AIM

Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910
301/587-8202

Centimeter

Inches

MANUFACTURED TO AIM STANDARDS
BY APPLIED IMAGE, INC.

1 of 2

NRTSC
NUCLEAR REACTOR TECHNOLOGY
AND SCIENTIFIC COMPUTATIONS

WSRC-TR-93-684

KEYWORDS:
ONSET OF FLOW INSTABILITY
ONSET OF SIGNIFICANT VOID
DEMAND CURVES
LOSS OF COOLANT ACCIDENT
CU-HTRF-T6

RETENTION:
PERMANENT

COLUMBIA UNIVERSITY FLOW INSTABILITY
EXPERIMENTAL PROGRAM, VOLUME 3

SINGLE TUBE PARALLEL FLOW TESTS (U)

by
T. DOUGHERTY, C. MACIUCA, E. V. MCASSEY, JR.,
D. G. REDDY, AND B. W. YANG

JUNE, 1990

3/28/94
Authorized Derivative Classifier/
Reviewing Official

SRTC

SAVANNAH RIVER TECHNOLOGY CENTER, A IKEN, SC 29808
Westinghouse Savannah River Corporation
Prepared for the U.S. Department of Energy under
Contract DE-AC09-89SR18035

MASTER

DISTRIBUTION OF THIS DOCUMENT IS UNLIMITED 875

Document: WSRC-TR-93-684
Title: COLUMBIA UNIVERSITY FLOW INSTABILITY
EXPERIMENTAL PROGRAM, VOLUME 3, SINGLE
TUBE PARALLEL FLOW TESTS (U)
Task: 92-033-1
Task title: COLUMBIA UNIVERSITY FLOW INSTABILITY
EXPERIMENTAL PROGRAM

Approvals

4/12/94

D. R. Muhlbaier, Responsible Manager Date:

4/6/94

A. J. Garrett, Level 3 Manager Date:

SRTC Perspective

D. A. Coutts
Senior Engineer

The coolant in the Savannah River Site (SRS) production nuclear reactor assemblies is circulated as a subcooled liquid under normal operating conditions. This coolant is evenly distributed throughout multiple annular flow channels with a uniform pressure profile across each coolant flow channel. During the postulated Loss of Coolant Accident (LOCA), which is initiated by a hypothetical guillotine pipe break, the coolant flow through the reactor assemblies is significantly reduced. The flow reduction and accompanying power reduction (after shutdown is initiated) occur in the first 1 to 2 seconds of the LOCA. This portion of the LOCA is referred to as the Flow Instability (FI) phase [1].

The reactor assemblies are subject to a type of FI known as a Ledinegg flow excursion. This type of instability is common in low pressure subcooled flow channels that exhibit a demand curve with a negative sloped region and a relative maximum and minimum as shown in Figure 1. The relative minimum is the result of the flow acceleration created by the change in fluid density, and an increase in the frictional pressure loss created by vapor nucleating on the heater surface and effectively increasing the flow channel roughness. The postulated LOCA can initiate such a flow excursion.

Assembly power limits are calculated for LOCA conditions using the FLOWTRAN-FI code. The code calculates a dimensionless ratio known as the Stanton number at each axial position in the channel through the course of the transient. This Stanton number was introduced by Saha and Zuber [2] to describe the Onset of Significant Void (OSV) in channels where subcooled nucleate boiling is present.

$$(1) \quad St = \frac{\phi}{Gc_p(T_{sat} - T_b)}$$

where:

ϕ = local heat flux
 G = mass velocity
 c_p = liquid specific heat
 T_{sat} = saturation temperature
 T_b = bulk liquid temperature

The Stanton number will vary both with time and position in the assembly. The reactor operating power is limited to preclude Stanton numbers in excess of 0.00455 during the LOCA. This value is 70 percent of the 0.065 value proposed by Saha and Zuber (2). This difference is a safety margin that accounts for data and calculation uncertainties.

Equation 1 was developed with data where the Peclet number did not exceed 400,000. The Peclet numbers in the SRS reactors can be an order of magnitude higher than this. To evaluate the suitability of the above described criteria additional test data at high Peclet numbers was required. Columbia University was tasked (AX-1811457) with obtaining this data. In addition Columbia University obtained data to evaluate the effect of spacer ribs in a concentric annulus.

This is one of a series of reports that documents the testing effort by Columbia University. Table 1 provides of the WSRC technical report volumes. The volumes which contain a hard copy version of the data files are also listed. The electronic media that contain the data have been stored as part of the Thermal-Fluids Laboratory (TFL), Building 786-A electronic records.

References

1. *Action Plan to Upgrade Thermal-Hydraulic Limits for Savannah River Site Production Reactors (U)*. 30 June 1989. WSRC-RP-89-373.
2. Saha, P., and N. Zuber, 1974, Point of Net Vapor Generation and Vapor Void Fraction in Subcooled Boiling. In *Proceedings of the 5th International Heat Transfer Conference, Tokyo, Japan, September 3-7, 1974*, 175-79.

Figure 1. Demand curves for subcooled isothermal and diabatic systems

Table 1.--Columbia University Onset of Flow Instability Experimental Program Technical Reports

Volume	WSRC document number	Authors	Sub-Title	Columbia University document number	Date prepared
1	WSRC-TR-93-682	Dougherty, et al.	Single Tube Uniformly Heated Tests, Part I, Technical Discussion	CU-HTRF-T4	January 1990
2	WSRC-TR-93-683	Dougherty, et al.	Single Tube Uniformly Heated Tests, Part II, Uncertainty Analysis and Data	CU-HTRF-T4	May 1990
3	WSRC-TR-93-684	Dougherty, et al.	Single Tube, Parallel Flow Tests	CU-HTRF-T6	June 1990
4	WSRC-TR-93-685	Dougherty, et al.	Single Tube, Non-Uniformly Heated Tube Tests	CU-HTRF-T5	October 1990
5	WSRC-TR-93-686	Carrano, et al.	Single Annulus Tests, Steady State Test Program	CU-HTRF-T3A	July 1991
6	WSRC-TR-93-687	Carrano, et al.	Single Annulus Tests, Transient Test Program	CU-HTRF-T3B	September 1992
7	WSRC-TR-93-688	Carrano, et al.	Single Tube Tests, Critical Heat Flux Test Program	CU-HTRF-T8	September 1992
8	WSRC-TR-93-659	Yang	Single Annulus Tests, Final Report	CU-HTRF-05-92	December 1992
9	WSRC-TR-93-690	Coutts	Single Tube Test Program Demand Curve Data Tables	...	September 1993
10	WSRC-TR-93-691	Coutts	Critical Heat Flux Test Program Data Tables	...	September 1993
11	WSRC-TR-93-692	Coutts	Single Annulus Steady State Test Program Data Tables	...	September 1993
12	WSRC-TR-93-693	Coutts	Single Annulus Transient Test Program Data Tables, Part I	...	September 1993
13	WSRC-TR-93-694	Coutts	Single Annulus Transient Test Program Data Tables, Part II	...	September 1993
14	WSRC-TR-93-695	Coutts	Single Annulus Transient Test Program Data Tables, Part III	...	September 1993

WESTINGHOUSE SAVANNAH RIVER COMPANY
FLOW EXCURSION EXPERIMENTAL PROGRAM
PARALLEL FLOW TESTS

REPORT No. CU-HTRF-T6

JUNE 1990

PART I - Technical Discussion

PART II - Data

Heat Transfer Research Facility

Columbia University

New York City, NY

FLOW EXCURSION EXPERIMENTAL PROGRAM

PARALLEL FLOW TESTS

SUBCONTRACT AX-721092

REPORT No. CU-HTRF-T6

JUNE 1990

**COLUMBIA UNIVERSITY
Heat Transfer Research Facility
Department of Chemical Engineering
New York, NY 10027**

Principal Investigators

**H. Y. Cheh
C. F. Fighetti**

Prepared by

**T. Dougherty
C. Maciucă
E. V. McAssey Jr.
D. G. Reddy
B. W. Yang**

Prepared for

Westinghouse Savannah River Company

**Project Manager
Z. Qureshi**

ACKNOWLEDGMENTS

Many individuals and organizations have contributed to the overall effort of designing and constructing the flow loop and test section. Some of the individuals that were directly responsible for obtaining the flow instability data presented in this report are acknowledged below.

We would like to express our appreciation to our colleagues at the Heat Transfer Research Facility of Columbia University for their continued interest and support throughout this project, especially to Messrs V. Carrano and W. Hovemeyer for the design and maintenance of the electrical system and instrumentation; Messrs S. Kokolis, A. Kaam, Ms. A. Girshovich for the mechanical design of the test sections and flow loop. We would also like to acknowledge Mr. J. Dechert and the machine shop personnel. In addition, we appreciate the important contribution of Mr. J. Zimmerman and the electrical shop personnel.

We are grateful to our sponsor, in particular Dr. Zafar Qureshi for his technical advice and direction.

ABSTRACT

A series of down flow experiments have been conducted on three different size single tubes. The objective of these experiments was to determine the effect of a parallel flow path on the occurrence of flow instability. In all cases, it has been shown that the point of flow instability (OFI) determined under controlled flow operation does not change when operating in a controlled pressure drop mode (parallel path operation).

TABLE OF CONTENTS

PART I

1. INTRODUCTION

1.1 Background	1.1
1.2 Test Objective	1.2
1.3 Report Format	1.2

2. Description of Test Facility

2.1 Introduction	2.1
2.2 Test Facility Physical Description	2.1
2.2.1 Single Tube Test Loop for Parallel Flow Test Mode	2.2
2.3 Test Matrix	2.4
2.4 Test Loop Operation	2.4

3. Instrumentation and Data Acquisition

3.1 Instrumentation	3.1
3.1.1 Instrumentation Philosophy	3.1
3.1.2 Instrumentation Layout	3.3
3.2 Data Acquisition	3.3
3.2.1 Description of Data Acquisition System	3.3
3.2.2 Description of Data Acquisition Procedure	3.4
3.2.3 Description of Data Files	3.6

4. Error and Uncertainty Analysis

4.1 Measurement Uncertainty	4.1
4.2 Instrumentation Uncertainties	4.1

4.2.1 Turbine Flowmeters	4.1
4.2.2 Temperature Measurement	4.2
4.2.3 Pressure Transducers	4.2
4.2.4 Power Measurement	4.3
4.3 Data Acquisition Line Uncertainties	4.3
4.4 Data Acquisition Multiplexer Digitizer Uncertainties	4.3
4.5 Overall Measurement Uncertainties	4.3
4.5.1 Uncertainty in Absolute Pressure Measurement	4.4
4.5.2 Uncertainty in Differential Pressure Measurement	4.5
4.5.3 Uncertainty in Temperature Measurement	4.5
4.5.4 Uncertainty in Flowrate Using Turbine Flow Meter	4.6
4.5.5 Uncertainty in Test Section Voltage Measurement	4.6
4.5.6 Uncertainty in Test Section Current Measurement	4.7
4.5.5 Uncertainty in Test Section Dimensional Measurements	4.7
4.6 Primary Instrumentation and Ranges	4.9
4.6.1 Data for Test 7	4.9
4.6.2 Data for Test 9	4.10
4.6.3 Data for Test 12	4.11
5. Results	
5.1 Introduction	5.1
5.2 Test Section Pressure Drop	5.2
6. Conclusions	6.1
Appendix - Data File Format	
PART II - Data	

PART I

1. INTRODUCTION

1.1 Background

In June 1988, The Savannah River Laboratory requested that the Heat Transfer Research Facility modify the flow excursion program, which had been in progress since November 1987, to include testing of single tubes in vertical down-flow over a range of length to diameter (L/D) ratios of 100 to 500. The impetus for the request was the desire to obtain experimental data as quickly as possible for code development work. The results from this effort have been presented in a report CU-HTRF-T4, "Single Tube Uniformly Heated Tests". These tests were conducted in a controlled flow mode in which flow to the test section was maintained well beyond the flow instability point. Flow control was achieved either by providing a large inlet pressure drop across a control valve or by using a high head variable speed pump. After the program was initiated, there was some concern expressed regarding the applicability of controlled flow data in an application in which parallel flow paths existed (i.e. a controlled pressure drop mode). HTRF proposed a series of tests in which the single tube test section would be connected in parallel with a large flow bypass line. Other than a flow meter, there was no flow restriction between the test section and the bypass.

The test facility for the single tube program was originally a bench test instrumentation evaluation facility. As part of the flow excursion program, HTRF was evaluating instrumentation for use in two-phase flow. These instruments included fast response thermocouples, fast response pressure transducers, and drag disks. Most of the flow loop equipment was already in place. The major changes to the single tube facility included the installation of power for the test section (approximately 1.5 MW), preparation of test sections, development of instrumentation, and the construction of a control room. An overall height limitation in the facility of 12 feet and a maximum pump head capacity of 70 psi restricted the allowable L/D range to 90 to 330. In the summer of 1989, this facility was modified to provide a large flow bypass in parallel with the normal test section. The bypass line included a manual valve which could be adjusted to provide various flow splits between the test section and bypass. The maximum ratio of bypass flow to test section flow that could be achieved over the entire test range was approximately 10:1.

For the purposes of this program, the onset of flow instability (OFI) is defined as the occurrence of a minimum in the pressure drop versus flowrate curve. For a fixed set of test conditions, the pressure drop across a test section will decrease with flowrate until vapor begins to form in the channel. Vapor appears in the form of bubbles at the heated surface. Initially, the effect of these bubbles is insignificant; however, as the bubble population increases, the resistance to flow increases. At this point, the pressure drop begins to increase even though the flowrate is decreasing (see figure 1.1). Since the bulk fluid temperature is below the saturation temperature, bubbles, which formed at the wall, collapse in the main channel flow. This process of formation and collapse causes the pressure reading to oscillate. Beyond the OFI point, the channel is unstable; however, when a positive flow supply is available no flow excursion occurs. If an alternate flow path were available, the possibility of flow diversion resulting in test section flow loss and subsequent burnout would exist.

1.2 Test Objective

The primary objective of this test program was to measure the OFI point in parallel flow and to compare these results with those for controlled flow under the same conditions. Since this was actually a verification test, the test matrix was a subset of the uniformly heated single tube program.

Test section pressure drop was measured over the heated length. In addition, the primary test data included flowrate, test section inlet temperature, and exit pressure. The latter parameters established inlet subcooling and saturation temperature respectively.

The test sections for this program were the same as those used in the controlled flow phase. A total of three test sections were tested. The test sections were instrumented with the same instrumentation as provided in the controlled flow tests; however, the wall temperature data have not been analyzed to the same degree as in report CU-HTRF-T4.

1.3 Report Format

This report presents data obtained during the uniform flux testing of three test sections covering an L/D range from 150 to 260. The present report consists of two parts. Part I contains the technical discussion of the test loop, procedures, and results. Part II of this report contains a listing of all the experimental data.

Figure 1.1 Schematic of Demand Curve

2. DESCRIPTION OF TEST FACILITY

2.1 Introduction

The single tube test program was developed in several phases which included controlled flow tests, parallel flow tests with large bypass flows, transient testing, non-uniform heating tests, and critical heat flux tests. The present report describes the parallel (controlled pressure drop) flow testing to obtain demand curves for three tubes of different size inside diameters.

2.2 Test Physical Description

2.2.1 Single Tube Test Loop for Parallel Flow Test Mode

For these tests, the test section was connected in parallel with a large capacity bypass line. The flow resistance in the bypass line was adjusted during cold flow tests to provide the desired flow split between the bypass and test section lines. Several tests were conducted to determine the effect of the size of the bypass ratio. Since no changes between a ratio of 6:1 and 10:1 were observed, the larger ratio, which represented the maximum loop capacity, was used for most of the tests. The loop was designed to provide the minimum flow resistance between the test section and the bypass line. The only resistance was a 1 inch turbine flowmeter located upstream of the test section which was required to obtain an accurate measurement of the test section flowrate. The test section and bypass flowrates were adjusted by an air operated valve located upstream of the test section-bypass junction. After steady state conditions for a given inlet temperature, exit pressure, and surface heat flux were established, the total flowrate was reduced until the minimum in the test section pressure drop occurred.

The test apparatus consists of the test loop, which supplies cooling water at the required conditions, and the test section which consists of the heater tube. Figure 2.1 presents a schematic of the complete single tube test apparatus. The flow loop is capable of supplying 260 gpm to the test section at a pump head of 75 psi. The test loop can be pressurized for a range of operating pressures. Heat input to the test section is supplied by a generator

which can deliver approximately 1.5 MW of DC power. This energy source is capable of generating a 1 million Btu/hr-ft² surface heat flux to the various diameter test sections selected for this program. All components in the flow loop are stainless steel or nickel plated. The water in the loop is maintained at a Ph of slightly less than 7.

As shown in figure 2.1, a 100 gallon accumulator supplies deionized water to the pump inlet. System pressure is maintained by adjusting the liquid level and by varying the helium blanket pressure in the accumulator. The test section inlet temperature is controlled by adjusting the loop external heat rejection rate.

The pump used for this test program was a centrifugal pump capable of providing a maximum flowrate of 250 gpm. Figure 2.2 presents the performance curve for this pump. The flow to the test section is controlled by an air operated valve which is located upstream of the test section-bypass junction (see figure 2.1).

The test assemblies were 126 inches in length. They were composed of a 96 inch heated test section, and upstream and downstream 15 inch calming lengths which also served as a connection to the power system. The calming lengths had an outside diameter of 1.5 inches and a variable inside diameter to accommodate the different size heater tubes. Three different size heater tubes and two different tube materials were used. The tubes were of uniform wall thickness 300 series stainless steel and 600 series inconel. Table 2.1 presents the specifications of the test sections used in the program. In all cases the test sections were constructed from commercial grade tubing. This means that the nominal uniform tube wall thickness could vary by as much as 10%.

TABLE 2.1
Test Section Specification

Test Section #	Tube	Material	ID nom. inches	ID meas. inches	Run
ST-7	4.620-001S	SS	0.620	0.603	1454-1609
ST-8	4.620-001I	Inconel	0.620	0.612	2277-2320
ST-9	4.370-003I	Inconel	0.370	0.359	1663-1797

The test section construction was essentially the same for all units. The heated portion of the test section was brazed to nickel plated copper end pieces which provided the flow calming length and also a connection to the power system. The inside diameter of the end pieces were gun bored to match the inside diameter of the inconel or stainless steel piece. To eliminate any non-uniformities in the heated section, no penetrations were made in the tube walls. Pressure measurement taps were located in the copper end pieces. These taps, which were 2.25 inches from the end of the units, were used for the absolute and differential pressure measurements. Voltage taps were brazed at either end of the test sections. In addition, each test section had a third voltage tap brazed approximately 12 inches from the test section exit. This tap was used for power trip in the event of a large change in tube resistivity resulting from overheating.

Downstream of the test section was the heat rejection system which included a plate type heat exchanger and shell and tube heat exchangers. These units removed energy from the water before it was returned to the accumulator.

Two types of loop instrumentation were used. The primary instrumentation, which is used for data analysis, included flowmeters, RTD'S, thermo-couples, absolute pressure and differential pressure transducers, all of which were sampled by the Data Acquisition System (DAS). These instruments were calibrated against standards traceable to the National Institute of Standards and Technology (NIST). They were routinely checked at the beginning of each day's operation and were constantly monitored

during testing. Secondary loop instrumentation was used to help the loop operator in controlling loop functions and also as back-up to the primary instrumentation. These instruments were also calibrated but this calibration may not be traceable to NIST standards.

Test section instrumentation included thermocouples for wall temperature measurement, taps and transducers for pressure drop measurement, and voltage tap leads and shunts for power measurements. These instruments were also calibrated and traceable to NIST standards.

Power to the test section was provided by a single generator capable of supplying 6,000 Amperes at 230 Volts DC. The voltage could be varied continuously from zero to full power. The voltage control was operated from the test area.

Power to the test section was determined by multiplying the measured voltage across the test section by the current which was measured by two calibrated shunts located in the positive and negative polarities. Test section resistance was measured by a calibrated Kelvin bridge during test section assembly, and was constantly monitored during operation. All instruments used for power measurements were calibrated and traceable to NIST standards.

2.3 TEST MATRIX

The single tube uniformly heated tests were performed in accordance with the following test conditions:

1. Test Section:	Stainless Steel, 0.60" ID
Test Mode:	Parallel Flow
Heat Flux:	0; 400,000; 800,000 Btu/hr-ft ²
Inlet Temperature:	77 °F, 122 °F
Exit pressure:	50 psig

2. Test Section:	Inconel, 0.612" ID
------------------	--------------------

Test Mode: Parallel Flow
Heat Flux: 0; 400,000; 800,000 Btu/hr-ft²
Inlet Temperature: 77 °F, 122 °F
Exit pressure: 50 psig

3. Test Section: Inconel, 0.360" ID
Test Mode: Parallel Flow
Heat Flux: 0; 400,000; 800,000 Btu/hr-ft²
Inlet Temperature: 77 °F, 122 °F
Exit pressure: 50 psig

2.4 Test Loop Operation

The operation of the loop is the responsibility of the test engineer. Prior to conducting a test, the loop was filled and leak checked. Loop instrumentation was checked to insure proper operation. The test start-up procedure was as follows:

- 1) at the highest point in the system, a vacuum pump is connected and system pressure is reduced to approximately 22" Hg vacuum.
- 2) at the lowest point deionized water is added to system until water reaches vacuum pump.
- 3) system bleed valves are opened selectively to remove any remaining air.
- 4) system is pressurized to 100 psia and leak check performed.
- 5) pumps are energized and nominal flowrate established to check for any remaining leaks.
- 6) loop operating pressures and temperatures was established and maintained for 10 minutes to insure satisfactory operation of loop controls.

In addition to the above procedures, a set of formal instructions for test loop operation was prepared. These were presented in appendix A of report CU-HTRF-T4.

For parallel flow testing, the flowrate to the test section was established at a high enough level to insure single phase conditions. The test parameters were then set as required by the test matrix. The following criteria were used to establish a valid test condition:

- 1) Exit Pressure ± 1 psig
- 2) Inlet Temperature $\pm 1^{\circ}$ F
- 3) Heat Flux $\pm 1\%$

When the test conditions satisfy the above criteria, the data were recorded and assigned a run number. The flowrate was then reduced and the loop parameters adjusted to maintain the required conditions. After steady state was achieved, the run was recorded. The process was repeated until OFI was established. The criteria for OFI was the achievement of the same OFI flowrate as determined from the controlled flow tests. To insure that the minimum point had been reached, conditions near the minimum were repeated in the fast scan mode.

The fast scan mode involved the recording of primary variables every 100 milliseconds. In addition, test section power trips were armed to protect the test section. Although the data was not really steady state, it could be used to verify the minimum point. In this mode, the lowest flowrate conditions obtained during steady state operation were re-established. The flowrate was then gradually decreased, and in all cases the power trip operated almost immediately. In most cases, the power trips were initiated by the loss of flow interlock. This was then used as verification that the last steady state point was indeed the minimum.

As the test conditions approach OFI, the pressure readings began to fluctuate; however, the flowrate, power, and inlet temperature remained essentially constant. These fluctuations meant that the pressure drop reading at OFI and beyond represented an average value. For tests 1 and 3, the

standard deviations in the primary measurements were calculated and recorded.

Fig. 2.1 Schematic of Single Tube Flow Loop

Figure 2.2 Pump head vs. flowrate for centrifugal pump

3. INSTRUMENTATION AND DATA ACQUISITION

3.1 Instrumentation

3.1.1 Instrumentation Philosophy

Loop instrumentation consisted of ten pressure transducers, two differential pressure transducers, six turbine flowmeters, one orifice flowmeter, and two thermocouples. The loop instrumentation was primarily used to operate the loop and establish the steady state test condition. A list of general instruments used is presented in the Table 3.1. All the flowmeters were located so that they can be checked against two or more flowmeters.

Table 3.1 Instrumentation List

INSTRUMENT (symbol)	TYPE OF SENSOR	MANUFACTURER	LOCATION
Volt BB	Voltage		Bus to bus voltage
Volt TS*	Voltage		Test section voltage
Curr TS*	Current (shunt)		Test section current
Curr TS2	Current (shunt)		Test section current
PTI1*	Absolute pressure transducer	SENSOTEC	Inlet of test section
PTI2	Absolute pressure transducer	CEC	Inlet of test section (after split)
PTO1*	Absolute pressure transducer	SENSOTEC	Outlet of test section
PTO3	Absolute pressure transducer	CEC	Outlet of test section
	Absolute pressure transducer	SENSOTEC	Parallel line inlet
PBO1	Absolute pressure transducer	SENSOTEC	Parallel line outlet
PL1	Absolute pressure transducer	SENSOTEC	Loop pressure
PL2	Absolute pressure transducer	SENSOTEC	Loop pressure (exit of parallel)
PD1	Absolute pressure transducer	SENSOTEC	Short to tank (bypass H.E.)
PXI1	Absolute pressure transducer	SENSOTEC	Heat exchanger inlet
PXO1	Absolute pressure transducer	SENSOTEC	Heat exchanger outlet
PPI1	Absolute pressure transducer	SENSOTEC	Pump inlet
PPO1	Absolute pressure transducer	SENSOTEC	Pump outlet
PA1	Absolute pressure transducer	SENSOTEC	Tank pressure
DT1*	Differential pressure transducer	T-HYDRONICS	Pressure drop of test section
DT2	Differential pressure transducer	SENSOTEC	Pressure drop of test section
DP1	Differential pressure transducer	BLH	Diff. pressure across pump
DLV1	Differential pressure transducer	SENSOTEC	Control valve pressure drop
OLI1	Differential pressure transducer	SENSOTEC	Orifice pressure drop
FLI1	Turbine flowmeter	HOFFER	Loop flowrate
FTI1 (FTI2)**	Turbine flowmeter	HOFFER	Test section flowrate
FBI1	Turbine flowmeter	HOFFER	Parallel line flowrate
FXI1	Turbine flowmeter	HOFFER	Heat exchanger flowrate

Table 3.1 Cont'd

INSTRUMENT TYPE OF (symbol) SENSOR	MANUFACTURER	LOCATION
FXI2 Turbine flowmeter	HOFFER	Heat exchanger flowrate
FS1 Turbine flowmeter	HOFFER	Bypass to tank (pump exit)
RTI1* Resistance temperature detector	WEED	Inlet of test section
RTI2 Resistance temperature detector	WEED	Inlet of test section
RTO1* Resistance temperature detector	WEED	Exit of test section
RTO2 Resistance temperature detector	WEED	Exit of test section
JXI1 Ungrounded type J thermocouple	CGS	Inlet to heat exchanger
JXO1 Ungrounded type J thermocouple	CGS	Exit of heat exchanger
EW1 (95W) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW2 (95E) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW3 (72N) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW4 (72S) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW5 (48W) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW6 (48E) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW7 (24N) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW8 (24S) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW9 (13W) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW10 (13E) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW11 (10N) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW12 (10S) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW13 (7W) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW14 (7E) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW15 (4N) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW16 (4S) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW17 (1W) Ungrounded type E thermocouple	CGS	Test section wall temp.
EW18 (1E) Ungrounded type E thermocouple	CGS	Test section wall temp.
TCB1 (7W) Grounded type K thermocouple	CGS	Test section wall temp.
TCB2 (4E) Grounded type K thermocouple	CGS	Test section wall temp.
TCB2 (1S) Grounded type K thermocouple	CGS	Test section wall temp.

*:Primary instrument

The test section instrumentation was designed to provide the required test data which includes test section pressure drop, heater wall temperature, test section resistance, test section voltage, inlet and exit fluid temperature, inlet and exit pressure, as well as test section flow rate. All primary measurements were accomplished through two or more redundant instruments.

The test section volumetric flow rate was measured by the turbine flowmeter (FTI1) provided by Hoffer Flow Controls Inc.. The flowmeter located at the inlet to

the test section, which was checked regularly with loop flowmeter FLI1 (turbine flowmeter) and DLI1 (orifice flowmeter), as well as heat exchanger flowmeter FXI1 or FXI2 (turbine flowmeters). Since deionized water was used, a hard carbon composite sleeve bearing was selected for the flowmeter. The rotation of the turbine is sensed by an externally mounted electronic pick-up coil. The signals in electrical pulses were transmitted to an Anadex PI-68 frequency to DC voltage converter, where they were converted to analog signals.

Test section pressure was monitored by two Sensotec strain gage pressure transducers model TJE at both inlet and exit locations. Transducers were mounted on the copper end pieces 2.25" away from the top and bottom of the heater. The transducers feature fast response (microsecond rise time), high accuracy (0.1%), shock resistance and long term stability. In addition, two calibrated Heise gages were mounted in parallel with the test section outlet pressure transducers and another pressure gage in parallel with inlet pressure transducer to check the transducer measurement during the tests.

The pressure drop across the test section was measured using strain gage diaphragm, differential pressure transducers provided by Sensotec and T-HYDRONICS. Both of these transducers feature high accuracy and good stability. Prior to every test, the readings from these differential pressure transducers were checked against the difference between the readings of the inlet and exit absolute pressure transducers with hydrostatic head correction. In addition, the reading was also confirmed with the manometer measurement during operation.

Power to the test section was calculated from the measured current and voltage applied to the test section. The current was measured by a calibrated shunt and the test section voltage was measured through the data acquisition system using a calibrated voltage divider setup. The diameter and wall thickness were measured by a calibrated gage. After the assembly of the test section, the overall test section resistance was also measured using a calibrated bridge.

The fluid temperature was monitored by two types of thermal sensors namely type J (iron-constantan) thermocouples and resistance temperature detectors (RTD). The inlet and exit fluid temperatures of the test section were measured by four platinum RTD's provided by Weed Instrument Company. The primary inlet

and outlet fluid temperature were measured using two high precision and fast response (0.5 seconds at 20 ft/sec water flow rate) resistance temperature detectors, model A9507. In addition, two high accuracy RTD's model 101 (accuracy 0.1% of span) were used to check the temperature measurement of the primary RTD's at steady state condition.

The basic instrumentation philosophy was to make all of measurements by non-intrusive devices to avoid any flow disturbance. Based on this approach, thermocouples were attached to the exterior of the heater to obtain steady state thermal data. For a uniformly heated tube, the hottest region was near the exit of the test section. Therefore, thermocouples were heavily distributed near the exit of that region.

Type E (chromel-constantan, 0.040 inches) ungrounded thermocouples were cemented to the heater using an alumina oxide type of cement with a high thermal conductivity for a more accurate temperature measurement. In addition, type K (chromel-alumel) exposed tip thermocouples were brazed directly to the heater wall for a fast response detection of a temperature change. Considering the possible effect of the residual brazed material on the local temperature, the brazed thermocouples were recommended only for burn-out trip detection.

3.1.2 Instrumentation Layout

A total of 9 pairs of ungrounded thermocouples were used in each test section to monitor the heater wall temperature. Two thermocouples at the same elevation were located 180 degrees apart and each set was rotated with respect to the preceding set by 90 degrees. The thermocouples were connected to a reference box where the reference temperature was constantly monitored. Figure 3-1 to Figure 3-3, show the thermocouple locations. For the first 83-inch of the heater, pairs of thermocouples were located every 24 inches along the test section. For the exit region of the test section, pairs of thermocouples were mounted approximately every 3 inches in the last 13 inches of the heater.

3.2 DATA ACQUISITION SYSTEM.

3.2.1 Description of Data Acquisition System

The data during flow instability tests were collected, processed, reduced to engineering units, and stored on a magnetic tape unit using a high speed data acquisition system. The computer controlled data acquisition system (CCDAS) is comprised of the following components:

- HP 1000 computer system operated under RTE-IV system.
- 15 MB disc system and a 9 track magnetic tape unit for data storage.
- graphic CRT's for system displays.
- line and character printers.
- 2313B data acquisition system.

The Hewlett Packard 2313B Analog-Digital interface subsystem is a highly flexible unit which satisfies the input and output requirements of a computer-based data acquisition and control system. The component parts of the HP-2313B subsystem include the following:

- a sample and hold amplifier,
- a 12 bit 45 KHz analog-to-digital converter (up to +10.24 volts full scale),
- a subsystem control card,
- a main frame assembly with slots for inner multiplexer or analog output cards,
- a computer interface card and cable,
- a Dual 12-bit digital-to-analog converter,
- a programmable pacer,
- twelve sets of 16 channel differential input high level (+10.24 V fs) multiplexer boards.

Figure 3.4 shows the CCDAS schematically. Specifications of this subsystem are given in Table 3.2.

Table 3.2 Data Acquisition System Specification

Number of Inputs	144 Nine 16-channel differential inputs, high level multiplexer cards)
Input Circuit	Floated and guarded signal pairs for each channel
Noise Rejection	80 db up to 1 Kohm source unbalanced, 105 db at all frequencies
Common Mode Voltage	15 V line to chassis
Accuracy for Voltage Measurement	+ 0.09% of full scale +1/2 Least Significant Bit (LSB = 5 mV)
Resolution for Voltage Measurements	12 bit including sign, LSB= 5 mV, 100 nV at 1000 V range
Analog-to-Digital Conversion Rate	45 KHz minimum with direct Memory Access
Rejection	

3.2.2 Description of Data Acquisition Procedure

The software consisted of a main program which controlled a number of subroutines for data acquisition and reduction to engineering units. The main program is an on-line contact with the operator at the loop control area through one of its terminals. Depending on the option selected, the computer initiated a scanning procedure and performed on line data reduction to engineering units. During the data reduction sequence, the program reduced the data to engineering units, and performed various checks on loop parameters.

At the inception of testing each day, all absolute pressure transducers and differential pressure transducers were set to zero position and all channels were scanned using the computer program to determine zero shifts of the transducers. These values were used by the program to offset the readings of the transducers until new zero shifts were calculated. With the instruments in zero position, all channels were scanned and reduced to engineering units and printed on the Diablo printer to check that the transducers read zero values with the zero shift corrections. Then the loop was pressurized to 50 psig, and all instruments were scanned and reduced to

engineering units to check the consistency of the data. The procedure was repeated with the loop pressurized to 20 psig.

During a typical steady state run, the program was in a continuous scanning mode. In this mode all the data channels were sequentially scanned forty times and the average of the 40 scans was calculated. The data matrix of the previous 30 averaged readings was updated, the latest reading was reduced to engineering units, and the important parameters of the test section such as, exit pressure, pressure drop, inlet and outlet temperatures of the coolant, the heat flux, and wall temperatures were displayed on the CRT monitor. The program checked for the operator interruption and went back to sequential scanning if no interruptions were detected.

