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Steam Generator Group Project

Task 13 Final Report: Nondestructive Examination Validation

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ABSTRACT

The Steam Generator Group Project (SGGP) was a multi-task effort using the retired-from-service Surry 2A pressurized water reactor steam generator as a test bed to investigate the reliability and effectiveness of in-service non-destructive eddy current (EC) inspection equipment and procedures. The information developed provided the technical basis for recommendations for improved in-service inspection and tube plugging criteria of steam generators.

This report describes the results and analysis from Task 13--NDE Validation. The primary objective of Task 13 was to validate the EC inspection results obtained under Tasks 7 and 9 and thereby establish the reliability of EC inspection to detect and size tube defects. Additional objectives were to assess the nature and severity of tube degradation from all regions of the generator and to measure the remaining integrity of degraded specimens by burst testing.

More than 550 specimens were removed from the generator and included in the validation studies. The bases for selecting the specimens and the methods and procedures used for specimen removal from the generator are reported. Results from metallurgical examinations of these specimens are presented and discussed. These examinations include visual inspection of all specimens to locate and identify tube degradation, metallographic examination of selected specimens to establish defect severity and burst testing of selected specimens to establish the remaining integrity of service-degraded tubes. Statistical analysis of the combined metallurgical and EC data to determine the probability of detection (POD) and sizing accuracy are reported along with a discussion of the factors which influenced the EC results. Finally, listings of the metallurgical and corresponding EC data bases are given.

EXECUTIVE SUMMARY

The Steam Generator Group (SGGP) was a multi-task effort conducted at Pacific Northwest Laboratory (PNL) for the U.S. Nuclear Regulatory Commission (NRC) with additional participation by the Electric Power Research Institute (EPRI) and groups from France, Italy and Japan. The main goal of the program was to provide the NRC with validated information regarding the ability of nondestructive examination (NDE) to detect and size defects in steam generator tubing and the remaining integrity of service-degraded tubes. The information was used to develop for NRC a series of recommendations for improved in-service inspections (ISIs) and tube plugging criteria of pressurized water reactor steam generator tubing.

The program used the removed-from-service Surry 2A steam generator as a test bed for producing data on the reliability of detection and accuracy of defect sizing provided by conventional and near-term field practice eddy current (EC) technologies and as a source of service-degraded tubes for burst testing to validate previously developed models of remaining tube integrity. Extensive postservice NDEs were conducted to obtain the necessary EC data base. Validation of the NDE results required removal of selected specimens from the generator for metallurgical examinations. This report describes the selection and removal of these specimens, the results of metallurgical examinations, the analysis of the combined metallurgical and NDE data, and the burst test results.

More than 550 specimens were selected and removed from the generator for metallurgical examination to validate the NDE results and establish the condition of the tubing from all regions of the generator. Specimen selection was primarily based on the NDE results with three major strata (categories) of specimens being defined. Stratum 1 specimens contained a location where an EC defect indication had been reported; Stratum 2 specimens contained locations where defects were expected based on past history but no EC defect indications were reported; and Stratum 3 specimens were from locations where defects would not be expected and none were reported. Emphasis was given to Stratum 1 specimens to ensure that sufficient numbers of defects would be available to estimate the probability of detection (POD) and sizing accuracy.

Specimen removal was a difficult task because of the radiation environment, the large number of specimens, and their diverse locations within the generator. Specialized removal methods and procedures were developed for each region of the generator to ensure that the specimens were removed with minimal damage and positive identification was maintained. In developing these methods, consideration was constantly given to minimizing radiation exposure to the removal crew.

Pitting and wastage were the predominant tube defects found in the specimens examined. This type of tube degradation was identified in the sludge pile region above the top of the tube sheet (TTS) within the tube-to-tube support plate (TSP) crevice, and to a lesser extent at antivibration bar (AVB) contact areas. The most severe pitting/wastage degradation was located in the

region 0 to 2 in. above the hot leg TTS where wall losses ranged up to 87%. Wide variations in the distribution and depth of local degraded areas were observed both axially and circumferentially within the corroded region of the hot leg TTS specimens. These variations in defect distributions appear to be a major factor in the variability of the EC depth estimates. In general, wall loss from pitting/wastage type degradation in specimens from other regions of the generator was less than 20%.

Intergranular stress corrosion cracking was also identified at specific locations within the generator. Cracking was observed at the apex of Row 1 and Row 2 U-bends which was attributed to stresses produced by inward movement of the U-bend legs from corrosion of the seventh (uppermost) TSP. Denting at the TSP intersections also produced cracking in specimens from the hot leg side of the generator. Axial cracks initiated at the ID were found in specimens with calculated strains as low as 10%. Higher stresses were required to produce OD-initiated cracking with OD cracks being observed for specimens with calculated strain values greater than 60%.

Burst testing showed that pitting/wastage type defects did not appreciably degrade tube strength. Comparison of the data with empirical relationships of tube integrity indicates these relationships adequately predict tube margin-to-failure. Defect length was found to be an important consideration in proper defect evaluation and EC data provided a conservative evaluation if long axial lengths were assumed for the pitting/wastage type defects.

The POD depended on the location and severity of the defects. The POD for pitting/wastage type defects at the TTS increased with wall loss and approached 0.9 for defects with greater than 40% through-wall penetrations. Conversely, denting at the TSP intersections interfered with the EC signals and the POD was near zero for these locations. Insufficient numbers of other defect types and locations where EC inspections were made precluded additional POD evaluations.

Wide variations in the reported EC depth estimates were observed between specimens with similar wall loss and also within the same specimen for data from different inspection teams. The team-to-team variations for a given specimen appear to result from differences in analysis procedures or the analyst's interpretation of the complex EC patterns. Defect morphology and distribution within the corroded region was considered the major cause for the variations between specimens with similar wall loss. However, dents and surface deposits near the defects also contributed to the sizing variations. In general, EC tended to undersize the pitting/wastage type defects, especially for the severely degraded specimens.

ACKNOWLEDGMENTS

The NDE validation task was an extremely difficult undertaking which required the dedicated efforts of a large number of people. Specimen removal was a critical aspect of the validation effort, and we would like to express our sincere appreciation to the many people who participated in this most difficult task. Special thanks are given to L. K. Fetrow, E. L. Grohs, G. H. Hauver, and R. L. Bickford for their many contributions to the specimen removal effort. We would also like to express our gratitude to R. J. Kurtz, G. J. Posakony, and J. Muscara for their guidance and assistance during the validation effort.

ACRONYMS AND ABBREVIATIONS

AATRR - Advanced/Alternate Techniques Round Robin

ASTM - American Society for Testing and Materials

AVB - antivibration bar

AVT - all volatile treatment

C - column

CEA - Commissariat a L'Energie Atomique, France

CL - cold leg

DAARR - Data Acquisition and Analysis Round Robin

dB - decibel

DOE - U.S. Department of Energy

EC - eddy current

EDM - electric discharge machining

EDS - energy-dispersive x-ray spectroscopy

EPRI - Electric Power Research Institute, Palo Alto, California

HL - hot leg

ICP - inductively coupled plasma spectroscopy

ID - inside diameter

IGA - intergranular attack

IGSCC - intergranular stress corrosion cracking

in. - inch

ISI - in-service inspection

kHz - kilohertz

lb - pound

LCC - localized circumferential corrosion

LTL - lower tolerance limit

MDM - metal disintegration machining

min - minute

MSLB - main-steam-line-break

NDE - nondestructive examination

NRC - U.S. Nuclear Regulatory Commission

OD - outside diameter

PNL - Pacific Northwest Laboratory, Richland, Washington

POD - probability of detection

psig - pounds per square inch (guage)

PWR - pressurized water reactor

R - row

SCC - stress corrosion cracking

SEM - scanning electron microscopy

SGEF - Steam Generator Examination Facility

SGGP - Steam Generator Group Project

TSP - tube support plate

TTS - top of tube sheet

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1.0 INTRODUCTION

The Steam Generator Group Project (SGGP) was conducted by Pacific Northwest Laboratory (PNL)[a] for the U.S. Nuclear Regulatory Commission (NRC) with supplemental support from the Electric Power Research Institute (EPRI) and consortiums from France, Italy, and Japan. The SGGP was a multitask program intended to provide information regarding the inspection reliability of current field practice eddy-current (EC) technologies in detecting and sizing service-induced defects in pressurized water reactor (PWR) steam generator tubes. The reliability data was used to evaluate proposed in-service inspection (ISI) strategies and to provide recommendations for improved ISI practice and tube-plugging criteria.

A service-degraded Westinghouse Model 51 steam generator was used as the primary research vehicle for this program. The unit was removed from the Virginia Electric Power Company's Surry 2A Nuclear Power Station after about 6 years of operation because extensive secondary side corrosion required the plugging of approximately 22% of the generator's 3388 heat exchanger tubes. After decommissioning, the generator was shipped to the Hanford Site in southeastern Washington, where it was installed in the Steam Generator Examination Facility (SGEF) for nondestructive testing and destructive analysis.

Extensive postservice nondestructive examination (NDE) inspections and analyses were conducted on the Surry 2A steam generator to provide the necessary data base to evaluate the reliability of in-service EC techniques to detect and size tube defects. Two separate baseline multifrequency EC examinations of about 3000 tubes were first performed to determine the condition of the tubes. One inspection used equipment designed and manufactured by Zetec, Incorporated, of Issaquah, Washington (United States); the other inspection used equipment designed by the Commissariat a L'Energie Atomique (CEA--France) and manufactured by Intercontrole, Rungis, France. Both types of equipment are extensively used worldwide, and the most experienced operators/analysts available conducted these examinations. Results of the baseline inspections are described in the Task 7 report (Doctor et al. 1986a).

Following completion of the baseline inspections, a subset of 320 tubes was selected for additional NDE inspection and analysis. Four separate but related round robin exercises were conducted:

- Data Acquisition and Analysis Round Robin (DAARR) using Zetec multifrequency EC inspection and analysis equipment

- Advanced/Alternate Techniques Round Robin (AATRR) consisting of NDE inspections with equipment or analysis procedures significantly different from those used in the baseline or other round robin inspections

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(a) Operated for the U.S. Department of Energy (DOE) by Battelle Memorial Institute under Contract DE-AC06-76RLO 1830.

- Analysis Round Robin 1 using EC data tapes produced by the baseline inspection conducted with Zetec multifrequency equipment

- Analysis Round Robin 2 using EC data tapes produced by the baseline inspection conducted with Intercontrole multifrequency equipment.

The DAARR and the two Analysis Round Robin experiments were designed to provide data for estimating the variability in inspection results. The results from the DAARR showed the variability related to personnel differences for the overall inspection (data acquisition and analysis) process using the same instrumentation. Conversely, data from the two Analysis Round Robins provided an estimate of the variability associated with only the analysis and interpretation of recorded EC signals. The AATRR was designed to provide NDE equipment developers with the opportunity to test equipment and/or analysis procedures on service-degraded tubes in exchange for providing inspection results. The intent of this round robin was not to compare the various techniques, since some of the techniques were designed to detect specific defect conditions, but to determine the improvement in defect detection and sizing to be expected from emerging NDE technologies. Results of the round robin exercises were described in the Task 9 report (Doctor et al. 1986b).

To validate the NDE results and determine the condition of the Inconel® 600 tubing, tube segments were selected and removed from the generator for metallurgical examinations. Emphasis was given to selecting specimens where an EC defect indication had been reported. However, specimens without EC defect indications were also included to verify the lack of defects or to establish the condition of the tubing at specific locations. Specimens from all levels and regions of the generator were removed and examined, although the majority of the EC defect indications were reported near the top of the tube sheet on the hot leg side of the generator.

This report describes the NDE validation work that was conducted and presents the metallurgical examination results along with an analysis of the combined EC and metallurgical results. Section 2 describes the procedures used in selecting, removing, and examining the validation specimens. Section 3 presents the results of the metallurgical examinations which describe the defects and conditions found in the various regions of the generator. Section 4 presents results from the analysis of the combined EC and metallurgical results to evaluate the reliability of NDE in detecting and sizing defects as well as to determine factors that may influence the inspection results. Section 5 outlines the conclusions derived from the examinations and analysis of the data.

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2.0 PROCEDURES

Validation of tube specimens from the Surry 2A steam generator was a multistep procedure as illustrated in Figure 2.1. Details of the individual steps are given below.

2.1 SPECIMEN SELECTION

The purpose of the specimen removal plan was to select tube sections for removal and visual and metallographic examination to ensure that a technically valid estimate of the reliability of the NDE of steam generator tubes could be made. The following criteria had to be met:

- Sufficient numbers of specimens with defects were needed to estimate the probability of detection (POD) of the inspection methods as a function of defect size.

- A representative cross section of and a sufficient number of defects were required to estimate the POD for different types of defects in the generator.

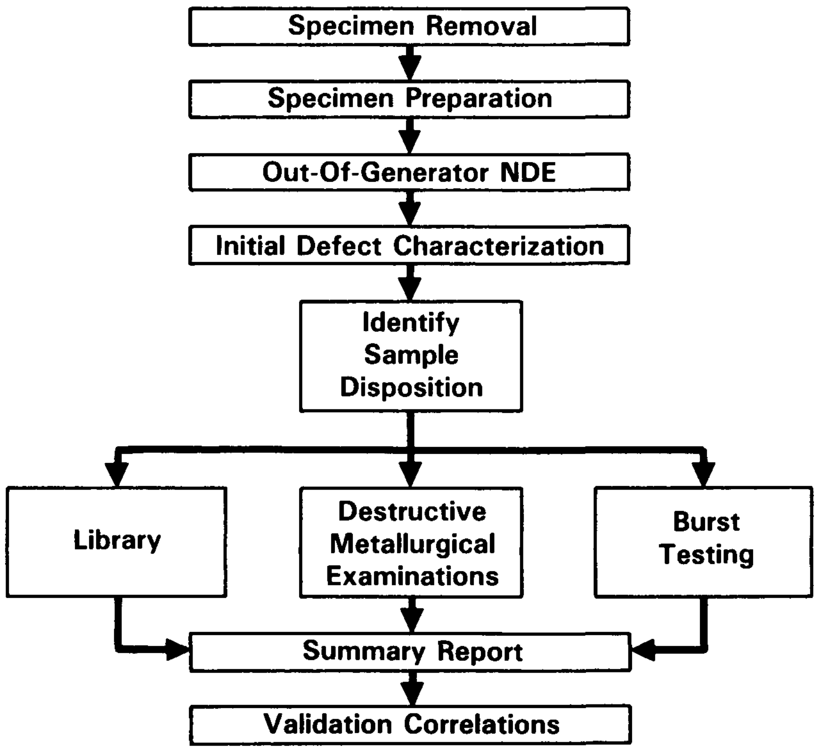


FIGURE 2.1. Flow Diagram for NDE Validation

- A representative selection and number of specimens without defects were needed to estimate the "false negative" (i.e., no defect reported when one exists) error rate.

In most NDE round robin exercises, the selection of specimens for inspection is a one-step process. Most round robins are conducted in near-laboratory conditions with physically manageable specimens. Thus, the number of specimens and numbers and sizes of defects can be specified; the defects are either manufactured in specimens or candidate specimens can be readily examined to determine their physical state. However, because NDE for the SGGP were to be performed on an intact steam generator to simulate ISI conditions, information about the physical condition of each tube was not available and had to be inferred from other sources. Therefore, the selection of specimens for the round robin necessitated the following two-step process:

1) selection of round robin tubes for inspection - A detailed description of the selection of the subset of tubes for the round robin activities is given in the Task 9 report (Doctor et al. 1986b). A randomly selected subset of 320 tubes was chosen based on the number of tubes that could be inspected and analyzed in a week of normal working hours and on statistical considerations. The likelihood of a tube containing a defect was a major consideration for the selection. A tube was judged as having a high probability of containing a defect primarily as a result of the two baseline inspections of the generator that are described in the Task 7 report (Doctor et al. 1986a). Approximately 80% of the round robin tubes selected were assumed to contain possible defects, and 20% had no reported indications and were assumed to contain no defects.

2) selection of specimens within the round robin tubes for removal and validation - The cost of removing and performing metallographic analyses on the entire length of each of the 320 round robin tubes was prohibitive. Therefore, a subset of specimens that met the above criteria was selected for the validation. The selection of tube specimens was done after the round robin inspections on the set of 320 tubes were completed.

The selection of the tube specimens for the NDE validation was governed by the following considerations:

- The total number of tube sections that could be removed based on the cost of postremoval examination and analysis was 500 to 600.

- With a few exceptions, which will be described below, the selected tube section had to have been inspected by all of the DAARR teams to ensure that the maximum information was obtained for NDE reliability.

Since the purpose of the validation was to establish the reliability of NDE, there was a need to have a large number of specimens with defects from which to estimate the POD. Three major strata (categories) of potential specimens were defined to reflect the lack of direct knowledge of the physical condition of the tube sections and to ensure that proper emphasis was given to the selection of a large number of specimens with defects. The three strata were as follows:

- a tube section with a defect indication reported by at least one inspection team
- a tube section with a potential defect based on past history but with no indication reported
- tube sections in which a defect was not expected and for which no indication was reported.

The number of specimens to be allocated to each stratum was based on the goal that 80% of the specimens should contain defects. It was felt that slightly more weight should be placed on the specimens with reported indications; thus, Stratum 1 was to contain about 50% of the specimens; Stratum 2, 30%; and Stratum 3, 20%.

Each stratum was then subdivided into finer substrata to ensure proper representation of the various locations within the generator. These strata are discussed in more detail below.

2.1.1 Stratum 1: Tube Sections with at Least One EC Defect Indication

The NDE inspections from which tube specimen selection for possible defects was made were the two baseline inspections, the DAARR, and the AATRR. Based on evidence of the two tubes pulled on the hot leg side (Doctor et al. 1986b), NDE sizing information was judged to be too inaccurate for use in determining defect size categories as was done for the round robin tube selection process.

There were approximately 300 potential specimens with at least one reported indication from the baseline inspections, the DAARR, and the AATRR. Most of these indicated that defects were at the top of the tube sheet on the hot leg side of the generator and were thought to be caused by wastage. There were substantially fewer reported indications at other locations in the generator. However, these indications were more likely to be caused by cracking, which is generally more detrimental to tube integrity than wastage. Specimens containing these indications were given high priority for removal. Indications reported at the top of the tube sheet (TTS) by an advanced technique team that were not reported by the baseline or DAARR inspections were thought to be attributable to the superiority of the newer inspection techniques over the conventional multifrequency EC/bobbin coil technology. Therefore, the specimens containing these indications were selected for removal. A random sample was selected from those specimens containing the remaining indications.

The reference locations of the removed specimens with reported indications are shown in Table 2.1. The numbers of specimens with indications reported by an advanced/alternate inspection technique are reported separately. A total of 269 specimens with reported indications were removed from the generator; 191, from the tube sheet area. Sixty-two of the specimens contained indications reported by an advanced/alternate inspection technique that were not reported by the conventional multifrequency EC/bobbin coil method.

TABLE 2.1. Reference Locations of Specimens with Reported Indications

Reference Location	Inspection Technique	No. of Specimens HL[a]	No. of Specimens CL[b]
Tube Sheet	Baseline and DAARR	117	42
	AATRR	3	29
Support Plate 1	Baseline and DAARR	--	4
	AATRR	3	5
Support Plate 2	Baseline and DAARR	3	1
	AATRR	2	--
Support Plate 3	Baseline and DAARR	1	1
	AATRR	1	1
Support Plate 4	Baseline and DAARR	2	3
	AATRR	6	1
Support Plate 5	Baseline and DAARR	3	--
	AATRR	2	--
Support Plate 6	Baseline and DAARR	3	1
	AATRR	1	2
Support Plate 7	Baseline and DAARR	3	2
	AATRR	--	3
U-bend	Baseline and DAARR	10	11
	AATRR	--	3

(a) Hot leg side of generator (HL): 160 or 59% of 269 specimens.
(b) Cold leg side of generator (CL): 109 or 41% of 269 specimens.

2.1.2 Stratum 2: Tube Sections in Which a Tube Defect Was Probable but None Was Reported

The tube sections in this stratum fall into two categories: 1) tubes adjacent to those that had reported indications at the same location, and 2) tubes in locations where past history with Model 51D generators indicated problems.

The substrata and their associated defects were defined by the location of specimens within the generator. The number of specimens in each substratum was proportional to the importance of the associated type of defect. Specimens for each substratum were selected to ensure that the horizontal and vertical extent of the generator were adequately sampled but were selected within these constraints as randomly as possible. A total of 165 specimens was selected for Stratum 2. A description of each substratum and the number of specimens included in it are given below:

- the sludge pile at the TTS where most of the reported indications are located - It was thought that the wall-loss defects were due to wastage caused by the general corrosion resulting from contact with the sludge produced by the phosphate secondary side water treatment during the first 2 years of generator operation.

  Substratum size: 34 or 21% of 165 specimens.

  Hot Leg (HL): 8 or 24% of 34 specimens.

  Cold Leg (CL): 26 or 76% of 34 specimens.

- support plate intersections - Because of the severe denting (caused by support plate corrosion) of the tubes at virtually every support plate intersection, it was suspected that there might be cracking at this location. Very few indications were found by the multifrequency EC inspections because the dent signal masked any defect signal. It is thought that the magnitude of strain in a tube caused by denting can be directly related to the existence and severity of tube cracking. The Babcock and Wilcox Profile 360 system inspection, performed as part of the AATRR, measured the strain levels at the dents. To the extent possible, those data were used to select specimens with a range of strain values, but the inspection was done only on the hot leg and on a subset of the round robin tubes. Tube denting and cracking can also occur in the hard- and soft-spot areas of the generator where movement or cracking of the support plates has taken place.

  Substratum size: 71 or 43% of 165 specimens.

  Strain specimens: All specimens with strain estimate >25%. Random sample of those with strain estimate <25%. Total number = 29.

Hard/soft spot specimens: Random selection of 42 locations.

(See Table 2.2 for distribution of specimens.)

- inner-row U-bends that are known sites of stress corrosion cracking (SCC) at the tube apex and bend transition-regions; U-bends in Rows 1 through 5 were not inspected by all round robin teams.

  Substratum size: 29 or 18% of 165 specimens.

  (See Table 2.3 for distribution of specimens.)

- roll transition at the base of the tube sheet, which is subject to SCC

  Substratum size: 12 or 7% of 165 specimens.

  (See Table 2.3 for hot and cold leg distribution of specimens.)

- crevice region in the tube sheet around the unexpanded tube, where corrosion can occur in the form of intergranular attack (IGA).

  Substratum size: 19 or 12% of 165 specimens.

  (See Table 2.3 for hot and cold leg distribution of specimens.)

2.1.3 Stratum 3: Tube Sections Where No Defect Was Expected

Tube sections with no defects were included to evaluate the extent of false negative calls. A total of 122 specimens were selected for Stratum 3. The specimens in Stratum 3 were divided into the following three substrata:

- straight sections of tubes between support plates where no systematic degradation mechanism was known to be active

  Substratum size: 39 or 32% of 122 specimens.

  (See Table 2.4 for specimen distribution.)

TABLE 2.2. Locations of Support Plate Specimens

Support Plate	No. of Specimens	
	Strain	Hard/Soft spots
HL 1	2	9
HL 2	1	2
HL 3	1	2
HL 4	5	2
HL 5	7	1
HL 6	5	1
HL 7	8	2
CL 1		5
CL 2		5
CL 3		2
CL 4		5
CL 5		1
CL 6		3
CL 7		2

Hot Leg: 48 or 68% of 71 specimens.

Cold Leg: 23 or 32% of 71 specimens.

TABLE 2.3. Reference Location of Remaining Stratum 2 Specimens

Location	No. of Specimens		
	Hot Leg	Cold Leg	U-Bend
Inner-row U-bends	--	--	29
Roll transition	5	7	---
Tube sheet crevice	13	6	---

TABLE 2.4. Reference Support Plate Locations of Straight Section Specimens

Support Plate	No. of Specimens	Support Plate	No. of Specimens
HL 1	3	CL 1	4
HL 2	3	CL 2	2
HL 3	1	CL 3	3
HL 4	2	CL 4	1
HL 5	1	CL 5	--
HL 6	10	CL 6	7
HL 7	--	CL 7	2

Hot Leg: 20 specimens; Cold Leg: 19 specimens.

- locations in the outer-row U-bends beyond Row 5 [excluding antivibration bar (AVB) contact points] where no degradation mechanism was known to be active

  Substratum size: 27 or 22% of 122 specimens

- locations in which nondefect conditions, such as loose parts, permeability variations, bulges, conductive deposits, etc. were reported during the inspections by the NDE data analyst. These reported conditions represented the presence of a signal by the NDE equipment; the cause of the signal was inferred (perhaps incorrectly) by the data analyst.

  Substratum size: 56 or 46% of 122 specimens.

  (See Table 2.5 for distribution of specimens.)

The specimens, except in a few instances, were confined to the NDE round robin tube subset.

Table 2.6 summarizes the numbers of specimens in each of the strata by the major regions of the generator (tube sheet, support plate, U-bend). The first line for each stratum lists the total number of specimens. The subsequent lines give the number of specimens in the substrata. Of the 556 specimens removed from the generator, 48% were from Stratum 1, 30% from Stratum 2, and 22% from Stratum 3. This demonstrates that the specimen removal plan was satisfied. The division of specimens into regions of the generator is as follows: 49% in the tube sheet, 37% in the support plate, and 14% in the U-bend. Although the tube sheet was the location of most of the reported indications, it accounted for only half of the specimens; the support plate and U-bend regions of the generator were adequately represented.

TABLE 2.5. Reference Support Plate Locations of Specimens with Reported Nondefect Conditions

Support Plate	No. of Specimens	Support Plate	No. of Specimens
HLTTS[a]	8	CLTTS[a]	8
HL 1	2	CL 1	2
HL 2	2	CL 2	4
HL 3	6	CL 3	3
HL 4	4	CL 4	2
HL 5	6	CL 5	5
HL 6	1	CL 6	2
HL 7	--	CL 7	--
		U-bend	1

Hot Leg: 29 specimens; Cold Leg: 27 specimens.

(a) TTS = top of tube sheet.

2.2 SPECIMEN REMOVAL

Removal of specimen tubes from the steam generator was a critical step in the NDE validation effort. Proper specimen identification and removal with minimal damage to the tube sections was essential for comparing postremoval inspection results with data from in situ NDE. The large number of specimens and widespread distribution within the generator required the development of complex methods and procedures for identifying and removing specimens for each region of the generator. The procedures and methods used for removing tubes from the U-bend region, tube support plate (TSP) region, and tube sheet region of the generator, respectively, are discussed in the following sections.

2.2.1 U-Bend Region

Because of their large physical size, outer-row U-bend specimen tubes were removed as half U-bends; each half was given a unique identification number. An abrasive cut-off wheel, shown in Figure 2.2, was the main tool used to cut the U-bends free at the top of the seventh TSP. This tool was operated semi-remotely through a penetration in the shell, as shown in Figure 2.3. Similar penetrations were located on the hot and cold leg sides of the generator and a hydraulic shear was adapted for cutting the tubes near the apex to enable outer-row U-bends to be removed in half sections. The outer-row U-bends were removed by periodically switching cutting activities from the hot to the cold leg region of the generator. This switching process continued until the length of the U-bends was small enough to allow removal of complete U-bends. Tubes

TABLE 2.6. Numbers of Specimens per Strata and Major Regions Within the Generator

Stratum	No. of Specimens in Region Tube Sheet	 Support Plate	 U-Bend
1. Reported indications	191	54	24
Defects	159	27	21
Advanced defects	32	27	3
2. Defects expected	65	71	29
Sludge pile	34		
Crevice	19		
Roll transition	12		
Strain		29	
Hard/soft spots		42	
Inner row U-bends			29
3. Defects not expected	16	78	28
Conditions	16	39	1
Straight sections		39	
Outer row U-bends			27

that were not identified for validation or special examinations were given a quick visual inspection for imperfections or defects. If no defects were observed, the tubes were then chopped into short pieces by a shear adapted for this purpose. The chopped pieces went directly into a waste drum for later burial at the waste disposal site.

About 2600 U-bends were removed from the generator during the U-bend removal operation. This large removal effort is illustrated by the photograph in Figure 2.4, which was taken from the top of the steam generator after the U-bends had been removed. The large holes in the seventh TSP are regions from which specimens have been removed; these will be discussed in the next section.

U-bend specimen tubes were identified by inserting a probe in an adjacent cut tube from the channel head, where positive identification of tube locations could be made. The specimen tube was marked with a dry paint marker on a pole, operated from the working platform at the fourth floor of the SGEF. The position of the probe and specimen tube at the seventh TSP was verified before

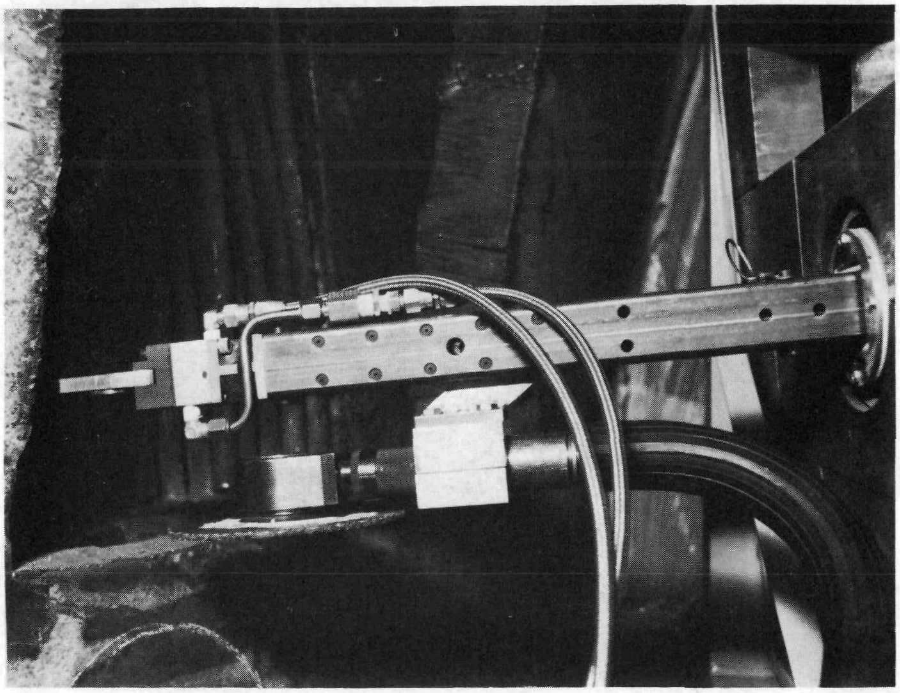


FIGURE 2.2. Abrasive Cut-Off Wheel

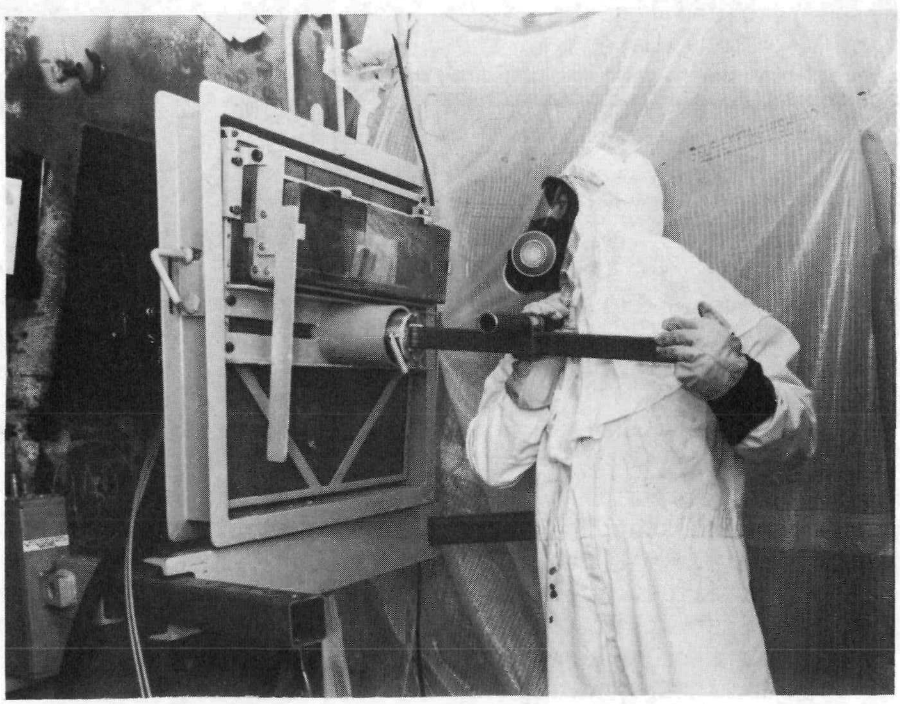


FIGURE 2.3. Semiremote Abrasive Wheel Cutting at Top of Seventh TSP

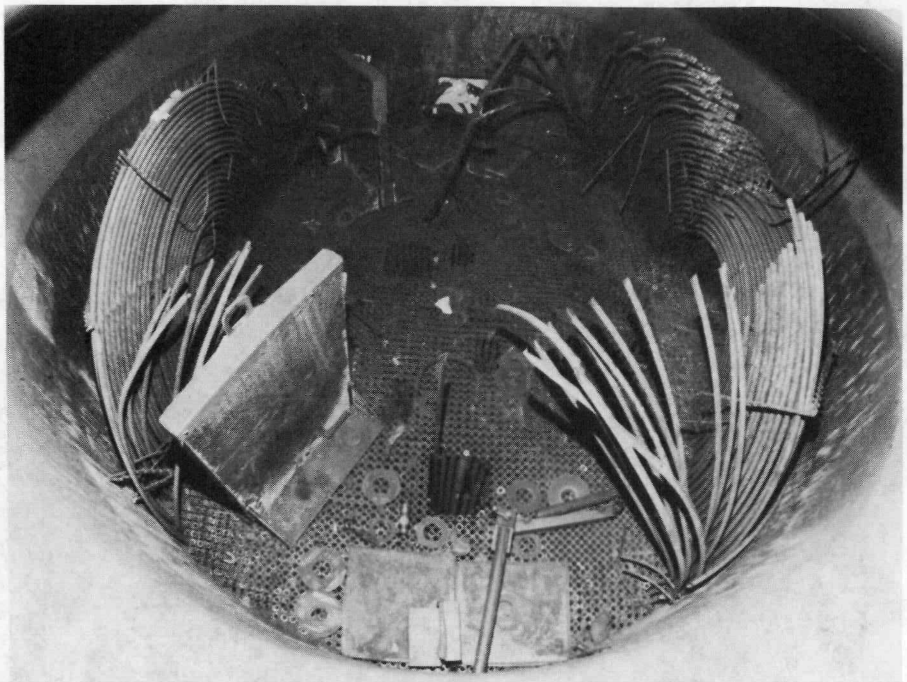


FIGURE 2.4. Top of Tube Bundle with U-bends Largely Removed

specimen removal by comparing its location to a previously marked and verified tube location. After removal, the specimen tube sections were identified by printing the row, column, and hot leg or cold leg designation on pressure-sensitive tape with a permanent marker. The tape marker was then attached to the end of the tube section that was adjacent to the seventh TSP. For specimens removed as complete U-bends, the tape marker was placed on the cold leg end of the tube.

2.2.2 Tube Support Plate Region

One of two methods was used to remove specimens from the support plate region of the steam generator, depending on the specimen location. Specimens that included the seventh TSP intersection or that contained defect indications <1 in. above the seventh TSP were removed as individual specimens concurrently with the U-bend specimens. The remaining specimens from the support plate region of the generator were removed by full-length tube pulls after the U-bend was removed.

Specimens that included the seventh TSP intersection were removed concurrently with or immediately after removal of the U-bends. The technique used for their removal is illustrated in Figure 2.5. The specimen tube and the adjacent tubes were cut ~6 in. above the seventh TSP with the abrasive saw, and the U-bend portion of the tube was removed. The sample tube was then positively identified by inserting a probe from the channel head where its location could be determined. As the probe emerged from the cut tube at the seventh

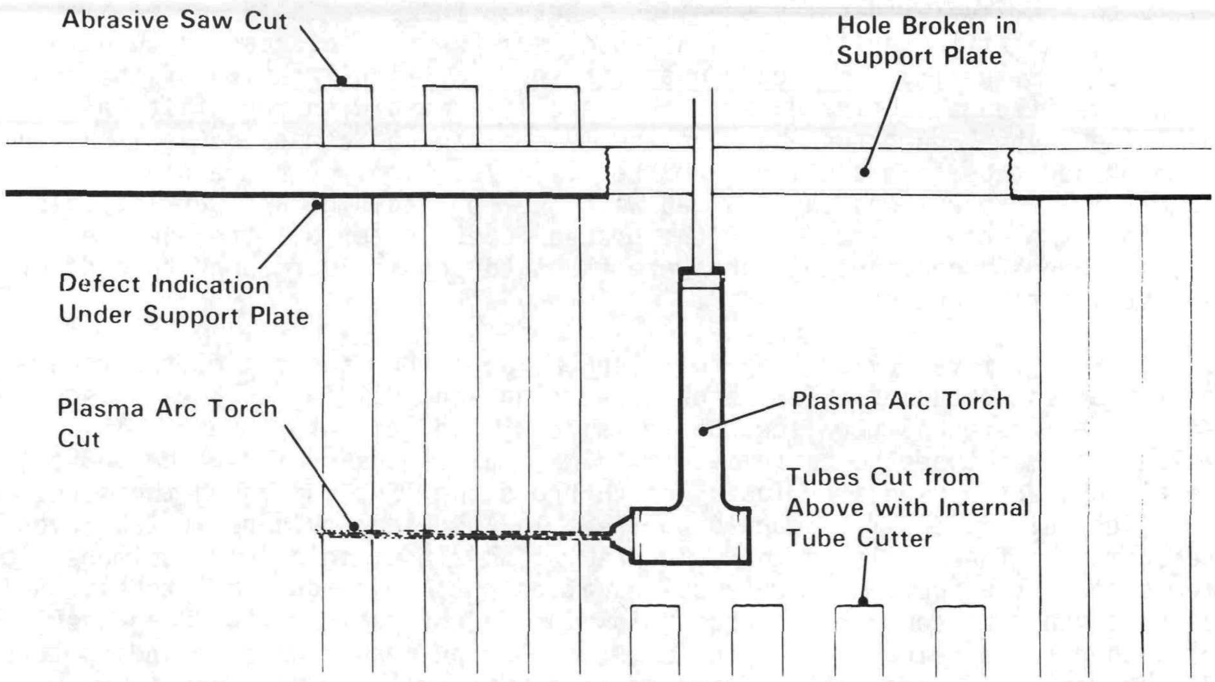


FIGURE 2.5. Technique for Removing Tube Specimens with Indicated Defect at Seventh TSP

TSP, the specimen was marked with a dry paint marker and the location was verified by visual comparison to a previously marked and verified tube location. Cutting the specimen tube off below the seventh TSP required an access hole in front of the specimen for the plasma arc torch. Thus, several tubes were cut from above with an internal tube cutter and a hole was broken in the seventh TSP. After the debris had been removed, the specimen tube was cut off below the seventh TSP with a plasma arc torch and removed from the generator. A tape identification marker was then prepared and attached to the specimen near the end of the plasma arc cut.

Removing specimens from below the seventh TSP was an especially difficult problem, and several approaches were considered. An early plan to penetrate the vessel at many locations and to tunnel in from the side to retrieve specimens was discarded because of the following serious disadvantages: 1) the diverse location of the specimens within the tube bundle would have required a large number of shell penetrations; 2) unsupported portions of the tube bundle might collapse or otherwise require support; and 3) the potential for incorrectly identified specimens was deemed to be unacceptably high. Consequently, specimen removal by pulling tubes from the top of the tube bundle was considered the most practical approach because it eliminated or minimized these difficulties. However, possible mechanical damage to tube specimens due to pulling the tubes through the TSPs was a disadvantage; procedures were developed to minimize this removal damage.

A major advantage in pulling tubes from the top of the tube bundle was the ability to positively identify specimen tubes at the seventh TSP. Specimen tubes were identified by inserting a probe from the channel head through the tube sheet and marking the specimen at its top end. The location of the probed tube was verified at the seventh TSP using a TV camera with pan, tilt, and zoom. The control operator observed the TV monitor and compared the location of the probed tube to a previously marked tube location. A commercial plug (Zetec template plug) was then tagged with the row, column, and hot leg/cold leg information and inserted into the probed tube. After all the specimen tubes had been tagged, photographs were taken to provide permanent records of the tube identifications.

Specimen removal by pulling full-length tubes from the top of the generator was aided because the TSPs broke up during tube pulling. It was discovered that all seven TSPs on the hot leg side of the generator broke. This enabled specimen tubes to be removed with minimal damage by first pulling out several adjacent nonspecimen tubes, which broke the TSPs and freed the specimen tube. Generally, TSPs 1 through 4 on the cold leg side would not break, even after numerous tube pulls in the same area. Therefore, cold leg specimens with defects above the fourth TSP were pulled after pulling neighboring tubes, until each specimen tube could be gripped below its defect region. Cold leg specimens with defects below the fourth TSP were also pulled after surrounding tubes had been removed to reduce the force necessary to pull the specimen tube.

Full-length tubes were pulled by first cutting the tube with an internal tube cutter at a point above the TTS. Once cut, the tube was then gripped at an appropriate point, using one of the devices shown in Figure 2.6, and pulled out with the bridge crane as shown in Figure 2.7. Initial removal of tubes from a region of the generator generally required manual breaking of the seventh TSP to enable the pulling device to be attached.

To retrieve cold leg specimens below the fourth TSP with minimal damage and to increase removal rates, some tubes were pulled directly to measure the forces required and to evaluate the resulting damage. Four cold leg tubes were pulled directly with the surrounding tubes in place. Pulling forces ranged up to 20,000 lb and the tubes were stretched 10% to 14%. The amount of stretching was determined by measuring TSP center-to-center distances on tubes pulled with low pulling forces compared with those requiring greater forces. By first pulling four or five neighboring tubes around a cold leg tube, the pulling force was reduced to between 2,000 and 12,000 lb. Minimal stretching was observed when pulling forces were kept below 11,000 lb. Center-to-center spacing of TSPs ranged from 50 to 51.5 in. on tubes that had been removed from the generator with low forces.

To keep removal rates acceptably high and simultaneously minimize damage to the specimens, the following approach was adopted. For hot leg tubes where direct pulling forces were lower than 5,000 lb, two or three adjacent tubes were pulled before removing the specimen tube, lowering the pulling forces to <1,500 lb. Four to six cold leg tubes were pulled before retrieving a specimen tube, which generally kept pulling forces under 7,000 lb.

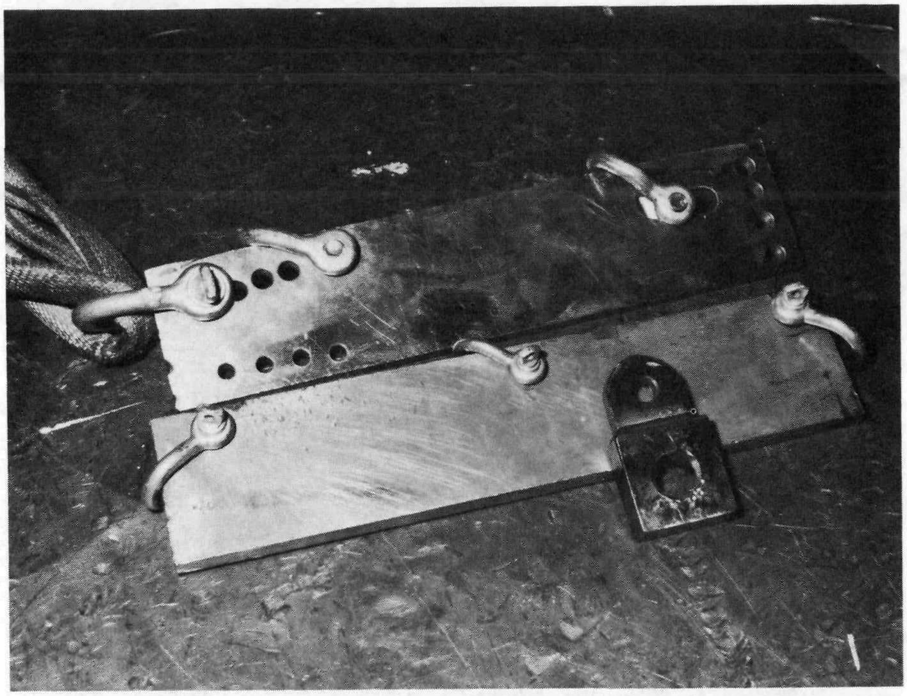


FIGURE 2.6. Gripping Devices for Pulling Tubes from Above

Before pulling full-length specimen tubes, a cutting diagram was prepared that showed the location and identification number of each tube segment (from one to six specimens per full-length tube) containing a validation specimen. The segments to be retained for validation were cut from the full-length tubes using a hydraulic shear. These cuts were made well away from the region of interest and were made to include the nearest TSP intersection, which was subsequently used as the reference point during specimen preparation to establish the location of the validation specimen. The specimen identification number, row, column, and hot leg or cold leg designation were printed on a tape marker and attached to the bottom end of the tube segment (i.e., the end nearest the tube sheet). The tube segment was then placed in a plastic sleeve, and a second identification marker was attached to the sleeve. The tube segment was retained in an interim storage area until it was prepared for validation, as will be discussed in Section 2.3.

2.2.3 Tube Sheet Region

Most specimens from the tube sheet and sludge pile region of the generator were retrieved by jacking the tubes out of the tube sheet into the channel head using a multistep process: 1) cutting the tube above the sludge pile, 2) inspecting the cut using a video probe, 3) removing the fillet weld, 4) heating the roll-expanded region to free the tube, 5) inserting the pulling mandrel, and 6) attaching the hydraulic jack and pulling the tube. Each tube

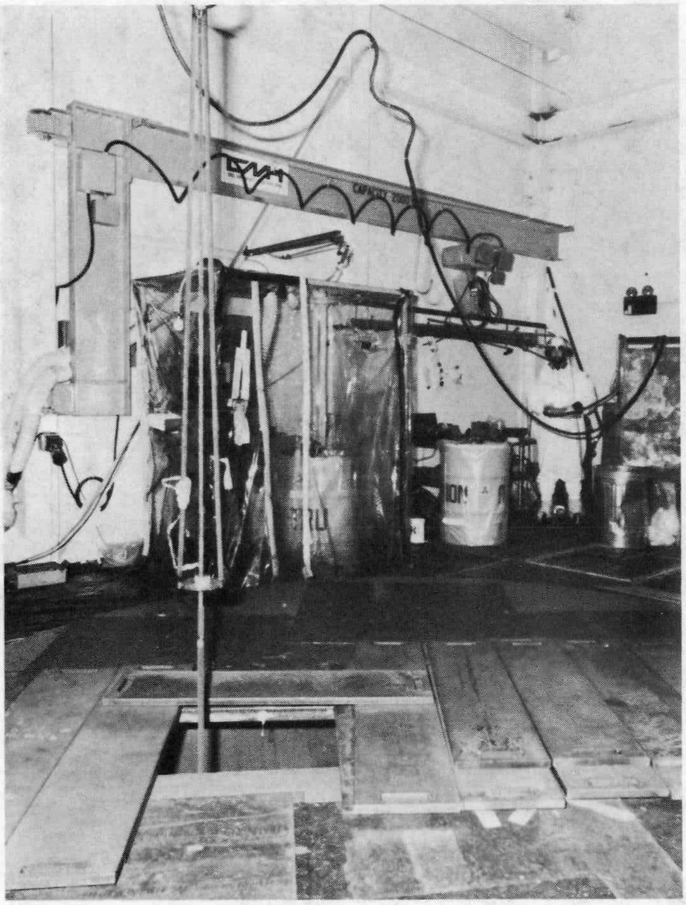


FIGURE 2.7. Full-Length Tube Being Pulled Up by SGEF Bridge Crane

specimen to be removed was cut above the sludge pile from the inside with a rotary hand cutter as shown in Figure 2.8. A completely cut tube was essential for reducing the pulling forces and minimizing tube damage; the cut tubes were then inspected using a video probe before tube removal. An offset was generally observed in a completely severed tube, as shown by the video image in Figure 2.9. Additional cuts were made if the video inspection indicated an incomplete cut. The tube-to-tube sheet fillet weld was milled off as shown in Figure 2.10. A fixture was used to hold the air motor and cutting tool in proper alignment against the tube sheet. The fillet weld was then removed by raising the motor and single-blade cutting tool using the lever device of the holding fixture. After the fillet weld had been removed, the roll-expanded region was heated with an oxyacetylene torch, which reduced the force required to pull the tube from the tube sheet. A threaded mandrel or pulling spear was then inserted into the tube end. A 2-ton hydraulic jack was positioned over the mandrel, and the specimen tube was pulled out as the jack operated on the

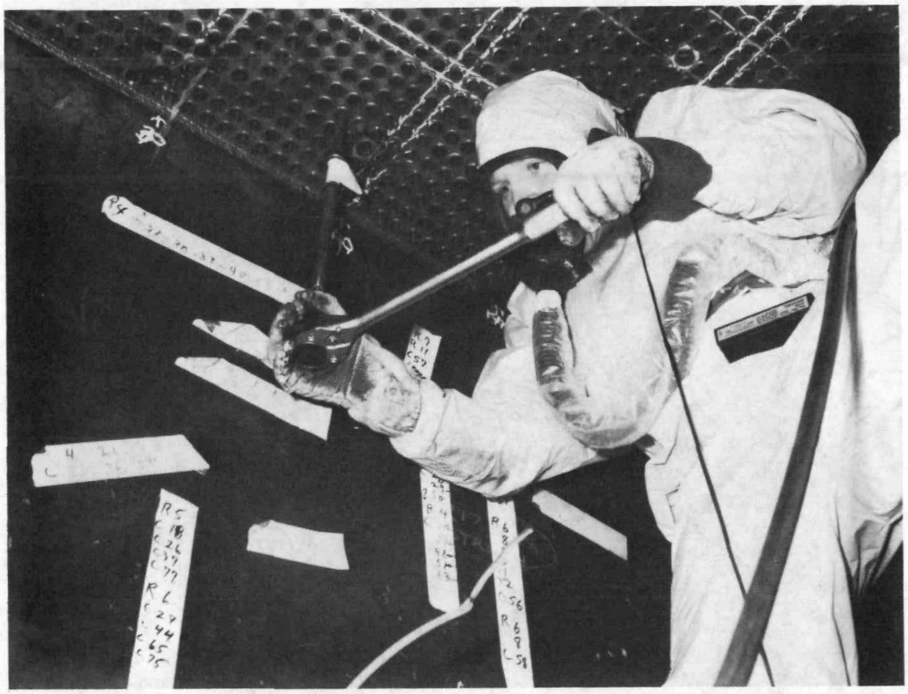


FIGURE 2.8. Cutting TTS Specimen Above the Sludge Pile

mandrel. A photograph of a tube being removed from the tube sheet is presented in Figure 2.11. The mandrel was removed from the tube by grinding an axial slit along the lower 3 in. of the tube end.

Although it was originally thought that Row 1 tube sheet specimens would be inaccessible, a tooling modification made it possible to retrieve them. A bar was fabricated that straddled two pulling mandrels spaced 10 columns apart in Row 1. The hydraulic jack was then placed between this bar and the bottom of the tube sheet. By pushing with the jack between the bar and the tube sheet, both of the Row 1 tubes connected by mandrels to the bar were pulled out simultaneously. The jack was moved back and forth along the bar as needed to equalize the forces. By repeating this process, three Row 1 hot leg specimen tubes were successfully retrieved.

Some specimens that had been plugged during service, in which the plugs had subsequently been removed by drilling (Wheeler et al. 1984), fractured during the tube-pulling operation. Four examples of tube ends that failed in this manner are shown in Figure 2.12. The fractures usually occurred in the roll-expanded region, although some failures occurred above the roll transition but within the region drilled out to remove the plugs. These specimen tubes were removed by repetitive insertion and jacking of mandrels with various diameters and lengths until the complete specimen was removed. Up to five repetitions of the procedure were required for some of the more difficult-to-remove specimens.

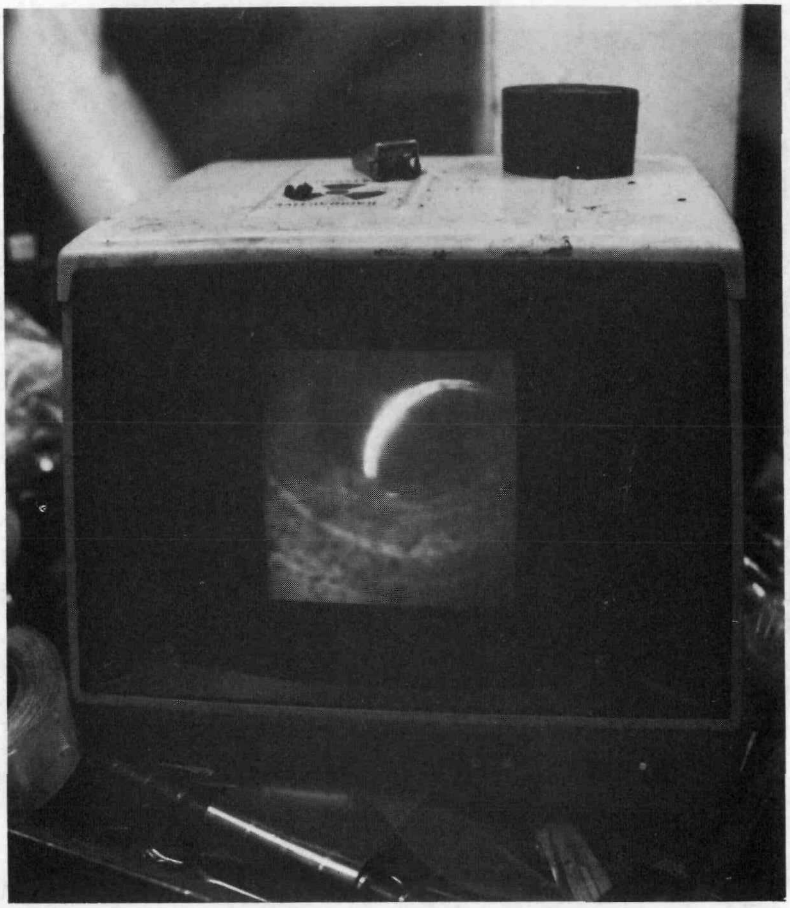


FIGURE 2.9. Video Probe Image of Tube Cut

The location of specimen tubes was determined by counting the rows and columns at the channel head. A 10-row by 10-column grid was clearly marked on the channel head for this purpose (see Figures 2.8, 2.10, and 2.11). The counting procedure to locate the specimen tube was repeated for each step of the tube removal operation and provided a method for verifying tube identification. A tape marker containing the identification number, row, column, and hot leg/cold leg designation was prepared and attached to the tube end nearest the channel head immediately after the mandrel had been removed. The specimen was then placed in a plastic sleeve with an additional identification marker attached to the sleeve and placed into interim storage until it was prepared for validation, as discussed in the following section.

In addition to the specimens removed by tube pulling, two hot leg and one cold leg tube sheet sections, each containing nine tubes in a 3x3 array, were removed from the generator. The tube sheet sections were successfully removed by an overbore drilling technique after initial attempts using metal disintegration machining (MDM) were unsuccessful. The process was developed by

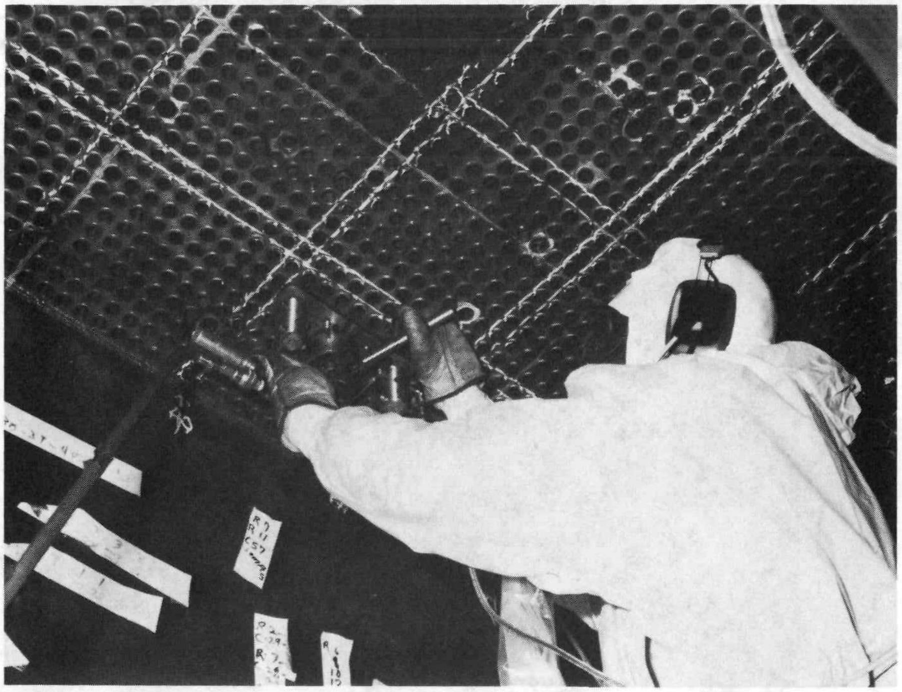


FIGURE 2.10. Grinding Off Tube-to-Tube Sheet Weld

Framatome, Inc., of France; the removal technique and equipment are illustrated in Figures 2.13 and 2.14. The process consisted of overboring the tube holes surrounding the desired section so that the holes overlapped slightly. The apparatus was essentially a modified lathe operating in a vertical position. The drill bits were designed with pilots that guide on the inside of each tube as the cutting edge drills out both the tube and a larger hole in the tube sheet. Two oil holes running the full length of each drill bit provide lubrication to the cutting edges. Approximately 1 in. before breakthrough, oil flow was stopped to prevent contamination of the crevices. After all the surrounding holes were drilled, the tubes in the section were cut above the sludge pile internally which freed the section for removal. Sixteen tubes must be overbored to release one 3x3 tube sheet section.

