65	1418	
11:17	1442	65	2837	1419
11:18	1441	65	4257	1420
11:19	1441	65	5679	1422
11:20	1441	65	7100	1421
11:21	1441	65	8526	1426
11:22	1441	65	9947	1421
				AVERAGE 1422

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 5

SITE NAME: 2DG-1KT

STEP No.: 9.3.33

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
~~13:13~~ 13:18	1441	66	9612	
~~13:14~~ 13:19	1440	66	11041	1429
~~13:15~~ 13:20	1441	66	12462	1421
~~13:16~~ 13:21	1441	66	13895	1433
~~13:17~~ 13:22	1441	66	15326	1431
~~13:18~~ 13:23	1441	66	16752	1426
13:24	1441	66	18177	1425
				AVERAGE 1428

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 5

SITE NAME: 2 DGSKT

STEP No.: 9.3.42

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FL DI
14:46	1439	66	JWM 1-18-91 2660 ~~2666~~	
14:47	1439	65	4053	
14:48	1439	66	5449	
14:49	1439	66	6839	
14:50	1439	66	8229	
14:51	1439	66	9619	
14:52	1439	66	11009	
				AVER

ATTACHMENT 6 1A RHR PUMP ROOM COOLER SW INLET SITE SETUP

1.0 SITE NAME: ARHRMCLR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. U0680

1.1.2 Track/Transducer size: 2

1.1.3 Transducer Serial Nos.: (up) U 13368
(down) U 13366A

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) Direct

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 6.631 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 6.626 in.

1.2.1.3 O.D. at downstream transducer location. 6.633 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 6.620 in.

1.2.1.5 Average of measured O.D.'s: 6.628 in.

Micrometers/Calipers:
CP&L No.: QM-023 Cal Date: 8/23/90 Cal Due Date: 2/18/90

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.275 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.268 in.

1.2.3.3 Average pipe wall thickness. 0.272 in.

ATTACHMENT 6 1A RHR PUMP ROOM COOLER SW INLET SITE SETUP

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 At least one RHR Pump Room Cooler shall be in operation and supplied by the NSW Header when the Service Water System is in operation.

2.1.2 1B RHR Pump Room Cooler is operational.

2.1.3 1A RHR Pump Room Cooler will be out of service during the zero flow calibration.

2.2 System Lineup

2.2.1 Setup the tracks/transducers on Line 1-SW-110-6-046 as shown on the 1A RHR Pump Room Cooler Inlet Site Setup Sketch. The tracks shall be setup horizontal and parallel to the floor. Record the reference dimension below and on the setup sketch.

REFERENCE DIMENSION 54"

2.2.2 At RTGB Panel XU-3 place NORTH RHR VENT FAN keyswitch to the OFF position. C

2.2.3 Verify (locally) the RHR Pump Room A Coolers Service Water Outlet Valve, 1-SW-V129, is in the closed position. C

2.2.4 Close RHR Pump Room A Coolers Service Water Supply Valve, 1-SW-V114. C

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B / 11

2.3.2 Zero Offset: 69.9 GPM

2.3.3 Diagnostic Data:

Vs 1112.96 m/s Valc 70 fx 1714236

Vfmax 34.76 Vsmax 1762.28

2.4 System Restoration

2.4.1 Lock open RHR Pump Room A Coolers Service Water Supply Valve, 1-SW-V114. C / JO
Ind. Ver.

2.4.2 Restore the NORTH RHR VENT FAN keyswitch per the Shift Foreman's instruction.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

3.0.1 Test Diagnostic Data:

1445:30 LKP 4/18/91

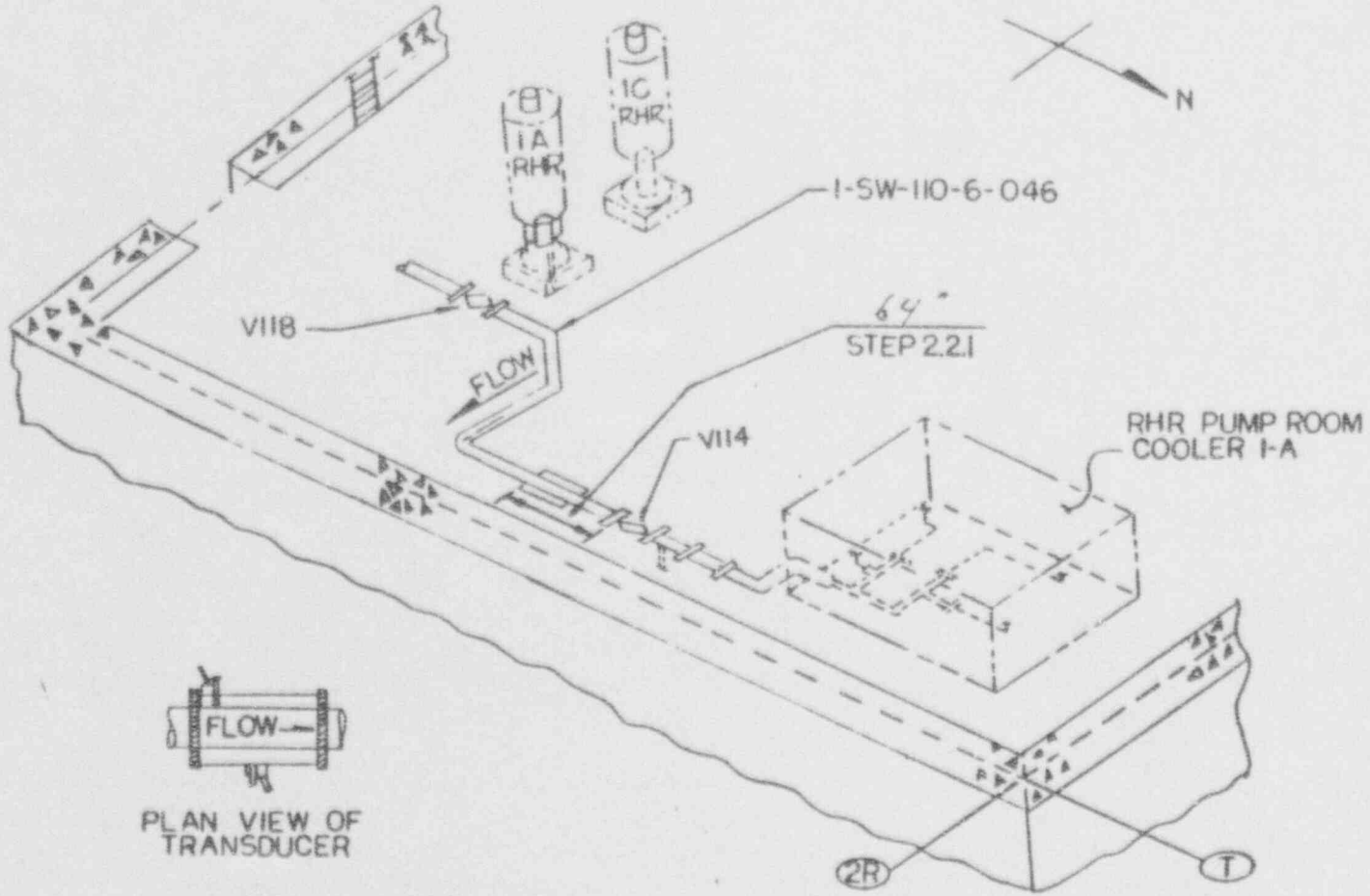
Vs ~~1112.96~~ m/s Valc 70 fx 1714286

Vfmax 34.76 Vsmax 1762.28

COMMENTS:

Upstream Transducer on West side of pipe

ATTACHMENT 6



1A RHR PUMP ROOM COOLER SW INLET SITE SETUP
UNIT 1 REACTOR BUILDING, EL. -17'

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 6

SITE NAME: ARHR MCLR

STEP No.: ~~9.3.25~~ 29 WKD 1/18/91

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
11:11	1445	70	195	~~520~~ WKD 1/18/91
11:12	1445	70	715	520
11:13	1445	70	1234	519
11:14	1445	70	1752	518
11:15	1445	70	2268	516
11:16	1445	70	2788	520
				AVERAGE 518.6

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 6

SITE NAME: ARHRMCLR

STEP No.: 9.3.33

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
13:41	1453	70	753	
13:42	1453	70	1249	496
13:43	1452	70	1751	502
13:44	1453	70	2249	498
13:45	1452	70	2746	497
13:46	1452	70	3249	503
			AVERAGE	499.7

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 6

SITE NAME: ARHRMCLR

STEP No.: 9.2.42

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
1432	~~1438~~ 1452 LWS 1/18/91	70	385	
1433	1452	70	879	494
14:34	1452	70	1373	494
14:35	1452	70	1872	499
14:36	1452	70	2364	492
14:37	1452	70	2859	495
				AVERAGE 494.8

ATTACHMENT 7: 1A RHR PUMP SEAL COOLER SW INLET SITE SETUP

1.0 SITE NAME: 1ASLCLR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. U0680

1.1.2 Track/Transducer size: 1

1.1.3 Transducer Serial Nos.: (up) U1395A
(down) U1395B

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) Direct

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 1.314 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 1.310 in.

1.2.1.3 O.D. at downstream transducer location. 1.313 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 1.311 in.

1.2.1.5 Average of measured O.D.'s: 1.312 in.

Micrometers/Calipers:
CP&L No.: OM-084 Cal Date: 9/6/90 Cal Due Date: 3/4/91

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.148 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.148 in.

1.2.3.3 Average pipe wall thickness. 0.148 in.

ATTACHMENT 7 1A RHR PUMP SEAL COOLER SW INLET SITE SETUP

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 The 1A RHR Pump will not be available during the zero flow calibration at this setup location.

2.2 System Lineup

2.2.1 Setup the tracks/transducers on Line 1-SW-111-1-17A at the location shown on the 1A RHR Pump Seal Cooler SW Inlet Site Setup sketch. The tracks should be located horizontally on the sides of the pipe. Record the reference dimension from the upstream Tee to the upstream edge of the Track below and on the site setup sketch.
REFERENCE DIMENSION 49"

2.2.2 Shutdown, or verify shutdown, the 1A RHR Pump. C

2.2.3 Verify (locally) the RHR Pump A Heat Exchanger Service Water Outlet Valve, 1-SW-V130, is in the closed position. C

2.2.4 Close RHR Pump A Heat Exchanger Service Water Inlet Valve, 1-SW-V113. C

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B / 1

2.3.2 Zero Offset: -0.032 gpm

2.3.3 Diagnostic Data:

Vs 1.4589 m/s Valc 68 fx 2,000,000

Vfmax 171.52 Vsmax 1521.61

2.4 System Restoration

2.4.1 Lock open RHR Pump A Heat Exchanger Service Water Inlet Valve, 1-SW-V113. C, JP
Ind. Ver.

2.4.2 Restore 1A RHR Pump operation per the Shift Foreman's instruction.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