When steady state conditions were achieved, the sequential scanning was manually interrupted using a scan default option. Then the latest 40 sequential scans were stored on a magnetic tape. The operator entered the run number, gauge exit pressure, and the manometer reading (for overall pressure drop of the test section) through an interactive terminal. The latest averaged reading of the 40 sequential scans was reduced to engineering units, stored on the magnetic tape, and printed on the printer. The following parameters were printed for each run:

1. Loop pressures
2. Test section inlet and exit pressures
3. Test section pressure drops
4. Test section inlet and exit temperatures
5. Flow rates
6. Standard deviations for the values of primary instruments based on 40 sequential scans
7. Outside wall temperatures of the test section
8. Heat flux, power, voltage, quality, and heat ratio.

3.2.3 Description of Data Files

Appendix A presents the file format for tests 7, 9, and 12. The format for each test number is constant. The format did change as data requirements were modified. Table 3.3 presents a catalog of the parallel flow portions of the various tests.

Table 3.3 Parallel Flow Catalog

Test Number	Run Number	Test Section Number	Tube ID
7	1454-1489, 1591-1609	ST-7	0.60"
9	1583-1907	ST-9	0.36"
12	2277-2320	ST-8	0.61"

TEST NO.: ST-7

TUBE NO.: 4.620-001S

MATERIAL : SS 304

ID: 0.60"

Figure 3.1 UNIFORMLY HEATED TEST SECTION INSTRUMENT ARRANGEMENT

TEST NO.: ST-8

TUBE NO.: 4.620-003I

MATERIAL : Inconel 600

ID: 0.61"

Figure 3.2 UNIFORMLY HEATED TEST SECTION INSTRUMENT ARRANGEMENT

TEST NO.: ST-9

TUBE NO.: 4.370-003I

MATERIAL : Inconel 600

ID: 0.36"

Figure 3.3 UNIFORMLY HEATED TEST SECTION INSTRUMENT ARRANGEMENT

FIGURE 3.4 High Speed Computer Controlled Data Acquisition System

4. ERROR AND UNCERTAINTY ANALYSIS

The errors attributed to the measurement can be categorized into three main sources; namely, the errors due to installation procedures, the instrument errors, and the errors derived from the measurement data acquisition system. Since most of the installation errors in these tests existed systematically as a fixed deviation, this type of error can be corrected prior to the determination of the measurement uncertainties (see part I of CU-HTRF-T4 report for the discussion of the installation error).

4.1 MEASUREMENT UNCERTAINTY ANALYSIS

The measurement uncertainties of these thermal hydraulic data can be conveniently categorized as instrumentation uncertainty, uncertainty of the data acquisition line, and the uncertainty due to the multiplexer digitizer.

4.2 INSTRUMENTATION UNCERTAINTIES

Each instrument used in the tests was calibrated prior to installation. In addition, all instruments used to provide data necessary for test data analysis were calibrated and certified to an NIST standard. Instruments which were used as backup to check the functioning of a primary instrument were calibrated and are traceable to a NIST standard but may not have traceability certification.

The instrumentation uncertainties include instrument calibration, the effects of repeatability, hysteresis, linearity, zero shift, and the temperature sensitivity of the instruments themselves as well as the excitation uncertainty for the absolute and differential pressure transducers, the uncertainty of the Anadex frequency to DC voltage convertor, and the uncertainty of the Rosemont bridge for the RTDs.

4.2.1 Turbine Flowmeter

The turbine flowmeter with size larger or equal to one inch were calibrated by the manufacturer using "master meter loop" method. The small size flowmeters (less than one inch) were calibrated using "weight measurement" procedure.

The uncertainties attribute to the turbine flowmeter itself are mainly the repeatability and the linearity. The repeatability was certified as 0.1% of full scale. The linearity was provided by the manufacturer with maximum percentage of deviation from the average meter constant K as 0.5% of reading. For the primary flow measurement, 0.5 % of full scale was taken conservatively as two standard deviation (STD) for the uncertainty calculation. The AnaJex frequency convertors were calibrated daily and the uncertainty of the converter is 0.03% which is the root-sum-square (RSS) of the linearity (0.025%) and the short term stability (0.02%) as stated by the manufacturer. The total instrument uncertainty of the flowmeter and frequency convertor was calculated using Kline and McClintock method, RSS of the individual error, as 0.5106% of full scale.

4.2.2 Fluid Temperature Measurement

The RTDs used for the fluid temperature measurement was calibrated with the Rosemont bridge by the manufacturer (Weed Inst.) with special request to have combined accuracy of 0.06% of the full scale (60 to 360°F). The primary RTDs were certified to have accuracy within 0.25°F.

4.2.3 Pressure Transducers (absolute and differential)

The pressure transducers were calibrated by the manufacturers according to the NIST standard dead-weight test procedure.

The absolute pressure transducers and differential pressure transducers provided by Sensotec was calibrated and certified to 0.1% F.S. of overall accuracy. The excitation source for those transducers were calibrated daily with uncertainty of 0.05%. The total RSS error of the transducer and the power source is 0.1118% of full scale.

4.2.4 Power Measurement

The overall power input was calculated from the voltage and current measurements. The current was measured using Ammeter shunts in series with the test section. The high precision D. C. Ammeter shunts were calibrated by the

EMPRO company and certified with accuracy 0.1% of reading. The voltage across the test section was measured directly with the voltage dividers. The voltage dividers compose of several precision resistors which were certified by the manufacturer with accuracy 0.05% of reading.

4.3 DATA ACQUISITION LINE UNCERTAINTIES

The uncertainties in the data acquisition system line include errors from various sources such as ripple in the power supplies of the data acquisition system, errors in gain of various amplifiers, and drift due to temperature effects. Detailed descriptions of such errors were discussed in the part I of CU-HTRF-T4 report. The overall line error was estimated by an end-to-end calibration. A known and constant input was provided to each channel of the data acquisition system and the channel's output was recorded to estimate the uncertainties.

4.4 DATA ACQUISITION MULTIPLEXER DIGITIZER UNCERTAINTIES

The error in the multiplexer digitizer was certified by the manufacturer as 0.005V over the 5 volts full scale range.

4.5 OVERALL MEASUREMENT UNCERTAINTIES

This section illustrates the overall uncertainties that have been estimated on the basis of instrumentation uncertainties, data acquisition line uncertainties, and multiplexer digitizer uncertainties. The analysis is in five parts to corresponding to five types of measurements for primary instruments. The number used to illustrate the calculation is just a typical operation condition. Actual measurement range of each instrument for different set of operational condition will be present along with each individual test data.

In combining errors, the basic approach recommended by Kline and McClintock (1953) will be used. The uncertainty interval δR of a dependent variable is given by:

$$\delta R = \text{sqrt}(\sum (\delta r / \delta v_i)^2 v_i^2)$$

Where $v_1, v_2, \dots, v_n$ are independent variables.

As stated in the part I of CU-HTRF-T4 report, the magnitude of the estimated errors presented here are assumed to be a reasonable approximation of the largest errors possible. More precisely, these errors are assumed to equal to double the standard deviation of that would be computed from a reasonable large sample of data. It should be recalled that 95% of a body of data will fall within two standard deviations of a mean.

4.5.1 Uncertainty in Absolute Pressure Measurement

Total error in pressure measured by absolute pressure transducer consists of:

- a) Accuracy of the instrument and excitation voltage stated by the manufacturer as 0.112% of full scale (200 psi).
- b) Error in the line from the source to the multiplexer digitizer. This was measured to be 0.304% of the reading.
- c) Error in the multiplexer digitizer (0.005 V)

The following table presents the uncertainty in absolute pressure measurement:

Abs. Pres. Psi	Signal Voltage volt	Instrument Error psi	Line Error psi	Digitizer Error psi	Total Error psi
20	0.5	0.224	0.061	0.200	0.31
50	1.25	0.224	0.152	0.200	0.34

4.5.2 Uncertainty in Differential Pressure Measurement

Total error in pressure measured by differential pressure transducer consists of:

- a) Accuracy of the instrument and excitation voltage stated by the manufacturer as 0.112% of full scale.
- b) Error in the line from the source to the multiplexer digitizer measured to be 0.304% of the signal.
- c) Error in the multiplexer digitizer (0.005 V).

The following table presents the uncertainty in the differential pressure measurement:

Press. Drop Psi	Signal Voltage Volt	Instrument Error Psi	Line Error Psi	Digitizing Error Psi	Total Error Psi
20	5.00	0.022	0.061	0.020	0.07
10	2.50	0.022	0.030	0.020	0.04
5	1.25	0.022	0.015	0.020	0.03
2	0.50	0.022	0.006	0.020	0.03

4.5.3 Uncertainty in Temperature Measurement

Total error in temperature measured by RTD consists of:

a) Accuracy of the instrument and Rosemont bridge stated by the manufacturer as 0.25 ° F.

b) Error in the line from the Rosemont bridge to the multiplexer digitizer measured to be 0.005% of the reading.

c) Error in the multiplexer digitizer (0.005 V).

The following table presents the uncertainty in temperature measurement:

Temp	signal	Instrument	Line	Digitizing	Total
°F	Voltage	Error	Error	Error	Error
°F	Volts	°F	°F	°F	°F
70	0.70	0.250	0.004	0.500	0.56
120	1.20	0.250	0.006	0.500	0.56
200	2.00	0.250	0.010	0.500	0.56
300	3.00	0.250	0.015	0.500	0.56

4.5.4 Uncertainty in Flowrate Using Turbine Flow Meter

Total error in flow rate measured by turbine flow meter consists of:

a) Accuracy of the instrument and Anadex frequency converter stated by the manufacturer as 0.5106% of full scale (60 GPM).

b) Error in the line from the Anadex output to the multiplexer digitizer measured to be 0.200% of the reading.

c) Error in the multiplexer digitizer (0.005 V).

Flow Rate GPM	Signal Voltage Volts	Instrument Error GPM	Line Error GPM	Digitizing Error GPM	Total Error GPM
36	3.00	0.306	0.072	0.060	0.32
20	1.67	0.306	0.040	0.060	0.31
10	0.83	0.306	0.020	0.060	0.31
5	0.42	0.306	0.010	0.060	0.31

4.5.5 Uncertainty in Test Voltage Measurement

Total error in test section voltage measurement consists of:

- a) Accuracy of the voltage divider stated by the manufacturer as 0.050% of the reading.
- b) Error in the line from the source to the multiplexer digitizer measured to be 0.304% of the reading.
- c) Error in the multiplexer digitizer (0.005 V).

The following table presents the uncertainty in voltage measurement:

T.S. voltage Volts	Signal Voltage Volts	Instrument Error Volts	Line Error Volts	Digitizing Error Volts	Total Error Volts
160	4.00	0.080	0.486	0.200	0.53
80	2.00	0.040	0.243	0.200	0.32
40	1.00	0.020	0.122	0.200	0.23

4.5.6 Uncertainty in Test Section Current Measurement

Total error in test section current measurement consists of:

- a) Accuracy of the shunt stated by the manufacturer as 0.100% of the reading.

b) Error in the line from the source to the multiplexer digitizer measured to be 0.304% of the reading.

c) Error in the multiplexer digitizer (0.005 V).

The following table presents the uncertainty in the current measurement:

T.S. Current Amps	Signal Voltage Volts	Instrument Error Amps	Line Error Amps	Digitizing Error Amps	Total Error Amps
10000	2.50	10	30	10	34
5000	2.50	5	15	10	19
2000	1.0	2	6	10	12

4.5.7 Uncertainty in Test Section Dimensional Measurements

The total error in the measurement of the test section dimension depends upon the measurement technique used. This error represents the resolution of the measurement instrument. For several test sections, the test section inside diameter was measured using go/no-go gages. In these cases, the error is one half of the difference between the go gage and the no-go gage. The following presents the uncertainty in the dimensional measurements.

Test Section	ID inches	Heated Length inches	Pressure Tap Separation inches
ST-7	0.005	0.038	0.058
ST-8	0.005	0.038	0.058
ST-9	0.0015	0.038	0.058

4.6 PRIMARY INSTRUMENTATION AND RANGES

4.6.1 Data for Test 7

The following is the data for Test 7 involving test section ST-7.

SYMBOL	INSTRUMENT SENSOR	MEASUREMENT	RANGE OF FULL SCALE
Volt TS	Voltage	Test section voltage	N/A
Curr TS	Current (shunt)	Test section current	N/A
PTI1	Absolute pressure transducer	Inlet pressure	200 psi
PTO1	Absolute pressure transducer	Outlet pressure	200 psi
DT1	Differential pressure transducer	Test section pressure drop	15 psi
FTI1	Turbine flowmeter	Test section flowrate	60 gpm
RTI1	RTD	Inlet temperature	60 °F to 360 °F
RTO1	RTD	Exit temperature	60 °F to 360 °F

4.6.2 Data for Test 9

The following is the data for Test 9 involving test section ST-9.

SYMBOL	INSTRUMENT SENSOR	MEASUREMENT	RANGE OF FULL SCALE
Volt TS	Voltage	Test section voltage	N/A
Curr TS	Current (shunt)	Test section current	N/A
PTI1	Absolute pressure transducer	Inlet pressure	200 psi
PTO1	Absolute pressure transducer	Outlet pressure	200 psi
DT1	Differential pressure transducer	Test section pressure drop	20 psi
FTI1	Turbine flowmeter	Test section flowrate	60 gpm
RTI1	RTD	Inlet temperature	60 °F to 360 °F
RTO1	RTD	Exit temperature	60 °F to 360 °F

4.6.3 Data for Test 12

The following is the data for Test 12 involving test section ST-8.

SYMBOL	INSTRUMENT SENSOR	MEASUREMENT	RANGE OF FULL SCALE
Volt TS	Voltage	Test section voltage	N/A
Curr TS	Current (shunt)	Test section current	N/A
PTI1	Absolute pressure transducer	Inlet pressure	200 psi
PTO1	Absolute pressure transducer	Outlet pressure	200 psi
DT1	Differential pressure transducer	Test section pressure drop	15 psi
FTI1	Turbine flowmeter	Test section flowrate	60 gpm
RTI1	RTD	Inlet temperature	60 °F to 360 °F
RTO1	RTD	Exit temperature	60 °F to 360 °F

5. RESULTS AND DISCUSSION

5.1 Introduction

The primary objective of this phase of the flow excursion experimental program was to determine if the presence of a parallel flow path would affect the OFI flowrate. Since the reactor fuel tubes are composed of multiple annuli and also because there are many fuel tubes in parallel, it was felt that establishing the validity of controlled flow OFI data for use in parallel operations was essential.

Determination of the OFI point using controlled flow is more accurate because data beyond the minimum point can be measured. These additional points help to better identify the minimum in the demand curve. Operation beyond OFI in parallel is not possible because the flow can be diverted from the test section, resulting in burnout.

Before the test program was initiated, it was felt that the effect of parallel flow paths would be negligible up to OFI. Prior to OFI, the channel pressure drop is controlled by the single phase pressure drop. As the flowrate to the test section is decreased, the single phase pressure drop decreases according to the velocity squared law. As the flowrate continues to decrease, the channel wall temperature eventually reaches and exceeds the local saturation temperature. At this point, two phase flow begins. The increase in the two phase component of the pressure drop is initially very small; however, as more bubbles are formed the effect increases. Since the parallel unheated channel is following the single phase pressure drop relation, the pressure drop in the parallel path also decreases. However, when the onset of significant voiding (OSV) occurs, there is a rapid increase in the two phase pressure drop. At OFI, the increasing two phase component of the total pressure drop overcomes the decreasing single phase component. Following this point, the pressure drop in the heated channel increases while the pressure drop in the unheated channel decreases. To re-establish the equality of pressure drop between the heated and unheated channel, the flow in the heated channel is diverted to the parallel path. This causes a further increase in the two phase pressure drop and can lead to dry-out or burnout.

As noted earlier in this report, a considerable amount of data on the test

section and flow loop were recorded. Part II of this report and part II of CU-HTRF-T4 presents all the data obtained for the test program. This data has also been transmitted in electronic form to SRL.

5.2 Test Section Pressure Drop

In the actual reactor, the parallel flow path is considerably larger than the channel experiencing flow loss. However, the test facility had a maximum flowrate capacity of approximately 250-280 gpm. This limited the maximum bypass ratio (bypass flowrate to test section flowrate) to 11:1. To determine the effect of bypass ratio, tests with two different ratios were conducted at a surface heat flux of 800,000 Btu/hr-ft². Figure 5.1 presents a comparison of the resulting demand curves. Since these tests showed that the magnitude of the bypass ratio was not important, the remainder of the parallel flow test program was conducted at the maximum ratio attainable (11:1).

Figures 5.2 through 5.4 present the test results for the 0.36 inch inside diameter test section. Figure 5.2 shows the variation of bypass flowrate with test section flowrate. From these results, it can be seen that the bypass ratio was constant over the complete test range. Figures 5.3 and 5.4 present demand curves for inlet temperatures of 77 °F and 122 °F respectively. Both figures show that there is negligible difference between the bypass and no bypass cases.

Figures 5.5 through 5.7 presents similar results for the 0.60 inch inside diameter test section. This test section was stainless steel. In all cases the demand curves for the bypass and no bypass cases agreed very closely.

The results for the 0.61 inch inside diameter test section are presented in figures 5.8 through 5.10. As with the previous results, there is no observable difference between the controlled flow results (no bypass) and the parallel flow (bypass) cases.

Using methods developed in CU-HTRF-T4, the surface temperature of the test section can be calculated from the measured wall temperature. Figure 5.11

presents the wall superheat (surface temperature - saturation temperature) at the channel exit as a function of flowrate. The agreement between the bypass and no bypass cases is very good.

These results show that the presence of a parallel path does not affect the OFI point.

During the initial testing of the 0.61 inch tube, an error was made in the placement of the test voltage measurement tap. The test section tap was incorrectly attached to the burnout detector tap. Since the burnout detector tap is located approximately 13 inches from the test section exit, the test section power input was 16% higher than recorded. The tests on this test section were therefore repeated to meet the test matrix. These results have been presented in figures 5.8 through 5.10. However, after correcting the surface heat flux, the results from the earlier tests, although outside the official test matrix, also useful. To present a meaningful comparison, the data will be plotted in terms of the test section pressure versus the Q_{ratio} . The Q_{ratio} is the ratio of the surface heat flux to the heat required to raise the exit temperature to saturation. In CU-HTRF-T4, the ratio was shown to be an excellent correlation parameter for instability data. In the controlled flow report, it was shown that OFI occurred at the same value of the Q_{ratio} for a particular L/D test section. Figures 5.12 and 5.13 present data taken during the higher flux tests at 77 °F and 122 °F respectively. The solid symbols present data taken at 464,000 Btu/hr-ft² and 928,000 Btu/hr-ft². The open symbols present data at the normal test matrix fluxes of 400,000 and 800,000 Btu/hr-ft². The higher fluxes result in slightly higher pressure drops; however, the minimum point occurs at the same value of the Q_{ratio} . This result verifies the usefulness of the Q_{ratio} and also shows that this result hold for the constant pressure drop case. The complete data set for these tests, designated test 8, are presented in part II (see run numbers 1610 through 1662). In addition, the file format is included in appendix A as test 8.

Figure 5.1 Effect of bypass ratio
 for 0.60 inch diameter tube
 $T_{\text{inlet}} = 77^{\circ}\text{F}$, $P_{\text{exit}} = 50 \text{ psig}$
 flux = 800,000 Btu/hr-ft²

Figure 5.2 Bypass flowrate vs. test section flowrate for 0.36 inch diameter tube

Figure 5.3 Pressure drop vs. flowrate
 for 0.36 inch diameter tube for
 $P_{\text{exit}} = 50$ psig, $T_{\text{inlet}} = 77^{\circ}\text{F}$

Figure 5.4 Pressure drop vs. flowrate
 for 0.36 inch diameter tube for
 $p_{\text{exit}} = 50$ psig, $T_{\text{inlet}} = 122$ °F

Figure 5.5 Bypass flowrate vs. test section flowrate
test section inside diameter = 0.60 inches

Figure 5.6 Pressure drop vs. test section flowrate
test section inside diameter = 0.60 inches
 $P_{\text{exit}} = 50$ psig, $T_{\text{inlet}} = 77$ °F

Figure 5.7 Pressure drop vs. test section flowrate
test section inside diameter = 0.60 inches
 $P_{\text{exit}} = 50$ psig, $T_{\text{inlet}} = 122$ °F

Figure 5.8 Bypass flowrate vs. test section flowrate
test section inside diameter = 0.61 inches

Figure 5.9 Pressure drop vs. test section flowrate
 test section inside diameter = 0.61 inches
 $P_{\text{exit}} = 50$ psig, $T_{\text{inlet}} = 77$ °F

Figure 5.10 Pressure drop vs. test section flowrate
 test section inside diameter = 0.61 inches
 $P_{\text{exit}} = 50$ psig, $T_{\text{inlet}} = 121$ °F

Figure 5.11 Wall superheat vs. flowrate
for 0.36 inch diameter tube for
 $T_{\text{inlet}} = 77^{\circ}\text{F}$, $P_{\text{exit}} = 50$ psig

Figure 5.13 Pressure drop vs. Q_{ratio}
 for 0.61 inch diameter tube for
 $T_{inlet} = 122^{\circ}\text{F}$, $P_{exit} = 50$ psig

Figure 5.12 Pressure drop vs. Q_{ratio}
 for 0.61 inch diameter tube for
 $T_{inlet} = 77^{\circ}\text{F}$, $P_{exit} = 50$ psig

6. CONCLUSIONS

Tests have been conducted in the single tube facility to investigate the effect of parallel operation on the OFI point obtained from controlled flow tests. The results of this program show that the presence of a parallel flow path does not affect the OFI point determined from controlled flow tests.

Data has also been presented which show that the OFI point can be correlated using the Q_{ratio} developed in report CU-HTRF-T4.

Limited analysis of the temperature data also indicates that parallel flow operation does affect these results.

APPENDIX A
Data File Format

SRL FLOW INSTABILITY TESTS
TESTS 7; RUN NUMBERS 1454-1609
EACH RUN HAS 100 WORDS IN 10 RECORDS
CARD IMAGE FORMAT (10F8.3)

RECO NO.	WORD NO.	SERIAL NO.	INSTRUMENT	PARAMETER	UNITS
1	1	1	PWR1	Power - Heater	KW
1	2	2	HFLX	Heat Flux - Heater	M.Btu/Hr
1	3	3	VOLT B	Voltage - Bus to Bus	Volts
1	4	4	VOLT T	Voltage - Heater	Volts
1	5	5	CURRT1	Current - Heater	Amps
1	6	6	CURRT2	Current - Heater Backup	Amps
1	7	7	PTI1	Pressure - T.S. Inlet	Psig
1	8	8	PTI2	Pressure - T.S. Inlet	Psig
1	9	9	PTO1	Pressure - Heater Outlet	Psig
1	10	10	PTO3	Pressure - Heater Outlet	Psig
2	1	11	PBI1	Pressure - By Pass Inlet	Psig
2	2	12	PBO1	Pressure - By Pass Outlet	Psig
2	3	13	PL1	Pressure - Loop 1	Psig
2	4	14	PL2	Pressure - Loop 2	Psig
2	5	15	PD1	Pressure - Heat Exchanger Divert	Psig
2	6	16	PXI1	Pressure - Heat Exchanger Inlet	Psig
2	7	17	PXO1	Pressure - Heat Exchanger Outlet	Psig
2	8	18	PPI1	Pressure - Pump Inlet	Psig
2	9	19	PPO1	Pressure - Pump Discharge	Psig
2	10	20	PA1	Pressure - Tank	Psig
3	1	21	DT1	Pressure Drop - Test Section DP1	Psi
3	2	22	DT2	Pressure Drop - Test Section DP2	Psi
3	3	23	DP1	Pressure Drop - Pump	Psi
3	4	24	DLV1	Pressure Drop - Valve	Psi
3	5	25	OLI1	Flow - Loop Inlet (Orifice Meter 2")	GPM
3	6	26	FLI1	Flow - Loop Inlet (Turbine meter) (2")	GPM
3	7	27	FTI1	Flow - T.S. Inlet (Turbine meter) (1")	GPM
3	8	28	FBI1	Flow - Bypass Line (Turbine meter) (2")	GPM
3	9	29	FXI1	Flow - HX Inlet (Turbine meter) (2")	GPM
3	10	30	FXI2	Flow - HX Inlet (Turbine meter) (1")	GPM
4	1	31	FS1	Flow - Bypass to Tank (Turbine meter) (2")	GPM
4	2	32	TRTI1	Temperature (RTD) - T.S. Inlet	Degrees F
4	3	33	TRTI2	Temperature (RTD) - T.S. Inlet	Degrees F
4	4	34	TRTO1	Temperature (RTD) - T.S. Outlet	Degrees F
4	5	35	TRTO2	Temperature (RTD or T/C) - T.S. Outlet	Degrees F
4	6	36	JXI1	Temperature (RTD) - T.S. Inlet	Degrees F
4	7	37	JXO1	Temperature (RTD) - T.S. Outlet	Degrees F
4	8	38	PTO2	Pressure - Heater Outlet (Gauge)	Psig
4	9	39	DT3	Pressure Drop - Test Section DP3 (Manometer)	Psi
4	10	40	TEW95W	Wall Temperature - Position 1	Degrees F

SRL FLOW INSTABILITY TESTS
TESTS 7; RUN NUMBERS 1454-1609
EACH RUN HAS 100 WORDS IN 10 RECORDS
CARD IMAGE FORMAT (10F8.3)

RECO NO.	WORD NO.	SERIAL NO.	INSTRUMENT	PARAMETER	UNITS
5	1	41	TEW95E	Wall Temperature - Position 2	Degrees F
5	2	42	TEW72N	Wall Temperature - Position 3	Degrees F
5	3	43	TEW72S	Wall Temperature - Position 4	Degrees F
5	4	44	TEW48W	Wall Temperature - Position 5	Degrees F
5	5	45	TEW48E	Wall Temperature - Position 6	Degrees F
5	6	46	TEW24N	Wall Temperature - Position 7	Degrees F
5	7	47	TEW24S	Wall Temperature - Position 8	Degrees F
5	8	48	TEW13W	Wall Temperature - Position 9	Degrees F
5	9	49	TEW13E	Wall Temperature - Position 10	Degrees F
5	10	50	TEW10N	Wall Temperature - Position 11	Degrees F
6	1	51	TEW10S	Wall Temperature - Position 12	Degrees F
6	2	52	TEW07W	Wall Temperature - Position 13	Degrees F
6	3	53	TEW07E	Wall Temperature - Position 14	Degrees F
6	4	54	TEW04N	Wall Temperature - Position 15	Degrees F
6	5	55	TEW04S	Wall Temperature - Position 16	Degrees F
6	6	56	TEW01W	Wall Temperature - Position 17	Degrees F
6	7	57	TEW01E	Wall Temperature - Position 18	Degrees F
6	8	58		BLANK	
6	9	59	TKW07W	Wall Temperature - Position 19	Degrees F
6	10	60	TKW04E	Wall Temperature - Position 20	Degrees F
7	1	61	TKW01S	Wall Temperature - Position 21	Degrees F
7	2	62		BLANK	
7	3	63	TEREF	E Reference Junction Temperature	Degrees F
7	4	64	TJREF	J Reference Junction Temperature	Degrees F
7	5	65		BLANK	
7	6	66		BLANK	
7	7	67		BLANK	
7	8	68		BLANK	
7	9	69	PWR2	Power - Heater (Backup)	KW
7	10	70	RTS	Test Section Resistance	Ohms
8	1	71	QUALITY	Quality - Heater Outlet	(%)
8	2	72	HRATIO	Heat Output / Heat Input Ratio	
8	3	73	HLOSS	Heat Losses	(%)
8	4	74	SVOLT	Standard Deviation of TS Voltage	(%)
8	5	75	SCURR	Standard Deviation of TS Current	(%)
8	6	76	SPT01	Standard Deviation of TS Exit Pressure	(%)
8	7	77	SDPT1	Standard Deviation of TS Pressure Drop DT1	(%)
8	8	78	SDPT2	Standard Deviation of TS Pressure Drop DT2	(%)
8	9	79	SFT11	Standard Deviation of TS Flow Rate	(%)
8	10	80	SRT11	Standard Deviation of TS Inlet Temperature	(%)

SRL FLOW INSTABILITY TESTS
TESTS 7; RUN NUMBERS 1454-1609
EACH RUN HAS 100 WORDS IN 10 RECORDS
CARD IMAGE FORMAT (10F8.3)

RECO NO.	WORD NO.	SERIAL NO.	INSTRUMENT	PARAMETER	UNITS
9	1	81		BLANK	
9	2	82		BLANK	
9	3	83		BLANK	
9	4	84	DPL	Distance Between Pressure Taps	Inches
9	5	85	VTL	Distance Between Voltage Taps	Inches
9	6	86	HL	Heated Length - Heater	Inches
9	7	87	ID	Diameter (ID) - Heater	Inches
9	8	88	DATE	Test Date	YYMM.D
9	9	89	TIME	Test Time	HHMM.S
9	10	90	TEST#	Test Number	
10	1	91	RUN#	Run Number	
10	2	92	PTO2	Pressure - Heater Outlet (Gauge)	Psig
10	3	93	DT3	Pressure Drop - Test Section DP3 (Manometer)	IN HG
10	4	94		BLANK	
10	5	95		BLANK	
10	6	96		BLANK	
10	7	97		BLANK	
10	8	98		BLANK	
10	9	99		BLANK	
10	10	100		BLANK	

SRL FLOW INSTABILITY TESTS

TESTS 8; RUN NUMBERS 1610-1662

EACH RUN HAS 100 WORDS IN 10 RECORDS

CARD IMAGE FORMAT (10F8.3)

RECO NO.	WORD NO.	SERIAL NO.	INSTRUMENT	PARAMETER	UNITS
1	1	1	PWR1	Power - Heater	KW
1	2	2	HFLX	Heat Flux - Heater	M.Btu/Hr
1	3	3	VOLT B	Voltage - Bus to Bus	Volts
1	4	4	VOLT T	Voltage - Heater	Volts
1	5	5	CURRT1	Current - Heater	Amps
1	6	6	CURRT2	Current - Heater Backup	Amps
1	7	7	PTI1	Pressure - T.S. Inlet	Psig
1	8	8	PTI2	Pressure - T.S. Inlet	Psig
1	9	9	PTO1	Pressure - Heater Outlet	Psig
1	10	10	PTO3	Pressure - Heater Outlet	Psig
2	1	11	PBI1	Pressure - By Pass Inlet	Psig
2	2	12	PBO1	Pressure - By Pass Outlet	Psig
2	3	13	PL1	Pressure - Loop 1	Psig
2	4	14	PL2	Pressure - Loop 2	Psig
2	5	15	PD1	Pressure - Heat Exchanger Divert	Psig
2	6	16	PXI1	Pressure - Heat Exchanger Inlet	Psig
2	7	17	PXO1	Pressure - Heat Exchanger Outlet	Psig
2	8	18	PPI1	Pressure - Pump Inlet	Psig
2	9	19	PPO1	Pressure - Pump Discharge	Psig
2	10	20	PA1	Pressure - Tank	Psig
3	1	21	DT1	Pressure Drop - Test Section DP1	Psi
3	2	22	DT2	Pressure Drop - Test Section DP2	Psi
3	3	23	DP1	Pressure Drop - Pump	Psi
3	4	24	DLV1	Pressure Drop - Valve	Psi
3	5	25	OLI1	Flow - Loop Inlet (Orifice Meter 2")	GPM
3	6	26	FLI1	Flow - Loop Inlet (Turbine meter) (2")	GPM
3	7	27	FTI1	Flow - T.S. Inlet (Turbine meter) (1")	GPM
3	8	28	FBI1	Flow - Bypass Line (Turbine meter) (2")	GPM
3	9	29	FXI1	Flow - HX Inlet (Turbine meter) (2")	GPM
3	10	30	FXI2	Flow - HX Inlet (Turbine meter) (1")	GPM
4	1	31	FS1	Flow - Bypass to Tank (Turbine meter) (2")	GPM
4	2	32	TRTI1	Temperature (RTD) - T.S. Inlet	Degrees F
4	3	33	TRTI2	Temperature (RTD) - T.S. Inlet	Degrees F
4	4	34	TRTO1	Temperature (RTD) - T.S. Outlet	Degrees F
4	5	35	TRTO2	Temperature (RTD or T/C) - T.S. Outlet	Degrees F
4	6	36	JXI1	Temperature (T/C) - T.S. Inlet	Degrees F
4	7	37	JXO1	Temperature (T/C) - T.S. Outlet	Degrees F
4	8	38	PTO2	Pressure - Heater Outlet (Gauge)	Psig
4	9	39	DT3	Pressure Drop - Test Section DP3 (Manometer)	Psi
4	10	40	TEW95W	Wall Temperature - Position 1	Degrees F

SRL FLOW INSTABILITY TESTS
TESTS 8; RUN NUMBERS 1610-1662
EACH RUN HAS 100 WORDS IN 10 RECORDS
CARD IMAGE FORMAT (10F8.3)