2.3 SPECIMEN PREPARATION

The tube sections removed from the generator were prepared for further investigation by 1) reducing the length to facilitate handling and reduce radiation exposure to personnel, 2) permanently identifying each specimen segment, and 3) chemically cleaning to remove the tenacious outside diameter (OD) deposits. Maintaining specimen identification and prior location within the steam generator was extremely important in validating the NDE results, and procedures were developed for this purpose. A diagram showing the location of all cuts relative to a reference point was prepared for each tube segment. The

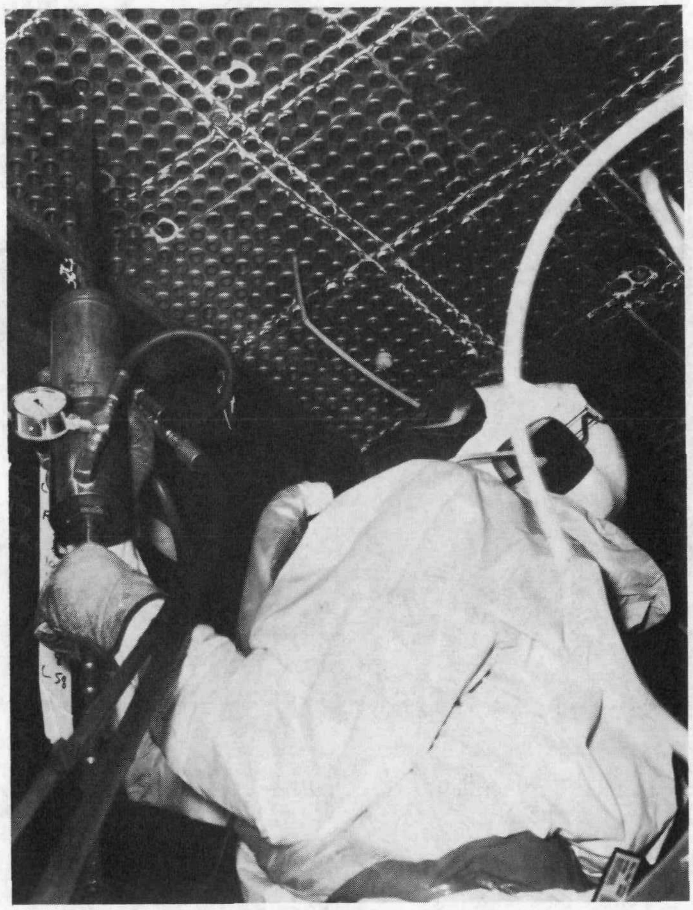


FIGURE 2.11. Tube Pulling Through Tube Sheet; Hydraulic Jack in Operation

reference point was the tube end adjacent to the seventh TSP for U-bend specimens removed in two sections; the cold leg end was used for complete U-bends. Tube support plate and TTS intersections with the tube specimens were the reference points used for specimens removed from the TSP and tube sheet regions of the generator, respectively.

Each tube section removed from the steam generator was assigned a unique identification number. Tube sections were often subdivided into "A," "B," "C," etc., segments depending on the total length of the section and the desired regions of examination. The tube segment was marked for cutting according to the cutting diagram and a unique identification number that included the segment designation (A, B, C, etc.) was vibra-etched onto the OD surface near the reference end of each specimen.[a] The specimen end nearest the bottom of the

(a) Hereafter, the term specimen will refer to a segment of tubing varying in length from 4 to 34 in. with a unique identification number inscribed at the reference end.

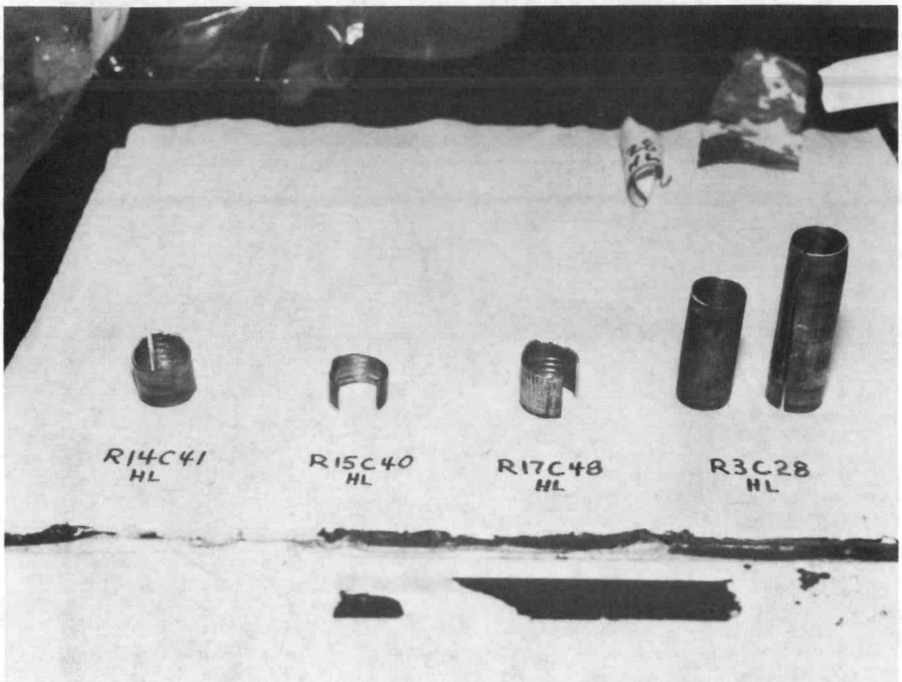


FIGURE 2.12. Examples of Failed Tube Ends. These sections failed during pulling of previously plugged tubes.

steam generator, (i.e., the channel head) was taken as the specimen reference end except for some inner-row U-bend specimens for which the reference end was nearest the cold leg seventh TSP.

Specimens were cut from the tube section using a band saw and a small through-wall hole was drilled ~1 in. from the reference end. The purpose of the hole was to provide a local reference point for comparing postremoval NDE with visual and metallographic examinations. Burrs were mechanically removed from the cut ends and drill hole to minimize damage to the NDE probes, and each specimen was measured for length. A specimen identification form was prepared for each validation specimen. Information included the specimen identification number, length, location within the steam generator (row, column, hot leg/cold leg, and axial position relative to the internal reference) and type (the specimen selection criteria discussed in Section 2.1).

To enable visual inspection of the tube surfaces for defects, the heavy deposits on the OD surfaces were removed by a two-step chemical cleaning procedure. First, the specimen was immersed in a 50% HNO_3 solution for 1 to 2 min to remove the metallic Cu component of the deposit. After a water rinse, the specimen was then placed in a formaldehyde-inhibited 50% HCl solution (CP-9) for 30 to 60 min with intermittent brushing to remove the Fe-rich deposits.

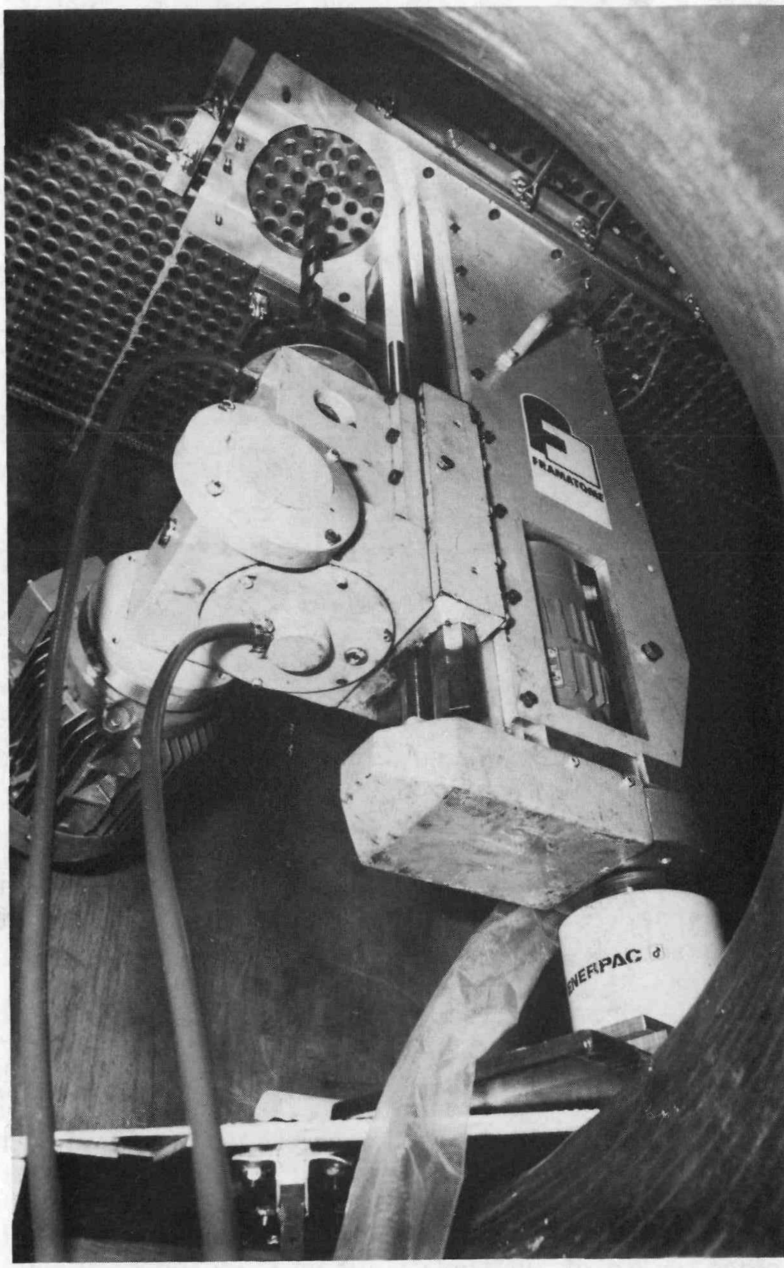


FIGURE 2.13. Tube Sheet Section Drilling Equipment in Place in Channel Head

Both solutions were maintained at ambient temperature, which reduced problems associated with acid vapors collecting in the ventilation and filtering system. The surfaces were wiped dry after a final water rinse.

The above procedures did not remove the thin Cr-rich oxide on the outer surface of the tube, and no visible attack to the base metal was evident.

FIGURE 2.14. Removal of Hot Leg Tube Sheet Section

However, to ensure that attack of the Inconel 600 was minimal, tests were conducted to measure the weight loss after immersion in the acid solutions. Results for various immersion times are shown in Table 2.7. Extremely small weight losses were measured for immersion times of 30 min in the HNO_3 solution plus up to 120 min in the CP-9 solution. An increase in weight loss with increasing immersion time was observed. However, calculations based on uniform attack indicate that the maximum weight loss (0.0034 g) corresponds to <1 μm wall loss, which is well within the uncertainties of the metallographic measurements of defect extent.

TABLE 2.7. Weight Loss Measurements of New Inconel 600 Tube Sections Exposed to 50% HNO_3 and CP-9 at Room Temperature

Exposure	Sample Weight, g #1	#2	#3
None	14.6922	15.3462	21.5995
50% HNO_3 30 Min	14.6925	15.3465	21.5998
CP-9			
30 Min	14.6914		
60 Min		15.3449	
120 Min			21.5961
Total Weight Loss	0.0008	0.0013	0.0034

2.4 POSTREMOVAL NDE INSPECTION

The validation specimens were inspected by multifrequency EC before and after the deposits were removed by chemical cleaning. The postremoval EC data were acquired using a 0.710-in.-diameter differential bobbin coil in conjunction with a Zetec MIZ-12 multifrequency instrument at frequencies of 500 kHz, 400 kHz, 240 kHz, and 100 kHz. Before data acquisition, an American Society for Testing and Materials (ASTM) in-line standard was used to set the EC phase angle and signal amplitude of the 100% through-wall hole at 40° and 45 dB, respectively, for each frequency. All postremoval EC data were obtained using the same procedures and instrument settings in order to directly compare the EC signals produced before and after the deposits were removed. The in-line standard was inspected with each specimen, and the data were recorded on magnetic tapes. The data were analyzed by normal procedures using the Zetec DDA-4 analysis system.

2.5 VISUAL INSPECTION

The OD surfaces of all specimens were visually examined after surface deposits had been removed by chemical cleaning. The specimen identification number was verified, and the types of defects or conditions observed and their axial location relative to the reference hole were measured and recorded. This initial visual examination was followed by a detailed inspection of the tube surface under a stereo microscope at magnifications ranging from 10X to 70X. The entire tube surface was examined at 10X; higher magnifications were used, as necessary, to evaluate the corrosion conditions at specific locations. Results of the microscope examination were recorded along with an estimate of the depth for certain types of defects, e.g., pits or wastage. In general, the depth of cracks or IGA could not be estimated by visual examinations.

In addition to the OD visual examination, the inside diameter (ID) surfaces of selected specimens were visually inspected using the procedures outlined above. Specimens were selected for examination to validate reported EC indications or to examine specimens at specific locations where ID-initiated intergranular stress corrosion cracking (IGSCC) would be expected to occur. These specific locations included the apex and bend transition regions of inner-row U-bends (R<5), dented tubes from TSP intersections or at TTS locations, and the roll transition region within the tube sheet crevice. Inspection of the internal surfaces required that the tube segments be split axially using a band saw. The specimens were also plastically deformed to open up any tight cracks on the ID surfaces. This deformation was accomplished by either flattening the split specimens at the desired region of inspection or bending the specimens axially around a 3-in.-diameter pipe. The internal surfaces were also sprayed with a clear lacquer to fix the smearable contamination before inspection.

Photographs were taken to document tube degradation or special conditions found during the visual examinations. All specimens with significant defects or conditions were photographed. Representative photographs were also taken to show the condition of specimens with little visible degradation. The specimen identification number and a ruler were included in the photographs to provide positive identification and magnification references.

2.6 METALLOGRAPHY

Specimens were selected for destructive metallographic examination based on the visual inspection results. Emphasis was given to validating defect indications reported by NDE, which were primarily located at the hot leg TTS. Selections were made to obtain a range of defect distributions and depths within the metallographic data in order to establish the accuracy of NDE methods in detecting and sizing tube defects. Metallographic sections were also prepared for a limited number of specimens without significant visible degradation to ensure that no unidentified defects were present or to evaluate the nature of the OD deposits.

Specimens selected for metallography were re-examined, and the number and location of metallographic sections needed to establish the level of degradation was determined. An ~1-in.-long segment containing the region of interest was cut from the specimen using a band saw. These cuts were made sufficiently far from the defects so as not to compromise the metallographic results. The position of each desired metallographic section was marked on the specimen surface and the location of each section relative to the reference end was measured and recorded. Sections were taken through the more severely degraded areas of each specimen. The number of sections prepared from each specimen ranged from one to five, depending on the nature of the degraded region. Transverse sections including the entire cross section of the tube were normally prepared, although longitudinal sections were employed for a few specimens to measure the depth of circumferentially oriented defects.

Metallographic specimens were prepared by further sectioning the tube segment near the location of the desired metallographic section. A slow-speed diamond saw was used for this operation to minimize damage. The resulting ring segments were mounted in a clear plastic resin and hand ground to the desired section location. This corresponded to the region of maximum defect penetration and, if possible, was determined visually through the clear plastic mount. The specimens were then polished by standard metallographic techniques and examined in the as-polished condition using an optical metallograph. A few specimens were also examined after electrolytic etching in a 10% oxalic acid solution to reveal grain structure.

Optical micrographs were taken at magnifications ranging from 6.5X to 500X to document the depth, type, and extent of any tube degradation. The standard procedure was to obtain low-magnification micrographs (6.5X) showing the entire specimen section and higher-magnification micrographs (50X) of significantly degraded areas for each specimen. Selected areas of some specimens were also photographed at magnifications up to 500X where higher magnification was beneficial in assessing specific degradation mechanisms.

The type of degradation observed and the maximum wall penetration were determined by examining the optical micrographs. The maximum wall penetration for pits and locally degraded areas was determined from the ratio of the minimum remaining wall thickness to the wall thickness adjacent to the local area. This measurement procedure minimized errors from magnification and accounted for the nonuniform wall thickness exhibited by the tubing. For those specimens with significant uniform wastage, the wall loss was determined by comparing the measured minimum remaining wall thickness to a nominal wall thickness of 0.050 in.

Scanning electron microscopy (SEM) with energy-dispersive x-ray spectroscopy (EDS) was used on a limited basis to evaluate the structure and elemental composition of OD surface deposits.

2.7 BURST TESTING

Before burst testing, degraded specimens from the steam generator were photographed at 90° intervals around the circumference of the tube, making sure that all the degraded area was documented. The depth of the degraded areas was determined by inserting the specimens on a mandrel and using a depth gauge to measure the remaining wall thickness. The wall thickness values were recorded directly onto the photographs to document measurement location. Wall thickness and OD measurements were also taken in a nongraded area of the tube.

The radiation work procedure for burst testing required that contaminated tube surfaces be cleaned to non-smearable OD and <500 counts/min ID before transfer to the burst facility. This level of contamination was very low relative to the as-removed tube condition. Since most of the contamination was on the tube ID, a cleaning procedure was needed that would remove residual radioactivity, but not cause wall thinning. For this reason electropolishing of the tube was ruled out. Based on experience gained by chemically cleaning tubes for removal of Cu-rich surface deposits, the following procedure was developed:

1) Five minute scrub with nylon bottle brush and 50% HCl solution inhibited with formaldehyde.

2) Five minute scrub with nylon bottle brush and 30% HNO_3 solution.

3) Repeated scrubbing with a scouring pad in an undiluted detergent.

4) Repeated wiping while alternating between wet and dry paper towels.

Step four was repeated numerous times until the appropriate level of decontamination was reached. In many instances repeated applications of the entire cleaning procedure was required.

As many as six specimens were then fitted with Swagelok plugs and end fittings, filled with deionized water, attached to numbered specimen lines, and inserted in an autoclave for burst testing. The autoclave was filled with deionized water and sealed. The specimen pressure lines were attached to corresponding numbered isolation valves, which were opened. A cross-connect valve between the autoclave and the specimen isolation valves was open to ensure that no pressure differential existed across the tube wall during bleed-off and heating. The entire system was pressurized to about 500 psig at room temperature and any air was bled out by opening a specimen manifold vent valve. During heating to the test temperature (550° or 600°F), the vent valve was closed and the specimen manifold and autoclave pressure rose together. Prior to testing, the cross-connect valve and specimen isolation valves were closed, with the exception of the isolation valve to the test specimen. Autoclave temperatures and pressures were noted. Testing started when a high-pressure injector increased the pressure in the test specimen until failure occurred.

After failure, the specimen was removed from the autoclave and placed in a hood for examination. The wall thickness at the area where the failure occurred was determined from the marked photographs. This measurement was used to evaluate the actual $\Delta P/\Delta P_0$ relationship (burst pressure of a defected specimen divided by the burst pressure of an undefected specimen) for comparison with empirical models.

2.8 DATA BASE

The metallurgical and NDE data were assembled into a data base consisting of three separate files that can be combined for statistical evaluations and analysis. The first file contains specimen information, including a unique identification number for each specimen examined during the validation studies, its length, and the position where it resided in the steam generator. A second file contains the NDE data from 12 EC acquisition teams for each validation specimen. Data are included from the two baseline inspection teams, the five data acquisition and analysis round robin teams, and five teams using advanced and alternate inspection techniques. This file contains reported EC defect information for each specimen and which of the 12 teams inspected that specimen. A third file contains visual inspection and metallographic data. This file includes the results from the visual inspection of the OD surfaces of all specimens and the results of ID inspections and metallography as available. Because multiple observations and entries were possible for a single specimen, it was necessary to identify the specific information to be used for the various aspects of the validation process. For instance, a specimen removed to validate an EC defect indication at one location could also include a TSP intersection or an AVB point. Information regarding the condition of the tube at these specific locations was included in the data base but identified separately from information regarding validation of the EC indication. A detailed description and listing of the metallurgical data base is given in Appendix A while the NDE data are given in Appendix B.

3.0 METALLURGICAL EXAMINATION RESULTS

Results from the visual inspection, metallographic examination, and burst testing of specimens are presented and discussed in this section as a function of region within the generator, namely, U-bend, TSP, and tube sheet regions. The condition of the Inconel 600 tubing is described, and examples of the various types of defects and conditions that were found are shown. Comparison and analysis of the combined NDE and metallurgical results for NDE validation are presented in Section 4.

3.1 U-BEND REGION

Specimen lengths for the 81 U-bend specimens that were examined in detail during the validation studies varied from 4 to 34 in.; the average length was 18 in. The outer surfaces of all specimens were examined; 39 specimens were split axially for examination of the internal surfaces. Metallographic examinations were conducted on 16 U-bend specimens. Because NDE validation was the primary purpose of these examinations, most of the specimens were taken from the round robin tube matrix where extensive EC inspections had been performed. However, some Row 2 and Row 3 U-bends with little or no EC inspection data were included to assess the degradation that was expected in inner row U-bends.

Intergranular SCC of inner row U-bends and wear/corrosion at AVB contact areas are the primary tube degradation mechanisms expected in the U-bend region of the generator. Evidence for each of these degradation types was found during the metallurgical examination of the Surry 2A U-bend specimens. In addition, mechanical damage (grinder marks) was found on two specimens. A heavy deposit that was rich in metallic Cu covered the U-bend specimens. This deposit seriously affected the EC signals as will be discussed in Section 4. The nature of the deposits and a description of the types of tube defects are presented in this section.

3.1.1 OD Surface Deposits

Tubes removed from the U-bend and support plate regions of the generator were covered with a dark granular deposit. The outer layer could be easily removed by washing in water with a soft-bristled brush, leaving a tenacious copper-colored deposit. This deposit generally covered the tube surface except for small spots or axial strips where the Inconel was visible. A photograph showing two spots and an axial strip where the metal is visible is presented in Figure 3.1. Axial strips without the copper-colored deposits were often found intermittently along the entire tube surface.

The nature of the deposits was examined by optical metallography and SEM with EDS. Eight metallographic sections through the bend transition region of Specimen 561A (R5 C74) and two sections from Specimen 430B (R35 C56) were prepared and examined by optical metallography before the surface deposits had been removed by chemical cleaning. Metallographic examination showed that the thicknesses of the deposits varied around the circumference of the sample.

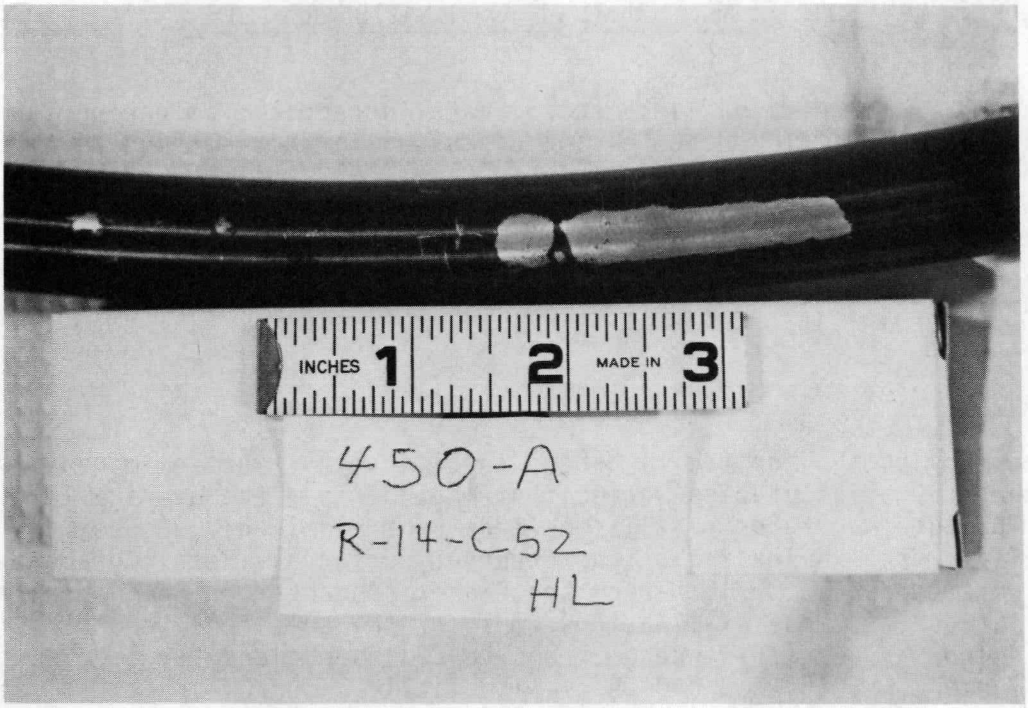


FIGURE 3.1. U-Bend Specimen 450A (R14 C52 HL) Showing Discontinuities in the Copper-Rich OD Surface Deposit

Maximum deposit thicknesses ranged from 160 to 250 μm for sections from Specimen 561A and from 80 to 100 μm for Specimen 430B. The outer layer of deposit had been washed from Specimen 430B prior to metallography, which accounts for at least part of the reduced thickness of these deposits.

The general microstructural characteristics of the outer surface deposits on Specimens 561A and 430B were similar, although the detailed distribution of phases varied between specimens and also between sections of the same specimen. Variations in microstructure would be expected in deposits formed in different areas, depending on the localized flow conditions. The available information does not allow a detailed analysis of the formation of these deposits to be made, and only the general characteristics of the deposits will be discussed.

The microstructure of the deposits can be generally characterized as a layered structure with multiple phases and granular features as illustrated by the optical micrographs in Figures 3.2 through 3.5. The relative amount and distribution of the different phases varied from sample to sample and also around the circumference of each sample. Variations in phase distribution were especially evident for the bright phase that was identified as metallic Cu by EDS and x-ray diffraction. Copper particles were observed throughout the thicker areas of the deposits but were concentrated in discrete layers, suggesting periodic intrusion of large concentrations of Cu into the secondary water. The relative amount of the metallic Cu phase was greater in the thinner areas of the deposits as can be seen by comparing Figures 3.2 and 3.3, which

FIGURE 3.2. Optical Micrograph Showing Deposits on the OD Surface of U-Bend Specimen 430B (R35 C56)

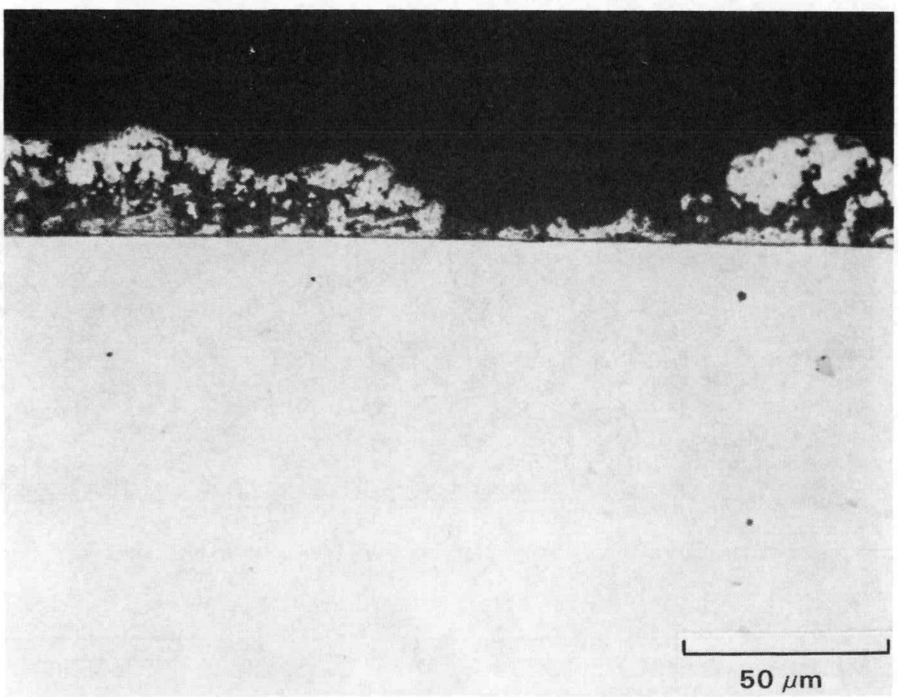


FIGURE 3.3. Optical Micrograph Showing Deposits on the OD Surface of U-Bend Specimen 430B (R35 C56)

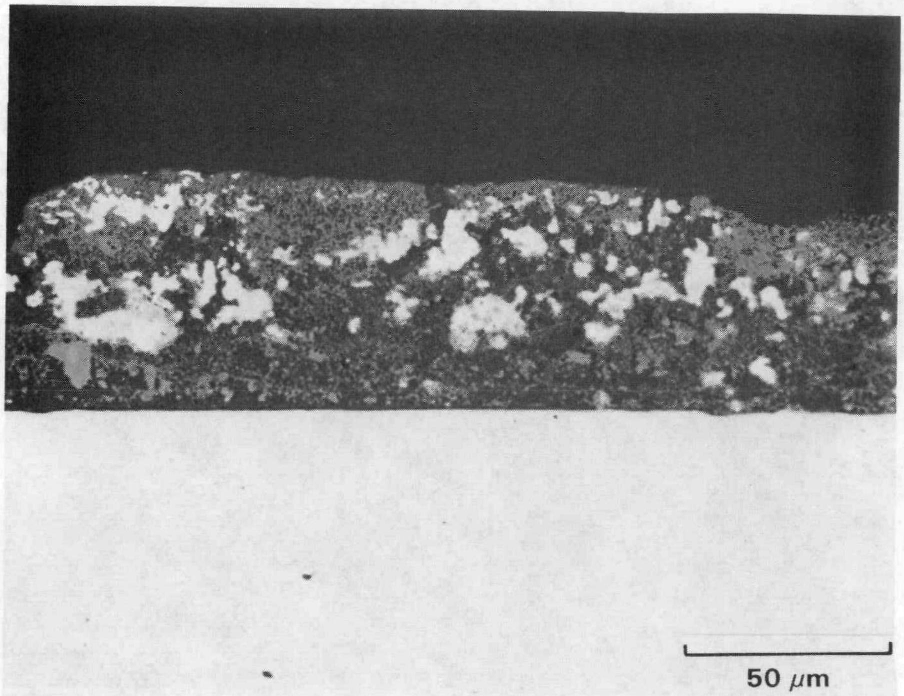


FIGURE 3.4. Optical Micrograph Showing Deposits on the OD Surface of Specimen 430B (R35 C56)

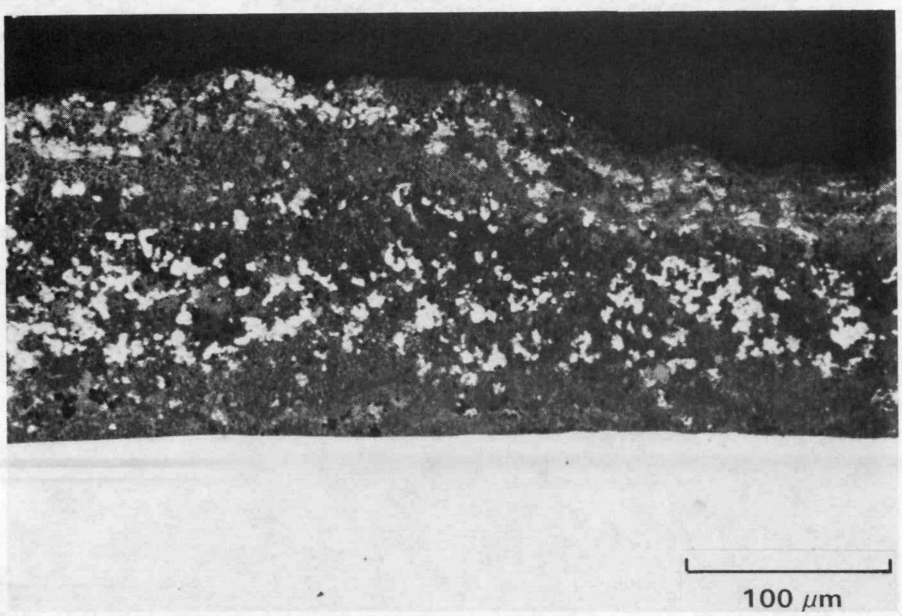


FIGURE 3.5. Optical Micrograph Showing Deposits on the OD Surface of Specimen 561A (R5 C74)

were from the same section but different areas of the cross section. In some localized areas, the Cu deposit approached a continuous thin layer.

As mentioned previously, the bright phase was identified by EDS and x-ray diffraction to be metallic Cu. The EDS spectra from the particles showed the chemical composition to be essentially pure Cu with a small amount of Fe. Elemental oxygen was not detectable with the spectrometer used for the analysis because of the low energy of the characteristic x-rays from this element. Consequently, the metallic form of the particles was determined by x-ray diffraction of the residue remaining after the Fe-rich deposits had been chemically removed in an inhibited HCl solution. Strong diffraction peaks corresponding to metallic Cu were observed with no evidence of copper oxides in the diffraction patterns.

Two additional phases were identified by EDS analysis of the deposits on the surface of Specimen 430B. The predominant phase was rich in Fe with lesser amounts of Ni and Zn as shown by a typical EDS spectra in Figure 3.6. This phase was distributed throughout the deposit in the form of individual particles or discrete layers of particles, and the composition remained relatively constant throughout the deposit. It was assumed to be primarily magnetite, although a positive phase identification was not made.

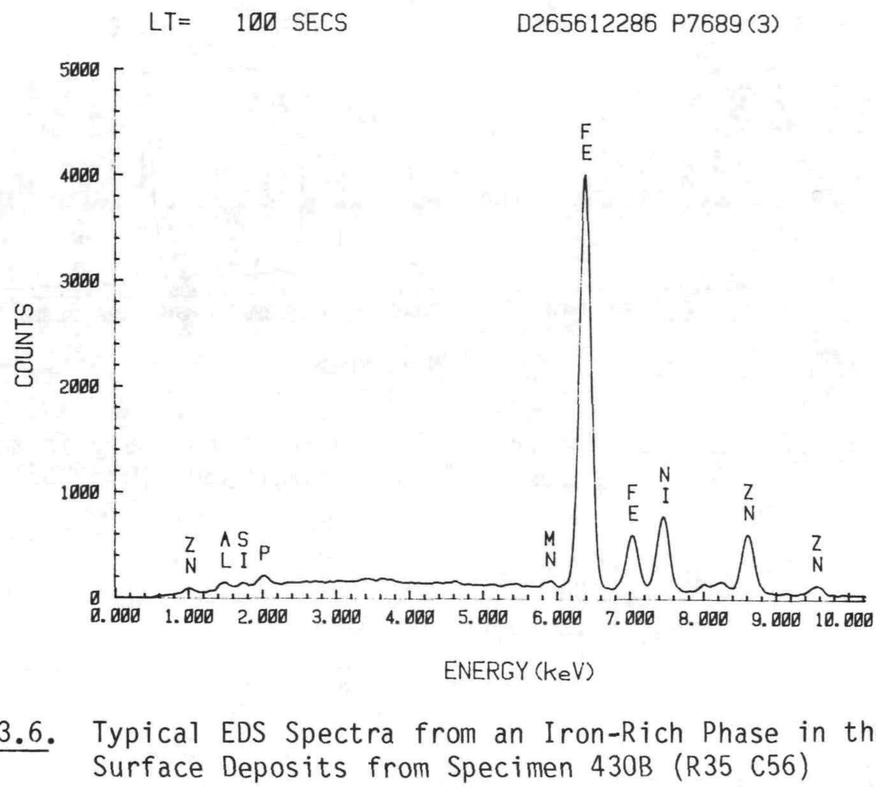


FIGURE 3.6. Typical EDS Spectra from an Iron-Rich Phase in the OD Surface Deposits from Specimen 430B (R35 C56)

The other noncopper phase was observed in the thicker regions of the deposits and appeared to provide a binder material for the discrete magnetite particles. This phase was found in a layer adjacent to the tube surface; the thickness of the layer ranged up to ~40 μm. Analysis using EDS showed that the phase generally contained P, Ca, Mn, Fe, and Zn with smaller amounts of Mg and Ni (see Figure 3.7). The relative concentration of the various elements varied within the deposit, and some regions were found to be particularly high in Ca and P. The consistently high P content suggests that this phase is a metal phosphate with the cation concentration varying locally within the deposit. Although SEM/EDS examinations were not conducted on the deposits from Specimen 561A, similar phases would be expected but with possible different distributions.

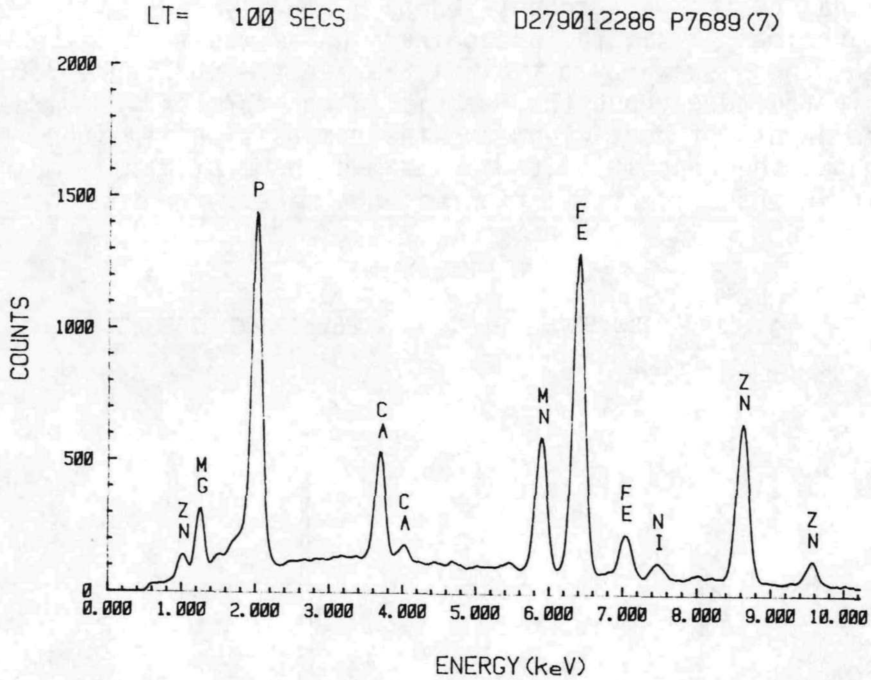


FIGURE 3.7. EDS Spectra from a Phosphorus-Rich Phase in the OD Surface Deposits from Specimen 430B (R35 C56)

3.1.2 Stress Corrosion Cracking

Inner row U-bends (Rows 2 through 5) were examined for cracking at the apex and bend transition regions during the validation studies. Row 1 U-bends had been examined previously and were not included in these examinations. The internal surfaces were examined after the sections were split axially and deformed to open tight ID cracks. A summary of the visual inspections conducted is given in Table 3.1. Inspection of some seventh TSP specimens included the U-bend transition region, which increased the number of Row 4 and 5 bend transitions examined. Cracking was found only at the apex of Row 2 U-bends. No evidence of cracking was observed at the bend transition region of the specimens examined.

Stress corrosion cracking was observed at the apex region of Row 1 and Row 2 U-bend specimens. A detailed description of the cracking in Row 1 U-bends was previously presented in Schwenk (1986), and only a summary will be given here. Axial cracking and/or rupture was observed in many of the Row 1 U-bends and appeared mainly in regions adjacent to severely hourglassed flow slots. An example of a ruptured Row 1 U-bend after removal from the generator is shown in Figure 3.8. Metallographic examination of Tube R1 C91 showed both OD- and ID-initiated SCCs that were oriented axially. The OD-initiated cracks were generally located along the sides of the U-bend corresponding to the major axis of the elliptical cross section produced from ovalization of the tube. Conversely, the ID-initiated cracks were located near the intrados and extrados zones of the U-bend. The exact circumferential location varied somewhat among the Row 1 U-bends examined, but their positions generally corresponded to regions where tensile hoop stresses would be expected on the respective tube surfaces.

TABLE 3.1. Summary of Inner Row U-Bends Inspected for Cracking in Apex and Bend Transition Regions

Inner-Row U-Bend	Apex Region		Bend Transition Region	
	OD Examination	ID Examination	OD Examination	ID Examination
Row 2	4	4	8	8
Row 3	8	7	16	14
Row 4	3	2	10	6
Row 5	-	-	2	2

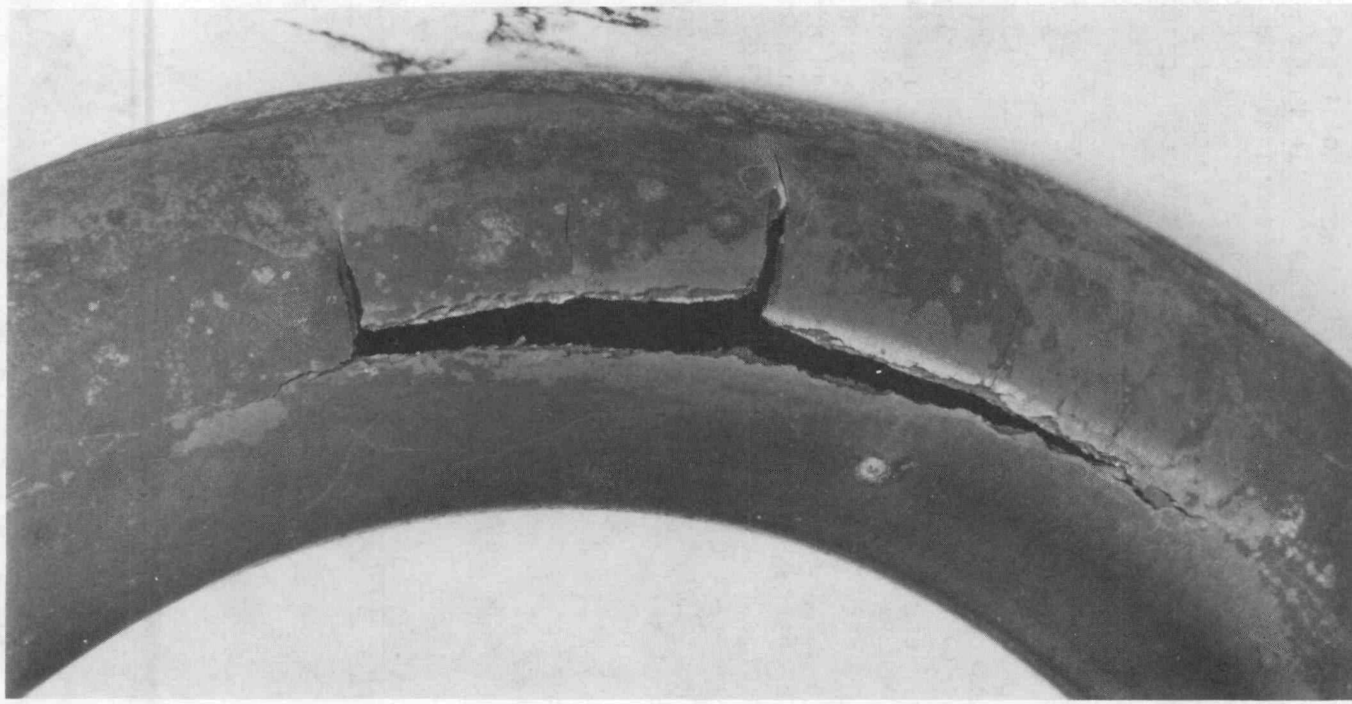
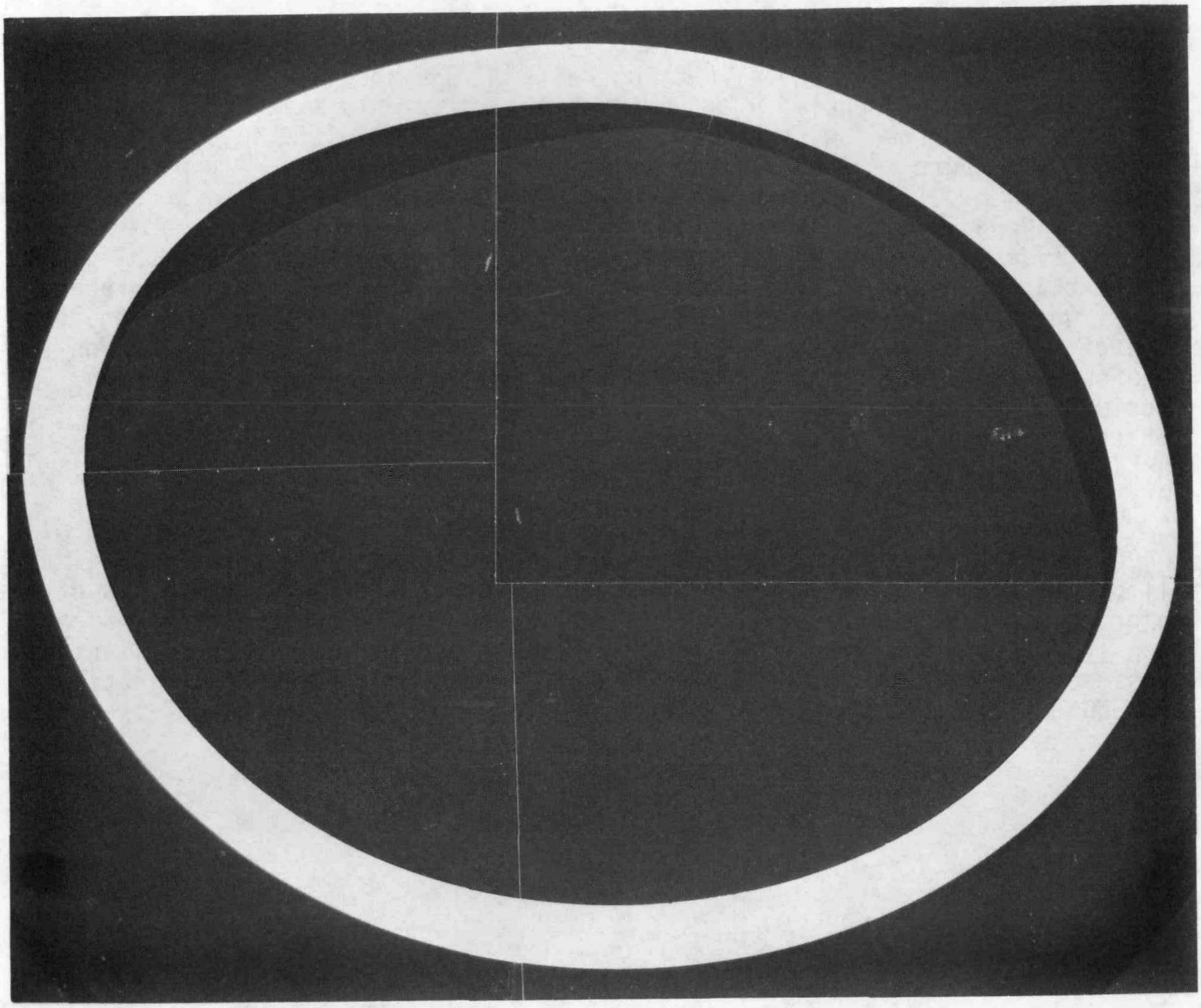


FIGURE 3.8. Row 1 U-Bend Showing Severe Cracking and Rupture

Cracking at the apex region was observed in three of the four Row 2 U-bend specimens inspected in the validation studies. One specimen contained both axially and circumferentially oriented cracks while only axial cracking was observed in the other two specimens. All cracks were initiated from the OD surface, and there was no evidence of ID-initiated cracking. A photograph showing both axially and circumferentially oriented cracks on the OD surface of Specimen 1049B (R2 C27) is shown in Figure 3.9. The axial cracks were located on each side of the U-bend and consisted of a series of short overlapping cracks that extended several inches along the apex region. The circumferential cracks were also segmented and were located at two positions on the extrados zone of the U-bend. They appeared to follow fine scratch-like markings on the tube surface. These fine circumferential markings were often observed on specimen surfaces and resulted from the initial fabrication process. The correspondence between the cracks and the fine markings suggests that the markings provided preferred nucleation sites for SCC.

Ovalization and the location of the axial cracks at the apex of Specimen 1049B (R2 C27) are shown in the optical photomicrograph in Figure 3.10. The elliptical shape of the tube cross section is clearly evident; the ratio of the major to minor axis is ~1.3. Multiple OD-initiated cracks were observed on each side of the metallographic specimen near the major axis of the elliptical cross section. Crack depths varied from 2% to 30% through-wall penetration with one major crack on each side of the specimen. The major cracks branched

FIGURE 3.9. Axial and Circumferential Cracking on the OD Surface at the Apex of U-Bend Specimen 1049B (R2 C27)



2 mm

FIGURE 3.10. Optical Micrograph Showing Tube Ovalization and OD Stress Corrosion Cracking of U-Bend Specimen 1049B (R2 C27 at Apex)

out at ~20% through-wall penetration. Close examination of the microstructures showed primarily intergranular crack propagation indicating IGSCC as the degradation mechanism. The features of the axial cracks from one side of the specimen are shown at higher magnifications in Figure 3.11. Similar features were also seen on the other side of the specimen.

Multiple OD-initiated cracks were also observed in a longitudinal metallographic section through the circumferentially cracked area identified in Figure 3.9. Optical micrographs showing the microstructure of the deepest crack are presented in Figure 3.12. The deeper circumferential cracks were more open than the axial cracks and showed evidence of blunting or deformation at the

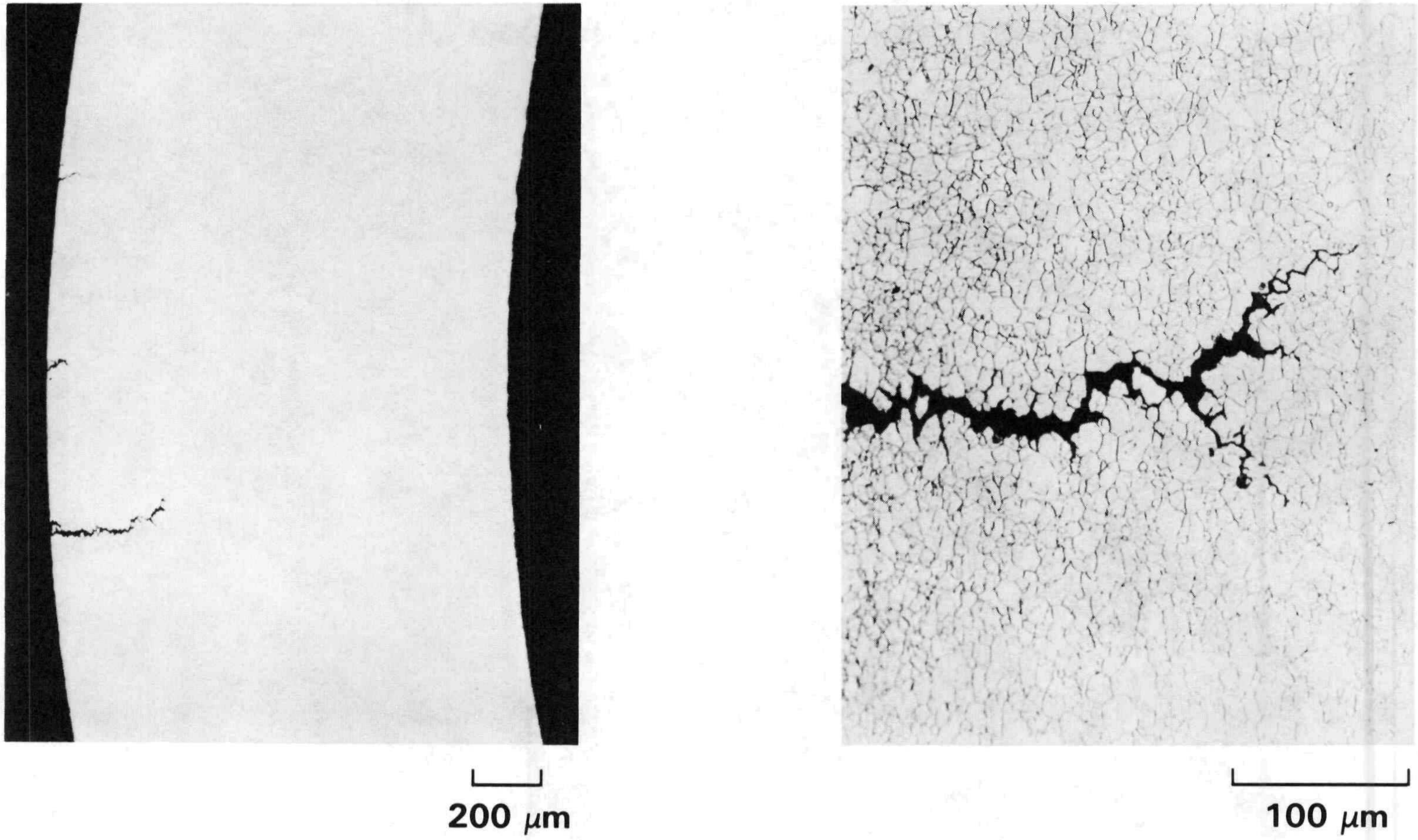


FIGURE 3.11. Optical Micrographs Showing Axial IGSCC at the Apex of U-Bend Specimen 1049B (R2 C27)

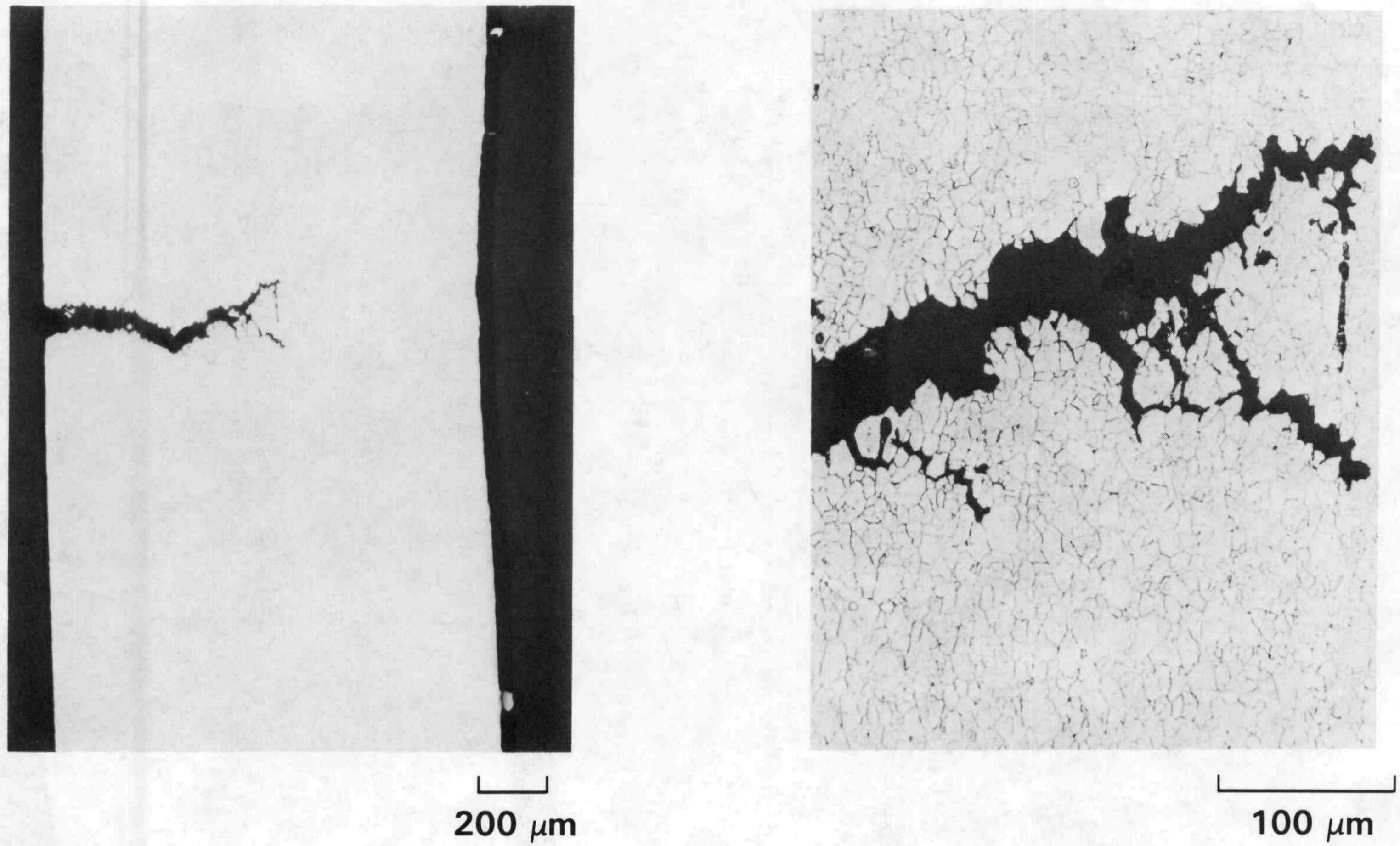


FIGURE 3.12. Optical Micrographs Showing Circumferential IGSCC at the Apex of U-Bend Specimen 1049B (R2 C27)

crack tips. Detailed examination of the microstructures indicated that crack propagation was primarily intergranular, which agrees with the cracking mechanism for the axial cracks. The intergranular nature of the cracking was especially evident in the more shallow cracks, where crack opening and the resulting deformation were not observed. The shallow cracks also enabled the OD surface to be examined for evidence of the surface scratches that appeared to nucleate the circumferential cracks. An example of an intergranular crack at the base of a shallow surface depression is shown in Figure 3.13. The surface depression is ~10 µm deep and 30 µm wide. Definite surface markings that initiated the remaining circumferential cracks were not readily apparent in the optical micrographs. However, the definite correlation between the circumferential cracks and the surface scratches on the OD surface (see Figure 3.9) indicates that most if not all of the circumferential cracks were nucleated at surface scratches produced during fabrication. Nucleation of OD-initiated SCC at axial scratches or "score" marks on tube sections removed from the Ringhals Unit 2 has been previously reported (Finnigan et al. 1983), which is in agreement with the present interpretation.