3.0.1 Test Diagnostic Data:

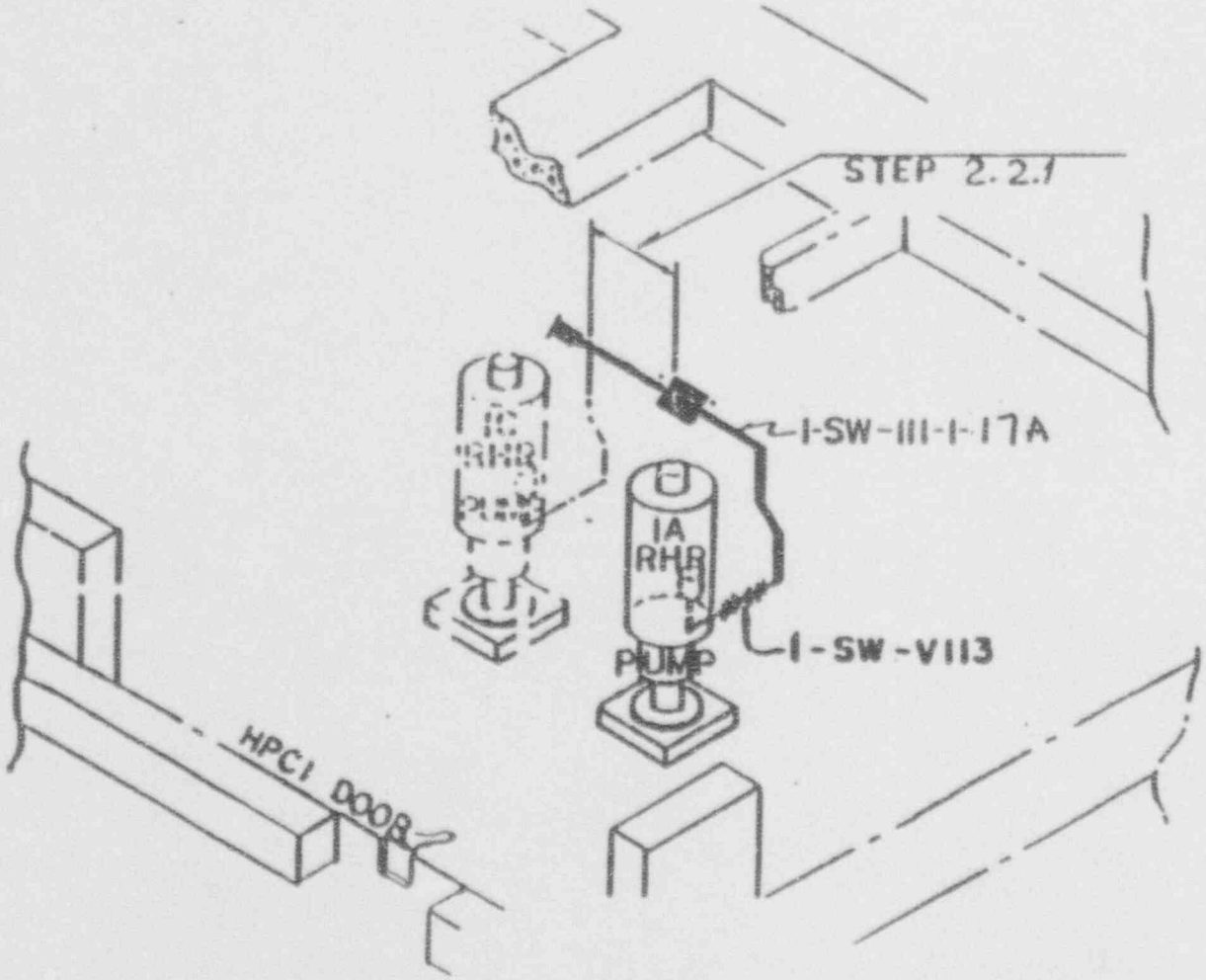
Vs 1.4652 m/s 1416-46 exp 1/18/91 Valc 68 fx 2,000,000

Vfmax 171.52 Vsmax 1521.61

COMMENTS:

upstream Transducer on North Side of pipe

ATTACHMENT 7



1A RHR PUMP SEAL COOLER SW INLET SITE SETUP
UNIT 1 REACTOR BUILDING EL. -17'

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 7

SITE NAME: IASLCLR

STEP No.: 9.3.29

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
11:42	1416	68	6.5	
11:43	1416	68	23.3	16.8
11:44	1416	68	40.0	16.7
11:45	1416	68	56.7	16.7
11:46	1416	68	73.4	16.7
11:47	1416	68	90.1	16.7
11:48	1416	68	106.8	16.7
			AVERAGE	16.71

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 7

SITE NAME: 1A5LCLR

STEP No.: 9.3.33

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
13:18	1405	68	0.0	
13:19	1405	68	16.5	16.5
13:20	1405	68	33.0	16.5
13:21	1405	68	49.4	16.4
13:22	1405	68	65.8	16.4
13:23	1405	68	82.3	16.5
				AVERAGE 16.46

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 7

SITE NAME: 1A51CLP

STEP No.: 9.3.42

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
14:49	1385	68	6.4	
14:56	1385	68	22.5	16.1
14:51	1385	68	38.6	16.1
14:52	1385	68	54.7	16.1
14:53	1385	68	70.8	16.1
14:54	1385	68	86.8	16.0
				AVERAGE 16.08

ATTACHMENT 8 1C RHR PUMP SEAL COOLER SW INLET SITE SETUP

1.0 SITE NAME: 1CSLCLR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. U0680

1.1.2 Track/Transducer size: 1

1.1.3 Transducer Serial Nos.: (up) U0201
(down) U0201

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) Direct

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 1.310 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 1.313 in.

1.2.1.3 O.D. at downstream transducer location. 1.310 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 1.313 in.

1.2.1.5 Average of measured O.D.'s: 1.312 in.

Micrometers/Calipers:
CP&L No.: 0M-089 Cal Date: 9/6/90 Cal Due Date: 3/4/91

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.150 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.150 in.

1.2.3.3 Average pipe wall thickness. 0.150 in.

ATTACHMENT 8 1C RHR PUMP SEAL COOLER SW INLET SITE SETUP

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 The 1C RHR Pump will not be available during the zero flow calibration at this setup location.

2.2 System Lineup

2.2.1 Setup the tracks/transducers on Line 1-SW-112-1-17A at the location shown on the 1C RHR Pump Seal Cooler SW Inlet Site Setup Sketch. Record the reference dimension from the downstream elbow to the upstream edge of the track below and on the site setup sketch.
REFERENCE DIMENSION 11 1/2"

2.2.2 Shutdown, or verify shutdown, the 1C RHR Pump. C

2.2.3 Verify (locally) the RHR Pump C Heat Exchanger Service Water Outlet Valve, 1-SW-V131, is in the closed position. C

2.2.4 Close RHR Pump C Heat Exchanger Service Water Inlet Valve, 1-SW-V112. C

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B, 6

2.3.2 Zero Offset: -0.064 gpm

2.3.3 Diagnostic Data:

Vs 1426.87 m/s Valc 61 fx 3,000,000

Vfmax 114.31 Vsmax 1918.23

2.4 System Restoration

2.4.1 Lock open RHR Pump C Heat Exchanger Service Water Inlet Valve, 1-SW-V112. C/TP
Ind. Ver.

2.4.2 Restore 1C RHR Pump operation per the Shift Foreman's instruction.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

3.0.1 Test Diagnostic Data:

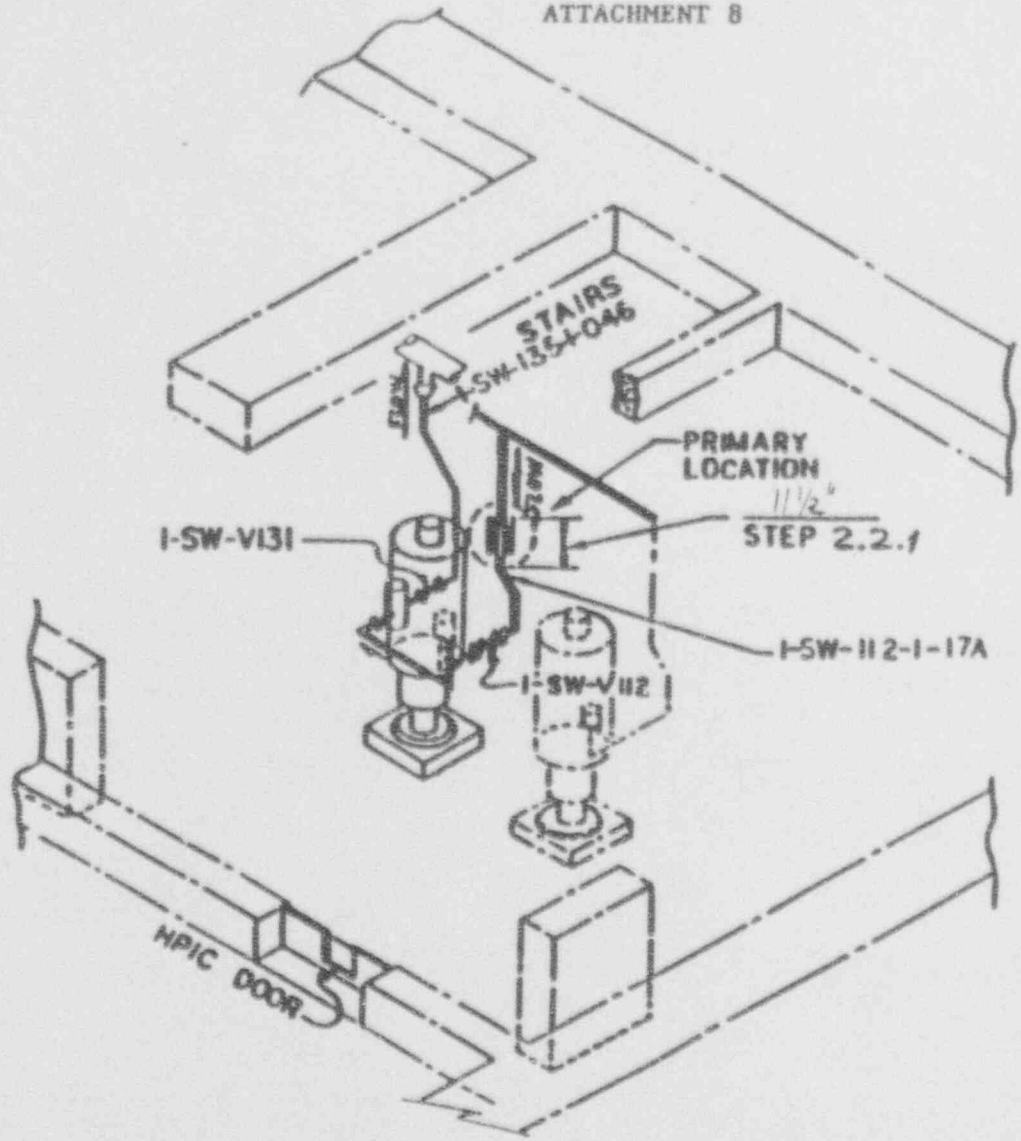
Vs ~~1427m/s~~ 1444.39 EWKP 1/18/91 Valc 62 fx 3,000,000

Vfmax ~~114.31~~ 120.21 EWKP 1/18/91 Vsmax 1918.23

COMMENTS:

Upstream transducer on west side of pipe.

ATTACHMENT 8



1C RHR PUMP SEAL COOLER SW INLET SITE SETUP
UNIT 1 REACTOR BUILDING EL. -17'

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 8

SITE NAME: ICSLCLR

STEP No.: 9.3.29

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
11:34	1383	62	11.2	
11:35	1383	62	28.3	17.1
11:36	1383	62	45.5	17.2
11:37	1383	62	62.5	17
11:38	1383	62	79.6	17.1
11:39	1383	62	96.8	17.2
			AVERAGE	17.12

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 8

SITE NAME: ICSLCLR

STEP No.: 9.3.33

DATE: 1/15/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
13:49	1438	62	24.6	
13:50	1438	62	40.3	15.7
13:51	1438	62	56.0	15.7
13:52	1438	62	71.6	15.6
13:53	1438	62	87.2	15.6
13:54	1438	62	102.8	15.6
				AVERAGE 15.64

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 8

SITE NAME: 1C SLCLR

STEP No.: 9.3.42

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
14:24	1438	62	390	
14:25	1438	62	405.2	15.2
14:26	1438	62	420.3	15.1
14:27	1438	62	435.3	15
14:28	1438	62	450.4	15.1
14:29	1438	62	465.4	15
				AVERAGE 15.08

ATTACHMENT 9 1B RHR PUMP ROOM COOLER SW INLET SITE SETUP

1.0 SITE NAME: BRHRMCLR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. U0389

1.1.2 Track/Transducer size: 2

1.1.3 Transducer Serial Nos.: (up) U2078A
(down) U2078B

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) Direct

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 6.629 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 6.627 in.

1.2.1.3 O.D. at downstream transducer location. 6.627 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 6.626 in.

1.2.1.5 Average of measured O.D.'s: 6.627 in.

Micrometers/Calipers:
CP&L No.: QM-723 Cal Date: 8/23/90 Cal Due Date: 2/8/91

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.265 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.265 in.

1.2.3.3 Average pipe wall thickness. 0.265 in.

ATTACHMENT 9 1B RHR PUMP ROOM COOLER SW INLET SITE SETUP

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 At least one RHR Pump Room Cooler shall be in operation and supplied by the NSW Header when the Service Water System is in operation.