RECO NO.	WORD NO.	SERIAL NO.	INSTRUMENT	PARAMETER	UNITS
5	1	41	TEW95E	Wall Temperature - Position 2	Degrees F
5	2	42	TEW72N	Wall Temperature - Position 3	Degrees F
5	3	43	TEW72S	Wall Temperature - Position 4	Degrees F
5	4	44	TEW48W	Wall Temperature - Position 5	Degrees F
5	5	45	TEW48E	Wall Temperature - Position 6	Degrees F
5	6	46	TEW24N	Wall Temperature - Position 7	Degrees F
5	7	47	TEW24S	Wall Temperature - Position 8	Degrees F
5	8	48	TEW13W	Wall Temperature - Position 9	Degrees F
5	9	49	TEW13E	Wall Temperature - Position 10	Degrees F
5	10	50	TEW10N	Wall Temperature - Position 11	Degrees F
6	1	51	TEW10S	Wall Temperature - Position 12	Degrees F
6	2	52	TEW07W	Wall Temperature - Position 13	Degrees F
6	3	53	TEW07E	Wall Temperature - Position 14	Degrees F
6	4	54	TEW04N	Wall Temperature - Position 15	Degrees F
6	5	55	TEW04S	Wall Temperature - Position 16	Degrees F
6	6	56	TEW01W	Wall Temperature - Position 17	Degrees F
6	7	57	TEW01E	Wall Temperature - Position 18	Degrees F
6	8	58		BLANK	
6	9	59	TKW07W	Wall Temperature - Position 19	Degrees F
6	10	60	TKW04E	Wall Temperature - Position 20	Degrees F
7	1	61	TKW01S	Wall Temperature - Position 21	Degrees F
7	2	62		BLANK	
7	3	63	TEREF	E Reference Junction Temperature	Degrees F
7	4	64	TJREF	J Reference Junction Temperature	Degrees F
7	5	65		BLANK	
7	6	66		BLANK	
7	7	67		BLANK	
7	8	68		BLANK	
7	9	69	PWR2	Power - Heater (Backup)	KW
7	10	70	RTS	Test Section Resistance	Ohms
8	1	71	QUALITY	Quality - Heater Outlet	(%)
8	2	72	HRATIO	Heat Output / Heat Input Ratio	
8	3	73	HLOSS	Heat Losses	(%)
8	4	74	SVOLT	Standard Deviation of TS Voltage	(%)
8	5	75	SCURR	Standard Deviation of TS Current	(%)
8	6	76	SPT01	Standard Deviation of TS Exit Pressure	(%)
8	7	77	SDPT1	Standard Deviation of TS Pressure Drop DT1	(%)
8	8	78	SDPT2	Standard Deviation of TS Pressure Drop DT2	(%)
8	9	79	SFT11	Standard Deviation of TS Flow Rate	(%)
8	10	80	SRT11	Standard Deviation of TS Inlet Temperature	(%)

SRL FLOW INSTABILITY TESTS
TESTS 8; RUN NUMBERS 1610-1652
EACH RUN HAS 100 WORDS IN 10 RECORDS
CARD IMAGE FORMAT (10F8.3)

RECO NO.	WORD NO.	SERIAL NO.	INSTRUMENT	PARAMETER	UNITS
9	1	81		BLANK	
9	2	82		BLANK	
9	3	83		BLANK	
9	4	84	DPL	Distance Between Pressure Taps	Inches
9	5	85	VTL	Distance Between Voltage Taps	Inches
9	6	86	HL	Heated Length - Heater	Inches
9	7	87	ID	Diameter (ID) - Heater	Inches
9	8	88	DATE	Test Date	YYMM.D
9	9	89	TIME	Test Time	HHMM.S
9	10	90	TEST#	Test Number	
10	1	91	RUN#	Run Number	
10	2	92	PTO2	Pressure - Heater Outlet (Gauge)	Psig
10	3	93	DT3	Pressure Drop - Test Section DP3 (Manometer)	IN HG
10	4	94		BLANK	
10	5	95		BLANK	
10	6	96		BLANK	
10	7	97		BLANK	
10	8	98		BLANK	
10	9	99		BLANK	
10	10	100		BLANK	

SRL FLOW INSTABILITY TESTS

TESTS 9; RUN NUMBERS 1663-1907

EACH RUN HAS 100 WORDS IN 10 RECORDS

CARD IMAGE FORMAT (10F8.3)

RECO NO.	WORD NO.	SERIAL NO.	INSTRUMENT	PARAMETER	UNITS
1	1	1	PWR1	Power - Heater	KW
1	2	2	HFLX	Heat Flux - Heater	M.Btu/Hr
1	3	3	VOLTB	Voltage - Bus to Bus	Volts
1	4	4	VOLTT	Voltage - Heater	Volts
1	5	5	CURRT1	Current - Heater	Amps
1	6	6	CURRT2	Current - Heater Backup	Amps
1	7	7	PTI1	Pressure - T.S. Inlet	Psig
1	8	8	PTI2	Pressure - T.S. Inlet	Psig
1	9	9	PTO1	Pressure - Heater Outlet	Psig
1	10	10	PTO3	Pressure - Heater Outlet	Psig
2	1	11	PBI1	Pressure - By Pass Inlet	Psig
2	2	12	PBO1	Pressure - By Pass Outlet	Psig
2	3	13	PL1	Pressure - Loop 1	Psig
2	4	14	PL2	Pressure - Loop 2	Psig
2	5	15	PD1	Pressure - Heat Exchanger Divert	Psig
2	6	16	PXI1	Pressure - Heat Exchanger Inlet	Psig
2	7	17	PXO1	Pressure - Heat Exchanger Outlet	Psig
2	8	18	PPI1	Pressure - Pump Inlet	Psig
2	9	19	PPO1	Pressure - Pump Discharge	Psig
2	10	20	PA1	Pressure - Tank	Psig
3	1	21	DT1	Pressure Drop - Test Section DP1	Psi
3	2	22	DT2	Pressure Drop - Test Section DP2	Psi
3	3	23	DP1	Pressure Drop - Pump	Psi
3	4	24	DLV1	Pressure Drop - Valve	Psi
3	5	25	OLI1	Flow - Loop Inlet (Orifice Meter 2")	GPM
3	6	26	FLI1	Flow - Loop Inlet (Turbine meter) (2")	GPM
3	7	27	FTI1	Flow - T.S. Inlet (Turbine meter) (1")	GPM
3	8	28	FBI1	Flow - Bypass Line (Turbine meter) (2")	GPM
3	9	29	FXI1	Flow - HX Inlet (Turbine meter) (2")	GPM
3	10	30	FXI2	Flow - HX Inlet (Turbine meter) (1")	GPM
4	1	31	FS1	Flow - Bypass to Tank (Turbine meter) (2")	GPM
4	2	32	TRTI1	Temperature (RTD) - T.S. Inlet	Degrees F
4	3	33	TRTI2	Temperature (RTD) - T.S. Inlet	Degrees F
4	4	34	TRTO1	Temperature (RTD) - T.S. Outlet	Degrees F
4	5	35	TRTO2	Temperature (RTD or T/C) - T.S. Outlet	Degrees F
4	6	36	JXI1	Temperature (T/C) - T.S. Inlet	Degrees F
4	7	37	JXO1	Temperature (T/C) - T.S. Outlet	Degrees F
4	8	38	PTO2	Pressure - Heater Outlet (Gauge)	Psig
4	9	39	DT3	Pressure Drop - Test Section DP3 (Manometer)	Psi
4	10	40	TEW95W	Wall Temperature - Position 1	Degrees F

SRL FLOW INSTABILITY TESTS
TESTS 9; RUN NUMBERS 1663-1907
EACH RUN HAS 100 WORDS IN 10 RECORDS
CARD IMAGE FORMAT (10F8.3)

RECO NO.	WORD NO.	SERIAL NO.	INSTRUMENT	PARAMETER	UNITS
5	1	41	TEW95E	Wall Temperature - Position 2	Degrees F
5	2	42	TEW72N	Wall Temperature - Position 3	Degrees F
5	3	43	TEW72S	Wall Temperature - Position 4	Degrees F
5	4	44	TEW48W	Wall Temperature - Position 5	Degrees F
5	5	45	TEW48E	Wall Temperature - Position 6	Degrees F
5	6	46	TEW24N	Wall Temperature - Position 7	Degrees F
5	7	47	TEW24S	Wall Temperature - Position 8	Degrees F
5	8	48	TEW14W	Wall Temperature - Position 9	Degrees F
5	9	49	TEW14E	Wall Temperature - Position 10	Degrees F
5	10	50	TEW10N	Wall Temperature - Position 11	Degrees F
6	1	51	TEW10S	Wall Temperature - Position 12	Degrees F
6	2	52	TEW07W	Wall Temperature - Position 13	Degrees F
6	3	53	TEW07E	Wall Temperature - Position 14	Degrees F
6	4	54	TEW04N	Wall Temperature - Position 15	Degrees F
6	5	55	TEW04S	Wall Temperature - Position 16	Degrees F
6	6	56	TEW01W	Wall Temperature - Position 17	Degrees F
6	7	57	TEW01E	Wall Temperature - Position 18	Degrees F
6	8	58		BLANK	
6	9	59	TKW11N	Wall Temperature - Position 19	Degrees F
6	10	60	TKW05E	Wall Temperature - Position 20	Degrees F
7	1	61	TKW01S	Wall Temperature - Position 21	Degrees F
7	2	62		BLANK	
7	3	63	TEREF	E Reference Junction Temperature	Degrees F
7	4	64	TJREF	J Reference Junction Temperature	Degrees F
7	5	65		BLANK	
7	6	66		BLANK	
7	7	67		BLANK	
7	8	68		BLANK	
7	9	69	PWR2	Power - Heater (Backup)	KW
7	10	70	RTS	Test Section Resistance	Ohms
8	1	71	QUALITY	Quality - Heater Outlet	(%)
8	2	72	HRATIO	Heat Output / Heat Input Ratio	(%)
8	3	73	HLOSS	Heat Losses	(%)
8	4	74	SVOLT	Standard Deviation of TS Voltage	(%)
8	5	75	SCURR	Standard Deviation of TS Current	(%)
8	6	76	SPTO1	Standard Deviation of TS Exit Pressure	(%)
8	7	77	SDPT1	Standard Deviation of TS Pressure Drop DT1	(%)
8	8	78	SDPT2	Standard Deviation of TS Pressure Drop DT2	(%)
8	9	79	SFTI1	Standard Deviation of TS Flow Rate	(%)
8	10	80	SRTI1	Standard Deviation of TS Inlet Temperature	(%)

SRL FLOW INSTABILITY TESTS
TESTS 9; RUN NUMBERS 1863-1907
EACH RUN HAS 100 WORDS IN 10 RECORDS
CARD IMAGE FORMAT (10F8.3)

RECO NO.	WORD NO.	SERIAL NO.	INSTRUMENT	PARAMETER	UNITS
9	1	81		BLANK	
9	2	82		BLANK	
9	3	83		BLANK	
9	4	84	DPL	Distance Between Pressure Taps	Inches
9	5	85	VTL	Distance Between Voltage Taps	Inches
9	6	86	HL	Heated Length - Heater	Inches
9	7	87	ID	Inside Diameter (ID) - Heater	Inches
9	8	88	DATE	Test Date	YYMM.D
9	9	89	TIME	Test Time	HHMM.S
9	10	90	TEST#	Test Number	
10	1	91	RUN#	Run Number	
10	2	92	PTO2	Pressure - Heater Outlet (Gauge)	Psig
10	3	93	DT3	Pressure Drop - Test Section DP3 (Manometer)	IN HG
10	4	94		BLANK	
10	5	95		BLANK	
10	6	96		BLANK	
10	7	97		BLANK	
10	8	98		BLANK	
10	9	99		BLANK	
10	10	100		BLANK	

SRL FLOW INSTABILITY TESTS

TEST 12; RUN NUMBERS 2277-2320

EACH RUN HAS 100 WORDS IN 10 RECORDS

CARD IMAGE FORMAT (10F&3)

RECO NO.	WORD NO.	SERIA NO.	INSTRU- MENT	PARAMETER	UNITS
1	1	1	PWR1	Power - Heater	KW
1	2	2	HFLX	Heat Flux - Heater	M.Btu/Hr
1	3	3	VOLTB	Voltage - Bus to Bus	Volts
1	4	4	VOLTT	Voltage - Heater	Volts
1	5	5	CURRT1	Current - Heater	Amps
1	6	6	CURRT2	Current - Heater Backup	Amps
1	7	7	PTI1	Pressure - T.S. Inlet	Psig
1	8	8	PTI2	Pressure - T.S. Inlet	Psig
1	9	9	PTO1	Pressure - Heater Outlet	Psig
1	10	10	PTO3	Pressure - Heater Outlet	Psig
2	1	11	PBI1	Pressure - By Pass Inlet	Psig
2	2	12	PBO1	Pressure - By Pass Outlet	Psig
2	3	13	PL1	Pressure - Loop 1	Psig
2	4	14	PL2	Pressure - Loop 2	Psig
2	5	15	PD1	Pressure - Heat Exchanger Divert	Psig
2	6	16	PXI1	Pressure - Heat Exchanger Inlet	Psig
2	7	17	PXO1	Pressure - Heat Exchanger Outlet	Psig
2	8	18	PPI1	Pressure - Pump Inlet	Psig
2	9	19	PPO1	Pressure - Pump Discharge	Psig
2	10	20	PA1	Pressure - Tank	Psig
3	1	21	DT1	Pressure Drop - Test Section DP1	Psi
3	2	22	DT2	Pressure Drop - Test Section DP2	Psi
3	3	23	DP1	Pressure Drop - Pump	Psi
3	4	24	DLV1	Pressure Drop - Valve	Psi
3	5	25	OLI1	Flow - Loop Inlet (Orifice Meter 2")	GPM
3	6	26	FLI1	Flow - Loop Inlet (Turbine meter) (2")	GPM
3	7	27	FTI1	Flow - T.S. Inlet (Turbine meter) (1")	GPM
3	8	28	FBI1	Flow - Bypass Line (Turbine meter) (2")	GPM
3	9	29	FXI1	Flow - HX Inlet (Turbine meter) (2")	GPM
3	10	30	FXI2	Flow - HX Inlet (Turbine meter) (1")	GPM
4	1	31	FS1	Flow - Bypass to Tank (Turbine meter) (2")	GPM
4	2	32	TRTI1	Temperature (RTD) - T.S. Inlet	Degrees F
4	3	33	TRTI2	Temperature (RTD) - T.S. Inlet	Degrees F
4	4	34	TRTO1	Temperature (RTD) - T.S. Outlet	Degrees F
4	5	35	TRTO2	Temperature (RTD or T/C) - T.S. Outlet	Degrees F
4	6	36	JXI1	Temperature (T/C) - T.S. Inlet	Degrees F
4	7	37	JXO1	Temperature (T/C) - T.S. Outlet	Degrees F
4	8	38	PTO2	Pressure - Heater Outlet (Gauge)	Psig
4	9	39	DT3	Pressure Drop - Test Section DP3 (Manometer)	Psi
4	10	40	TEW95W	Wall Temperature - Position 1	Degrees F

SRL FLOW INSTABILITY TESTS
TEST 12; RUN NUMBERS 2277-2320
EACH RUN HAS 100 WORDS IN 10 RECORDS
CARD IMAGE FORMAT (10F8.3)

RECO NO.	WORD NO.	SERIAL NO.	INSTRUMENT	PARAMETER	UNITS
5	1	41	TEW95E	Wall Temperature - Position 2	Degrees F
5	2	42	TEW72N	Wall Temperature - Position 3	Degrees F
5	3	43	TEW72S	Wall Temperature - Position 4	Degrees F
5	4	44	TEW48W	Wall Temperature - Position 5	Degrees F
5	5	45	TEW48E	Wall Temperature - Position 6	Degrees F
5	6	46	TEW24N	Wall Temperature - Position 7	Degrees F
5	7	47	TEW24S	Wall Temperature - Position 8	Degrees F
5	8	48	TEW13W	Wall Temperature - Position 9	Degrees F
5	9	49	TEW13E	Wall Temperature - Position 10	Degrees F
5	10	50	TEW10N	Wall Temperature - Position 11	Degrees F
6	1	51	TEW10S	Wall Temperature - Position 12	Degrees F
6	2	52	TEW07W	Wall Temperature - Position 13	Degrees F
6	3	53	TEW07E	Wall Temperature - Position 14	Degrees F
6	4	54	TEW04N	Wall Temperature - Position 15	Degrees F
6	5	55	TEW04S	Wall Temperature - Position 16	Degrees F
6	6	56	TEW01W	Wall Temperature - Position 17	Degrees F
6	7	57	TEW01E	Wall Temperature - Position 18	Degrees F
6	8	58		BLANK	
6	9	59	TKW07W	Wall Temperature - Position 19	Degrees F
6	10	60	TKW04E	Wall Temperature - Position 20	Degrees F
7	1	61	TKW01S	Wall Temperature - Position 21	Degrees F
7	2	62		BLANK	
7	3	63	TEREF	E Reference Junction Temperature	Degrees F
7	4	64	TJREF	J Reference Junction Temperature	Degrees F
7	5	65		BLANK	
7	6	66		BLANK	
7	7	67		BLANK	
7	8	68		BLANK	
7	9	69	PWR2	Power - Heater (Backup)	KW
7	10	70	RTS	Test Section Resistance	Ohms
8	1	71	QUALITY	Quality - Heater Outlet	(%)
8	2	72	HRATIO	Heat Output / Heat Input Ratio	(%)
8	3	73	HLOSS	Heat Losses	(%)
8	4	74	SVOLT	Standard Deviation of TS Voltage	(%)
8	5	75	SCURR	Standard Deviation of TS Current	(%)
8	6	76	SPT01	Standard Deviation of TS Exit Pressure	(%)
8	7	77	SDPT1	Standard Deviation of TS Pressure Drop DT1	(%)
8	8	78	SDPT2	Standard Deviation of TS Pressure Drop DT2	(%)
8	9	79	SFT11	Standard Deviation of TS Flow Rate	(%)
8	10	80	SRT11	Standard Deviation of TS Inlet Temperature	(%)

SRL FLOW INSTABILITY TESTS
TEST 12; RUN NUMBERS 2277-2320
EACH RUN HAS 100 WORDS IN 10 RECORDS
CARD IMAGE FORMAT (10F8.3)

RECO NO.	WORD NO.	SERIA NO.	INSTRU- MENT	PARAMETER	UNITS
9	1	81		BLANK	
9	2	82		BLANK	
9	3	83		BLANK	
9	4	84	DPL	Distance Between Pressure Taps	Inches
9	5	85	VTL	Distance Between Voltage Taps	Inches
9	6	86	HL	Heated Length - Heater	Inches
9	7	87	ID	Diameter (ID) - Heater	Inches
9	8	88	DATE	Test Date	YYMM.D
9	9	89	TIME	Test Time	HHMM.S
9	10	90	TEST#	Test Number	
10	1	91	RUN#	Run Number	
10	2	92	PTO2	Pressure - Heater Outlet (Gauge)	Psig
10	3	93	DT3	Pressure Drop - Test Section DP3 (Manometer)	IN HG
10	4	94		BLANK	
10	5	95		BLANK	
10	6	96		BLANK	
10	7	97		BLANK	
10	8	98		BLANK	
10	9	99		BLANK	
10	10	100		BLANK	

PART II

DATA

SRL Single Tube Flow Instability Test # 7.0
Stainless Steel ID = 0.600"

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
RUN	HFLX	VOLTT	CURRT2	PTI2	PTO3	PBO1	PL2	PXI1	PP11										
	PWR1	VOLTB	CURRT1	PTI1	PTO1	PBI1	PL1	PD1	PXO1	PPO1									
1454	146.0	0.399	55.4	55.1	2649	2627	63.8	75.3	49.9	34.8	75.3	51.7	93.9	51.5	33.3	48.7	33.0	20.9	76.6
1455	146.8	0.401	55.8	55.5	2644	2626	55.8	61.9	49.9	34.3	61.7	51.2	102.5	50.6	40.6	48.4	40.3	28.5	84.5
1456	146.9	0.401	56.0	55.7	2638	2619	52.9	57.1	49.6	33.9	57.2	50.4	104.8	50.5	42.6	48.1	42.4	30.7	87.2
1457	148.0	0.404	56.3	56.0	2641	2620	51.0	53.7	49.5	33.7	53.7	50.2	106.9	50.3	44.4	48.1	44.2	32.5	89.3
1458	146.8	0.401	55.8	55.5	2643	2624	54.7	60.0	49.8	34.2	55.5	50.2	95.2	45.1	31.9	38.8	32.4	20.6	84.3
1459	145.8	0.398	55.8	55.5	2626	2603	50.2	55.7	50.2	34.2	52.2	50.3	112.7	47.5	37.8	42.1	38.0	29.6	97.2
1460	147.7	0.403	56.5	56.3	2626	2604	50.7	51.5	50.2	34.5	49.6	50.2	126.7	48.9	43.3	45.2	43.2	37.9	106.5
1461	147.2	0.402	56.7	56.4	2612	2590	49.4	49.9	50.1	34.0	49.0	50.4	133.8	49.1	44.9	46.0	44.8	40.4	112.1
1462	147.2	0.402	56.9	56.5	2605	2586	47.7	49.0	49.9	33.7	48.2	50.1	135.7	49.3	45.3	46.2	45.2	41.3	113.9
1463	0.0	0.000	0.0	0.0	1	-1	41.9	42.1	44.0	29.5	41.5	44.1	132.9	43.8	40.3	40.8	40.2	37.0	109.5
1464	146.2	0.399	55.8	55.4	2638	2619	55.3	60.4	50.0	46.3	55.7	50.1	86.8	45.4	31.8	38.6	23.5	20.6	84.2
1465	145.1	0.396	55.9	55.5	2614	2593	51.9	53.8	50.0	46.5	44.1	50.0	109.6	47.7	39.7	42.9	30.7	32.5	101.1
1466	147.6	0.403	56.6	56.1	2629	2608	50.3	51.9	50.0	46.5	50.0	49.7	116.5	48.0	41.9	44.0	32.7	36.0	106.2
1467	146.9	0.401	56.7	56.3	2611	2592	48.4	49.9	50.0	46.3	19.4	49.8	123.1	49.0	44.2	45.4	35.1	39.5	111.1
1468	147.7	0.403	56.8	56.4	2619	2600	49.8	50.2	50.2	45.8	19.2	49.9	122.6	49.0	44.1	45.4	34.9	39.2	109.6
1469	145.4	0.397	55.7	55.3	2631	2610	55.5	60.8	50.4	45.8	56.2	50.4	96.0	45.7	32.5	39.3	32.9	21.2	85.0
1470	147.1	0.402	56.4	55.9	2629	2606	51.2	53.3	49.6	45.7	50.6	49.5	121.0	47.4	40.4	43.3	40.3	33.7	103.0
1471	146.4	0.400	56.6	56.2	2607	2587	48.9	48.8	49.5	45.5	48.5	49.4	125.0	49.0	37.1	42.3	36.5	32.6	103.9
1472	146.0	0.399	56.6	56.2	2598	2577	48.0	49.1	49.4	45.4	48.3	49.5	127.4	48.8	38.3	42.8	37.8	34.1	106.0
1473	145.9	0.398	56.0	55.7	2621	2602	50.7	53.9	50.4	46.4	51.9	50.1	104.9	47.6	26.1	37.3	25.5	19.9	87.8
1474	146.5	0.400	56.7	56.3	2604	2583	48.4	49.5	50.3	46.2	48.4	50.1	128.0	49.2	38.8	43.2	38.3	35.1	106.1
1475	145.8	0.398	56.7	56.3	2592	2570	48.3	48.7	50.2	46.1	48.3	49.9	130.9	49.3	40.3	44.1	39.8	36.9	108.7
1476	146.3	0.399	56.8	56.4	2596	2574	48.4	49.0	50.3	43.1	48.5	49.9	131.4	48.6	41.3	44.5	40.8	37.4	109.1
1477	146.0	0.399	56.8	56.4	2589	2566	48.1	49.1	50.8	44.0	48.5	50.4	133.9	48.8	42.7	45.4	42.3	39.0	111.1
1478	146.4	0.400	56.5	56.3	2602	2582	48.4	49.4	49.7	42.5	48.3	49.4	126.2	48.3	39.4	43.5	38.9	35.2	106.2
1479	145.8	0.398	56.4	56.1	2601	2582	49.0	50.4	50.5	46.8	49.1	50.2	124.7	49.3	37.2	42.8	36.7	32.8	103.6
1480	145.0	0.396	56.6	56.1	2584	2565	48.1	48.2	50.1	46.1	47.9	49.9	131.2	49.6	40.7	44.4	40.3	37.0	108.7
1481	146.1	0.399	56.1	55.8	2621	2602	50.9	53.8	50.0	44.6	51.5	50.0	109.6	48.6	31.1	39.4	30.9	24.3	92.8
1482	145.6	0.397	56.6	56.2	2592	2568	48.3	49.6	50.3	44.3	48.7	50.1	131.3	50.8	42.0	44.7	41.7	38.1	109.9
1483	145.9	0.398	56.9	56.4	2588	2567	47.6	48.4	50.3	44.1	47.7	50.0	133.7	51.4	43.1	45.2	42.8	39.5	111.5
1484	144.4	0.394	56.6	56.2	2572	2550	47.8	48.7	50.4	44.2	47.9	50.2	134.5	50.6	43.8	45.6	43.5	40.4	112.2
1485	146.5	0.400	57.0	56.6	2586	2566	48.1	48.6	50.1	43.9	47.9	49.9	134.4	51.7	43.5	45.5	43.2	40.2	112.1
1486	145.4	0.397	56.8	56.4	2579	2561	47.8	48.3	50.3	43.8	47.9	50.2	134.9	54.9	44.0	45.6	43.7	40.6	112.0
1487	145.4	0.397	56.9	56.4	2581	2558	47.6	48.6	50.3	43.6	48.1	49.9	134.9	50.1	43.9	45.7	43.7	40.6	112.2
1488	292.4	0.798	81.0	80.5	3634	3608	53.8	58.3	50.3	43.5	54.9	50.3	87.8	48.0	18.8	32.5	18.4	9.5	75.2
1489	0.0	0.000	0.1	0.1	1	2	52.1	57.2	50.4	30.4	53.3	48.7	85.6	47.3	26.7	35.0	26.7	14.4	75.2

SRL Single Tube Flow Instability Test # 7.0
Stainless Steel ID = 0.600"

RUN	20 PA1	21 DT1	22 DT2	23 DP1	24 DLV1	25 OL1	26 FLI1	27 FTI1	28 FBI1	29 FXI1	30 FXI2	31 FS1	32 TRT11	33 TRT12	34 TRTO1	35 TRTO2	36 JXI1	37 JXO1
1454	32.4	17.43	17.44	55.4	16.2	60.46	29.43	29.93	0.00	29.12	29.69	297.5	121.2	120.6	155.0	155.5	155.2	118.3
1455	39.7	9.50	9.54	55.8	38.5	55.64	21.33	21.72	0.00	20.96	21.65	299.4	120.5	120.3	167.5	167.6	166.6	93.4
1456	41.7	6.90	6.96	56.3	45.7	0.78	18.40	18.40	0.00	17.72	18.39	301.9	121.0	120.9	177.0	177.1	177.4	91.0
1457	43.4	4.91	4.96	56.5	51.4	0.78	15.74	15.35	0.00	14.36	15.36	302.4	120.5	120.0	187.4	187.5	186.9	85.0
1458	27.9	8.42	8.59	63.7	12.6	237.01	253.48	20.68	229.74	103.62	0.00	-0.1	121.5	121.3	171.5	171.8	124.5	112.0
1459	34.8	5.70	5.77	67.5	41.4	194.49	206.07	16.78	187.36	84.26	0.00	-0.1	121.5	121.3	182.5	183.0	125.7	112.2
1460	41.2	3.12	3.11	70.5	67.7	138.75	148.40	12.04	136.35	60.55	0.00	0.0	121.0	120.8	207.5	208.0	127.5	108.8
1461	43.2	2.31	2.31	71.6	76.4	120.44	124.51	9.92	114.89	51.07	0.00	0.0	120.5	120.2	225.0	225.3	124.0	107.0
1462	43.8	2.00	1.99	71.8	80.4	108.23	113.37	8.97	104.17	46.47	0.00	-0.1	121.0	120.9	237.5	238.0	129.4	104.4
1463	39.1	1.45	1.45	72.4	85.9	97.18	95.27	7.17	87.79	36.82	0.00	-0.1	110.5	110.2	113.6	113.9	111.2	87.5
1464	28.0	8.29	8.52	64.0	12.6	240.28	252.57	20.88	229.15	104.93	0.00	-0.1	120.5	120.5	170.0	170.1	124.8	113.9
1465	37.2	4.58	4.81	68.8	50.9	181.83	187.03	15.41	169.59	76.64	0.00	0.0	121.0	121.1	188.0	188.0	126.3	112.1
1466	39.8	3.42	3.53	70.1	62.6	158.43	159.34	13.03	147.04	65.63	0.00	0.0	120.9	120.6	199.5	199.9	126.9	110.2
1467	42.5	2.39	2.53	71.6	74.0	132.00	131.03	10.76	119.55	53.84	0.00	0.0	121.5	121.4	217.7	218.0	129.0	107.0
1468	42.3	2.61	2.59	71.3	73.2	129.60	134.16	10.94	123.36	55.03	0.00	0.0	120.4	120.2	215.5	215.7	127.8	107.4
1469	28.5	8.68	8.29	63.7	12.5	241.39	253.70	21.28	228.91	103.88	0.00	0.0	121.0	121.5	170.7	171.0	124.5	116.6
1470	38.0	4.33	4.04	69.1	56.4	168.90	175.41	14.38	160.03	72.22	0.00	0.0	121.4	121.5	194.0	194.0	127.0	110.8
1471	35.5	2.50	2.36	71.4	67.7	128.53	131.25	10.66	120.98	98.81	0.00	0.0	121.1	121.5	216.0	216.5	128.4	116.9
1472	36.9	2.19	2.00	71.6	71.3	120.05	122.84	9.89	112.55	92.56	0.01	0.0	121.1	121.3	224.0	224.2	129.5	117.0
1473	23.9	4.97	4.79	67.9	37.2	178.98	189.49	15.38	172.50	140.16	0.00	0.0	121.0	120.9	187.5	188.0	126.0	118.3
1474	37.4	2.23	2.15	71.1	71.2	115.93	123.22	9.95	112.99	94.13	0.00	0.0	122.0	121.9	225.0	225.5	130.1	119.7
1475	39.1	1.88	1.72	71.5	75.7	104.94	111.81	8.84	103.00	86.01	0.00	0.0	120.0	120.0	233.5	234.0	128.6	115.1
1476	40.0	1.89	1.88	72.0	76.6	75.12	111.23	8.90	102.60	81.52	0.00	0.0	121.0	122.3	238.5	239.0	131.3	118.2
1477	41.6	1.66	1.62	72.1	79.5	65.41	103.22	8.20	94.85	75.86	0.00	0.0	120.5	121.8	248.0	248.4	132.1	118.0
1478	38.1	2.16	2.04	71.8	72.6	105.07	122.22	9.87	113.24	89.08	0.00	0.0	120.5	121.9	224.0	224.2	129.8	117.3
1479	35.3	2.49	2.37	71.2	67.1	128.12	130.19	10.71	119.60	101.80	0.01	0.0	121.1	122.1	218.6	218.6	129.2	120.0
1480	38.5	1.75	1.68	71.6	76.9	105.56	106.60	8.49	98.54	83.84	0.00	0.0	120.5	121.5	241.0	241.1	130.2	118.8
1481	-0.2	4.68	4.50	68.4	43.5	177.91	183.51	15.11	166.66	121.99	0.00	0.0	121.5	122.1	190.5	190.5	127.4	117.5
1482	0.3	1.88	1.86	71.6	76.3	110.66	111.75	9.02	102.37	77.51	0.00	0.0	120.5	121.3	234.0	234.5	129.8	118.4
1483	0.2	1.61	1.61	71.9	80.0	100.41	101.71	7.92	93.77	70.86	0.00	0.0	120.0	120.9	249.5	249.7	130.7	115.0
1484	0.2	1.54	1.56	71.8	81.1	96.78	97.32	7.62	89.77	68.04	0.00	0.0	120.5	121.1	255.2	255.5	131.1	117.0
1485	0.6	1.51	1.43	71.8	81.7	95.94	97.27	7.52	89.92	67.96	0.00	0.0	121.6	122.4	259.5	259.9	132.7	116.4
1486	0.4	1.47	1.40	71.8	82.4	93.44	94.64	7.03	87.87	66.05	0.00	0.0	120.0	120.8	265.0	265.5	131.3	115.0
1487	0.7	1.44	1.36	71.6	82.8	94.23	94.60	7.14	88.06	66.20	0.00	0.0	120.5	121.1	265.1	265.2	131.1	116.2
1488	0.4	7.23	6.93	66.0	10.6	222.13	230.72	19.45	209.79	162.21	16.87	0.0	77.3	78.3	183.5	183.9	87.5	74.2
1489	0.4	0.01	-0.01	-0.1	0.3	0.78	238.73	17.52	110.95	132.80	10.77	42.6	77.0	76.6	76.5	0.0	76.3	76.4

SRL Single Tube Flow Instability Test # 7.0
Stainless Steel ID = 0.600"