The observed SCC at the apex of the inner row U-bends is consistent with the stress distributions produced by tube ovalization from the inward movement of the U-bend legs that was caused by corrosion of the seventh TSP and resulted in partial closure of the flow slots. Under these conditions of tube ovalization, tensile hoop stresses would be expected on the OD surfaces at the sides

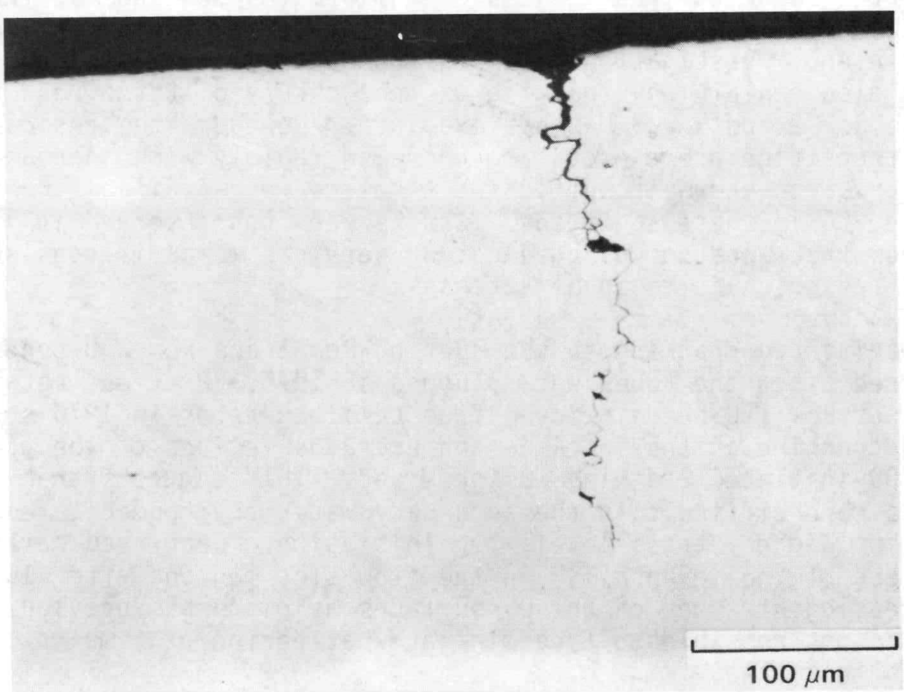


FIGURE 3.13. Optical Micrograph Showing a Circumferential SCC Initiated at a Shallow Surface Scratch on the OD Surface of U-Bend Specimen 1049B (R2 C27)

of the U-bends and on the ID surfaces near the intrados and extrados regions as discussed by Dobbeni et al. (1981). Tensile hoop stresses would produce axial SCC, and the locations and surface of initiation for the axial cracks observed in the Row 1 and Row 2 U-bends is consistent with the stress distribution in an ovalized tube. Inward movement of the U-bend legs would also produce the necessary axial tensile stress on the OD surface along the extrados region to form the circumferential cracks observed on Specimen 1049B.

The lack of ID-initiated IGSCCs at the apex of Row 2 U-bends is most likely associated with the preventative plugging that occurred early in the service history of the generator. In 1976, most of the tubes in the inner three rows were plugged after a Row 1 U-bend ruptured during operation. Preventative plugging would reduce the tube temperature and, more importantly, remove the water environment needed to initiate and propagate the SCCs on the inside surfaces of the tube. Inadequate stress levels on the internal surfaces could also decrease the tendency for ID cracking. However, the degree of ovalization observed for the Row 2 U-bends with OD-initiated cracking was greater than that reported by Morgan (1981) for ID cracking of Row 1 U-bends. This suggests that sufficient stresses were available for ID cracking; thus, the change in environment was the primary reason for the observed lack of ID cracking at the apex.

Although SCC at the bend transition was found in one of the Row 1 U-bends removed from the Surry 2A steam generator in 1976 (Aspden and Kuchirka 1981), no cracking was observed at this location in the larger radius U-bends examined during the present investigation. The environmental change produced by tube plugging may also explain why cracking was not observed at the bend transition region of the Row 2 and Row 3 U-bends examined. However, the residual stresses at the bend transition are expected to decrease rapidly with increasing U-bend radius and it is not known if sufficient stresses were available to initiate and propagate SCC in these specimens. Cracks were not observed in larger radius U-bends that were not plugged during service, which is consistent with the expected reduction in residual stresses.

The OD-initiated cracking at the apex of Row 1 and Row 2 U-bends most likely occurred after the tubes were plugged in 1976. Previous metallurgical examinations of Row 1 U-bends removed from this generator in 1976 showed axial ID-initiated cracking at the intrados and extrados regions of the apex, but no evidence of OD-initiated cracking was observed. This suggests that SCC nucleation is more difficult in the secondary water environment, requiring longer times or higher stress levels for initiation. Continued corrosion and inward movement of the seventh TSP in the flow slot regions after 1976 would provide increasing stresses on the OD surfaces as discussed previously. However, it is not possible to determine at what period of time or stress level the OD cracks initiated.

3.1.3 Antivibration Bar Contact Wear and Corrosion

Antivibration bar contact areas at 53 axial positions on the tube surfaces were examined during the validation studies. Seventeen of these axial locations contained AVB contact areas on both sides of the tube, which increased the total number examined to 70. The contact areas were examined under an optical microscope for evidence of corrosion, and metallographic sections were prepared for the more severely degraded regions. Of the 70 AVB contact areas examined, 7 areas showed visible evidence of mechanical wear and corrosion, 6 areas exhibited minor corrosion without mechanical wear, and 57 areas showed little or no evidence of wear or corrosion.

A typical AVB contact area from Specimen 491A (R13 C29) is shown in Figure 3.14. The contact areas were marked by the absence of the thin dark oxide coating on the tube surface and occasional deposits that were not removed by chemical cleaning. Shallow circumferential scratches produced during tube fabrication were often observed in the contact areas, which shows the lack of significant abrasion or corrosion.

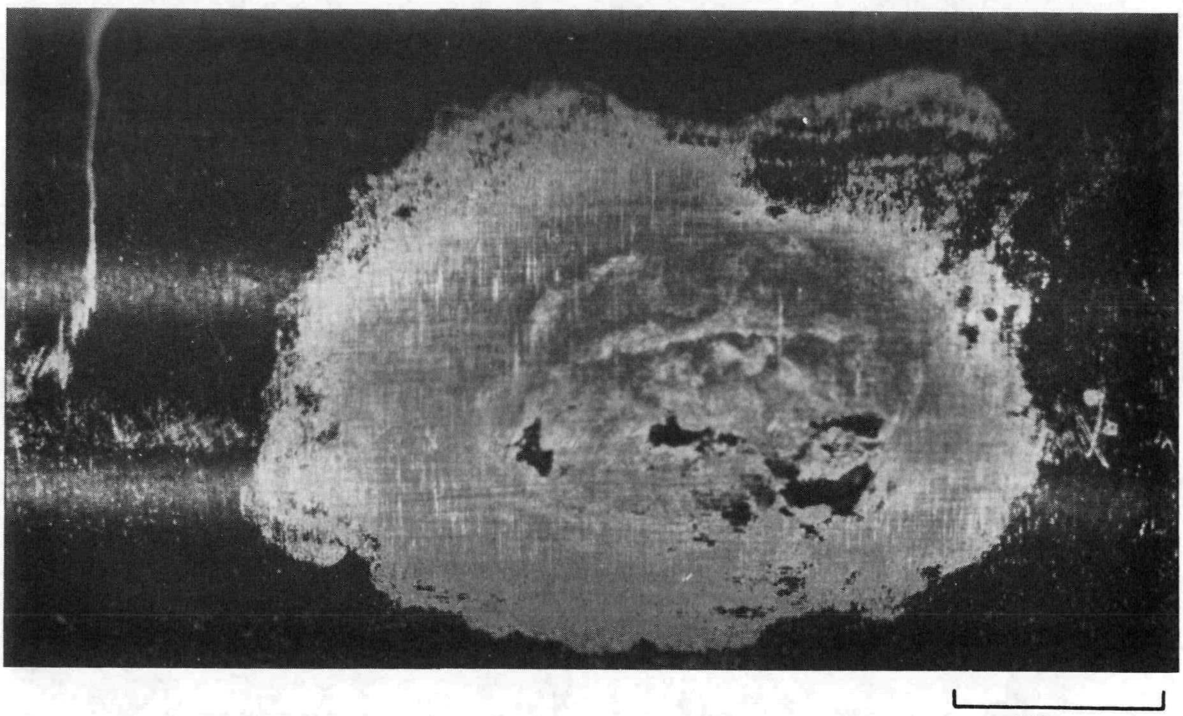


FIGURE 3.14. Photograph of Typical AVB Contact Area Showing Little Evidence of Wear or Corrosion; Specimen 491A (R13 C29)

Minor corrosion in the form of pitting, wastage, and/or IGA was observed at some of the contact areas examined. The pits were very small and could generally be seen only at high magnifications. Uniform corrosion (wastage) and potential IGA were denoted at high magnifications by an etched appearance with some crack-like markings on the OD surface. Metallographic examination confirmed the shallow nature of the degradation; the maximum defect depth was 4% through-wall for an isolated pit in Specimen 497A (R10 C29) (see Figure 3.15). Incipient IGA at the OD surface was also observed in this specimen when examined at high magnifications (500X). However, the attack affected only the surface grains with the maximum penetration being ~20 μm. No measurable wall loss from uniform corrosion was observed.

Evidence of wear and corrosion under the AVB contact areas was found on seven of the contact areas examined. The wear marks were generally rectangular in shape and often contained linear features that were filled with corrosion products or deposits as illustrated in Figure 3.16. A pit-like depression filled with corrosion products or deposits was also observed near the center of a wear mark on Specimen 435C (R31 C58 HL) as shown in Figure 3.17. The shape

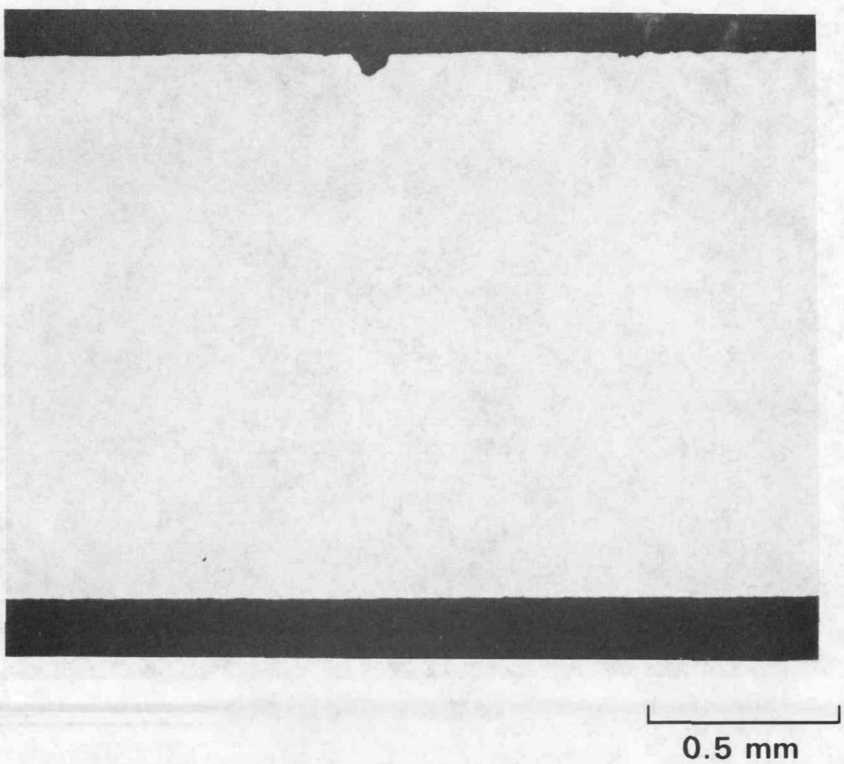


FIGURE 3.15. Optical Micrograph Showing an Isolated Pit at an AVB Contact Area on U-Bend Specimen 497A (R10 C29 HL)

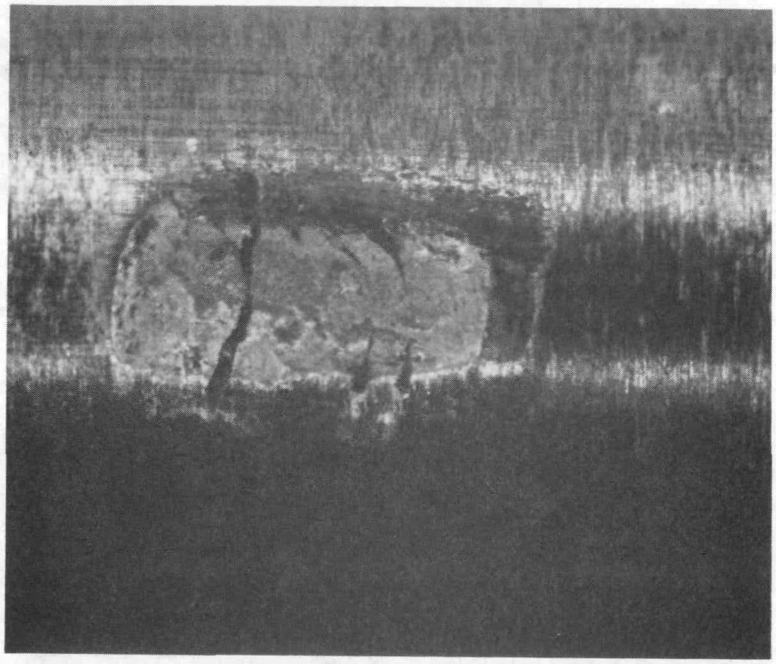


FIGURE 3.16. Wear and Corrosion at an AVB Contact Area on U-Bend Specimen 416C (R31 C58)

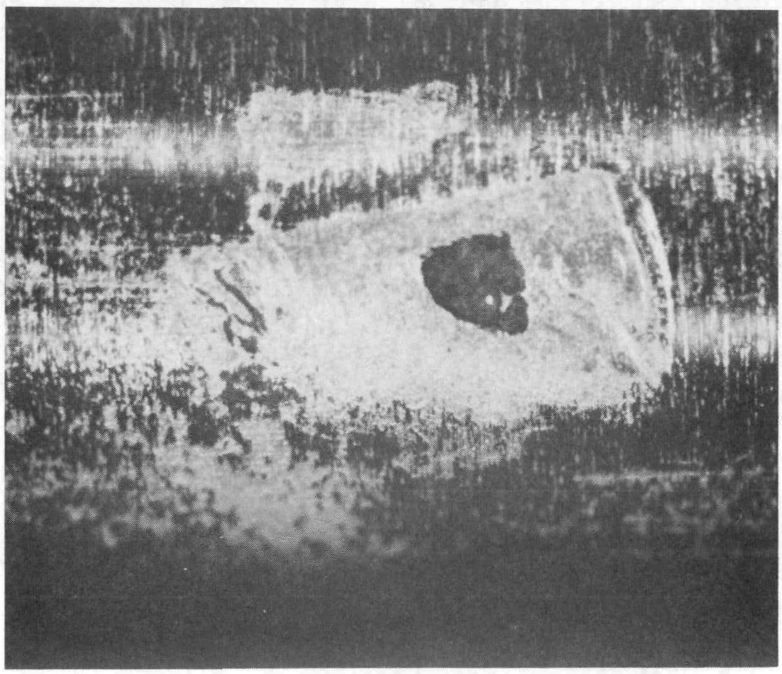


FIGURE 3.17. Central Pit within an AVB Wear Area on the OD Surface of U-Bend Specimen 435C (R31 C58)

of the wear marks and general features of the metal surfaces suggest formation by mechanical wear caused by relative motion between the AVB and tube surfaces. The direction of motion was nearly perpendicular to the tube axis. However, the depressed features filled with corrosion products or deposits suggest additional metal loss by corrosion since it is difficult to rationalize their formation by purely mechanical means.

Metallographic sections were taken through the five most severely degraded contact areas; the results are summarized in Table 3.2. All of these contact areas were found at different axial locations on Tube R31 C58. Metallographic Specimens 416C-2 and 416C-3 represent AVB contact areas from opposite sides of the tube that were separated axially by ~0.5 in. The maximum depth ranged from 5% to 25% with the median being 8% through-wall penetration. Tube degradation was greater at the upper AVB, and maximum wall penetration occurred on the hot leg side of the generator.

Examination of the microstructures indicated that the degradation was a combination of mechanical wear and corrosion. This degradation was especially evident for Specimen 435C-2, which contained the wear mark with the central pit-like depression (see Figure 3.17). Optical micrographs from a transverse section through the central region of the wear mark are shown in Figure 3.18. The profile of the degraded area consists of a nonuniform region bounded on either side by relatively flat surfaces. The width of the nonuniform region corresponds closely to the pit-like depression on the tube surface. A flat profile would be expected for mechanical wear produced by relative motion between the AVB and the tube surface. The flat surfaces at the edges of the wear mark are consistent with mechanical wear while corrosion is the best explanation for the nonuniform region in the center of the wear mark. No evidence of intergranular corrosion was found, which suggests that pitting or another form of nonuniform corrosion was responsible for the attack.

The remaining wear areas examined showed relatively flat profiles indicative of mechanical wear. The linear features seen on the surfaces were quite shallow with no significant contribution from corrosion to the measured wear. There was also no evidence of IGA at any of the wear surfaces examined.

TABLE 3.2. Summary of Wall Loss from AVB Contact Wear and Corrosion

Specimen No.	Tube No.	Metallography Wall Loss, %
435B-2	R31 C58 HL	5
435C-2	R31 C58 HL	25
416B-2	R31 C58 CL	8
416C-2	R31 C58 CL	12
416C-3	R31 C58 CL	7

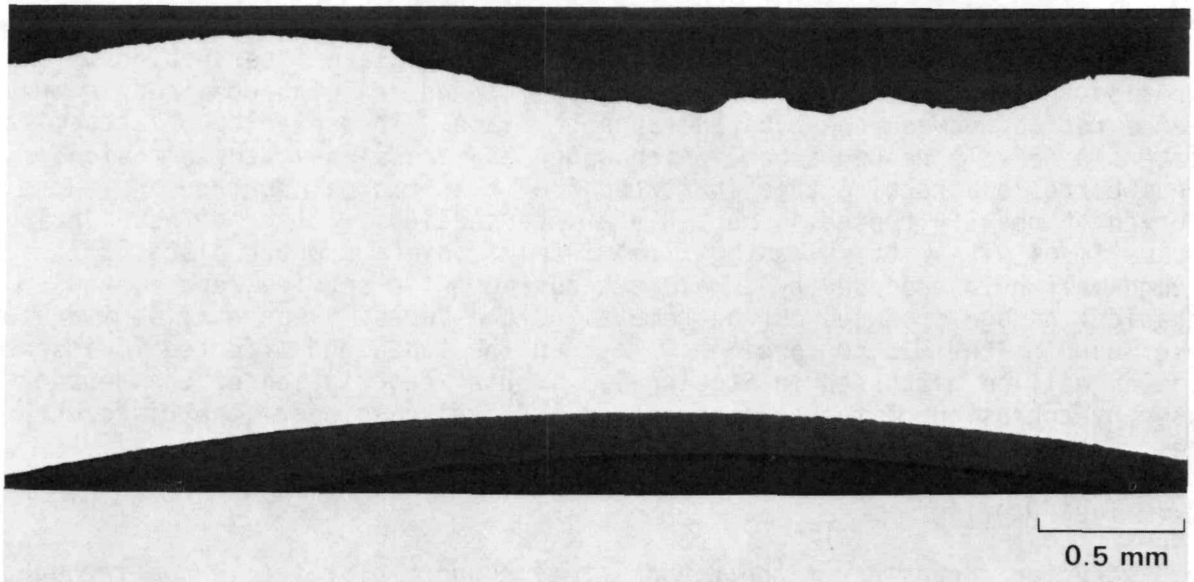


FIGURE 3.18. Optical Micrograph Showing AVB Contact Wear and Corrosion on U-Bend Specimen 435C (R31 C58 HL)

3.1.4 Mechanical Damage

Severe grinder marks were found on two of the outermost U-bend specimens: 428A (R46 C45) and 429A (R46 C50). The defects were located 14 in. and 20 in. above the seventh TSP on the hot leg side of the generator. Metallographic examination showed the maximum defect depth to be 72% through-wall for Specimen 428A and 66% through-wall for Specimen 429A. These defects were identified by the EC inspections prior to specimen removal activities and were therefore produced during an in-service repair or inspection. A through-wall hole from a welding torch was also found on Tube R46 C50 (Specimen 1026) 25 in. below the seventh TSP and was apparently produced during the same repair operation. Both tubes had been plugged in 1976.

3.2 TUBE SUPPORT PLATE REGION

A total of 203 specimens were removed from the TSP region of the generator and inspected during the validation studies. The intersections between the tube and support plates are the primary sites for tube degradation in this region of the generator; a total of 117 TSP intersections were examined. This number included 29 specimens with a range of calculated strain values based on profilometry and 42 specimens from hard/soft spots near the flow slots of inner row tubes, Rows 1 through 5. Although attempts were made to select specimens with EC data, severe denting at hot leg TSP intersections reduced the EC inspectability of this region of the generator by blocking the passage of the EC probe.

Almost all of the tube degradation observed in specimens from the TSP region of the generator was associated with support plate intersections. Corrosion in the form of pitting, wastage, IGA, and cracking occurred in the crevice region between the tube and support plate. The severity of attack was greater in heavily dented tubes, which suggests stress-assisted corrosion. Stress corrosion cracking that initiated from the internal surfaces was also observed at heavily dented support plate intersections. Other defects included two specimens with pitting/wastage immediately above a support plate, a through-wall hole produced by a weld arc during an in-service repair, and mechanical damage produced during removal of the tubes. Deposits, similar to those found on the U-bend specimens, covered the tubes and affected EC inspections as will be discussed in Section 4. A brief description of the denting caused by corrosion of the support plates and a discussion of the different types of tube defects observed are presented below.

3.2.1 Tube Denting

Extensive corrosion of the carbon steel support plates occurred throughout the generator but was most extensive on the hot leg side. Support plate corrosion is thought to be caused by the intrusion of chloride ion impurities into the secondary water. These impurities concentrate in the crevice region between the tube and support plate, resulting in an acidic environment that corrodes the carbon steel support plates. Magnetite is produced by the corrosion reaction, and its volume is about twice that of the uncorroded carbon steel. As corrosion progresses, the increased volume of magnetite produces high stresses that can eventually plastically deform the tubes and support plates. Deformation of the tubes is called denting.

The extensive amount of support plate corrosion and tube denting is illustrated in Figure 3.19, a photograph of the seventh TSP after U-bend removal. Extensive cracking and movement of the support plate into the flow slot are clearly evident. More support plate cracking is seen on the hot leg side of the generator with the Row 1 tubes being completely separated from the support plate. This complete separation occurred after the Row 1 U-bends had been removed. Severe deformation of the tubes (denting) and support plate are also seen near the center post on the hot leg side. The center post prevented expansion of the support plate into the flow lane, which resulted in nearly complete collapse of some tubes.

Increased support plate corrosion and denting on the hot leg side are consistent with the higher operating temperatures in this region. Corrosion rates increase dramatically with increasing temperature, and observations regarding support plate breakup during full-length tube removal are in general agreement with expected temperature variations. All seven support plates on the hot leg side broke apart during tube removal, indicating extensive support

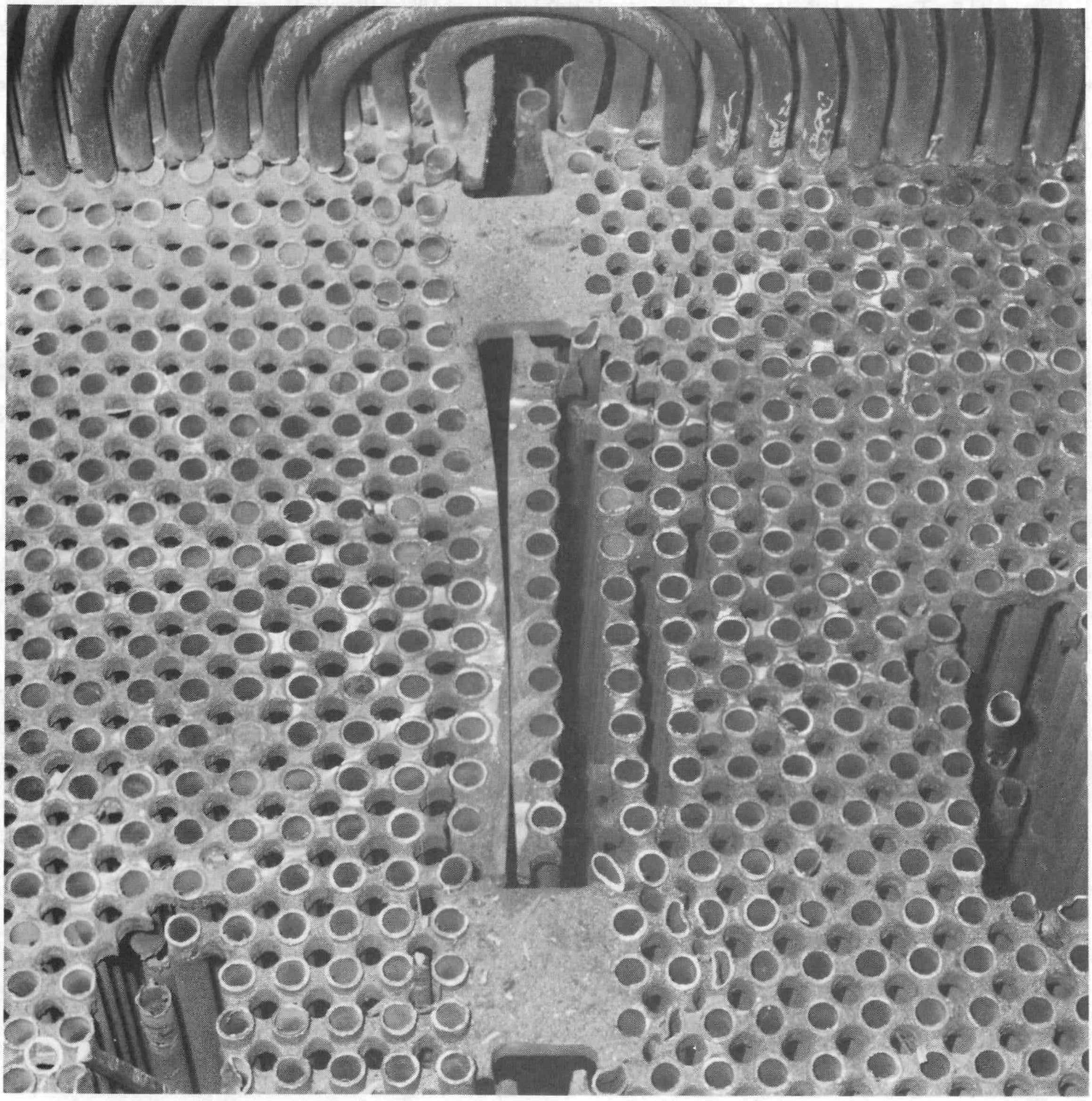


FIGURE 3.19. Seventh TSP After U-Bend Removal Showing Support Plate Cracking and Tube Denting

plate ligament cracking throughout the hot leg region. Breakup of cold leg support plates was more difficult and was limited to the fifth, sixth, and seventh TSPs. In general, temperatures would be higher on the hot leg side of the generator and would also decrease with decreasing elevation on the cold leg side. The cooler temperatures at the lower elevations of the cold leg side would reduce the corrosion rate and thereby maintain the integrity of the lower support plates.

Although severe tube denting was observed in localized regions of the generator, the average maximum strain for hot leg TSP intersections was <10% as shown in Table 3.3. These data were obtained from the profilometry examination of 101 hot leg tubes performed by personnel from Babcock & Wilcox as described in the Task 9 report (Doctor et al. 1986b). The maximum strain was calculated at the TTS and each TSP intersection for the 101 tubes inspected; Table 3.3 presents a summary of these maximum strain data. The data show that denting occurred at the TTS and TSP intersections of all tubes examined. Denting was less severe at the TTS with the average being about one-third of the strain measured at the TSP intersections. For the TSP intersections, the average maximum strain decreased with increasing TSP elevation except for the seventh TSP, where the average increased relative to the fifth and sixth TSP. The general trend in the strain data (i.e., decreasing strain with increasing elevation) can be attributed to lower primary coolant temperatures at the higher elevations as discussed previously. The small increase in average strain at the seventh TSP resulted from very high strain values (>50%) for three tubes at this elevation. The remaining tubes followed the general trend of decreasing strain with decreasing primary coolant temperature.

3.2.2 OD Surface Corrosion and Cracking

The vast majority of the TSP intersections showed visible evidence of corrosion in the crevice region between the tube and TSP. A photograph of a typical intersection is shown in Figure 3.20. The tube surface exhibited an etched appearance with local areas showing minor wastage and/or pitting. Except for the more severely dented intersections, the wastage and pitting was most prevalent at the extremes of the crevice region corresponding to the top and bottom surfaces of the TSP. The depth of these degraded areas was visually estimated to be <20% through-wall penetration. To confirm these estimates, three

TABLE 3.3. Summary of Calculated Strain Values from Profilometry Examination of 101 Hot Leg Tubes

Location	Calculated Strain, %		
	Average	Maximum	Minimum
7th TSP	7.9	88.3	1.8
6th TSP	6.7	39.1	2.4
5th TSP	6.9	27.0	2.6
4th TSP	8.1	49.4	2.1
3rd TSP	8.6	82.9	2.5
2nd TSP	9.0	58.1	2.2
1st TSP	9.1	76.6	1.8
TTS	2.6	11.1	1.4

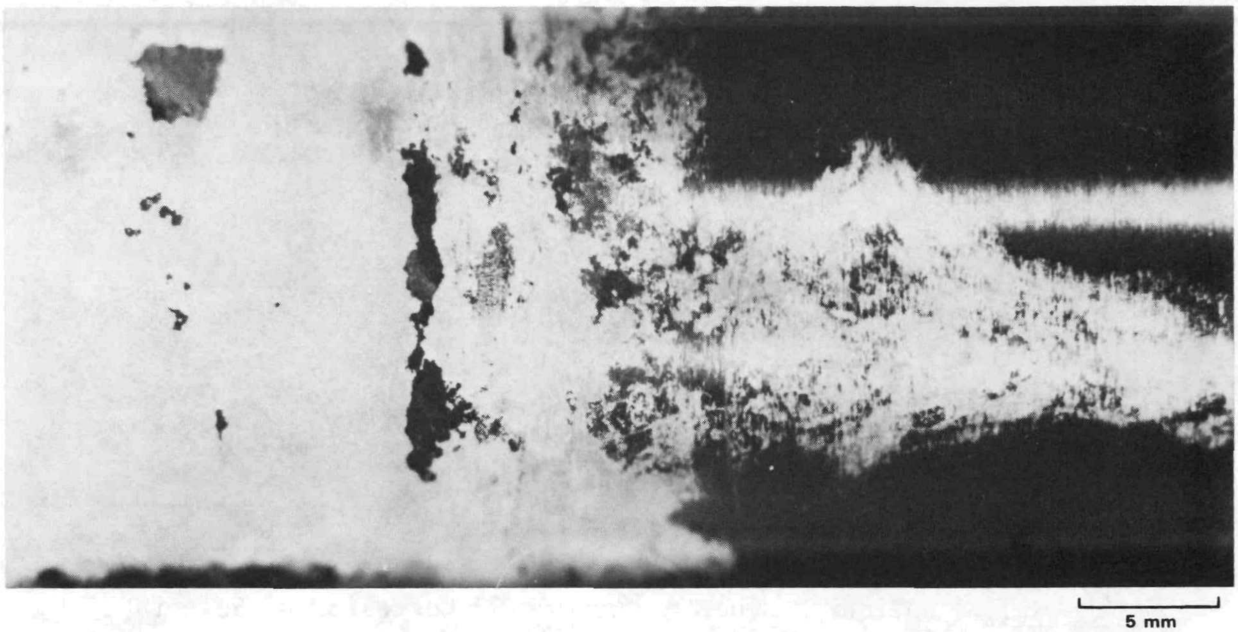


FIGURE 3.20. Typical TSP Intersection; Specimen 665 (R7 C57 HL)

transverse metallographic sections were prepared from hot leg seventh TSP Specimen 455 (R9 C47 HL7), which was one of the more severely degraded specimens with low strain estimates. Figure 3.21 shows a local degraded area consisting of wastage and/or pitting near the top of the TSP crevice region. The measured wall loss was 8%, which is well below the 20% upper limit from the visual estimate. It should be noted that 20% wall loss was considered to be a realistic lower limit for visual estimation of wall loss from wastage and pitting. No measurable tube degradation was observed in the other two sections that were located within or near the bottom of the crevice region.

More extensive corrosion on the tube OD surfaces was observed in the TSP crevice region of the more severely dented specimens. In addition to the corrosion near the TSP surfaces, wastage, pitting, IGA, and cracking of varying degrees were found within the crevice region. The tube degradation by corrosion was concentrated circumferentially at regions near the major axis of the flattened tube cross sections. As discussed previously, these regions would have higher tensile hoop stresses on the OD surfaces, which indicates that the corrosion degradation observed in the TSP crevices was enhanced by high surface stresses. The stress dependence of IGSCC is well documented, but the present results show that wastage, pitting, and IGA in the crevice region may also be enhanced by local surface stresses.

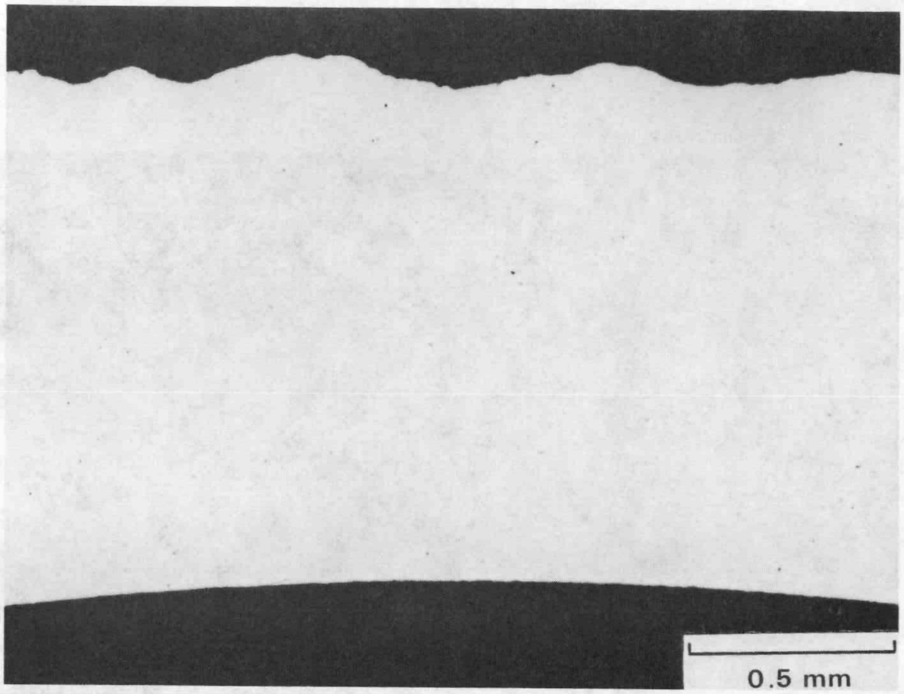


FIGURE 3.21. Optical Micrograph Showing OD Corrosion of Seventh TSP Specimen 455 (R9 C47 HL7)

Representative examples of corrosion on the OD surfaces of heavily dented TSP intersections are shown in Figures 3.22 and 3.23. The arrow in Figure 3.22 denotes the region of high tensile hoop stresses, and wastage and pitting are seen along the tube axis through most of the crevice region. In addition to wastage and pitting, visual evidence of IGA or cracking on the OD surface was observed in the crevice region of some specimens in areas of high surface tensile stresses. This form of tube degradation was generally visible in the stereo microscope at higher magnifications and appeared as very fine crack-like markings on the surface. These features can be seen near the edge of the dark deposits in Figure 3.23.

Axial cracks in the crevice region that were initiated from the OD surface were observed visually in specimens with extremely high levels of denting (calculated strain >60%). Figure 3.24 shows the axial cracking found on Specimen 451 (R45 C50 HL7), which had a calculated strain of 79.8%. Multiple cracks with a generally axial orientation are seen in the region corresponding to the seventh TSP crevice. In agreement with the U-bend cracking, the axial cracks were located near the major axis of the flattened cross section where maximum tensile hoop stresses would occur. Outside the crevice region, more crack branching occurred with some fine cracks showing a near circumferential orientation. The depth of the axial cracks was visually estimated to be >50% through-wall. Metallographic examinations were not conducted because of the obvious degradation and the extreme deformation required to produce these cracks.

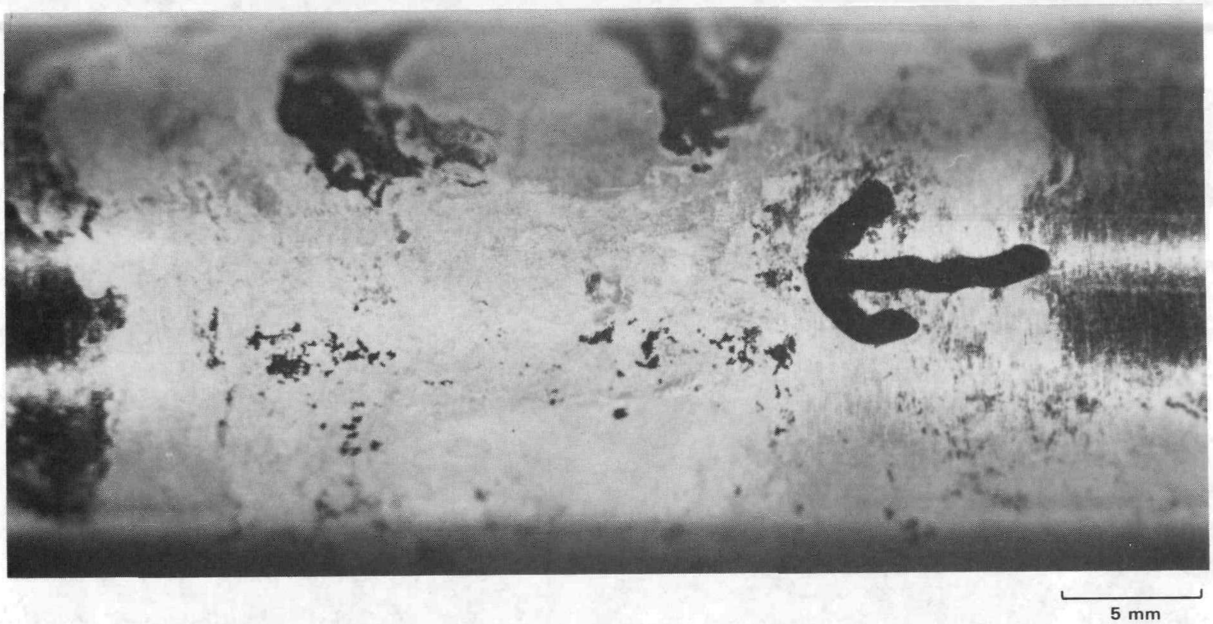


FIGURE 3.22. Photograph Showing OD Surface Corrosion of Fifth TSP Specimen 935 (R45 C52 HL) (17.1% strain)

FIGURE 3.23. Photograph Showing OD Surface Corrosion of First TSP Specimen 1041 (R4 C51 HL) (26.9% strain)

FIGURE 3.24. Photograph Showing Axial Cracking of Seventh TSP Specimen 451 (R45 C50 HL7) (79.8% strain)

Transverse metallographic sections through the less heavily dented TSP intersections confirmed the concentrated OD corrosion at regions of high surface stresses. Wastage, pitting, and IGA in varying amounts and distributions were observed in the TSP crevice region of the specimens that were metallographically examined. Figure 3.25 shows the OD corrosion of fifth TSP Specimen 935 (R45 C52 HL) where wastage and pitting are seen to be the predominant defect types. Shallow IGA was normally observed at the outermost surface regions of the specimen where significant wall loss had not occurred. This form of attack is illustrated in Figure 3.26 by an optical micrograph from fifth TSP Specimen 909 (R10 C39 HL5). The attack was fairly uniform along the surface with penetrations extending from 1 to 3 grain diameters (<100 μm). Shallow IGA was also observed at the base of the pitted and wastage areas as illustrated in Figure 3.27. Corrosion products containing isolated metal grains were often observed near the degraded surfaces, which suggests that corrosion occurred by IGA followed by dissolution of the isolated grains. More severe intergranular penetrations were observed in first TSP Specimen 1041 (R4 C51 HL2) as shown in Figure 3.28. These penetrations ranged up to 150 μm in depth with a 12% wall loss; some may have been incipient SCC. Similar but smaller intergranular penetrations were also observed in Specimen 925 (R4 C51 HL5).

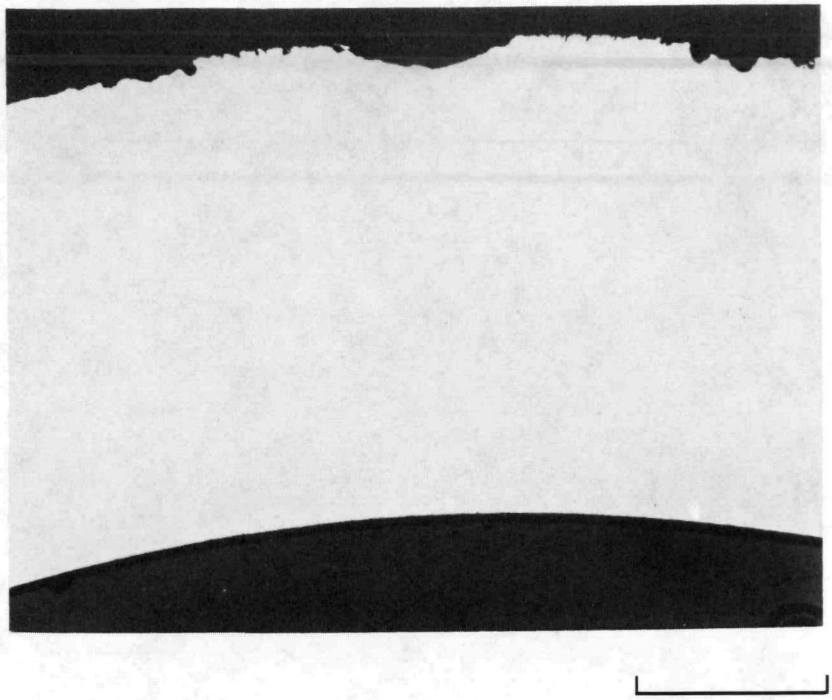


FIGURE 3.25. Optical Micrograph Showing OD Corrosion of Fifth TSP Specimen 935 (R45 C52 HL5)

Results of the metallographic examinations regarding OD corrosion of the dented TSP intersections are summarized in Table 3.4. The degradation was shallow in all cases with the maximum wall loss being 12%. Although the circumferential location of the degraded areas indicates stress-enhanced corrosion, no definite relationship between wall loss and calculated strain is evident in the data. Differences in the local corrosion environment (e.g., temperature and impurity concentrations) as well as differences in local surface stresses produced by variations in the dented cross sections are most likely responsible for the observed wall loss variations. In any event, the present results show that the OD corrosion of dented TSP intersections was shallow (2% to 12% wall loss) for calculated strains up to 39%. For calculated strains >60%, axial cracks were visually observed on the OD surfaces at regions of high tensile hoop stress. Metallography was not performed, but the depth of the cracks on Specimen 451 (R45 C50 HL7) appeared to be >50% through-wall penetration.

Pitting type defects outside of the tube-to-support plate crevice were found on only two of the specimens examined. The degradation in both specimens occurred directly above a support plate in a region where sludge deposits would be expected. An isolated pit with an estimated wall loss of ~40% was located ~0.3 in. above the first TSP in Specimen 967 (R34 C76 CL1), while shallow

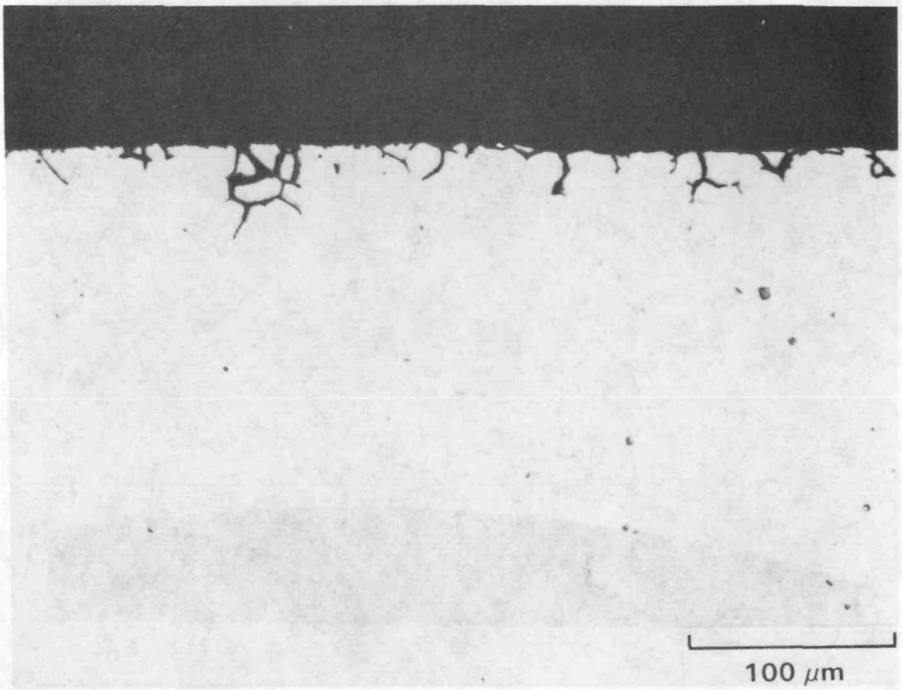


FIGURE 3.26. Optical Micrograph Showing Shallow IGA on the OD Surface of Fifth TSP Specimen 909 (R10 C39 HL5)

pitting was observed on Specimen 997 (R5 C82 CL4) ~0.2 in. above the fourth TSP. No other corrosion type defects were observed in tube sections between TSPs.

3.2.3 ID-Initiated SCC at Dented TSP Intersections

The internal surfaces of 27 hot leg and 11 cold leg specimens were examined for ID-initiated cracking at the dented TSP intersections. The specimens were split axially to expose the internal surfaces. If cracks were not visibly evident, the split segments were bent around a pipe to open any tight cracks prior to detailed examination. Seventeen of the hot leg specimens had profilometry data available and the calculated strain values ranged from 4.2% to 39.1%.

Results of the ID visual examinations of dented TSP intersections as a function of location within the generator are presented in Table 3.5. Ten hot leg specimens contained axial cracks on the ID surface while no evidence of cracking was observed in the cold leg specimens. Maximum crack depth ranged from 27% to 88% through-wall penetration. Cracking was generally found throughout the hot leg region of the generator and, based on visual observations, occurred in the more heavily deformed TSP intersections. Less severe deformation from denting was observed for the 11 cold leg specimens and 6 hot leg specimens from the seventh TSP that were given ID examinations. The

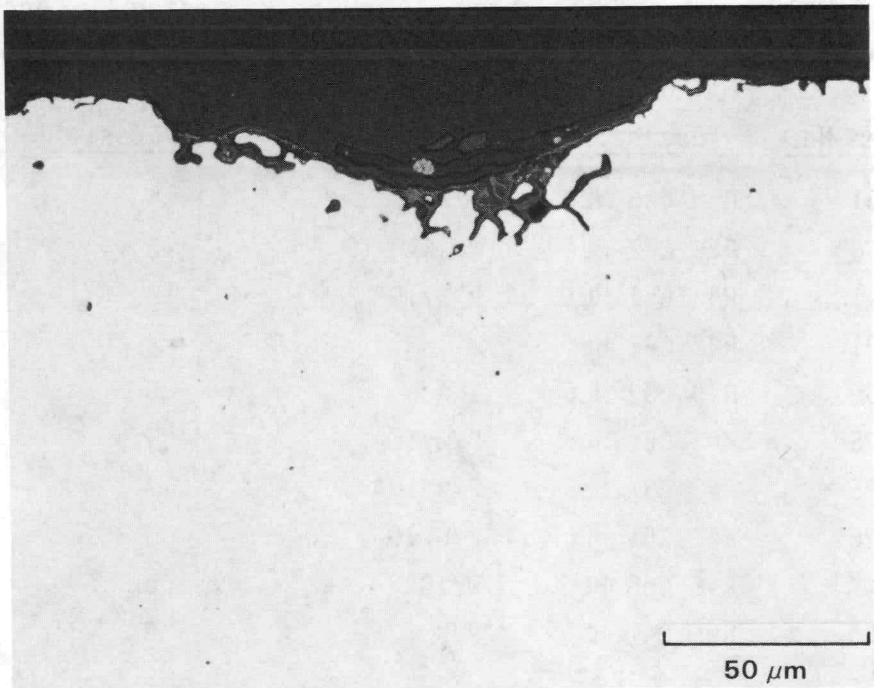


FIGURE 3.27. Optical Micrograph Showing IGA at the Base of Corroded Areas in Sixth TSP Specimen 926 (R4 C51 HL6)

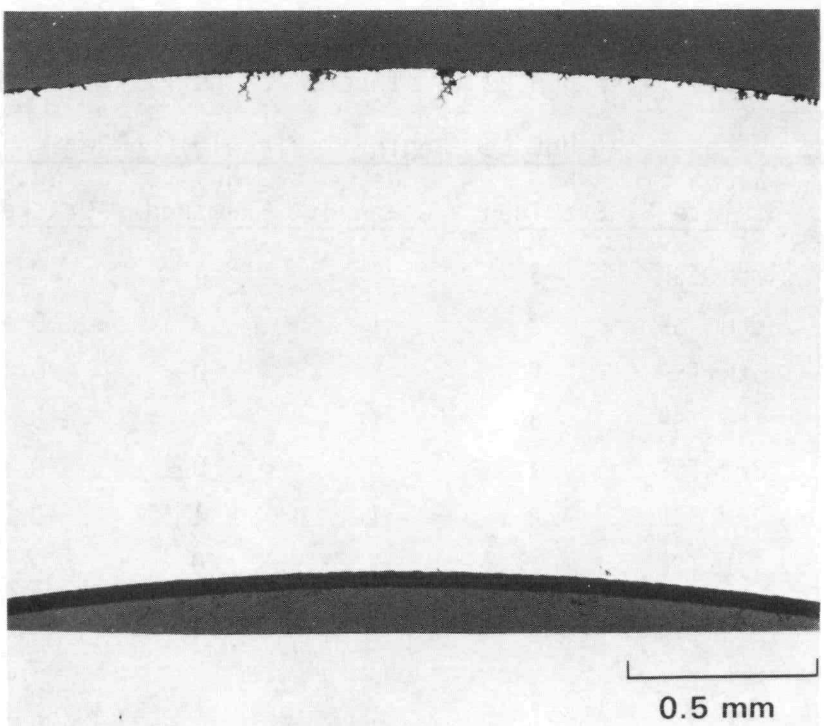


FIGURE 3.28. Optical Micrograph Showing Intergranular Penetrations of First TSP Specimen 1041 (R4 C51 HL1)

TABLE 3.4. Summary of Metallography Results Regarding OD Corrosion of Dented TSP Intersections

Specimen No.	Tube No.	Defect Type[a]	Maximum Wall Loss, %	Calculated Strain, %
851	R5 C26 HL1	P/W	4	---
856	R5 C77 HL1	W/IGA	<2	---
1041	R4 C51 HL1	P/W/IGA	12	26.9
921	R42 C47 HL4	W	<2	11.1
909	R10 C39 HL5	IGA	6	11.9
925	R4 C51 HL5	P/W/IGA	5	27
935	R42 C52 HL5	P/W/IGA	10	17
926	R4 C51 HL6	P/W/IGA	6	39.1
947	R45 C55 HL6	W/IGA	5	16.5
455	R9 C47 HL7	P/W	8	7

(a) p = pitting; w = wastage.

TABLE 3.5. Summary of Visual Examination of ID Cracking at Dented TSP Intersections

Support Plate	Hot Leg Region No. Examined	Hot Leg Region No. Cracked	Cold Leg Region No. Examined	Cold Leg Region No. Cracked
7th TSP	6	0	4	0
6th TSP	2	1	3	0
5th TSP	8	3	0	0
4th TSP	5	1	3	0
3rd TSP	0	0	0	0
2nd TSP	2	1	1	0
1st TSP	4	4	0	0
Total	27	10	11	0

reduced deformation by denting is thought to be the primary reason for the absence of cracking, although lower operating temperatures may have reduced the tendency for cracking.

The 17 specimens with profilometry data provide a means for evaluating the effect of deformation strain on ID cracking. Table 3.6 summarizes the results of visual and metallographic examinations of these specimens. The results may be divided into three strain regions: 0 to 10%, 10% to 20%, and >20%. No ID cracks were observed below 10% strain, while approximately one-third of the specimens with 10% to 20% strain exhibited ID cracks. Above 20% strain, all of the specimens contained ID cracks. None of these specimens were plugged during service; thus, the water environment for cracking was available to all. Maximum crack depth ranged from 44% to 88% through-wall with no definite relationship between crack depth and calculated strain being observed. However, a consistent relationship would not be expected because of differences in the complex stress distributions produced by the nonuniform nature of the denting and temperature variations within the hot leg region of the generator.

The axial ID cracks ranged from 0.6 to 0.9 in. long and were generally oriented along the tube axis in the region of maximum ID tensile hoop stress. Figure 3.29 shows the ID surface of cracked Specimen 1041 (R4 C51 HL1), which had a calculated strain of 26.9%. Multiple cracks with a general axial orientation are seen in the region under to the TSP crevice with crack branching occurring near the top and bottom surfaces of the TSP. Similar features were found on all the cracked specimens, although the crack distribution varied depending on the nature of the deformation.