2.1.2 1A RHR Pump Room Cooler is operational.

2.1.3 1B RHR Pump Room Cooler will be out of service during the zero flow calibration.

2.2 System Lineup

2.2.1 Setup the tracks/transducers on Line 1-SW-120-6-046 as shown on the 1B RHR Pump Room Cooler Inlet Site Setup Sketch. The tracks shall be setup horizontal and parallel to the floor. Record the reference dimension below and on the site setup sketch.

REFERENCE DIMENSION 12 3/8"

2.2.2 At RTGB Panel XU-3 place SOUTH RHR VENT FAN keyswitch to the OFF position. C

2.2.3 Verify (locally) the RHR Pump Room B Coolers Service Water Outlet Valve, 1-SW-V124, is in the closed position. C

2.2.4 Close RHR Pump Room B Coolers Service Water Supply Valve, 1-SW-V120. C

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B, 11

2.3.2 Zero Offset: -6.3 gpm

2.3.3 Diagnostic Data:

Vs 45.52 m/s Valc 72 fx 1200000

Vfmax 49.56 Vsmax 1764.98

2.4 System Restoration

2.4.1 Lock open RHR Pump Room B Coolers Service Water Supply Valve, 1-SW-V120. C/SD
Ind. Ver.

2.4.2 Restore the SOUTH RHR VENT FAN keyswitch per the Shift Foreman's instruction.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

3.0.1 Test Diagnostic Data:

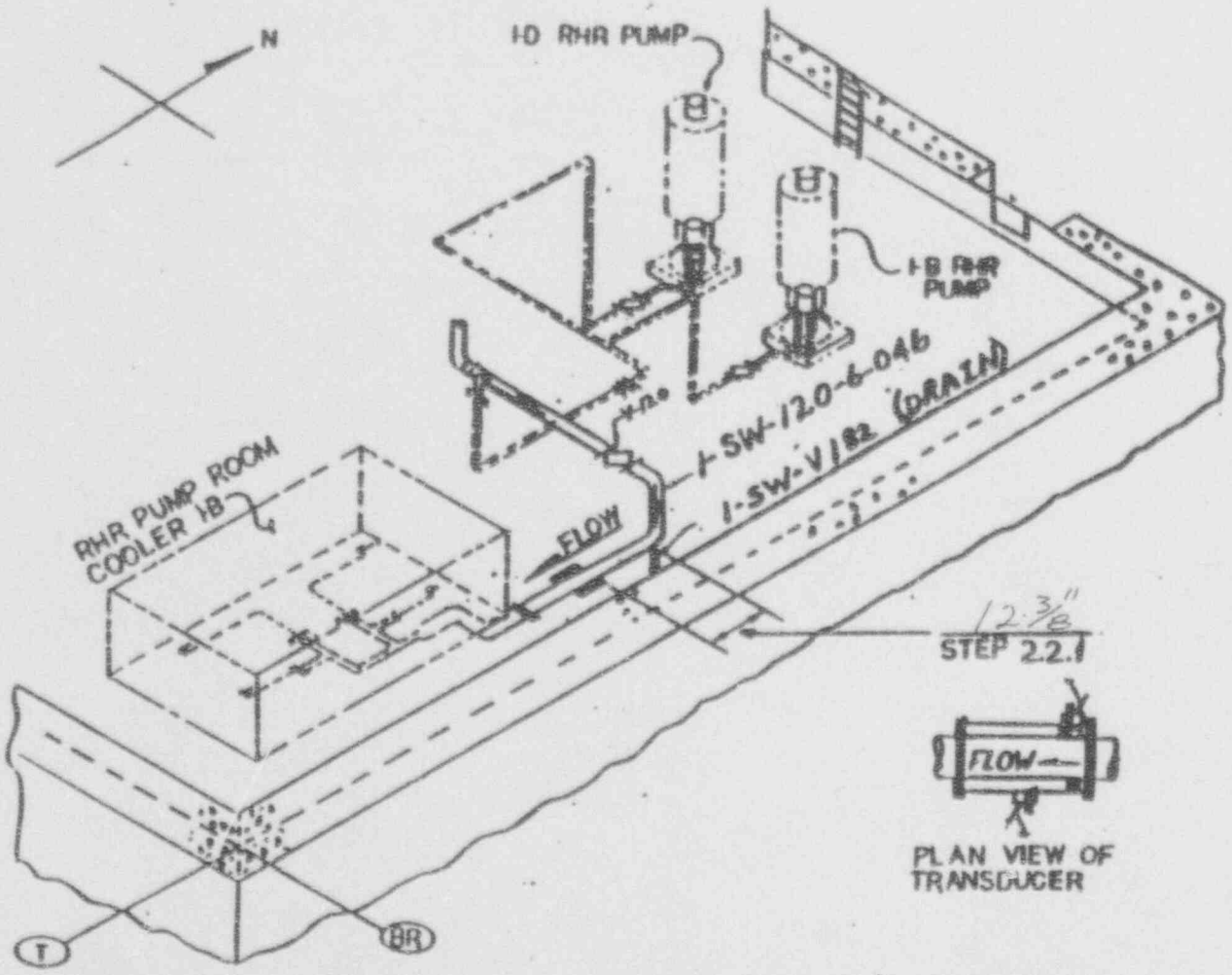
Vs 1438 m/s Valc 72 fx 1,200,000

Vfmax 49.7 Vsmax 1765.0

COMMENTS:

Upstream Transducer on West side of pipe.

ATTACHMENT 9



1B RHR PUMP ROOM COOLER SW INLET SITE SETUP
UNIT 1 REACTOR BUILDING, EL. -17'

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 9

SITE NAME: BRUNSWICK

STEP No.: 9.3.2.9

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
1141	1438	72	0 (1-18-91 CS) .1151K	
1142	1438	72	.525	.41 K
1143	1438	72	.934	.409 K
1144	1438	72	1.346	.392K
1145	1438	72	1.754	.408 K
1146	1438	72	2.162	.408 K
1147	1438	72	2.572	.410 K
				AVERAGE .40616

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 9

SITE NAME: BRAIDWOOD

STEP No.: 2.3.32

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
13:26	1446	72	354	
13:27	1446	72	758	404
13:28	1446	72	1161	403
13:29	1446	72	1563	402
13:30	1446	72	1964	401
13:31	1446	72	2364	400 1-18-91 CS
1332	1446	72	2767	~~400~~ 403
				AVERAGE 402.17

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 9

SITE NAME: BRHRMCLR

STEP No.: 9.3.42

DATE: 1/15/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
1425	1440	72	298	
1426	1440	72	398	~~300~~ 403
1427	1440	72	1102	404
1428	1440	72	1501	399
1429	1440	72	1901	400
1430	1440	72	2304	403
1431	1440	72	2703	399
				AVERAGE 400.63

ATTACHMENT 10 1B RHR PUMP SEAL COOLER SW INLET SITE SETUP

1.0 SITE NAME: 1BSLCLR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. U0389

1.1.2 Track/Transducer size: 1

1.1.3 Transducer Serial Nos.: (up) U0329
(down) U0329

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) Direct

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 1.312 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 1.313 in.

1.2.1.3 O.D. at downstream transducer location. 1.313 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 1.313 in.

1.2.1.5 Average of measured O.D.'s: 1.313 in.

Micrometers/Calipers:
CP&L No.: OM-084 Cal Date: 9/6/90 Cal Due Date: 3/4/91

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.148 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.148 in.

1.2.3.3 Average pipe wall thickness. 0.148 in.

ATTACHMENT 10 1B RHR PUMP SEAL COOLER SW INLET SITE SETUP

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 The 1B RHR Pump will not be available during the zero flow calibration at this setup location.

2.2 System Lineup

2.2.1 Setup the tracks/transducers on Line 1-SW-119-1-17A at the location shown on the 1B RHR Pump Seal Cooler SW Inlet Site Setup Sketch. The tracks are to be located on the East and West sides of the pipe. Measure and record the reference dimension from the upstream edge of the tracks to the center of the upstream elbow below and on the site setup sketch. REFERENCE DIMENSION 17½"

2.2.2 Shutdown, or verify shutdown, the 1B RHR Pump. C

2.2.3 Verify (locally) the RHR Pump B Heat Exchanger Service Water Outlet Valve, 1-SW-V126, is in the closed position. C

2.2.4 Close RHR Pump B Heat Exchanger Service Water Inlet Valve, 1-SW-V119. C

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B / 6

2.3.2 Zero Offset: -1.48 gpm

2.3.3 Diagnostic Data:

Vs 150.66 m/s Valc 74 fx 3,000,000

Vfmax 119.97 Vsmax 1920.12

2.4 System Restoration

2.4.1 Lock open RHR Pump B Heat Exchanger Service Water Inlet Valve, 1-SW-V119. MW / C
Ind. Ver.

2.4.2 Restore 1B RHR Pump operation per the Shift Foreman's instruction.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

3.0.1 Test Diagnostic Data:

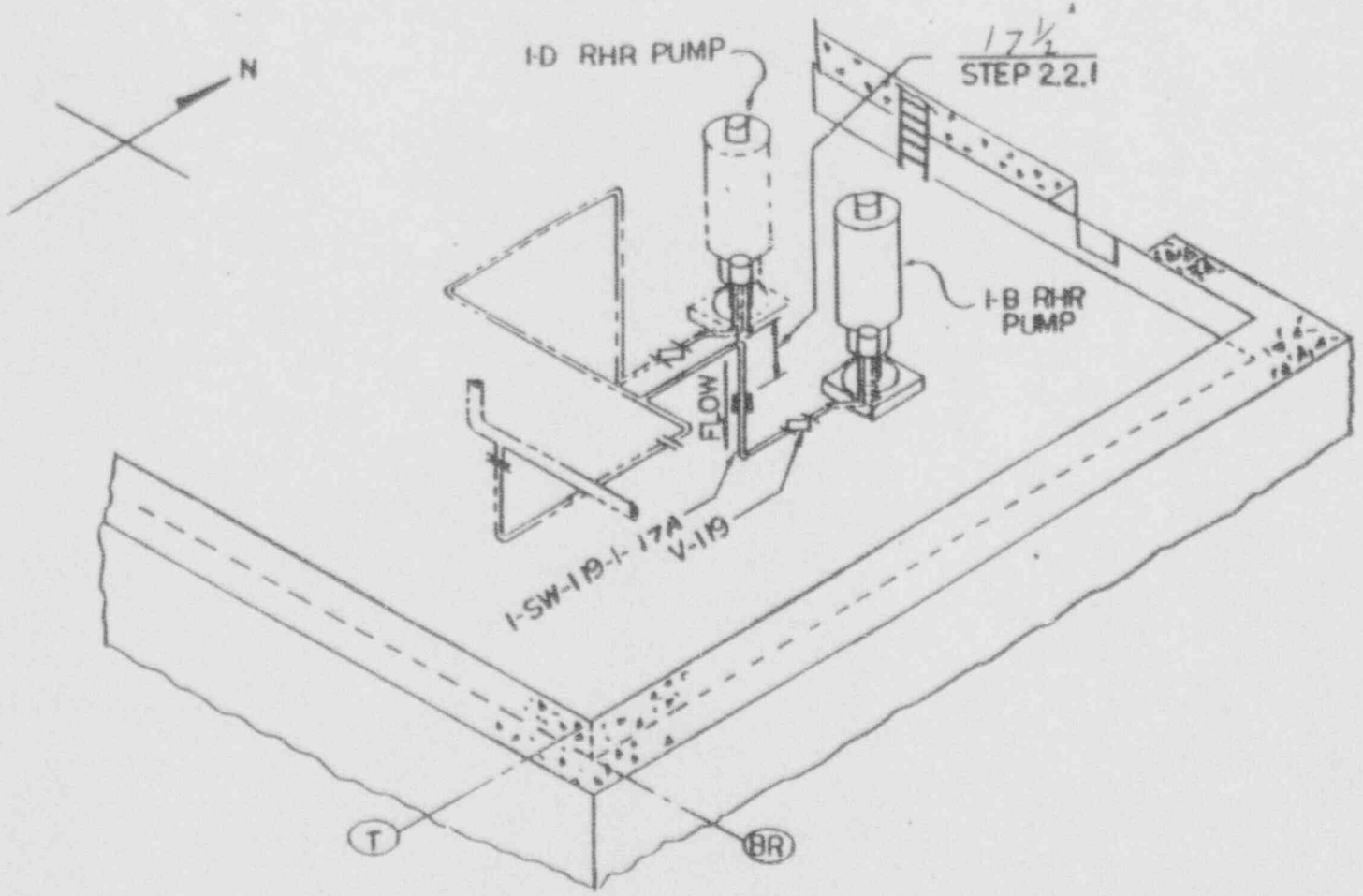
Vs 1502 1-15-91 ~~1503~~ m/s Valc 74 1-15-91 ~~75~~ fx 3,000,000

Vfmax 120.0 Vsmax 1920

COMMENTS:

Upstream Transducer on East side of pipe.