	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
RUN	PTO2	TEW95W		TEW72N		TEW48W		TEW24N		TEW13W		TEW10N		TEW07W		TEW04N		TEW01W	
		DT3	TEW95E		TEW72S		TEW48E		TEW24S		TEW13E		TEW10S		TEW07E		TEW04S		
1454	49.9	17.57	293.3	300.3	314.7	296.2	317.5	313.9	318.0	325.0	328.8	309.1	317.2	324.7	331.1	322.0	319.3	330.2	336.6
1455	50.0	9.49	305.4	312.3	332.9	312.9	336.2	332.5	336.2	346.1	351.3	332.8	340.8	347.2	355.2	344.5	344.2	352.9	360.2
1456	49.6	6.95	314.9	323.4	342.9	323.9	350.3	346.5	354.6	361.4	369.8	351.0	359.2	364.5	371.9	360.7	363.6	369.4	379.0
1457	50.2	4.90	323.7	331.1	353.2	336.5	363.6	359.7	369.5	378.2	382.8	364.1	374.7	380.1	389.4	377.9	379.4	386.2	396.1
1458	50.0	8.49	309.9	317.7	336.7	318.4	342.2	336.3	345.0	352.4	358.9	341.6	348.7	354.5	361.1	351.1	352.7	360.2	367.9
1459	50.0	5.58	318.2	326.7	349.3	330.3	356.4	351.7	361.1	368.3	376.5	357.7	366.4	371.8	380.2	368.0	370.9	378.7	386.8
1460	50.0	3.13	340.5	349.0	379.8	356.0	390.3	385.6	398.0	403.5	412.3	390.4	404.6	409.9	420.2	406.1	411.4	417.2	429.0
1461	50.0	2.23	353.1	363.7	399.0	374.2	403.8	405.4	416.8	420.1	430.2	407.6	424.2	429.4	439.9	430.4	431.3	436.7	447.2
1462	50.0	1.95	363.3	371.0	407.3	387.8	414.5	407.7	428.9	432.2	441.7	425.3	434.8	439.9	448.3	439.3	443.3	444.8	453.6
1463	44.0	1.41	119.3	123.6	137.9	170.2	145.0	150.5	152.9	130.3	125.0	158.9	131.9	128.6	118.3	118.9	143.5	123.7	124.9
1464	50.0	8.47	306.4	312.4	333.1	312.8	336.4	332.9	336.8	346.9	355.7	335.2	344.1	336.6	358.8	347.1	347.5	355.4	363.9
1465	49.9	4.74	321.8	328.0	354.3	332.5	360.1	356.7	365.0	373.6	384.5	362.2	373.1	366.3	386.5	375.6	377.4	384.4	395.1
1466	50.0	3.56	332.2	339.9	369.5	346.8	377.1	373.0	384.5	392.8	405.0	382.1	394.0	385.6	409.2	395.4	399.1	405.0	417.2
1467	49.9	2.47	345.6	352.6	387.8	362.7	397.9	393.8	407.7	416.9	427.6	405.0	417.2	408.8	434.4	420.3	424.4	430.6	442.0
1468	50.1	2.57	345.1	352.7	387.1	362.1	397.6	392.9	406.9	415.8	427.1	404.2	416.5	407.5	433.2	419.2	422.4	429.3	441.8
1469	50.5	8.49	307.4	313.5	334.1	315.2	337.7	334.7	341.1	348.5	356.9	339.4	346.6	351.1	360.0	347.9	350.4	356.7	365.0
1470	49.7	4.21	328.2	336.1	363.8	341.7	370.9	367.1	376.5	385.2	396.3	376.6	385.6	390.0	400.9	388.6	390.4	395.8	407.6
1471	49.6	2.41	344.5	351.5	385.0	361.1	396.2	391.5	405.6	414.5	427.8	403.1	415.6	421.1	434.4	419.4	420.1	428.3	441.6
1472	49.5	2.17	349.0	358.4	393.8	368.4	406.0	400.7	416.2	425.6	435.2	413.5	424.8	430.3	443.3	428.7	431.5	438.3	449.0
1473	50.3	4.85	322.0	329.0	354.9	335.1	361.5	358.3	367.8	375.9	386.2	365.1	374.0	379.8	391.4	376.4	378.3	386.2	396.8
1474	50.3	2.20	350.7	359.1	394.4	370.9	406.7	402.5	417.8	427.8	436.1	414.3	425.6	432.5	445.0	430.6	431.2	444.9	450.6
1475	50.2	1.88	356.6	365.9	403.1	379.8	417.7	413.8	431.2	440.1	443.5	422.9	431.9	439.1	451.6	439.0	439.4	448.8	453.8
1476	50.3	1.83	361.2	369.6	408.5	382.6	422.0	417.7	433.6	444.9	446.9	425.8	435.2	443.1	452.8	444.3	441.7	452.4	457.4
1477	50.4	0.00	368.2	376.9	419.4	394.2	434.8	430.1	439.6	450.8	451.6	431.1	439.5	447.0	454.9	447.3	444.4	454.5	459.2
1478	49.8	0.00	348.0	356.3	390.5	365.7	401.4	397.6	411.1	422.6	435.7	407.5	420.6	428.9	440.7	427.6	423.3	438.0	447.2
1479	50.0	2.43	345.1	352.4	386.6	362.1	395.9	392.4	405.3	416.4	429.8	402.1	415.8	407.5	434.0	420.8	419.7	431.8	443.8
1480	50.0	1.73	361.8	369.5	409.9	386.3	424.4	420.6	434.1	442.6	446.9	428.8	436.3	428.8	451.4	443.2	442.4	450.5	456.1
1481	50.0	4.61	323.2	329.1	355.7	332.8	361.1	357.9	366.3	376.4	386.9	361.1	372.8	367.9	393.8	378.6	375.4	387.6	398.9
1482	50.0	1.86	356.1	364.8	401.0	378.7	416.2	412.1	428.0	436.8	444.5	422.8	432.6	424.8	452.1	439.3	439.0	448.2	454.8
1483	50.0	1.59	367.1	377.9	418.1	394.4	432.5	428.8	438.8	449.6	452.0	433.1	440.4	432.9	457.9	449.0	445.2	454.9	459.8
1484	50.0	0.00	371.8	380.6	425.3	397.0	436.4	433.6	441.1	450.3	453.0	436.4	442.3	434.9	458.1	448.1	445.7	454.0	458.5
1485	49.9	0.00	375.0	384.2	427.3	404.7	439.5	436.5	443.5	453.3	454.9	438.5	444.2	438.3	459.5	450.5	447.5	455.6	459.6
1486	49.9	0.00	378.5	388.6	430.3	409.2	442.6	439.9	445.8	454.7	455.9	440.7	445.6	438.5	458.6	451.9	447.4	456.3	457.9
1487	49.8	0.00	378.2	388.7	429.1	408.6	441.8	439.0	445.1	453.6	455.3	440.1	445.2	437.8	457.5	450.9	446.8	456.0	457.1
1488	50.2	7.04	456.5	470.8	498.4	465.9	504.7	498.7	512.4	523.1	539.4	503.0	516.6	511.8	547.9	523.7	521.7	538.8	554.7
1489	50.4	0.00	76.1	76.3	76.2	76.6	76.1	77.0	76.7	77.3	76.8	76.3	76.4	71.1	77.0	76.7	76.6	77.2	76.8

SRL Single Tube Flow Instability Test # 7.0
Stainless Steel ID = 0.600"

	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
RUN	BL	TKW04E	BL	TJREF	BL	BL	BL	BL	BL	BL	PWR2	RTS	HRATIO	SVOLT	SPT01						
	TEW01E	TKW07W	TKW01S	TEREF	BL	BL	BL	BL	BL	BL	BL	QUALITY	HLOSS	SCURR	SDPT1						
1454	316.0	0	323.9	258.2	334.0	0	31.9	31.8	62	0	0	0	144.8	0.021	-15.79	99.7	0.3	1.1	0.2	1.4	6.7
1455	338.7	0	356.8	281.3	356.1	0	32.0	31.9	62	0	0	0	145.8	0.021	-14.45	100.3	-0.3	1.0	0.2	0.8	5.1
1456	357.1	0	375.5	296.1	377.3	0	34.1	31.8	62	0	0	0	145.8	0.021	-13.42	101.2	-1.2	1.1	0.2	0.6	4.0
1457	373.2	0	392.6	314.5	393.7	0	32.4	31.7	62	0	0	0	146.9	0.021	-12.22	100.2	-0.2	0.6	0.2	0.7	4.0
1458	346.3	0	361.3	285.4	345.3	0	33.2	31.7	62	0	0	0	145.7	0.021	-14.07	101.6	-1.6	1.0	0.3	1.9	10.1
1459	361.8	0	378.8	305.5	377.8	0	33.1	31.7	62	0	0	0	144.5	0.021	-12.91	101.3	-1.3	0.9	0.2	1.3	6.2
1460	404.4	0	421.1	347.0	417.8	0	33.3	31.5	62	0	0	0	146.5	0.021	-10.25	102.0	-2.0	1.0	0.2	1.2	7.9
1461	425.1	0	442.1	367.7	442.6	0	32.9	31.7	62	0	0	0	146.0	0.022	-8.34	101.8	-1.8	0.9	0.3	1.2	11.0
1462	434.4	0	449.6	375.5	447.6	0	32.6	31.7	62	0	0	0	146.2	0.022	-7.04	102.6	-2.6	1.0	0.2	0.7	13.7
1463	127.6	0	118.2	115.8	113.7	0	32.1	31.9	62	0	0	0	0.0	0.008	0.00	0.0	100.0	0.0	0.0	3.1	79.8
1464	342.2	0	356.4	281.7	358.6	0	32.9	32.0	62	0	0	0	145.1	0.021	-14.27	101.8	-1.8	0.5	0.5	2.0	8.2
1465	371.3	0	389.0	310.9	393.8	0	33.7	31.7	62	0	0	0	143.9	0.021	-12.37	102.4	-2.4	0.3	0.2	1.8	15.2
1466	392.5	0	411.6	331.3	412.5	0	34.2	31.8	62	0	0	0	146.4	0.021	-10.92	100.0	0.0	0.3	0.2	1.7	23.2
1467	417.5	0	436.6	356.7	438.1	0	31.6	32.1	62	0	0	0	145.8	0.022	-9.10	101.6	-1.6	0.3	0.1	1.4	17.9
1468	416.8	0	433.6	354.4	438.2	0	33.1	31.8	62	0	0	0	146.7	0.022	-9.35	101.6	-1.6	0.3	0.3	1.9	32.0
1469	344.6	0	359.4	278.4	362.8	0	33.6	31.7	62	0	0	0	144.3	0.021	-14.39	104.7	-4.7	0.2	0.2	2.8	4.0
1470	384.5	0	397.6	315.0	402.3	0	33.4	31.9	62	0	0	0	145.8	0.021	-11.66	102.1	-2.1	0.4	0.2	2.3	4.9
1471	415.8	0	430.7	351.0	440.0	0	33.3	32.2	62	0	0	0	145.3	0.022	-9.01	99.6	0.4	0.5	0.2	2.9	4.9
1472	426.6	0	441.9	359.2	444.2	0	33.7	32.1	62	0	0	0	144.8	0.022	-8.22	100.6	-0.6	0.5	0.2	3.0	5.4
1473	376.6	0	388.1	310.6	391.4	0	33.6	32.2	62	0	0	0	144.8	0.021	-12.37	101.1	-1.1	0.5	0.2	1.3	4.2
1474	427.4	0	443.0	365.7	446.4	0	38.6	32.0	62	0	0	0	145.4	0.022	-8.25	100.6	-0.6	0.6	0.2	1.7	3.7
1475	434.2	0	448.7	374.4	454.4	0	34.2	32.2	62	0	0	0	144.6	0.022	-7.11	99.4	0.6	0.9	0.2	1.2	4.2
1476	438.0	0	451.2	380.0	457.3	0	34.5	32.4	62	0	0	0	145.1	0.022	-7.05	103.2	-3.2	1.1	0.2	0.9	8.1
1477	441.8	0	453.2	378.9	459.8	0	34.0	32.6	62	0	0	0	144.7	0.022	-6.14	103.6	-3.6	1.1	0.2	1.3	21.2
1478	421.9	0	440.5	360.8	446.2	0	32.7	32.3	62	0	0	0	145.3	0.022	-8.30	101.0	-1.0	1.3	0.3	2.4	7.2
1479	417.1	0	434.6	381.9	436.6	0	33.0	31.7	62	0	0	0	144.7	0.022	-9.23	103.4	-3.4	0.8	0.3	1.6	5.9
1480	437.4	0	449.4	355.4	453.7	0	33.0	31.6	62	0	0	0	143.9	0.022	-6.58	101.8	-1.8	1.4	0.4	1.5	7.2
1481	373.3	0	391.8	278.3	393.9	0	32.6	31.5	62	0	0	0	145.1	0.021	-12.13	102.8	-2.8	1.5	0.4	1.2	2.9
1482	435.2	0	445.8	284.6	453.3	0	33.0	32.0	62	0	0	0	144.2	0.022	-7.34	101.5	-1.5	1.5	0.3	1.0	8.4
1483	441.4	0	453.7	292.7	457.9	0	32.7	32.7	62	0	0	0	144.7	0.022	-5.64	101.5	-1.5	1.7	0.4	1.9	12.3
1484	443.6	0	453.6	352.9	480.7	0	33.2	31.9	62	0	0	0	143.2	0.022	-5.20	102.7	-2.7	1.3	0.4	1.3	15.3
1485	446.6	0	457.2	360.1	463.6	0	29.1	31.8	62	0	0	0	145.3	0.022	-4.65	102.4	-2.4	1.1	0.4	1.1	19.5
1486	446.6	0	454.6	382.5	462.3	0	33.2	31.7	62	0	0	0	144.4	0.022	-3.93	101.5	-1.5	1.3	0.4	1.2	18.4
1487	441.8	0	457.8	401.6	465.1	0	33.0	31.6	62	0	0	0	144.2	0.022	-4.08	102.5	-2.5	1.5	0.6	1.1	24.7
1488	516.9	0	537.3	427.6	549.6	0	33.0	32.8	62	0	0	0	290.2	0.022	-13.03	102.6	-2.6	1.0	0.2	1.5	2.4
1489	73.6	0	76.2	77.4	77.4	0	33.6	32.2	62	0	0	0	0.0	0.076	0.00	0.0	100.0	0.0	0.0	1.5	0.0

SRL Single Tube Flow Instability Test # 7.0
Stainless Steel ID = 0.600"

	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
RUN	SDPT2	SRT11			BL	DPL	HL		DATE		TEST#		PTO2	BL		BL	BL	BL	BL	BL	BL	BL	BL
		SFT11		BL	BL		VTL		ID		TIME		RUN#		DT3	BL	BL	BL	BL	BL	BL	BL	BL
1454	0.9	0.3	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.03	1755.31	7	1454	49.9	36.7	0	0	0	0	0	0	0
1455	2.2	0.2	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.03	1809.34	7	1455	50.0	20.9	0	0	0	0	0	0	0
1456	2.5	0.2	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.03	1819.25	7	1456	49.6	15.3	0	0	0	0	0	0	0
1457	2.8	0.2	0.1	0	0	0	100.5	95.5	96.0	0.600	8908.03	1826.42	7	1457	50.2	10.8	0	0	0	0	0	0	0
1458	2.8	0.5	0.1	0	0	0	100.5	95.5	96.0	0.600	8908.03	1859.19	7	1458	50.0	16.7	0	0	0	0	0	0	0
1459	4.7	0.6	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.03	1907.43	7	1459	50.0	12.3	0	0	0	0	0	0	0
1460	7.0	1.3	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.03	1916.25	7	1460	50.0	6.9	0	0	0	0	0	0	0
1461	6.6	0.7	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.03	1920.17	7	1461	50.0	4.9	0	0	0	0	0	0	0
1462	6.9	2.1	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.03	1926.13	7	1462	50.0	4.3	0	0	0	0	0	0	0
1463	16.9	0.8	0.1	0	0	0	100.5	95.5	96.0	0.600	8908.03	1933.26	7	1463	44.0	3.1	0	0	0	0	0	0	0
1464	2.6	0.4	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.04	1547.27	7	1464	50.0	16.7	0	0	0	0	0	0	0
1465	3.5	0.5	0.1	0	0	0	100.5	95.5	96.0	0.600	8908.04	1554.45	7	1465	49.9	10.5	0	0	0	0	0	0	0
1466	5.5	0.9	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.04	1559.16	7	1466	50.0	7.9	0	0	0	0	0	0	0
1467	7.0	0.6	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.04	1603.47	7	1467	49.9	5.5	0	0	0	0	0	0	0
1468	8.4	0.8	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.04	1631.35	7	1468	50.1	5.7	0	0	0	0	0	0	0
1469	16.2	1.5	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.09	1559.10	7	1469	50.5	18.7	0	0	0	0	0	0	0
1470	26.7	0.6	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.09	1617.57	7	1470	49.7	9.3	0	0	0	0	0	0	0
1471	37.6	0.5	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.09	1639.23	7	1471	49.6	5.3	0	0	0	0	0	0	0
1472	62.9	1.4	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.09	1643.06	7	1472	49.5	4.8	0	0	0	0	0	0	0
1473	22.4	0.8	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.10	1059.54	7	1473	50.3	10.7	0	0	0	0	0	0	0
1474	54.7	0.5	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.10	1109.02	7	1474	50.3	4.9	0	0	0	0	0	0	0
1475	54.2	0.6	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.10	1113.58	7	1475	50.2	4.2	0	0	0	0	0	0	0
1476	47.9	1.3	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.11	1452.54	7	1476	50.3	4.0	0	0	0	0	0	0	0
1477	52.6	0.8	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.11	1535.11	7	1477	50.4	0.0	0	0	0	0	0	0	0
1478	54.9	0.3	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.11	1554.07	7	1478	49.8	0.0	0	0	0	0	0	0	0
1479	60.0	1.0	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.15	1630.10	7	1479	50.0	5.4	0	0	0	0	0	0	0
1480	46.0	0.7	0.1	0	0	0	100.5	95.5	96.0	0.600	8908.15	1649.41	7	1480	50.0	3.8	0	0	0	0	0	0	0
1481	20.9	1.0	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.16	1413.01	7	1481	50.0	10.2	0	0	0	0	0	0	0
1482	52.7	0.6	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.16	1421.55	7	1482	50.0	4.1	0	0	0	0	0	0	0
1483	76.2	1.8	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.16	1428.33	7	1483	50.0	3.5	0	0	0	0	0	0	0
1484	66.7	1.7	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.16	1440.58	7	1484	50.0	0.0	0	0	0	0	0	0	0
1485	63.9	1.8	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.16	1444.48	7	1485	49.9	0.0	0	0	0	0	0	0	0
1486	57.9	0.8	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.16	1450.51	7	1486	49.9	0.0	0	0	0	0	0	0	0
1487	89.5	1.2	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.16	1456.12	7	1487	49.8	0.0	0	0	0	0	0	0	0
1488	15.8	0.5	0.3	0	0	0	100.5	95.5	96.0	0.600	8908.16	1627.01	7	1488	50.2	15.5	0	0	0	0	0	0	0
1489	0.0	1.0	0.1	0	0	0	100.5	95.5	96.0	0.600	8908.23	1646.39	7	1489	50.4	0.0	0	0	0	0	0	0	0

SRL Single Tube Flow Instability Test # 7.0
Stainless Steel ID = 0.600"

	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
RUN	PA1		DT2		DLV1		FLJ1		FBI1		FXI2		TRT11		TRTO1		JXI1	
		DT1		DP1		OLJ1		FTI1		FXI1		FS1		TRT12		TRTO2		JXO1
1591	28.2	7.74	7.40	62.2	12.7	229.85	249.65	19.95	230.66	107.07	10.34	0.0	77.0	77.1	178.5	181.7	84.9	63.9
1592	32.0	6.43	6.13	64.6	27.3	211.19	227.75	18.02	210.43	26.84	9.29	0.0	77.5	76.8	188.5	191.2	85.4	76.8
1593	34.6	5.43	5.20	66.2	38.9	192.37	208.07	16.64	191.67	67.21	8.38	0.3	78.0	77.9	201.2	205.0	87.9	63.7
1594	36.2	4.79	4.51	67.3	47.2	179.93	192.97	15.32	178.13	81.04	7.80	0.0	78.0	77.6	211.0	215.2	87.9	61.9
1595	8.6	4.85	4.61	66.2	18.7	182.07	194.24	15.51	179.09	193.14	18.90	0.0	78.0	76.7	207.9	212.3	87.5	83.4
1596	17.1	3.88	3.66	68.4	35.8	161.88	171.98	13.37	158.95	171.22	16.75	0.0	77.7	77.4	226.0	231.7	88.8	78.6
1597	18.4	3.75	3.61	68.7	39.2	156.68	166.91	13.05	154.40	166.41	16.24	0.0	76.5	76.1	231.5	237.4	87.8	74.0
1598	12.2	15.25	14.72	67.3	6.9	173.58	186.43	28.49	158.64	185.51	18.23	0.0	77.0	76.8	148.5	150.3	87.9	77.8
1599	19.9	12.21	11.78	69.0	25.8	155.77	166.39	25.34	141.79	165.56	16.20	-0.1	78.0	77.6	158.4	160.7	89.8	79.3
1600	26.3	9.41	9.04	70.3	42.5	139.27	145.33	22.13	123.16	144.60	14.21	-0.1	77.0	77.2	168.5	171.4	90.7	73.1
1601	31.2	7.32	7.07	71.5	55.3	122.67	126.67	19.53	107.89	126.66	12.42	0.0	76.1	76.1	179.6	182.6	90.7	72.7
1602	35.7	5.46	5.25	72.2	66.2	106.68	109.76	16.75	93.83	109.53	10.69	-0.1	77.0	76.8	199.0	202.8	94.9	78.4
1603	38.0	4.63	4.42	72.4	71.7	98.24	100.57	15.12	86.07	100.22	9.72	0.0	77.0	76.5	210.0	214.3	95.7	79.7
1604	39.4	3.99	3.83	72.4	76.0	89.74	92.02	13.74	78.83	91.82	8.89	0.0	77.0	76.6	225.7	231.5	98.1	77.5
1605	17.3	4.53	4.36	69.1	31.4	175.06	187.41	14.90	173.11	167.84	16.01	0.0	77.5	77.1	213.5	218.3	87.7	77.0
1606	21.7	3.99	3.85	70.0	41.1	162.95	173.13	13.85	160.23	154.83	14.89	0.0	77.8	77.6	226.0	231.1	88.5	78.0
1607	24.2	3.69	3.57	70.4	46.1	156.21	165.67	13.01	153.82	148.43	14.17	0.0	77.0	76.6	234.6	240.5	89.1	75.9
1608	39.8	4.11	3.87	72.9	75.6	91.37	93.72	14.13	80.67	93.31	8.88	3.3	76.5	76.4	222.4	227.2	97.2	75.7
1609	41.6	3.44	3.31	73.0	79.7	81.51	83.52	12.20	72.29	83.21	7.92	0.0	76.5	76.6	245.0	251.4	100.2	75.0

SRL Single Tube Flow Instability Test # 7.0
Stainless Steel ID = 0.600"

	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
RUN	PTO2	TEW95W	TEW72N	TEW48W	TEW24N	TEW13W	TEW10N	TEW07W	TEW04N	TEW01W									
		DT3	TEW95E	TEW72S	TEW48E	TEW24S	TEW13E	TEW10S	TEW07E	TEW04S									
1591	50.0	7.49	454.7	468.0	493.5	464.6	498.7	496.3	503.1	520.4	531.2	506.7	511.8	509.2	535.6	523.7	518.6	538.7	541.9
1592	50.1	6.13	462.5	478.8	501.7	472.8	509.0	506.7	514.4	531.6	543.3	517.9	523.6	521.6	548.5	536.6	530.2	550.7	553.1
1593	50.2	4.90	474.1	490.1	516.5	486.8	525.3	523.8	531.4	548.3	558.9	534.1	539.1	535.8	560.9	550.1	544.7	563.9	565.7
1594	50.3	4.36	482.0	496.5	527.0	497.8	536.7	535.7	540.9	557.7	565.3	542.5	546.3	542.3	564.5	555.3	550.8	568.3	570.7
1595	50.5	4.68	477.5	492.8	520.7	488.1	529.6	528.2	534.2	553.6	563.8	531.4	541.0	539.9	565.6	556.7	544.1	567.6	571.5
1596	50.3	3.84	491.3	508.1	538.5	506.9	548.9	548.0	549.2	567.2	569.7	546.0	550.7	546.7	571.6	562.9	554.7	572.7	575.8
1597	49.8	3.63	496.6	512.6	544.0	513.7	553.9	552.3	552.1	568.8	572.2	549.1	552.9	549.0	573.9	566.2	556.7	575.2	576.8
1598	49.8	15.14	424.8	438.0	461.5	429.2	459.5	457.7	451.9	473.0	483.6	455.9	460.4	462.1	485.9	475.2	464.8	489.6	489.8
1599	50.1	12.01	435.0	448.3	470.5	442.2	473.0	470.9	472.7	490.0	499.0	473.9	477.7	476.7	501.0	490.6	483.0	501.5	505.5
1600	50.0	9.24	444.6	458.2	481.8	453.3	485.7	483.6	487.5	504.7	514.5	490.4	493.8	493.1	517.3	506.0	499.8	519.1	522.0
1601	49.7	7.08	453.6	468.6	493.3	464.3	499.2	496.8	502.9	520.6	531.3	506.2	510.8	509.1	534.2	523.2	517.4	536.9	539.5
1602	50.2	5.34	470.6	485.7	513.2	482.5	520.9	519.6	527.1	545.8	555.7	530.0	534.6	532.3	558.4	548.8	539.7	561.4	562.0
1603	50.4	4.54	481.2	496.0	525.4	496.0	535.3	533.1	542.1	559.0	565.4	541.9	546.3	542.6	566.8	557.8	550.5	570.0	570.8
1604	50.3	3.90	496.7	513.1	543.1	512.0	553.7	552.6	552.2	570.0	574.8	552.0	555.2	550.7	574.4	566.2	558.8	577.3	578.7
1605	49.9	4.45	483.4	498.0	526.9	497.7	537.6	536.5	543.2	561.6	565.7	541.0	546.0	562.6	570.0	558.3	550.7	569.4	570.2
1606	50.0	3.88	491.4	508.7	539.2	507.7	549.3	548.9	549.5	567.4	571.1	547.3	551.6	567.8	574.1	563.3	555.9	574.1	574.8
1607	50.2	3.59	501.5	519.9	550.3	519.4	559.8	557.5	555.1	573.1	577.5	554.3	557.5	573.9	580.5	569.1	561.0	579.7	579.6
1608	50.5	3.97	488.7	505.7	535.6	503.9	545.8	545.8	545.5	565.0	569.0	541.5	547.1	564.7	574.5	562.4	549.6	573.2	573.1
1609	50.6	3.34	507.1	525.0	552.9	522.2	557.7	555.6	555.9	573.1	576.7	552.2	556.1	572.9	579.1	568.7	558.3	575.3	577.5

SRL Single Tube Flow Instability Test # 7.0

Stainless Steel ID = 0.600"

	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
RUN	BL	TKW04E	BL	TJREF	BL	BL	BL	RTS	HRATIO	SVOLT	SPT01										
	TEW01E	TKW07W	TKW01S	TEREF	BL	BL	PWR2	QUALITY	HLOSS	SCURR	SDPT1										
1591	514.8	0	517.7	139.6	537.3	0	30.8	31.7	62	0	0	0	291.0	0.022	-13.31	100.5	-0.5	2.1	0.1	2.3	4.4
1592	527.3	0	532.7	139.6	545.3	0	33.4	31.8	62	0	0	0	289.8	0.022	-12.10	99.5	0.5	2.2	0.2	2.4	4.7
1593	540.4	0	543.5	139.6	557.6	0	33.0	31.9	62	0	0	0	292.0	0.022	-10.95	101.3	-1.3	2.1	0.2	2.0	3.9
1594	545.6	0	550.9	139.6	563.5	0	32.4	32.0	62	0	0	0	291.5	0.022	-9.83	101.3	-1.3	2.0	0.2	1.0	3.3
1595	544.5	0	545.9	139.6	560.6	0	33.3	31.8	62	0	0	0	290.0	0.022	-10.06	100.1	-0.1	2.1	0.2	1.1	4.3
1596	551.5	0	553.8	139.6	569.6	0	31.6	31.9	62	0	0	0	288.1	0.023	-7.97	99.6	0.4	2.2	0.2	1.5	4.7
1597	552.6	0	556.7	139.6	570.7	0	33.0	32.0	62	0	0	0	290.7	0.023	-7.47	100.6	-0.6	2.1	0.2	1.4	4.6
1598	461.5	0	470.9	139.5	484.1	0	33.4	31.7	62	0	0	0	291.7	0.022	-16.56	100.6	-0.6	2.1	0.2	1.9	2.2
1599	477.2	0	484.4	139.5	499.5	0	33.3	31.6	62	0	0	0	292.3	0.022	-15.52	100.7	-0.7	2.1	0.2	1.6	2.5
1600	495.9	0	502.5	139.2	515.9	0	31.4	31.5	62	0	0	0	290.6	0.022	-14.44	101.0	-1.0	2.0	0.2	1.7	3.3
1601	513.8	0	519.4	139.7	534.2	0	31.9	31.7	62	0	0	0	288.4	0.022	-13.23	101.3	-1.3	2.2	0.2	2.6	3.8
1602	537.2	0	542.2	139.6	556.6	0	33.6	31.7	62	0	0	0	290.5	0.022	-11.23	101.7	-1.7	2.1	0.2	2.4	3.8
1603	547.0	0	554.4	139.7	565.0	0	33.3	31.7	62	0	0	0	289.8	0.022	-9.88	100.3	-0.3	2.1	0.2	2.2	6.6
1604	554.4	0	561.6	139.5	573.7	0	32.4	31.4	62	0	0	0	292.8	0.023	-8.24	101.1	-1.1	2.1	0.1	1.6	4.0
1605	548.0	0	545.8	139.6	569.1	0	33.3	31.9	62	0	0	0	289.5	0.022	-9.54	101.2	-1.2	0.8	0.3	1.1	3.3
1606	552.5	0	551.1	139.6	574.4	0	33.0	32.0	62	0	0	0	289.0	0.022	-8.42	102.7	-2.7	0.8	0.3	1.2	4.0
1607	557.6	0	553.7	139.6	578.9	0	33.1	32.0	62	0	0	0	292.0	0.023	-7.36	101.7	-1.7	0.8	0.3	1.5	3.7
1608	547.5	0	544.5	139.6	570.3	0	33.8	32.0	62	0	0	0	292.3	0.022	-8.73	101.4	-1.4	0.9	0.5	1.7	5.5
1609	558.0	0	553.2	139.6	572.7	0	33.0	32.1	62	0	0	0	290.5	0.023	-6.48	102.8	-2.8	0.6	0.3	3.8	5.3

SRL Single Tube Flow Instability Test # 7.0
Stainless Steel ID = 0.600"

	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
RUN	SDPT2		SRT11		BL	DPL			HL		DATE		TEST#		PTO2		BL		BL		BL		BL
		SFT11		BL	BL		VTL		ID		TIME		RUN#		DT3		BL		BL		BL		BL
1591	14.9	0.8	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.30	1655.31	7	1591	50.0	16.5	0	0	0	0	0	0	0
1592	17.4	1.0	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.30	1700.57	7	1592	50.1	13.5	0	0	0	0	0	0	0
1593	16.2	1.2	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.30	1705.46	7	1593	50.2	10.8	0	0	0	0	0	0	0
1594	20.0	0.9	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.30	1725.17	7	1594	50.3	9.6	0	0	0	0	0	0	0
1595	18.1	1.5	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.30	1737.46	7	1595	50.5	10.3	0	0	0	0	0	0	0
1596	22.4	1.4	0.3	0	0	0	100.5	95.5	96.0	0.600	8908.30	1742.20	7	1596	50.3	8.5	0	0	0	0	0	0	0
1597	23.3	1.6	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.30	1745.49	7	1597	49.8	8.0	0	0	0	0	0	0	0
1598	5.5	0.6	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.30	1811.20	7	1598	49.8	33.4	0	0	0	0	0	0	0
1599	5.4	0.3	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.30	1817.26	7	1599	50.1	26.5	0	0	0	0	0	0	0
1600	11.9	0.8	0.4	0	0	0	100.5	95.5	96.0	0.600	8908.30	1820.41	7	1600	50.0	27.4	0	0	0	0	0	0	0
1601	13.1	0.6	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.30	1823.57	7	1601	49.7	13.6	0	0	0	0	0	0	0
1602	22.8	1.0	0.0	0	0	0	100.5	95.5	96.0	0.600	8908.30	1827.44	7	1602	50.2	11.8	0	0	0	0	0	0	0
1603	23.5	1.3	0.1	0	0	0	100.5	95.5	96.0	0.600	8908.30	1831.08	7	1603	50.4	10.0	0	0	0	0	0	0	0
1604	40.2	0.9	0.2	0	0	0	100.5	95.5	96.0	0.600	8908.30	1833.51	7	1604	50.3	8.6	0	0	0	0	0	0	0
1605	17.1	1.1	0.0	0	0	0	100.5	95.5	96.0	0.600	8909.05	1340.11	7	1605	49.9	9.8	0	0	0	0	0	0	0
1606	25.4	1.9	0.3	0	0	0	100.5	95.5	96.0	0.600	8909.05	1343.48	7	1606	50.0	8.6	0	0	0	0	0	0	0
1607	17.7	1.4	0.0	0	0	0	100.5	95.5	96.0	0.600	8909.05	1347.45	7	1607	50.2	7.9	0	0	0	0	0	0	0
1608	36.2	1.7	0.0	0	0	0	100.5	95.5	96.0	0.600	8909.05	1442.06	7	1608	50.5	8.8	0	0	0	0	0	0	0
1609	40.2	1.7	0.0	0	0	0	100.5	95.5	96.0	0.600	8909.05	1445.24	7	1609	50.6	7.4	0	0	0	0	0	0	0

SRL Single Tube Flow Instability Test # 8.0
Inconel Tube ID = 0.612"