Metallographic examination of transverse sections through the cracked regions showed the cracking to be intergranular in nature. A typical example of the crack microstructure is shown by optical micrographs from Specimen 935 (R45 C52 HL5) in Figure 3.30. Multiple cracks were commonly observed near the region with higher tensile hoop stress on the internal surface. The number of cracks varied with axial position within a specimen and also from one specimen to another. More cracks were generally observed in the more highly strained specimens with six individual cracks being found in one section of the most heavily strained specimen (Specimen 926).

Detailed examination of the etched microstructures indicated that the cracking was primarily intergranular. The intergranular features of the cracking can be seen near the crack tip in Figure 3.30, although crack opening and some deformation is evident. Figure 3.31 shows a tight crack at high magnification near the ID surface of Specimen 921 (R42 C47 HL4) where the intergranular facets of the crack are clearly evident. Shallow IGA is also seen at the ID surface in Figure 3.31. This form of uniform grain boundary attack was often observed in the metallographic sections and usually affected only the surface grains. The grain boundary penetration was usually <25 μm deep, which is less severe than observed for IGA on the OD surfaces of the specimens.

TABLE 3.6. Summary of ID Cracking at Dented TSP Intersections with Various Strain Levels

ID No.	Row	Col	TSP Location	Strain[a]	ID[b] Cracking	Crack[c] Depth, %
553	9	70	HL7	4.2	No	
567	21	71	HL7	4.9	No	
525	12	36	HL7	5.4	No	
455	9	47	HL7	7.0	No	0
922	4	20	HL5	9.9	No	
929	12	36	HL5	10.1	No	
921	42	47	HL4	11.1	Yes	44
909	10	39	HL5	11.9	Yes	70
927	5	37	HL5	12.5	No	
923	4	36	HL5	13.4	No	
924	4	36	HL4	14.1	No	
947	45	55	HL6	16.5	No	0
935	45	52	HL5	17.1	Yes	64
908	10	39	HL4	17.9	No	
1041	4	51	HL1	26.9	Yes	88
925	4	51	HL5	27	Yes	67
926	4	51	HL6	39.1	Yes	57

(a) Based on profilometry data.
(b) Based on visual examination.
(c) Metallography results.

3.2.4 Mechanical Damage

Pulling the tubes from the support plate region produced mechanical damage in some specimens, especially cold leg specimens where the TSPs did not completely break up. In general, light scratches or tube stretching did not interfere with visual inspection since these defects could be easily identified. However, a few specimens exhibited severe removal damage and could not be used to validate reported EC defect indications.

Other mechanical damage observed in the TSP specimens included the through-wall hole discussed previously and tube buldging that was seen in nine specimens from Tube R14 C36. Six hot leg and three cold leg specimens from

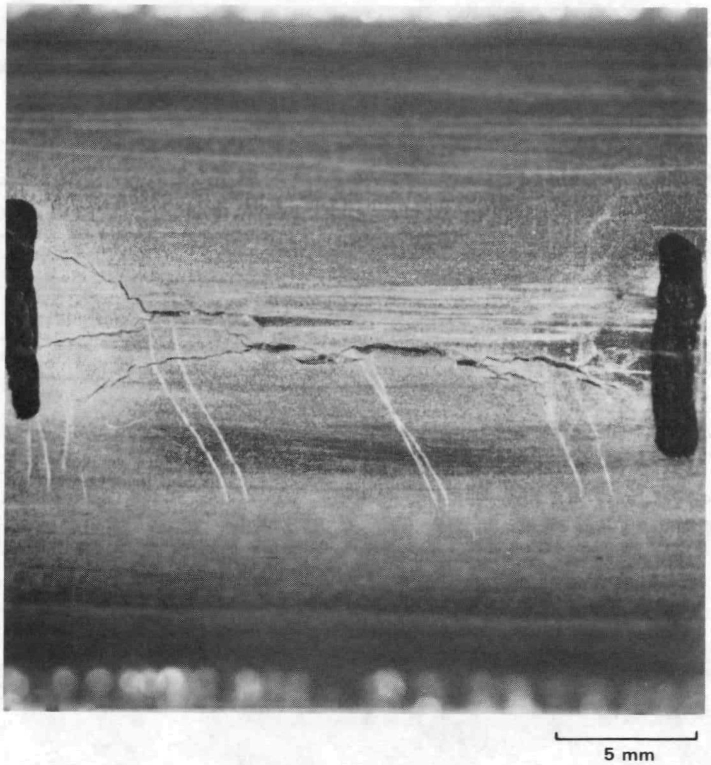


FIGURE 3.29. Photograph Showing ID Cracking of First TSP Specimen 1041 (R4 C51 HL) (26.9% strain)

various TSP intersections along the tube length were examined and all showed similar characteristics. The tube diameter increased above the nominal 0.875 in. on either side of the TSP intersections. The appearance of the specimens suggests the tube was plastically deformed by internal pressurization, although the source of the internal pressure is uncertain. This tube was plugged during service and may have filled with water through a small leak. Pressurization could then occur by thermal expansion during operation or, more likely, by the water freezing while the generator was stored in subzero temperatures awaiting placement into the SGEF.

3.3 TUBE SHEET REGION

Two hundred and seventy-two tube sections from the tube sheet region of the generator were included in the validation examinations. The majority of these specimens were from the sludge pile region immediately above the tube sheet with 136 specimens from the hot leg side of the generator, and 105 specimens from the cold leg side. The remaining 31 specimens were tube segments located within the tube sheet region and were examined to identify potential tube degradation within the tube sheet crevice and roll transition regions. In addition, degradation to the tube sheet and the nature of the sludge and crevice deposits were evaluated by examining selected specimens from the tube sheet sections that were removed from the generator.

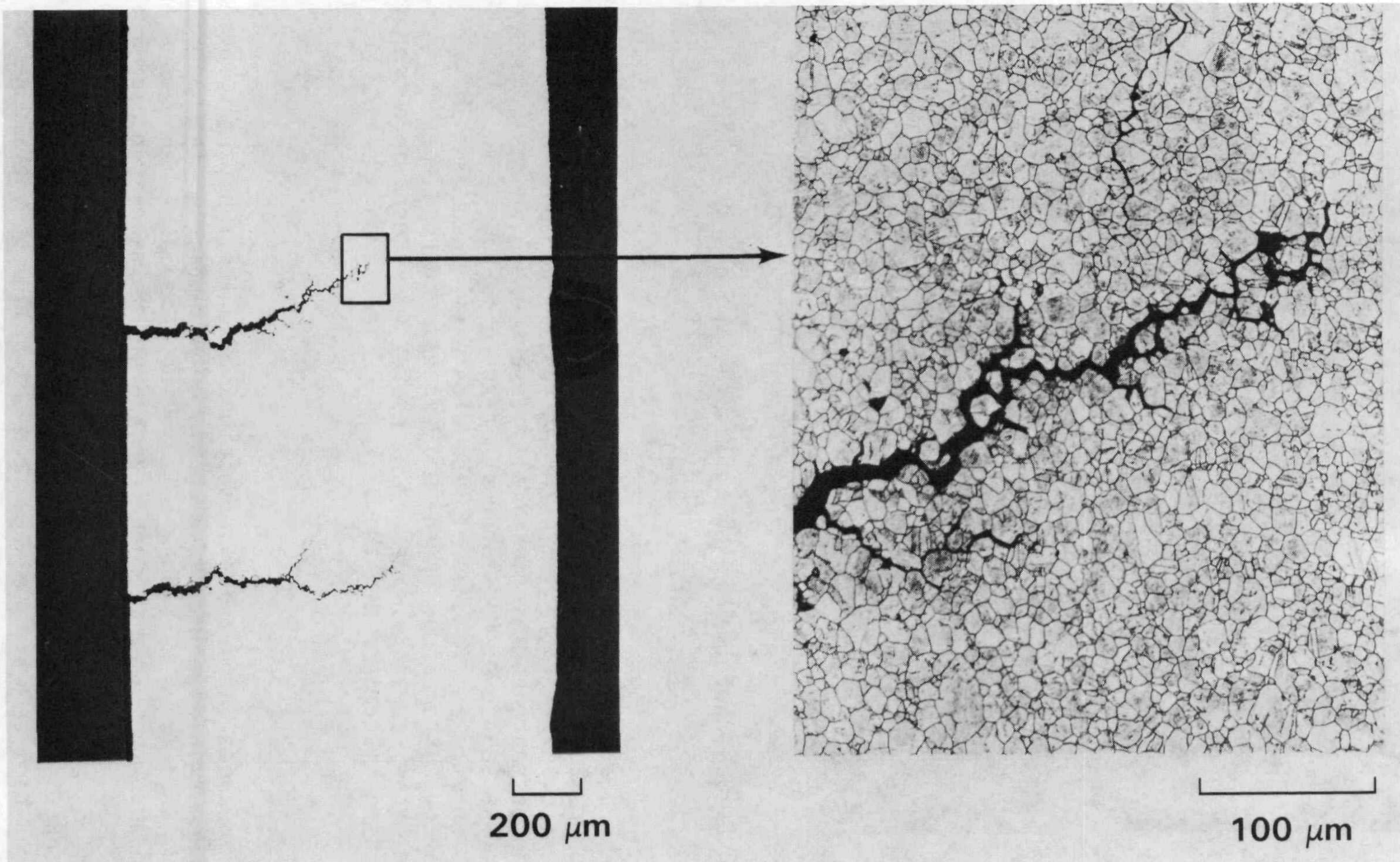


FIGURE 3.30. Optical Micrographs Showing ID Axial Cracking of Fifth TSP Specimen 935 (R45 C52 HL5)

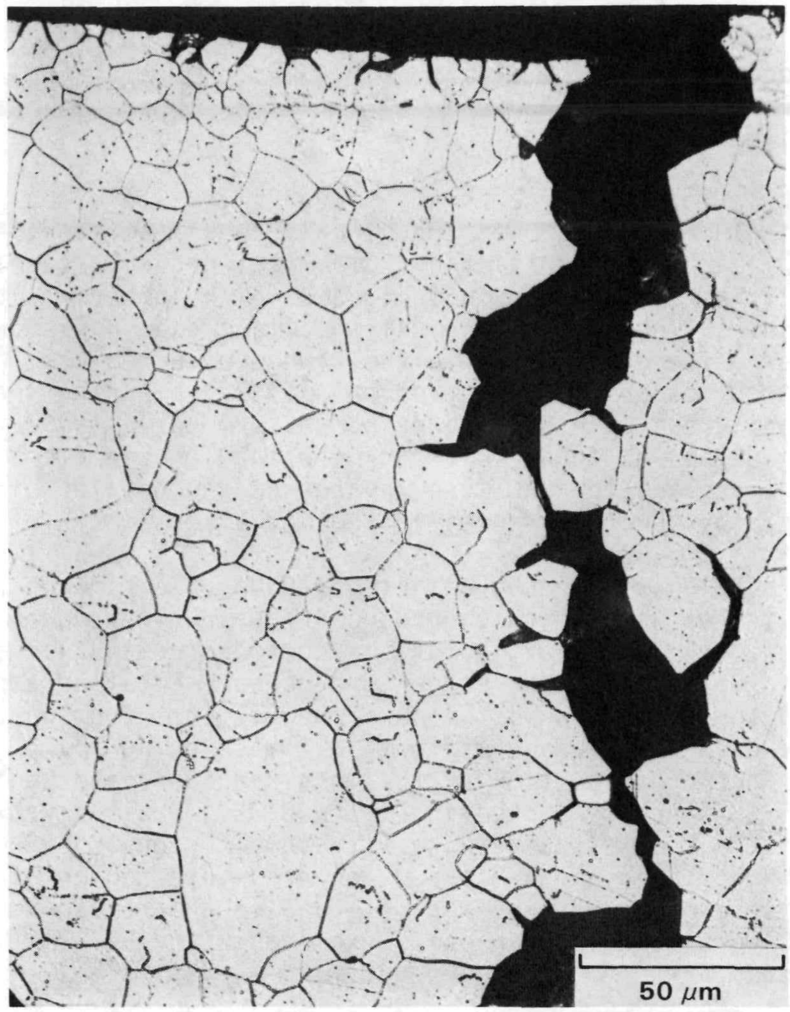


FIGURE 3.31. Optical Micrograph Showing the Intergranular Nature of the ID Cracking; Specimen 921 (R42 C47 HL4)

The OD surface of all specimens (except those from the tube sheet section) was visually examined after the deposits had been removed by chemical cleaning. The internal surfaces of 61 specimens were examined after the tubes had been split and mechanically deformed to open any tight ID cracks. Metallographic examinations were conducted on 98 specimens and 17 hot leg specimens were burst tested to evaluate the remaining integrity of service degraded tubes. All specimens from the tube sheet region were from the round robin inspection matrix and had been extensively studied by NDE. Meaningful NDE inspection of the roll transition region was not possible for those tubes which had been plugged during service because of the mechanical damage produced by plug removal.

Results pertaining to the degradation of the tubing, burst testing, and examination of the hot leg tube sheet Section 355 are presented and discussed below.

3.3.1 Tube Degradation

Sludge Pile Region

Several types of tube defects were found immediately above the TTS. These defect types include pitting, wastage, localized circumferential corrosion (LCC), shallow IGA, and OD initiated SCC. Pitting and wastage were the predominant defects as can be seen in Table 3.7 which summarizes the visual inspection results. Only 14 of the 241 specimens examined showed no definite evidence of corrosion degradation in the sludge pile region. Areas with wastage or uniform corrosion were observed on all the remaining specimen surfaces while additional areas with pitting or nonuniform corrosion were found on 138 specimens. Cracking was found in two of the hot leg specimens examined. The severity of the degradation was much greater on the hot leg side of the generator as evidenced by the differences in the visual estimates of wall loss.

Tube degradation within the cold leg sludge pile region consisted of uniform corrosion or wastage which produced a slightly roughened surface and light wall loss. The axial extent of the corroded region varied between specimens and ranged up to 7 in. above the tube sheet. Metallographic examination of 11 cold leg specimens showed the maximum wall loss from wastage to range from 2% to 24% with the average maximum wall loss being 10.7%. Optical micrographs showing the cross section of the most degraded cold leg TTS specimen [580C (R27 C25 CL)] are presented in Figure 3.32. Shallow wall loss occurred around most of the tube circumference with some regions showing localized attack. Maximum wall loss was 24% and occurred in a region of localized attack. Less severe degradation was observed in the remaining ten cold leg TTS specimens that were metallographically examined with 15% wall loss being found in two specimens.

TABLE 3.7. Summary of OD Visual Examinations of TTS Specimens from the Sludge Pile Region of the Generator

Degradation Type	Hot Leg Specimens: No. of Specimens	Hot Leg: Estimated Wall Loss, % <20	20-40	>40	Cold Leg Specimens: No. of Specimens	Cold Leg: Estimated Wall Loss, % <20	20-40	>40
None	7				7			
Pitting/wastage	105	10	46	49	23	22	1	
Wastage	15	10	5	0	74	73	1	
Other[a]	9	3	3	3	1	1		

(a) Includes various combinations of wastage, pitting, LCC, and cracking.

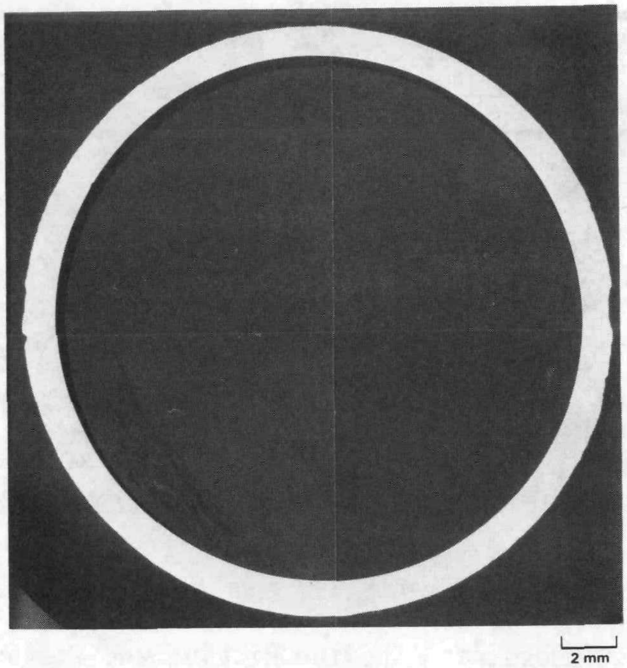


FIGURE 3.32. Optical Micrograph Showing Wastage on Cold Leg TTS Specimen 580C (R27 C35 CL)

In addition to wastage, small pits were seen in 23 of the cold leg TTS specimens. These pits were often located near the top of the corroded zone as illustrated in Figure 3.33. For orientation, the tube sheet is to the left of the photograph and the top of the corroded zone (TTS +2.5 in.) is nearly centered. Several small pits were within the marked area; the roughened surface that was typical of cold leg wastage is seen to the left. No evidence of tube corrosion was found above the marked area (right side of photograph) although axial scratches produced by tube removal are evident.

Optical micrographs showing the nature of the cold leg pits on Specimens 678C (R7 C27 CL) and 743C (R16 C37 CL) are presented in Figures 3.34 and 3.35, respectively. Maximum wall loss was 7% for Specimen 678C and 12% for 743C. The cross sections show the width of the degraded areas to be less than 0.04 in. on the OD surface and to contain either overlapping pits or combined wastage and pitting. No evidence of significant IGA was observed in the cold leg specimens.

To ensure that no significant defects were being overlooked during the visual inspections, 20 cold leg TTS specimens were split axially and bent around a pipe to reveal any cracks or other hidden defects. Visual inspection of the ID and OD surfaces after deformation found no evidence of tube defects that had not been previously observed. Consequently, it appears that shallow wastage and pitting were the only tube defects produced in the sludge pile region on the cold leg side of the generator.

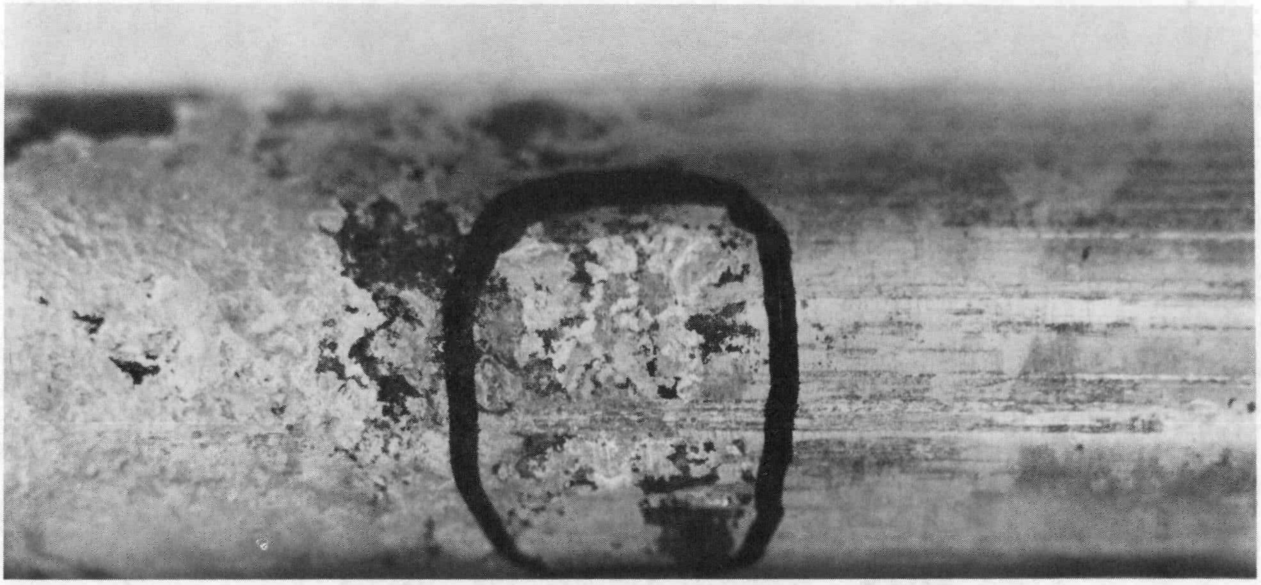


FIGURE 3.33. Photograph Showing Pitting and Wastage on Cold Leg TTS Specimen 678C (R7 C27 CL)

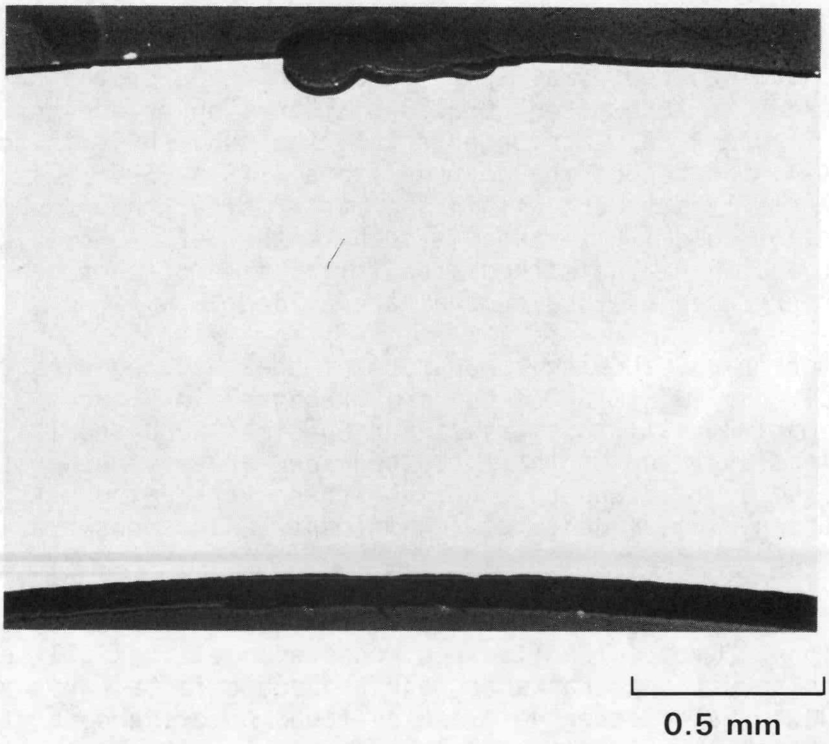


FIGURE 3.34. Optical Micrograph Showing Pitting on Cold Leg TTS Specimen 678C (R7 C27 CL)

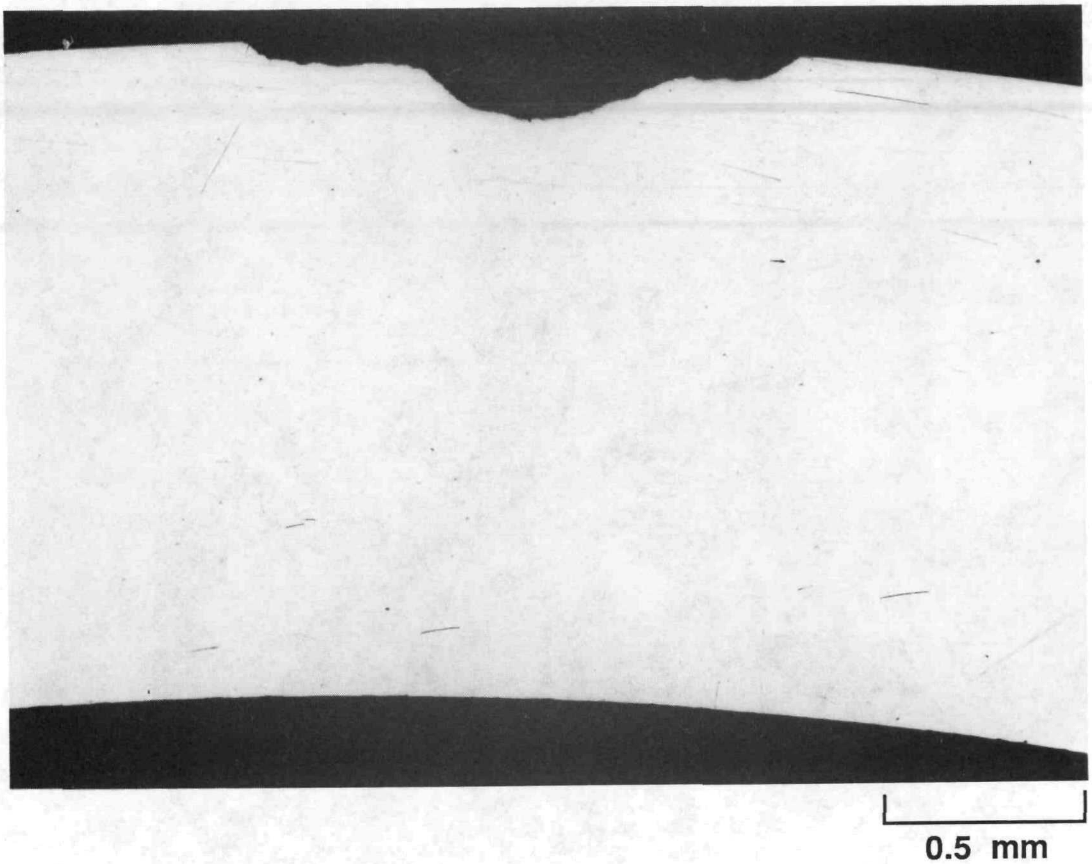


FIGURE 3.35. Optical Micrograph Showing Pitting on Cold Leg TTS Specimen 743C (R16 C37 CL)

The hot leg TTS specimens also showed regions with wastage or uniform wall thinning in the sludge pile region for all of the degraded specimens. Wall loss by uniform thinning was normally quite shallow with the estimated depth being less than 20%. (Note: 20% represents a reasonable lower limit for estimating wall loss by visual examination and much of the uniform thinning is thought to be much less than 20%.) However, a few hot leg specimens exhibited more severe wastage in the form of a ring which encircled the tube at various shallow angles. The angle of the ring is most likely related to variations in sludge pile height with the corrosion occurring within a specific sludge layer. This form of ring type wastage is illustrated by the dark ring immediately above the TTS of Specimen 633C (R13 C44 HL) in Figure 3.36. The axial extent of this form of wastage was less than one-half in. with a gradual taper in wall thickness from both axial directions. This axial wall loss distribution is illustrated by optical micrographs of a longitudinal section from Specimen 791C (R14 C36 HL) in Figure 3.37. Transverse metallographic sections through the wastage rings exhibited various circumferential distributions as shown in Figures 3.38 through 3.40. In some sections, wall loss occurred around most of the tube circumference (Figure 3.38), while other sections showed local areas of wall loss (Figures 3.39 and 3.40). Local differences in corrosion rate and/or differences in angle between the wastage ring and tube

FIGURE 3.36. Photograph Showing Ring Type Wastage on Hot Leg TTS Specimen 633C (R13 C44 HL)

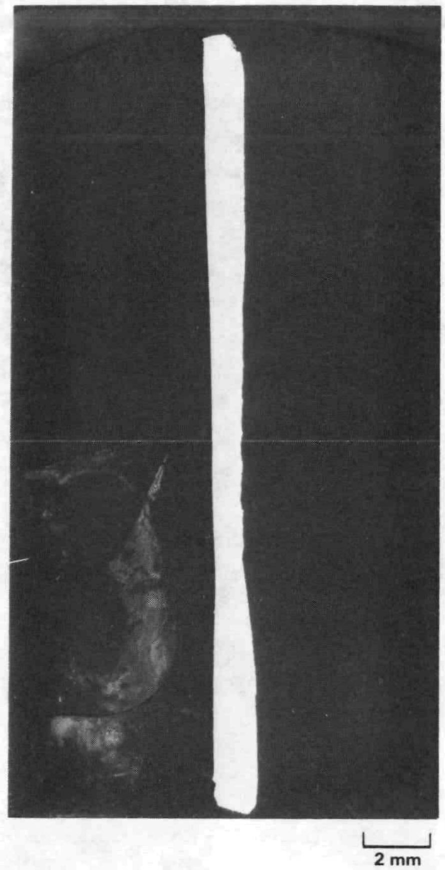


FIGURE 3.37. Optical Micrograph from Longitudinal Section Showing Ring Type Wastage on Hot Leg TTS Specimen 791C (R14 C36 HL)

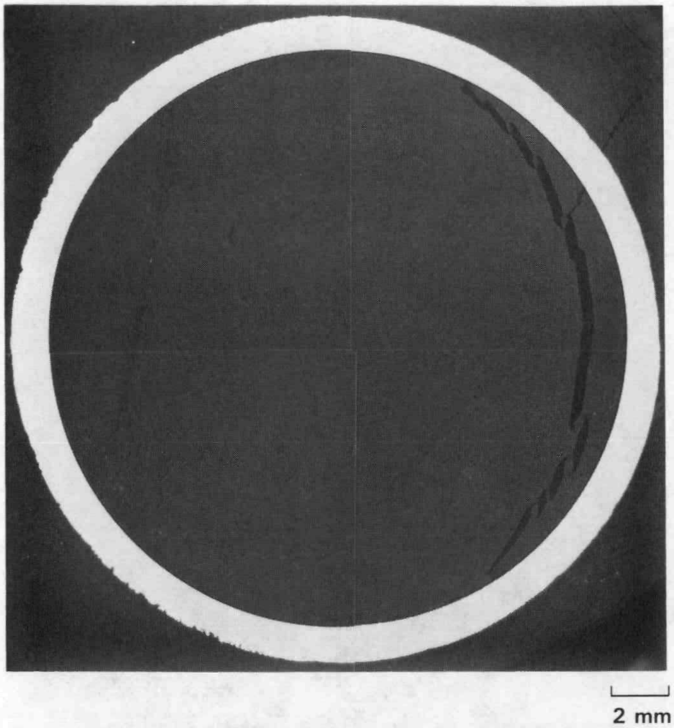


FIGURE 3.38. Optical Micrograph Showing Ring Type Wastage on Hot Leg TTS Specimen 660C (R15 C49 HL at TTS + 0.6 in.)

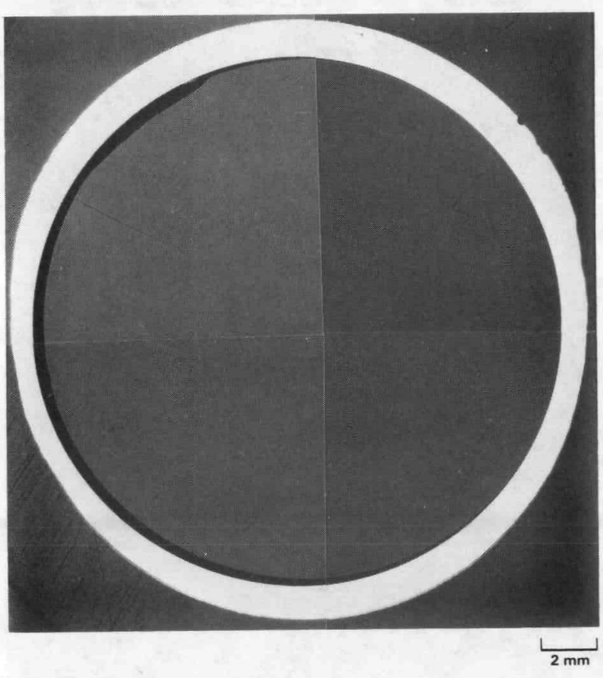


FIGURE 3.39. Optical Micrograph Showing Ring Type Wastage on Hot Leg TTS Specimen 632C (R13 C37 HL)

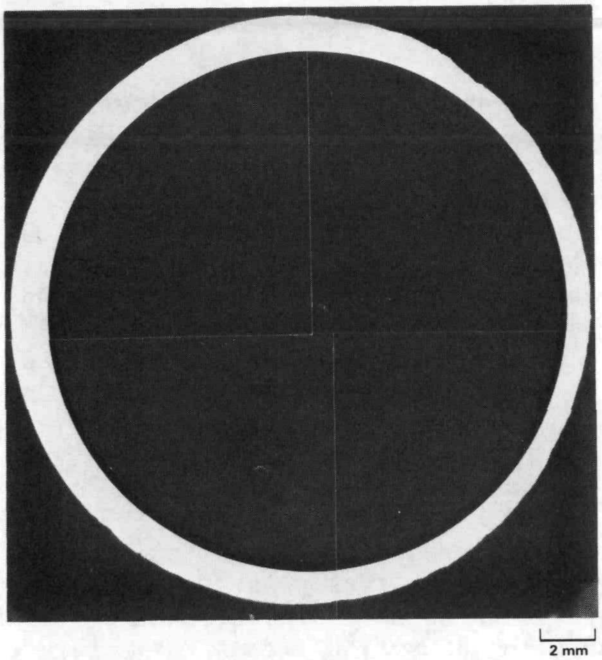


FIGURE 3.40. Optical Micrograph Showing Ring Type Wastage on Hot Leg TTS Specimen 632C (R13 C37 HL)

axis are most likely responsible for the observed variations in the circumferential distribution of wall loss. Maximum wall loss from this ring type wastage ranged from 20% to 52%.

All specimens with significant ring type wastage were removed from the area of the generator where tubes had been plugged during service due to EC defect indications above the hot leg TTS. This area was located near the center of the hot leg between Rows 13 and 21 and between Columns 30 through 50 (Doctor et al. 1983). When the tubes were plugged, wastage was thought to be the predominant defect type based on experience with similar generators operating with sodium phosphate as the secondary water treatment additive. Finding the ring type wastage only in specimens removed from this central region is consistent with initial defect interpretation and suggests pitting became a primary degradation mechanism after switching to all volatile water treatment (AVT) in 1975.

Although wastage was found in all degraded hot leg TTS specimens, the primary mode of degradation in most of the severely degraded tubes was from pitting and/or other localized corrosion processes. The pits were distributed intermittently but not uniformly within the degraded region. The axial extent of the degraded region varied from one specimen to another but was typically <2 in. above the TTS for hot leg specimens. There was also a tendency for clustering, which resulted in localized areas with a wide range of wall loss within the overall degraded region. The appearance of these more severely degraded areas is best described as clusters of overlapping pits, although the mechanism by which they formed may have included wastage or other forms of corrosion.

Large variations in the number, severity, and distribution of degraded areas (clusters) were observed in the hot leg TTS specimens. A few specimens exhibited a single pit or cluster of pits along with shallow wastage in the corroded region. A photograph of Specimen 587C (R6 C65 HL) in Figure 3.41 illustrates an isolated pit with minimal wastage on the OD surface while the corresponding metallographic section is shown in Figure 3.42. Although specimens with a single isolated defect were occasionally found, the vast majority of the hot leg specimens exhibited multiple degraded areas which were often connected by wastage. The degraded areas were distributed both axially and circumferentially within the corroded region of the tube surface. Composite photographs showing the distribution of degraded areas in Specimens 657C (R17 C62 HL) and 794C (R16 C57 HL) are shown in Figures 3.43 and 3.44. (Note: the individual photographs were taken at approximately 90° intervals around the tube circumference; distortions, due to depth of field, are evident at the edge of each photograph.) Local degraded areas consisting of isolated pits and circumferentially oriented defect areas connected by shallow wastage are seen in the corroded region of both specimens. Degradation was more severe for Specimen 794C, with corrosion occurring around the entire circumference of the tube. Wall thickness measurements using a dial indicator showed that the uniform wall loss was typically <20% with the depth of the local degraded areas ranging up to 78% through-wall penetration. The maximum wall loss for both Specimen 794C and 657C was associated with the isolated pit clusters although the maximum depth in other hot leg specimens occurred in the circumferentially oriented defect areas. The axial extent of the severely degraded areas was <0.25 in.; the circumferential extent varied widely between specimens and locally within the same specimen.

Transverse metallographic sections presented in Figures 3.45 through 3.50 show examples of the wide variations in the circumferential extent of the local degraded areas in the hot leg specimens with combined pitting and wastage. A few degraded areas are seen in some sections (Figures 3.45 through 3.47), while others show extensive local areas of degradation around most of the tube circumference (Figures 3.48 through 3.50). Pitting or nonuniform corrosion appears to be the primary cause of severe wall loss in most specimens, although isolated pits were found in the wastage ring of a few specimens. An isolated pit within the wastage ring of Specimen 532C (R17 C32 HL) is seen in Figure 3.51. Maximum wall loss was 50% at the pit bottom with uniform wastage accounting for 30% of the total. Isolated pits within the wastage ring occurred infrequently and so the relative contributions from wastage and pitting could be measured in only a few specimens. Most of the pitting/wastage type specimens showed isolated pits with aspect ratios (width:depth) <4 in some regions and circumferentially oriented defects in other regions of the cross section. The shape of the circumferential defects in cross section suggests that some of these degraded areas were formed by the nucleation and growth of individual pits within a narrow circumferential band on the tube surface. With continued pit growth, the individual pits overlapped resulting in highly irregular wall loss within the degraded area. In contrast, other circumferentially

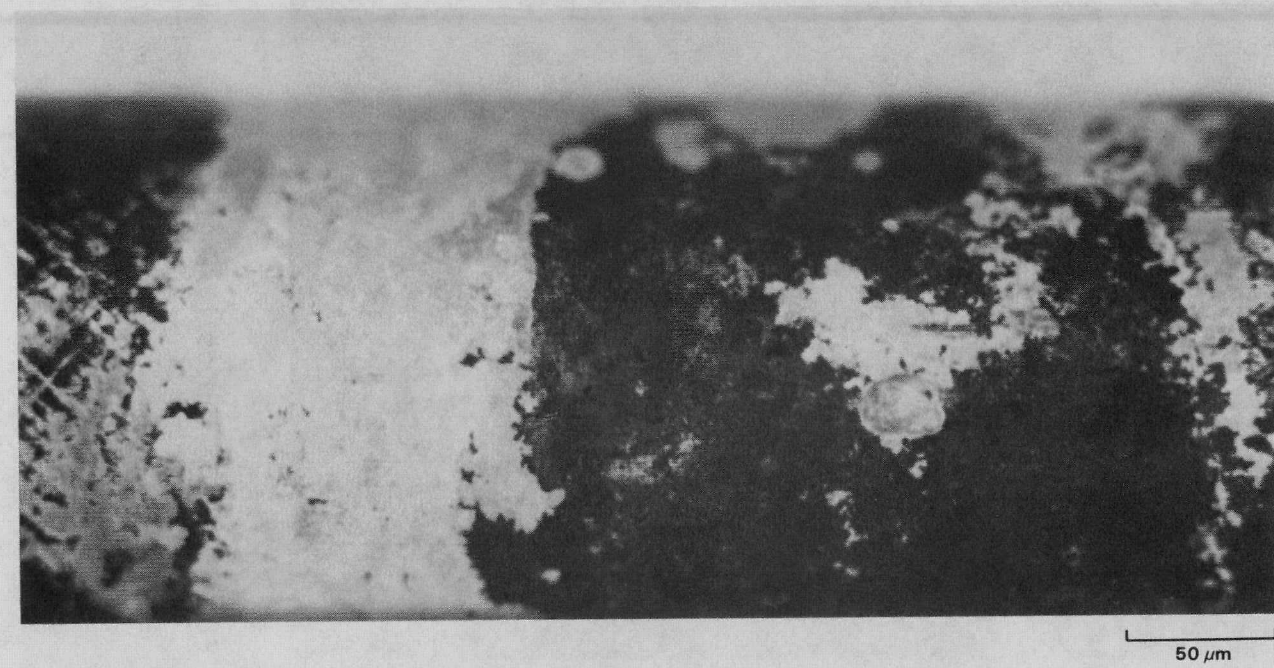


FIGURE 3.41. Photograph Showing Isolated Pitting on Hot Leg TTS Specimen 587C (R6 C65 HL)

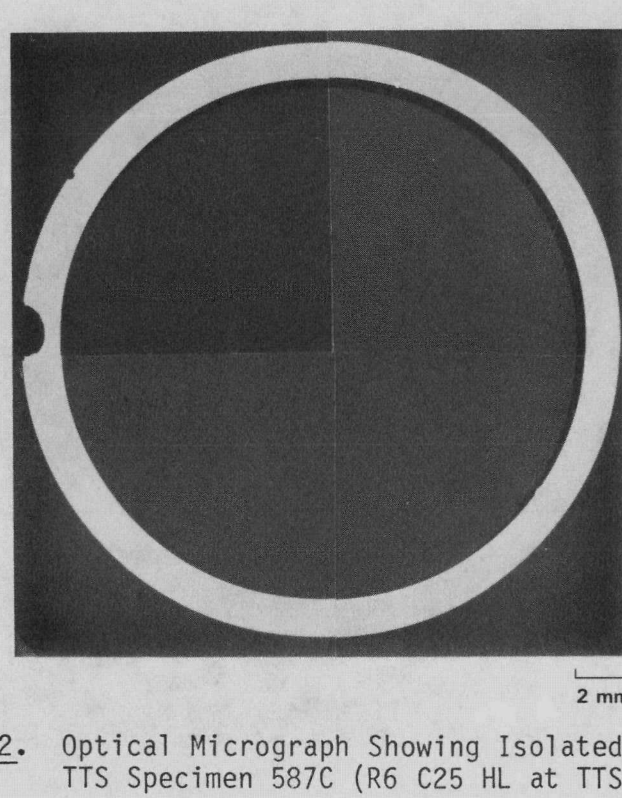


FIGURE 3.42. Optical Micrograph Showing Isolated Pitting on TTS Specimen 587C (R6 C25 HL at TTS + 0.9 in.)

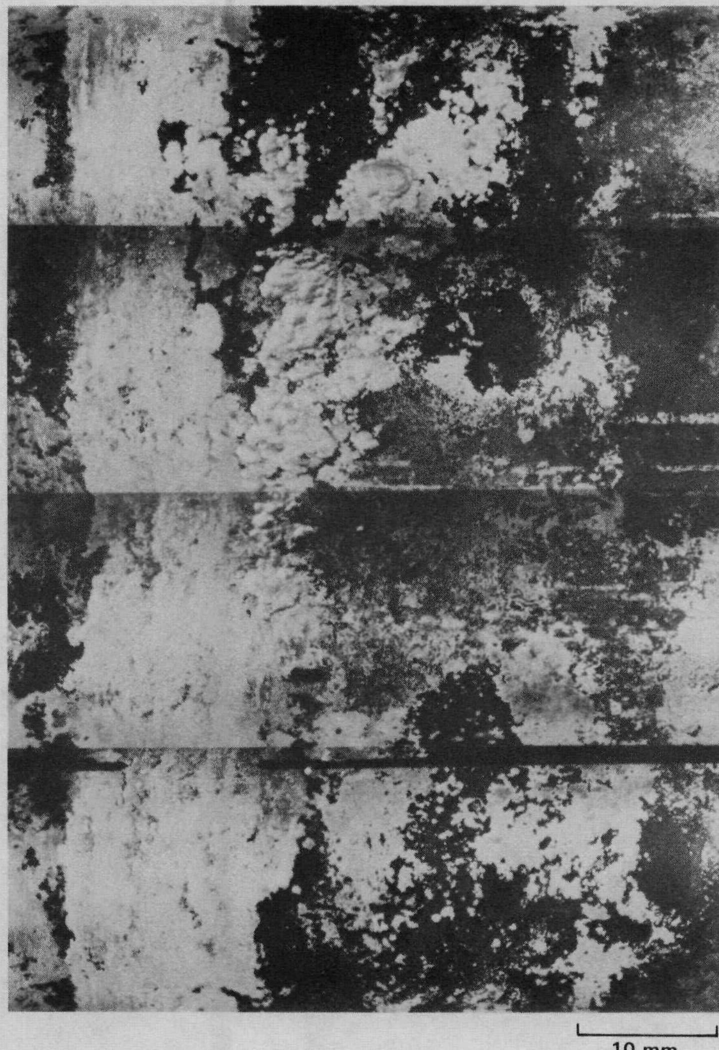


FIGURE 3.43. Composite Photographs Showing the Distribution of Pitting/ Wastage Type Degradation on Hot Leg TTS Specimen 657C (R17 C62 HL)

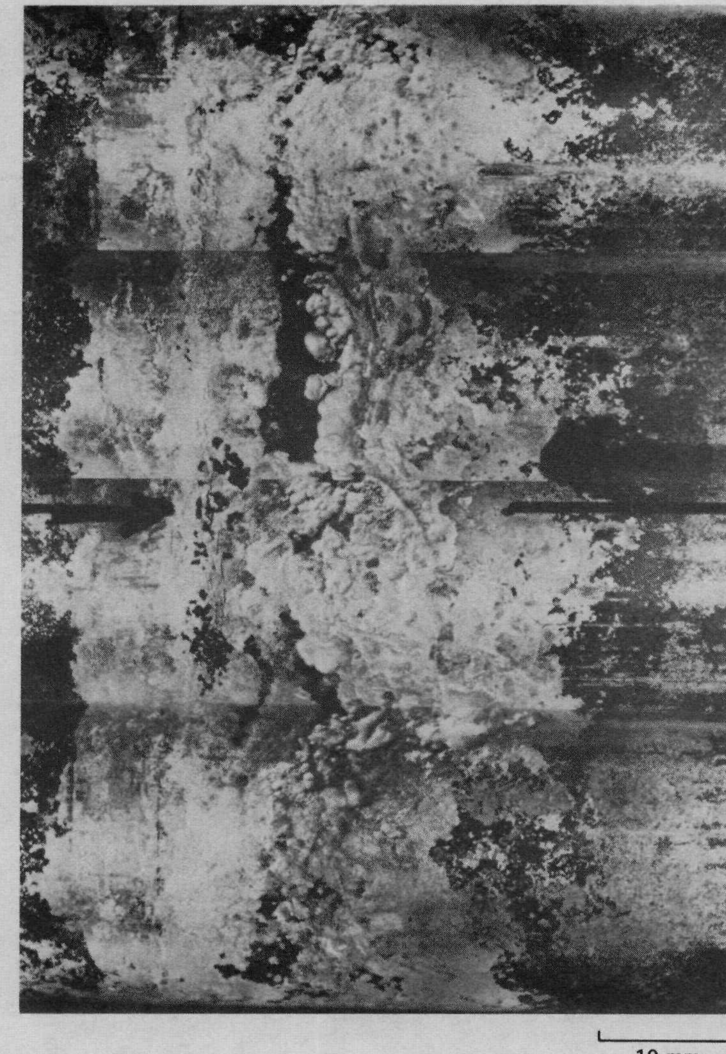


FIGURE 3.44. Composite Photographs Showing the Distribution of Pitting/ Wastage Type Degradation on Hot Leg TTS Specimen 794C (R16 C57 HL)

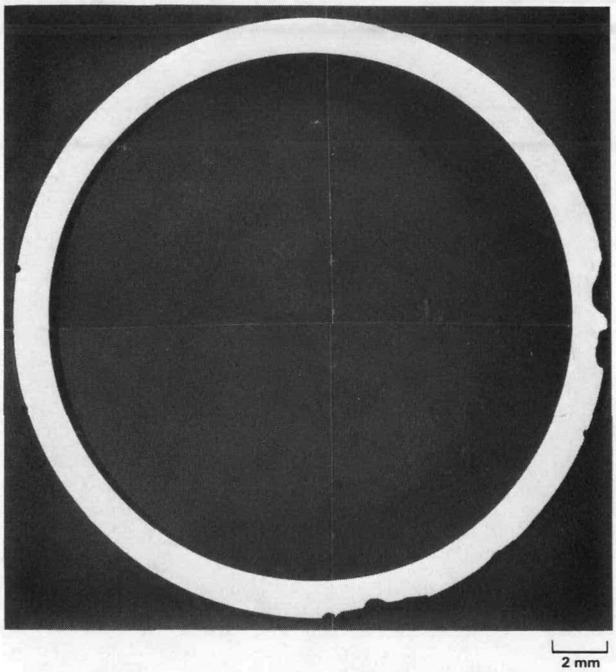


FIGURE 3.45. Optical Micrograph Showing Pitting/Wastage on Hot Leg TTS Specimen 636C (R14 C27 HL)

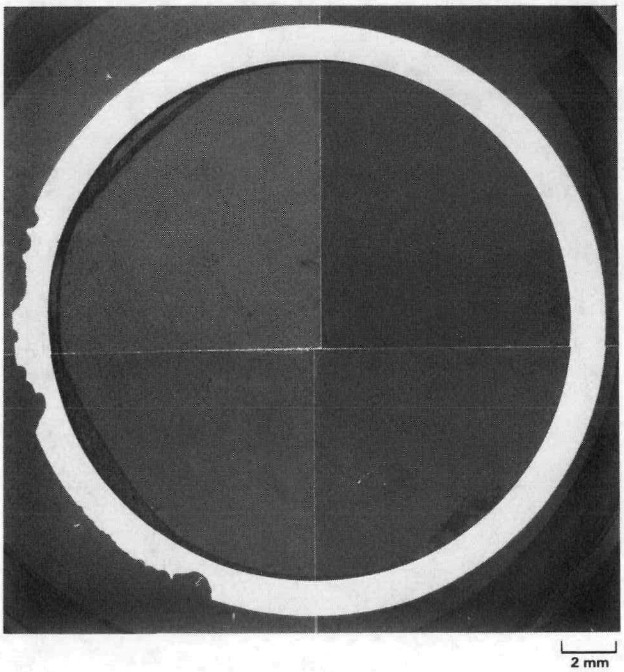


FIGURE 3.46. Optical Micrograph Showing Pitting/Wastage on Hot Leg TTS Specimen 582C (R13 C73 HL)

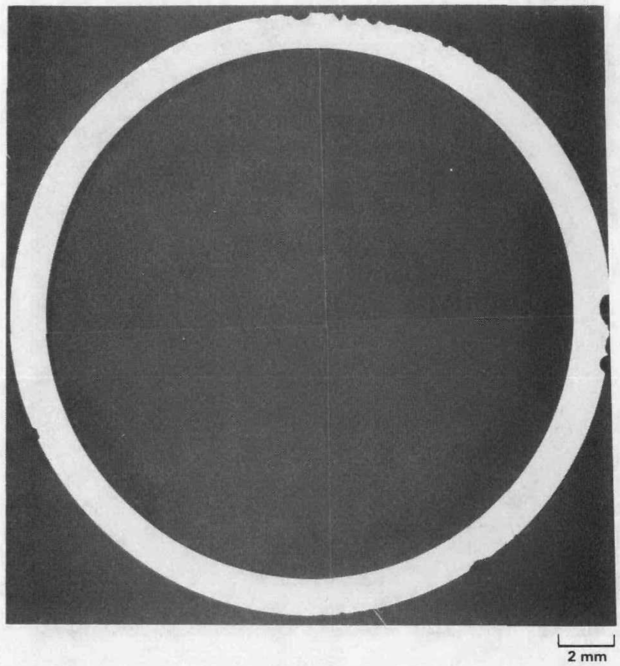


FIGURE 3.47. Optical Micrograph Showing Pitting/Wastage on Hot Leg TTS Specimen 630C (R12 C76 HL)

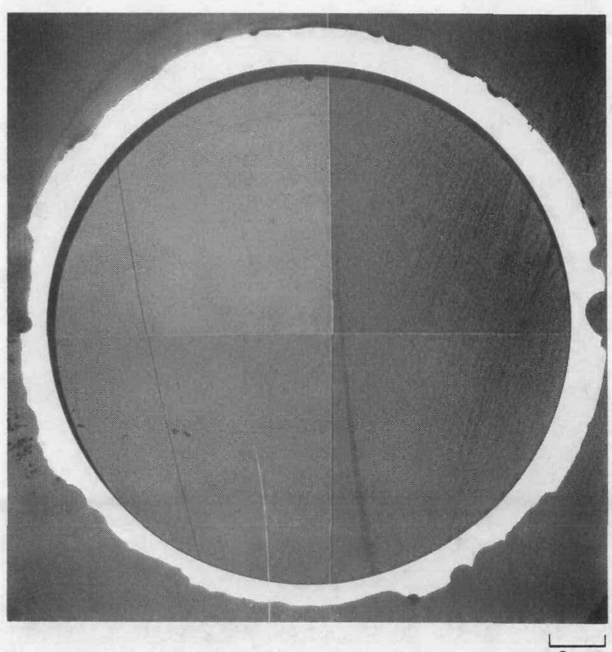


FIGURE 3.48. Optical Micrograph Showing Pitting/Wastage on Hot Leg TTS Specimen 625C (R10 C53 HL)

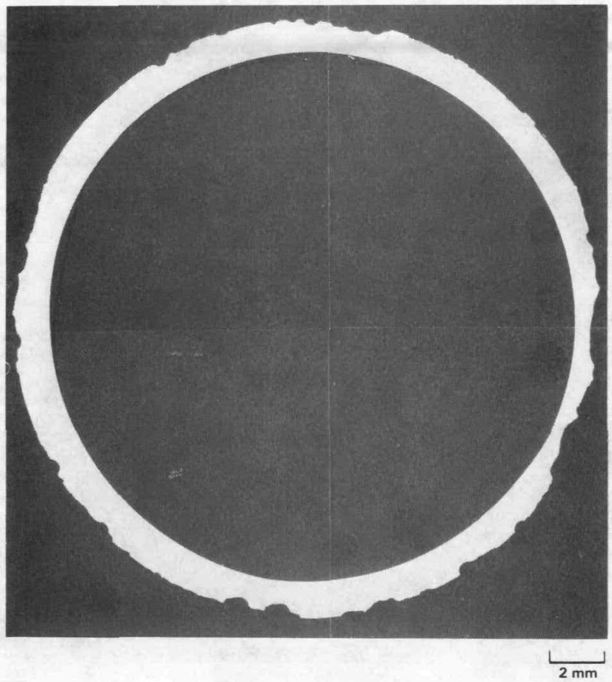


FIGURE 3.49. Optical Micrograph Showing Pitting/Wastage on Hot Leg TTS Specimen 639C (R14 C57 HL)

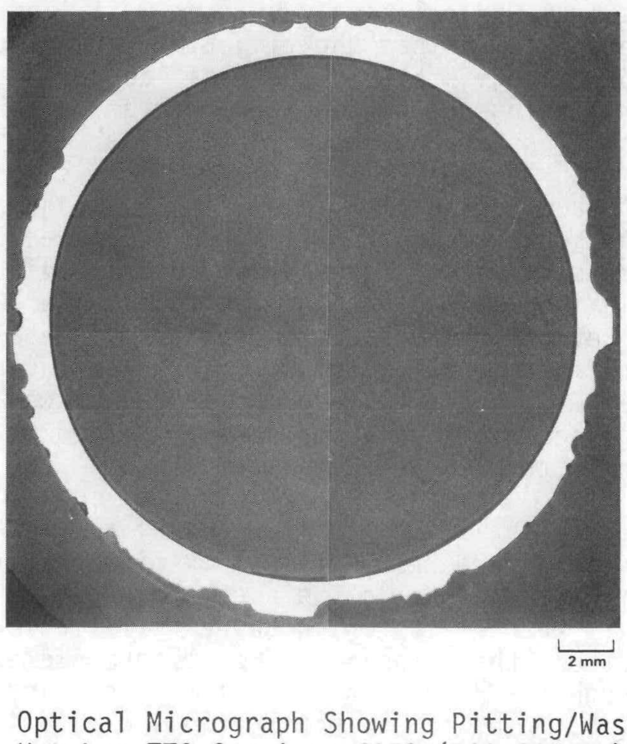


FIGURE 3.50. Optical Micrograph Showing Pitting/Wastage on Hot Leg TTS Specimen 617C (R11 C62 HL)

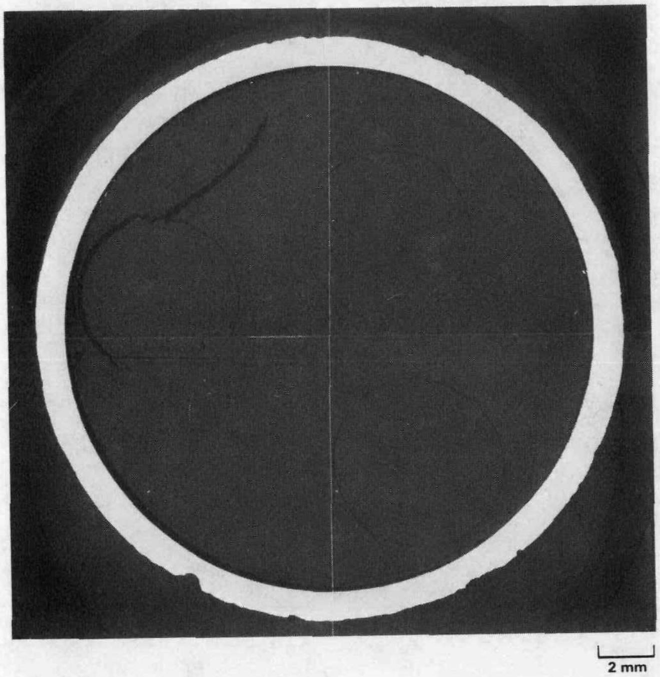


FIGURE 3.51. Optical Micrograph Showing Pitting and Ring Type Wastage on Hot Leg TTS Specimen 532C (R17 C32 HL)

oriented defect areas showed relatively uniform wall loss compared with the pitted areas but less uniform than the ring type wastage described previously. This morphology suggests that the local degraded areas may have formed by a combination of pitting and wastage type corrosion, although the relative contributions to wall loss are not known.