ATTACHMENT 10



1B RHR PUMP SEAL COOLER SW INLET SITE SETUP
UNIT 1 REACTOR BUILDING EL. -17'

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 10

SITE NAME: LBSLCLR

STEP No.: 9.3.29

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
1132	1-18-91 CS ~~75~~ 1481	1-18-91 CS ~~CS~~ 75	3.6853 K	
1133	1481	75	3.7001 K	.0148 K
1134	1481	75	3.7149 K	.0148 K
1135	1481	75	3.7297 K	.0148 K
1136	1481	75	3.7446 K	.0149 K
1137	1481	75	3.7594 K	.0148 K
1138	1481	75	3.7742 K	.0148 K
				AVERAGE .014866

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 10

SITE NAME: IBSLCLR

STEP No.: 9.3.33

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
13:35	1501	75	3683.1	
13:36	1501	75	3697.2	14.1
13:37	1501	75	3711.3	14.1
13:38	1501	75	3725.4	14.1
13:39	1502	75	3739.5	14.1
13:40	1502	75	3753.7	14.2
13:41	1501	75	3767.7	14.0
				AVERAGE 14.1

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 10

SITE NAME: 1BSLCLR

STEP No.: 9.3.42

DATE: 1/16/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
14:35	1501	75	11.2	
14:36	1501	75	25.6	14.4
14:37	1501	75	40	14.4
14:38	1501	75	54.4	14.4
14:39	1500	75	68.8	14.4
14:40	1500	75	83.3	14.5
14:41	1501	75	97.7	14.4
			AVERAGE	14.46

ATTACHMENT 11 1D RHR PUMP SEAL COOLER SW INLET SITE SETUP

1.0 SITE NAME: 1DSLCLR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. U0389

1.1.2 Track/Transducer size: 1

1.1.3 Transducer Serial Nos.: (up) 120429 (ST-12)
(down) U0429 (ST-11)

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) Direct

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 1.313 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 1.312 in.

1.2.1.3 O.D. at downstream transducer location. 1.312 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 1.312 in.

1.2.1.5 Average of measured O.D.'s: 1.312 in.

Micrometers/Calipers:
CP&L No.: 0M-082 Cal Date: 9/6/90 Cal Due Date: 3/4/91

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.148 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.150 in.

1.2.3.3 Average pipe wall thickness. 0.149 in.

ATTACHMENT 11 1D RHR PUMP SEAL COOLER SW INLET SITE SETUP

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 The 1D RHR Pump will not be available during the zero flow calibration at this setup location.

2.2 System Lineup

2.2.1 Setup the tracks/transducers on Line 1-SW-118-1-17A at the location shown on the 1D RHR Pump Seal Cooler SW Inlet Site Setup Sketch. The tracks are to be located on the East and West sides of the pipe. Measure and record the reference dimension from the upstream edge of the tracks to the center of the upstream elbow below and on the site setup sketch. REFERENCE DIMENSION 17"

2.2.2 Shutdown, or verify shutdown, the 1D RHR Pump. C

2.2.3 Verify (locally) the RHR Pump D Heat Exchanger Service Water Outlet Valve, 1-SW-V125, is in the closed position. C

2.2.4 Close RHR Pump D Heat Exchanger Service Water Inlet Valve, 1-SW-V199. C

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B / L

2.3.2 Zero Offset: .57 gpm

2.3.3 Diagnostic Data:

Vs ~~1461.28~~ m/s Valc 68 fx 2,400,000

Vfmax 150.24 Vsmax 1919.92

2.4 System Restoration

2.4.1 Lock open RHR Pump D Heat Exchanger Service Water Inlet Valve, 1-SW-V199. C 12D
Ind. Ver.

2.4.2 Restore 1D RHR Pump operation per the Shift Foreman's instruction.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

3.0.1 Test Diagnostic Data:

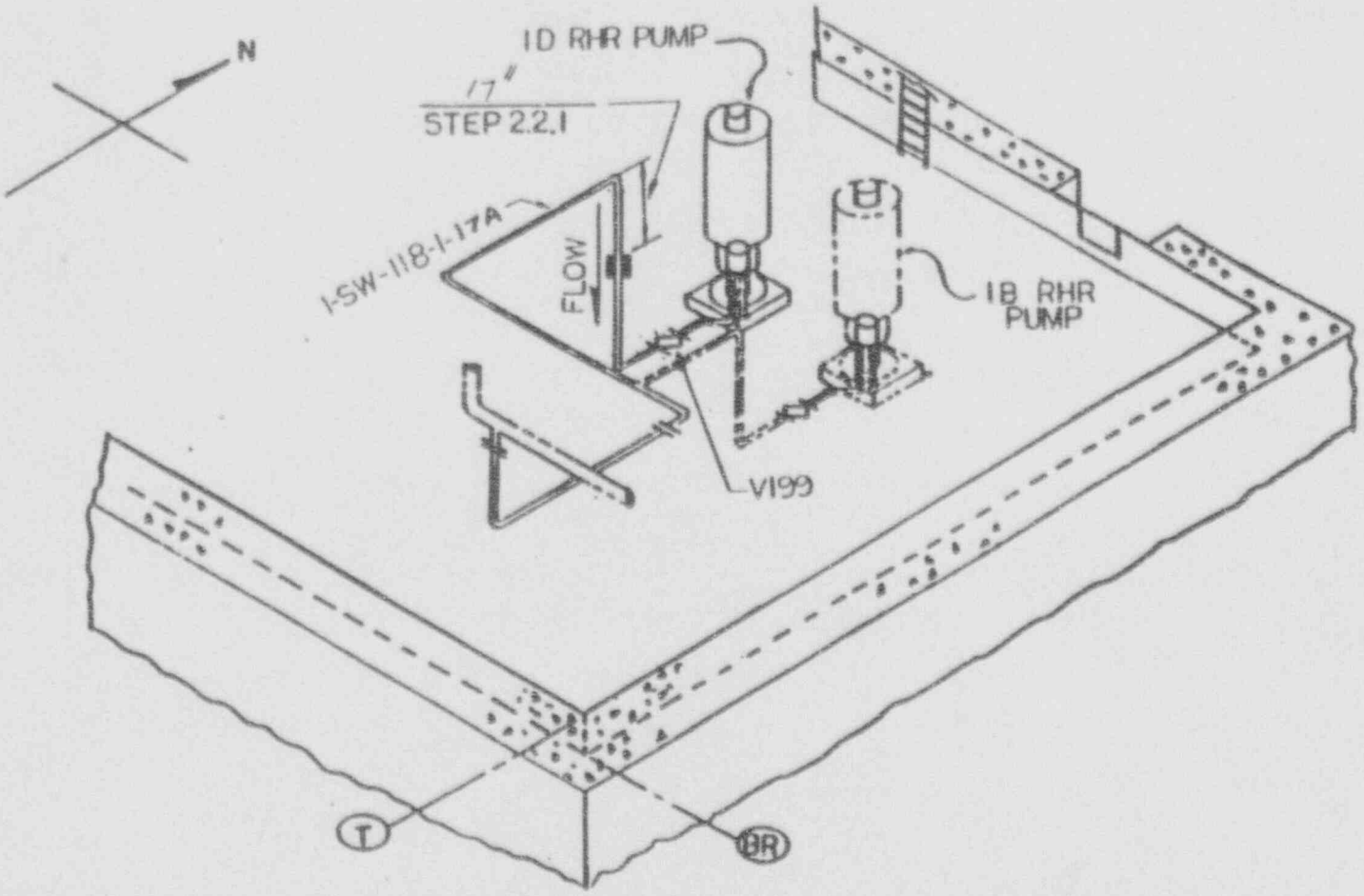
Vs ~~1432~~ 1426 m/s Valc 69 fx 2,400,000

Vfmax 142.9 Vsmax 1920

COMMENTS:

Upstream Transducer on west side of pipe.

ATTACHMENT 11



1D RHR PUMP SEAL COOLER SW INLET SITE SETUP
UNIT 1 REACTOR BUILDING EL. -17'

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 11

SITE NAME: IDSLCLR 81-53

STEP No.: 9.3.29

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
1120	1456	69	.020 K	
1121	1456	69	.037 K	.017 K
1122	1456	69	.053 K	.016 K
1123	1456	69	.070 K	.017 K
1124	1456	69	.087 K	.017 K
1125	1456	69	.103 K	.016 K
1126	1456	69	.120 K	.017 K
				AVERAGE .01666

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 11

SITE NAME: IDSLCLR

STEP No.: 9.3.29 1-16-91 OS 33

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
1344	1431	69	18	
1345	1431	69	34	16
1346	1431	69	50	16
1347	1430	69	66	16
1348	1430	69	82	16
1349	1430	69	98	16
1350	1430	69	114	16
			AVERAGE	16

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 11

SITE NAME: 1DSLCLR

STEP No.: 9.3.42

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
14:43	1430	69	20	
14:44	1430	69	18	16
14:45	1430	69	34	16
14:46	1430	69	50	16
14:47	1430	68	66	16
14:48	1430	69	82	16
14:49	1430	69	98	16
			AVERAGE	16

ATTACHMENT 12 CS PUMP ROOM 1A FAN COOLING UNIT SW INLET SITE SETUP

1.0 SITE NAME: ACSCLR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. U0680

1.1.2 Track/Transducer size: 2

1.1.3 Transducer Serial Nos.: (up) U0658
(down) U0658

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) Direct

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 2.377 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 2.377 in.

1.2.1.3 O.D. at downstream transducer location. 2.378 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 2.378 in.

1.2.1.5 Average of measured O.D.'s: 2.378 in.

Micrometers/Calipers:
CP&L No.: 0M-068 Cal Date: 12/17/90 Cal Due Date: 6/17/91

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.125 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.130 in.

1.2.3.3 Average pipe wall thickness. 0.128 in.

ATTACHMENT 12 CS PUMP ROOM 1A FAN COOLING UNIT SW INLET SITE SETUP

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 The Core Spray Pump Room 1A Cooler will not be available during the zero flow calibration at this setup location.

2.2 System Lineup

2.2.1 Setup the tracks/transducers on Line 1-SW-116-2-17A as shown on the CS Pump Room 1A Fan Cooling Unit SW Inlet Site Setup Sketch. The tracks shall be on the sides of the pipe, each one an equal distance away from the North wall. Measure the reference dimension from the upstream edge of the track transducer assembly to the U-bolt on the support immediately downstream. Record this reference dimension below and on the site setup sketch.