RUN	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	HFLX		VOLTT		CURRT2		PTI2		PTO3		PBO1		PL2		PXI1		PPI1		
	PWR1	VOLTB	CURRT1	PTI1	PTO1	PBI1	PL1	PD1	PXO1	PPO1									
1610	0.0	0.000	0.1	0.1	4	-2	50.9	52.4	49.9	43.9	50.8	50.2	71.4	47.0	39.6	42.2	39.9	19.2	66.5
1611	0.0	0.000	0.1	0.0	2	2	49.6	50.4	50.2	44.2	49.4	49.9	63.9	49.1	25.8	36.2	25.2	5.5	56.3
1612	0.0	0.000	0.1	0.4	4	2	66.6	79.1	49.9	45.3	79.4	51.4	90.0	51.5	30.3	48.0	30.1	18.1	75.6
1613	0.0	0.000	0.1	-0.1	4	3	60.1	68.0	50.1	44.9	68.5	51.3	97.2	50.4	36.6	48.0	36.5	24.7	82.6
1614	0.0	0.000	0.1	0.1	3	3	56.1	61.0	50.1	44.4	61.5	50.2	101.3	52.2	40.3	47.7	40.2	28.6	86.9
1615	0.0	0.000	0.0	0.2	4	3	52.1	54.5	49.8	44.0	55.0	49.8	105.4	49.9	43.8	47.4	43.7	32.4	90.8
1616	0.0	0.000	0.1	0.2	3	3	49.2	49.6	49.9	43.9	50.1	49.5	106.7	50.5	46.4	47.5	46.3	35.1	94.2
1617	0.0	0.000	0.0	0.1	4	3	47.6	47.3	50.0	43.8	47.9	50.3	110.6	50.4	47.7	47.6	47.7	36.8	95.6
1618	0.0	0.000	0.2	-0.1	4	3	55.0	59.1	50.1	44.3	55.2	49.8	94.1	46.0	31.2	37.5	31.9	20.8	86.2
1619	0.0	0.000	0.1	-0.1	4	1	53.5	55.7	50.2	44.2	52.9	50.0	106.4	44.4	35.4	40.0	35.9	27.3	96.0
1620	0.0	0.000	0.1	0.1	3	1	50.5	50.7	49.8	43.7	49.6	48.9	124.4	48.1	41.4	43.2	41.6	36.3	109.3
1621	0.0	0.000	0.0	0.0	4	3	49.4	48.4	50.1	43.9	47.9	49.6	135.4	48.8	45.3	45.6	45.4	42.2	116.9
1622	0.0	0.000	0.3	0.2	4	4	48.1	46.6	49.9	43.8	46.7	49.6	140.5	49.6	48.9	46.5	46.9	44.6	120.0
1623	0.0	0.000	0.1	0.3	0	2	66.0	79.2	50.1	46.9	78.9	52.4	89.4	52.4	31.1	48.9	30.9	18.8	75.3
1624	0.0	0.000	0.1	0.0	3	2	61.0	70.1	50.0	46.3	69.9	50.6	94.4	52.0	36.0	48.6	35.8	23.8	80.2
1625	0.0	0.000	-0.2	0.0	0	1	56.0	61.6	49.8	45.5	61.4	50.5	100.4	49.9	40.5	46.2	40.3	28.4	85.7
1626	0.0	0.000	0.1	0.1	3	1	52.5	56.3	50.0	45.4	55.8	50.2	104.5	50.0	43.7	48.1	43.6	31.9	89.8
1627	0.0	0.000	-0.1	0.1	1	2	50.3	52.0	50.1	45.2	51.9	50.3	107.2	50.1	46.0	48.1	45.9	34.1	91.8
1628	0.0	0.000	0.1	0.1	4	1	48.4	49.2	50.0	45.0	49.0	49.7	108.9	49.8	47.4	48.0	47.2	35.9	94.1
1629	0.0	0.000	0.0	0.0	2	-1	48.1	48.3	50.0	45.1	48.2	49.3	109.0	50.0	48.0	48.1	47.9	36.4	94.5
1630	0.0	0.000	0.2	0.0	1	2	55.4	59.8	50.6	46.0	55.2	50.2	94.1	45.9	32.3	38.6	33.0	20.9	85.9
1631	0.0	0.000	0.1	0.0	1	6	52.7	55.7	49.7	45.1	52.1	49.5	108.5	48.8	36.5	40.7	36.9	27.9	96.3
1632	0.0	0.000	0.2	0.1	4	-1	50.7	52.9	50.2	45.3	50.2	49.9	121.8	48.3	41.2	43.7	41.4	35.0	105.7
1633	0.0	0.000	-0.1	0.1	-3	1	49.8	49.3	50.2	45.3	48.8	50.0	131.1	48.7	44.4	45.5	44.5	39.8	112.2
1634	0.0	0.000	0.0	0.0	7	1	48.4	48.0	49.9	44.8	47.4	49.8	137.5	49.2	46.5	46.7	46.5	43.0	117.0
1635	0.0	0.000	0.1	0.0	0	1	48.4	47.1	49.9	45.1	46.6	49.8	140.9	49.7	47.6	47.4	47.6	44.9	118.6
1636	0.0	0.000	0.1	-0.1	3	2	54.2	58.1	50.2	45.9	53.8	49.9	101.1	48.4	34.3	40.1	35.2	24.8	91.2
1637	150.0	0.465	70.9	60.8	2469	2453	54.6	59.3	49.8	45.8	54.9	49.6	93.5	46.1	31.8	38.4	32.6	20.5	85.3
1638	148.7	0.460	70.8	60.4	2460	2441	52.9	57.0	50.2	45.9	53.4	50.0	104.5	46.9	35.5	40.6	36.1	26.1	93.6
1639	149.2	0.462	70.7	60.7	2460	2445	52.3	54.8	50.3	45.7	52.0	50.1	113.6	47.6	38.7	42.5	39.2	30.9	100.2
1640	149.0	0.462	70.4	60.8	2452	2437	51.1	52.6	50.1	45.6	50.4	50.1	121.2	47.9	41.2	44.0	41.5	34.9	105.4
1641	151.1	0.467	71.9	61.1	2471	2450	49.4	50.5	49.7	45.0	48.8	49.7	127.2	47.8	43.0	44.7	43.1	37.8	109.9
1642	150.6	0.466	70.8	61.2	2461	2445	49.1	50.1	50.1	45.3	48.4	49.8	132.7	49.1	45.0	46.1	45.1	40.7	113.8
1643	149.2	0.462	70.5	60.6	2462	2444	56.5	60.1	50.4	45.8	54.7	49.7	93.7	45.0	32.1	38.9	32.8	20.8	86.0
1644	149.0	0.462	70.4	60.5	2465	2443	55.4	59.7	50.2	45.7	54.6	49.7	94.2	46.1	32.0	38.5	32.5	20.4	86.4
1645	150.1	0.465	70.9	60.7	2474	2454	53.4	56.9	50.2	45.5	52.2	49.4	106.8	47.0	35.9	40.8	36.6	26.9	95.6
1646	150.1	0.465	70.9	60.7	2472	2454	51.9	53.1	49.9	44.6	50.0	49.5	118.1	47.4	39.8	42.8	40.1	33.0	104.2
1647	149.8	0.464	70.9	60.7	2468	2450	53.1	51.9	50.4	45.2	48.8	49.9	126.2	48.1	42.6	44.6	42.8	37.2	109.7
1648	150.0	0.465	71.0	60.8	2467	2452	50.6	49.7	50.2	44.9	47.7	49.7	133.0	49.2	44.8	45.9	44.9	40.7	115.2
1649	148.6	0.460	70.9	60.5	2456	2439	48.3	48.8	50.0	44.8	46.9	49.3	136.9	49.7	46.1	46.5	46.1	42.6	117.0
1650	149.4	0.463	70.4	60.6	2466	2449	56.6	60.4	50.5	45.7	54.9	50.0	94.5	45.7	32.2	38.6	32.8	20.8	86.7
1651	300.2	0.928	100.6	86.2	3480	3458	54.0	60.1	50.3	46.8	55.4	49.6	94.6	46.4	31.9	38.4	32.6	20.6	86.8
1652	296.9	0.919	100.3	85.8	3460	3441	53.0	57.7	49.9	46.3	53.4	48.5	104.0	46.0	34.7	39.9	35.2	25.2	93.8
1653	298.6	0.923	100.4	86.1	3466	3442	51.9	54.0	50.1	46.4	51.2	48.9	115.5	47.6	36.9	42.3	39.1	31.5	102.8
1654	299.2	0.926	100.4	86.2	3471	3447	54.5	59.7	50.2	46.5	55.0	48.8	94.1	45.6	32.1	38.5	32.6	20.8	86.3
1655	299.1	0.925	100.5	86.1	3472	3444	53.3	58.0	50.5	46.6	53.8	49.1	102.3	46.3	35.1	40.5	35.4	25.2	92.5
1656	297.3	0.920	100.2	85.9	3459	3429	53.1	56.4	50.8	46.6	52.8	49.1	108.3	47.6	37.2	41.9	37.5	28.6	97.1
1657	149.8	0.464	70.9	60.7	2469	2452	51.8	54.3	49.8	43.6	51.2	45.1	110.1	46.4	37.0	41.4	37.4	29.1	98.5
1658	148.1	0.458	70.5	60.4	2450	2434	49.3	49.3	50.2	43.6	47.5	45.0	133.2	49.4	44.6	46.0	44.6	40.6	114.2
1659	150.4	0.465	70.4	60.3	2492	2475	54.0	59.5	50.4	44.5	55.2	45.9	94.2	45.8	31.7	38.7	32.4	20.5	86.9
1660	149.7	0.464	70.5	60.5	2475	2456	48.3	48.6	50.3	43.7	47.7	45.5	136.9	49.6	45.8	46.6	45.8	42.5	117.5
1661	149.7	0.464	70.3	60.7	2468	2447	47.9	47.9	50.2	43.3	47.0	45.6	138.3	48.8	46.1	46.6	46.0	43.0	118.3
1662	297.9	0.921	99.8	85.6	3482	3454	52.7	54.4	50.6	44.2	51.5	45.7	96.7	46.0	19.2	33.5	18.6	12.7	83.7

SRL Single Tube Flow Instability Test # 8.0
Inconel Tube ID = 0.612"

	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
RUN	PA1	DT1	DT2	DP1	DLV1	OLI1	FLI1	FTI1	FBI1	FXI1	FXI2	FBI	TRTI1	TRTI2	TRTO1	TRTO2	JXI1	JXO1
1610	37.6	4.53	4.35	47.7	6.6	168.78	181.10	13.39	167.57	75.15	7.10	238.0	77.5	77.3	77.0	78.4	79.2	74.3
1611	25.0	3.10	2.97	48.3	4.6	138.62	148.55	10.77	137.27	147.12	14.17	248.5	77.2	77.0	76.5	77.4	77.1	77.0
1612	29.9	19.15	19.70	57.4	0.3	29.87	31.23	31.06	0.00	30.69	30.89	299.3	76.6	76.4	76.5	77.1	76.4	76.4
1613	36.2	13.78	13.34	58.2	0.1	24.77	25.36	25.15	0.00	24.60	24.99	300.5	77.3	77.1	76.8	77.5	77.7	76.0
1614	39.9	9.72	9.43	58.4	0.4	21.14	20.72	20.58	0.00	19.99	20.49	301.9	76.5	76.6	76.5	76.8	77.3	76.3
1615	43.4	5.70	5.46	58.5	-0.1	15.95	15.50	15.22	0.00	14.58	15.15	304.2	77.5	77.4	77.0	77.8	77.9	63.1
1616	46.0	2.74	2.56	58.8	0.0	11.66	10.11	10.10	0.00	9.15	10.04	305.9	76.8	76.6	76.2	76.8	75.9	75.0
1617	47.4	1.26	1.19	59.2	0.1	8.66	6.00	6.51	0.00	4.65	6.56	306.8	77.0	76.8	76.5	77.6	78.3	53.9
1618	27.7	8.41	8.09	65.7	13.0	232.09	252.98	19.13	233.67	107.10	10.58	0.0	77.0	70.7	76.5	77.2	76.7	76.6
1619	32.7	6.49	6.21	69.1	34.4	203.58	219.92	16.43	203.93	92.80	9.19	0.0	77.5	77.5	77.3	78.1	77.7	74.0
1620	39.8	3.47	3.33	73.2	65.0	152.55	157.78	11.67	147.45	65.56	6.45	0.0	76.7	76.5	76.3	77.1	76.6	76.4
1621	44.3	1.79	1.72	75.2	82.5	107.97	109.81	7.92	102.33	45.07	4.29	0.0	77.5	77.2	77.0	77.8	77.3	75.7
1622	46.3	0.90	0.86	75.7	90.9	74.52	75.28	5.30	70.25	30.75	2.99	0.0	77.5	77.4	77.0	78.0	77.4	75.4
1623	30.5	18.60	18.89	58.1	0.0	29.77	31.66	31.67	0.00	30.80	31.35	298.7	120.5	120.1	120.0	121.3	119.6	119.3
1624	35.3	14.21	13.89	58.4	0.0	24.51	26.86	26.93	0.00	26.00	26.59	301.7	121.5	121.2	121.0	122.1	120.6	120.0
1625	39.8	9.46	9.19	58.9	0.0	18.91	21.36	21.40	0.00	20.52	21.17	303.7	121.5	121.5	121.0	122.0	122.2	109.4
1626	43.1	6.00	5.87	57.3	-0.3	14.94	16.71	16.54	0.00	15.58	16.50	304.1	121.5	121.1	120.8	121.9	120.2	119.1
1627	45.4	3.63	3.50	57.5	0.0	10.34	12.54	12.45	0.00	11.43	12.48	306.7	120.5	120.2	120.0	121.0	118.9	118.0
1628	46.7	1.93	1.88	57.9	-0.1	5.10	8.43	8.94	0.00	7.39	8.79	305.3	121.5	121.2	120.9	121.4	120.0	118.7
1629	47.4	1.34	1.29	57.8	-0.2	3.91	6.10	7.27	0.00	5.11	7.06	308.4	121.5	121.1	121.0	122.1	121.8	97.7
1630	28.6	6.05	7.82	65.0	13.3	230.09	254.72	19.33	235.22	107.46	10.71	0.0	121.0	120.4	120.1	121.0	120.5	120.0
1631	33.8	5.83	5.62	68.5	37.9	195.12	213.01	16.38	197.62	90.93	8.94	0.0	121.5	121.3	121.0	122.1	121.1	120.7
1632	39.3	3.86	3.79	70.7	59.1	158.80	170.03	12.86	158.19	72.30	7.12	0.0	120.9	120.4	120.0	121.7	120.4	119.3
1633	43.0	2.35	2.24	72.5	74.9	126.22	131.12	9.82	122.36	55.20	5.34	0.0	121.1	120.9	120.5	122.2	120.9	119.9
1634	15.6	1.25	1.23	73.2	86.3	91.53	93.31	6.84	87.17	38.60	3.70	0.0	121.5	121.4	121.0	122.1	121.5	113.3
1635	46.9	0.69	0.70	73.9	91.9	66.91	67.09	4.83	62.91	27.30	2.66	0.0	121.0	120.9	120.2	121.5	120.6	119.8
1636	31.3	7.08	6.90	66.4	25.2	215.28	235.36	18.03	217.84	98.84	9.84	0.0	121.5	121.2	121.0	122.2	121.1	121.5
1637	28.2	7.67	7.45	64.7	13.3	229.62	254.28	20.32	234.05	107.56	10.79	0.2	121.5	121.3	120.0	123.3	125.8	112.0
1638	32.6	6.17	6.04	67.3	31.1	206.57	225.44	18.06	208.20	96.52	9.53	0.0	121.5	121.3	121.5	120.6	126.4	111.0
1639	36.2	4.89	4.76	69.1	45.5	183.59	199.78	16.13	184.62	84.20	8.30	0.0	121.9	121.4	121.3	120.1	127.2	112.6
1640	39.3	3.63	3.49	70.5	58.8	159.80	171.74	13.44	158.45	72.48	7.17	0.0	121.9	121.6	120.5	121.9	128.7	109.0
1641	41.4	2.71	2.64	71.7	69.1	140.46	146.19	11.52	134.97	61.60	6.01	0.0	121.5	120.9	122.5	121.0	128.6	109.6
1642	43.8	2.03	1.97	72.6	77.9	116.72	122.07	9.17	113.33	52.00	5.07	0.1	121.5	121.3	125.0	125.3	130.9	106.2
1643	28.5	7.67	6.67	65.0	13.6	229.32	253.93	20.61	233.93	108.68	10.91	0.0	120.5	120.0	178.5	181.4	125.0	114.0
1644	28.3	7.66	6.72	66.0	13.1	232.39	253.19	20.34	232.99	106.30	10.48	0.0	78.0	77.5	136.0	137.6	82.1	70.4
1645	33.2	5.91	5.09	68.7	34.2	203.85	219.84	17.88	201.55	91.89	9.01	0.3	77.5	77.1	143.9	146.0	82.1	68.4
1646	37.7	4.05	3.22	71.0	54.4	170.79	181.72	14.74	167.06	76.90	7.21	0.2	77.6	77.6	159.5	162.3	84.1	65.1
1647	41.0	2.90	2.10	72.2	66.9	147.85	152.40	12.72	140.20	73.97	6.17	0.2	77.0	77.1	174.0	177.3	84.9	59.7
1648	43.6	1.91	1.13	73.7	78.4	118.03	121.68	9.92	112.14	51.54	4.89	1.2	77.5	77.2	199.4	203.6	87.0	58.7
1649	45.1	1.36	0.62	74.1	85.3	96.73	99.73	7.64	92.76	41.31	3.94	0.5	77.0	76.9	233.0	238.7	88.7	59.2
1650	28.5	7.73	6.74	65.6	13.3	231.88	253.22	20.54	233.00	106.69	10.45	0.5	77.5	77.0	135.5	137.5	81.8	72.7
1651	28.3	7.51	7.28	66.5	13.2	233.71	253.36	21.06	233.00	106.45	10.45	0.0	77.0	76.9	191.2	194.8	86.0	64.7
1652	31.7	6.20	6.04	68.6	28.7	211.61	228.49	18.94	210.33	95.19	9.32	2.0	77.0	76.7	202.6	206.9	87.1	63.4
1653	36.5	4.68	4.59	71.4	48.9	180.09	192.35	15.57	177.18	80.65	7.87	0.7	77.0	76.7	229.5	234.7	88.9	61.9
1654	28.3	7.71	7.60	65.5	13.0	230.42	254.98	20.71	235.14	107.29	10.81	2.3	121.0	120.5	236.3	242.6	130.0	110.3
1655	31.8	6.66	6.64	67.2	26.4	212.96	233.98	18.85	215.36	96.27	9.94	0.7	121.0	120.2	247.5	255.0	130.6	108.7
1656	34.0	5.98	6.02	68.6	36.5	197.44	215.71	16.70	198.95	91.15	9.14	3.1	121.0	120.4	261.4	269.4	130.4	106.3
1657	34.5	5.13	5.12	69.2	42.2	190.04	208.97	16.65	190.49	86.81	8.84	0.0	120.5	120.2	192.5	196.4	126.4	112.4
1658	43.5	1.91	2.04	73.7	79.7	114.63	118.31	9.10	110.21	50.02	4.96	0.0	120.5	120.0	252.0	259.6	129.7	106.5
1659	28.2	7.68	7.22	66.2	13.0	232.17	253.25	20.48	233.13	105.79	10.46	0.0	77.5	77.2	136.0	137.9	82.1	68.3
1660	44.8	1.38	1.10	74.9	84.7	97.56	100.67	7.79	93.52	42.44	4.11	0.0	77.0	76.8	228.5	234.2	88.3	63.6
1661	45.2	1.19	0.92	75.0	87.6	88.16	90.77	6.48	85.64	37.17	3.62	0.0	77.5	77.4	258.7	266.6	89.5	57.5
1662	17.6	4.56	3.92	71.2	30.2	178.85	192.21	15.53	177.09	165.64	16.61	0.0	76.5	76.5	229.4	235.9	88.8	74.5

SRL Single Tube Flow Instability Test # 8.0
Inconel Tube ID = 0.612"

	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
RUN	PTO2	TEW95W	TEW72N	TEW48W	TEW24N	TEW13W	TEW10N	TEW07W	TEW04N	TEW01W									
	DT3	TEW95E	TEW72S	TEW48E	TEW24S	TEW13E	TEW10S	TEW07E	TEW04S										
1610	49.9	4.45	79.2	78.9	78.1	79.1	79.0	80.0	79.2	80.2	79.7	79.3	79.1	79.4	79.1	79.3	82.2	81.0	78.5
1611	50.2	3.04	77.0	76.7	76.6	76.0	77.0	77.8	77.0	78.3	77.8	77.0	77.1	77.0	77.4	77.3	78.3	77.6	77.3
1612	49.9	20.02	76.6	76.3	77.0	77.1	76.3	77.3	76.7	77.6	77.2	76.7	76.6	77.0	79.9	76.9	78.9	80.9	76.9
1613	50.1	13.55	77.4	77.0	79.0	76.8	77.3	77.5	77.1	78.1	78.0	77.3	77.1	76.7	76.7	77.3	79.1	82.6	77.3
1614	50.1	9.53	76.5	76.3	77.2	76.4	76.1	77.0	76.6	77.6	77.5	76.7	76.7	77.0	77.0	77.1	76.3	82.6	77.3
1615	49.8	5.58	77.5	77.6	78.4	77.8	77.5	78.8	77.4	78.6	78.2	77.8	77.6	77.9	78.0	77.6	78.5	75.3	77.7
1616	49.9	2.68	76.3	76.3	69.8	77.1	76.1	77.3	76.7	77.6	77.6	76.7	76.7	76.7	76.0	76.9	76.8	80.5	76.5
1617	50.0	1.16	76.9	76.7	77.7	77.7	77.1	77.4	77.0	78.2	77.5	77.0	77.2	77.5	77.5	77.2	78.5	75.6	76.8
1618	50.1	8.24	76.5	76.4	76.7	77.7	76.5	77.3	76.4	77.8	75.5	76.7	76.7	76.7	76.8	77.1	77.9	77.9	76.7
1619	50.2	6.40	77.4	77.5	76.8	78.9	77.6	78.2	77.9	78.8	78.1	77.8	77.7	78.3	78.3	78.0	78.9	78.5	77.9
1620	49.8	3.41	76.4	76.4	77.5	77.3	76.3	77.3	76.2	77.4	77.8	76.6	76.5	77.0	77.1	76.8	77.1	77.8	76.8
1621	50.1	1.73	77.4	76.9	78.2	77.7	77.5	77.5	77.4	78.4	78.4	77.1	77.3	77.7	77.8	77.1	77.5	77.3	77.4
1622	49.9	0.86	77.5	77.2	77.8	76.7	77.4	77.9	77.5	78.3	77.7	77.6	77.5	77.7	77.7	77.6	77.9	81.0	77.6
1623	50.1	19.05	120.2	120.0	121.2	119.6	120.1	120.7	120.7	121.2	119.5	120.4	120.3	120.1	120.9	120.1	116.0	119.6	120.2
1624	50.0	13.99	121.0	120.9	123.4	120.2	120.9	120.7	122.4	122.8	123.0	121.4	121.1	121.2	122.1	121.3	117.1	123.2	121.4
1625	49.8	9.23	121.0	121.2	120.9	120.1	121.0	123.4	122.5	123.0	121.8	121.5	121.1	122.3	121.9	121.9	118.5	122.2	121.8
1626	50.0	5.89	120.9	120.8	122.5	119.7	121.0	122.0	122.5	122.3	122.9	121.0	121.0	121.6	121.1	120.8	117.3	120.9	121.2
1627	50.1	3.59	120.2	120.0	121.2	122.0	120.4	120.6	120.7	121.1	120.7	120.3	120.3	120.1	120.8	120.4	117.0	117.7	120.3
1628	50.0	1.93	120.9	120.8	121.7	116.4	120.9	122.4	122.5	122.6	122.3	121.2	121.0	121.8	121.6	121.2	117.6	122.5	121.2
1629	50.0	1.34	121.0	120.9	122.2	122.4	120.9	121.9	121.0	122.7	120.2	121.1	120.9	122.6	121.4	121.2	116.7	121.2	121.3
1630	50.6	7.95	120.6	120.3	121.1	121.3	120.6	121.1	121.3	121.4	122.0	120.5	120.7	121.0	121.0	120.9	120.3	121.9	120.8
1631	49.7	5.81	121.1	121.0	122.1	121.9	121.0	122.0	121.7	122.6	122.2	121.3	121.0	122.0	122.1	121.5	119.3	121.6	121.7
1632	50.2	3.72	120.5	120.1	121.8	121.1	120.6	121.3	120.7	121.3	121.7	120.6	120.7	120.6	121.1	120.4	118.2	120.4	120.5
1633	50.2	2.34	120.9	120.6	121.7	121.7	120.9	120.9	121.0	122.0	121.6	120.9	120.8	120.9	121.1	120.9	118.2	120.7	120.8
1634	49.9	1.25	120.9	120.9	122.0	121.8	120.9	122.2	121.8	122.9	122.0	121.2	121.1	122.1	121.7	121.5	118.3	120.8	121.4
1635	49.9	0.68	120.8	120.3	120.7	121.5	120.8	121.3	120.9	121.5	121.5	120.8	120.8	121.0	120.8	120.8	119.8	121.0	120.7
1636	50.2	6.86	121.0	120.7	121.5	118.6	120.9	122.6	121.6	122.9	122.2	121.2	121.1	121.6	122.0	121.8	119.0	121.1	121.4
1637	49.8	7.51	326.1	333.0	351.7	356.3	363.6	365.7	379.0	377.8	386.0	380.9	385.1	382.6	384.5	381.3	345.6	373.6	387.7
1638	50.2	5.99	331.2	339.7	359.3	364.4	372.8	375.2	389.7	388.5	396.8	392.1	396.7	394.2	395.7	393.0	362.8	385.8	399.9
1639	50.3	4.74	338.0	345.8	369.2	373.3	382.8	385.9	401.5	399.9	410.3	404.0	409.4	406.2	409.5	406.0	371.9	397.2	413.5
1640	50.1	3.59	347.1	356.4	381.9	386.7	397.8	400.5	419.1	417.8	428.7	416.5	426.2	422.3	426.1	421.2	385.4	410.4	429.6
1641	49.7	2.68	361.6	370.6	400.6	406.2	420.3	423.1	444.1	441.2	450.1	436.2	446.4	439.5	446.8	439.7	397.7	425.4	446.3
1642	50.1	2.00	379.6	390.2	423.6	433.2	447.3	448.7	463.0	460.8	463.8	446.8	459.6	454.6	461.0	452.8	416.0	436.1	456.7
1643	50.4	7.54	324.1	331.4	348.4	352.1	359.5	361.5	375.9	375.2	383.1	377.8	380.2	374.5	380.2	376.2	336.9	359.3	383.8
1644	50.2	7.58	297.2	305.2	319.4	323.6	329.5	331.5	344.5	343.6	350.6	345.5	348.3	344.0	349.1	344.6	313.8	330.7	351.4
1645	50.2	5.79	304.4	313.1	329.5	333.8	340.8	343.1	357.1	355.9	363.6	358.1	361.4	358.6	363.1	358.4	332.5	349.7	364.8
1646	49.9	4.00	319.9	330.0	349.9	354.6	362.5	365.1	381.2	380.2	389.2	383.8	387.7	383.3	387.7	384.4	355.9	371.6	392.0
1647	50.4	2.86	332.4	341.6	365.7	371.3	380.6	383.2	401.9	401.3	411.2	405.2	409.8	405.7	409.5	406.1	374.9	387.6	415.6
1648	50.2	1.91	351.0	362.4	390.7	397.0	409.5	411.9	435.0	433.7	443.8	435.2	438.9	432.9	442.6	438.3	399.1	418.0	444.5
1649	50.0	1.36	372.8	384.2	420.5	426.5	439.2	442.9	457.3	456.2	460.6	451.5	455.3	449.2	460.7	457.2	412.5	432.4	457.6
1650	50.5	7.58	298.3	305.7	323.0	326.1	331.9	336.7	346.6	348.3	351.4	347.6	351.7	350.8	349.8	349.6	343.3	348.6	353.5
1651	50.3	7.40	484.1	498.3	513.5	520.6	531.1	531.7	558.9	555.0	570.8	560.3	562.3	549.4	565.8	557.2	478.0	523.1	569.0
1652	49.9	6.09	492.3	507.0	523.1	531.0	542.7	543.8	570.8	569.2	582.2	569.9	571.1	556.9	575.4	566.7	481.2	526.3	577.1
1653	50.1	4.59	515.7	526.5	549.9	557.8	570.6	571.4	588.5	587.4	593.5	584.3	584.5	574.1	588.3	583.6	499.6	543.9	586.0
1654	50.2	7.54	503.3	515.5	540.0	546.6	561.1	562.9	588.1	584.3	592.4	582.8	585.9	577.5	584.8	586.2	526.9	555.3	581.9
1655	50.5	6.49	511.7	525.2	555.6	560.9	573.0	576.2	595.3	593.1	598.0	589.4	593.5	589.4	591.3	594.6	544.0	571.1	586.4
1656	50.8	5.88	520.0	532.9	565.0	571.9	581.3	584.6	599.7	598.0	599.1	591.5	594.2	591.7	589.8	594.6	544.6	575.4	582.9
1657	49.8	5.04	335.0	342.5	357.8	361.9	372.0	368.6	399.5	391.0	405.0	396.5	396.0	376.1	397.2	390.6	281.1	346.5	403.6
1658	50.2	1.86	379.8	386.4	422.8	429.1	444.8	445.3	459.8	458.2	462.8	458.2	459.7	455.9	459.3	459.2	417.0	441.2	460.8
1659	50.4	7.56	301.4	308.8	320.7	323.9	331.3	333.7	348.5	348.8	355.4	350.2	353.4	349.8	351.5	351.0	322.9	340.2	355.7
1660	50.3	1.36	373.8	383.0	413.1	420.6	433.3	435.1	456.4	456.9	462.3	454.4	456.8	449.0	456.3	454.6	395.6	432.6	459.3
1661	50.2	1.18	392.3	400.7	433.5	440.0	449.1	452.3	470.1	468.9	472.7	466.4	466.4	461.0	466.6	465.3	421.7	444.9	465.0
1662	50.6	4.50	517.5	531.1	549.7	556.5	569.4	570.8	593.5	592.2	599.5	591.6	594.1	587.6	589.9	590.2	535.3	570.3	594.7

SRL Single Tube Flow Instability Test # 8.0
Inconel Tube ID = 0.612"

RUN	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
	BL	TKW04E	BL	TJREF	BL	BL	BL	BL	BL	BL	BL	BL	BL	RTS	HRATIO	SVOLT	SPT01				
	TEW01E	TKW07N	TKW018	TEREF	BL	BL	BL	PWR2	QUALITY	HLOSS	SCURR	SDPT1									
1610	79.8	0	78.3	80.5	80.4	0	34.2	34.2	62	0	0	0	0.0	0.025	0.00	0.0	100.0	0.0	0.0	0.8	3.1
1611	77.2	0	77.9	78.0	77.0	0	33.8	32.7	62	0	0	0	0.0	-0.008	0.00	0.0	100.0	0.0	0.0	1.1	5.4
1612	77.5	0	73.7	77.6	77.3	0	32.9	32.5	62	0	0	0	0.0	0.117	0.00	0.0	100.0	0.0	0.0	1.7	0.4
1613	77.8	0	78.1	77.9	77.4	0	35.2	32.5	62	0	0	0	0.0	-0.014	0.00	0.0	100.0	0.0	0.0	1.3	1.4
1614	77.9	0	76.7	77.7	78.3	0	34.1	32.5	62	0	0	0	0.0	0.031	0.00	0.0	100.0	0.0	0.0	1.0	3.0
1615	78.2	0	77.5	77.9	78.3	0	31.9	32.5	62	0	0	0	0.0	0.047	0.00	0.0	100.0	0.0	0.0	0.9	5.2
1616	77.5	0	77.6	77.7	78.1	0	31.9	32.4	62	0	0	0	0.0	0.066	0.00	0.0	100.0	0.0	0.0	0.5	10.1
1617	77.8	0	78.4	77.7	78.6	0	32.8	32.5	62	0	0	0	0.0	0.016	0.00	0.0	100.0	0.0	0.0	0.5	8.1
1618	78.2	0	77.0	77.7	79.8	0	31.3	32.6	62	0	0	0	0.0	-0.031	0.00	0.0	100.0	0.0	0.0	1.4	2.7
1619	78.1	0	78.3	78.5	82.5	0	34.0	32.3	62	0	0	0	0.0	-0.024	0.00	0.0	100.0	0.0	0.0	1.3	3.4
1620	77.8	0	77.2	77.6	80.6	0	33.2	32.5	62	0	0	0	0.0	0.045	0.00	0.0	100.0	0.0	0.0	1.3	4.2
1621	77.8	0	77.4	78.3	72.1	0	33.8	32.5	62	0	0	0	0.0	0.002	0.00	0.0	100.0	0.0	0.0	1.2	9.4
1622	77.7	0	77.5	78.3	78.5	0	33.5	32.3	62	0	0	0	0.0	0.043	0.00	0.0	100.0	0.0	0.0	1.0	14.3
1623	120.5	0	120.1	120.4	120.6	0	33.4	32.2	62	0	0	0	0.0	0.123	0.00	0.0	100.0	0.0	0.0	1.5	0.8
1624	120.6	0	121.3	121.3	121.3	0	33.0	32.2	62	0	0	0	0.0	-0.012	0.00	0.0	100.0	0.0	0.0	1.3	1.3
1625	121.2	0	121.1	121.6	121.6	0	33.0	32.2	62	0	0	0	0.0	0.076	0.00	0.0	100.0	0.0	0.0	0.9	3.6
1626	120.2	0	121.2	120.7	120.9	0	32.9	32.1	62	0	0	0	0.0	0.050	0.00	0.0	100.0	0.0	0.0	1.0	6.6
1627	120.4	0	120.0	120.1	120.0	0	33.3	32.3	62	0	0	0	0.0	0.036	0.00	0.0	100.0	0.0	0.0	0.8	10.0
1628	119.4	0	120.7	121.1	121.6	0	33.0	32.2	62	0	0	0	0.0	0.031	0.00	0.0	100.0	0.0	0.0	0.9	19.6
1629	120.3	0	120.5	121.1	120.6	0	33.3	32.0	62	0	0	0	0.0	0.000	0.00	0.0	100.0	0.0	0.0	0.8	11.9
1630	108.6	0	120.6	120.5	120.5	0	31.2	32.2	62	0	0	0	0.0	-0.008	0.00	0.0	100.0	0.0	0.0	1.5	2.5
1631	125.8	0	121.0	120.9	122.2	0	33.3	32.3	62	0	0	0	0.0	-0.013	0.00	0.0	100.0	0.0	0.0	1.4	2.8
1632	119.1	0	120.2	120.3	118.9	0	33.1	32.1	62	0	0	0	0.0	0.021	0.00	0.0	100.0	0.0	0.0	1.1	4.1
1633	120.4	0	120.7	120.5	119.7	0	33.3	32.3	62	0	0	0	0.0	0.021	0.00	0.0	100.0	0.0	0.0	1.2	4.0
1634	119.1	0	121.4	121.3	120.5	0	31.7	31.9	62	0	0	0	0.0	0.006	0.00	0.0	100.0	0.0	0.0	1.8	13.7
1635	116.9	0	121.2	120.1	120.4	0	33.5	31.8	62	0	0	0	0.0	0.018	0.00	0.0	100.0	0.0	0.0	1.4	15.9
1636	119.7	0	121.5	121.2	120.4	0	33.3	31.8	62	0	0	0	0.0	-0.046	0.00	0.0	100.0	0.0	0.0	1.2	4.0
1637	383.2	0	399.9	388.3	412.8	0	32.7	32.1	62	0	0	0	149.0	0.025	-12.96	98.5	1.5	1.7	0.4	1.8	3.1
1638	394.5	0	410.2	397.5	409.0	0	33.0	32.0	62	0	0	0	147.6	0.025	-12.23	99.3	0.7	1.9	0.4	2.3	4.2
1639	407.7	0	423.8	411.9	435.1	0	32.7	32.0	62	0	0	0	148.3	0.025	-11.33	100.2	-0.2	1.6	0.4	2.0	4.2
1640	420.6	0	441.4	429.3	457.9	0	33.0	32.1	62	0	0	0	148.1	0.025	-9.74	97.8	2.2	1.8	0.4	1.2	4.1
1641	435.4	0	463.8	448.7	470.6	0	33.0	32.3	62	0	0	0	149.8	0.025	-7.79	98.1	1.9	1.6	0.4	1.0	5.2
1642	441.7	0	479.0	462.1	497.1	0	33.0	32.0	62	0	0	0	149.6	0.025	-5.12	99.9	0.1	1.7	0.5	1.7	6.8
1643	377.7	0	396.0	384.0	408.7	0	33.5	32.2	62	0	0	0	148.0	0.025	-13.29	99.9	0.1	1.5	0.5	1.7	2.4
1644	345.3	0	364.2	351.0	378.2	0	33.1	32.2	62	0	0	0	147.7	0.025	-17.89	99.3	0.7	2.4	0.5	2.1	2.6
1645	357.7	0	379.1	367.1	392.1	0	33.0	32.4	62	0	0	0	148.9	0.025	-16.99	99.0	1.0	1.6	0.5	1.9	4.4
1646	384.9	0	403.0	392.2	415.7	0	33.4	32.1	62	0	0	0	149.0	0.025	-15.38	100.7	-0.7	1.7	0.5	1.3	3.2
1647	406.4	0	425.4	411.9	440.0	0	34.0	32.4	62	0	0	0	148.7	0.025	-14.10	103.1	-3.1	2.3	0.5	1.7	3.9
1648	430.8	0	458.1	444.5	471.4	0	33.2	32.1	62	0	0	0	149.1	0.025	-11.10	101.0	-1.0	2.2	0.5	1.8	6.2
1649	444.1	0	478.2	464.5	489.8	0	33.7	32.0	62	0	0	0	147.6	0.025	-7.29	100.4	-0.4	2.1	0.6	0.9	11.0
1650	350.6	0	363.1	351.6	379.1	0	33.0	32.2	62	0	0	0	148.3	0.025	-18.04	100.2	-0.2	2.5	0.5	1.4	2.8
1651	555.4	0	592.7	572.0	609.5	0	33.3	32.1	62	0	0	0	298.2	0.025	-11.93	100.5	-0.5	1.7	0.4	2.8	3.5
1652	561.7	0	600.7	580.8	617.8	0	34.8	32.4	62	0	0	0	295.2	0.025	-10.62	100.3	-0.3	1.7	0.4	2.4	2.9
1653	571.0	0	616.6	595.4	633.4	0	33.3	32.0	62	0	0	0	296.5	0.025	-7.63	100.0	0.0	1.5	0.4	2.2	4.3
1654	564.6	0	616.0	593.6	632.3	0	33.4	32.5	62	0	0	0	297.1	0.025	-6.85	99.7	0.3	2.0	0.4	1.4	2.5
1655	566.2	0	620.4	600.2	634.7	0	33.5	32.3	62	0	0	0	296.6	0.025	-5.60	99.5	0.5	2.0	0.3	2.2	3.1
1656	564.6	0	615.0	596.2	625.0	0	34.1	32.3	62	0	0	0	294.7	0.025	-3.93	98.5	1.5	2.0	0.4	3.3	7.6
1657	396.1	0	421.8	410.0	434.8	0	34.4	32.3	62	0	0	0	148.7	0.025	-11.62	99.4	0.6	2.6	0.4	2.3	4.0
1658	443.4	0	478.8	466.9	490.6	0	34.4	32.3	62	0	0	0	147.1	0.025	-5.28	101.0	-1.0	2.7	0.5	1.9	9.1
1659	351.4	0	369.2	357.7	381.3	0	34.0	32.4	62	0	0	0	149.3	0.024	-17.94	99.8	0.2	2.6	0.4	2.3	3.7
1660	440.2	0	475.6	463.2	483.5	0	33.7	32.6	62	0	0	0	148.5	0.024	-7.62	99.1	0.9	2.8	0.4	1.3	10.3
1661	457.3	0	487.0	472.7	496.5	0	33.5	32.2	62	0	0	0	148.5	0.025	-4.25	99.3	0.7	2.5	0.5	1.5	20.0
1662	580.5	0	619.4	599.5	633.0	0	33.2	32.3	62	0	0	0	295.5	0.025	-7.72	100.2	-0.2	1.9	0.3	1.2	4.1

AIM

Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910
301/587-8202

Centimeter

Inches

MANUFACTURED TO AIM STANDARDS
BY APPLIED IMAGE, INC.