Other forms of tube degradation found in the sludge pile region of hot leg TTS specimens include shallow IGA, LCC, and OD initiated IGSCC (2 specimens). The IGA and LCC type defects were generally found immediately above the TTS and below the severe pitting/wastage area of the tube. The IGA was shallow in nature and was not detected by visual examinations. Metallographic examination showed that the attack was shallow (<100 μm deep) and occurred primarily in regions with minimal wall loss. Intergranular attack was not usually observed in the severely degraded areas produced by wastage and/or pitting, although a few shallow pits exhibited IGA at the bottom.

Localized circumferential corrosion appeared as crack-like markings on the OD surface as shown in Figure 3.52. Visual examination of chemically cleaned specimens at high magnifications in the stereo microscope indicated a relatively flat bottom to the defects which suggests formation by a localized corrosion process rather than cracking. Metallographic examination of longitudinal sections through the defect area confirmed the visual observations as can be seen in Figure 3.53. The defect penetrations were quite blunt with no evidence of cracking or IGA beneath the defects. This type of defect was observed

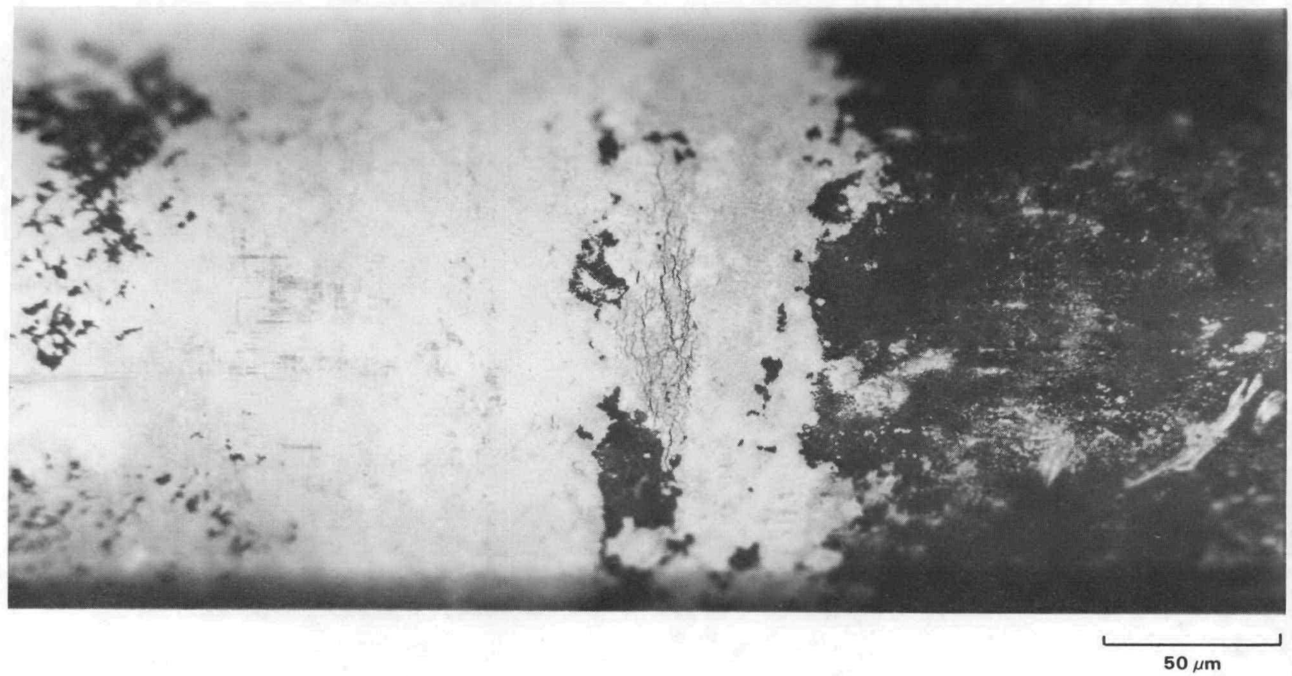


FIGURE 3.52. Photograph of TTS Specimen 660 (R15 C49 HL) Showing Wastage and Localized Circumferential Corrosion

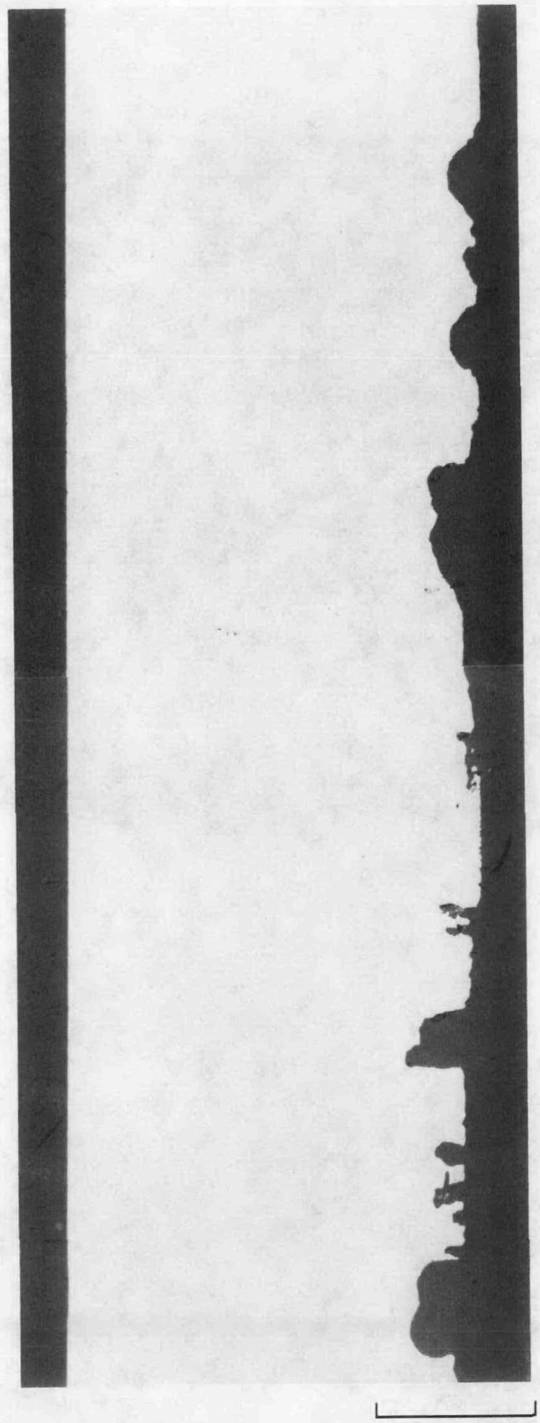


FIGURE 3.53. Optical Micrograph from a Longitudinal Section Showing Localized Circumferential Corrosion on TTS Specimen 715C (R24 C60 HL)

on many of the hot leg TTS specimens but generally appeared very shallow with no significant wall loss. An exception was Specimen 595C (R4 C25 HL) which exhibited deep trench-like defects around part of the tube circumference combined with extensive pitting/wastage near the same axial location. Pitting and wastage type degradation were normally observed above the axial location for LCC. The severe nature of the LCC type defects in this specimen is most likely caused by a more aggressive environment associated with the pitting/wastage type degradation.

Intergranular stress corrosion cracks that initiated on the outside surface were found in two of the hot leg TTS specimens examined. Circumferentially oriented cracks were observed in Specimen 633C (R13 C44 HL) while axial cracking was found in Specimen 799C (R18 C46 HL). The circumferential crack in Specimen 633C was located about 0.2 in. above the TTS and was within a zone of ring type wastage. It was initiated at the outside surface and extended around ~30% of the tube circumference. Metallographic examination of longitudinal sections through the defect region showed an intergranular mode of attack (Figure 3.54). The maximum wall penetration measured was 40% which included both wastage and cracking. The deeper cracks appeared to have opened up during removal as evidenced by the slightly deformed structure at the tip of the deepest crack. The axial cracks in Specimen 799 were not found during the initial visual inspection of this specimen but were readily apparent after burst testing. Several short overlapping cracks were seen in the region of tube rupture. The total length of the cracked region was 0.53 in. and was located 1.5 to 2 in. above the TTS. A region of pitting/wastage type degradation was located 0.5 to 1 in. above the TTS. A transverse metallographic section through the area of rupture showed several additional cracks in the area adjacent to the major crack. All cracks were initiated at the outside surface and were intergranular in nature. Examination of the microstructure at the fracture surface showed intergranular crack propagation for 80% of the wall thickness with 20% of the wall showing evidence of ductile rupture that was produced during the burst test. The secondary cracks were less than 50% deep and were located only in the region of the major crack. No evidence of significant uniform IGA was seen on the outside surface of either Specimen 799C or 633C which indicates that IGSCC was responsible for the observed cracking.

The presence of IGSCC in the sludge pile region is difficult to explain because high tensile stresses would not be expected on the OD surfaces of free standing tubes. Both tubes with IGSCC were removed from the same area of the generator and were near the edges of a region where tubes had been plugged during service. Unexpected stresses may have resulted from differences in axial thermal expansion between plugged tubes and tubes which had remained in service. Denting at the TTS and first TSP would constrain tube movement and differential thermal expansion could produce stresses in the tubes. Examination of the plugging records (Doctor et al. 1983) indicates Specimen 633C (R13 C44 HL) was not plugged during service but was adjacent to two plugged tubes (R13 C43 and R14 C44). Conversely, the records indicate Specimen 799C (R18 C46 HL) had been plugged and was surrounded by tubes which had remained in service. In both cases, differential thermal expansion between adjacent tubes would be expected. However, it is difficult to rationalize the stress

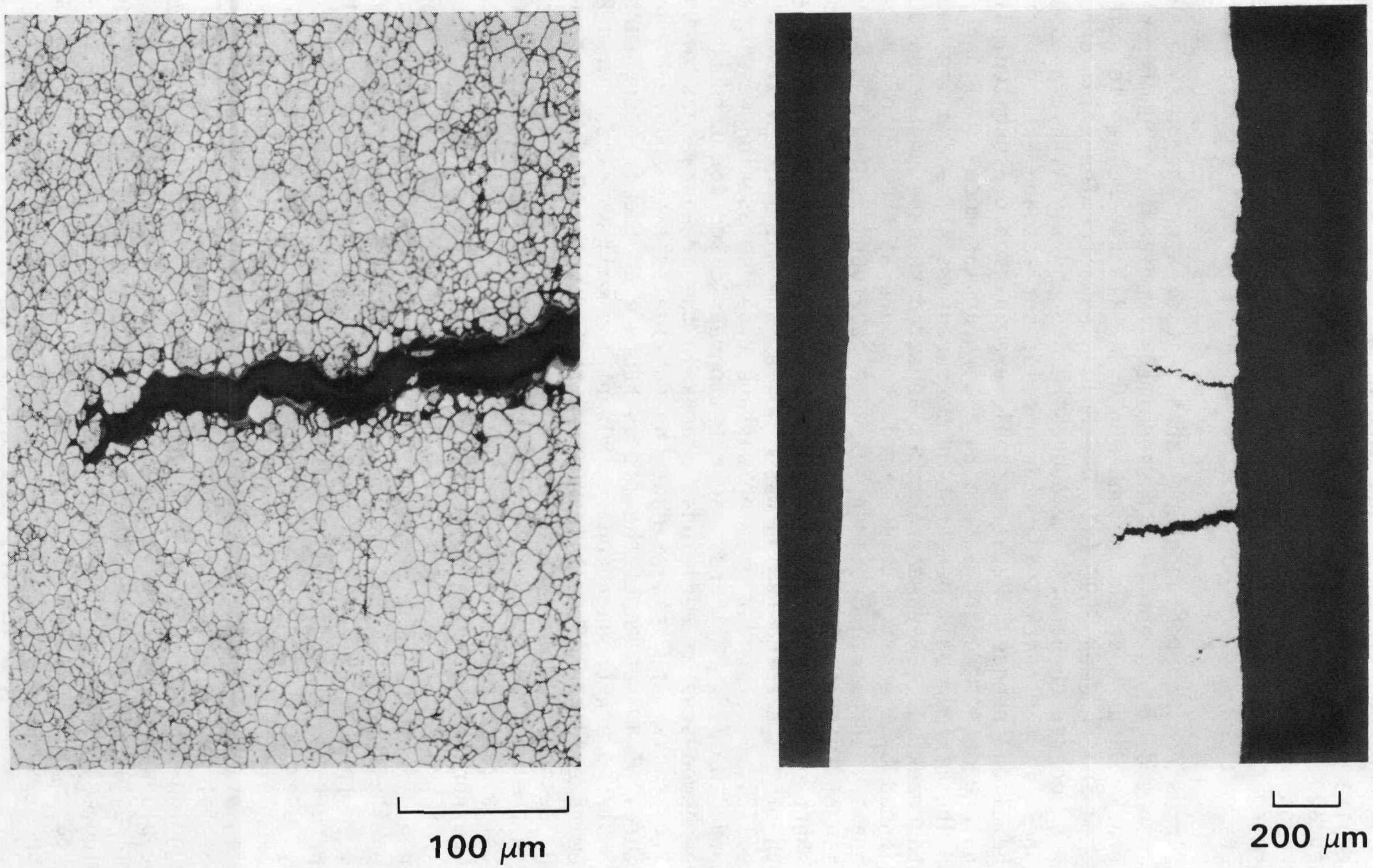


FIGURE 3.54. Optical Micrographs from a Longitudinal Section Showing OD Circumferential Cracking of TTS Specimen 633C (R13 C44 HL at TTS + 0.2 in.)

distributions needed to produce the observed cracking based on differential thermal expansion and thus, the cause of the IGSCC in the sludge pile region is uncertain.

Although IGSCC was found on the outside surface within the sludge pile region, no evidence of ID cracking was observed in the dented region at the TTS. Specimens were split axially, plastically deformed, and examined under the stereo microscope for evidence of cracking at the intersection of the tube with the TTS. A total of 19 hot leg and 15 cold leg specimens were examined and no evidence of cracking was found in any of the dented intersections. This lack of cracking is consistent with the low strain levels associated with the TTS denting. The profilometry results presented previously in Table 3.3 show the average strain for dents at the hot leg TTS to be only 2.6%; less severe denting would be expected at the cold leg TTS. Cracking at dented TSP intersections was found only for strain levels above 10%, and thus, cracking would not be expected for the level of denting found at the TTS.

Tube Sheet Crevice Region

Although no specific defects within the tube sheet crevice region were identified by the EC inspections, a selected number of tube segments from this region were examined because IGA and IGSCC have been found at this location in the hot leg region of several operating steam generators. Thirteen specimens from the hot leg and six specimens from the cold leg were included in the examinations. Visual inspections of the specimens were conducted both before and after extensive plastic deformation to ensure that any tight cracks or IGA would be visible. The surfaces of three specimens were also examined at high magnifications by SEM, and metallographic sections were prepared and examined to establish the nature of the tube degradation.

Shallow IGA was the only tube defect found in specimens from the tube sheet crevice region of the generator and was identified by metallographic and SEM examinations. Visual inspection of the surfaces under the optical microscope showed a lightly etched appearance to the outside surface but definite evidence of grain boundary attack could not be seen. An electron micrograph showing IGA on the OD surface of Specimen 271B (R9 C60 HL) is presented in Figure 3.55. The grain boundary attack was quite wide and appeared very shallow which indicates that general metal corrosion with preferential grain boundary attack has occurred. Metallographic examinations confirmed the shallow nature of the grain boundary attack as can be seen in Figure 3.56 [Specimen 582B (R13 C73 HL)]. This specimen had been plastically deformed prior to metallographic examination and the results of the deformation are clearly seen on the OD surface. Maximum intergranular penetration was <50 μm and affected only the outermost layers of grains on the OD surface. These isolated areas with shallow IGA were observed in all of the metallographic sections examined and did not appear to be strongly dependent upon the axial position within the tube sheet crevice.

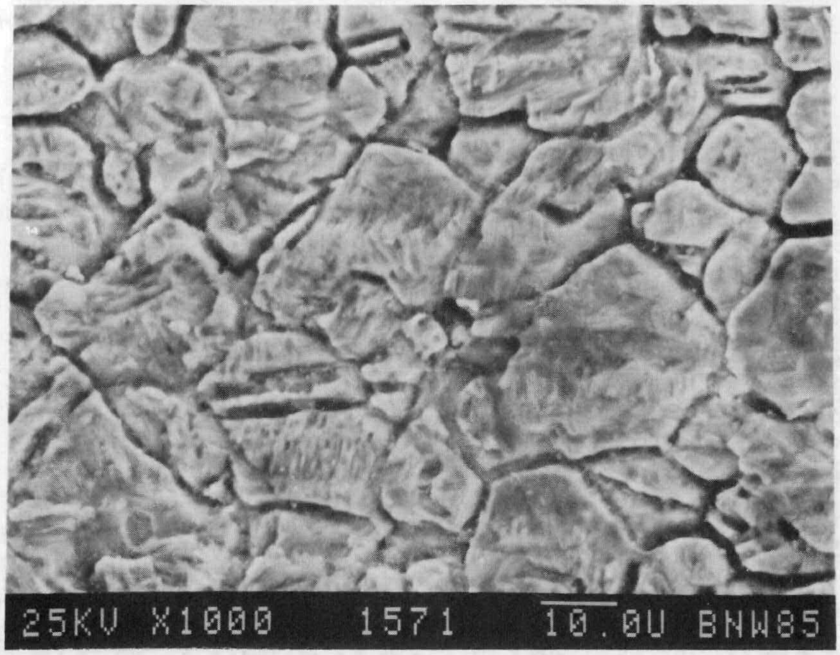


FIGURE 3.55. Electron Micrograph Showing IGA on the OD Surface of TTS Specimen 271B (R9 C60 HL)

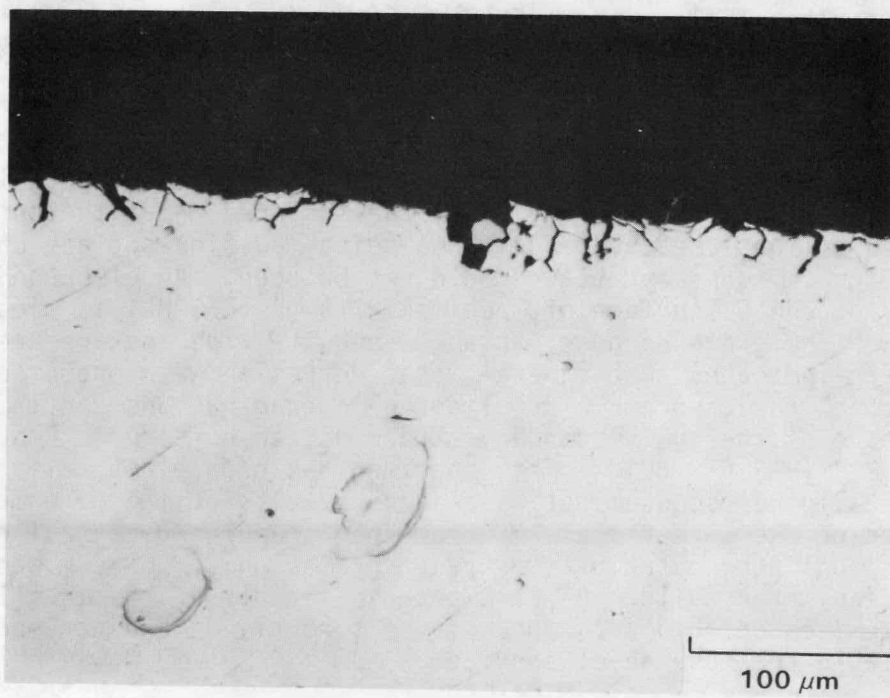


FIGURE 3.56. Optical Micrograph Showing IGA on the OD Surface of Specimen 582B (R13 C73 HL)

Roll Transition and Roll Expansion Region

No evidence of ID initiated cracking at the roll transition was observed in the specimens examined. Five hot leg and six cold leg specimens containing the roll transition region were split axially and visually examined both before and after plastic deformation to open any tight cracking on the inside surface. Mechanical damage produced by the spear during specimen removal did not extend to the roll transition in these specimens and therefore did not interfere with the inspections. In addition to visual inspections, transverse and longitudinal metallographic sections through the roll transition region of Specimen 1057 (R23 C38 HL) were prepared and examined. No evidence of IGSCC was observed in these metallographic sections although shallow IGA was seen on the OD surface immediately above the roll transition which corresponds to the region at the very bottom of the tube to tube sheet crevice.

Although IGSCC was not observed at the roll transition, circumferential cracks were found in the roll expanded region of tubes which had been plugged during service. These defects were discovered when some of the previously-plugged tubes fractured near the bottom of the tube sheet during pulling. The plugs had been removed by drilling which reduced the wall thickness of the tubing, especially above the roll transition. All of the fractures occurred within the drilled region of the tubes. Examination of the fracture surfaces suggested that ductile rupture was the primary failure mode above the roll transition, while intergranular fracture surfaces were observed on tube segments from within the roll expanded region. The differences in appearance of the fracture surfaces suggest that the failures above the roll transition were caused by the reduced wall thickness from drilling, while intergranular cracking was the primary cause for failure within the roll expanded region.

Metallographic examination of longitudinal sections from tube segments which failed within the roll expanded region confirmed the presence of IGSCC as shown in Figure 3.57 for Specimen 547 (R17 C48 HL). Several circumferential cracks were found in the longitudinal section of this specimen with the maximum crack depth being about 60% through-wall. Deformation at the crack tip produced during removal was clearly evident for the deeper cracks. The intergranular nature of the cracking is most clearly seen by examining the microstructure near the shallow crack where little deformation had occurred. Multiple intergranular cracks with similar crack distributions were also observed in a longitudinal section from Specimen 1056 (R15 C40 HL). Although the maximum crack depth within the metallographic section was 64% through-wall, the tube failed during removal at an axial region containing a through-wall intergranular crack as determined by SEM examination of the fracture surface. Electron micrographs showing a portion of the fracture surface are presented in Figure 3.58. The fracture surface contained flat regions with intergranular characteristics which were perpendicular to the tube axis. Corrosion products were observed on some of the flat surfaces across the entire tube thickness suggesting that a through-wall circumferential crack had been present prior to specimen removal. Other areas of the fracture surface showed intergranular features toward the inner surface corresponding to IGSCC and ductile features

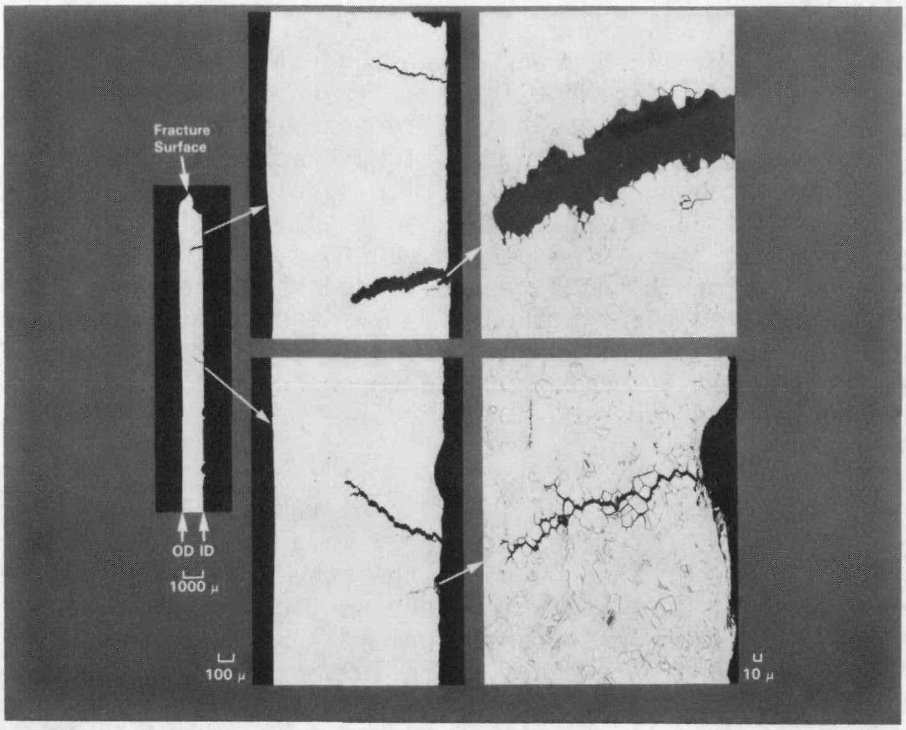


FIGURE 3.57. Optical Micrographs Showing Circumferential IGSCC in Roll Expanded Region of Specimen 547 (R17 C48 HL)

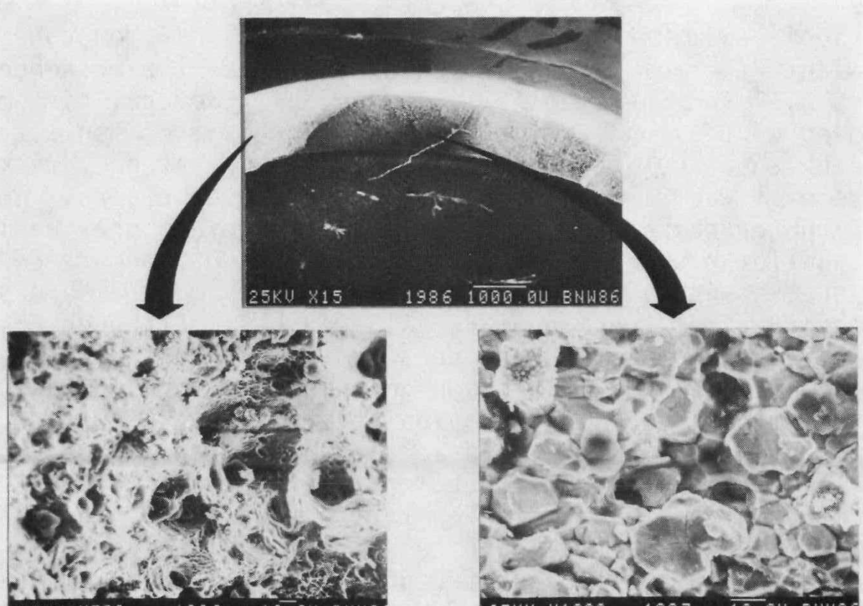


FIGURE 3.58. Electron Micrographs Showing Fracture Surface of Specimen 535 (R15 C40 HL)

at the outside surface. The section failed during pulling by ductile rupture of the remaining outer wall and ligaments between adjacent circumferentially oriented cracks.

The observed IGSCC is most likely associated with the high residual stresses produced during formation of the roll expanded region combined with additional stresses produced when the plugs were explosively positioned in the tube ends. Although no attempt has been made to evaluate the complex stress distributions produced under these conditions, some relevant observations regarding the failure location and comparison with previous work is appropriate. Length measurements of the broken tube segments showed the failures within the roll expanded region normally occurred at 1 in. increments (i.e., the fracture occurred ~1 in. or 2 in. above the tube end). Severe circumferential cracking at 1 in. and 2 in. above the tube end was also observed in Specimen 543A (R21 C36 HL) which had been removed from the generator within tube sheet Section 355. The bottom 4 in. of the tube and surrounding tube sheet were split axially to release the tube and plastically deformed to reveal the circumferential cracks. The spacing between the severe circumferential cracks may be related to the overlap region between successive steps used in forming the roll expanded region where more complex stresses would be present. However, since circumferential cracking in the roll expansion region was found only in tubes which had been plugged during service, factors relating to the plugs must also have contributed to the cracking. Additional stresses produced by the explosive positioning of the plug and the formation of a crevice between the plug and the tube are two potential factors. Circumferential cracking has been found beneath minisleeves on tubes removed from the Doel Unit 2 steam generator (H. Tas and J. Van de Velde 1986). These sleeves were applied by an explosive welding technique in an effort to establish a permanent repair for roll transition cracking found in the generator. Application of the sleeves produced substantial increases in hardness of the tube material and circumferential cracks were observed at regions of incomplete bonding between the tube and sleeve. These observations are consistent with the present results insofar as both the plugs and sleeves were applied by explosive techniques and circumferential cracks were observed in the tube materials. The interface between the plugs and tube was destroyed during plug removal and the nature of the bonding can not be determined. However, the intergranular nature of the cracking suggests incomplete bonding within the roll expanded region produced a crevice environment which enabled IGSCC to occur at regions of high residual stress produced by application of the plug and formation of the roll expanded region.

3.4 RESULTS OF BURST TESTING

Twenty specimens removed from the hot leg tube sheet region of the steam generator were burst tested to measure remaining tube integrity. Seventeen specimens with pitting and wastage type defects from above the TTS (denoted as "C" segments in Table 3.8) were tested along with three specimens taken from the tube sheet crevice with no observable defects (denoted as "B" segments in Table 3.8). Defected and undefected portions of tubing were tested so that the burst pressure of defected specimens could be normalized (burst pressure of a

TABLE 3.8. Surry Tube Burst Data

Specimen No.	Test Temp., °F	Max. P/W Depth, %	Max. Flaw[a] Depth, %	Max. Flaw[a] Length, in.	Burst Pressure, psig	Normalized Burst Pressure, $\Delta P/\Delta P_o$
657B	550	--	--	--	11,165	1.00
794B	550	--	--	--	10.720	1.00
797B	550	--	--	--	11,765	1.00
601C	550	49	24	0.06	10,540	0.94
603C	550	55	55	0.15	9,790	0.87
635C	600	51	43	0.10	10,825	0.97
657C	550	69	69	0.15	8,835	0.79
794C	600	78	78	0.17	7,175	0.67
797C	550	50	50	0.10	11,110	0.94
615C	600	37	24	0.06	10,152	0.91
628C	600	65	52	0.10	10,078	0.90
642C	600	36	36	0.04	10,498	0.94
661C	600	75	75	0.11	9.195	0.82
712C	600	38	38	0.06	10,652	0.95
790C	600	57	57	0.05	10,300	0.92
792C	600	38	38	0.07	10,128	0.90
795C	600	29	29	0.04	10,800	0.96
799C	600	51	80[b]	0.53[b]	6,930	0.62
812C	600	44	22	0.08	9,988	0.89
826C	600	57	43	0.10	10,485	0.94

(a) Corresponds to maximum depth and length of P/W at failure location.
(b) Maximum depth and length of an axial crack.

defected specimen divided by the burst pressure for an undefected specimen). This was done to minimize the influence of material property and dimensionsal variations on burst strength. The burst test results are given in Table 3.8.

The length and depth of defect that caused each specimen to fail (Columns 4 and 5 in Table 3.8) was estimated by comparing the failed tube with the pretest photographs showing the remaining wall thickness measurements. In most instances the depth of defect causing tube failure corresponded to the region of maximum pitting/wastage (Column 3). The data show that even deep pitting/wastage did not significantly reduce the burst strength. All tubes leaked or burst at levels much higher than the maximum pressure attainable in a main-steam-line-break (MSLB) accident (~2600 psig). This was because of the short length of the observed defects both axially and circumferentially. For failure to occurr at MSLB pressure levels a tube must have 80% through-wall uniform thinning over a 1 in. axial length (Alzheimer et al. 1979). Thus, in-service tubes with pitting/wastage type defects of limited axial extent would most likely fail by leakage at a deep pit.

Another interesting observation was that the burst pressures of both undefected and defected removed-from-generator tubing was greater than new tubing tested previously by Alzheimer et al. (1979). The average burst pressure for three heats of undefected new tubing with the same diameter and wall thickness as Surry tubing was ~9500 psig. The average burst strength of undefected and service exposed tubing from Surry was ~11,200 psig (~20% increase). In addition, many of the defected and service exposed specimens exhibited burst pressures exceeding that of the new tubing. This difference may have been due to heat-to-heat variability in tube fabrication, but this was not pursued since it was beyond the scope of our investigation.

One of the principal reasons for burst testing removed samples of tubing from the Surry Generator was to validate empirical models of remaining tube integrity developed previously by this program (Alzheimer et al. 1979). Burst and collapse tests were performed on segments of new tubing containing machined defects such as electric discharge machined (EDM) slots, uniform thinning, and elliptical wastage. Empirical equations were derived to describe the effect of defect length and depth on tube burst pressure. These equations are given for the EDM slot, uniform thinning, and elliptical wastage burst mode cases, respectively.

$$\Delta P/\Delta P_o = 1-(h/t)+(h/t)e^{-.373\ L/\sqrt{Rt}} \quad (1)$$

$$\Delta P/\Delta P_o = (1-h/t)^{1-\exp(-.13\ L/\ \sqrt{R[t(1-h/t)]}} \quad (2)$$

$$\Delta P/\Delta P_o = (1-h/t)^{0.604} \quad (3)$$

The term $\Delta P/\Delta P_o$ represents the normalized burst pressure. The nondimensionalized defect depth is given by h/t, the defect length by L, the tube inner radius is denoted by R, and t is the tube wall thickness. Figure 3.59 shows a plot of the normalized burst pressure [calculated from Equations (1) to (3)] versus defect length for three defect depths. Note the similarity of the EDM slot and uniform thinning equations over the full range of defect dimensions. Conversely, the relationship for elliptical wastage type defects consistently indicated a higher burst pressure for the same length and depth of defect compared to an EDM slot or a uniformly thinned specimen.

To determine the adequacy of these relationships to predict the tube burst strength reduction caused by service induced defects, calculations of the normalized burst pressure were made by substituting the measured lengths and depths of the defects from Table 3.8 into the equations. The experimentally measured normalized burst pressure was then computed by dividing the actual burst pressure of defected tubes by the average burst pressure of undefected tubes ("B" segments). This procedure eliminated the effect of material property and tubing dimensional variations on burst behavior. Figures 3.60 through 3.62 show plots of the calculated normalized burst pressure against the measured normalized burst pressure. Excellent agreement was obtained between calculated and measured values for the EDM and uniform thinning empirical models (Figures 3.60 and 3.61). All but one of the data points were within ±10% of perfect agreement. The one data point outside the ±10% range was from Tube 799C which failed at an OD-initiated axial IGSCC. The actual burst pressure was about 20% greater than the predicted value. This result was partially due to the method employed for characterizing the crack dimensions. The cracked portion of the tube was, in fact, composed of several small, closely spaced cracks. To conservatively characterize the flawed area, an overall crack length consisting of the sum of the smaller cracks was reported. The crack depth was estimated from post-test fracture surface measurements and a metallographic section taken through the center point where the crack had penetrated the tube wall. However, from the remaining data it is clear that the EDM slot and uniform thinning equations provide a realistic estimate of the effect of pitting/wastage type defects on tube burst strength. In addition, these equations also gave conservative results for the axial IGSCC when bounding dimensions were used to characterize its size.

As shown in Figure 3.62, the elliptical wastage model [Equation (3)] was too conservative for pitting/wastage type defects because actual burst pressures were consistently greater than the predicted values. This relationship overpredicted the effect of pitting/wastage defects since it was developed from burst tests on tubes with long (~1.5 in.) axial elliptical wastage. In developing the model, no tests were performed with short (0.25 in.) axial elliptical wastage, so it was not expected that an accurate prediction would be obtained.

The burst test results can also be used to illustrate how EC/bobbin coil NDE data may provide a conservative estimate of the remaining margin to failure if the true defect length is relatively short (<0.25 in.) as observed in the pitting/wastage type defects. Table 3.9 gives the minimum, average, and maximum EC inspection results from the baseline and DAARR for the specimens in Table 3.8. Although EC/bobbin coil data generally tend to underestimate

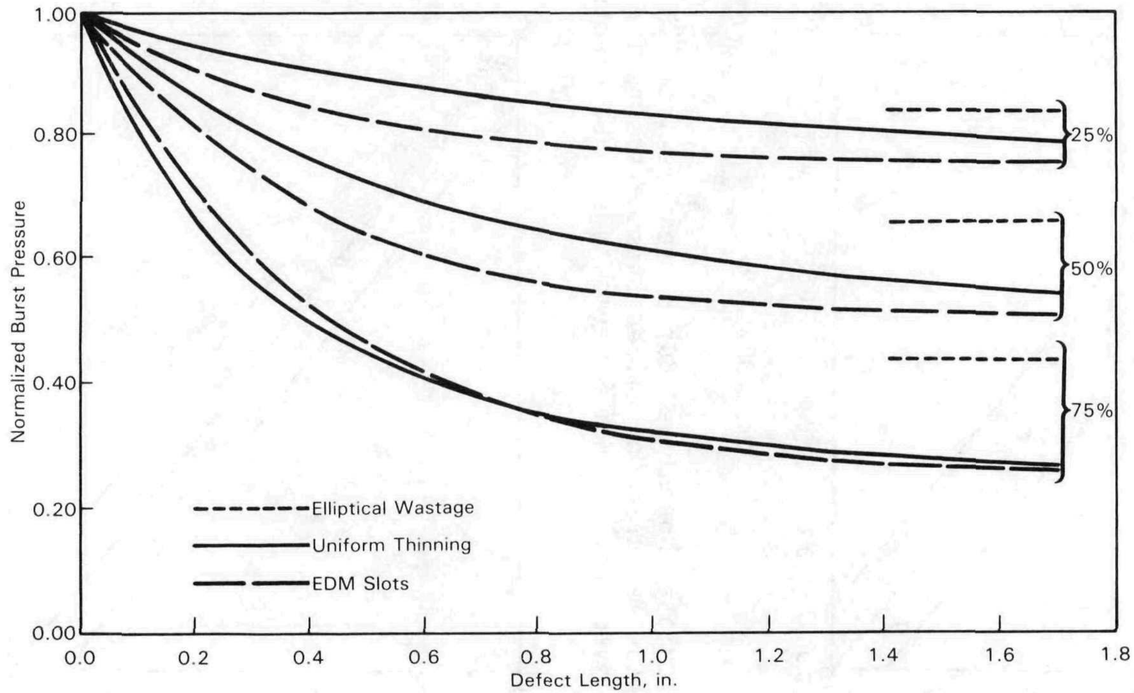


FIGURE 3.59. Comparison of Burst Pressure Equations for Elliptical Wastage, Uniform Thinning, and EDM Slots

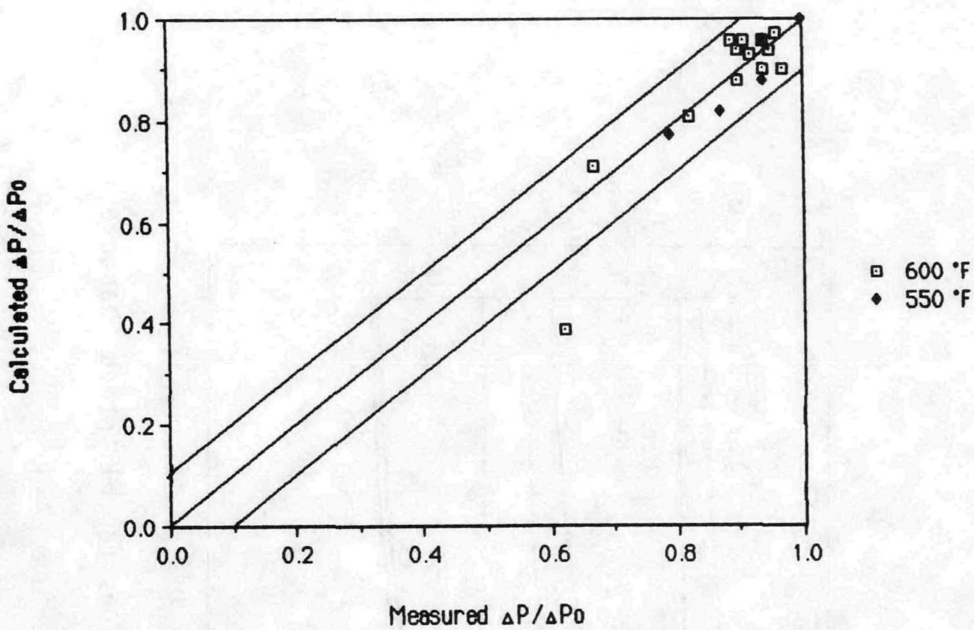


FIGURE 3.60. Calculated Normalized Burst Pressure from EDM Slot Equation Versus Measured Normalized Burst Pressure for Tubes Removed from the HLTTS Region with P/W Defects

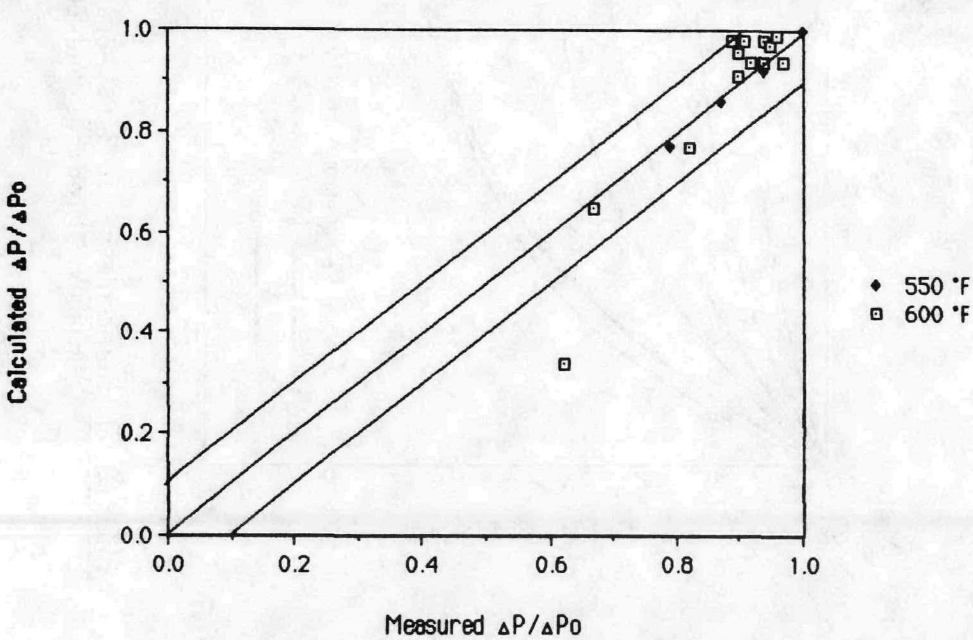


FIGURE 3.61. Calculated Normalized Burst Pressure from Uniform Thinning Equation Versus Measured Normalized Burst Pressure for Tubes Removed from the HLTTS Region with P/W Defects

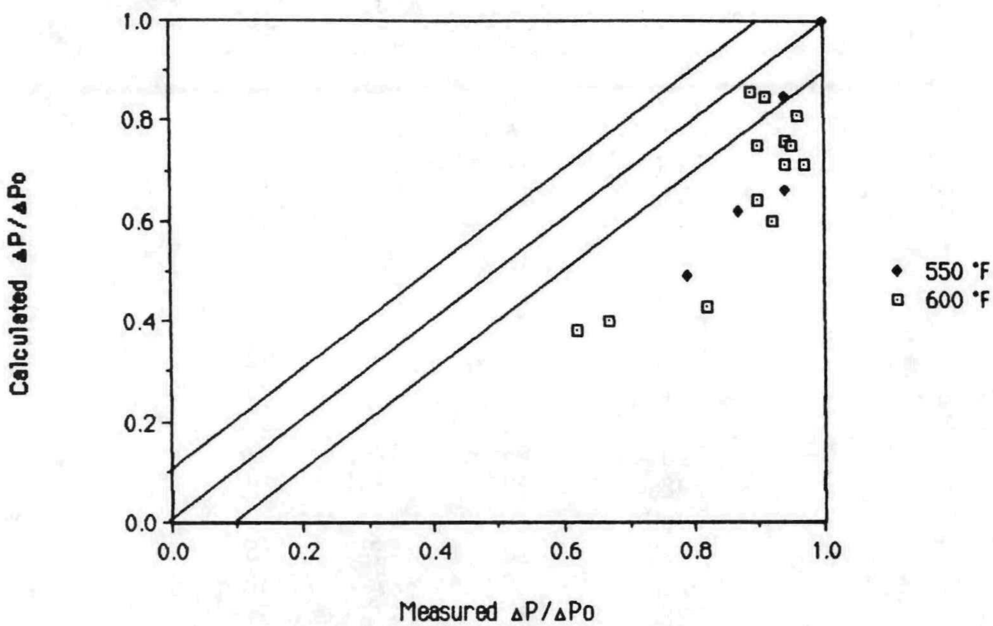


FIGURE 3.62. Calculated Normalized Burst Pressure from Elliptical Wastage Equation Versus Measured Normalized Burst Pressure for Tubes Removed from the HLTTS Region with P/W Defects

maximum defect depth, they appear to provide a conservative estimate of the remaining margin to failure if a long (~1 in.) axial crack of depth equal to the EC measurement is assumed.

Figures 3.63 through 3.65 give plots of the measured normalized burst pressure versus calculated values based on the minimum, average, and maximum EC measurements, respectively. The DAARR EC data were inserted into Equation (1) along with an assumed 1 in. crack length to produce the graphs in Figures 3.63 through 3.65. Note that the calculated results are mostly conservative, even when minimum EC values are used. These results clearly illustrate the significant influence of defect length on tube burst pressure. Gross inaccuarcies in EC determination of defect depth can be tolerated for short defects if, during the defect evaluation process, a long crack-like defect type is assumed. Accurate measurement of defect depth becomes important only if the defects have a long axial dimension.

3.5 TUBE SHEET SECTION EXAMINATION

Detailed examinations were conducted on two tubes from hot leg tube sheet Section 355 to validate NDE results and characterize the nature of the deposits within the sludge pile and tube sheet crevice region of the generator. Sludge

TABLE 3.9. Baseline and DAARR EC Test Results, % Wall Loss

Specimen No.	Min. EC	Avg. EC	Max. EC
601C	25	34	40
603C	56	71	87
635C	37	40	42
657C	43	67	74
794C	66	72	80
797C	43	48	52
615C	10	21	27
628C	47	54	62
642C	25	38	52
661C	29	57	75
712C	32	49	60
790C	26	42	88
792C	22	25	29
795C	20	33	45
799C	10	45	65
812C	10	27	38
826C	39	47	51

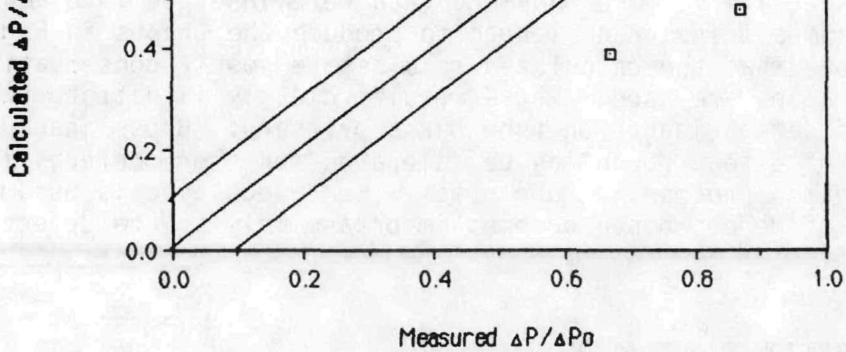


FIGURE 3.63. Calculated Normalized Burst Pressure (EDM Slot Equation) Based on Minimum EC Data from the DAARR Versus Measured Values

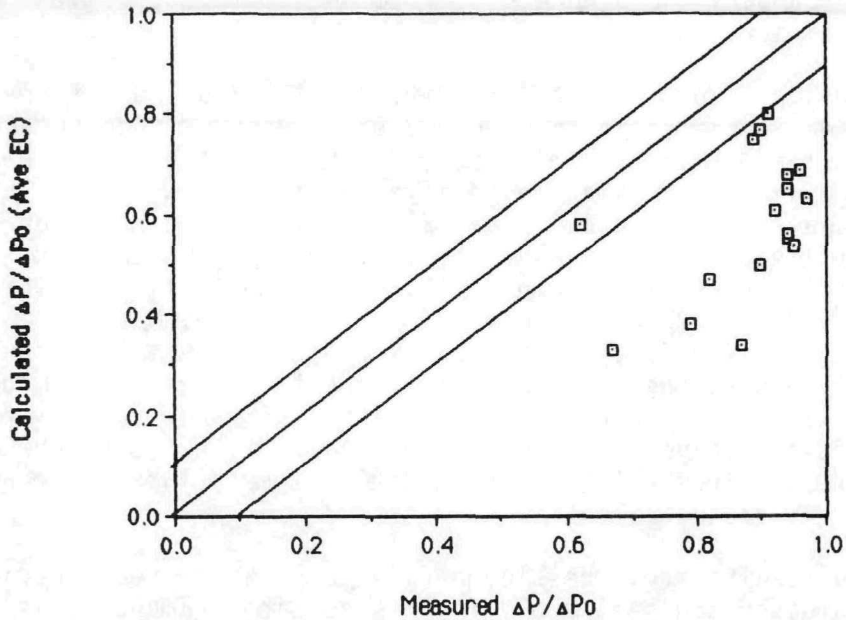


FIGURE 3.64. Calculated Normalized Burst Pressure (EDM Slot Equation) Based on Average EC Data from the DAARR Versus Measured Values

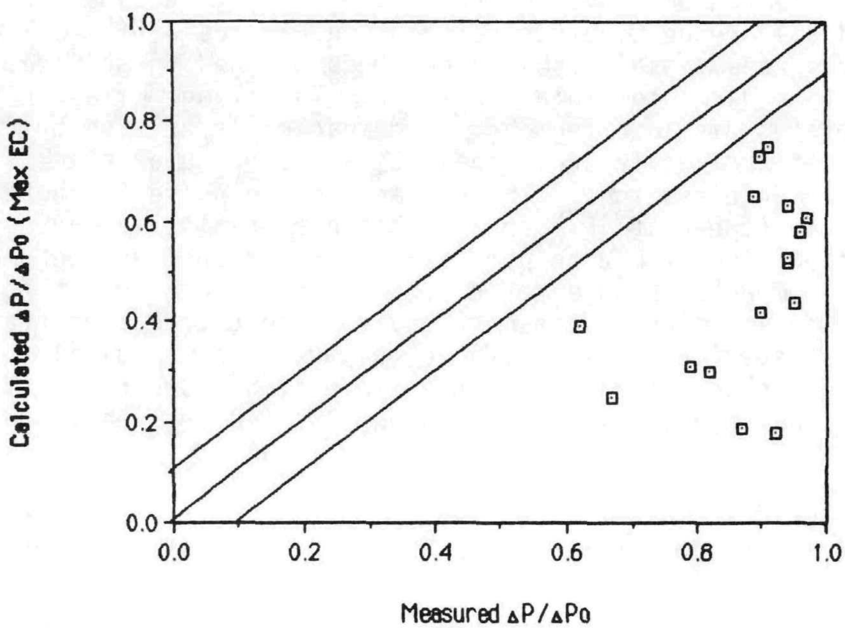


FIGURE 3.65. Calculated Normalized Burst Pressure (EDM Slot Equation) Based on Maximum EC Data from the DAARR Versus Measured Values

samples from hot leg Section 355 and cold leg Section 354 were also examined to characterize and compare the sludge pile from the different regions as a function of axial position.

A cutting diagram for separating individual tube/tube sheet specimens from the tube sheet section is shown in Figure 3.66. Tubes R21 C36 HL and R22 C38 HL were selected for detailed examination because both tubes had been part of the NDE round robin excercises and extensive NDE results were available for validation. Visual inspection of Tube R22 C38 HL revealed this tube had been inadvertently drilled during the plug removal operation which destroyed the ID surface at the roll transition region. Therefore, the roll transition region of adjacent Tube R23 C38 HL was examined for possible IGSCC and the results were presented in Section 3.3. To release the desired tube/tube sheet specimens, axial cuts through the tube sheet, but not the tubes, were made along the entire length of the tube sheet using a vertical band saw. A view of the tube sheet section after cutting is shown in Figure 3.67. The four tube cluster was subsequently released from the SGGP for additional metallurgical examinations under EPRI Research Project S304-19.

Examination results from the sludge pile samples and tube specimens will be presented and discussed separately in this section. Emphasis is given to tube sheet degradation and characterization of the sludge and crevice deposits since tube degradation in these regions was discussed previously.

3.5.1 Sludge Pile Examination

The sludge pile region above the hot leg and cold leg tube sheet Sections 355 and 354, respectively, are shown in Figures 3.68 and 3.69. The light colored tubes are those which had not been plugged in service, while the plugged tubes have a dark brown/black coating. The sludge piles of both specimens consisted of two distinct regions: a compacted layer with brittle characteristics was located directly above the TTS, and a granular black sludge (AVT origin) was at higher elevations. The compact region above the hot leg section was relatively thin (one-half in.) and exhibited a distinctly layered structure. A transition band with a copper-like color was observed between the granular AVT and compacted sludge regions. The axial location of this band is correlated with the location of the most severe tube degradation that was found in the hot leg TTS specimens. The cold leg sludge pile was similar in appearance to the hot leg sludge except that the transition between the AVT and compacted regions was reddish in color and was located between 1 and 2 in. above the TTS.

Sludge samples for elemental analysis and crystal structure determination were taken at locations corresponding to the visually distinct sludge layers. The regions examined include:

- the compact sludge immediately above the TTS (0 - 0.5 in.)
- the transition region above the hot leg sample (0.5 - 1 in.)

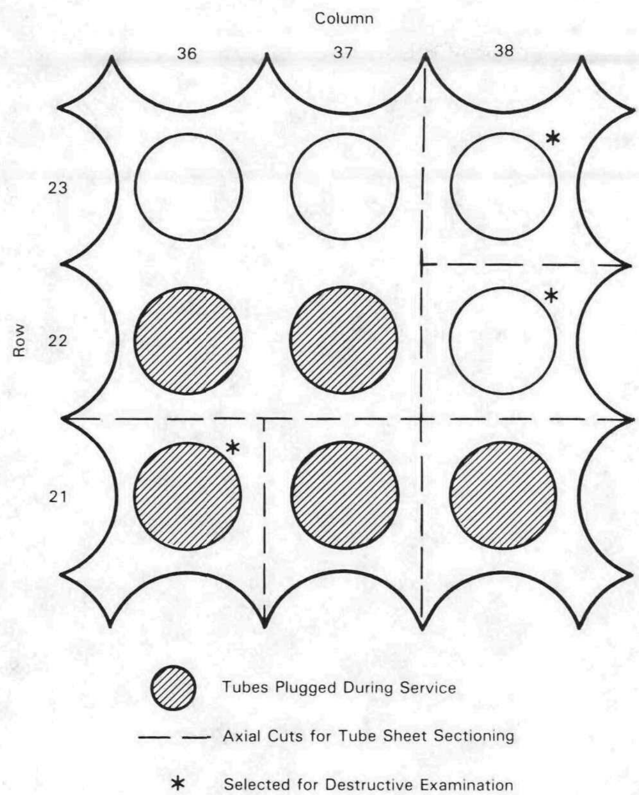


FIGURE 3.66. Cutting Diagram for Hot Leg Tube Sheet Section 355

- the reddish colored material above the cold leg sample (1 - 1.5 in.)
- the granular AVT sludge (2 - 3 in.).

Samples from each axial location were taken from both the hot and cold leg sections.

Elemental compositions of the sludge samples obtained from inductively coupled plasma spectroscopy (ICP) are presented in Table 3.10. Iron, copper, and zinc were the primary elements found in the hot leg sludge samples. The Cu and Zn concentrations increased with distance above the TTS with a sharp increase in Cu observed in granular AVT sludge (i.e., 1 - 1.5 in. above the TTS). In addition to Fe, Cu, and Zn, high concentrations of Na and P were found in the cold leg sludge samples from locations up to 2.5 in. above the TTS. A sharp increase in Cu and Zn and a corresponding decrease in Na and P occured when the sludge changed from phosphate to AVT origin. The lack of P and Na in the hot leg sludge samples was somewhat surprising and may be related to removal of the original phosphate sludge during sludge lancing operations which were conducted after the switch to AVT water chemistry.