REFERENCE DIMENSION 38 1/8"

2.2.2 Shutdown, or verify as shutdown, Core Spray Pump 1A. N-1

2.2.3 Verify (locally) the Core Spray Pump Room A Coolers Service Water Outlet Valve, 1-SW-V128, is in the closed position. N-1

2.2.4 Close Core Spray Pump Room A Coolers Service Water Inlet Valve, 1-SW-V115. N-1

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B, 5

2.3.2 Zero Offset: N-1 gpm

2.3.3 Diagnostic Data:

Vs N-1 m/s Valc N-1 fx N-1

Vfmax N-1 Vsmax N-1

2.4 System Restoration

2.4.1 Lock open Core Spray Pump Room A Coolers Service Water Inlet Valve, 1-SW-V115. N-1 / N-1 Ind. Ver.

2.4.2 Restore Core Spray Pump A operation as per the Shift Foreman's instruction.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

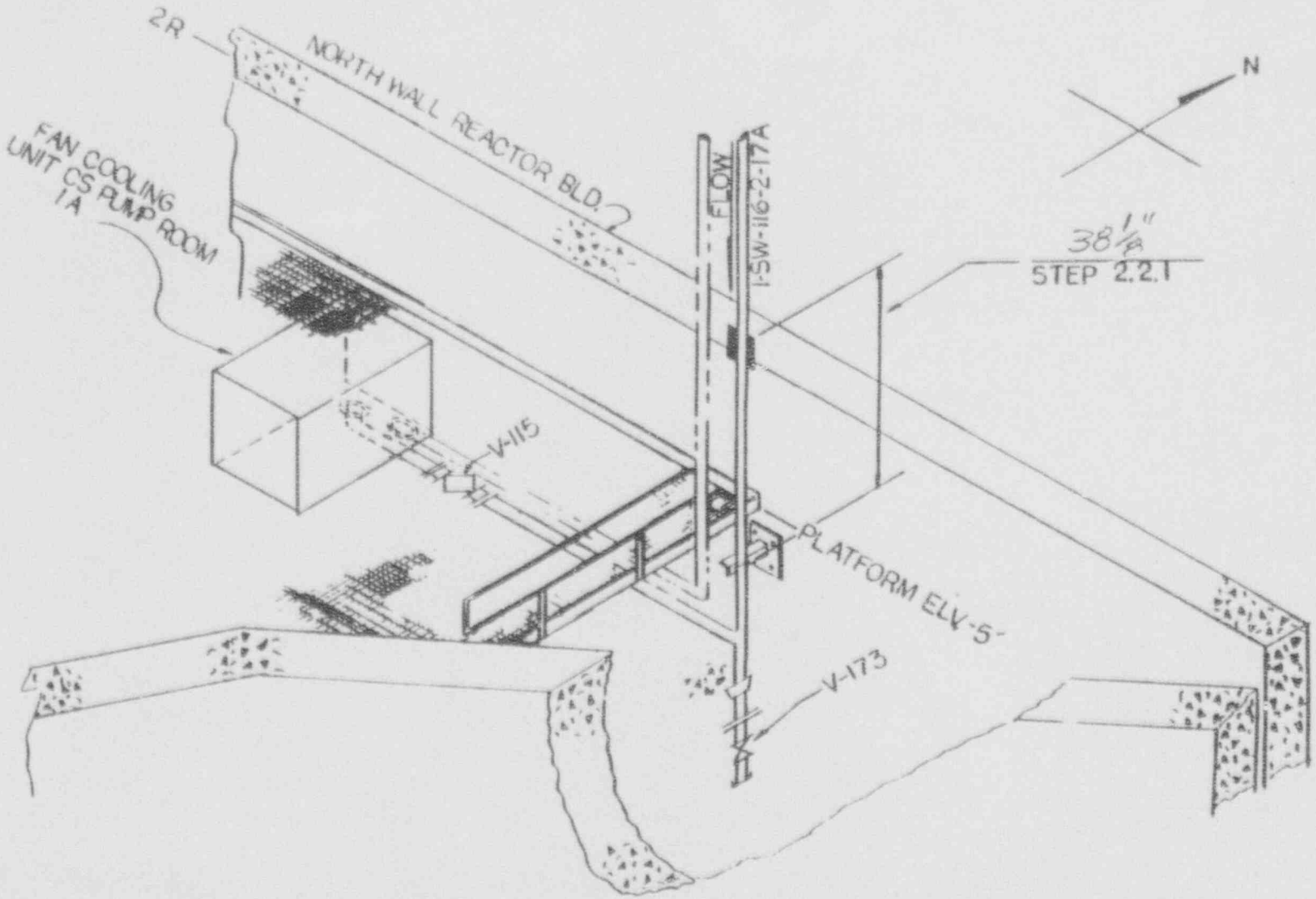
3.0.1 Test Diagnostic Data:

Vs ~~1521.82 m/s~~ 78 4/18/91 Valc ~~79~~ 78 4/18/91 fx 17142.86

Vfmax 163.98 Vsmax 1877.21

COMMENTS: N-1 - The cs spray system could not be put in an inoperable configuration (eg. V115 closed) due to plant conditions. Zero flow was obtained by the transducer reversal method.
(Upstream Transducer on east side of pipe)

ATTACHMENT 12



CORE SPRAY PUMP ROOM A COOLER SW INLET SITE SETUP
UNIT 1 REACTOR BUILDING, NORTH CORE SPRAY ROOM

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 12

SITE NAME: ACSCLR

STEP No.: Zero Flow by transducer reversal method, Transducers normal

DATE: 1/17/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
9:46	1526	78	856	
9:47	1526	78	952	96
9:48	1526	78	1048	96
9:49	1527	78	1143	95
9:50	1526	78	1239	96
9:51	1526	78	1334	95
				AVERAGE 95.6

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 12

SITE NAME: ACSCLR

STEP No.: Zero Flow by Transducer reversal method, Transducers reversed

DATE: / /

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
10:07	1530	78	-82	
10:08	1530	78	-172	90
10:09	1530	78	-263	91
10:10	1530	78	-354	91
10:11	1530	78	-444	90
10:12	1530	78	-535	91
10:13	1530	78	-625	90
				AVERAGE 90.5

$\frac{95.6 + 90.6}{2} = 93.1$ - Entered as actual flow

2.57 - indicated offset prior to transducer reversal zero calibration.

95.6 - 93.1 = 2.5 - offset calculated from zero flow data

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 12

SITE NAME: ACSCLR

STEP No.: 9.3.29

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
11:25	1521	78	113	
11:26	1521	78	204	91
11:27	1521	78	296	92
11:28	1521	78	387	91
11:29	1521	78	478	91
11:30	1521	78	569	91
				AVERAGE 91.2

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 12

SITE NAME: ACSCLR

STEP No.: 9.3.33

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
13:32	1530	78	81	
13:33	1530	78	172	91
13:34	1529	78	264	92
13:35	1529	78	354	90
13:36	1529	78	445	91
13:37	1529	78	537	92
				AVERAGE 91.2

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 12

SITE NAME: ACSCLR

STEP No.: 9.3.42

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
14:41	1529	78	500	
14:42	1528	78	141	91
14:43	1528	78	231	90
14:44	1528	78	322	91
14:45	1528	78	413	91
14:46	1528	78	503	90
				AVERAGE 90.6

ATTACHMENT 13 CS PUMP ROOM 1B FAN COOLING UNIT SW INLET SITE SETUP

1.0 SITE NAME: BCSCLR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. 110389

1.1.2 Track/Transducer size: 2

1.1.3 Transducer Serial Nos.: (up) U30444A
(down) U30448

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) Direct

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 2.372 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 2.375 in.

1.2.1.3 O.D. at downstream transducer location. 2.372 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 2.372 in.

1.2.1.5 Average of measured O.D.'s: 2.373 in.

Micrometers/Calipers:
CP&L No.: OM-069 Cal Date: 12/17/90 Cal Due Date: 6/17/91

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.121 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.134 in.

1.2.3.3 Average pipe wall thickness. 0.128 in.

ATTACHMENT 13 CS PUMP ROOM 1B FAN COOLING UNIT SW INLET SITE SETUP

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 The Core Spray Pump Room 1B Cooler will not be available during the zero flow calibration at this setup location.

2.2 System Lineup

2.2.1 Setup the tracks/transducers on Line 1-SW-124-2-17A as shown on the CS Pump Room 1B Fan Cooling Unit SW Inlet Site Setup Sketch. Measure the reference dimension from the upstream edge of the track transducer assembly to the U-bolt on the support immediately downstream. Record this reference dimension below and on the site setup sketch.

REFERENCE DIMENSION 26 1/2

2.2.2 Measure and record below and on the site setup sketch the radial location of the transducer track assembly holding the upstream transducer from the South wall as shown on the sketch.

REFERENCE DIMENSION See Sketch

2.2.3 Shutdown, or verify as shutdown, Core Spray Pump 1B. N-1

2.2.4 Verify (locally) the Core Spray Pump Room B Coolers Service Water Outlet Valve, 1-SW-V123, is in the closed position. N-1

2.2.5 Close Core Spray Pump Room B Coolers Service Water Inlet Valve, 1-SW-V121. N-1

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B / 5

2.3.2 Zero Offset: N-1 gpm

2.3.3 Diagnostic Data:

Vs N-1 m/s Valc N-1 fx N-1

Vfmax N-1 Vsmax N-1

2.4 System Restoration

2.4.1 Lock open Core Spray Pump Room B Coolers Service Water Inlet Valve, 1-SW-V121. N-1 / N-1 (Ind. / Ver.)

2.4.2 Restore Core Spray Pump B operation as per the Shift Foreman's instruction.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

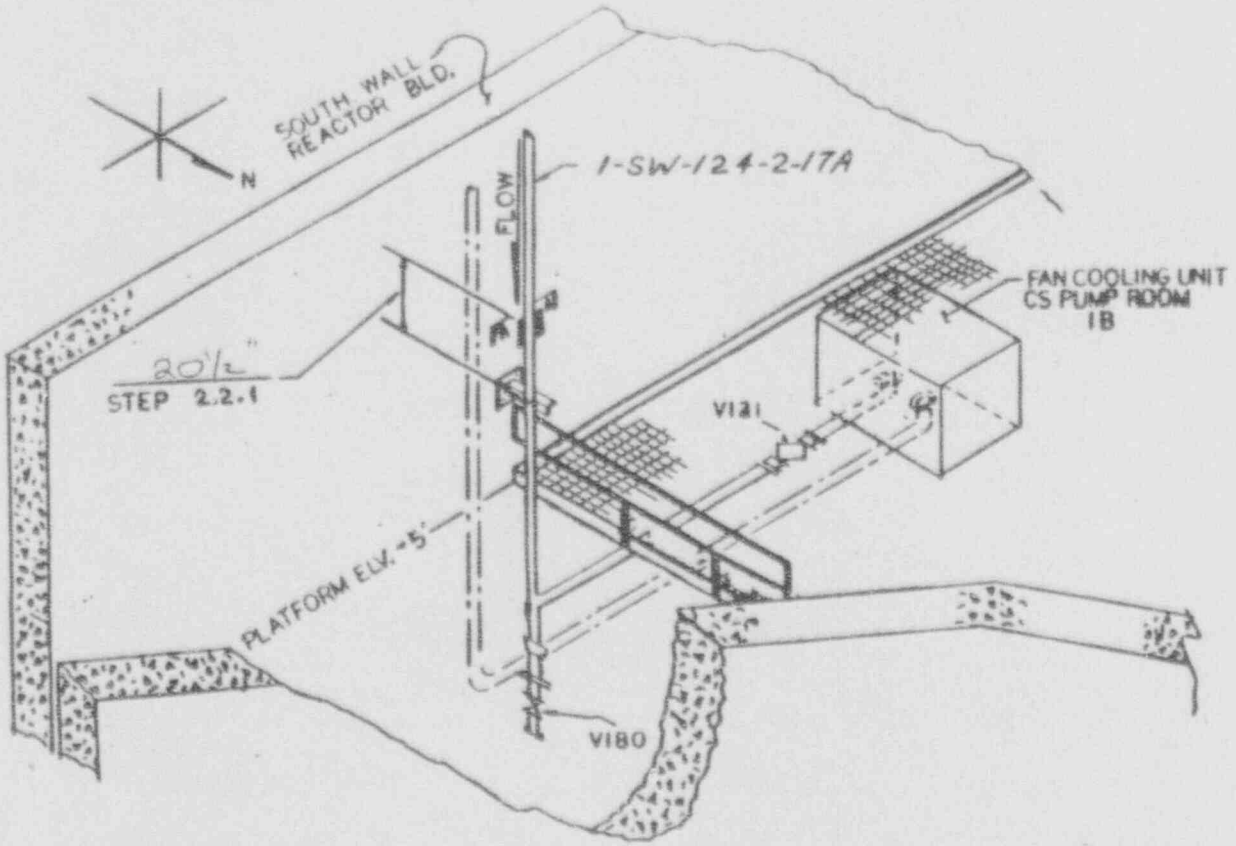
3.0.1 Test Diagnostic Data:

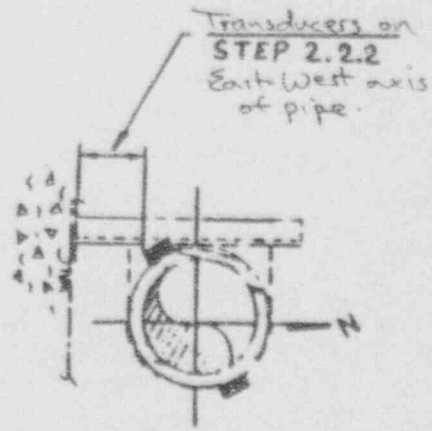
Vs 1498 1.72 m/s Valc 73 72 fx 1,714,286

Vfmax 104.9 Vsmax 184.6

COMMENTS: N-1 - The core spray system could not be put in an inoperable configuration (eg V123 closed) due to plant conditions. Zero flow was obtained by the transducer reversed method, - Upstream Transducer on west side of pipe.