2 of 2

SRL Single Tube Flow Instability Test # 8.0
Inconel Tube ID = 0.612"

	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
RUN	SDPT2	SRTI1	BL	BL	DPL	VTL	ID	TIME	TEST#	PTO2	DT3	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
	SFTI1	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
1610	14.4	1.0	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.15	1507.13	8	1610	49.9	9.8	0	0	0	0	0	0	0
1611	26.8	0.9	0.3	0	0	0	100.5	82.6	96.0	0.612	8909.15	1515.31	8	1611	50.2	6.7	0	0	0	0	0	0	0
1612	7.9	0.2	0.3	0	0	0	100.5	82.6	96.0	0.612	8909.15	1524.20	8	1612	49.9	44.1	0	0	0	0	0	0	0
1613	11.5	0.4	0.3	0	0	0	100.5	82.6	96.0	0.612	8909.15	1528.08	8	1613	50.1	29.9	0	0	0	0	0	0	0
1614	21.1	0.3	0.2	0	0	0	100.5	82.6	96.0	0.612	8909.15	1532.53	8	1614	50.1	21.0	0	0	0	0	0	0	0
1615	15.6	0.3	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.15	1537.13	8	1615	49.8	12.3	0	0	0	0	0	0	0
1616	26.3	0.4	0.3	0	0	0	100.5	82.6	96.0	0.612	8909.15	1543.43	8	1616	49.9	5.9	0	0	0	0	0	0	0
1617	14.8	1.0	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.15	1550.22	8	1617	50.0	2.6	0	0	0	0	0	0	0
1618	9.9	0.8	0.1	0	0	0	100.5	82.6	96.0	0.612	8909.15	1618.55	8	1618	50.1	18.2	0	0	0	0	0	0	0
1619	11.0	1.0	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.15	1622.09	8	1619	50.2	14.1	0	0	0	0	0	0	0
1620	11.1	0.9	0.3	0	0	0	100.5	82.6	96.0	0.612	8909.15	1626.37	8	1620	49.8	7.5	0	0	0	0	0	0	0
1621	31.3	0.9	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.15	1629.54	8	1621	50.1	3.8	0	0	0	0	0	0	0
1622	45.0	0.7	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.15	1633.10	8	1622	49.9	1.9	0	0	0	0	0	0	0
1623	10.5	0.4	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1133.52	8	1623	50.1	42.0	0	0	0	0	0	0	0
1624	12.3	0.3	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1135.58	8	1624	50.0	30.8	0	0	0	0	0	0	0
1625	13.7	0.3	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1147.52	8	1625	49.8	20.3	0	0	0	0	0	0	0
1626	32.4	0.3	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1158.46	8	1626	50.0	13.0	0	0	0	0	0	0	0
1627	19.9	0.7	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1204.02	8	1627	50.1	7.9	0	0	0	0	0	0	0
1628	42.3	0.6	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1205.52	8	1628	50.0	4.3	0	0	0	0	0	0	0
1629	22.7	0.5	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1214.31	8	1629	50.0	3.0	0	0	0	0	0	0	0
1630	14.4	1.3	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1431.42	8	1630	50.8	17.5	0	0	0	0	0	0	0
1631	15.8	0.8	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1433.44	8	1631	49.7	12.8	0	0	0	0	0	0	0
1632	14.8	1.1	0.2	0	0	0	100.5	82.6	96.0	0.612	8909.18	1436.26	8	1632	50.2	8.2	0	0	0	0	0	0	0
1633	27.2	1.4	0.1	0	0	0	100.5	82.6	96.0	0.612	8909.18	1438.14	8	1633	50.2	5.2	0	0	0	0	0	0	0
1634	55.9	1.5	0.1	0	0	0	100.5	82.6	96.0	0.612	8909.18	1440.04	8	1634	49.9	2.8	0	0	0	0	0	0	0
1635	103.1	1.0	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1449.21	8	1635	49.9	1.5	0	0	0	0	0	0	0
1636	12.0	1.1	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1451.39	8	1636	50.2	15.1	0	0	0	0	0	0	0
1637	13.2	0.6	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1502.48	8	1637	49.8	16.6	0	0	0	0	0	0	0
1638	16.5	0.9	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1508.36	8	1638	50.2	13.2	0	0	0	0	0	0	0
1639	17.0	0.4	0.2	0	0	0	100.5	82.6	96.0	0.612	8909.18	1510.46	8	1639	50.3	10.5	0	0	0	0	0	0	0
1640	14.7	0.6	0.1	0	0	0	100.5	82.6	96.0	0.612	8909.18	1513.38	8	1640	50.1	7.9	0	0	0	0	0	0	0
1641	31.7	1.4	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1516.11	8	1641	49.7	5.9	0	0	0	0	0	0	0
1642	35.0	0.6	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1523.04	8	1642	50.1	4.4	0	0	0	0	0	0	0
1643	17.9	0.5	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1532.02	8	1643	50.4	16.6	0	0	0	0	0	0	0
1644	16.2	0.5	0.2	0	0	0	100.5	82.6	96.0	0.612	8909.18	1544.49	8	1644	50.2	16.7	0	0	0	0	0	0	0
1645	16.1	0.9	0.2	0	0	0	100.5	82.6	96.0	0.612	8909.18	1559.19	8	1645	50.2	12.8	0	0	0	0	0	0	0
1646	18.1	1.3	0.2	0	0	0	100.5	82.6	96.0	0.612	8909.18	1604.30	8	1646	49.9	8.8	0	0	0	0	0	0	0
1647	30.1	2.0	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1608.07	8	1647	50.4	6.3	0	0	0	0	0	0	0
1648	57.4	0.8	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1612.23	8	1648	50.2	4.2	0	0	0	0	0	0	0
1649	111.6	2.1	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1614.27	8	1649	50.0	3.0	0	0	0	0	0	0	0
1650	15.0	0.7	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.18	1617.21	8	1650	50.5	16.7	0	0	0	0	0	0	0
1651	13.3	1.2	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.19	1134.19	8	1651	50.3	16.3	0	0	0	0	0	0	0
1652	15.8	0.8	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.19	1142.58	8	1652	49.9	13.4	0	0	0	0	0	0	0
1653	18.3	1.0	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.19	1147.29	8	1653	50.1	10.1	0	0	0	0	0	0	0
1654	13.4	0.6	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.19	1354.55	8	1654	50.2	16.6	0	0	0	0	0	0	0
1655	13.8	0.5	0.1	0	0	0	100.5	82.6	96.0	0.612	8909.19	1412.04	8	1655	50.5	14.3	0	0	0	0	0	0	0
1656	14.5	0.9	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.19	1416.00	8	1656	50.8	13.0	0	0	0	0	0	0	0
1657	19.0	0.8	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.19	1436.20	8	1657	49.8	11.1	0	0	0	0	0	0	0
1658	75.4	1.2	0.1	0	0	0	100.5	82.6	96.0	0.612	8909.19	1445.10	8	1658	50.2	4.1	0	0	0	0	0	0	0
1659	14.1	0.8	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.19	1516.13	8	1659	50.4	16.7	0	0	0	0	0	0	0
1660	155.7	0.6	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.19	1522.20	8	1660	50.3	3.0	0	0	0	0	0	0	0
1661	0.0	0.9	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.19	1529.45	8	1661	50.2	2.6	0	0	0	0	0	0	0
1662	26.0	1.7	0.0	0	0	0	100.5	82.6	96.0	0.612	8909.19	1615.07	8	1662	50.6	9.9	0	0	0	0	0	0	0

SRL Single Tube Flow Instability Test # 9.0
Inconel Tube ID = 0.359"

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
RUN	HFLX	VOLT	CURRT	PTI2	PTO3	PBO1	PL2	PXI1	PPI1										
PWR1	VOLT	CURRT1	PTI1	PTO1	PBI1	PL1	PD1	PXO1	PPO1										
1853	0.0	0.000	0.2	0.1	3	1	98.0	113.2	49.9	51.1	110.9	50.7	125.5	50.7	43.5	45.7	44.6	38.5	110.8
1854	0.0	0.000	0.1	0.1	7	7	86.4	98.7	50.0	50.5	96.9	50.1	129.9	50.6	44.5	46.1	45.2	40.3	113.5
1855	0.0	0.000	0.1	0.1	6	5	79.4	89.6	50.0	50.2	88.1	49.6	132.2	50.3	45.1	46.2	45.7	41.5	115.2
1856	0.0	0.000	0.1	0.3	6	6	71.3	78.1	49.9	49.6	76.4	49.4	135.3	50.4	45.9	46.6	46.4	42.9	116.8
1857	0.0	0.000	0.1	0.2	6	6	64.1	68.9	50.0	49.4	68.1	49.2	138.1	50.5	46.5	47.0	47.1	44.1	118.7
1858	0.0	0.000	0.1	0.1	8	6	57.7	60.1	49.9	49.0	59.4	48.9	139.9	50.4	47.1	47.1	47.5	45.2	119.5
1859	0.0	0.000	0.2	0.2	9	6	54.3	55.4	50.0	49.0	54.6	49.0	141.3	50.4	47.6	47.6	48.1	45.9	121.0
1860	0.0	0.000	0.1	0.1	8	7	51.6	52.1	50.1	49.0	51.5	48.4	141.9	50.6	48.0	47.7	48.4	46.4	122.0
1861	0.0	0.000	0.1	0.1	7	6	49.4	49.5	50.0	49.0	49.2	48.4	142.3	50.7	48.1	47.8	48.6	46.8	122.5
1862	86.8	0.396	61.9	61.4	1414	1400	96.3	114.4	49.9	51.3	112.4	51.2	126.1	51.0	44.0	46.1	44.6	38.9	111.6
1863	87.5	0.399	62.2	61.7	1418	1403	84.5	97.9	50.1	50.6	95.7	50.8	130.7	51.3	45.2	46.9	45.9	41.1	115.0
1864	87.1	0.398	62.0	61.7	1413	1399	78.6	89.6	50.0	50.6	88.0	50.4	132.7	51.0	45.6	47.0	46.1	41.8	115.4
1865	87.4	0.399	62.0	61.8	1415	1399	70.8	78.4	49.9	50.1	76.9	49.6	135.5	50.9	46.2	47.2	46.7	43.2	117.7
1866	87.2	0.398	61.9	61.8	1412	1397	63.7	70.3	50.1	50.0	69.3	49.7	137.6	50.9	46.9	47.4	47.4	44.3	119.5
1867	87.0	0.397	61.9	61.6	1412	1399	58.5	62.1	50.1	49.6	61.5	49.3	139.5	50.6	47.4	47.6	47.8	45.1	120.9
1868	87.0	0.397	62.0	61.7	1409	1396	56.0	58.9	50.0	49.3	58.1	49.2	140.7	50.9	47.6	47.9	48.0	45.6	120.9
1869	87.0	0.397	62.7	61.8	1407	1394	53.8	55.8	50.0	49.4	55.2	49.2	141.6	50.6	47.9	48.0	48.3	46.1	121.9
1870	86.8	0.396	62.0	61.7	1407	1391	52.3	54.5	50.2	49.6	53.7	49.3	142.1	50.9	48.4	48.1	48.6	46.5	122.6
1871	86.8	0.396	61.9	61.8	1405	1389	51.4	52.7	49.9	49.3	52.2	49.1	142.2	51.4	48.1	48.1	48.6	46.4	122.3
1872	87.6	0.400	62.3	62.2	1407	1393	50.5	51.3	50.1	49.2	51.0	48.9	142.5	50.9	48.1	47.6	48.5	46.5	122.7
1873	174.6	0.797	88.1	87.7	1991	1972	97.1	114.5	50.0	52.2	112.3	51.7	126.2	51.7	44.6	46.9	45.2	39.3	112.1
1874	176.1	0.803	89.0	88.1	1999	1979	86.8	101.1	50.0	51.5	98.9	51.3	129.9	51.3	45.2	47.0	45.9	40.8	114.3
1875	175.8	0.802	88.2	88.1	1997	1977	78.6	90.4	49.8	51.1	88.9	50.6	132.5	51.1	45.9	47.2	46.5	42.1	116.0
1876	175.5	0.801	88.5	88.0	1995	1975	74.5	83.5	50.1	50.7	82.4	50.3	134.3	51.4	46.4	47.6	46.9	42.9	117.7
1877	175.2	0.800	88.3	87.9	1993	1971	69.3	76.6	49.9	50.3	75.3	49.8	135.8	51.0	46.6	47.4	47.2	43.6	118.9
1878	175.2	0.799	88.3	88.0	1991	1969	64.3	70.6	49.9	50.1	69.6	49.6	137.3	50.3	47.1	47.5	47.5	44.2	119.7
1879	175.3	0.800	88.3	88.0	1992	1970	66.2	71.5	50.0	50.1	70.4	49.8	137.3	51.2	47.0	47.5	47.5	44.3	120.0
1880	174.9	0.798	88.2	88.0	1988	1964	59.9	65.1	50.1	50.0	64.2	49.5	138.8	51.2	47.5	47.7	47.9	45.0	121.2
1881	0.0	0.000	0.0	0.1	8	7	97.8	113.7	50.2	51.7	111.1	51.0	124.9	51.3	44.1	46.6	44.7	38.9	111.0
1882	0.0	0.000	-0.1	0.1	10	8	90.2	103.2	49.8	51.0	101.5	50.4	127.1	50.6	44.5	46.4	45.0	40.0	112.6
1883	0.0	0.000	0.0	0.2	5	6	80.5	91.5	50.0	50.4	89.6	50.0	130.5	51.1	45.3	46.7	45.9	41.4	114.8
1884	0.0	0.000	-0.1	0.7	5	7	71.1	78.0	50.2	50.1	76.7	49.7	134.0	50.4	46.3	47.3	46.8	43.2	117.3
1885	0.0	0.000	0.2	0.1	6	5	63.5	68.7	50.1	50.0	67.7	49.0	136.8	50.8	46.9	47.5	47.3	44.2	118.8
1886	0.0	0.000	0.1	0.1	7	7	59.3	61.5	50.1	49.5	60.9	49.3	139.0	50.7	47.3	47.6	47.8	45.2	120.1
1887	0.0	0.000	0.1	0.2	10	6	56.5	57.5	49.9	49.2	56.8	48.4	139.4	50.6	47.5	47.6	47.8	45.6	119.7
1888	0.0	0.000	0.2	0.1	7	5	52.7	53.5	50.0	49.0	53.0	48.9	140.8	50.5	47.9	47.8	48.3	46.2	120.8
1889	0.0	0.000	0.1	0.1	9	5	50.1	50.7	49.9	49.1	50.3	48.8	141.3	50.5	48.1	48.0	49.0	46.5	121.8
1890	0.0	0.000	0.0	0.2	6	9	49.4	49.4	50.0	49.0	49.0	48.8	142.1	50.7	48.2	48.1	48.4	46.8	121.9
1891	87.5	0.399	62.1	61.9	1413	1401	97.7	115.3	50.1	51.8	113.5	51.7	126.7	51.6	44.9	46.7	45.5	40.0	111.8
1892	87.3	0.398	61.3	61.8	1412	1400	89.2	104.4	49.9	51.1	102.7	50.9	129.2	50.8	45.2	46.6	45.9	40.9	113.1
1893	87.1	0.397	62.0	61.8	1408	1396	83.4	95.3	49.9	50.8	93.5	50.7	131.4	51.0	45.8	46.8	46.2	41.9	114.9
1894	86.7	0.396	62.0	61.6	1407	1394	75.4	85.3	49.8	50.3	83.6	50.3	133.6	50.8	46.2	46.9	46.7	42.8	116.0
1895	86.8	0.396	61.4	61.7	1406	1395	70.0	77.7	50.1	50.1	76.6	50.2	135.6	51.1	46.9	47.3	47.3	44.0	117.6
1896	87.5	0.399	62.1	62.1	1410	1399	62.6	67.1	50.1	49.7	66.5	49.8	138.5	50.7	47.4	47.5	47.8	45.1	119.1
1897	87.2	0.398	62.2	61.9	1408	1395	58.3	62.2	50.0	49.5	61.3	49.5	139.3	50.5	47.7	47.6	48.0	45.6	119.6
1898	87.3	0.398	62.2	62.0	1408	1396	55.4	58.0	50.0	49.4	57.1	49.5	140.5	50.9	47.9	47.8	48.2	46.0	120.6
1899	87.3	0.398	62.3	62.1	1406	1393	52.5	53.8	49.8	48.7	53.5	48.8	140.9	50.1	47.6	47.1	47.9	45.9	120.6
1900	87.8	0.401	62.5	62.4	1406	1395	52.0	52.8	49.8	48.5	52.3	48.6	141.3	50.0	47.5	47.2	47.7	45.7	120.8
1901	175.8	0.802	88.5	88.1	1995	1974	97.9	115.2	50.0	52.0	113.3	51.8	126.5	51.7	45.0	47.0	45.7	40.2	111.9
1902	175.9	0.803	88.5	88.1	1996	1977	89.4	105.2	50.0	51.5	102.9	51.4	129.3	52.2	45.8	47.2	46.2	41.2	113.8
1903	175.3	0.800	88.3	88.0	1991	1973	81.2	93.1	50.0	50.9	91.4	50.8	131.7	51.0	46.1	47.2	46.5	42.4	115.7
1904	175.1	0.799	88.4	88.0	1990	1969	76.1	85.2	50.0	50.7	83.7	50.5	133.8	51.6	46.6	47.2	47.0	43.4	117.1
1905	174.6	0.797	88.2	88.0	1985	1967	69.7	76.6	50.1	50.2	75.5	50.1	136.1	51.1	47.0	47.5	47.5	44.2	117.9
1906	173.8	0.793	88.1	87.7	1981	1963	65.9	72.6	49.9	49.8	71.3	49.7	136.6	51.1	46.9	47.2	47.3	44.1	118.3
1907	174.1	0.794	88.1	87.8	1983	1962	65.0	70.5	49.5	49.4	69.5	49.6	136.5	50.4	46.8	47.0	47.2	44.1	118.5

SRL Single Tube Flow Instability Test # 9.0
Inconel Tube ID = 0.359"

	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
RUN	PA1	DT1	DT2	DP1	DLV1	OLI1	FLI1	FTI1	FBI1	FXI1	FXI2	FS1	TRTI1	TRTI2	TRTO1	TRTO2	JXI1	JXO1
1853	42.4	0.06	52.16	72.3	3.2	147.73	157.50	12.10	145.08	72.24	5.51	0.0	77.0	77.1	77.0	77.5	77.5	74.0
1854	43.7	0.06	40.02	73.4	26.3	129.82	138.38	10.45	127.09	60.07	4.95	0.0	77.5	77.6	77.5	78.0	77.7	74.2
1855	44.5	0.06	33.16	74.0	38.9	121.04	125.04	9.61	115.20	52.52	4.35	0.0	77.4	77.1	77.0	77.4	77.5	77.7
1856	45.5	0.06	24.25	74.6	55.2	102.99	106.01	8.01	97.50	44.61	3.69	0.0	77.0	77.1	77.0	77.3	77.6	72.4
1857	46.3	16.96	17.74	75.0	67.4	86.93	90.08	6.74	83.23	37.60	3.10	0.0	77.5	77.6	77.0	77.5	77.5	77.5
1858	47.0	10.53	10.99	75.3	80.3	69.19	70.41	5.22	65.60	29.32	2.40	0.0	77.7	77.6	77.5	77.9	77.7	72.6
1859	47.6	6.67	6.92	75.2	86.2	55.28	55.73	4.02	52.12	22.96	1.91	0.1	77.5	77.6	77.0	77.8	77.5	77.5
1860	48.0	4.28	4.41	75.7	90.4	44.22	43.97	3.05	40.48	18.35	1.53	0.0	77.1	77.1	77.0	77.5	77.6	68.8
1861	48.3	2.36	2.46	76.2	94.4	34.66	32.10	2.14	29.67	13.11	1.09	0.0	77.0	77.1	76.5	76.9	77.3	77.2
1862	42.9	0.06	51.09	72.9	4.2	149.10	159.18	12.60	145.73	67.96	5.58	0.3	77.5	77.6	124.8	125.3	81.8	69.1
1863	44.5	0.07	38.17	74.0	29.3	128.05	137.12	10.89	125.97	57.98	4.76	0.0	77.3	77.4	132.0	133.0	82.2	71.4
1864	45.0	0.06	32.32	74.4	39.9	121.77	125.78	10.00	115.84	53.25	4.43	0.0	77.4	77.5	137.0	137.8	82.3	66.1
1865	45.8	0.07	24.01	74.8	54.5	105.00	108.22	8.49	100.07	45.77	3.80	0.0	77.6	77.6	147.0	147.9	84.0	65.4
1866	46.7	17.37	18.19	75.2	65.9	89.74	93.58	7.34	86.05	39.24	3.23	1.3	77.4	77.5	157.9	158.7	83.9	64.4
1867	47.3	11.48	12.07	75.8	77.0	74.36	75.94	5.94	69.59	32.13	2.65	1.0	77.0	77.0	175.9	176.6	84.6	66.0
1868	47.6	8.91	9.46	75.7	82.7	64.92	66.57	5.24	61.46	27.50	2.26	0.6	77.9	78.0	190.8	191.3	87.1	65.2
1869	48.0	6.61	6.93	75.9	86.5	56.08	57.07	4.46	53.31	23.29	1.90	0.3	77.3	77.4	210.3	211.2	88.6	56.6
1870	48.4	5.23	5.48	75.9	88.9	49.27	50.30	3.93	50.24	20.61	1.68	-0.1	76.2	75.8	223.6	224.7	86.0	58.4
1871	48.2	4.42	4.60	76.1	89.4	45.59	46.10	3.57	53.60	19.06	1.56	0.2	76.7	76.7	240.9	241.7	88.7	58.7
1872	48.2	3.38	3.47	76.4	92.6	41.54	41.32	2.99	39.98	16.52	1.34	-0.1	76.6	76.2	271.2	272.4	89.6	56.0
1873	43.5	0.05	50.92	72.9	4.3	149.28	159.62	12.69	146.01	100.11	5.66	0.2	77.7	77.8	171.7	172.3	85.3	65.4
1874	44.5	0.05	40.38	73.6	24.8	133.78	141.81	11.38	130.73	66.50	4.93	0.0	76.7	76.7	182.7	183.7	84.9	64.2
1875	45.3	0.05	32.92	74.3	37.2	122.57	127.17	10.27	117.00	53.77	4.44	-0.1	77.0	76.8	194.7	195.7	86.4	62.9
1876	45.9	0.05	27.50	74.8	49.2	112.21	115.67	9.21	105.95	50.11	4.17	0.2	77.7	77.3	206.7	207.5	87.8	62.6
1877	46.3	0.05	22.41	75.1	58.0	101.16	105.00	8.36	96.44	45.03	3.68	0.5	76.7	76.3	219.7	220.5	88.1	58.9
1878	46.8	0.05	18.18	75.2	65.4	90.28	94.05	7.47	86.06	39.45	3.23	0.1	76.6	76.3	236.1	237.1	88.8	59.5
1879	46.8	18.01	18.94	75.1	64.8	91.93	95.28	7.54	87.05	39.98	3.32	0.2	77.3	77.4	235.8	236.8	89.7	59.0
1880	47.4	13.45	14.07	75.3	72.5	79.47	81.57	6.43	75.13	34.07	2.82	-0.1	77.7	77.3	261.2	262.3	92.1	57.9
1881	43.0	0.00	50.11	72.0	4.7	146.66	160.13	12.46	147.39	80.28	5.89	0.0	122.7	122.6	122.5	123.1	123.2	122.6
1882	43.6	0.00	43.65	72.6	17.3	137.79	148.44	11.54	136.15	74.31	5.33	0.0	121.4	121.1	121.0	121.7	121.5	120.6
1883	44.6	0.00	33.88	73.4	35.7	123.35	130.66	10.11	119.65	55.73	4.59	0.0	121.5	121.5	121.0	121.7	121.9	121.4
1884	45.9	-0.01	23.89	74.0	53.0	106.12	108.73	8.31	100.80	46.30	3.89	0.0	122.0	121.6	121.5	122.0	122.0	121.7
1885	46.6	16.53	17.10	74.4	67.2	89.44	91.48	6.90	84.14	38.65	3.26	0.0	121.5	121.1	121.0	121.7	121.5	121.0
1886	47.2	11.34	11.75	74.6	77.0	74.19	75.68	5.65	69.56	31.59	2.67	0.0	122.0	121.6	121.2	121.9	121.8	121.2
1887	47.5	8.27	8.59	75.0	82.6	63.13	64.21	4.79	59.62	27.15	2.28	0.0	121.2	121.1	120.5	121.2	121.4	119.7
1888	48.0	5.29	5.48	75.1	88.4	50.85	51.31	3.67	51.56	21.13	1.76	0.0	121.5	121.6	120.7	121.3	121.4	120.7
1889	48.2	3.27	3.37	75.5	92.3	40.35	39.55	2.76	36.82	16.39	1.40	0.0	122.0	122.1	121.0	121.7	122.1	120.7
1890	48.4	2.14	2.18	75.7	93.8	33.82	31.57	2.13	29.28	12.67	1.10	0.0	122.5	122.6	121.5	122.2	122.7	121.2
1891	43.7	0.04	51.50	72.0	4.3	144.01	155.95	12.79	142.99	66.75	5.64	1.6	122.6	122.2	169.6	170.1	125.6	114.6
1892	44.3	0.05	43.18	72.6	20.2	132.63	142.64	11.65	131.22	60.48	5.07	0.4	122.8	122.7	174.0	174.4	125.5	118.4
1893	45.0	0.05	36.40	73.2	33.1	122.49	130.80	10.63	119.79	55.76	4.69	1.1	122.5	122.2	178.1	178.8	126.7	109.0
1894	45.6	0.05	29.05	73.5	45.2	111.87	116.21	9.52	106.71	49.20	4.14	0.4	122.6	122.2	184.6	185.7	126.1	124.7
1895	46.5	0.04	23.38	73.9	55.9	99.78	102.44	8.45	93.76	43.72	3.59	1.6	122.7	122.3	193.2	194.1	128.0	124.7
1896	47.2	15.10	15.84	74.2	69.7	82.08	83.58	6.66	76.61	35.09	2.91	0.1	121.7	121.7	210.1	210.8	128.7	101.9
1897	47.5	11.33	11.69	74.4	77.8	70.38	72.24	5.89	65.88	30.12	2.49	0.1	122.5	122.1	222.0	222.9	128.8	124.5
1898	47.8	8.19	8.48	74.6	83.6	60.23	61.01	4.93	56.06	25.11	2.08	0.1	122.6	122.7	242.1	243.0	131.1	115.7
1899	47.5	5.61	5.87	75.1	87.5	50.51	51.32	4.00	52.71	20.85	1.73	2.0	122.6	122.6	270.0	271.0	134.1	88.9
1900	47.4	4.93	5.10	75.4	88.9	47.75	47.95	3.72	49.23	19.56	1.63	0.6	121.5	121.2	273.8	274.8	133.0	92.6
1901	44.0	0.04	51.54	72.1	4.4	143.27	156.21	12.78	143.27	74.23	5.68	0.2	122.5	122.6	217.0	217.9	129.9	108.0
1902	44.7	0.04	43.42	72.8	19.2	132.67	142.85	11.76	130.41	61.25	5.14	0.7	122.1	121.7	224.6	225.6	129.7	111.0
1903	45.3	0.04	35.03	73.5	34.3	122.30	127.51	10.52	115.98	54.52	4.51	-0.1	122.6	122.6	237.5	238.4	131.5	106.4
1904	46.0	0.04	29.00	73.8	45.4	111.66	114.93	9.53	105.52	48.86	4.07	0.0	122.5	122.2	249.1	249.8	131.9	111.4
1905	46.6	0.04	22.66	74.0	57.6	98.61	101.60	8.33	92.61	43.04	3.58	0.3	122.7	122.7	267.1	267.9	134.3	103.9
1906	46.5	19.00	19.72	74.3	63.1	92.31	95.41	7.67	86.96	40.31	3.36	0.1	121.5	121.2	275.0	276.2	133.5	101.3
1907	46.4	18.28	19.25	74.4	64.7	86.32	91.57	7.38	83.97	38.60	3.17	0.9	122.0	121.8	282.6	283.9	133.6	103.8

SRL Single Tube Flow Instability Test # 9.0

Inconel Tube ID = 0.359"