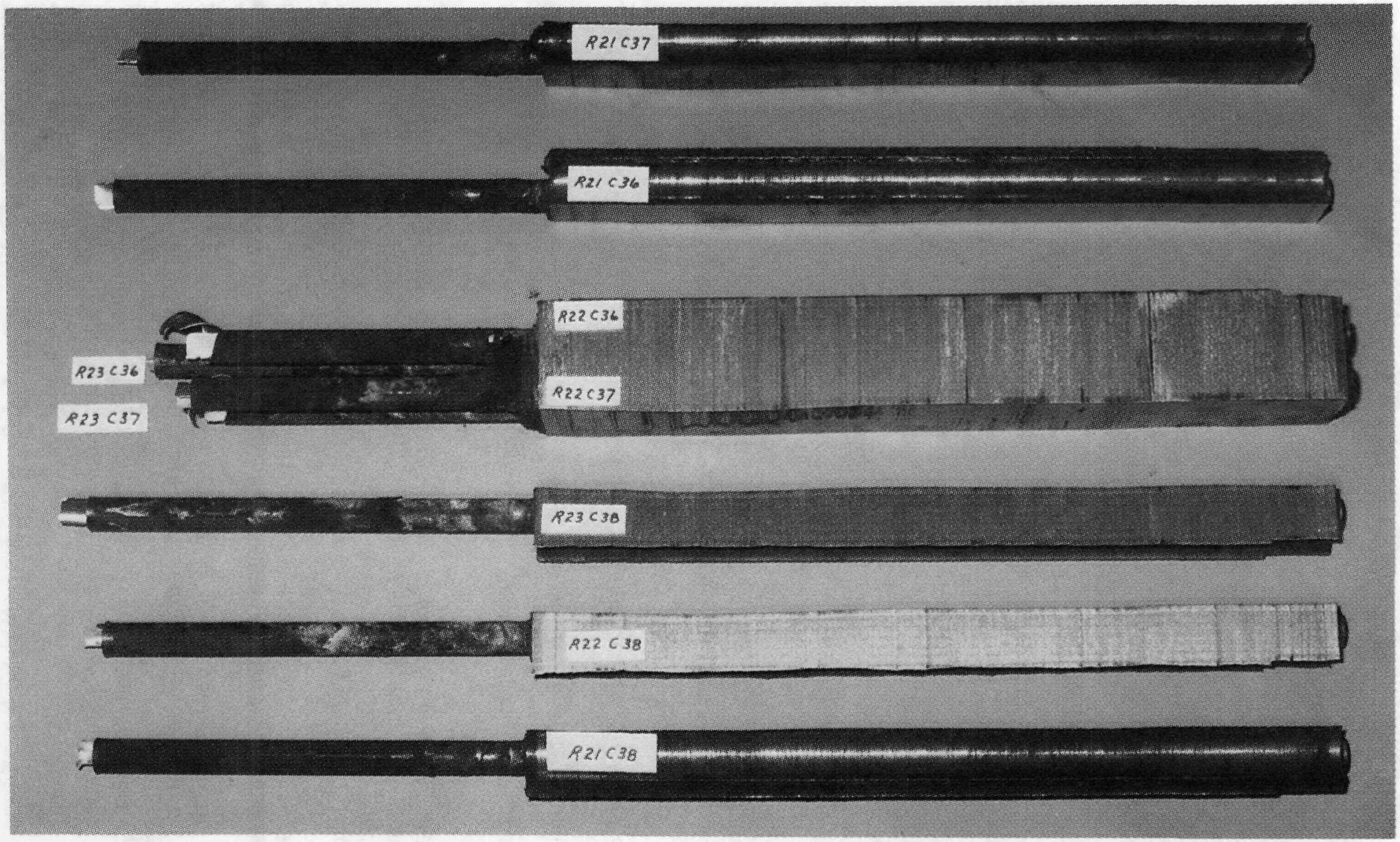


FIGURE 3.67. Tube Sheet Specimen 355 After Sectioning

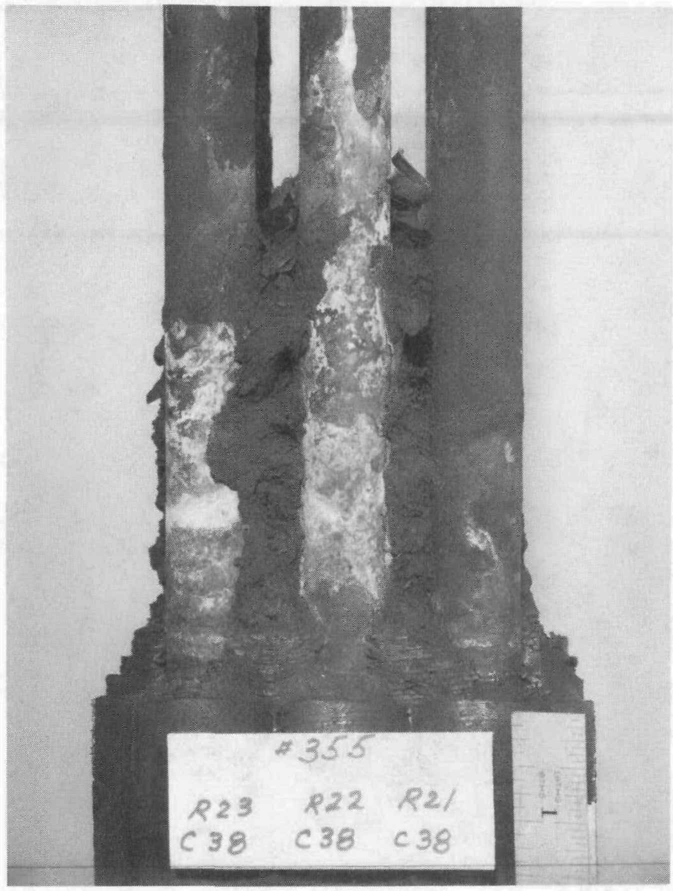


FIGURE 3.68. View of Sludge Pile Above Hot Leg Tube Sheet Section 355

TABLE 3.10. Results from ICP Analysis of Sludge Samples from Tube Sheet Specimen 354 and 355[(a)]

	Location Above Tube Sheet, in.							
	0-0.5		0.5-1		1-1.5		2-3	
Element	HL	CL	HL	CL	HL	CL	HL	CL
Fe	67.00	35.05	55.41	34.69	42.53	36.28	40.17	44.51
Cu	0.81	1.44	3.76	3.20	18.07	4.57	21.90	14.46
Zn	0.28	0.27	1.05	0.39	2.24	0.57	6.94	11.27
Cr	0.26	0.29	0.25	0.13	0.27	0.26	0.14	0.20
Ni	0.62	0.49	0.89	0.33	1.19	1.07	0.12	0.81
Si	0.26	0.73	1.06	0.24	0.76	0.46	0.34	0.49
P	0.29	9.77	1.35	10.57	1.25	10.08	0.31	0.24
Na	0.15	12.90	0.13	13.35	0.17	8.70	0.80	0.96

(a) Values reported as weight percent.

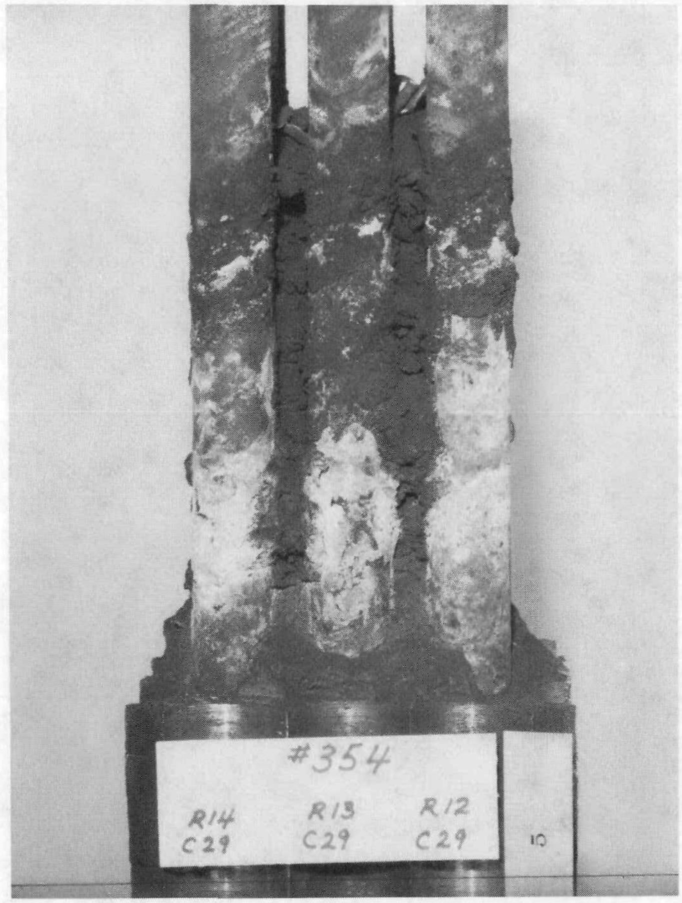


FIGURE 3.69. View of Sludge Pile Above Cold Leg Tube Sheet Section 354

X-ray diffraction indicated that the AVT sludge was primarily composed of Fe_3O_4 and metallic Cu with a small amount of Fe_2O_3 in the cold leg sample taken at 2 - 2.5 in. above the TTS as shown in Table 3.11. Relative phase concentrations were estimated from peak intensities which depend strongly on the diffraction characteristics of the individual phases. Consequently, the apparently high Cu content (compared to the elemental analysis) can be attributed to the poor diffraction characteristics of the oxide phases. The reddish colored phosphate sludge from the cold leg sample at 1 - 1.5 in. above the TTS was composed of Fe_2O_3, Fe_3O_4, and $NaFePO_4$ in decreasing order of relative composition. Only a trace of Fe_3O_4 was detected in the x-ray diffraction patterns of the sludge samples taken <1 in. from the TTS of both the hot and cold leg sections. A lack of diffraction peaks in these samples suggests either an amorphous or highly defected crystal structure with poor diffracting characteristics. The detection limit for phase identification was estimated to be about 5% and thus, diffraction peaks from metallic Cu or Cu compounds would not be expected in the samples with low elemental Cu concentrations.

Sludge samples from the hot leg and cold leg tube sheet sections were examined by optical metallography and SEM/EDS. Both samples were located directly

TABLE 3.11. Results from X-Ray Diffraction of Sludge Samples from Tube Sheet Specimen 354 and 355

	Location Above Tube Sheet, in.							
	0-0.5		0.5-1		1-1.5		2-3	
Phase	HL	CL	HL	CL	HL	CL	HL	CL
Fe_3O_4	(a)	(a)	(a)	(a)	60%(b)	30%	60%	25%
Fe_2O_3	-	-	-	-	-	50%	-	15%
Cu	-	-	-	-	40%	-	40%	60%
$NaFePO_4$	-	-	-	-	-	20%	-	-

(a) Mostly amorphous with trace of Fe_3O_4.
(b) Relative phase concentrations were estimated from peak intensities.

above the TTS in the compact sludge region of the sludge pile. A layered structure with the layers parallel to the tube sheet was observed in the hot leg sludge sample, as seen in the left side of Figure 3.70. Two layered phases and some discrete particles were observed in the optical micrographs and subsequently examined by SEM/EDS. Iron was the only element detected by EDS in the predominant layered phase while the minor layered phase contained small amounts of nickel, chromium, silicon, and sulfur in addition to iron. Both layered phases were distributed throughout the sample and are assumed to be iron oxides. The discrete particles were found to be rich in Cu and S with a small signal from Fe. These particles were only observed near the top of the sample in the region >0.2 in. above the TTS. Evidence of metallic Cu or copper oxide particles was not observed in this sample.

A completely different microstructure was observed in the cold leg sludge sample as seen on the right side of Figure 3.70. Individual particles of various sizes and shapes were embedded in a continuous matrix. Energy-dispersive x-ray spectroscopy analysis showed the matrix phase or binding phase to be rich in Na, P, and Fe which indicates $NaFePO_4$ was the binding phase for the compact cold leg sludge material. The EDS spectra from individual particles showed Fe or Fe-P to be the major element(s) present for the majority of the particles examined. In one region of the sample, a few particles rich in Co and Cr were observed. Attempts to locate Cu particles were generally unsuccessful except for one particle which appeared to be metallic Cu. No Cu-S-rich particles were found in the cold leg sludge.

3.5.2 Examination of Hot Leg Tubes R21 C36 and R22 C38

Destructive examinations include x-ray diffraction of surface deposits; metallographic examinations of the tube, deposits, and tube sheet material; and SEM/EDS analysis of deposits at various axial locations as shown in Figure 3.71. Tube/tube sheet Specimen 544 (R22 C38 HL) was split axially along its entire length using a vertical band saw. One-half of the tube was

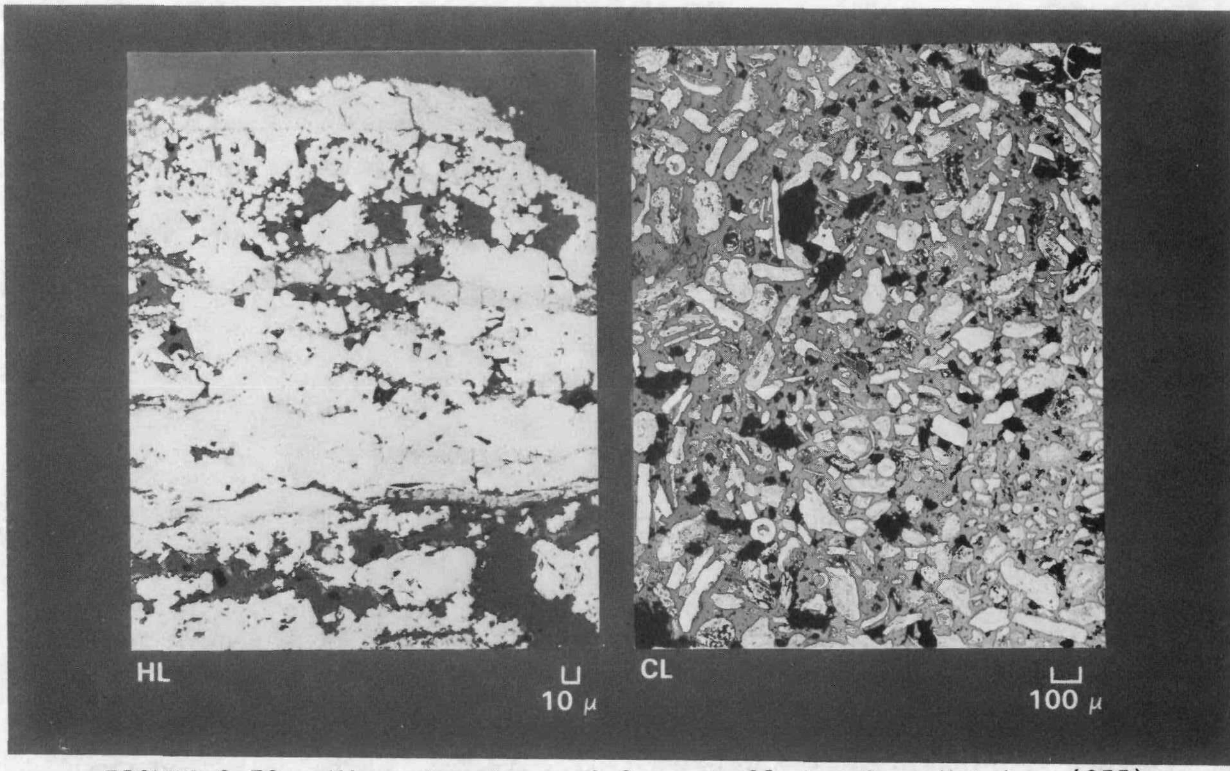


FIGURE 3.70. Microstructure of Compact Sludge from Hot Leg (355) and Cold Leg (354) Tube Sheet Section

separated from the tube sheet by cutting off the welded end and lifting the tube from the tube sheet. Surface deposits for x-ray diffraction were then scraped from the tube and tube sheet at corresponding axial locations using a Mo scraper. This half of the tube was then cleaned of remaining deposits and examined for defects. Wastage and pitting in the region 0 to 1 in. above the TTS and shallow IGA in the crevice region were the only defects found in the tube. The nature of these defect types was described previously in Section 3.3 and will not be repeated here.

Results from x-ray diffraction of the deposits scraped from Tube R22 C38 HL are summarized in Table 3.12. Deposits from the sludge pile region showed Fe_3O_4 and metallic Cu to be the primary phases present and the relative amount of these phases was similar to that found in the sludge samples taken 1 in. above the hot leg TTS. A third phase, with x-ray lines suggesting a layer-type silicate structure, was also present in the scraped deposits and the diffraction lines were best fit to the $Mg_3Si_2O_5(OH)_4$ structure. A few additional very weak diffraction lines were observed in the x-ray pattern but could not be identified.

Three phases, namely, Fe_3O_4, $NaFePO_4$, and NaCl were identified in all three deposit samples from the tube/tube sheet crevice region. The relative phase concentration (based on peak intensity) varied with axial location with Fe_3O_4 and $NaFePO_4$ the major phases near the TTS, NaCl the predominant phase in

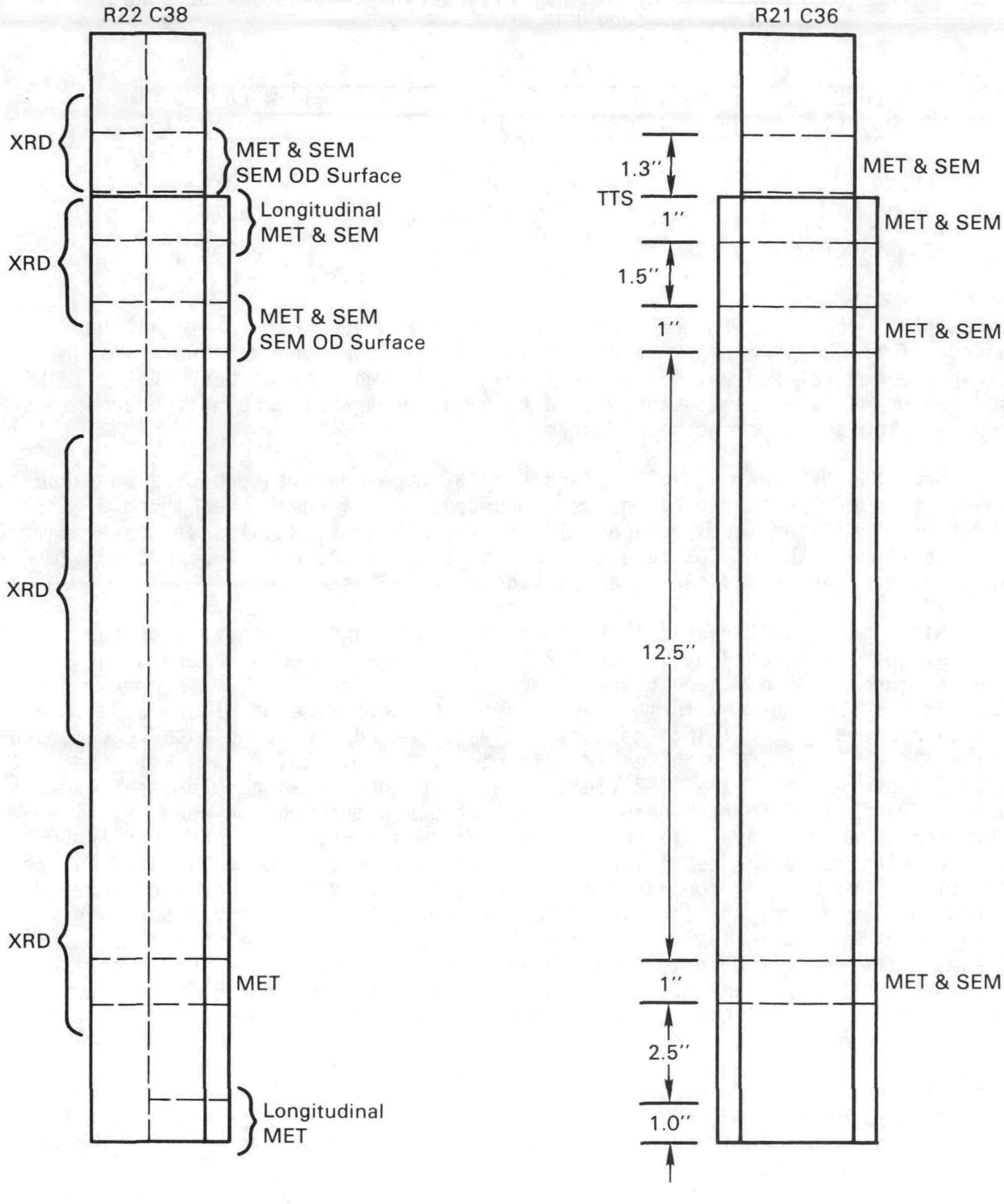


FIGURE 3.71. Location of Metallurgical Examinations Conducted on Hot Leg Tubes R21 C36 and R22 C38

TABLE 3.12. Results from X-Ray Diffraction of Deposits Scraped from Tube R22 C38 HL

Axial Location			
0 to 2 in. above TTS	0 to 2.5 in. below TTS	5.5 to 11.6 in. below TTS	14.4 to 17.6 in. below TTS
Fe_3O_4	$NaFePO_4$	NaCl	Fe_3O_4
Cu	Fe_3O_4	$NaFePO_4$	NaCl
$Mg_3Si_2O_5(OH)_4$	NaCl	Fe_3O_4	$NaFePO_4$

the central region of the crevice, and Fe_3O_4 the predominant phase at the bottom of the crevice near the roll transition. Fewer deposits were found along the central region of the crevice and the high NaCl content of the scraped deposits is consistent with a thin layer of NaCl coating the tenacious tube and tubesheet corrosion products.

Sections of Tubes R21 C36 HL and R22 C38 HL along with deposits and tube sheet at several axial locations were mounted and polished (see Figure 3.71). These were analyzed metallographically and by SEM/EDS. Results of these examinations along with SEM/EDS results from the outer surface of Tube R22 C38 HL are presented and discussed as a function of axial location.

Significant differences in the microstructure and composition of the scales/deposits located at 0.8 to 1.2 in. above the TTS were observed on plugged Tube R21 C36 HL and never-plugged Tube R22 C38 HL. A more porous deposit was found on the former, as seen in the left side of Figure 3.72. Energy-dispersive x-ray spectroscopy analysis showed the deposit to be composed primarily of Fe and Cu with smaller amounts of Cr, Ni, Zn, P, and Mg. The bright features in Figure 3.72 (left side) were identified as elemental Cu while a variety of Fe-rich phases were distributed through the deposit. The thin scale layer adjacent to the tube surface was found to be enriched in Cr and Fe relative to the metal matrix and also contained trace amounts of Cu, Zn, Al, Si, P, and Cl. In contrast, a compact scale deposit was found on Tube R22 C38 HL as illustrated in the right side of Figure 3.72. Energy-dispersive X-ray spectroscopy analysis indicated the scale was a mixture of two major phases. The darker phase in Figure 3.72 (right side) was composed primarily of Mg and Si with small amounts of Fe, Ni, and Cr. Iron was the major element in the lighter phase which also contained small amounts of manganese, zinc, and silicon. Elemental Cu was not found in the section examined although small particles rich in Cu and S were occasionally seen in the silicate phase. The composition of these particles was similar to the particles in the hot leg sludge sample discussed previously. The thin scale layer adjacent to the tube surface was highly enriched in Cr and contained significant concentrations of Cl and S at the metal/scale interface.

Results from SEM/EDS examination of the outside surface deposits from Tube R21 C38 HL were generally consistent with the cross section results. These

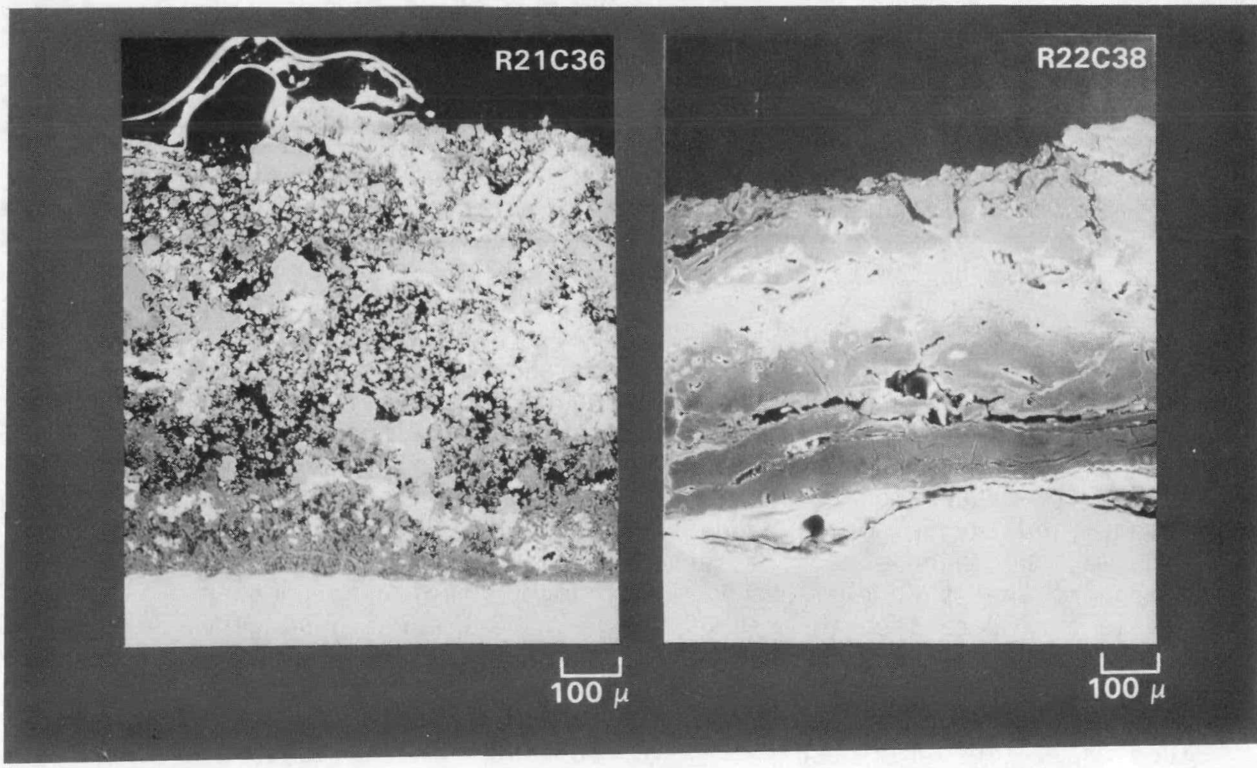


FIGURE 3.72. Electron Micrographs Comparing the Scale/Deposits on Hot Leg Tube R21 C36 and R22 C38

examinations were performed 0.2 to 1.2 in. above the TTS prior to metallographic preparation of the sample. Energy-dispersive x-ray spectroscopy analysis of the scales/deposits showed Fe, Si, Mg, and Cu to be the major elements present with lesser amounts of Zn and S. Localized regions were found to be rich in Mg and Si while Fe was the major element at other regions of the scale. Copper was found to be distributed in two distinct forms on the OD surface. Regions rich in Cu and S were observed on the surface of the silicate scale while discrete particles of Cu were found in the more porous Fe-rich surface deposits.

The differences in scale structure and microchemistry between Tubes R21 C36 HL and R22 C38 HL may be related to the operating conditions of the individual tubes since R21 C36 HL was plugged during service and would have been at a lower operating temperature during the final years of operation. The presence of a silicate scale on Tube R22 C38 HL but not R21 C36 HL suggests that the scales formed on the OD surfaces of operating tubes after 1975 which was when Tube R21 C36 was plugged because of wastage at the hot leg TTS.

The microstructure and microchemistry of the corrosion products and deposits within the tube sheet crevice varied with axial location. Transverse metallographic sections containing the tube, crevice deposits, and surrounding tube sheet from Tube R21 C36 HL showed the tube sheet crevice to be completely filled with corrosion products and deposits near the top and bottom of the crevice and partially filled at 2 to 3 in. below the TTS. The crevice microstructure consisted of corrosion product layers adjacent to the tube and tube sheet with a rather porous deposit between the two layers. The corrosion layer adjacent to the tube surface was quite thin (~10 μm) and was fairly uniform along the tube axis. Conversely, the tube sheet corrosion product was thickest near the TTS and decreased with axial distance. Shallow IGA (<40 μm) was the only tube defect identified in the crevice region and was more prominent near the bottom of the crevice.

Crevice microstructure at ~0.05 in. below the TTS of Tube R21 C36 HL is shown in Figure 3.73. The tube sheet corrosion products exhibited a distinctly layered structure from the tube sheet to the porous deposit. Energy-dispersive x-ray spectroscopy analysis indicated the dark bands within the tube sheet corrosion product layer were composed of Fe and Cl while the lighter bands were rich in Fe with trace amounts of Si, Cr, Mn, and Ni in some layers. The elements identified in the porous deposit were Fe, Ni, Cr, P, Si, Ca, Al, and Mn. Iron was the major element observed in the deposit and the relative concentrations of the other elements varied from one region to another. Significant levels of P were seen in most of the EDS spectra which suggests $FePO_4$ may be the important component of the deposit since no evidence of Na was found in the spectra.

Tube sheet corrosion near the TTS of Tube R22 C38 HL was similar to that found on Tube R21 C36 HL as shown by the longitudinal metallographic section in Figure 3.74. The thickness of the tube sheet corrosion product layer decreased rapidly with distance within the crevice. Layers or bands composed of Fe and Cl were again observed within the Fe-rich oxide corrosion product layers. The Fe/Cl layers dissipated with depth within the crevice and were not observed near the bottom of the section examined (~0.6 in. below TTS). The thin corrosion product layer adjacent to the tube surface was found to be rich in Cr compared to the metal matrix and also contained small amounts of Si, P, S, and Cl. The porous crevice deposit at the TTS was similar in appearance to that seen for Tube R21 C36 HL. However, the microstructure changed with increasing depth within the crevice and its appearance resembled that of the compact cold leg sludge as illustrated in Figure 3.75. Elemental analysis by EDS indicated similar particle and matrix compositions as previously found in the cold leg sludge sample (i.e., particles rich in Fe or Fe-P embedded in a $NaFePO_4$ matrix). This suggests that the original phosphate sludge pile was completely removed from this area of the hot leg region during sludge lancing operations.

The crevice region of Tube R21 C36 HL at ~2.5 in. below the TTS was only partially filled with corrosion products and deposits. Most of the crevice circumference contained thin deposits near the tube and tube sheet surfaces with a few areas with heaver deposits. An electron micrograph showing an area with thicker deposits is presented in Figure 3.76. Tube sheet corrosion was quite light (<80 μm) but was not as uniform as observed at other axial locations. The thin oxide layer adjacent to the tube sheet was Fe-rich with trace amounts of Si, P, S, Cr, Ni, and Mn. No evidence of impurity concentration at the metal interface was observed. The composition of the crevice deposits suggests $NaFePO_4$ and iron oxide were the primary phases present, but the microstructures were not similar to the cold leg phosphate sludge. Deposits

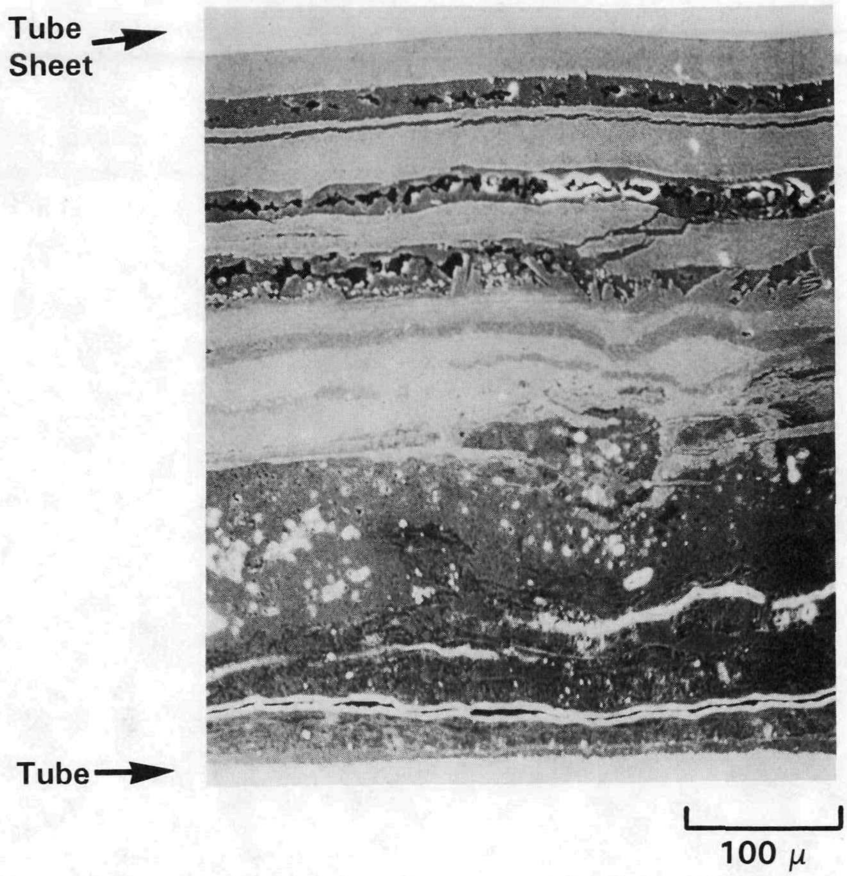


FIGURE 3.73. Microstructure of Crevice Deposits and Corrosion Products from Hot Leg Tube/Tube Sheet Specimen R21 C36 (~0.05 in. below TTS)

adjacent to the tube surface were found to contain Ni, Cr, P, and Fe as the major elements with trace amounts of Cu, Zn, and Si in some spectra.

Additional information on the crevice deposits at 2.5 to 3.25 in. below the TTS were obtained by SEM/EDS examination of the OD surface of Tube R22 C38 HL. Energy-dispersive x-ray spectroscopy analysis revealed significant concentrations of Na, Al, Si, P, and Cl in addition to Fe, Ni, and Cr. Iron- and nickel-rich deposits with a wide variety of compositions were observed in selected areas. Identification of specific phase compositions was difficult because of beam spreading and overlapping phases. However, some EDS spectra consistent with iron oxides or $NaFePO_4$ were observed. It was also noted that Si and Al appeared to be associated with Ni although the relative concentrations varied widely. Chlorine was observed in most of the spectra examined with very high concentrations in some areas of the sample surface. These regions of high Cl concentration contained a glassy-appearing phase on the surface in which Na and Cl were the major elements present. Sodium chloride was identified by x-ray diffraction to be a major phase within the crevice deposits, which is consistent with the EDS analysis. The absence of NaCl in

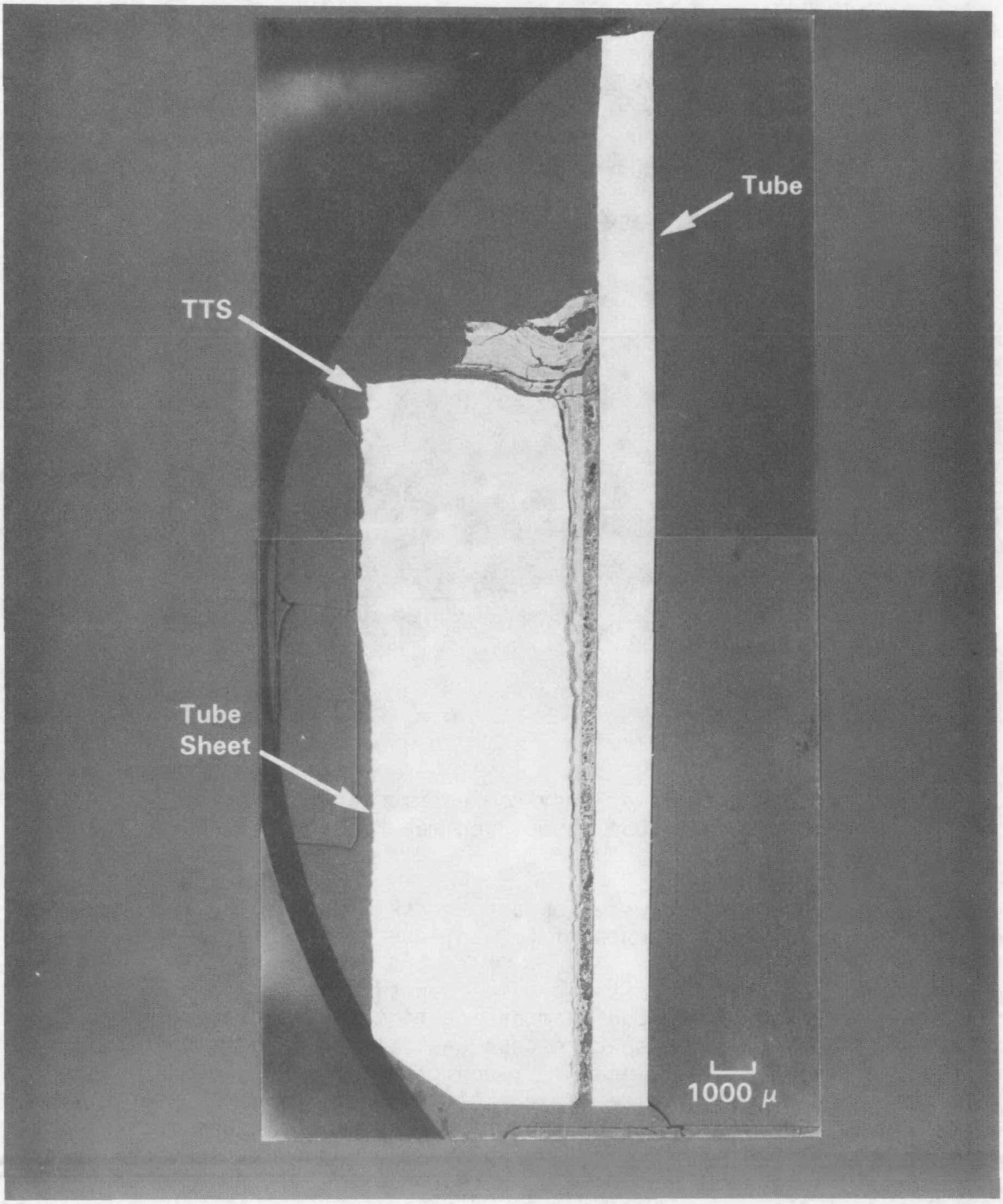


FIGURE 3.74. View of Longitudinal Metallographic Section Through the TTS of Hot Leg Tube/Tube Sheet Specimen R22 C38

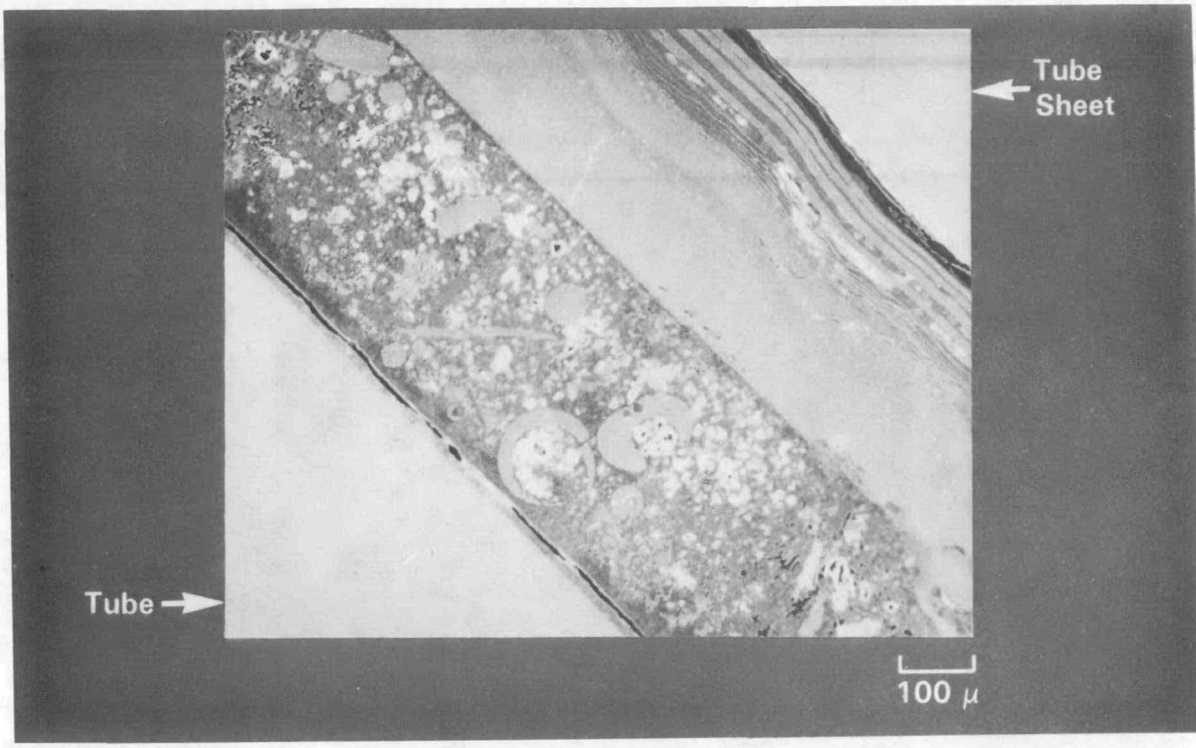


FIGURE 3.75. Microstructure of Crevice Deposits and Corrosion Products from Hot Leg Tube/Tube Sheet Specimen R22 C38 (~0.1 in. below TTS)

the metallographic section from Tube R21 C36 HL can be attributed to sample preparation whereby the NaCl deposits dissolved into the epoxy resin used to mount the sample.

The crevice region 16 in. below the TTS of Tube R21 C36 HL was filled with scales/deposits as shown in Figure 3.77. Tube sheet corrosion was very light and uniform at this axial location as evidenced by the thin oxide layer at the tube sheet surface. The major elements identified by EDS in the porous deposit were Fe, P, Na, Cl, and Ca. Iron, phosphorus, and sodium were the major elements in most spectra although significant concentrations of chlorine and calcium were also present and trace amounts of sulfur, potassium, manganese, and silicon were observed in some spectra. The corrosion layer adjacent to the tube surface contained significant concentrations of Si, P, K, Ca, and Cu in addition to the metal matrix elements Ni, Cr, and Fe. The concentrations of Si, K, and Cu were greater than were observed in the porous deposit which suggests these elements are being concentrated at the tube surface.

To determine if significant degradation was occuring at the interface between the bottom of the tube sheet and the Inconel cladding, a longitudinal metallographic section containing the tube and tube sheet was prepared from the end of Tube R22 C38 HL. Examination of the polished specimen showed no service-induced degradation at the tube sheet/cladding interface. Some manufacturing defects such as porosity and thermal-induced cracking was seen near

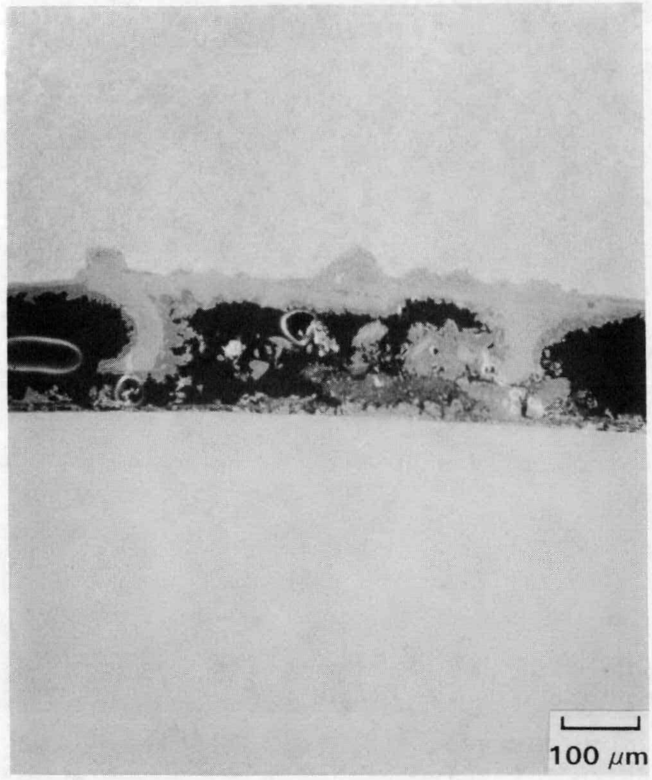


FIGURE 3.76. Microstructure of Crevice Deposits and Corrosion Products from Hot Leg Tube/Tube Sheet Specimen R21 C36 (~2.8 in. below TTS)

the interface as shown in Figure 3.78. However, no evidence of corrosion or in-service degradation to the tube sheet or cladding was found.

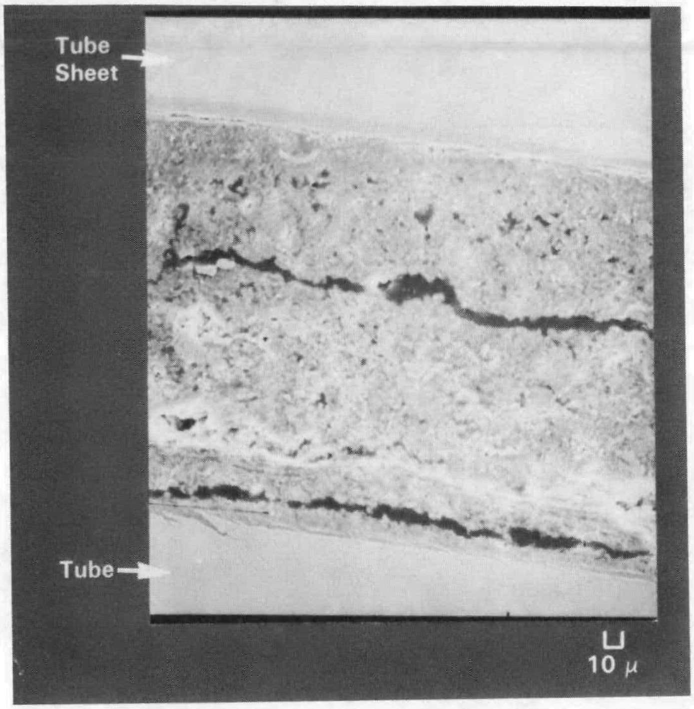


FIGURE 3.77. Microstructure of Crevice Deposits and Corrosion Products from Hot Leg Tube/Tube Sheet Specimen R21 C36 (~16 in. below TTS)

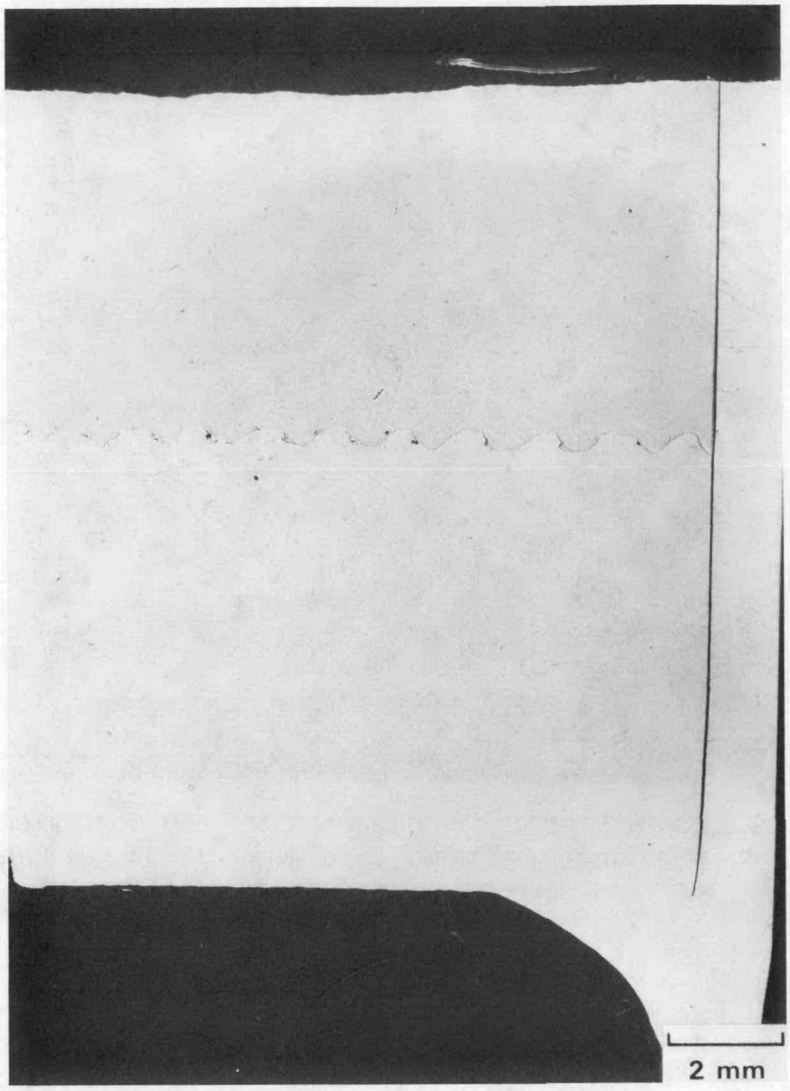


FIGURE 3.78. Optical Micrograph Showing the Interface Between the Tube Sheet and Cladding at the Bottom of Specimen R22 C38 HL

4.0 NDE VALIDATION

There are two aspects to the validation (or estimation of the reliability) of the NDE inspection of steam generator tubing. The first is the issue of detection, the ability of NDE to determine if a wall loss defect is present. Since not all defects threaten the integrity of a tube, the second issue is the ability of NDE to accurately characterize and size a defect, so that tubes with critical defects are plugged, but those with non-critical defects are allowed to remain in operation. Since the correct matching of NDE indications and actual defects is necessary to obtain accurate detection and sizing reliability estimates, Section 4.1 describes the criteria for matching and summarizes the results. Section 4.2 describes the detection analyses results, Section 4.3 gives the results of the sizing analyses, and Section 4.4 presents an analysis of factors that influence inspection reliability.

4.1 DEFECT - NDE INDICATION MATCHING

The validation of the NDE inspection results requires that the information from the visual and metallographic examinations of the specimens be properly matched in order to develop estimates of the POD and sizing accuracy. The reported location of an indication has to be close to the physical location of the defect within the specimen.

An inspected unit of material can always be placed into one of the following four categories:

- true positive (a defect indication was reported and there was an actual defect present)
- false positive (a defect indication was reported and there was no defect)
- false negative (no defect was reported and an actual defect was present)
- true negative (no defect was reported and no defect was present).

Data in these four categories can be used to quantify detection performance. Since the first three outcomes listed have specific locations associated with either a reported or actual defect, they are easily determined. The extent of a defected region can vary both axially and circumferentially. The degraded region ranged from a single pit to generalized wastage and pitting covering up to a few inches axially and around a large fraction of the tube circumference. Furthermore, the EC/bobbin coil inspection cannot determine the circumferential extent of wall loss. Therefore, it is difficult to determine the minimum size or length of a tube needed to determine the number of true negatives. This, however, does not present a major difficulty, because the safety issue involved in NDE reliability does not depend on the amount of nondefective material correctly passed, but whether the defective material is identified. Consequently, for this analysis, only the first three outcomes will be dealt with here: true and false positives and false negatives.

As part of the inspection, the teams were required to give a specific location for a reported defect in inches from the nearest reference point (tube sheet, support plate). This location is based on calculations made from the channel traces assuming the probe is moving at constant speed in the tube. However, the probe does not always move at constant speed due to constrictions in the tube, and the cable can twist and loop. Consequently, there are errors in the reported locations of the NDE indications. Similarly, there are errors in the reported location of actual defects because of measurement errors during the tube cutting and removal process and further sectioning for visual and metallographic examination. Therefore, as in the Task 9 Report (Doctor et al. 1987b), a defect reported within 3 in. of an actual defect in a specimen is considered a true positive call. An exception is corrosion at TSP intersections where EC calls above or below the intersections were considered separately. Also, the origin of the reported defect had to agree with the origin of the actual defect before the location was verified.

Table 4.1 gives a summary of the numbers of true positive, false positive, and false negative calls from the visual examination data for each of the five DAARR teams (A through E), the two baseline inspection teams (X, Y), and the five AATRR teams (U, UU, V, VV, W). These calls are listed separately for the three regions of the generator (TTS, TSP, U-bend). The true positives and false negatives for the OD defects are listed by the amount of wall loss based on a visual examination (light = <20%, medium = 20-40%, and heavy = >40%). Since the depth of cracks cannot be determined visually, the ID cracks are listed separately. However, the two OD cracks that were found above the hot leg TTS are included in the medium and heavy categories because they were associated with pitting and wastage.

For the baseline and DAARR teams the number of specimens inspected ranged between 481 and 497. The number of specimens inspected by the AATRR teams ranged from 22 for Team W to 392 for Team V. For the DAARR and the baseline teams, the number of specimens with actual defects ranged from 312 to 324. The range was from 20 to 245 for the AATRR teams. Because of the small number of specimens examined by the AATRR (with the exception of Team V), a direct comparison of the numbers of true and false positives and false negatives with the baseline and DAARR teams is not appropriate.

For the TSP and U-bend regions, there may be more than one number reported for a team, with the second number in parentheses. For the TSP region, the first number is the number of reported and/or actual defects at the support plate intersection, which is the primary location for wall loss defects to occur. For the U-bend region, the first number is the number of reported and/or actual defects at the AVB contact points. The number in parentheses for both regions is the number of reported and/or actual defects at other locations within a specimen.

Several patterns emerge from a study of Table 4.1. There is remarkable consistency among the two baseline inspection and five DAARR (multifrequency EC/bobbin coil equipment) teams in terms of the numbers of true and false positives and false negatives for the three areas of the generator. At the TTS, where most of the defects occur, the largest number of true positives occur in the heavy size category and the largest number of false negatives are in the light size category. There was only one false positive reported by the

TABLE 4.1. Summary Classification of Individual Team NDE Inspection Results by Region of the Generator

Data Acquisition and Analysis Round Robin

	Type of Defect[a]	Team A	B	C	D	E
Number of specimens		484	488	494	487	481
Number of wall loss defects		312	317	324	316	314
TTS						
True positives	L	10	4	13	26	9
	M	38	31	41	43	42
	H	49	45	48	50	50
	K	0	0	0	0	0
False positives		0	0	0	1	0
False negatives	L	110	116	107	94	110
	M	17	25	15	13	14
	H	2	6	3	1	1
	K	0	0	0	0	0
TSP						
True positives	L	1	0	0	0	0
	M	0	0	0	0	0
	H	0(1)	0(1)	0(1)	0(1)	0(1)
	K	0	0	0	0	0
False positives		0(4)	0(2)	1(1)	0(1)	0
False negatives	L	65(1)	69(1)	75(1)	68(1)	67(1)
	M	1	1	1	1	1
	H	0(1)	0(1)	0(1)	0(1)	0(1)
	K	1	2	3	2	2
U-bend						
True positives	L	0	0	0	0	0
	M	0	0	0	0	0
	H	0(2)	0(2)	0(1)	0(2)	0(2)
	K	0	0	0	0	0
False positives		0	0	0	0	0
False negatives	L	12	12	12	12	12
	M	1	1	1	1	1
	H	0	0	0(1)	0	0
	K	0	0	0	0	0

TABLE 4.1. (contd)

Baseline ĒC Inspections

	Type of Defect[(a)]	Team X	Team Y
Number of specimens		497	488
Number of wall loss defects		319	316
TTS			
True positives	L	7	34
	M	35	45
	H	47	46
	K	0	0
False positives		0	0
False negatives	L	112	86
	M	21	11
	H	4	4
	K	0	0
TSP			
True positives	L	0	0
	M	0	0
	H	0(2)	0(1)
	K	0	0
False positives		0(7)	0(9)
False negatives	L	72(1)	70
	M	1	1
	H	0	0
	K	2	3
U-bend			
True positives	L	0	0
	M	0	0
	H	0(2)	0(2)
	K	0	0
False positives		0(8)	0(14)
False negatives	L	12	12
	M	1	1
	H	0	0
	K	0	0

TABLE 4.1. (contd)

Advanced/Alternate Techniques Round Robin

	Type of Defect[a]	Team U	Team UU	Team V	Team VV	Team W
Number of specimens		128	172	392	172	22
Number of wall loss defects		70	131	245	131	20
TTS						
True positives	L	31	9	25	11	0
	M	12	15	48	17	9
	H	8	26	51	24	7
	K	0	0	0	0	0
False positives		0	4	2	1	0
False negatives	L	7	72	63	70	0
	M	4	6	8	4	2
	H	0	3	0	5	2
	K	0	0	0	0	0
TSP						
True positives	L	0	(b)	0	(b)	(c)
	M	0	(b)	0	(b)	(c)
	H	0	(b)	0	(b)	(c)
	K	0	(b)	0	(b)	(c)
False positives		0(3)	(b)	5(12)	(b)	(c)
False negatives	L	8	(b)	34(1)	(b)	(c)
	M	0	(b)	0	(b)	(c)
	H	0	(b)	0(1)	(b)	(c)
	K	0	(b)	2	(b)	(c)
U-bend						
True positives	L	0	(b)	0	(b)	(c)
	M	0	(b)	0	(b)	(c)
	H	0	(b)	0	(b)	(c)
	K	0	(b)	0	(b)	(c)
False positives		0(3)	(b)	0	(b)	(c)
False negatives	L	0	(b)	11	(b)	(c)
	M	0	(b)	1	(b)	(c)
	H	0	(b)	0	(b)	(c)
	K	0	(b)	0	(b)	(c)

(a) L = light, M = medium, H = heavy, K = crack.
(b) Not analyzed because the extent of the inspection was uncertain at the time.
(c) Not inspected.

baseline and DAARR teams. There were 13 heavy wall-loss defects that were missed by at least one of the teams. Seven of these were single team misses; five specimens were missed by two teams, and one was missed by four teams.