ATTACHMENT 13





SECT A-A
LOCATION PLAN

CORE SPRAY PUMP ROOM B COOLER SW INLET SITE SETUP
UNIT 1 REACTOR BUILDING, SOUTH CORE SPRAY ROOM

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 13

SITE NAME: BCSCLR

STEP No.: Zero Flow calibration by transducer reversal, Transducers Normal

DATE: 1/17/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
9:48	1473	72	944	
9:49	1473	72	1009	65
9:50	1473	72	1074	65
9:51	1473	73	1139	65
9:52	1473	72	1205	66
9:53	1473	72	1270	65
				AVERAGE 65.2

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 13

SITE NAME: BCSCLR

STEP No.: Zero flow calibration by transducer reversal, transducers Reversed

DATE: 1/17/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
10:00	1398	66	-63	
10:01	1398	66	-126	63
10:02	1398	66	-190	64
10:03	1398	66	-253	63
10:04	1397	66	-316	63
10:05	1397	66	-379	63
10:06	1397	66	-443	64
			AVERAGE	63.33

$\frac{65.2 + 63.33}{2} = 64.27$ Entered as actual flow

0.04 gpm - indicated offset prior to transducer reversal zero calibration.

65.2 - 64.27 = .93 - offset calculated from zero flow data.

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 13

SITE NAME: BCS CLP 18-41-05

STEP No.: 9.3 ~~3~~ 29

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
1111	1497	72	.525 K	
1112	1497	72	.591 K	.066 K
1113	1497	72	.657 K	.066 K
1114	1497	72	.723 K	.066 K
1115	1497	73	.790 K	.067 K
1116	1497	73	.856 K	.066 K
1117	1497	73	.922 K	.066 K
				AVERAGE .06616

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 13

SITE NAME: BESCLR

STEP No.: 9.3.2.5 5.1.2.1.c.(5)

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
1353	1504	73	101	
1354	1505	73	163	62
1355	1505	73	225	62
1356	1505	73	287	62
1357	1505	73	349	62
1358	1505	73	411	62
1359	1505	73	473	62
			AVERAGE	62

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 13

SITE NAME: BCSCLR

STEP No.: 9.3.42

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
14:51	1504	73	7	
14:52	1504	73	68	61
14:53	1503	73	130	62
14:54	1503	73	192	62
14:55	1503	73	254	62
14:56	1503	73	315	61
14:57	1503	73	377	62
				AVERAGE 61.1.6

ATTACHMENT 14 RHR SW BOOSTER PUMP 1A MOTOR COOLER SW INLET SITE SETUP

1.0 SITE NAME: ABPMCLR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. 120009

1.1.2 Track/Transducer size: 1

1.1.3 Transducer Serial Nos.: (up) V 1374A
(down) V 1374B

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) Direct

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 1.896 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 1.897 in.

1.2.1.3 O.D. at downstream transducer location. 1.897 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 1.897 in.

1.2.1.5 Average of measured O.D.'s: 1.897 in.

Micrometers/Calipers:
CP&L No.: OM-157 Cal Date: 11/6/90 Cal Due Date: 5/6/91

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.137 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.146 in.

1.2.3.3 Average pipe wall thickness. 0.142 in.

ATTACHMENT 14 RHR SW BOOSTER PUMP 1A MOTOR COOLER SW INLET SITE SETUP

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 RHR SW Booster Pump 1A will not be in service during the zero flow calibration.

2.2 System Lineup

2.2.1 Setup the tracks/transducers at the location shown on the 1A RHR Service Water Booster Pump Motor Cooler Service Water Inlet Site Setup Sketch. The tracks shall be installed horizontally and parallel to the floor. Measure and record the reference dimension below and on the site setup sketch.

REFERENCE DIMENSION 20 3/4"

2.2.2 Shutdown, or verify as shutdown RHR SW Booster Pump 1A. JM

2.2.3 Verify (locally) the RHR Service Water Booster Pump A Cooler Service Water Inlet Valve, 1-SW-V136, is closed. JM

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B / 8

2.3.2 Zero Offset: 81 gpm

2.3.3 Diagnostic Data:

Vs 1478.7 m/s Valc 71 fx 3,000,000

Vfmax 75.05 Vsmax 1945.01

2.4 System Restoration

2.4.1 Restore RHR SW Booster Pump 1A operation per the Shift Foreman's instruction.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

3.0.1 Test Diagnostic Data:

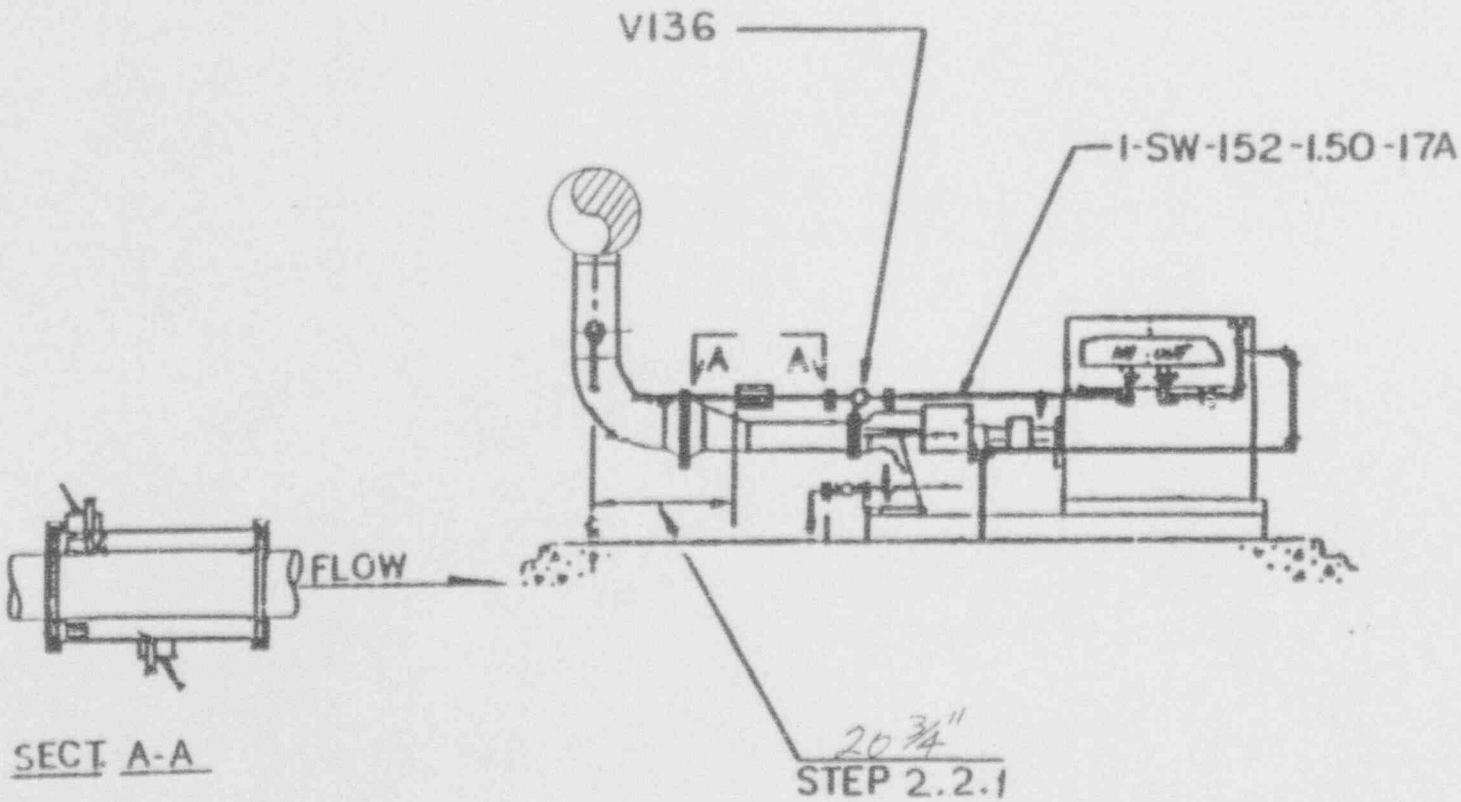
Vs 1936.59 m/s Valc 72 fx 3,000,000

Vfmax 75.05 fps Vsmax 1945.01 (m/s)

COMMENTS:

upstream Transducer on south side of pipe.

ATTACHMENT 14



1A RHR SERVICE WATER BOOSTER PUMP MOTOR COOLER SERVICE WATER INLET SITE SETUP
UNIT 1 REACTOR BUILDING, EL. 50'

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 14

SITE NAME: ABPMCLR

STEP No.: 9.3.~~25~~ ~~30~~ 29 SR 11/12/90

~~DATA~~ SR 11/12/90

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL Kgal	FLOW TOTAL DIFFERENCE Kgal
10:58	1437	72	1.135	
10:59	1437	73	1.203	0.068
11:00	1436	73	1.270	0.067
11:01	1436	73	1.337	0.067
11:02	1436	72	1.405	0.068
11:03	1436	72	1.472	0.067
11:04	1436	73	1.540	0.068
			AVERAGE	0.0675

ATTACHMENT 15 RHR SW BOOSTER PUMP 1C MOTOR COOLER SW INLET SITE SETUP

1.0 SITE NAME: CBPMCLR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. U0009

1.1.2 Track/Transducer size: 1

1.1.3 Transducer Serial Nos.: (up) U2852A
(down) U2892A

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) Direct

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 1.897 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 1.897 in.

1.2.1.3 O.D. at downstream transducer location. 1.898 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 1.897 in.

1.2.1.5 Average of measured O.D.'s: 1.897 in.

Micrometers/Calipers:
CP&L No.: DM-15 Cal Date: 11/6/90 Cal Due Date: 5/6/91

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.137 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.143 in.

1.2.3.3 Average pipe wall thickness. 0.140 in.

ATTACHMENT 15 RHR SW BOOSTER PUMP 1C MOTOR COOLER SW INLET SITE SETUP

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 RHR SW Booster Pump 1C will not be in service during the zero flow calibration.

2.2 System Lineup

2.2.1 Setup the tracks/transducers at the location shown on the 1C RHR Service Water Booster Pump Motor Cooler Service Water Inlet Site Setup Sketch. The tracks shall be installed horizontally and parallel to the floor. Measure and record the reference dimension below and on the site setup sketch.