	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
RUN	PTO2	TEW95W	TEW72N	TEW48W	TEW24N	TEW14W	TEW10N	TEW07W	TEW04N	TEW01W									
	DT3	TEW95E	TEW72S	TEW48E	TEW24S	TEW14E	TEW10S	TEW07E	TEW04S										
1853	49.9	0.00	81.3	82.5	79.7	81.1	87.7	80.0	79.4	74.9	79.7	79.1	78.6	78.5	79.3	78.7	82.5	78.5	78.7
1854	50.0	0.00	79.2	79.0	78.5	79.0	80.4	78.6	78.8	73.5	79.1	78.4	77.8	78.0	78.8	78.7	82.2	78.3	78.3
1855	50.0	0.00	78.1	78.0	77.8	78.4	78.1	77.9	71.3	78.2	77.5	77.5	78.0	78.3	77.5	81.8	78.1	77.7	
1856	49.9	0.00	78.2	78.2	78.1	77.7	78.8	78.1	78.0	71.6	78.3	77.5	77.4	78.1	78.2	77.5	81.8	77.9	77.5
1857	50.0	16.98	77.8	77.6	77.9	77.9	77.7	78.1	77.9	71.7	78.1	77.5	77.6	78.2	78.1	77.8	81.8	78.1	77.7
1858	49.9	10.62	78.5	78.2	78.3	78.2	78.8	78.8	78.2	72.4	78.6	77.7	77.6	78.4	78.9	77.9	81.9	78.3	77.7
1859	50.0	6.88	77.7	77.3	78.0	78.0	77.6	77.9	77.9	71.6	78.2	77.5	77.5	78.1	78.5	77.7	81.8	77.9	77.6
1860	50.1	4.31	77.9	77.9	78.0	78.0	77.5	78.1	77.7	71.4	78.1	77.5	77.4	77.9	78.8	77.7	81.8	77.4	77.4
1861	50.0	2.36	77.5	77.1	77.3	77.4	77.5	77.3	77.1	70.9	77.5	77.1	77.1	77.4	77.4	77.2	81.1	77.5	77.2
1862	49.9	0.00	250.0	238.7	255.4	257.1	261.9	260.3	278.6	265.5	284.2	273.1	286.4	277.9	275.3	290.0	278.4	281.5	280.9
1863	50.1	0.00	256.1	243.9	263.7	264.5	269.3	268.4	287.6	273.8	294.0	282.9	296.7	288.1	285.7	300.6	288.4	293.0	291.5
1864	50.0	0.00	258.9	247.7	266.3	268.5	275.5	273.1	293.4	279.5	300.5	288.9	303.0	294.2	292.1	307.2	294.6	300.8	298.5
1865	49.9	0.00	266.3	255.1	275.3	277.9	285.9	283.5	305.8	291.5	313.7	302.3	316.5	307.8	305.3	320.6	307.9	312.7	312.3
1866	50.1	17.43	273.0	261.7	283.8	284.9	296.1	293.7	318.3	304.0	326.9	315.3	330.2	321.9	319.9	335.4	322.0	328.5	327.2
1867	50.1	11.62	282.3	269.4	297.1	297.1	308.1	309.1	337.1	321.0	347.3	335.6	352.2	342.9	340.4	357.5	342.5	345.2	349.6
1868	50.0	8.99	291.8	279.8	308.1	308.8	322.2	322.3	354.0	338.5	365.7	353.5	370.5	361.4	358.9	378.2	361.2	368.4	369.0
1869	50.0	6.74	303.9	289.6	322.2	322.6	339.6	339.1	375.8	359.6	388.9	376.7	394.6	385.2	382.9	400.8	384.8	394.8	394.5
1870	50.2	5.24	306.6	292.5	329.5	327.4	345.3	348.7	386.1	368.7	399.9	389.0	410.3	400.8	396.3	415.8	397.2	411.0	409.4
1871	49.9	4.45	316.9	303.6	342.3	341.8	361.4	364.5	407.4	390.1	422.7	410.7	428.5	420.0	417.3	433.2	415.5	429.8	427.0
1872	50.1	3.45	334.2	322.9	363.9	365.7	388.3	391.3	432.7	415.8	445.1	435.4	450.1	443.2	439.4	455.1	437.7	452.7	449.3
1873	50.0	0.00	399.1	378.3	407.5	410.4	415.6	415.8	448.1	427.6	458.4	440.0	463.4	448.6	443.6	469.6	445.9	456.9	454.4
1874	50.0	0.00	406.9	385.6	417.3	419.4	427.3	427.0	461.4	440.9	473.0	454.0	478.7	463.5	458.3	485.1	460.2	473.6	469.9
1875	49.8	0.00	415.5	393.9	424.5	429.2	438.7	437.7	474.8	453.6	486.4	467.8	492.8	477.6	473.0	500.1	475.0	488.2	484.8
1876	50.1	0.00	422.4	400.6	434.9	437.4	449.0	447.3	487.3	465.9	500.8	481.3	506.7	491.4	486.6	514.2	488.7	502.6	499.6
1877	49.9	0.00	429.8	407.4	439.8	446.3	459.6	457.9	500.9	479.3	515.0	495.9	521.8	506.2	501.9	529.0	502.9	517.6	515.0
1878	49.9	0.00	438.4	416.5	454.8	456.4	472.4	471.2	517.1	494.8	531.7	512.7	539.1	523.2	518.9	545.5	519.0	534.9	531.7
1879	50.0	18.21	439.7	417.8	454.9	457.9	475.3	472.1	516.0	495.1	530.3	511.1	537.2	521.6	516.7	543.8	517.6	532.4	530.6
1880	50.1	13.62	451.5	428.4	471.0	471.9	490.4	491.2	537.4	515.1	551.0	533.6	557.9	544.4	538.4	564.2	538.0	555.2	552.1
1881	50.2	0.00	131.9	135.5	131.0	132.2	145.8	127.5	126.4	123.0	126.6	126.1	127.5	127.0	131.4	129.5	128.5	125.4	128.5
1882	49.8	0.00	127.4	128.9	124.0	126.3	134.7	125.1	124.5	119.0	124.7	123.5	124.9	125.1	127.0	126.2	125.6	125.1	125.2
1883	50.0	0.00	126.0	127.4	119.7	125.1	130.8	124.1	124.0	118.3	124.0	122.8	124.4	124.4	125.1	124.7	125.2	124.3	124.1
1884	50.2	0.00	125.3	126.8	124.3	124.8	128.7	124.5	123.5	117.1	124.8	122.8	123.8	124.6	124.9	124.5	125.1	124.7	124.7
1885	50.1	16.80	122.9	123.8	122.9	123.0	123.5	121.9	121.8	114.6	122.0	122.1	122.5	122.7	123.9	122.5	123.9	121.3	122.5
1886	50.1	11.40	122.9	123.8	123.3	123.6	123.2	122.5	123.3	115.1	122.2	122.2	122.5	123.2	123.3	122.6	124.4	122.3	122.7
1887	49.9	8.26	122.6	123.0	122.1	123.1	122.4	121.9	122.2	114.0	121.7	122.0	122.3	122.5	123.0	122.1	123.4	122.3	122.3
1888	50.0	5.45	122.3	122.2	122.7	122.3	122.2	121.8	121.7	113.0	121.7	121.9	122.3	122.6	122.7	122.2	123.6	120.7	122.2
1889	49.9	3.31	122.4	122.5	123.3	122.7	122.3	122.2	123.0	113.9	122.3	122.3	122.4	122.8	123.3	122.4	124.0	122.1	122.4
1890	50.0	2.13	122.8	122.4	124.2	122.7	122.2	122.9	123.0	114.2	122.9	122.4	122.7	123.9	123.4	122.7	124.7	123.5	122.8
1891	50.1	0.00	283.1	272.0	290.8	288.0	297.4	296.7	314.3	300.5	319.1	308.9	320.4	312.5	309.0	321.8	310.2	317.1	314.3
1892	49.9	0.00	284.7	273.5	293.6	294.6	300.0	300.4	319.9	303.5	324.2	313.5	325.2	317.5	312.8	327.0	315.0	322.1	319.8
1893	49.9	0.00	287.9	276.9	297.1	297.9	305.4	304.4	323.5	309.2	329.9	319.1	331.0	323.2	318.7	332.7	321.1	328.1	325.8
1894	49.8	0.00	290.5	279.0	301.8	302.8	309.3	310.0	331.2	315.2	336.8	326.6	339.0	331.0	325.7	340.4	328.4	336.0	333.8
1895	50.1	22.75	297.0	285.6	308.7	311.1	319.5	318.5	341.9	326.3	348.5	337.7	350.6	342.4	338.2	352.6	340.2	348.1	346.3
1896	50.1	15.16	307.3	295.5	322.8	324.0	336.6	335.2	362.6	347.4	370.8	359.4	373.6	365.1	359.9	376.2	362.5	371.3	370.5
1897	50.0	11.53	311.0	298.8	330.1	329.8	342.7	345.0	375.3	357.6	383.8	372.8	387.7	379.0	372.4	389.6	375.9	386.8	384.9
1898	50.0	8.24	322.0	309.0	344.7	344.1	359.9	362.5	396.9	379.0	407.6	396.6	411.7	402.9	397.7	414.5	400.1	411.5	410.3
1899	49.8	5.63	336.3	323.3	364.6	364.1	387.0	387.5	426.6	410.9	438.0	426.2	443.0	433.8	428.9	445.7	430.5	442.4	442.6
1900	49.8	4.95	337.5	324.4	366.7	366.4	390.2	390.6	430.5	412.2	439.9	429.3	446.2	436.5	430.2	447.9	432.6	446.3	444.8
1901	50.0	0.00	425.5	405.5	438.6	441.4	447.6	449.2	482.2	460.5	490.4	473.1	493.5	479.3	471.1	495.7	474.3	488.0	484.4
1902	50.0	0.00	430.1	409.4	444.2	447.0	455.6	456.1	490.7	468.2	499.5	482.0	503.0	488.8	480.1	505.5	483.5	500.0	494.6
1903	50.0	0.00	437.7	417.0	453.6	456.2	468.5	466.9	504.5	482.7	514.5	496.2	518.0	503.7	495.5	521.1	517.4	517.1	510.6
1904	50.0	0.00	443.2	422.0	460.7	463.2	477.1	476.4	516.4	493.6	527.2	509.0	531.3	516.5	508.3	534.4	530.8	527.2	524.2
1905	50.1	22.29	452.3	432.0	473.4	476.2	494.7	491.6	534.9	512.3	546.5	528.4	551.2	536.5	528.9	554.4	551.2	546.3	544.7
1906	49.9	19.30	455.0	434.7	478.4	480.6	499.3	497.5	542.2	519.1	554.4	536.5	560.2	545.5	536.3	562.8	559.9	557.5	553.9
1907	49.5	18.39	458.8	437.8	483.3	484.7	505.2	502.8	548.5	524.9	561.0	543.2	567.6	552.5	542.8	570.1	566.8	563.8	558.3

SRL Single Tube Flow Instability Test # 9.0

Inconel Tube ID = 0.359"

RUN	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
	BL	TKW05E	BL	TJREF	BL	BL	BL	BL	BL	BL	BL	BL	BL	RTS	HRATIO	SVOLT	SPT01				
	TEW01E	TKW11N	TKW01S	TEREF	BL	BL	BL	BL	BL	BL	BL	BL	PWR2	QUALITY	HLOSS	SCURR	SDPT1				
1853	78.6	0	84.8	83.9	81.8	0	33.8	33.1	0	0	0	0	0.0	0.032	0.00	0.0	0.0	0.0	0.0	1.4	0.0
1854	77.9	0	82.6	79.4	81.8	0	33.3	33.0	0	0	0	0	0.0	0.020	0.00	0.0	0.0	0.0	0.0	1.1	0.0
1855	77.9	0	82.0	80.7	81.7	0	34.0	33.0	0	0	0	0	0.0	0.012	0.00	0.0	0.0	0.0	0.0	1.0	0.0
1856	77.7	0	82.1	81.5	82.0	0	33.9	33.2	0	0	0	0	0.0	0.052	0.00	0.0	0.0	0.0	0.0	1.2	0.0
1857	77.5	0	82.1	79.0	81.5	0	33.1	32.9	0	0	0	0	0.0	0.032	0.00	0.0	0.0	0.0	0.0	1.3	8.4
1858	79.9	0	82.1	79.0	81.9	0	33.6	33.2	0	0	0	0	0.0	0.014	0.00	0.0	0.0	0.0	0.0	1.0	8.5
1859	77.7	0	81.1	78.4	82.4	0	33.9	33.0	0	0	0	0	0.0	0.021	0.00	0.0	0.0	0.0	0.0	1.0	9.4
1860	77.9	0	81.6	78.2	82.0	0	32.9	33.0	0	0	0	0	0.0	0.017	0.00	0.0	0.0	0.0	0.0	1.1	12.5
1861	77.1	0	81.0	78.1	81.3	0	33.2	32.9	0	0	0	0	0.0	0.018	0.00	0.0	0.0	0.0	0.0	0.9	26.1
1862	292.1	0	272.9	287.2	288.5	0	33.5	33.0	0	0	0	0	86.0	0.043	-19.09	99.4	0.6	2.5	0.7	1.8	0.0
1863	302.9	0	282.6	298.2	294.0	0	33.9	33.3	0	0	0	0	86.6	0.044	-18.27	98.5	1.5	2.7	0.7	1.3	0.0
1864	309.7	0	287.9	304.6	292.3	0	34.4	33.1	0	0	0	0	86.2	0.044	-17.74	99.1	0.9	2.1	0.7	1.8	0.0
1865	323.7	0	302.1	317.2	304.2	0	33.6	32.8	0	0	0	0	86.5	0.044	-16.53	97.9	2.1	2.8	0.8	1.6	0.0
1866	338.7	0	315.3	334.0	315.4	0	35.5	33.0	0	0	0	0	86.3	0.044	-15.39	98.7	1.3	2.2	0.7	1.2	3.9
1867	361.6	0	334.3	353.7	339.1	0	33.4	32.9	0	0	0	0	86.2	0.044	-13.35	98.3	1.7	2.1	0.7	1.1	8.5
1868	380.9	0	350.5	372.9	357.1	0	33.1	32.7	0	0	0	0	86.1	0.044	-11.77	99.1	0.9	2.3	0.7	1.2	12.3
1869	406.6	0	373.8	398.1	381.0	0	33.3	32.4	0	0	0	0	86.2	0.044	-9.49	98.3	1.7	2.3	0.6	1.3	9.7
1870	421.3	0	392.7	413.4	396.8	0	32.6	32.1	0	0	0	0	85.9	0.044	-7.83	97.3	2.7	2.2	0.7	1.0	9.6
1871	438.5	0	404.4	430.7	410.7	0	32.9	32.1	0	0	0	0	85.8	0.044	-6.11	98.7	1.3	2.2	0.8	0.8	14.3
1872	459.8	0	423.7	452.0	432.8	0	32.7	31.9	0	0	0	0	86.7	0.044	-2.46	97.6	2.4	2.0	0.6	1.0	21.4
1873	473.6	0	435.6	463.8	443.9	0	34.0	32.3	0	0	0	0	173.0	0.044	-13.92	99.3	0.7	1.4	0.4	1.5	0.0
1874	489.7	0	450.2	479.8	461.3	0	32.8	32.1	0	0	0	0	174.3	0.044	-12.66	99.0	1.0	1.5	0.6	1.4	0.0
1875	504.8	0	462.6	493.0	474.5	0	32.9	32.0	0	0	0	0	174.1	0.044	-11.47	100.2	-0.2	1.5	0.6	1.4	0.0
1876	519.3	0	473.7	505.9	485.1	0	33.6	32.1	0	0	0	0	173.7	0.044	-9.93	98.5	1.5	1.6	0.5	1.3	0.0
1877	534.2	0	489.8	523.3	502.4	0	32.5	32.1	0	0	0	0	173.3	0.044	-8.59	99.4	0.6	1.6	0.5	1.4	0.0
1878	550.2	0	504.9	538.4	524.7	0	33.5	31.8	0	0	0	0	173.2	0.044	-6.75	99.3	0.7	1.6	0.5	1.2	0.0
1879	549.9	0	504.9	537.5	511.6	0	33.5	32.1	0	0	0	0	173.4	0.044	-6.84	99.6	0.4	1.4	0.5	1.1	3.9
1880	570.7	0	522.4	558.3	534.3	0	33.0	32.3	0	0	0	0	172.8	0.044	-3.85	98.8	1.2	1.5	0.5	1.2	5.9
1881	127.5	0	139.5	132.0	126.2	0	34.0	32.9	0	0	0	0	0.0	0.012	0.00	0.0	0.0	0.0	0.0	1.5	0.0
1882	124.1	0	134.4	127.4	125.5	0	37.8	33.0	0	0	0	0	0.0	0.012	0.00	0.0	0.0	0.0	0.0	1.7	0.0
1883	124.1	0	134.3	126.4	112.8	0	34.5	32.8	0	0	0	0	0.0	0.043	0.00	0.0	0.0	0.0	0.0	1.3	0.0
1884	124.3	0	132.2	126.1	126.1	0	34.3	32.8	0	0	0	0	0.0	0.131	0.00	0.0	0.0	0.0	0.0	1.3	0.0
1885	122.7	0	125.9	122.9	123.5	0	33.6	32.9	0	0	0	0	0.0	0.023	0.00	0.0	0.0	0.0	0.0	1.0	8.3
1886	122.7	0	126.2	123.4	112.8	0	33.7	32.9	0	0	0	0	0.0	0.014	0.00	0.0	0.0	0.0	0.0	1.7	11.1
1887	122.2	0	125.4	122.5	123.4	0	33.7	32.9	0	0	0	0	0.0	0.024	0.00	0.0	0.0	0.0	0.0	0.9	7.7
1888	122.2	0	124.7	122.2	123.8	0	33.4	32.8	0	0	0	0	0.0	0.008	0.00	0.0	0.0	0.0	0.0	0.8	10.0
1889	122.8	0	124.8	122.5	126.3	0	34.1	32.7	0	0	0	0	0.0	0.011	0.00	0.0	0.0	0.0	0.0	0.9	16.5
1890	123.1	0	115.4	123.1	121.6	0	33.7	33.1	0	0	0	0	0.0	0.030	0.00	0.0	0.0	0.0	0.0	0.8	30.8
1891	325.5	0	304.7	321.4	311.3	0	33.0	32.2	0	0	0	0	86.8	0.044	-14.18	99.1	0.9	2.2	0.7	1.8	0.0
1892	331.0	0	308.4	328.9	319.4	0	32.7	31.9	0	0	0	0	86.5	0.044	-13.70	99.7	0.3	2.2	0.7	1.5	0.0
1893	336.9	0	314.3	334.4	324.8	0	32.8	32.0	0	0	0	0	86.3	0.044	-13.16	98.1	1.9	2.2	0.7	1.8	0.0
1894	345.3	0	320.9	337.8	326.9	0	32.6	31.9	0	0	0	0	85.9	0.044	-12.41	98.1	1.9	2.3	0.7	1.4	0.0
1895	357.7	0	334.4	356.1	344.1	0	33.3	32.1	0	0	0	0	86.1	0.044	-11.65	100.0	0.0	2.3	0.8	1.5	0.0
1896	381.9	0	354.0	374.3	360.0	0	32.9	31.9	0	0	0	0	86.8	0.044	-9.83	100.6	-0.6	1.5	0.6	1.4	8.4
1897	396.8	0	366.2	390.4	377.9	0	32.8	31.7	0	0	0	0	86.4	0.044	-8.13	97.2	2.8	2.0	0.5	1.2	10.4
1898	422.7	0	357.4	414.4	400.6	0	32.6	32.0	0	0	0	0	86.5	0.044	-5.95	98.0	2.0	2.0	0.5	0.8	8.8
1899	454.6	0	416.9	444.3	431.6	0	32.3	31.8	0	0	0	0	86.6	0.044	-2.77	98.2	1.8	1.9	0.7	0.6	13.1
1900	457.3	0	423.6	455.3	465.0	0	32.5	31.8	0	0	0	0	87.1	0.044	-1.59	94.0	6.0	1.9	0.5	0.8	17.4
1901	503.3	0	464.3	494.2	473.3	0	32.9	32.0	0	0	0	0	173.9	0.044	-8.91	99.2	0.8	1.4	0.4	2.6	0.0
1902	513.9	0	474.5	507.6	483.0	0	33.1	32.0	0	0	0	0	174.2	0.044	-8.08	99.3	0.7	1.6	0.5	1.8	0.0
1903	529.7	0	489.2	521.7	496.3	0	32.7	31.8	0	0	0	0	173.7	0.044	-6.73	100.0	0.0	1.6	0.4	1.3	0.0
1904	543.5	0	498.8	531.2	507.2	0	32.8	31.7	0	0	0	0	173.3	0.044	-5.41	99.7	0.3	1.7	0.5	1.1	0.0
1905	564.0	0	520.5	556.0	530.9	0	33.3	32.0	0	0	0	0	173.1	0.044	-3.47	100.2	-0.2	1.6	0.5	0.9	0.0
1906	573.8	0	527.1	563.6	536.6	0	32.6	31.8	0	0	0	0	172.2	0.044	-2.26	98.5	1.5	1.7	0.5	1.0	4.1
1907	578.7	0	533.0	568.7	538.0	0	32.6	31.8	0	0	0	0	172.3	0.044	-1.47	99.1	0.9	1.4	0.4	2.4	7.5

SRL Single Tube Flow Instability Test # 9.0
Inconel Tube ID = 0.359"

	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
RUN	SDPT2	SRT11	BL	BL	DPL	VTL	HL	ID	DATE	TEST#	PTO2	DT3	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
	SFT11	BL	BL	BL	VTL	ID	TIME	RUN#															
1853	2.7	0.2	0.1	0	0	0	100.5	95.5	96.0	0.359	8911.21	1139.40	9	1853	49.9	0.0	0	0	0	0	0	0	0
1854	1.7	0.6	0.1	0	0	0	100.5	95.5	96.0	0.359	8911.21	1143.27	9	1854	50.0	0.0	0	0	0	0	0	0	0
1855	4.5	0.2	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.21	1147.00	9	1855	50.0	0.0	0	0	0	0	0	0	0
1856	4.3	0.4	0.0	0	0	0	100.5	95.5	96.0	0.359	8911.21	1150.13	9	1856	49.9	0.0	0	0	0	0	0	0	0
1857	6.4	0.2	0.0	0	0	0	100.5	95.5	96.0	0.359	8911.21	1152.40	9	1857	50.0	37.4	0	0	0	0	0	0	0
1858	8.3	0.2	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1157.28	9	1858	49.9	23.4	0	0	0	0	0	0	0
1859	9.6	0.2	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.21	1159.16	9	1859	50.0	15.2	0	0	0	0	0	0	0
1860	21.7	0.5	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1203.45	9	1860	50.1	9.5	0	0	0	0	0	0	0
1861	37.1	0.4	0.0	0	0	0	100.5	95.5	96.0	0.359	8911.21	1205.44	9	1861	50.0	5.2	0	0	0	0	0	0	0
1862	2.6	0.1	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.21	1357.48	9	1862	49.9	0.0	0	0	0	0	0	0	0
1863	2.5	0.3	0.4	0	0	0	100.5	95.5	96.0	0.359	8911.21	1402.21	9	1863	50.1	0.0	0	0	0	0	0	0	0
1864	4.2	0.2	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.21	1407.20	9	1864	50.0	0.0	0	0	0	0	0	0	0
1865	5.0	0.2	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1414.10	9	1865	49.9	0.0	0	0	0	0	0	0	0
1866	8.3	0.2	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.21	1420.22	9	1866	50.1	38.4	0	0	0	0	0	0	0
1867	8.5	0.4	0.4	0	0	0	100.5	95.5	96.0	0.359	8911.21	1422.05	9	1867	50.1	25.6	0	0	0	0	0	0	0
1868	7.9	0.2	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1424.14	9	1868	50.0	19.8	0	0	0	0	0	0	0
1869	8.4	0.4	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1428.14	9	1869	50.0	14.9	0	0	0	0	0	0	0
1870	10.4	0.3	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1430.44	9	1870	50.2	11.6	0	0	0	0	0	0	0
1871	13.5	0.5	0.5	0	0	0	100.5	95.5	96.0	0.359	8911.21	1433.31	9	1871	49.9	9.8	0	0	0	0	0	0	0
1872	35.9	0.4	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1448.18	9	1872	50.1	7.6	0	0	0	0	0	0	0
1873	2.3	0.3	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1503.37	9	1873	50.0	0.0	0	0	0	0	0	0	0
1874	2.4	0.2	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1507.01	9	1874	50.0	0.0	0	0	0	0	0	0	0
1875	4.3	0.2	0.5	0	0	0	100.5	95.5	96.0	0.359	8911.21	1508.51	9	1875	49.8	0.0	0	0	0	0	0	0	0
1876	5.0	0.3	0.4	0	0	0	100.5	95.5	96.0	0.359	8911.21	1510.34	9	1876	50.1	0.0	0	0	0	0	0	0	0
1877	5.4	0.2	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1512.30	9	1877	49.9	0.0	0	0	0	0	0	0	0
1878	6.4	0.5	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1514.13	9	1878	49.9	0.0	0	0	0	0	0	0	0
1879	5.8	0.3	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1516.58	9	1879	50.0	40.1	0	0	0	0	0	0	0
1880	10.1	0.3	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.21	1519.27	9	1880	50.1	30.0	0	0	0	0	0	0	0
1881	2.8	0.5	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.21	1553.21	9	1881	50.2	0.0	0	0	0	0	0	0	0
1882	3.8	0.3	0.1	0	0	0	100.5	95.5	96.0	0.359	8911.21	1555.16	9	1882	49.8	0.0	0	0	0	0	0	0	0
1883	3.0	0.3	0.0	0	0	0	100.5	95.5	96.0	0.359	8911.21	1557.01	9	1883	50.0	0.0	0	0	0	0	0	0	0
1884	3.9	0.4	0.1	0	0	0	100.5	95.5	96.0	0.359	8911.21	1558.42	9	1884	50.2	0.0	0	0	0	0	0	0	0
1885	5.9	0.2	0.0	0	0	0	100.5	95.5	96.0	0.359	8911.21	1607.22	9	1885	50.1	37.0	0	0	0	0	0	0	0
1886	12.4	0.2	0.0	0	0	0	100.5	95.5	96.0	0.359	8911.21	1609.04	9	1886	50.1	25.1	0	0	0	0	0	0	0
1887	11.6	0.3	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.21	1610.50	9	1887	49.9	18.2	0	0	0	0	0	0	0
1888	17.2	0.2	0.0	0	0	0	100.5	95.5	96.0	0.359	8911.21	1613.31	9	1888	50.0	12.0	0	0	0	0	0	0	0
1889	33.0	0.2	0.0	0	0	0	100.5	95.5	96.0	0.359	8911.21	1615.15	9	1889	49.9	7.3	0	0	0	0	0	0	0
1890	54.6	0.4	0.0	0	0	0	100.5	95.5	96.0	0.359	8911.21	1617.13	9	1890	50.0	4.7	0	0	0	0	0	0	0
1891	2.5	0.1	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.22	1034.55	9	1891	50.1	0.0	0	0	0	0	0	0	0
1892	2.6	0.2	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.22	1037.25	9	1892	49.9	0.0	0	0	0	0	0	0	0
1893	4.1	0.2	0.3	0	0	0	100.5	95.5	96.0	0.359	8911.22	1042.06	9	1893	49.9	0.0	0	0	0	0	0	0	0
1894	4.0	0.2	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.22	1043.48	9	1894	49.8	0.0	0	0	0	0	0	0	0
1895	3.3	0.5	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.22	1048.04	9	1895	50.1	50.1	0	0	0	0	0	0	0
1896	9.1	0.4	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.22	1057.01	9	1896	50.1	33.4	0	0	0	0	0	0	0
1897	8.7	0.3	0.1	0	0	0	100.5	95.5	96.0	0.359	8911.22	1059.23	9	1897	50.0	25.4	0	0	0	0	0	0	0
1898	7.0	0.4	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.22	1101.08	9	1898	50.0	18.2	0	0	0	0	0	0	0
1899	17.2	0.3	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.22	1107.46	9	1899	49.8	12.4	0	0	0	0	0	0	0
1900	17.2	0.5	0.1	0	0	0	100.5	95.5	96.0	0.359	8911.22	1112.22	9	1900	49.8	10.9	0	0	0	0	0	0	0
1901	2.3	0.2	0.1	0	0	0	100.5	95.5	96.0	0.359	8911.22	1121.21	9	1901	50.0	0.0	0	0	0	0	0	0	0
1902	4.0	0.3	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.22	1123.27	9	1902	50.0	0.0	0	0	0	0	0	0	0
1903	4.4	0.3	0.1	0	0	0	100.5	95.5	96.0	0.359	8911.22	1126.41	9	1903	50.0	0.0	0	0	0	0	0	0	0
1904	5.0	0.2	0.1	0	0	0	100.5	95.5	96.0	0.359	8911.22	1128.28	9	1904	50.0	0.0	0	0	0	0	0	0	0
1905	6.1	0.9	0.2	0	0	0	100.5	95.5	96.0	0.359	8911.22	1134.43	9	1905	50.1	49.1	0	0	0	0	0	0	0
1906	7.7	0.2	0.1	0	0	0	100.5	95.5	96.0	0.359	8911.22	1138.35	9	1906	49.9	42.5	0	0	0	0	0	0	0
1907	9.7	0.4	0.1	0	0	0	100.5	95.5	96.0	0.359	8911.22	1141.46	9	1907	49.5	40.5	0	0	0	0	0	0	0

SRL Single Tube Flow Instability Test # 12.0
Inconel Tube ID = 0.612"

RUN	1 PWR1	2 HFLX	3 VOLT B	4 VOLT T	5 CURRT1	6 CURRT2	7 PT11	8 PT12	9 PTO1	10 PTO3	11 PB11	12 PSO1	13 PL1	14 PL2	15 PD1	16 PX11	17 PXO1	18 PP11	19 PPO1
2277	149.0	0.399	64.9	64.7	2302	2287	54.3	61.8	49.8	48.4	57.9	49.0	93.2	45.9	31.2	38.2	32.6	21.0	84.8
2278	148.9	0.399	65.2	64.9	2294	2277	53.4	59.6	49.8	48.1	56.2	49.2	101.3	46.6	33.7	39.8	35.3	25.2	91.0
2279	149.6	0.400	65.4	65.1	2299	2260	51.6	55.4	50.1	48.4	53.0	48.8	113.9	47.9	38.1	42.4	39.4	32.0	100.6
2280	150.6	0.403	65.4	65.1	2313	2286	50.5	53.3	50.1	48.1	51.5	49.1	121.4	48.6	40.7	44.1	42.0	36.0	105.9
2281	148.4	0.397	65.2	64.9	2288	2275	49.1	50.9	49.9	48.0	49.6	49.3	126.5	49.2	42.9	45.3	44.1	39.7	110.5
2282	148.7	0.398	65.1	64.8	2294	2273	48.3	49.5	49.8	48.0	48.5	48.8	133.3	49.5	44.4	46.1	45.6	42.1	113.8
2283	147.8	0.396	65.1	64.8	2282	2267	48.0	48.6	49.8	47.9	47.8	48.8	135.8	49.6	45.1	46.5	46.3	43.4	115.4
2284	149.9	0.401	65.6	65.5	2287	2290	48.0	48.5	49.8	47.7	47.5	48.6	136.4	49.7	45.3	46.6	46.5	43.7	116.2
2285	149.4	0.400	65.6	65.3	2287	2287	47.8	48.3	49.7	47.7	47.6	48.7	136.2	49.5	45.2	46.5	46.4	43.5	115.9
2286	150.1	0.402	64.9	64.6	2325	2257	48.3	49.2	49.9	48.1	48.3	49.0	135.2	49.7	45.0	46.5	46.2	43.0	115.2
2287	149.7	0.401	65.6	65.3	2293	2282	47.7	48.2	49.7	47.7	47.4	48.5	135.7	49.4	45.1	46.4	46.2	43.3	116.4
2288	300.0	0.803	93.0	92.6	3240	3223	54.0	61.7	49.8	49.0	58.1	49.0	93.0	45.8	31.2	38.0	32.8	21.0	84.9
2289	300.7	0.805	93.1	92.7	3245	3228	52.9	58.4	49.9	49.2	55.4	48.9	104.0	46.8	34.4	40.2	36.2	26.6	93.0
2290	299.3	0.801	92.9	92.5	3236	3221	51.2	55.9	50.0	48.7	53.5	49.2	86.9	47.8	10.3	28.7	10.3	5.1	73.6
2291	298.7	0.800	92.8	92.4	3232	3222	51.2	54.5	50.4	49.0	52.5	49.4	97.5	48.6	17.5	32.5	17.6	13.0	82.2
2292	296.9	0.795	92.6	92.2	3222	3206	50.4	53.3	50.0	49.1	51.5	49.1	102.8	48.5	20.8	34.1	21.1	17.0	86.6
2293	300.1	0.803	93.0	92.7	3239	3219	50.6	53.8	50.0	48.7	51.8	49.2	100.2	48.4	19.0	33.5	19.3	14.9	84.3
2294	297.6	0.797	92.5	92.2	3229	3202	51.3	53.4	50.4	49.1	51.7	49.4	105.1	49.0	22.6	35.2	22.9	18.9	89.2
2295	296.9	0.795	92.5	92.1	3224	3204	49.8	52.1	49.5	47.9	50.4	48.4	105.6	48.0	22.5	35.0	22.8	18.9	89.0
2296	299.5	0.802	92.9	92.5	3238	3216	49.2	52.0	49.6	48.0	50.3	48.6	107.2	48.3	23.7	35.5	24.1	20.2	90.8
2297	149.3	0.400	65.2	64.9	2299	2283	53.8	61.2	49.6	48.8	57.3	48.2	92.2	45.5	31.1	38.1	32.7	21.1	84.4
2298	149.6	0.400	65.2	64.9	2305	2281	53.4	59.3	50.2	49.0	56.0	48.8	101.4	46.9	34.5	40.3	35.8	26.0	91.2
2299	150.1	0.402	65.2	64.9	2313	2278	51.6	56.2	49.7	48.7	53.6	48.6	109.7	47.2	36.7	41.6	38.2	30.1	96.9
2300	149.2	0.399	65.3	65.1	2293	2283	51.3	55.1	49.6	48.3	52.7	48.7	111.9	47.3	37.5	41.9	38.8	31.3	99.0
2301	148.9	0.398	65.3	65.0	2290	2277	50.6	54.0	49.8	48.1	51.9	49.0	116.6	47.8	39.3	43.2	40.6	33.9	102.3
2302	148.8	0.398	65.2	64.9	2294	2276	50.0	52.7	49.7	48.1	51.2	48.8	120.8	48.2	40.5	44.0	41.8	35.9	105.1
2303	148.6	0.398	65.2	64.9	2291	2275	49.8	51.9	49.9	48.6	50.4	48.6	124.5	48.9	41.9	44.7	43.2	38.1	108.1
2304	149.1	0.399	65.3	65.1	2292	2281	49.2	50.9	49.9	48.4	49.6	49.1	127.8	49.1	42.9	45.5	44.1	39.6	110.4
2305	149.5	0.400	65.3	65.0	2296	2276	49.3	50.8	49.6	47.5	49.6	48.9	126.3	48.6	42.3	44.9	43.6	38.8	109.3
2306	149.4	0.400	65.2	65.0	2297	2274	49.2	50.7	49.7	48.4	49.4	48.8	128.4	49.0	43.1	45.6	44.3	40.0	110.8
2307	148.3	0.397	65.2	64.9	2284	2273	48.7	50.4	50.0	48.5	49.1	48.7	129.8	49.4	43.6	45.9	44.8	40.6	111.7
2308	148.7	0.398	65.2	65.0	2288	2275	48.9	50.2	50.2	48.8	49.1	49.0	131.3	49.7	44.3	46.4	45.4	41.6	113.2
2309	151.1	0.404	65.7	65.4	2310	2290	48.6	49.6	49.8	47.9	48.6	48.8	131.8	49.4	44.2	46.2	45.4	41.6	113.1
2310	151.0	0.404	65.5	65.2	2316	2281	49.1	49.0	49.1	48.4	48.1	48.6	133.4	49.7	44.8	46.6	46.0	42.7	113.9
2311	149.9	0.401	65.5	65.2	2298	2280	48.2	48.6	49.5	47.6	47.9	48.4	132.5	49.0	44.1	45.8	45.2	41.7	113.4
2312	149.6	0.401	65.5	65.2	2294	2281	48.4	49.1	49.7	48.0	48.0	48.7	133.2	49.2	44.5	46.3	45.6	42.1	113.9
2313	300.0	0.803	92.9	92.6	3241	3222	54.1	61.3	49.6	48.6	57.3	48.6	91.8	45.7	31.2	38.2	32.8	21.2	84.6
2314	297.3	0.796	92.5	92.2	3225	3206	53.5	59.3	50.4	49.5	56.3	49.0	101.7	47.2	34.6	40.6	35.9	26.0	91.3
2315	298.3	0.798	92.8	92.3	3230	3215	52.7	58.1	50.0	48.8	55.0	48.9	105.8	47.1	35.9	41.4	37.3	28.2	94.8
2316	299.9	0.803	93.0	92.6	3240	3217	52.1	56.1	49.9	48.7	53.5	48.7	109.8	47.4	37.1	42.1	38.4	30.2	97.9
2317	298.0	0.798	92.7	92.3	3227	3208	51.6	55.3	49.4	48.0	52.9	48.3	111.3	47.2	37.2	41.9	38.6	30.8	98.2
2318	297.4	0.757	92.6	92.2	3225	3204	51.3	54.8	49.6	48.4	52.5	48.5	113.7	47.6	38.2	42.7	39.6	32.1	100.2
2319	296.9	0.795	92.5	92.2	3222	3204	50.9	54.1	50.3	47.8	51.8	47.8	113.5	47.4	38.2	42.4	39.4	32.2	100.7
2320	296.3	0.793	92.4	92.0	3221	3198	51.7	54.8	50.2	48.3	52.5	48.6	114.3	47.7	38.5	42.8	39.8	32.4	101.2