In the support plate region there were numerous false negative calls of light pitting and wastage at the support plate intersections. The NDE inspections were not able to detect these defects because of the signal distortion caused by the dented tube at these intersections. The one deep defect with false negative calls was a pit that was located ~0.2 in. above the support plate intersection. It was missed by all DAARR inspection teams. In addition, there were several cracks at the support plate intersections that were missed by all teams that inspected that section of tube (see Table 4.2).

There were numerous false positive calls in the support plate region, only one of which was at a support plate intersection. The two baseline teams called the most false negatives, 7 and 9 for Teams X and Y, respectively. The majority of the false negatives were reported as small defects (<20%).

There were very few defects found in the U-bend region that were inspected by EC. With the exception of the two grinder marks found by all but one team, the defects were mostly light fretting wastage at the AVB contact points. Since they were the earliest inspections, Teams X and Y had a tendency to report the small volume indications in the U-bend as small defects that later proved to be interruptions in the Cu-rich deposits on the tubes. All of the Team Y indications called were less than 25% wall loss. Team X's indications, on the other hand, were sized larger; the largest indication was reported as 55% wall loss. None of the false positives were in the same specimens.

In general, the conclusions that can be drawn from the AATRR results are limited, with the exception of Team V, since so few of the specimens were inspected by these teams. Team W did not inspect beyond the TTS. For Teams UU

TABLE 4.2. Summary of EC Inspection Results for Specimens with ID Cracks at Dented TSP Intersections

Specimen No.	Through-Wall, %	No. of EC Inspections	Reported Defects
856	27	6	0
851	36	5	0
877	(a)	2	0
935	64	2	0

(a) No metallographic data; visual inspection identified cracking.

and VV, the extent of the individual inspections was not given, so the decision was to report information only for the TTS. Team V's results are similar to those of the baseline and DAARR teams. However, they reported fourteen 50% through-wall ID defects outside support plate intersections that turned out to be false positives.

4.2 PROBABILITY OF DETECTION

The first step in determining the reliability of the NDE inspections is to estimate the probability of detecting defects. Since the chance of detecting a defect usually increases as the depth of the defect increases (as seen in Table 4.1), the POD is usually expressed as a curve, which is a function of defect size.

The POD estimate (f) for a particular size group (z) is defined as:

$$f(z) = \frac{NTP(z)}{N(z)}, \qquad (4)$$

where N(z) is the number of defects in Group z and NTP(z) is the number of true positive calls in Group z.

There were two types of wall loss sizing information obtained during the validation work: a visual estimate and metallographic sectioning. (Details are given in Section 3.) Differences in wall loss resolution between visual estimates and metallographic measurements precluded combining the two types of information to estimate a POD curve. Therefore, separate POD calculations were made for the visually estimated wall loss (light, medium, and heavy) and the wall loss obtained from metallographic sectioning. The POD calculations for the visual wall loss data can be obtained from the data in Table 4.1. For example, the value of NTP for the light wall loss category for Team A in the TTS region is 10, and the value of N is 120 (the sum of the number of true positive and false negative calls).

Figures 4.1 through 4.7 show the visual data POD curves for the DAARR Teams A - E and the baseline Teams X and Y, respectively. There are two curves plotted in each figure; the solid line is the POD curve for the TTS region, and the dashed line is the one for all regions combined, representing a composite POD curve based on the mix of defects found in this generator. Because most of the defects found in this generator were located in the TTS region, the two curves are very close. A comparison of the POD curves for the DAARR and baseline teams shows that the shape of the curves are similar: the curves increase with increasing wall loss, and the slope between the light- and medium-size categories is larger than the slope from the medium- to heavy-size categories. However, the greater the slope differences between the two curve segments, the better the teams detection performance. Team Y's POD curve shows the sharpest difference in slope of the teams, but the PODs for Teams A, C, D, and E nearly overlay it. Teams B and X have POD curves that are close to a straight line and overlay each other. Figure 4.8 shows the median POD curve

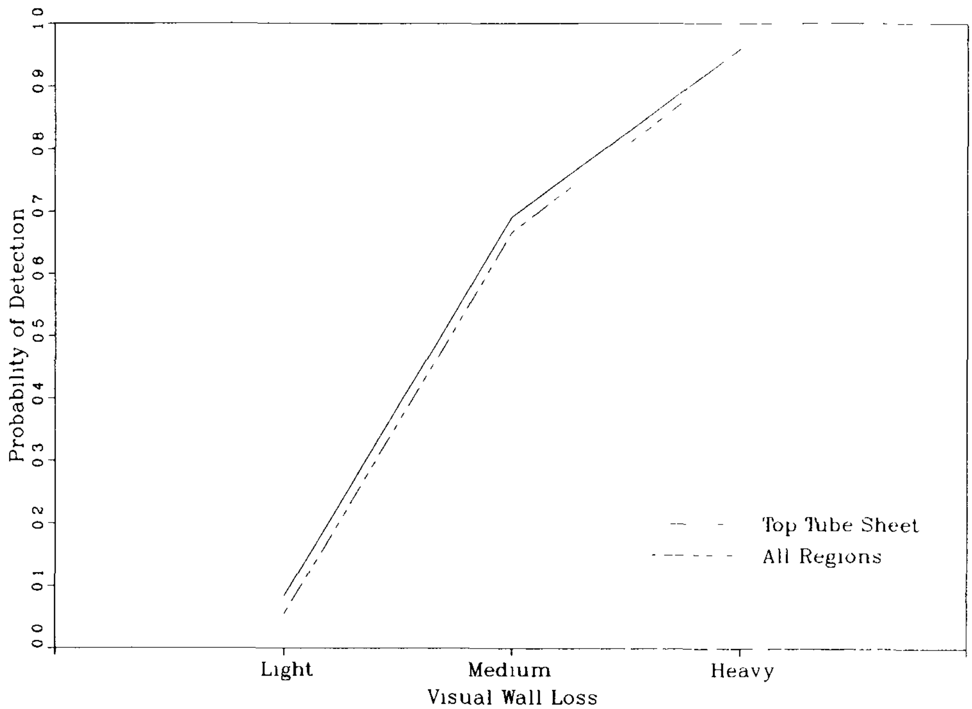


FIGURE 4.1. POD Curve for Team A Based on Visual Wall Loss Data

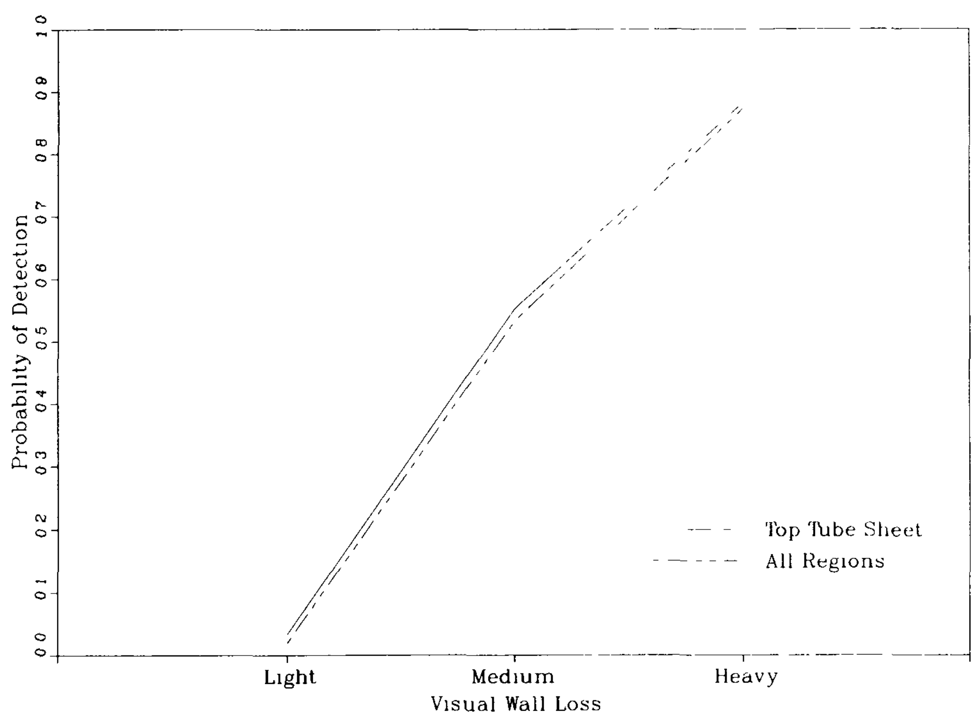


FIGURE 4.2. POD Curve for Team B Based on Visual Wall Loss Data

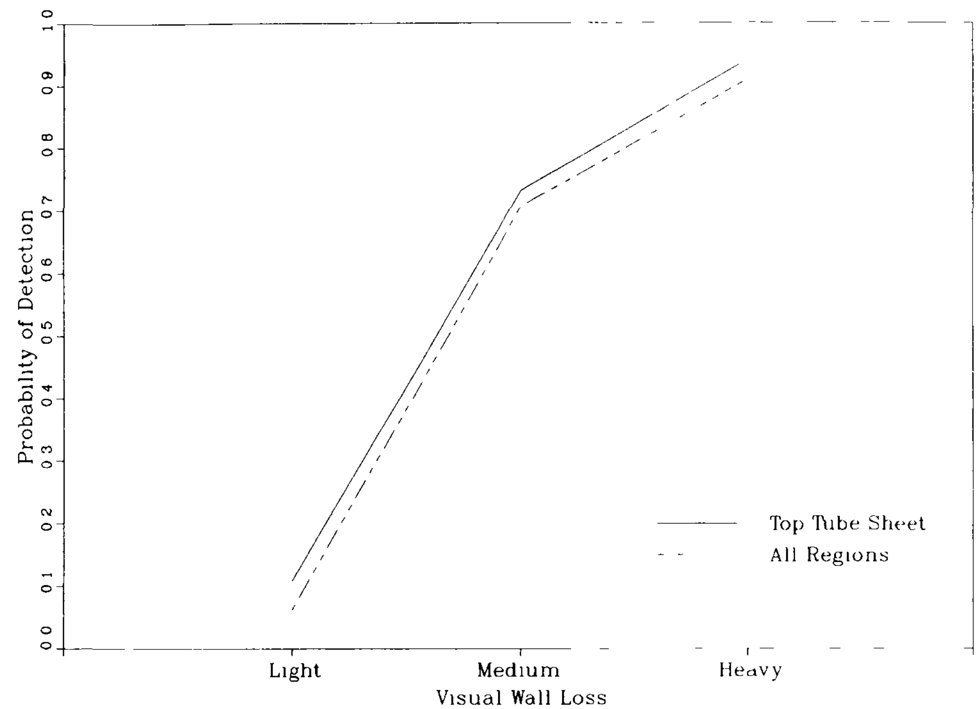


FIGURE 4.3. POD Curve for Team C Based on Visual Wall Loss Data

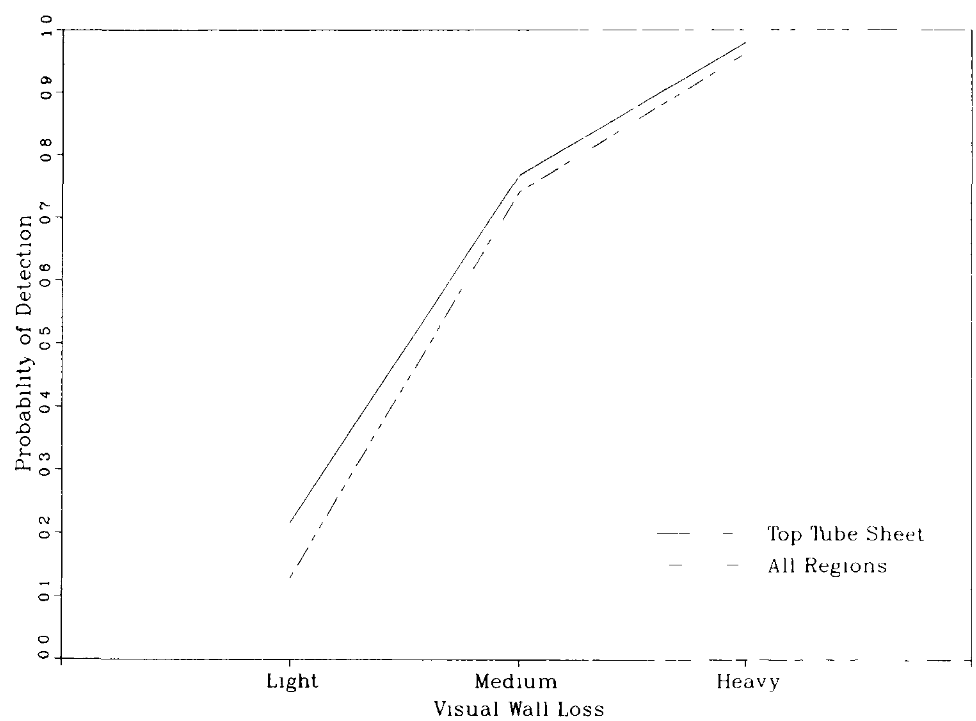


FIGURE 4.4. POD Curve for Team D Based on Visual Wall Loss Data

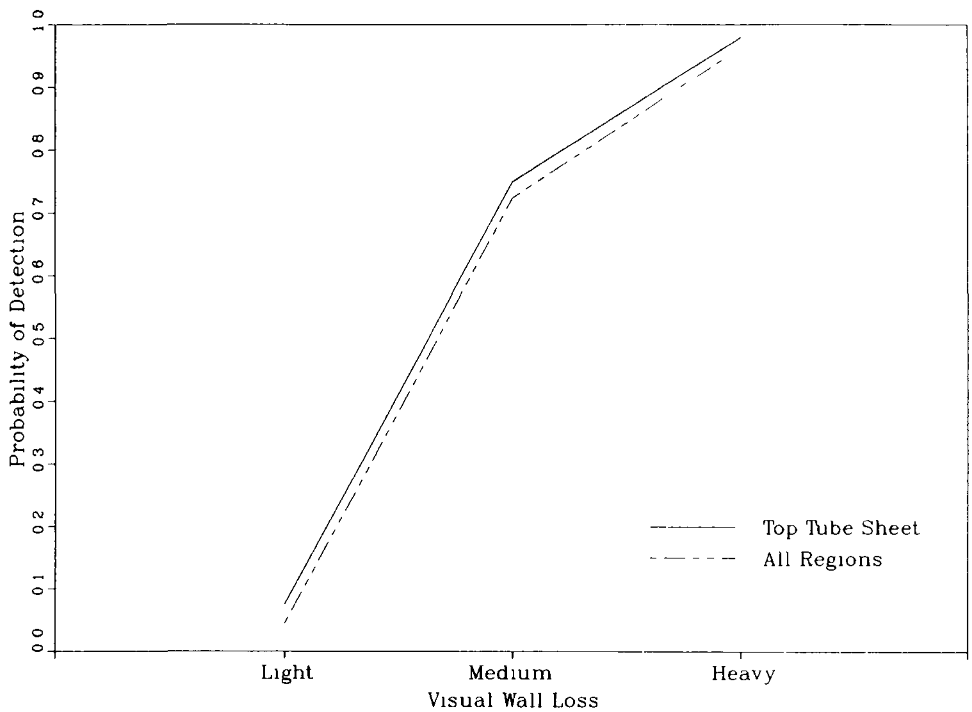


FIGURE 4.5. POD Curve for Team E Based on Visual Wall Loss Data

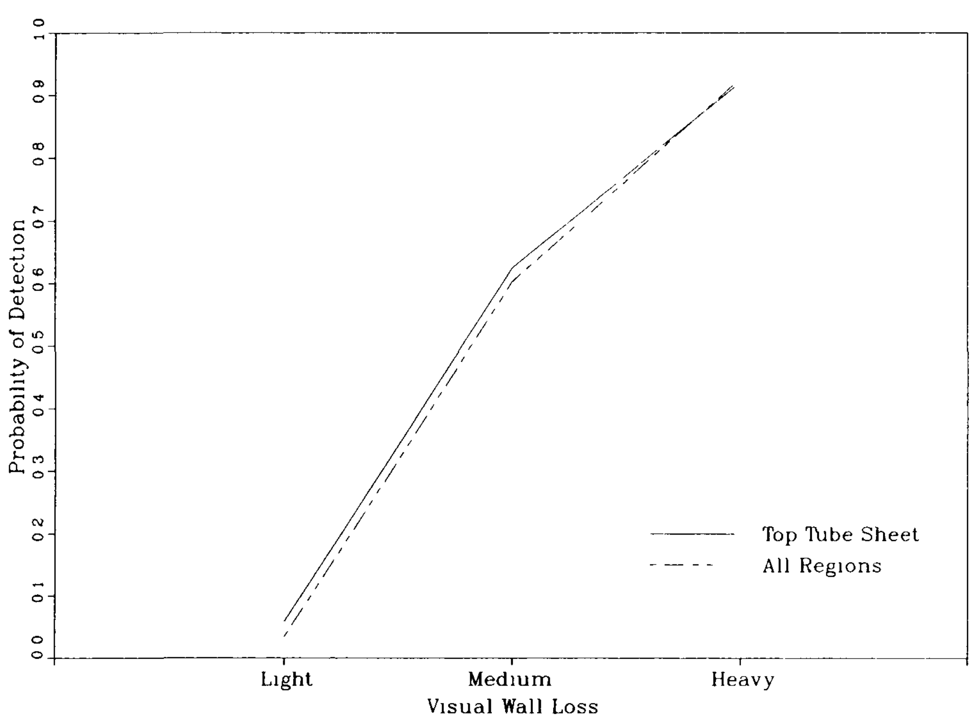


FIGURE 4.6. POD Curve for Team X Based on Visual Wall Loss Data

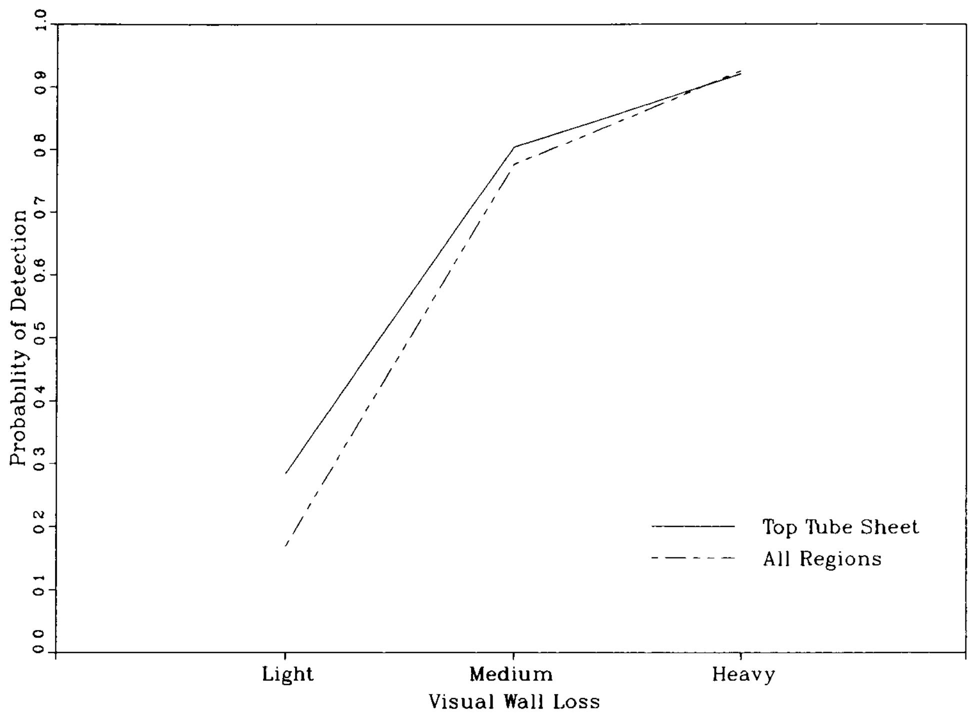


FIGURE 4.7. POD Curve for Team Y Based on Visual Wall Loss Data

for the DAARR and baseline teams. It was estimated by taking the median (middle value) of the POD estimates for the seven teams for each size category.

The only AATRR team for which a POD curve was estimated was Team V (Figure 4.9). It has the largest POD value for the medium category and approaches 1.0 for the heavy category.

Table 4.3 shows the total number of defects (true positives and false negatives) in each size category from the visual examination data. The number of defects in the light wall-loss size category for the DAARR and baseline teams is nearly four times the number of the medium and heavy wall-loss categories. The numbers of defects in the medium and heavy categories are too small to test the differences in POD estimates statistically among the various teams with any degree of confidence, so the differences discussed in the previous paragraph are based on visual inspection of the POD curves.

Although the metallographic data base is less extensive than the visual examination data base, one may estimate a more detailed POD curve from the metallography data. Table 4.3 also gives the numbers of defects in increments of 10% wall loss for the metallographic data. The numbers of defects in each decade is quite small. There is no defect with wall loss >90% listed, even though there was one through-wall hole found; since light could be seen through the hole, there was no need to do metallographic sectioning to confirm the depth.

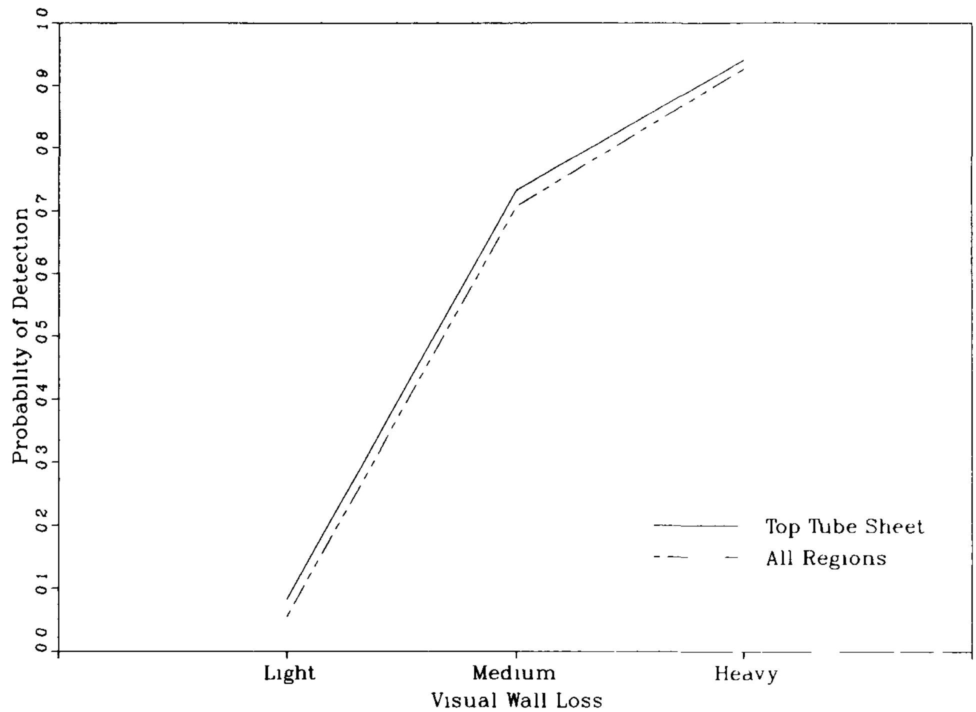


FIGURE 4.8. Median POD Curve for DAARR and Baseline Teams Based on Visual Wall Loss Data

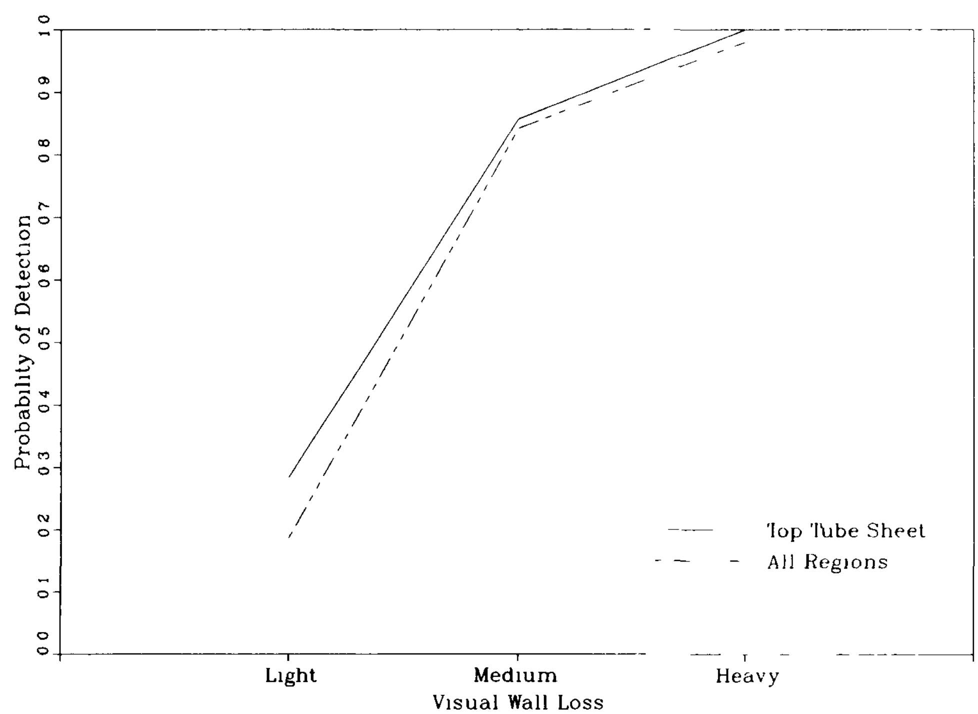


FIGURE 4.9. POD Curve for Team V Based on Visual Wall Loss Data

TABLE 4.3. Numbers of Defects in Each Size Category for Each Team from Visual and Metallographic Examinations

Visual Examination

Size Category	Team A	B	C	D	E	X	Y	U	UU	V	VV	W
L	199	202	208	201	199	204	202	46	81	134	160	0
M	57	58	58	58	58	58	58	16	21	57	22	11
H	55	55	55	55	55	55	53	8	29	52	32	9

Metallographic Examination

Wall Loss, %	Team A	B	C	D	E	X	Y	U	UU	V	VV	W
<10	18	19	19	19	19	22	22	6	11	17	20	0
10-20	17	17	17	17	17	17	17	6	9	15	11	0
20-30	7	7	7	7	7	7	6	1	4	7	6	0
30-40	13	14	14	14	14	13	14	3	5	14	6	3
40-50	12	12	12	12	12	12	12	6	3	12	3	2
50-60	12	12	12	12	12	12	12	4	5	12	6	4
60-70	19	19	19	19	19	20	19	1	10	18	13	7
70-80	7	7	7	7	7	7	7	0	4	6	5	1
80-90	1	1	1	1	1	1	1	0	1	1	2	0
90-100	0	0	0	0	0	0	0	0	0	0	0	0

Plots of the POD curves for the DAARR and baseline teams are given in Figures 4.10 - 4.16. Separate POD curves were calculated for the TTS and all regions combined. There is more divergence between the two curves for the metallographic data because of the very small numbers of defects in some size categories. The oscillatory behavior for some of the teams is also due to the small numbers of defects in some size categories. For example, in the 50% to 60% wall loss category with a total of 12 defects, missing two defects causes the POD estimate to drop from 1.0 to 0.83. The observations that were made on the visual data POD curves were also appropriate for the metallographic data POD curves. The POD curves for Teams A, C, D, E and Y overlap, with Team Y appearing to do better on the smaller defects. The POD curves for Teams B and X overlap. However, the POD for all teams for >50% through-wall defects is greater than 0.8. Figure 4.17 shows the median POD curve for the DAARR and baseline teams. The composite curve is monotone except for a dip in the 50% to 60% wall-loss category, which is likely due to the geometries of some of the defects in that category.

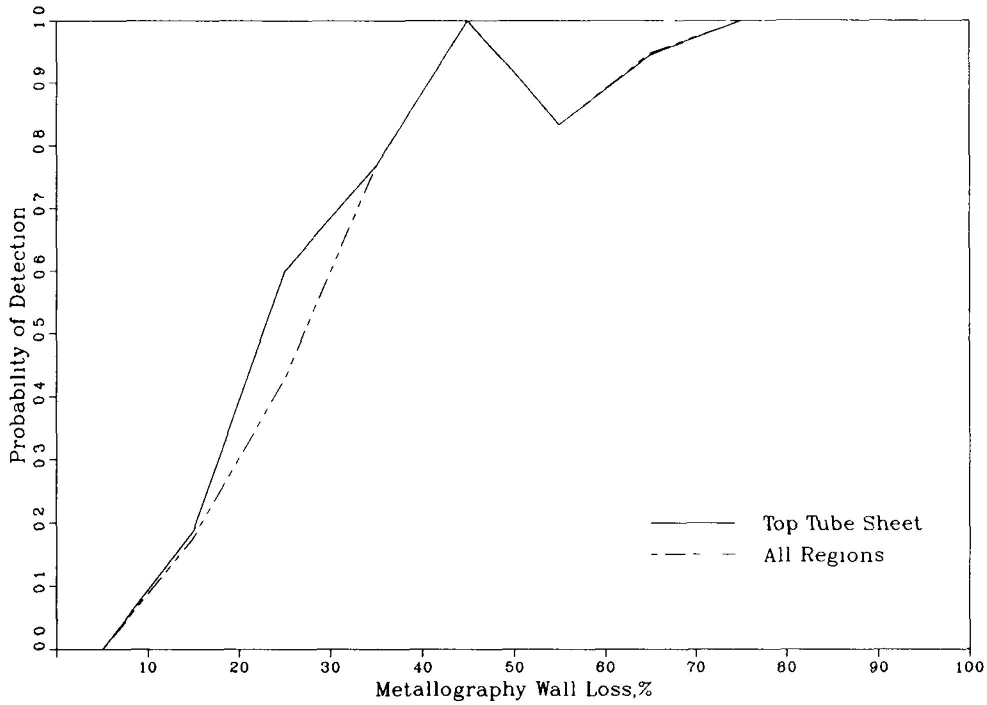


FIGURE 4.10. POD Curve for Team A Based on Metallographic Wall Loss Data

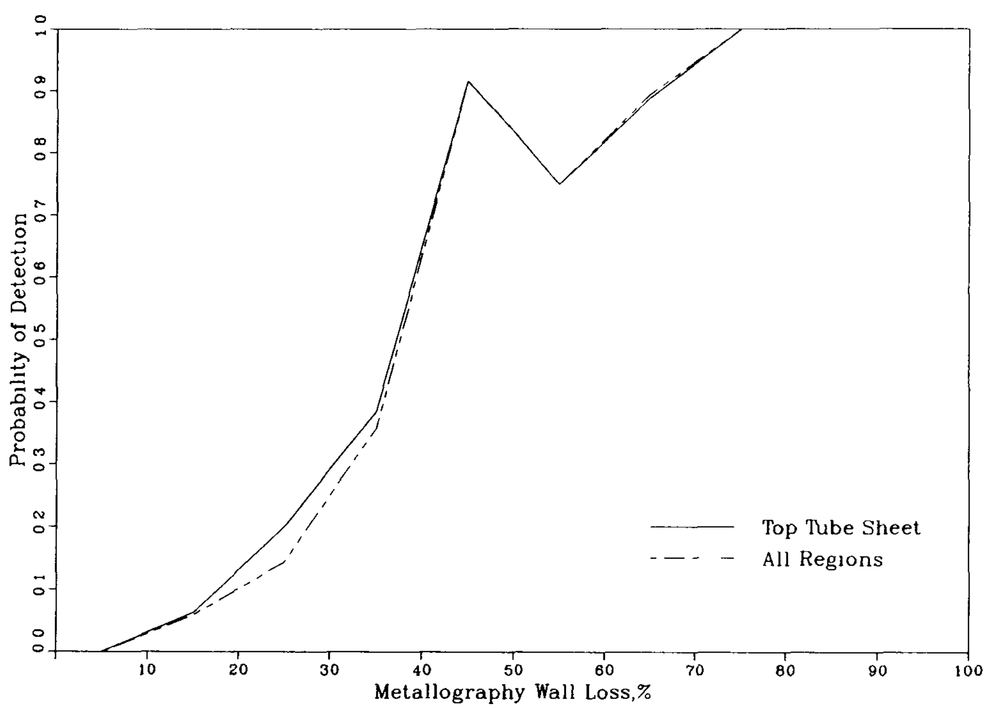


FIGURE 4.11. POD Curve for Team B Based on Metallographic Wall Loss Data

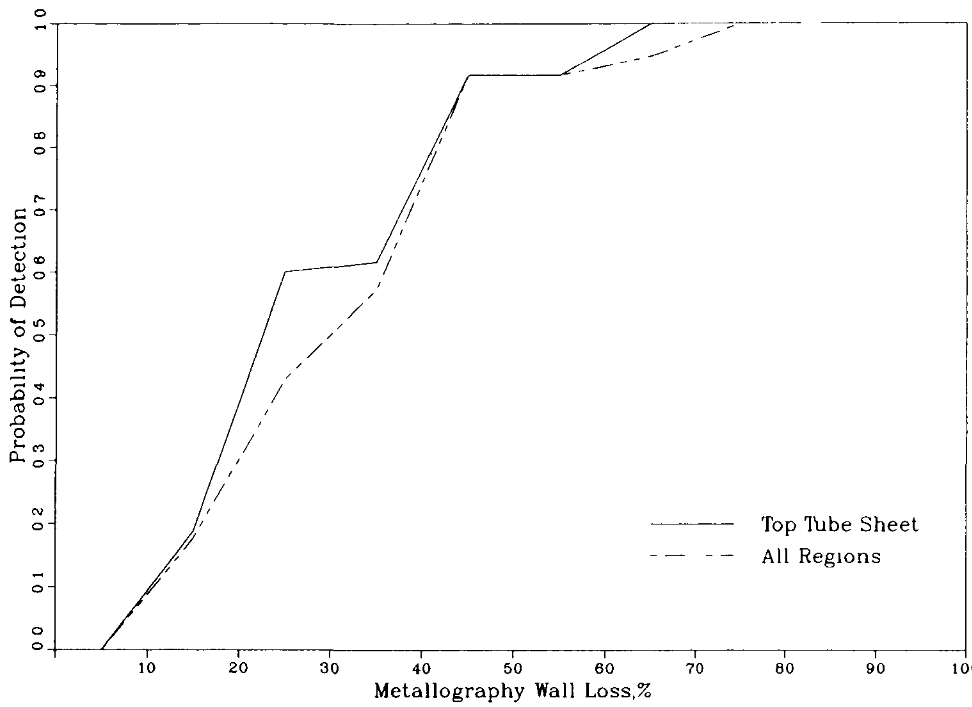


FIGURE 4.12. POD Curve for Team C Based on Metallographic Wall Loss Data

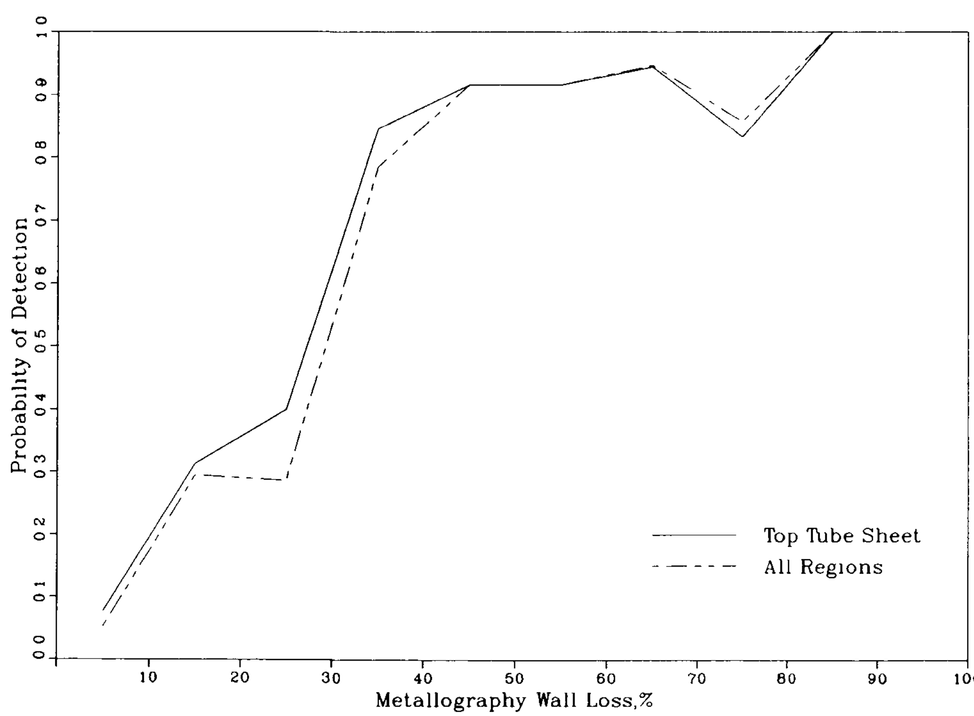


FIGURE 4.13. POD Curve for Team D Based on Metallographic Wall Loss Data

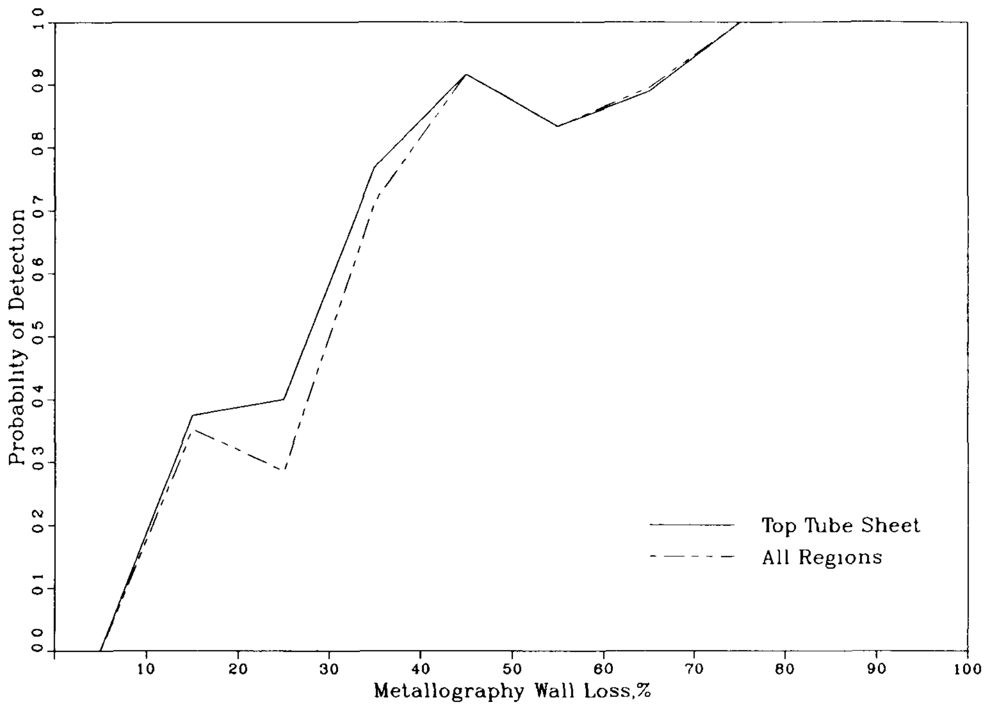


FIGURE 4.14. POD Curve for Team E Based on Metallographic Wall Loss Data

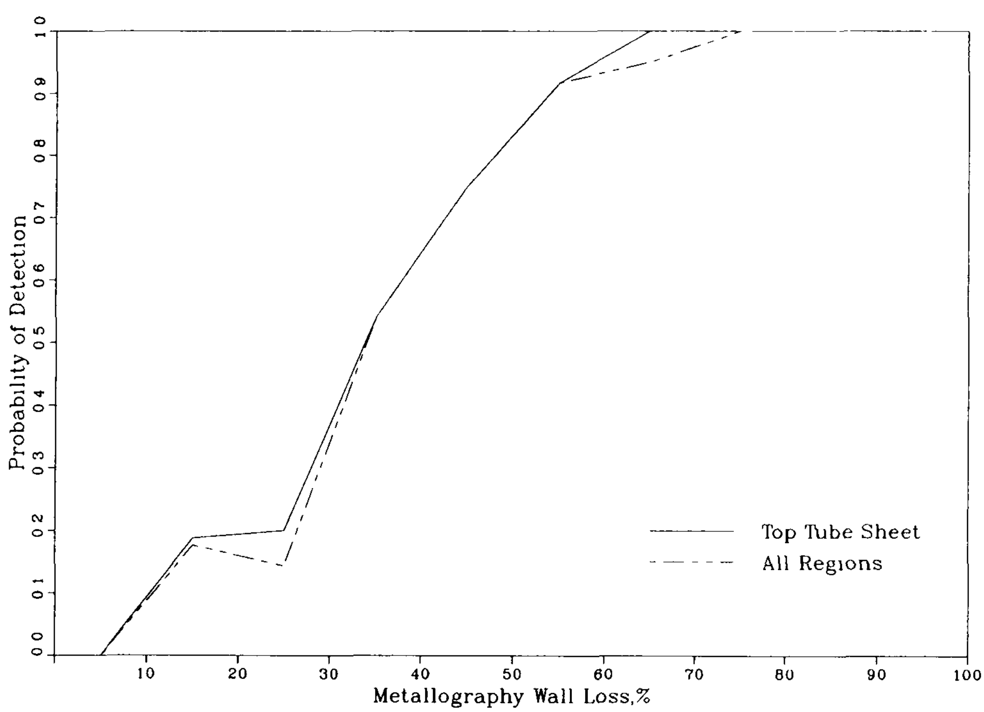


FIGURE 4.15. POD Curve for Team X Based on Metallographic Wall Loss Data

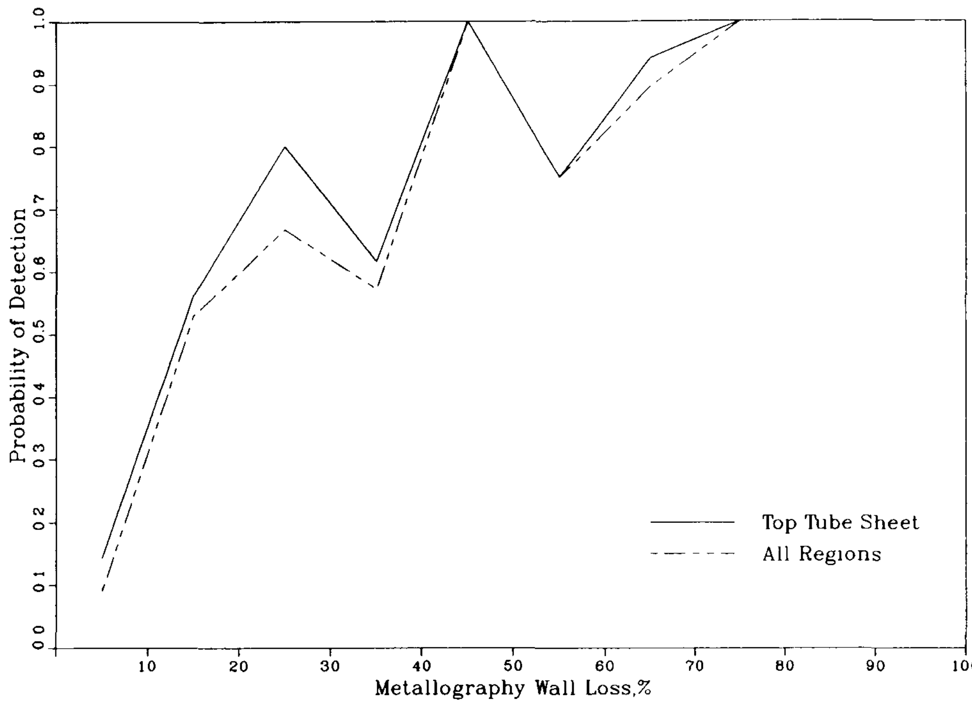


FIGURE 4.16. POD Curve for Team Y Based on Metallographic Wall Loss Data

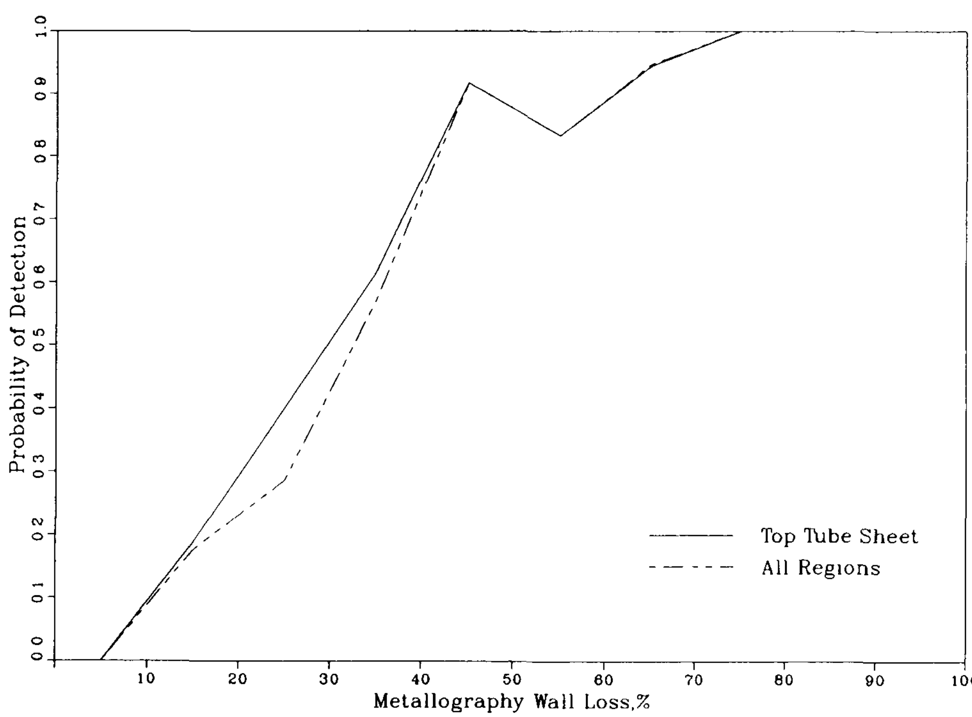


FIGURE 4.17. Median POD Curve for DAARR and Baseline Teams Based on Metallographic Wall Loss Data

Figure 4.18 shows the POD for the metallographic data for Team V. Its comparison to the median POD curve for DAARR and baseline teams shows that it has a convex appearance as opposed to the concave nature of the median curve. For example, the Team V POD for the TTS reaches 0.8 in the 20% to 30% wall loss category compared to 0.4 for the median curve. Interestingly, the POD curve for the TTS for Team Y traces Team V's curve up to 30% wall loss, and from there, the peaks of the Team Y curve trace the Team V curve.

Figure 4.19 gives a plot of the POD performance for the DAARR and baseline teams for each 10% wall loss increment. To estimate the lower bound POD, an approximate 90/90 lower tolerance limit (LTL) was computed (curve in Figure 4.19) for individual team performance over the population of teams from which the DAARR and baseline inspection teams are assumed to be a sample. That is, if each team in this population had inspected the same set of tubes, we can be about 90% confident that about 90% of the individual team POD values would be above this LTL. The dashed segment of the curve indicates that the number of specimens with deep through-wall degradation was inadequate to provide a meaningful estimate of the LTL. Thus, the LTL at 65% wall loss is extended as a conservative approximation of the LTL (i.e., the POD is assumed to either increase or stay the same as wall loss increases).

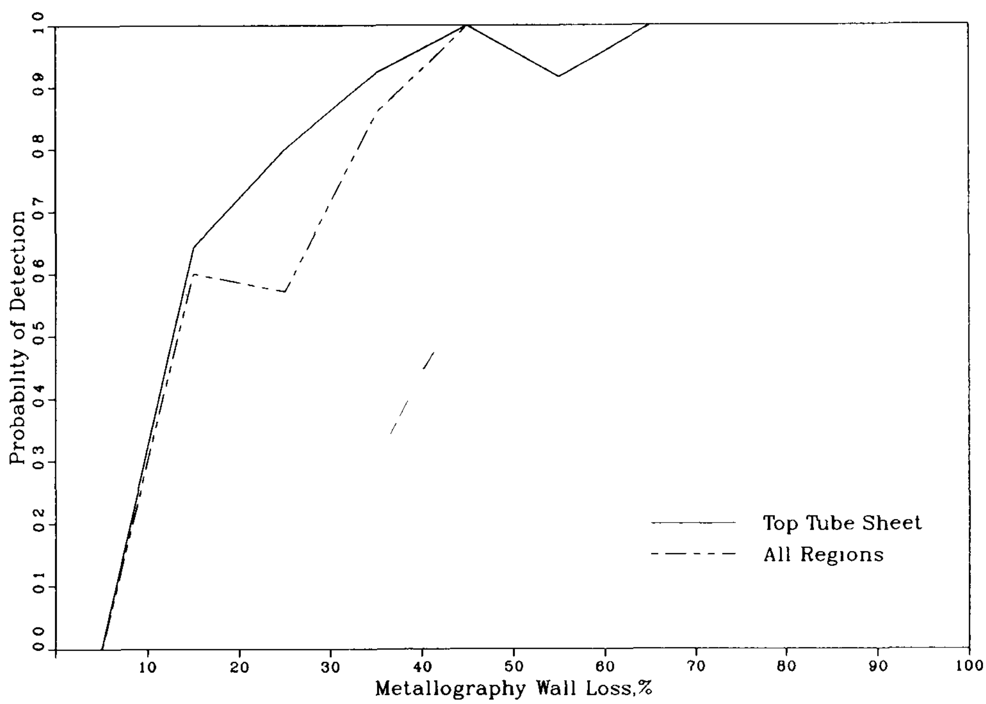


FIGURE 4.18. POD Curve for Team V Based on Metallographic Wall Loss Data

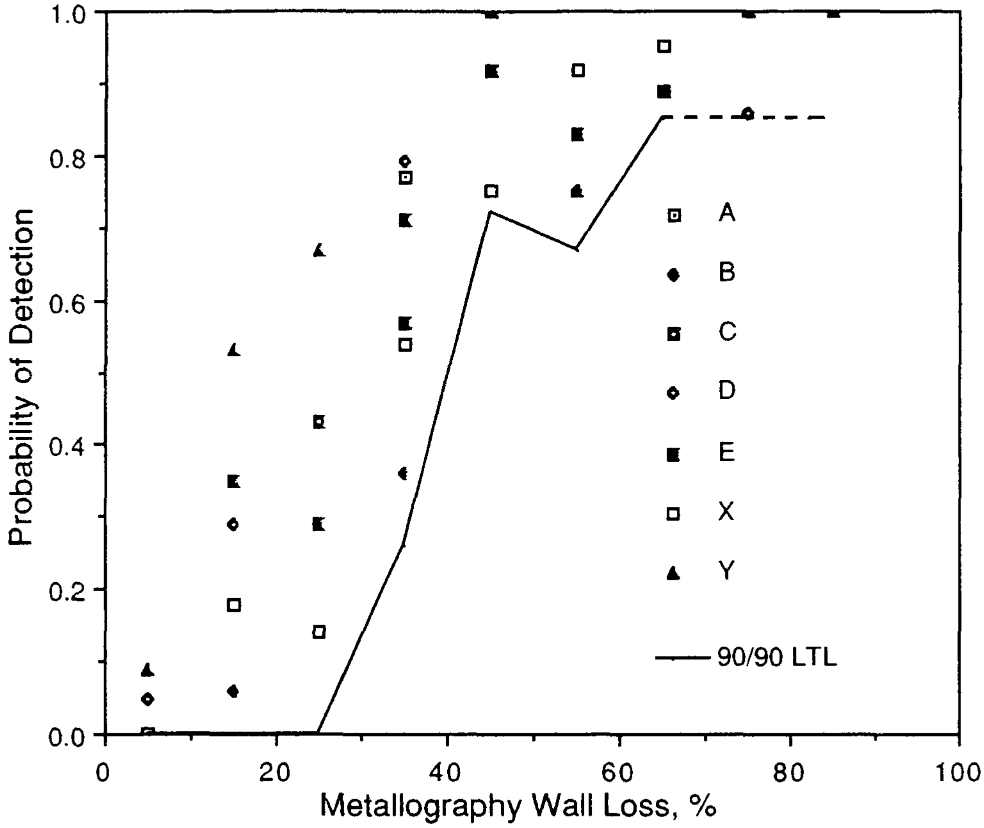


FIGURE 4.19. Individual POD Values and 90/90 LTL for DAARR and Baseline Inspection Teams Based on Metallographic Wall Loss Data

4.3 SIZING ACCURACY

Sizing is the second aspect of reliability of the NDE inspection of steam generator tubing. Figures 4.20 through 4.31 show the estimated wall loss plotted against the measured wall loss from the metallographic examinations for each of the DAARR, baseline and AATRR teams. Although there were very few defects in each size group for the AATRR teams, the plots are included to show the sizing patterns. The estimated depths of the false positive calls is plotted along the Y-axis, and the depths of the false negative calls are plotted along the X-axis. From Table 4.1, there were few false positives and those that were reported tend to be small. However, there were a few large defect exceptions (Team C with an 80% indication and Team V with fourteen 50% through-wall ID calls). As one would expect, most of the false negative calls were for defects with a depth <20%. However, there were some large defects that were missed as discussed in Section 4.2. As will be seen later, the wide

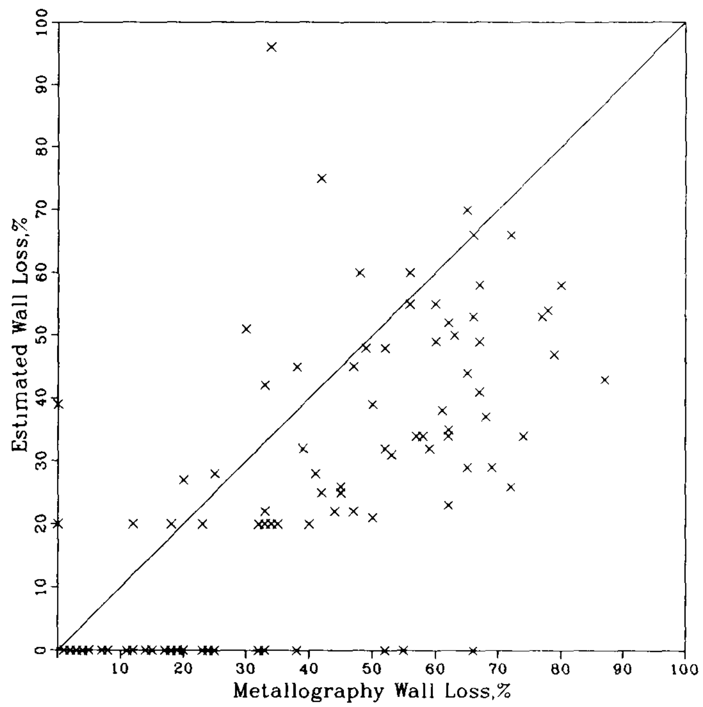


FIGURE 4.20. Plot of Estimated Defect Depth Versus Depth from Metallographic Analysis for Team A

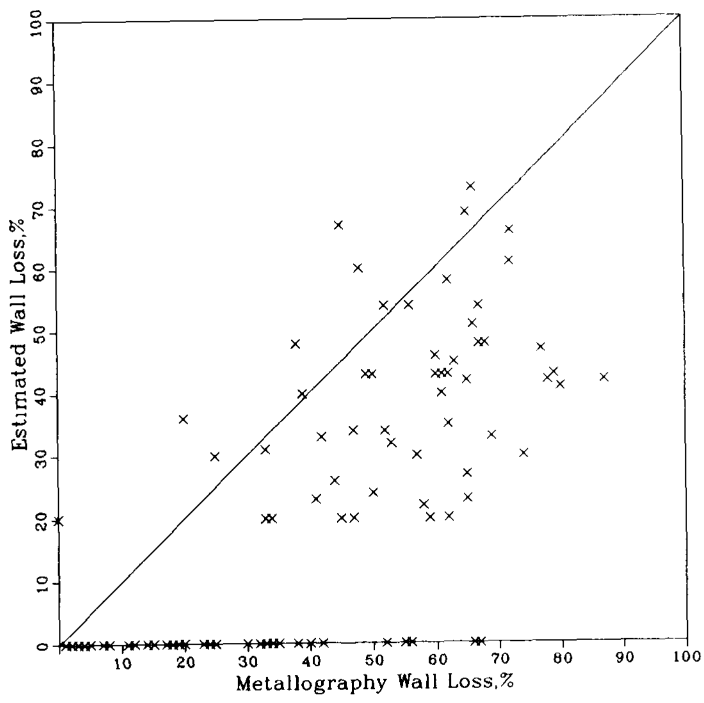


FIGURE 4.21. Plot of Estimated Defect Depth Versus Depth from Metallographic Analysis for Team B