REFERENCE DIMENSION 26"

2.2.2 Shutdown, or verify as shutdown RHR SW Booster Pump 1C.

2.2.3 Verify (locally) the RHR Service Water Booster Pump C Cooler Service Water Inlet Valve, 1-SW-V137, is closed.

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B,8

2.3.2 Zero Offset: -1.78 gpm

2.3.3 Diagnostic Data:

Vs 148.7 m/s Valc 71 fx 3,000,000

Vfmax 75.04 Vsmax 1947.04

2.4 System Restoration

2.4.1 Restore RHR SW Booster Pump 1C operation per the Shift Foreman's instruction.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

3.0.1 Test Diagnostic Data:

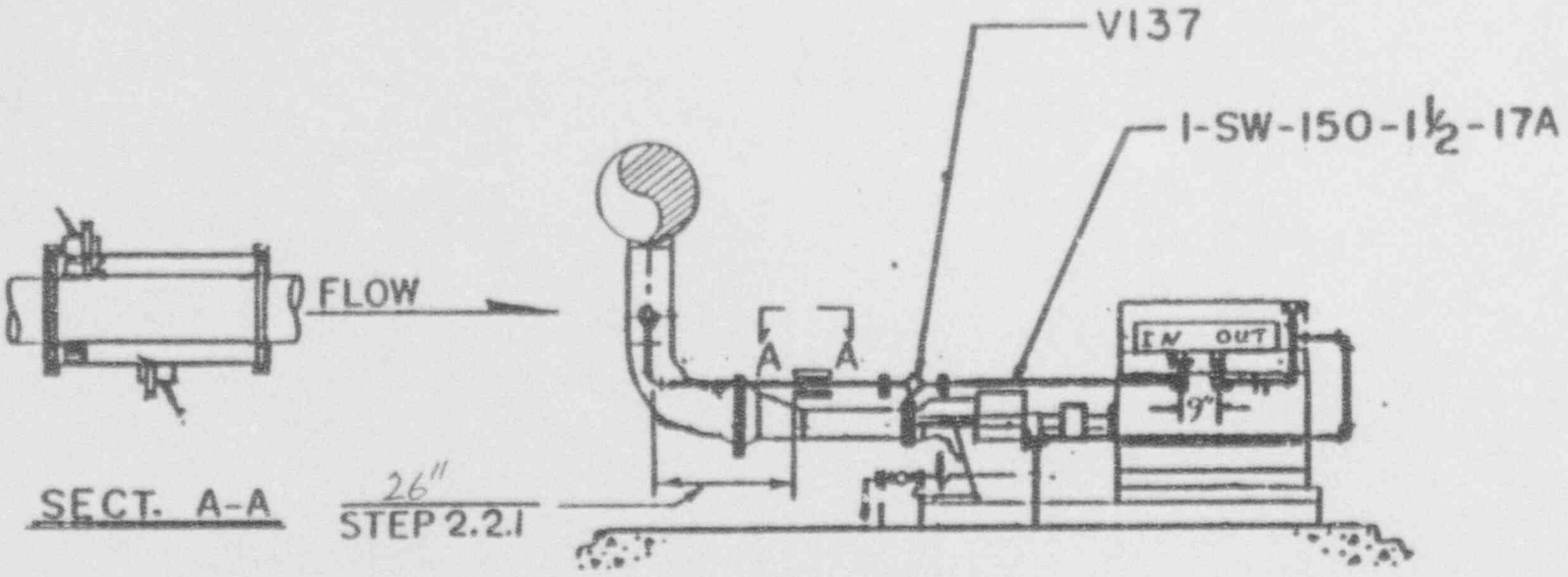
Vs 1952.92 m/s Valc 71 fx 3,000,000

Vfmax 75.04 (fps) Vsmax 1947.04 M/S

COMMENTS:

upstream Transducer on South side of pipe.

ATTACHMENT 15



ELEV. LOOKING SOUTH

1C RHR SERVICE WATER BOOSTER PUMP MOTOR COOLER SERVICE WATER INLET SITE SETUP
UNIT 1 REACTOR BUILDING, EL. 50'

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 15

SITE NAME: CBPMCLR

STEP No.: 9.3.3529 SR 1/18/91

DATE: 1/18/9091 SR 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
11:09	1453	72	0.133	
11:10	1453	71	0.199	0.066
11:11	1453	71	0.265	0.066
11:12	1453	72	0.331	0.066
11:13	1453	71	0.397	0.066
11:14	1453	71	0.464	0.067
11:15	1452	71	0.530	0.066
				AVERAGE 0.0666

ATTACHMENT 16 RHR SW BOOSTER PUMP 1B MOTOR COOLER SW INLET SITE SETUP

1.0 SITE NAME: BBPMCLR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. U0009

1.1.2 Track/Transducer size: 1

1.1.3 Transducer Serial Nos.: (up) U2891A
(down) U2891B

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) Direct

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 1.898 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 1.898 in.

1.2.1.3 O.D. at downstream transducer location. 1.898 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 1.897 in.

1.2.1.5 Average of measured O.D.'s: 1.898 in.

Micrometers/Calipers:
CP&L No.: DM-157 Cal Date: 11/6/90 Cal Due Date: 5/6/91

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.123 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.123 in.

1.2.3.3 Average pipe wall thickness. 0.123 in.

ATTACHMENT 16 RHR SW BOOSTER PUMP 1B MOTOR COOLER SW INLET SITE SETUP

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 RHR SW Booster Pump 1B will not be in service during the zero flow calibration.

2.2 System Lineup

2.2.1 Setup the tracks/transducers at the location shown on the 1B RHR Service Water Booster Pump Motor Cooler Service Water Inlet Site Setup Sketch. The tracks shall be installed horizontally and parallel to the floor. Measure and record the reference dimension below and on the site setup sketch.

REFERENCE DIMENSION 39 1/2

2.2.2 Shutdown, or verify as shutdown RHR SW Booster Pump 1B.

2.2.3 Verify (locally) the RHR Service Water Booster Pump B Cooler Service Water Inlet Valve, 1-SW-V138, is closed.

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B / 7

2.3.2 Zero Offset: -1.68 gpm

2.3.3 Diagnostic Data:

Vs 1471.87 m/s Valc 71 fx 3,000,000

Vfmax 74.82 Vsmax 1653.33

2.4 System Restoration

2.4.1 Restore RHR SW Booster Pump 1B operation per the Shift Foreman's instruction.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

3.0.1 Test Diagnostic Data:

Vs 1469.13 m/s Valc 78 fx 3,000,000

Vfmax 74.82 Vsmax 1653.33

COMMENTS:

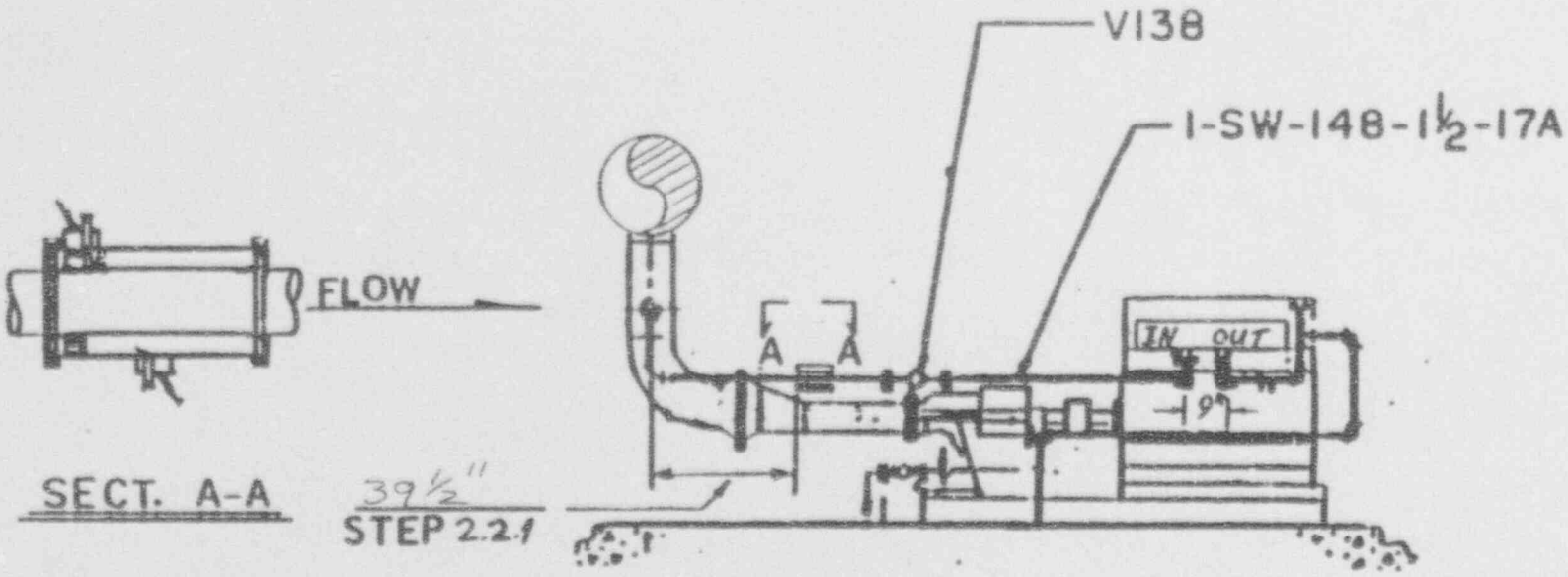
3.0.1 1/18/91 Test Diagnostic Data:

V_s 1460.29 m/s Valc 71 f_x 3,000,000

$V_{f_{max}}$ 72.29 $V_{s_{max}}$ 1653.33

Upstream Transducer on South side of pipe

ATTACHMENT 16



ELEV LOOKING SOUTH

1B RHR SERVICE WATER BOOSTER PUMP MOTOR COOLER SERVICE WATER INLET
UNIT 1 REACTOR BUILDING, EL. 50'

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 1

SITE NAME: BDPMCLR

STEP No.: 5.3.33 ~~4.4~~ SR 1/12/91

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
13:39	1468	70	0.231	
13:40	1468	70	0.298	0.067
13:41	1468	70	0.364	0.066
13:42	1467	70	0.431	0.067
13:43	1468	70	0.498	0.067
13:44	1467	70	0.564	0.066
13:45	1467	71	0.631	0.067
13:46	1467	70	0.697	0.066
~~13:47~~ SR 1/12/91				
				AVERAGE 0.0665

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 16

SITE NAME: BBPMCLR

STEP No.: 9.3.42

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL K Gal	FLOW TOTAL DIFFERENCE K Gal
14:22	1468	70	3.093	
14:23	1467	71	3.159	0.066
14:24	1468	70	3.225	0.066
14:25	1468	71	3.290	0.065
14:26	1467	70	3.356	0.066
14:27	1467	70	3.422	0.066
14:28	1467	70	3.488	0.066
				AVERAGE 0.0658

ATTACHMENT 17 RHR SW BOOSTER PUMP 1D MOTOR COOLER SW INLET SITE SETUP

1.0 SITE NAME: DBPMCLR

1.1 TEST EQUIPMENT

1.1.1 Controlotron Serial No. U0009

1.1.2 Track/Transducer size: 1

1.1.3 Transducer Serial Nos.: (up) U2889A
(down) U2889B

1.1.4 Track/Transducer Mounting Mode: (Direct/Reflect) Direct

1.2 PIPE DATA

1.2.1 Pipe O.D.:

1.2.1.1 O.D. at upstream transducer location. 1.897 in.

1.2.1.2 O.D. 90° around pipe from upstream transducer location. 1.898 in.

1.2.1.3 O.D. at downstream transducer location. 1.897 in.

1.2.1.4 O.D. 90° around pipe from downstream transducer location. 1.898 in.

1.2.1.5 Average of measured O.D.'s: 1.898 in.

Micrometers/Calipers:
CP&L No.: OM-087 Cal Date: 9/6/90 Cal Due Date: 3/4/91

1.2.2 Pipe Material: COPPER NICKEL (70/30)

1.2.3 Wall Thickness:

1.2.3.1 Pipe Wall thickness at upstream transducer location. 0.132 in.

1.2.3.2 Pipe Wall thickness at downstream transducer location. 0.116 in.

1.2.3.3 Average pipe wall thickness. 0.124 in.

ATTACHMENT 17 RHR SW BOOSTER PUMP 1D MOTOR COOLER SW INLET SITE SETUP

2.0 ZERO FLOW CALIBRATION

2.1 Precautions and Limitations

2.1.1 RHR SW Booster Pump 1D will not be in service during the zero flow calibration.

2.2 System Lineup

2.2.1 Setup the tracks/transducers at the location shown on the 1D RHR Service Water Booster Pump Motor Cooler Service Water Inlet Site Setup Sketch. The tracks shall be installed horizontally and parallel to the floor. Measure and record the reference dimension below and on the site setup sketch.