SRL Single Tube Flow Instability Test # 12.0
Inconel Tube ID = 0.612"

RUN	20 PA1	21 DT1	22 DT2	23 DP1	24 DLV1	25 OLI1	26 FLI1	27 FTI1	28 FBH1	29 FXI1	30 FXI2	31 FS1	32 TRT11	33 TRT12	34 TRTO1	35 TRTO2	36 JXI1	37 JXO1
2277	28.5	7.15	7.56	64.5	12.9	231.39	250.55	19.72	227.20	108.04	9.87	-0.1	77.5	77.3	128.0	129.1	81.1	68.8
2278	31.8	6.09	6.54	66.6	26.8	213.13	229.66	18.17	208.94	97.47	8.92	0.0	77.1	76.5	132.5	133.5	80.7	73.6
2279	37.0	4.21	4.46	69.3	49.2	178.11	189.74	15.07	172.21	79.67	7.31	0.0	77.6	77.5	145.7	146.8	83.1	67.4
2280	40.2	3.09	3.33	70.6	61.4	157.46	162.80	12.85	148.62	66.57	6.12	0.0	77.6	77.5	156.9	158.1	83.7	63.7
2281	42.9	2.15	2.27	72.1	74.4	128.42	131.88	10.39	120.34	58.71	5.03	0.0	77.6	77.7	174.6	175.8	84.8	63.9
2282	44.7	1.45	1.54	72.8	82.5	104.91	108.03	8.52	96.17	44.79	4.05	-0.2	77.6	77.6	196.6	197.1	86.1	60.1
2283	45.6	1.09	1.16	73.3	87.0	89.43	91.65	6.93	84.14	39.11	3.39	-0.1	77.6	77.5	220.6	222.1	87.7	60.4
2284	45.9	0.97	1.05	73.4	88.6	83.84	86.16	6.04	79.29	34.78	3.19	0.0	77.6	77.5	245.1	246.5	89.3	57.5
2285	45.8	0.94	1.05	73.3	98.7	84.40	86.34	6.29	78.73	36.22	3.26	-0.1	76.6	76.3	237.1	238.6	87.1	58.8
2286	45.5	1.14	1.20	73.2	85.6	95.61	97.44	7.47	88.87	42.47	3.61	-0.1	76.6	76.4	208.6	210.0	86.3	60.7
2287	45.6	1.03	1.14	73.3	88.1	87.92	89.40	6.52	81.73	35.62	3.30	-0.1	76.6	76.4	228.1	229.4	87.4	58.3
2288	28.7	6.79	7.13	64.6	12.8	232.39	251.48	20.22	226.97	106.99	9.86	-0.1	77.5	77.6	178.0	179.2	85.6	64.9
2289	32.9	5.46	5.83	67.3	31.8	207.53	221.92	17.89	200.76	91.99	8.65	-0.1	76.8	76.6	191.1	192.4	85.8	63.8
2290	9.9	4.21	4.46	69.0	20.9	181.66	193.51	15.47	175.15	191.92	17.96	0.0	76.6	76.3	207.4	208.7	86.6	77.2
2291	17.3	3.50	3.67	70.2	35.6	163.99	174.37	13.71	158.33	172.58	16.21	0.0	77.3	77.3	223.8	225.4	88.7	75.2
2292	20.8	3.15	3.28	70.6	43.7	152.60	162.88	12.78	147.71	161.24	15.21	-0.1	77.5	77.6	234.6	236.3	90.0	76.3
2293	19.0	3.41	3.65	70.5	39.8	158.24	168.62	13.48	152.85	167.24	15.80	0.0	77.5	77.1	229.4	230.9	89.2	77.7
2294	22.6	3.03	3.14	70.9	46.2	149.17	158.94	12.30	144.25	160.05	14.77	0.0	77.1	76.9	239.3	240.8	88.9	76.4
2295	22.5	2.99	3.22	71.1	48.2	148.61	155.75	12.02	141.70	154.52	14.61	0.0	76.6	76.5	244.1	245.7	89.1	74.7
2296	23.8	2.99	3.29	71.1	50.3	146.25	152.13	11.30	139.69	152.50	14.27	-0.1	76.6	76.5	253.6	255.4	89.2	75.4
2297	28.5	7.21	7.55	63.8	12.8	231.48	252.37	20.01	228.03	105.69	10.06	0.0	120.1	120.3	170.6	172.0	124.8	111.7
2298	32.4	6.15	6.46	65.8	28.2	206.89	229.07	18.25	206.82	97.46	9.11	0.0	121.1	120.0	176.6	177.9	125.1	122.5
2299	35.5	4.90	5.21	67.8	42.9	187.41	203.49	16.13	184.53	84.77	8.04	-0.1	121.5	121.2	185.0	186.3	126.1	110.1
2300	36.3	4.44	4.71	68.3	47.6	178.36	194.46	15.23	177.36	83.11	7.65	-0.1	120.8	121.5	188.0	189.5	127.0	99.5
2301	38.3	3.79	4.05	69.1	55.3	165.13	179.36	14.05	162.78	75.60	7.03	-0.1	121.0	120.4	192.6	194.0	125.9	117.3
2302	39.9	3.10	3.36	70.0	61.8	156.11	163.02	12.66	148.86	69.42	6.46	-0.1	121.1	121.2	200.1	201.6	127.7	105.1
2303	41.6	2.61	2.78	70.7	68.3	141.11	148.04	11.49	135.29	62.39	5.83	-0.1	121.6	121.5	209.1	210.6	128.7	102.2
2304	42.8	2.20	2.42	71.4	73.8	129.39	133.72	10.38	122.12	58.69	5.37	-0.1	121.1	120.5	217.6	219.0	127.3	115.1
2305	42.1	2.32	2.55	71.2	72.1	132.91	138.27	10.74	126.12	59.42	5.42	0.1	120.7	121.0	214.6	216.2	128.4	96.9
2306	43.0	2.12	2.28	71.4	74.9	126.51	130.48	10.01	119.47	56.49	5.06	-0.1	121.5	121.3	221.5	223.1	128.8	105.3
2307	43.6	2.01	2.10	71.8	77.3	120.50	123.77	9.53	113.20	52.96	4.75	0.0	121.0	120.3	225.5	226.9	128.4	124.7
2308	44.3	1.78	1.94	72.0	79.7	114.46	117.84	9.00	108.12	49.95	4.55	-0.1	121.8	120.9	232.7	234.3	129.0	125.7
2309	44.4	1.64	1.80	72.0	81.3	109.25	112.84	8.55	103.33	47.31	4.35	-0.1	121.1	120.8	239.1	240.7	129.6	103.5
2310	45.1	1.08	1.74	72.2	84.2	99.72	103.10	7.42	94.58	45.11	3.96	-0.1	120.1	119.7	254.3	256.0	129.4	111.4
2311	44.3	1.49	1.72	72.3	83.1	103.05	106.41	7.64	97.52	46.18	4.12	-0.1	121.6	122.2	256.4	258.3	132.7	81.4
2312	44.7	1.41	1.65	72.3	84.0	100.44	102.69	7.22	94.60	43.69	4.04	-0.1	121.6	121.5	261.3	263.1	131.1	105.4
2313	28.6	7.12	7.48	64.0	12.9	229.90	252.61	20.30	227.67	106.94	10.12	0.0	121.1	120.7	221.9	223.3	128.7	108.9
2314	32.4	5.87	6.18	66.1	28.5	206.84	228.57	18.16	206.81	96.28	9.31	0.0	121.5	120.7	231.9	233.6	129.5	113.0
2315	34.1	5.37	5.72	67.3	36.0	199.03	216.02	17.08	195.61	91.13	8.63	-0.1	120.6	120.3	239.0	240.5	129.7	109.5
2316	35.6	4.87	5.22	68.0	43.3	185.78	202.84	15.94	183.95	86.91	8.06	0.3	121.6	121.4	249.7	251.4	131.1	107.0
2317	36.0	4.66	5.03	68.5	47.1	179.44	195.53	15.21	177.56	84.62	7.85	-0.1	121.5	120.8	254.2	256.0	131.3	112.1
2318	37.1	4.31	4.71	68.9	50.8	173.70	188.21	14.57	170.66	80.49	7.60	0.1	121.6	121.1	259.2	261.0	131.6	106.4
2319	37.1	4.75	4.88	68.9	51.5	172.46	187.28	14.13	170.96	83.38	7.54	-0.1	121.6	121.5	262.4	264.3	132.7	103.5
2320	37.4	4.58	4.76	68.9	51.3	172.44	187.29	14.33	170.35	77.50	7.49	0.0	121.5	120.9	263.3	265.0	131.5	109.6

SRL Single Tube Flow Instability Test # 12.0
Inconel Tube ID = 0.612"

	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
RUN	PTO2	TEW95W	TEW72N	TEW48W	TEW24N	TEW13W	TEW10N	TEW07W	TEW04N	TEW01W									
		DT3	TEW95E	TEW72S	TEW48E	TEW24S	TEW13E	TEW10S	TEW07E	TEW04S									
2277	49.8	7.26	269.9	275.8	290.5	289.7	297.2	305.8	311.6	311.5	316.5	316.1	316.4	313.4	315.3	316.4	288.8	306.4	316.5
2278	49.8	6.17	274.8	280.9	296.2	295.8	303.4	310.8	318.7	319.1	324.4	323.6	324.0	320.9	323.1	323.9	294.9	312.9	324.8
2279	50.1	4.29	287.5	295.2	313.5	312.6	321.8	329.6	339.7	340.0	346.4	345.1	345.9	342.0	345.7	346.5	314.1	334.3	348.0
2280	50.1	3.20	296.8	304.6	325.9	325.8	336.0	340.9	355.5	356.3	362.6	362.9	363.2	360.6	362.5	364.1	331.6	352.4	365.0
2281	49.9	2.13	309.4	318.9	344.3	343.5	356.3	365.5	378.9	379.8	387.9	388.3	388.0	385.6	388.4	390.2	353.8	377.0	391.7
2282	49.8	1.52	325.8	335.0	366.2	367.0	381.4	389.0	406.3	408.2	416.3	416.0	416.6	415.7	416.6	417.1	384.6	406.0	418.1
2283	49.8	1.20	339.4	351.8	386.3	385.8	403.5	410.2	429.4	430.4	434.8	432.3	432.1	427.1	433.0	430.8	390.6	414.5	433.6
2284	49.8	1.00	359.8	373.1	411.8	411.6	425.6	433.6	443.3	444.0	449.0	446.9	447.7	443.1	447.9	446.2	406.2	429.3	446.5
2285	49.7	0.98	354.2	364.6	405.7	404.2	419.2	426.4	440.3	441.3	448.1	445.3	444.7	438.3	445.0	442.6	400.3	425.4	444.8
2286	49.9	1.27	332.9	341.8	376.2	375.5	392.4	402.3	420.3	421.1	429.5	427.5	428.3	425.9	428.3	429.2	390.3	414.1	429.6
2287	49.7	1.09	346.4	358.4	394.5	393.8	411.4	418.0	435.7	435.8	442.0	439.0	439.7	434.3	438.9	437.3	399.2	421.0	439.4
2288	49.8	6.95	437.5	448.7	467.2	465.7	478.3	483.3	505.7	505.4	516.4	513.7	513.9	508.1	513.8	514.6	462.8	495.4	516.5
2289	49.9	5.54	450.0	461.4	481.8	481.2	494.8	504.2	524.7	523.9	535.2	532.8	533.1	525.0	531.9	531.3	472.3	509.4	534.1
2290	50.0	4.27	463.1	475.4	498.3	498.0	514.0	521.9	542.9	543.4	551.8	548.4	549.0	545.5	547.6	546.4	499.2	527.8	547.5
2291	50.4	3.63	474.6	487.0	513.1	513.1	529.3	539.1	554.7	554.7	559.1	555.2	557.4	553.2	556.1	554.0	508.9	536.7	554.1
2292	50.0	3.27	482.5	496.6	521.7	523.0	537.2	541.6	559.1	558.1	563.4	560.1	561.7	557.6	561.1	558.7	514.0	540.6	557.6
2293	50.0	3.31	476.6	490.8	516.2	516.1	533.3	540.4	560.3	559.3	567.6	563.9	560.6	552.2	560.4	558.7	483.7	527.5	557.8
2294	50.4	3.06	485.2	497.8	526.8	526.2	542.1	549.4	562.4	561.0	566.0	564.3	564.4	559.6	562.7	562.3	515.9	543.2	559.8
2295	49.5	2.97	488.5	502.4	530.1	529.5	544.7	552.3	563.7	562.0	567.1	565.7	565.4	560.5	563.5	562.6	517.2	543.6	559.5
2296	49.6	2.95	499.5	512.7	538.2	537.1	549.1	555.2	568.1	566.9	569.0	566.9	565.5	560.4	561.8	560.2	516.4	541.8	556.9
2297	49.6	7.08	298.9	303.9	321.3	321.0	329.0	334.9	344.5	345.0	350.2	350.2	350.7	348.4	349.1	350.5	321.1	339.7	350.4
2298	50.2	6.04	303.1	309.0	327.2	326.6	335.8	343.2	353.1	353.5	359.2	359.3	359.5	356.1	358.6	359.8	327.6	347.4	360.4
2299	49.7	4.81	309.5	316.3	336.3	335.7	346.6	354.4	365.4	365.3	371.7	371.7	372.4	369.6	371.6	372.9	340.8	360.9	373.7
2300	49.6	4.40	314.2	320.4	341.1	340.8	352.3	359.7	371.6	372.0	378.9	378.9	378.8	376.3	379.0	380.2	346.6	367.5	380.4
2301	49.8	3.72	317.0	322.3	345.0	343.9	356.8	363.1	377.5	378.0	385.0	384.9	385.3	382.0	384.7	386.3	351.3	373.1	387.3
2302	49.7	3.13	322.8	329.1	353.1	352.9	366.7	373.2	388.0	389.4	396.5	396.6	396.7	395.1	396.8	396.5	362.3	385.5	399.0
2303	49.9	2.63	329.0	336.7	362.5	361.9	377.3	385.8	400.4	401.6	409.3	409.6	409.9	407.5	409.6	411.2	375.7	398.0	412.5
2304	49.9	2.20	335.5	342.6	369.8	368.9	385.2	392.9	410.9	411.4	421.7	420.6	420.7	414.7	420.6	421.3	380.9	405.0	424.2
2305	49.6	2.32	334.2	341.7	368.8	368.6	384.9	390.1	408.3	409.9	417.8	418.2	418.1	416.8	418.1	419.8	385.6	407.3	420.6
2306	49.7	2.09	338.8	345.7	375.0	374.7	391.6	397.7	416.4	418.2	427.4	426.8	426.7	423.9	426.6	427.4	390.5	413.7	429.2
2307	50.0	1.91	341.4	347.5	378.7	378.3	396.0	403.0	421.9	423.0	432.2	431.5	432.0	428.7	431.1	432.1	395.0	417.9	433.4
2308	50.2	1.75	346.9	353.1	385.4	385.6	403.4	410.0	431.0	432.4	440.6	440.1	440.3	436.3	438.6	439.6	400.9	424.4	440.0
2309	49.8	1.59	352.1	358.1	392.4	390.8	409.9	416.1	439.1	440.2	449.1	446.9	447.2	443.3	445.8	446.3	406.7	429.1	446.9
2310	49.1	1.41	363.4	371.1	406.9	407.3	426.5	427.1	456.0	456.1	456.1	455.0	453.4	451.1	454.7	454.0	413.9	435.8	453.2
2311	49.5	1.41	365.6	375.7	409.5	409.3	428.5	432.7	454.4	453.5	454.1	454.6	452.7	450.5	453.1	452.2	415.5	436.1	452.0
2312	49.7	1.36	364.7	372.0	413.0	411.6	428.8	435.1	444.3	444.4	453.2	452.3	451.2	448.2	451.7	451.0	409.0	433.9	451.1
2313	49.6	7.13	457.3	469.3	492.9	492.8	508.4	517.2	536.9	536.2	547.0	544.0	544.5	540.1	544.4	544.0	495.0	525.6	546.3
2314	50.4	5.90	463.3	475.2	501.5	500.7	517.1	524.0	545.5	544.9	555.5	552.7	552.3	548.3	552.3	552.0	502.4	533.5	553.8
2315	50.0	5.38	469.3	481.2	508.1	507.0	523.8	532.1	551.9	551.8	562.2	559.0	558.6	554.2	558.4	558.7	508.9	539.4	559.9
2316	49.9	4.79	480.7	491.6	520.6	519.9	537.2	544.7	562.3	561.8	570.8	568.1	568.4	564.5	566.9	566.9	519.6	548.2	565.9
2317	49.4	4.70	482.5	494.3	522.3	522.2	539.0	545.2	564.7	563.4	571.8	569.7	568.9	565.1	567.6	566.6	520.8	548.1	565.3
2318	49.6	4.45	486.1	497.8	526.7	525.9	542.5	550.1	567.1	565.8	572.8	569.6	569.6	565.1	567.0	565.8	520.5	545.1	559.9
2319	50.3	4.45	490.2	501.2	530.1	530.3	546.1	552.0	567.5	566.7	567.8	565.0	562.9	557.5	558.6	556.0	514.6	538.6	554.5
2320	50.2	4.45	490.1	500.8	529.8	529.0	545.0	552.4	566.8	565.6	568.1	565.1	562.9	557.1	558.6	556.1	513.5	538.3	554.7

SRL Single Tube Flow Instability Test # 12.0
Inconel Tube ID = 0.612"

RUN	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77
	BL	TKW04E	BL	TJREF	BL	BL	BL	BL	BL	BL	BL	BL	BL	RTS	HRATIO	SVOLT	SPT01				
	TEW01E	TKW07N	TKW01S	TEREF	BL	BL	PWR2	QUALITY	HLOSS	SCURR	SDPT1										
2277	316.3	0	0.0	326.6	316.3	336	0.0	31.4	31	62	0	0	146.0	0.028	-18.60	97.2	2.8	0.2	3.3	1.1	14.7
2278	323.9	0	0.0	334.2	331.2	349	0.0	32.5	32	62	0	0	147.8	0.028	-18.16	98.4	1.6	0.3	3.4	1.4	28.6
2279	347.4	0	0.0	360.0	352.1	372	0.0	32.4	32	62	0	0	147.1	0.028	-16.83	99.7	0.3	0.2	3.4	1.0	14.7
2280	365.8	0	0.0	376.2	367.4	386	0.0	32.6	31	62	0	0	148.9	0.028	-15.46	98.5	1.5	0.3	3.3	1.4	61.3
2281	392.1	0	0.0	401.5	394.6	415	0.0	32.4	31	62	0	0	147.6	0.028	-13.53	98.8	1.2	0.3	3.5	1.5	98.3
2282	414.0	0	0.0	425.5	422.3	439	0.0	32.3	31	62	0	0	147.3	0.028	-11.15	98.6	1.4	0.2	3.6	1.5	0.0
2283	425.5	0	0.0	443.1	440.0	461	0.0	32.3	31	62	0	0	148.9	0.028	-8.22	97.8	2.2	0.2	3.4	1.3	0.0
2284	436.4	0	0.0	460.3	449.6	470	0.0	31.6	32	62	0	0	150.1	0.029	-5.59	98.5	1.5	0.2	3.4	5.2	0.0
2285	435.4	0	0.0	459.5	452.5	470	0.0	32.5	31	62	0	0	149.4	0.029	-6.46	98.5	1.5	0.2	3.4	1.1	0.0
2286	421.9	0	0.0	439.6	435.7	453	0.0	32.3	32	62	0	0	145.7	0.028	-9.26	95.6	4.4	0.2	2.1	1.1	0.0
2287	431.7	0	0.0	454.4	449.4	467	0.0	32.3	31	62	0	0	149.0	0.028	-7.06	98.2	3.8	0.3	3.5	0.9	0.0
2288	514.2	0	0.0	537.2	523.8	552	0.0	32.2	32	62	0	0	298.4	0.029	-13.11	98.6	1.4	0.1	2.6	1.0	16.8
2289	527.2	0	0.0	554.1	539.2	570	0.0	32.3	32	62	0	0	299.2	0.029	-11.72	99.0	1.0	0.1	2.7	1.3	23.8
2290	537.7	0	0.0	565.4	551.6	584	0.0	32.0	31	62	0	0	296.0	0.029	-9.84	98.5	1.5	0.2	2.5	1.2	21.3
2291	542.5	0	0.0	574.0	561.4	592	0.0	32.0	31	62	0	0	297.7	0.029	-7.99	98.1	1.9	0.2	2.5	0.9	24.2
2292	543.2	0	0.0	578.0	564.1	595	0.0	32.3	31	62	0	0	295.5	0.029	-6.81	98.6	1.4	0.2	2.5	0.9	15.1
2293	542.0	0	0.0	578.2	564.7	593	0.0	32.3	32	62	0	0	296.2	0.029	-7.55	99.6	0.4	0.1	2.6	1.0	38.4
2294	544.2	0	0.0	583.8	567.6	594	0.0	32.3	31	62	0	0	295.1	0.029	-6.20	97.9	2.1	0.2	2.5	4.1	40.3
2295	543.5	0	0.0	579.8	567.4	591	0.0	32.2	31	62	0	0	295.0	0.029	-5.76	98.1	0.9	0.2	2.5	1.3	21.5
2296	544.5	0	0.0	578.7	560.0	590	0.0	32.3	32	62	0	0	297.4	0.029	-4.42	97.6	2.4	0.2	2.6	2.9	52.1
2297	349.7	0	0.0	359.7	354.7	371	0.0	32.3	31	62	0	0	148.2	0.028	-13.93	97.7	2.3	0.3	3.7	1.0	14.5
2298	359.7	0	0.0	373.4	365.0	383	0.0	32.4	32	62	0	0	148.0	0.028	-13.34	97.8	2.2	0.2	1.4	1.1	16.6
2299	373.1	0	0.0	388.3	377.5	397	0.0	32.3	31	62	0	0	147.8	0.028	-12.38	98.5	1.5	0.2	3.8	1.0	17.9
2300	380.8	0	0.0	391.2	387.4	403	0.0	32.0	32	62	0	0	148.5	0.028	-12.08	99.2	0.8	0.2	3.9	1.1	25.1
2301	386.9	0	0.0	397.4	391.9	408	0.0	32.2	32	62	0	0	148.0	0.028	-11.47	97.6	2.4	0.2	3.9	1.1	22.8
2302	399.3	0	0.0	404.1	403.8	417	0.0	31.8	31	62	0	0	147.6	0.028	-10.57	97.1	2.9	0.2	3.7	1.5	45.7
2303	411.9	0	0.0	421.4	413.5	431	0.0	32.6	31	62	0	0	147.6	0.028	-9.65	97.8	2.2	0.2	3.7	1.3	54.2
2304	422.2	0	0.0	435.7	432.8	446	0.0	32.2	31	62	0	0	148.4	0.028	-8.62	97.2	2.8	0.2	3.6	1.1	72.1
2305	420.4	0	0.0	429.8	425.7	442	0.0	32.2	31	62	0	0	148.0	0.028	-8.96	97.6	2.4	0.2	3.7	1.4	79.1
2306	426.4	0	0.0	433.9	436.0	451	0.0	31.8	31	62	0	0	147.9	0.028	-8.13	97.1	2.9	0.2	3.6	1.3	100.9
2307	430.6	0	0.0	445.6	440.0	457	0.0	32.4	32	62	0	0	147.5	0.028	-7.72	97.2	2.8	0.2	3.9	1.5	179.9
2308	436.4	0	0.0	452.9	446.2	463	0.0	31.2	32	62	0	0	147.8	0.028	-6.94	97.2	2.8	0.2	3.7	1.5	141.1
2309	441.2	0	0.0	456.5	450.4	470	0.0	32.2	31	62	0	0	149.8	0.028	-6.09	98.8	3.2	0.2	3.8	1.1	85.5
2310	446.1	0	0.0	466.5	453.4	471	0.0	32.3	32	62	0	0	148.8	0.028	-4.09	95.6	4.4	0.2	3.3	9.5	0.0
2311	445.6	0	0.0	463.9	456.8	472	0.0	32.3	32	62	0	0	148.7	0.028	-4.53	99.7	0.3	0.2	3.2	6.2	311.1
2312	439.9	0	0.0	460.8	452.0	472	0.0	32.2	32	62	0	0	148.8	0.028	-3.69	97.7	2.3	0.3	3.7	1.0	0.0
2313	539.1	0	0.0	562.5	546.9	575	0.0	32.5	32	62	0	0	296.3	0.029	-8.28	98.7	1.3	0.1	2.6	1.1	12.2
2314	542.6	0	0.0	570.5	553.2	583	0.0	32.5	32	62	0	0	295.5	0.029	-7.11	97.7	2.3	0.2	2.7	1.1	18.4
2315	545.9	0	0.0	576.7	563.8	591	0.0	32.4	32	62	0	0	296.8	0.029	-6.32	98.2	1.8	0.2	2.6	1.1	16.2
2316	549.6	0	0.0	581.0	572.6	597	0.0	32.3	31	62	0	0	297.8	0.029	-5.17	98.7	1.3	0.2	2.7	1.3	13.0
2317	548.4	0	0.0	585.5	569.3	594	0.0	32.1	31	62	0	0	296.2	0.029	-4.54	98.2	1.8	0.2	2.8	1.3	15.2
2318	547.2	0	0.0	584.3	565.7	588	0.0	32.2	32	62	0	0	295.4	0.029	-3.94	97.9	2.1	0.2	2.7	1.4	14.8
2319	545.8	0	0.0	575.8	559.8	585	0.0	32.1	32	62	0	0	295.2	0.029	-3.56	97.3	2.7	0.2	2.8	4.2	26.9
2320	545.8	0	0.0	578.3	557.2	581	0.0	32.3	32	62	0	0	294.2	0.029	-3.80	99.5	0.5	0.2	2.7	2.6	15.5

SRL Single Tube Flow Instability Test # 12.0
Inconel Tube ID = 0.612"

	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
RUN	SDPT2	SRT1	BL	BL	DPL	HL	DATE	TEST#	PTO2	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
	SFT1	BL	BL	VTL	ID	TIME	RUN#	DT3	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL	BL
2277	14.9	1.1	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	1907.52	12	2277	49.8	16.0	0	0	0	0	0	0	0
2278	14.3	0.4	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	1910.39	12	2278	49.8	13.6	0	0	0	0	0	0	0
2279	14.5	0.5	0.3	0	0	0	100.5	95.5	96.0	0.612	9003.19	1916.30	12	2279	50.1	9.5	0	0	0	0	0	0	0
2280	16.5	0.2	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	1921.01	12	2280	50.1	7.1	0	0	0	0	0	0	0
2281	0.0	0.4	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	1924.41	12	2281	49.9	4.7	0	0	0	0	0	0	0
2282	0.0	0.5	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	1936.10	12	2282	49.8	3.4	0	0	0	0	0	0	0
2283	0.0	0.4	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	1938.18	12	2283	49.8	2.7	0	0	0	0	0	0	0
2284	0.0	0.3	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	1943.54	12	2284	49.8	2.2	0	0	0	0	0	0	0
2285	0.0	0.6	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	2002.55	12	2285	49.7	2.2	0	0	0	0	0	0	0
2286	0.0	0.4	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	2009.50	12	2286	49.9	2.8	0	0	0	0	0	0	0
2287	0.0	1.0	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	2015.00	12	2287	49.7	2.4	0	0	0	0	0	0	0
2288	16.5	0.4	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.19	2310.39	12	2288	49.8	15.3	0	0	0	0	0	0	0
2289	13.5	0.3	0.4	0	0	0	100.5	95.5	96.0	0.612	9003.19	2320.14	12	2289	49.9	12.2	0	0	0	0	0	0	0
2290	20.4	0.4	0.3	0	0	0	100.5	95.5	96.0	0.612	9003.19	2325.19	12	2290	50.0	9.1	0	0	0	0	0	0	0
2291	23.2	0.2	0.4	0	0	0	100.5	95.5	96.0	0.612	9003.19	2329.04	12	2291	50.4	8.0	0	0	0	0	0	0	0
2292	22.0	0.5	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.19	2331.46	12	2292	50.0	7.2	0	0	0	0	0	0	0
2293	22.2	0.6	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.19	2338.30	12	2293	50.0	7.3	0	0	0	0	0	0	0
2294	25.5	0.4	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	2346.21	12	2294	50.4	6.8	0	0	0	0	0	0	0
2295	26.9	0.6	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	2349.49	12	2295	49.5	6.6	0	0	0	0	0	0	0
2296	30.2	1.2	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.19	2353.36	12	2296	49.6	6.5	0	0	0	0	0	0	0
2297	15.7	0.2	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	14.48	12	2297	49.6	15.6	0	0	0	0	0	0	0
2298	13.6	0.4	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	18.00	12	2298	50.2	13.3	0	0	0	0	0	0	0
2299	10.6	0.4	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	21.29	12	2299	49.7	10.6	0	0	0	0	0	0	0
2300	14.1	0.9	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.20	24.53	12	2300	49.6	9.7	0	0	0	0	0	0	0
2301	16.2	0.2	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	27.49	12	2301	49.8	8.2	0	0	0	0	0	0	0
2302	17.8	0.5	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	29.54	12	2302	49.7	6.9	0	0	0	0	0	0	0
2303	25.8	0.6	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	33.36	12	2303	49.9	5.8	0	0	0	0	0	0	0
2304	0.0	0.7	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	36.17	12	2304	49.9	4.9	0	0	0	0	0	0	0
2305	28.7	0.3	0.3	0	0	0	100.5	95.5	96.0	0.612	9003.20	38.10	12	2305	49.6	5.1	0	0	0	0	0	0	0
2306	0.0	0.7	0.0	0	0	0	100.5	95.5	96.0	0.612	9003.20	42.45	12	2306	49.7	4.6	0	0	0	0	0	0	0
2307	0.0	0.3	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	44.59	12	2307	50.0	4.2	0	0	0	0	0	0	0
2308	0.0	0.4	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.20	48.48	12	2308	50.2	3.9	0	0	0	0	0	0	0
2309	0.0	1.0	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.20	55.33	12	2309	49.8	3.5	0	0	0	0	0	0	0
2310	0.0	0.8	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	58.58	12	2310	49.1	3.1	0	0	0	0	0	0	0
2311	0.0	0.6	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.20	103.16	12	2311	49.5	3.1	0	0	0	0	0	0	0
2312	0.0	0.4	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.20	114.03	12	2312	49.7	3.0	0	0	0	0	0	0	0
2313	16.6	0.3	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	201.24	12	2313	49.6	15.7	0	0	0	0	0	0	0
2314	12.2	0.3	0.3	0	0	0	100.5	95.5	96.0	0.612	9003.20	203.47	12	2314	50.4	13.0	0	0	0	0	0	0	0
2315	17.0	0.8	0.2	0	0	0	100.5	95.5	96.0	0.612	9003.20	206.04	12	2315	50.0	11.9	0	0	0	0	0	0	0
2316	20.8	0.6	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	208.55	12	2316	49.9	10.6	0	0	0	0	0	0	0
2317	16.4	0.8	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	212.13	12	2317	49.4	10.4	0	0	0	0	0	0	0
2318	17.4	0.2	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	214.33	12	2318	49.6	9.8	0	0	0	0	0	0	0
2319	31.5	0.2	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	218.18	12	2319	50.3	9.8	0	0	0	0	0	0	0
2320	22.8	0.4	0.1	0	0	0	100.5	95.5	96.0	0.612	9003.20	220.15	12	2320	50.2	9.8	0	0	0	0	0	0	0

**DATE
FILMED**

8/25/94

END