REFERENCE DIMENSION 2 1 3/4

2.2.2 Shutdown, or verify as shutdown RHR SW Booster Pump 1D.

2.2.3 Verify (locally) the RHR Service Water Booster Pump D Cooler Service Water Inlet Valve, 1-SW-V139, is closed.

2.3 Zero Set

2.3.1 Letter/Number Spacing Index B 17

2.3.2 Zero Offset: .93 gpm

2.3.3 Diagnostic Data:

Vs 1469.56 m/s Valc 73 fx 3000000

Vfmax 74.83 Vsmax 1551.85

2.4 System Restoration

2.4.1 Restore RHR SW Booster Pump 1D operation per the Shift Foreman's instruction.

3.0 TEST PERFORMANCE SITE SETUP VERIFICATION

3.0.1 Test Diagnostic Data:

Vs 1456.69 m/s Valc 74 fx 3,000,000

Vfmax 72.25 Vsmax 1551.85

COMMENTS:

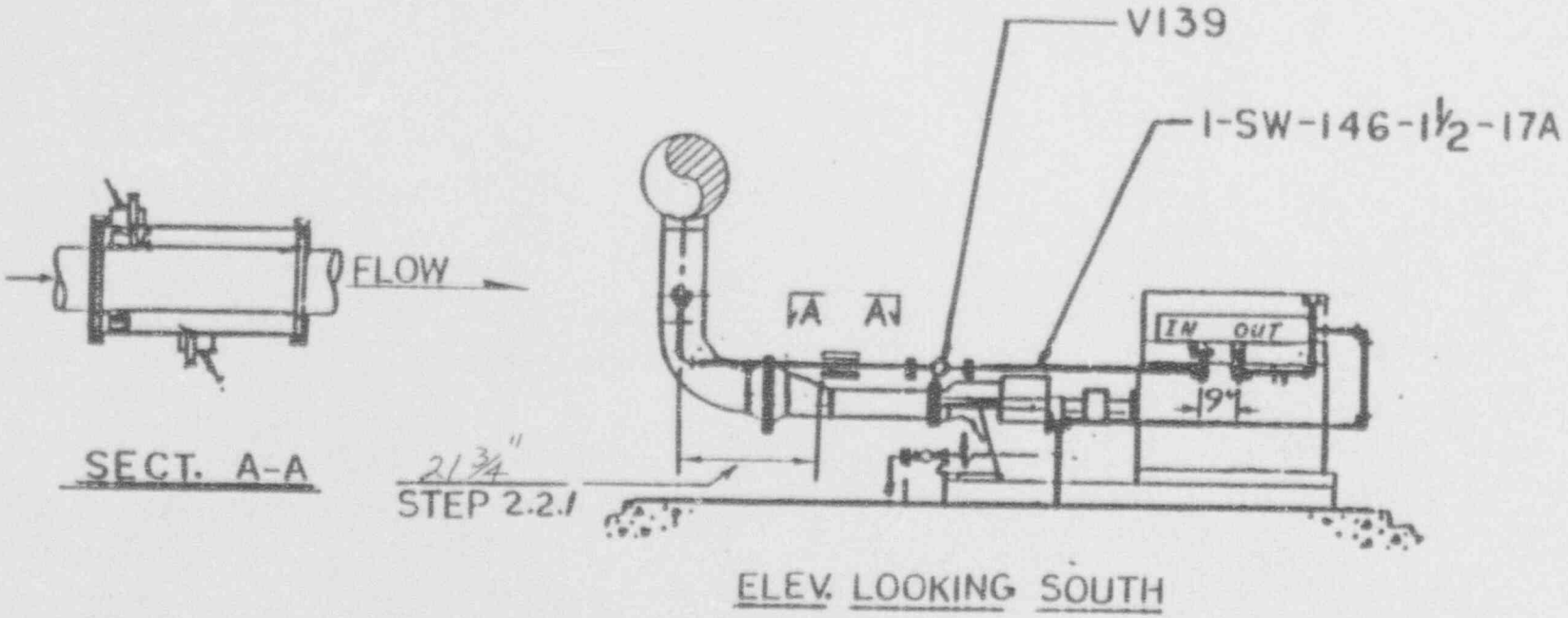
3.0.1 1/18/91 Test Diagnostic Data:

V_S 1455.94 m/s V_{alc} 74 f_x 3000000

V_{Pmax} 72.25 V_{Smax} 1551.85

Upstream Transducer on south side of pipe.

ATTACHMENT 17



1D RHR SERVICE WATER BOOSTER PUMP MOTOR COOLER SERVICE WATER INLET
UNIT 1 REACTOR BUILDING, EL. 50'

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 17

SITE NAME: DBPMCLR

STEP No.: 9.3.33 ~~N/A~~ SR/1/12/91

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL	FLOW TOTAL DIFFERENCE
13:21	1456	74	0.044	
13:22	1456	74	0.108	0.064
13:23	1456	74	0.171	0.063
13:24	1456	74	0.235	0.064
13:25	1456	74	0.299	0.064
13:26	1456	74	0.362	0.063
13:27	1456	74	0.426	0.064
13:28	1456	74	0.489	0.063
13:29	1456	74	0.553	0.064
				AVERAGE 0.0636

DATA SHEET 6
DATA ACQUISITION SHEET

ATTACHMENT No.: 17

SITE NAME: DBPMCLR

STEP No.: 9.3.42

DATE: 1/18/91

TIME	Vs	Valc	FLOW TOTAL K Gal	FLOW TOTAL DIFFERENCE K Gal
14:31	1455	74	13.776	
14:32	1455	74	13.840	0.064
14:33	1455	74	13.903	0.063
14:34	1455	74	13.967	0.064
14:35	1455	74	14.030	0.063
14:36	1455	74	14.093	0.063
14:37	1455	74	14.156	0.063
				AVERAGE 0.0633

CERTIFICATION AND REVIEW FORM

General Comments and Recommendations _____

_____

_____

_____

	Initials	Signature
Test procedure performed by	GR	G. Rubleski
	DC	Dominic Williams
	TMS	Thomas M. Sheridan
	MD	M. Dwin
	TO	Tom O'Brien
	SND	Scott N. Davis
	JE	Jeff E. Jr.
	JMR	James M. Burton
	SH	Sam Strickland

Exceptions to satisfactory performance _____

_____

_____

Corrective action required _____

_____

_____

Test procedure <u>has</u> been satisfactorily completed:

Responsible Engineer: _____ _____
Signature Date

Test procedure <u>has not</u> been satisfactorily completed:

Responsible Engineer: _____ _____
Signature Date

Test has been reviewed by

Supervisor: _____ _____
Signature Date

CERTIFICATION AND REVIEW FORM

General Comments and Recommendations _____

_____

_____

_____

	Initials	Signature
Test procedure performed by	JR	J. Clay G. Brow

Exceptions to satisfactory performance _____

_____

_____

Corrective action required _____

_____

_____

Test procedure <u>has</u> been satisfactorily completed:

Responsible Engineer: _____ _____
Signature Date

Test procedure <u>has not</u> been satisfactorily completed:

Responsible Engineer: _____ _____
Signature Date

Test has been reviewed by

Supervisor: _____ _____
Signature Date

CERTIFICATION AND REVIEW FORM

General Comments and Recommendations _____

_____

_____

_____

	Initials	Signature
Test procedure performed by	[illegible]	Sam Strickland
	[illegible]	[illegible]
	CK	C. SCOTT
	[illegible]	L. MODLIN
	JWM	JW McIlwain

Exceptions to satisfactory performance _____

_____

_____

Corrective action required _____

_____

_____

Test procedure has been satisfactorily completed:

Responsible Engineer: _____ _____
Signature Date

Test procedure has not been satisfactorily completed:

Responsible Engineer: _____ _____
Signature Date

Test has been reviewed by

Supervisor: _____ _____

DATA SHEET 1

CONTROL ROOM

STEP NO.	TIME	CANAL TEMP COMP POINT C382	CANAL LEVEL 1-SCW-LR-285 **	NUC HDR PRESS 1-SW-PI -143-1	CONV HDR PRESS 1-SW-PI -131-1	RHRSW A(B)-LOOP FLOW 1-E11 -FI- R602A(B) *	RBCCW SW FLOW 1-SW -FI- 1158-1	VITAL HDR FLOW A-LOOP 1-SW-FI -5114	VITAL HDR FLOW B-LOOP 1-SW-FI -5115
9.3.29	1105	49.0	+2.0	62	60	3000 (R602A)	3400	550	500
9.3.33	1320	50.6	-0.2	60	60	3000 (R602B)	3300	530	490
9.3.42	1443	50.2	-1.3	59	22	3000 (R602B)	3300	520	480

* Note the operating RHR SW LOOP (A or B) with the recorded data.

** VERIFIED WITH COMP. POINT L125

DATA SHEET 2

REACTOR BUILDING EL. 50'

STEP NO.	RHR SW BSTR PUMP A MOTOR COOLER FLOW	RHR SW BSTR PUMP C MOTOR COOLER FLOW	RHR SW BSTR PUMP B MOTOR COOLER FLOW	RHR SW BSTR PUMP D MOTOR COOLER FLOW
9.3.29	67.5	66.16	N/A	N/A
9.3.33	N/A	N/A	66.5	63.6
9.3.42	N/A	N/A	65.8	63.3

DATA SHEET 3

DIESEL GENERATORS
SERVICE WATER FLOWS

STEP NO.	DIESEL GENERATOR #1 JACKET WATER COOLER SW FLOW	DIESEL GENERATOR #2 JACKET WATER COOLER SW FLOW
9.3.29	1386	1422
9.3.33	1300	1428
9.3.42	1300	1392

DATA SHEET 4

SERVICE WATER BUILDING

STEP NO.	NSW PUMP 1A FLOW	NSW PUMP 1B FLOW	LUBE WATER FLOW 131.0 1-18-91 JSG	CONV HDR PRESS TEST GAUGE #1	NUC HDR PRESS TEST GAUGE #2	NSW PMP A DISCH PRESS PI-144	NSW PMP B DISCH PRESS PI-145	NSW PMP A DISCH STRN ΔP PDIC-138	NSW PMP A DISCH STRN ΔP PDIC-140	PI-131-2 CSW HDR	PI-143-2 NSW HDR
9.3.29	5664.0	4601.25	~~128.5~~	57.4	61.2	57	58	1.5	2.0	60	64
9.3.33	5387.0	4668.0	124.0	56.6	59.5	55	56	1.4	2.0	60	62
9.3.42	5693.0	4810.0	127.0	*18.5 → @ 14:40 JSG 1-18-91	58.0	~~78~~ 54	56	1.4	2.2	21	60

Test Gauge #1 Data:

CP&L No. BSEP G-127 Range: 0-150 psi Installed El.: (+)6'-6"

Cal Date: 1-2-91 Cal. Due Date: 1/28/91

Test Gauge #2 Data:

CP&L No. BSEP G-136 Range: 0-150 psi Installed El.: (+)6'-6"

Cal Date: 12-21-90 Cal. Due Date: 1/21/91

* CONV. HDR PRESSURE INCREASING AS FOLLOWS:

TIME	PRES
14:49	20.2
15:00	22.0
15:07	23.0
15:11	23.8

DATA SHEET 5

REACTOR BUILDING EL. -17'

STEP NO.	RHR PUMP ROOM A CLR LOOP FLOW	RHR PUMP 1A SEAL CLR FLOW	RHR PUMP 1C SEAL CLR FLOW	VITAL HDR A LOOP PRESS TEST GUAGE #4	RHR PUMP ROOM CLR B LOOP FLOW	RHR PUMP 1B SEAL CLR FLOW	RHR PUMP 1D SEAL CLR FLOW	VITAL HDR B LOOP PRESS TEST GUAGE #3	CORE SPRAY ROOM CLR FLOW A LOOP	CORE SPRAY ROOM CLR FLOW B LOOP
9.3.29	518.6	16.71	17.12	63.0	406.16	14.87	16.66	64.0	91.2 ~~66.66~~	66.16
9.3.33	499.2	16.46	15.64	61.5	402.17	14.1	16	62.5	91.2	62
9.3.42	494.8	16.08	15.08	66.0	400.83	14.4	16	61.0	90.6	61.66

Test Gauge #3 Data:

CP&L No. G-175 Range: 0-200 Installed El.: -12' 2"

Cal Date: 12/27/90 Cal. Due Date: 1/21/91

Test Gauge #4 Data:

CP&L No. G-177 Range: 0-200 Installed El.: -13' 8"

Cal Date: 1/14/91 Cal. Due Date: 2/11/91