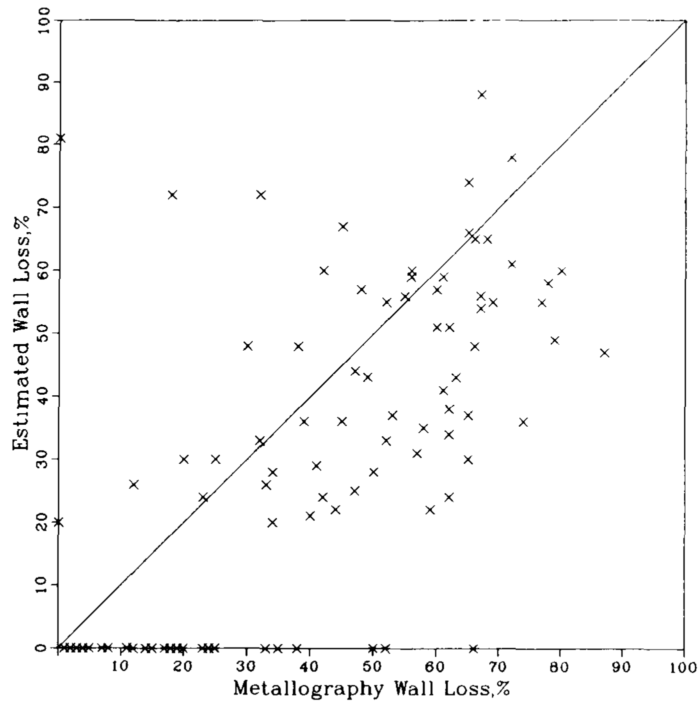


FIGURE 4.22. Plot of Estimated Defect Depth Versus Depth from Metallographic Analysis for Team C

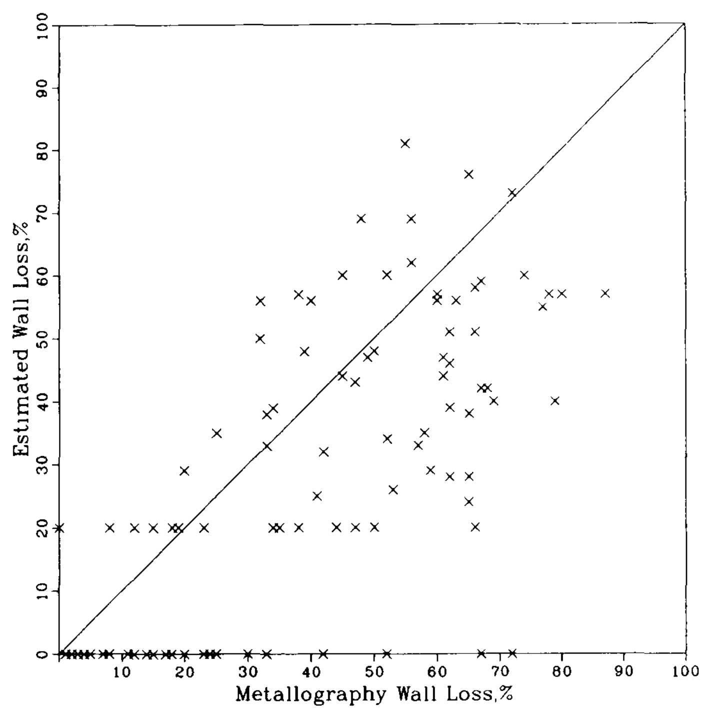


FIGURE 4.23. Plot of Estimated Defect Depth Versus Depth from Metallographic Analysis for Team D

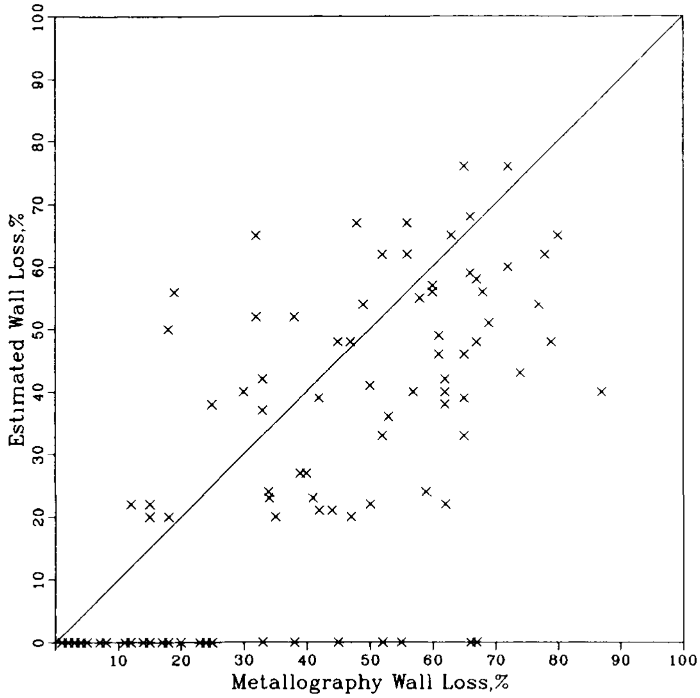


FIGURE 4.24. Plot of Estimated Defect Depth Versus Depth from Metallographic Analysis for Team E

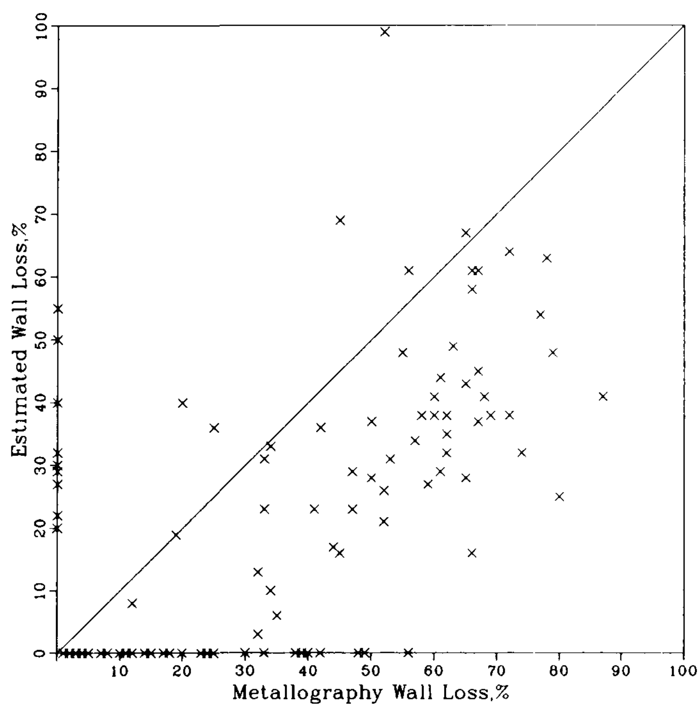


FIGURE 4.25. Plot of Estimated Defect Depth Versus Depth from Metallographic Analysis for Team X

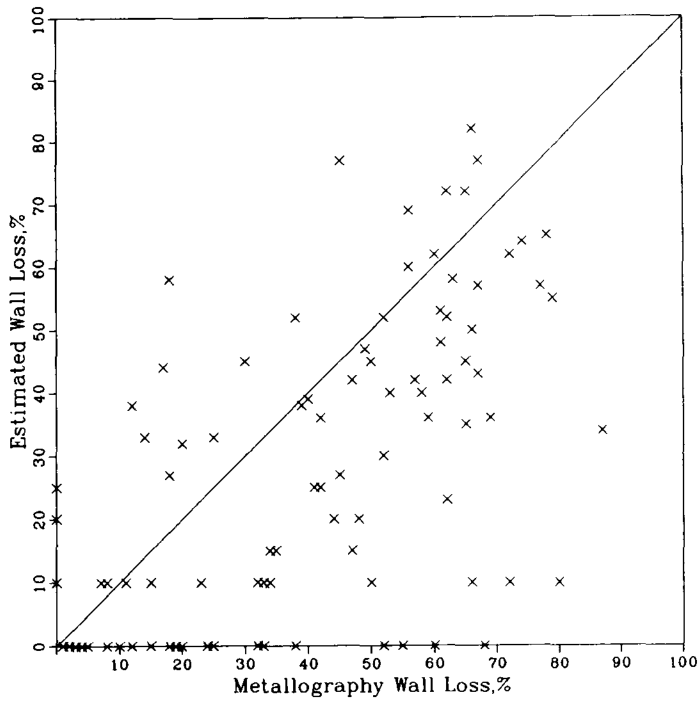


FIGURE 4.26. Plot of Estimated Defect Depth Versus Depth from Metallographic Analysis for Team Y

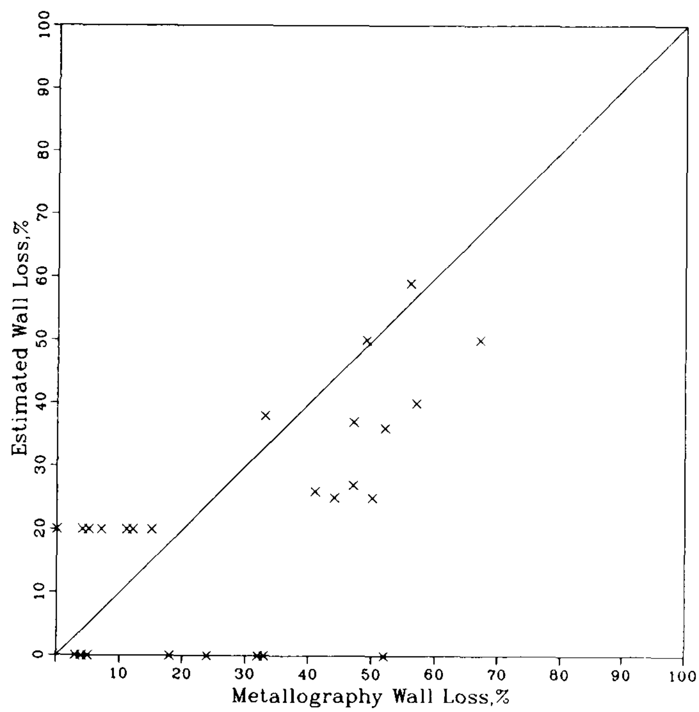


FIGURE 4.27. Plot of Estimated Defect Depth Versus Depth from Metallographic Analysis for Team U

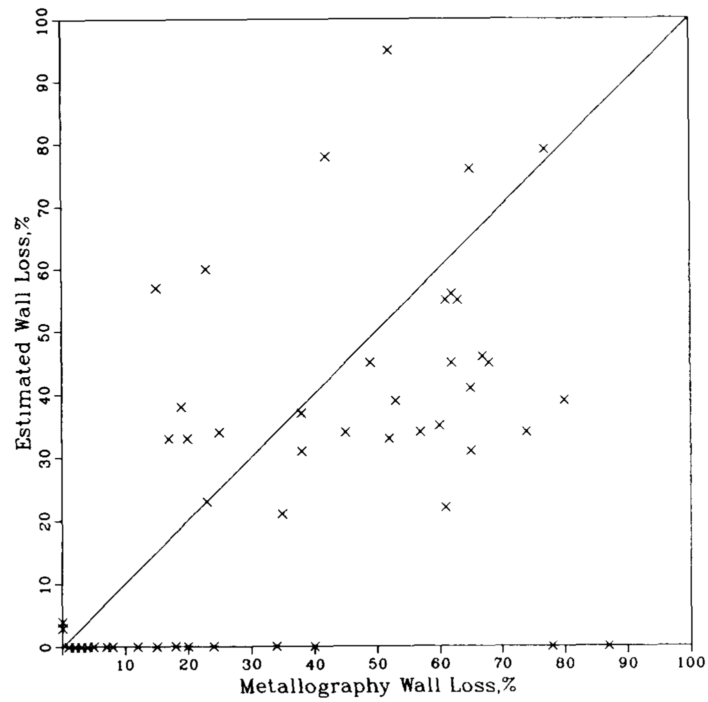


FIGURE 4.28. Plot of Estimated Defect Depth Versus Depth from Metallographic Analysis for Team UU

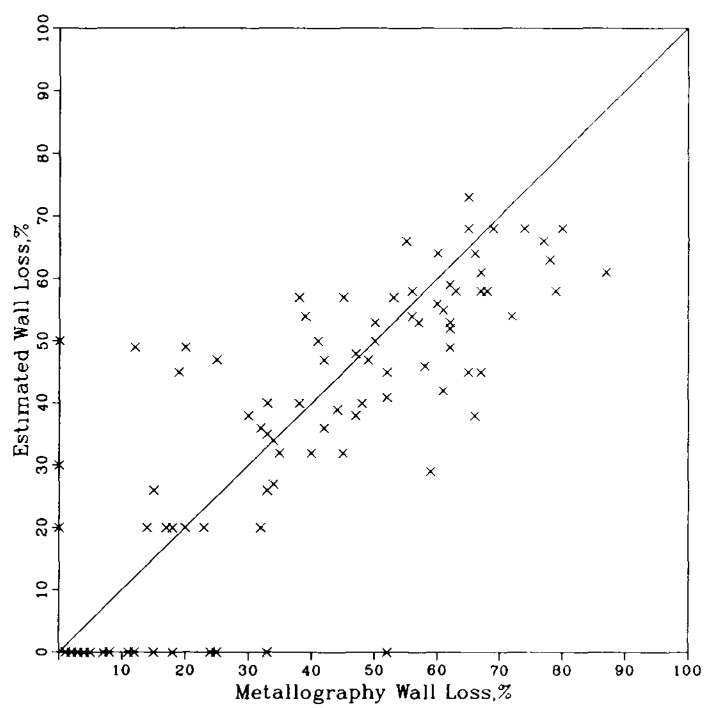


FIGURE 4.29. Plot of Estimated Defect Depth Versus Depth from Metallographic Analysis for Team V

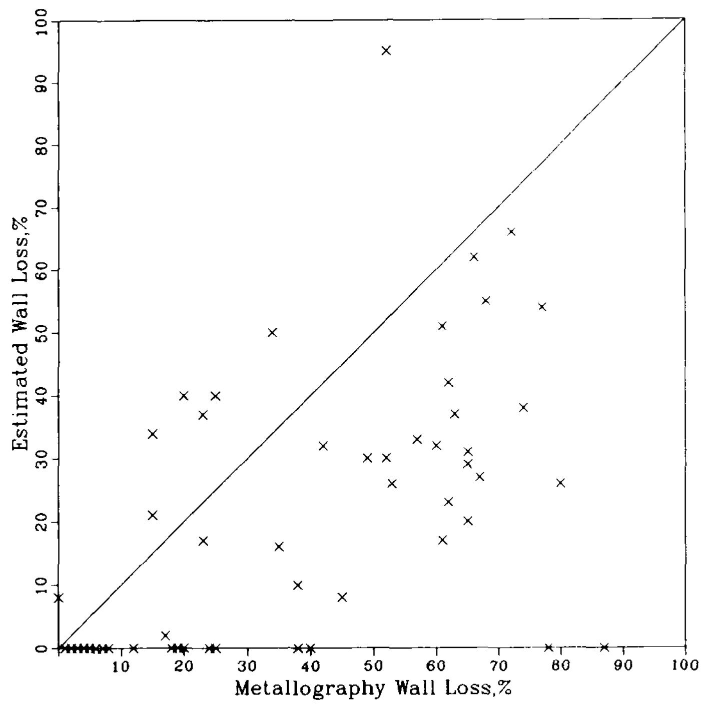


FIGURE 4.30. Plot of Estimated Defect Depth Versus Depth from Metallographic Analysis for Team VV

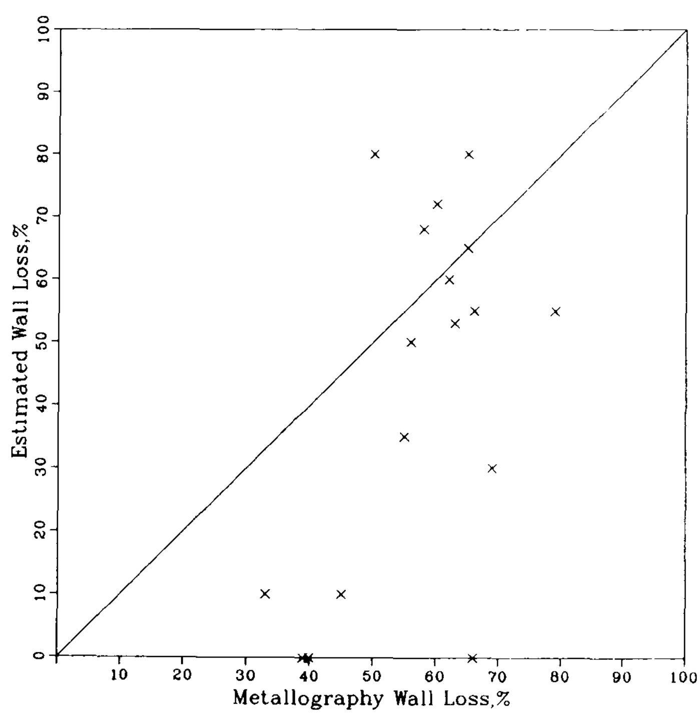


FIGURE 4.31. Plot of Estimated Defect Depth Versus Depth from Metallographic Analysis for Team W

dispersion observed in the true positives between estimated and actual defect depth in these plots is largely due to the complex geometry of the defects which produce complex EC signals.

For ease of reference, the diagonal perfect sizing line is drawn on the plots. There is not a strong sizing relationship, except for Team V and possibly Team U. However, the number of defects upon which to make a judgment for Team U is rather small (13 defects with reported sizes >20%). With the exception of Team V, and possibly Team E, there is a tendency for EC to underestimate defect wall loss.

Team V's data appear to be centered about the perfect sizing line. The linear model was used to estimate the line,

$$Y = \alpha + \beta X + \varepsilon \tag{5}$$

where Y = NDE measured defect depth
X = actual depth
α = intercept
β = slope
ε = error.

The model was fit using an algorithm designed for truncated data (Aitkin 1981). Data truncation usually results from the inability of a system to produce measurements over the entire range of possible values. In this case, many of the NDE inspection teams reported shallow defects as <20% wall loss because of the known limitations of the equipment. The truncation point used by each team can be determined by examination of Figures 4.20 through 4.31. The regression algorithm applied to Team V's data produced an intercept of 14% and a slope of 0.64. The perfect sizing relationship is described by an intercept of 0.0 and a slope of 1.0. Both the estimated intercept and slope are statistically different from the perfect sizing values. From the plots, Team V has the least amount of dispersion compared to the other inspection teams. However, the calculated R^2 value, which is a measure of how well the model fits the data, is only 0.57 compared to a perfect sizing R^2 value of 1.0. Consequently, although Team V has the best performance, the sizing error estimate is 10%.

For completeness, the summary statistics for the linear sizing model for all teams is given in Table 4.4. The intercept, slope, sizing error estimate, number of defects, truncation values, and R^2 are listed. With the exception of Team U, the R^2 values are very low, which reflects the poor sizing capability displayed in the plots.

The Team U results require more study. Their values for R^2 and the sizing error are, respectively, the largest (0.85) and smallest (7.62) of any of the teams. However, the small number of defects with wall loss >20% (13) limits the conclusion that the Team U data represent a significant sizing improvement over the other teams.

TABLE 4.4. Sizing Regression Summary Statistics

Team	Intercept, %	Slope	Error, %	n	R^2	Measurement Truncation, %
A	12.05	0.49	16.48	64	0.21	20
B	17.58	0.38	14.67	52	0.13	20
C	24.17	0.40	15.60	62	0.16	20
D	8.96	0.61	16.69	66	0.31	20
E	20.27	0.45	14.81	64	0.24	20
X	9.43	0.49	15.82	58	0.21	0
Y	5.98	0.61	21.11	69	0.26	10
U	-4.21	0.84	7.62	19	0.85	20
UU	35.33	0.19	17.80	31	0.04	20
V	14.30	0.64	10.59	73	0.57	20
VV	19.76	0.29	17.94	33	0.09	0
W	-33.26	1.40	23.34	14	0.33	10

Table 4.4 shows little consistency in the estimates of the intercept. For the baseline and DAARR teams, it varies from 6% to 24%, which represents a significant sizing bias. The slopes, varying from 0.38 to 0.61, are reasonably consistent. The sizing errors are also consistent, 14.67% to 16.69%, with the exception of Team Y at 21.11%. These errors are large; a one standard deviation (error estimate) range about a defect size estimate is at minimum 30% of wall thickness. Team V's intercept and slope are consistent with the baseline and DAARR results, but the sizing error is smaller (10.59%), so a one standard deviation range is about 21% of wall thickness.

Figure 4.32 is a plot of each DAARR and baseline team's reported size versus the actual defect size. Nondetections are not shown on the plot. The character plotted is the team's letter designation, A through E and X and Y. An asterisk (*) means that several teams reported the same value. The range of estimated defect size is large regardless of the actual size of the defect, and no team consistently under or oversizes defects. Multiple specimens with the same defect depth show the large effect of defect geometry. Therefore, any team differences in bias are minor compared to the specimen differences. Figure 4.33 is the same plot for the AATRR teams. It shows the same characteristics as Figure 4.32, but one can see that Team V's estimates are in the center of the scatterplot showing the more accurate sizing.

4.4 FACTORS INFLUENCING EC INSPECTION RELIABILITY

The EC data and reports obtained from the various inspection teams were examined to determine if the causes of the variations in detection and sizing could be identified. Some of the causes could partially be attributed to particular technical difficulties associated with the condition of the Surry generator, such as denting, Cu deposits, etc. Denting at the TSP intersections

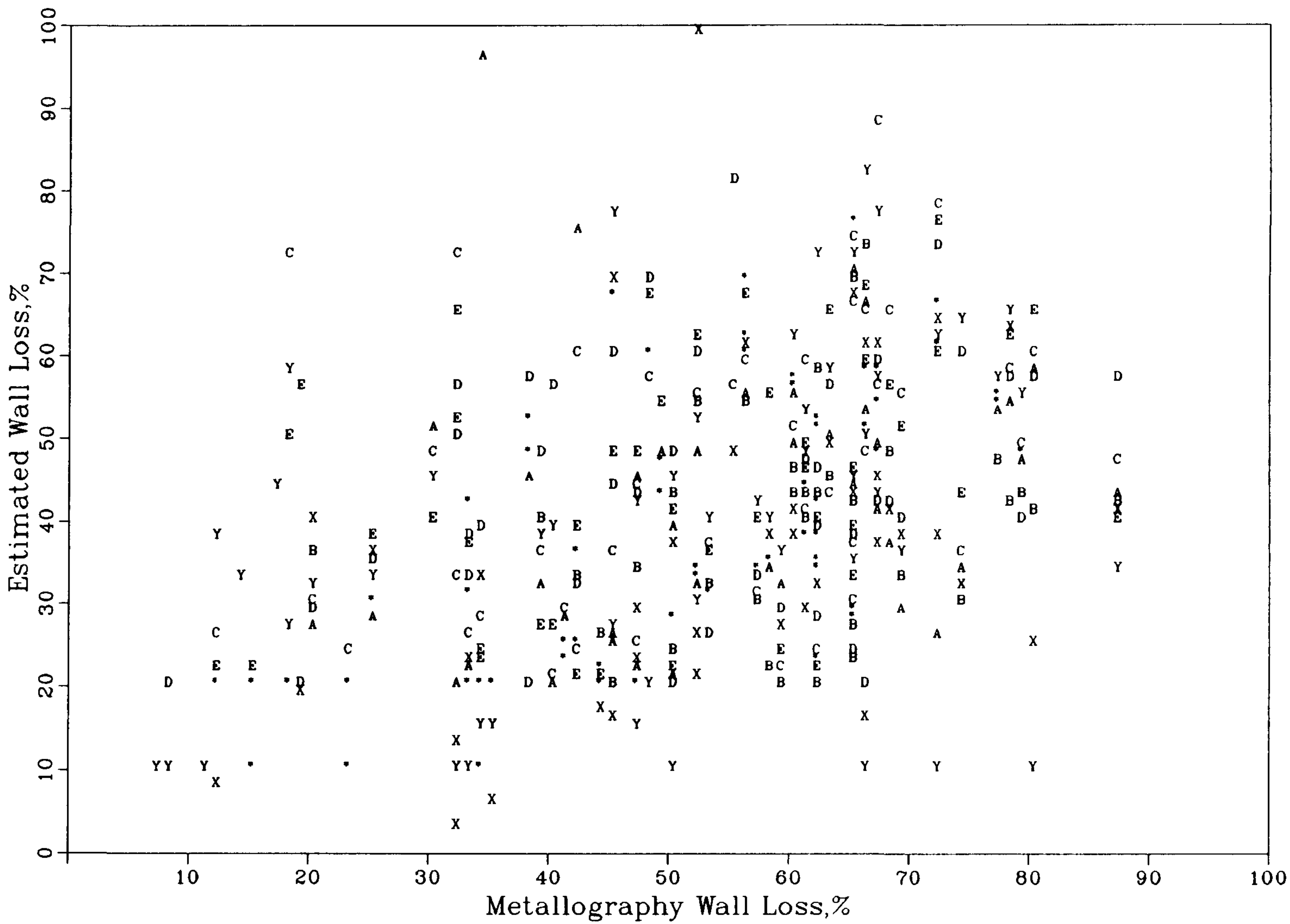


FIGURE 4.32. Plot of Estimated Defect Depth for DAARR and Baseline Teams Versus Depth from Metallographic Analysis

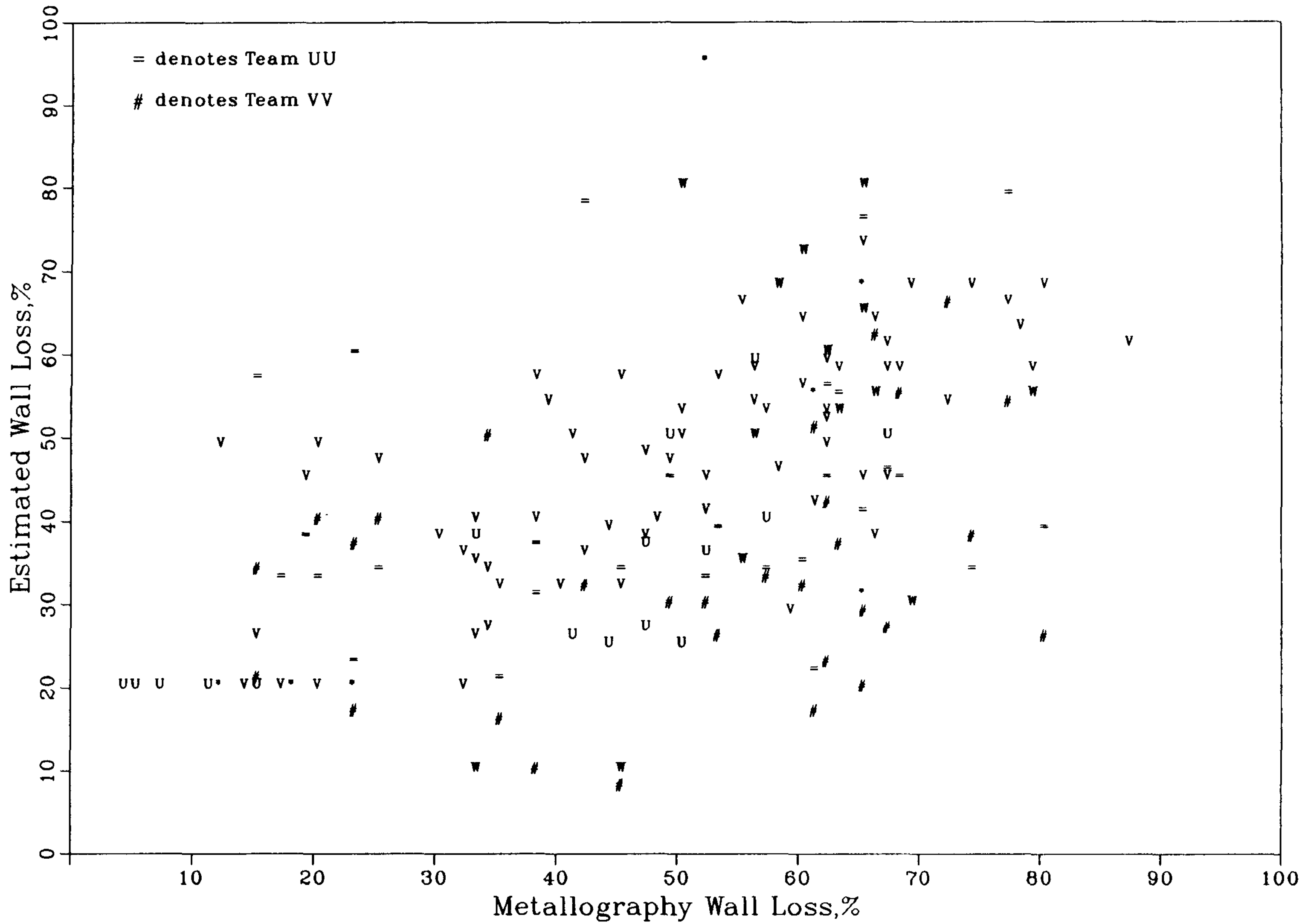


FIGURE 4.33. Plot of Estimated Defect Depth for AATRR Teams Versus Depth from Metallographic Analysis

distorted the EC signal characteristics to the point where reliable defect detection was not possible. Less severe denting at the TTS also affected the EC signals and may have influenced defect sizing.

The method used to detect and size defects was to analyze the change in the vertical and horizontal components of the signals at the frequencies being used for the examination. The change that was formed by the voltage swing resulting when one coil of the differential probe just passed over the indication and the second coil was beginning to encounter the indication was related to that of a machined standard containing known defect depths (see Figure 4.34). Note that in the case of a signal produced by a machined defect, a uniform signal was generated. This signal could be measured at two locations: the peak-to-peak and the tangent.

Examples of complex EC signals containing components from dents, defects, and Cu deposits from a hot leg TTS specimen are shown in Figure 4.35. The complex interactions of the various components were not known, but interpretation and sizing of defects within the complex EC signals varied among the inspection teams. Many of these variations could be related to the training and conventions of the analysis procedures that are currently practiced by Level II and III EC analysts.

Factors influencing the sizing and detection of tube defects and the effect of the Cu deposits on EC inspection reliability are discussed below.

4.4.1 Defect Sizing

The EC data and reports obtained from the various inspection teams were examined to determine the cause of the wide variations in sizing the same degraded specimen. Interpretation of the complex signals and differences in analysis procedures appeared to be the primary source for the large variations in defect depths. Specific causes that were identified include: (1) multiple defect signals within the degraded region, (2) different analysis procedures and locations used to measure the phase angle within the distorted signals, and (3) the frequency used to measure the defect depth. Most of the large variations in reported defect depth for a given specimen could be explained by one or more of the above causes. It was also noted that complex EC signal shapes usually coupled with a poor signal-to-noise ratio were general characteristics of specimens with large variations in the reported defect depths.

A good example of the problems encountered by analysts is Specimen 636C (R14 C27 HL). Metallography measured the defect depth to be 44% through-wall in this specimen. As shown in Figure 4.36, this defect signal was complex and showed more than one indication at the detection frequency of 100 kHz. Two indications were seen at this frequency that could be representative of a defect (A = 25% through-wall and B = 38% through-wall).

Indication A was very straightforward, with the 100 kHz equal to a depth of 25% on the OD of the tube. The 400 kHz validated this as also being an OD indication, with a depth of 19% through-wall. Indication B, on the other hand, was not so straightforward. Due to its shape, this indication, even at

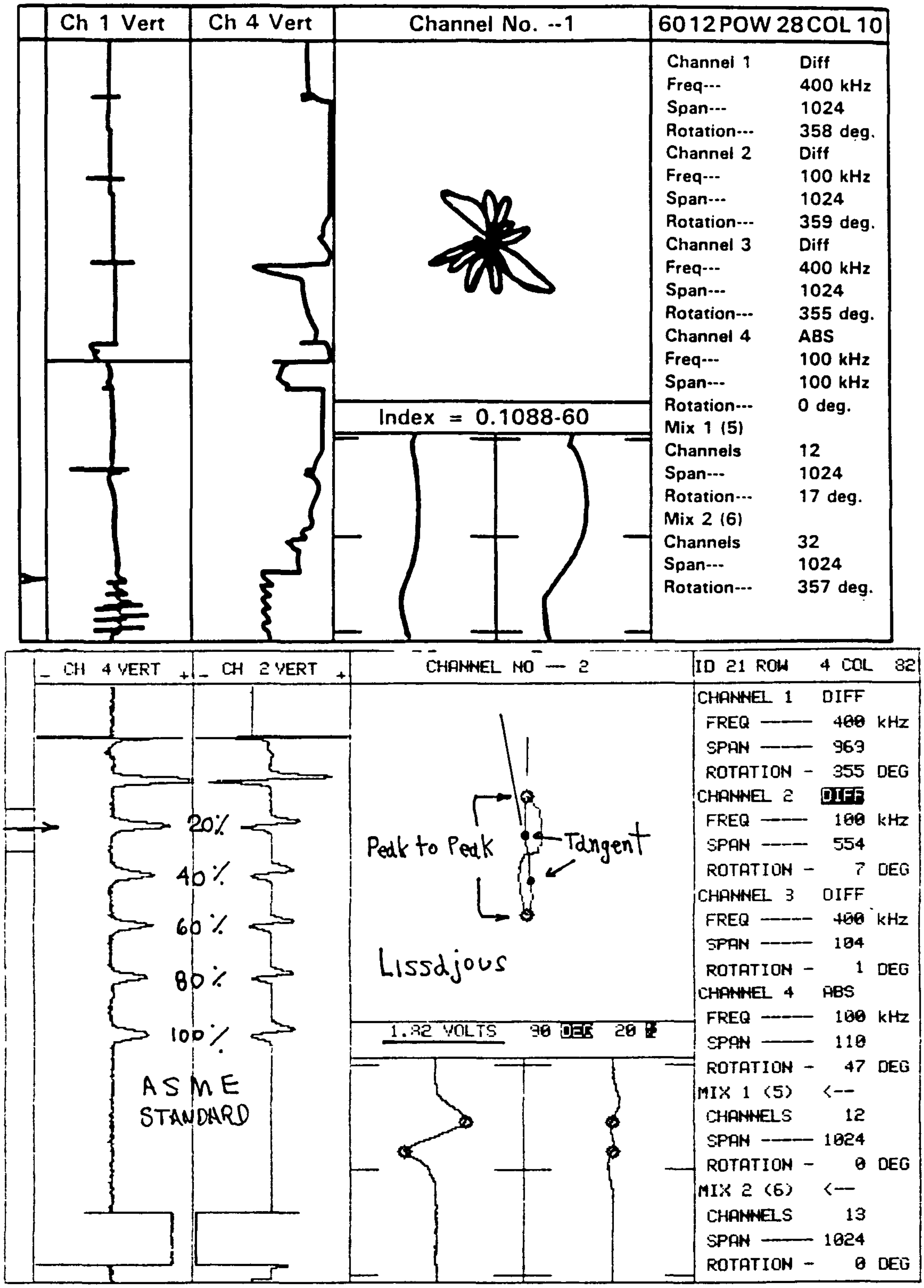


FIGURE 4.34. ASME Standard Used for Defect Detection and Sizing

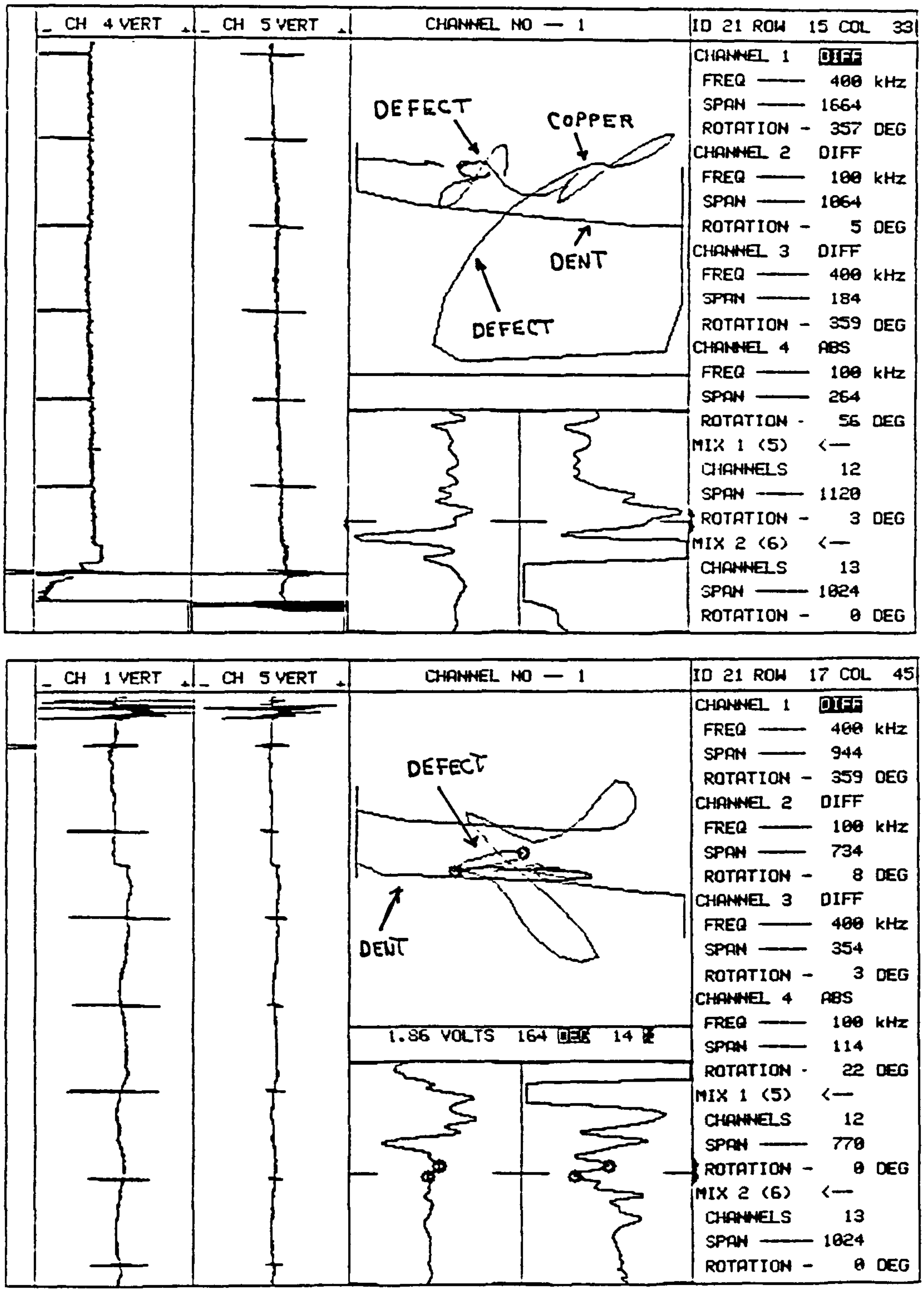


FIGURE 4.35. Complex Signals from TTS Specimens 658C (R15 C33 HL) and 655C (R17 C45 HL) Showing Defects and Effects of Copper and Dent

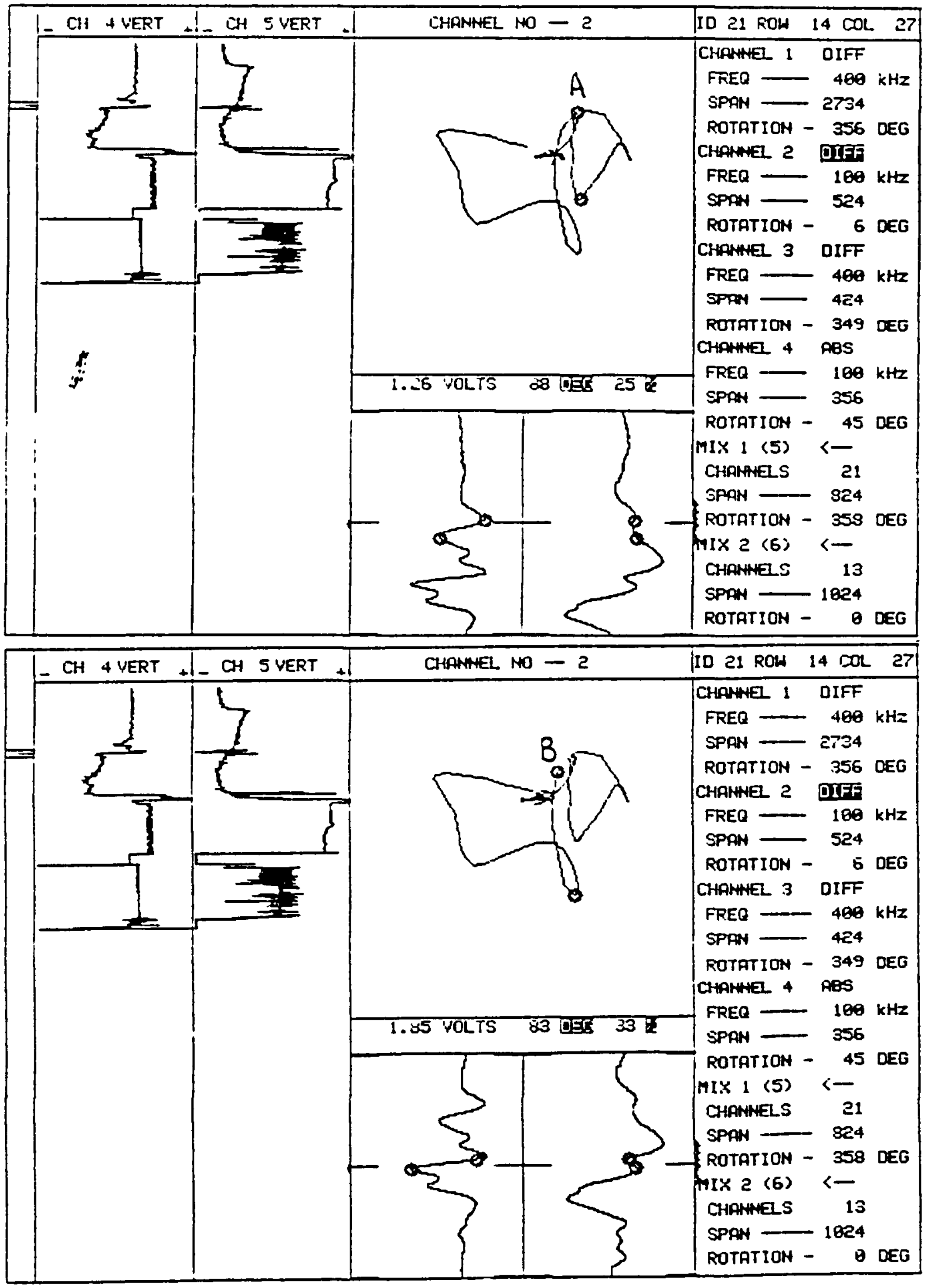


FIGURE 4.36. Complex Defect Signals from TTS Specimen 636C Showing More Than One Defect with a Dent Present

100 kHz, could be measured at different locations along the tangent and could give a depth between 33% to 45% through-wall. The problem became more complex because Indication B at 400 kHz showed a phase that would be representative of an ID defect. Most analysts would regard Indication B as not being generated by a defect.

The EC data from 46 TTS specimens with metallographic data available were reanalyzed to determine if a consistent analysis method and/or frequency would improve the correlation between EC and metallography wall loss. The EC data tapes from one of the DAARR inspection teams were analyzed at 400 kHz, 100 kHz, and a 400/100 kHz mix. The defect signals were measured at all three channels and the location within the signal which produced the deepest wall loss was reported. This location usually was a tangent point of a deflection on the vertical channel of each output. Good agreement between the depth estimates from the three channels was observed for some specimens while other specimens showed wide variations in estimated wall loss. No definite relationship between the variability in the EC data from different channels and the defect distributions from the metallography was evident.

A comparison of the EC depth estimates from each of the three channels with the metallographic data is shown in Figures 4.37 through 4.39. The sizing patterns showed the same general characteristics as seen for the baseline and round robin inspections. The data were widely scattered about the perfect correlation line, and the EC estimates generally tended to underestimate wall loss for the more severely degraded specimens. Although a consistent analysis method was employed, no definite improvement in the variability of the EC depth estimates was seen in these data compared to the baseline or round robin inspections. This suggests that other factors such as defect distributions, denting, or sludge deposits may be contributing to the wide variations in the EC estimates of wall loss.

To evaluate the effect of defect type and distribution on the EC sizing variability, the TTS specimens with metallographic data were divided into defect categories consisting of wastage, pitting and wastage, and isolated pitting. The pitting and wastage specimens were further subdivided into two categories depending on the circumferential extent of the defects in the transverse sections. For Category I, degraded regions (not necessarily continuous) were distributed around more than one-half of the tube circumference for (see Figures 3.48 through 3.50). Category II specimens had degraded regions less than one-half of the tube circumference (see Figures 3.45 through 3.47). Specimens in the wastage category exhibited the ring-type wastage described in Section 3.3 and are shown in Figures 3.36 through 3.40, while an example of an isolated pit is shown in Figure 3.41. A total of 61 specimens were included in the analysis [8 wastage, 6 pitting, 25 pitting/wastage(I), and 22 pitting/wastage(II)]. Specimens which did not uniquely fit into these categories were not included.

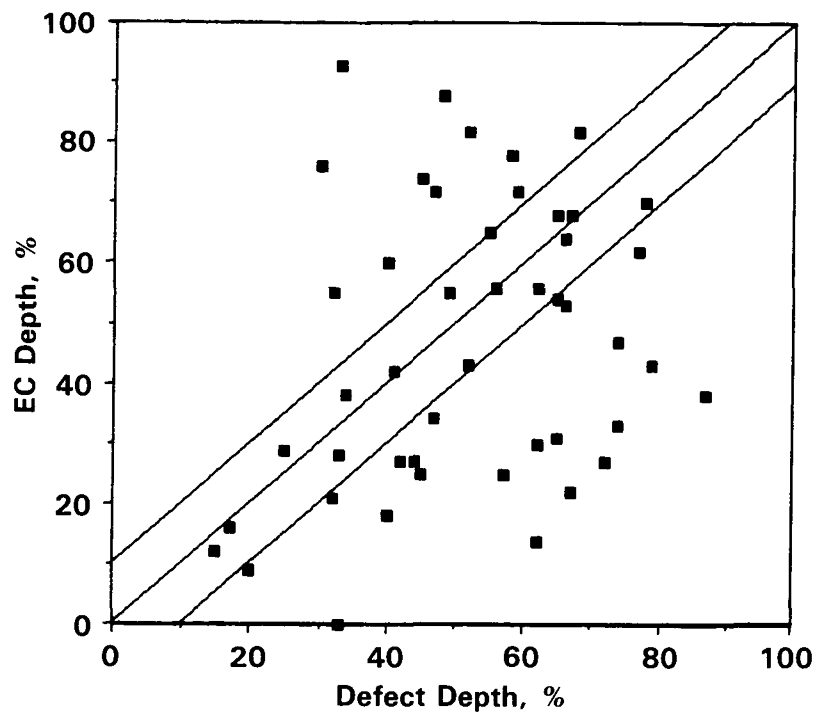


FIGURE 4.37. Metallographic Validation (100 kHz)

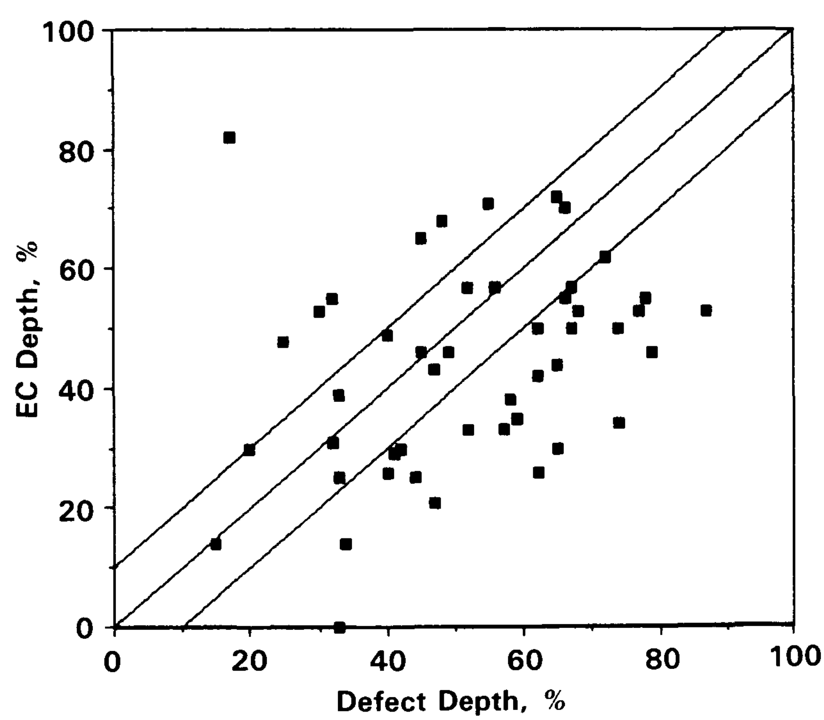


FIGURE 4.38. Metallographic Validation (400 kHz)

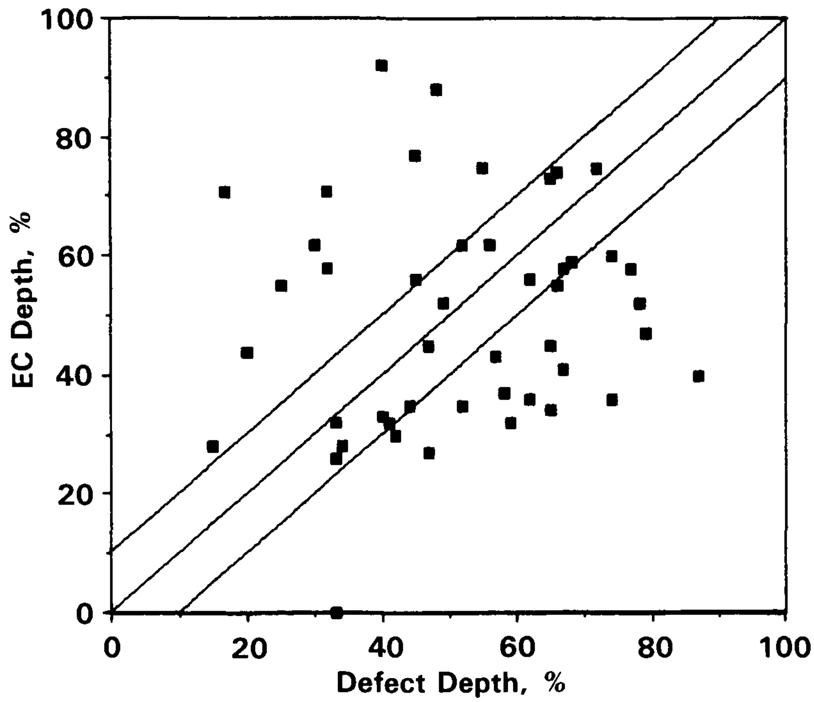


FIGURE 4.39. Metallographic Validation (100/400 kHz Mix)

The reported wall loss from the baseline and DAARR inspections is plotted against the metallographic data for each defect type category in Figures 4.40 through 4.43. Large scatter exists within the data for each category, and EC tends to underestimate the wall loss for the more severely degraded specimens. However, a closer analysis of the data indicates some general trends in sizing accuracy as a function of defect type and distribution around the tube as shown in Table 4.5. These values represent the difference between the metallography wall loss and the average EC wall loss reported by the baseline and DAARR inspection teams which reported a defect. The mean and standard deviation are given for each defect category, and the number of specimens in each size class are shown in parentheses. Positive and negative mean values in Table 4.5 correspond to over and underestimation of wall loss by the EC data.

Two general trends were seen in the data: (1) the difference between the EC and metallography wall loss became more negative as the complexity of the degraded region increased, and (2) the difference between the EC and metallography wall loss became more negative as the metallographic wall loss increased. The simple defect types (wastage and isolated pits) showed the best correspondence to the metallographic data, while the greatest deviations were seen for the most complex defect distributions (i.e., pitting/wastage I). The large standard deviations reflected the specimen-to-specimen variations in defect sizing within each specimen group. These variations, combined with the small number of specimens in each category, makes the statistical significance

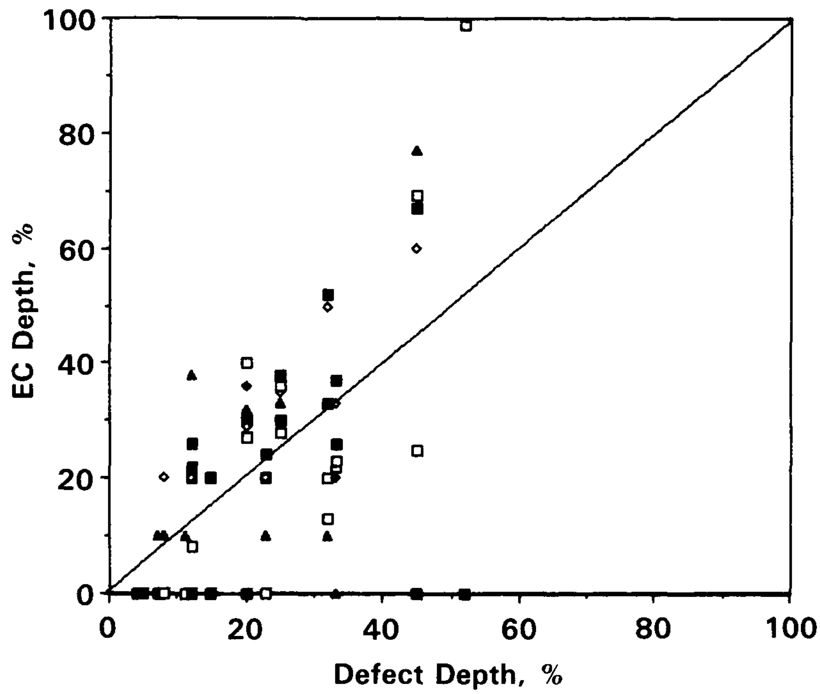


FIGURE 4.40. Metallographic Validation for Wastage-Type Defects (baseline and DAARR teams)

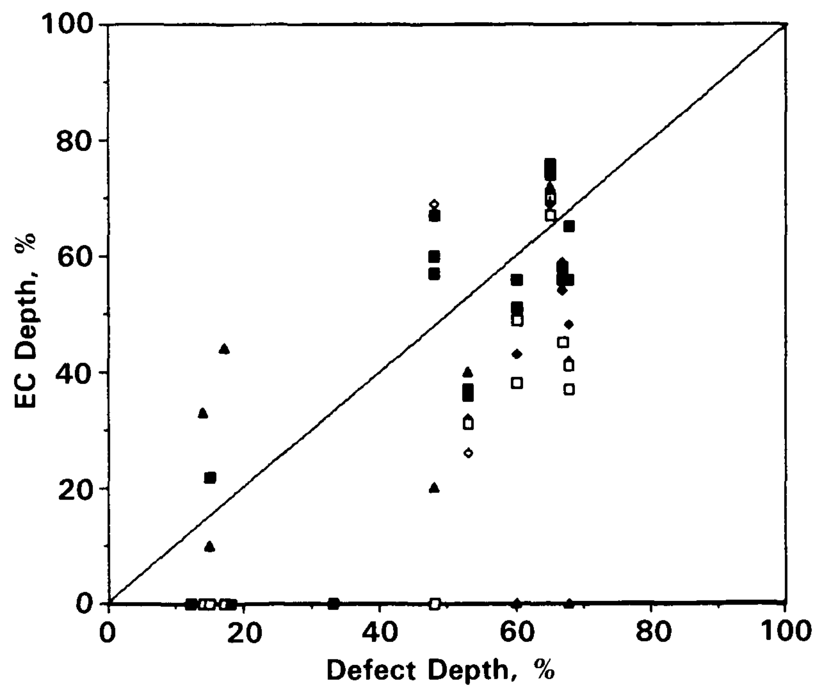


FIGURE 4.41. Metallographic Validation for Isolated Pitting-Type Defects (baseline and DAARR teams)

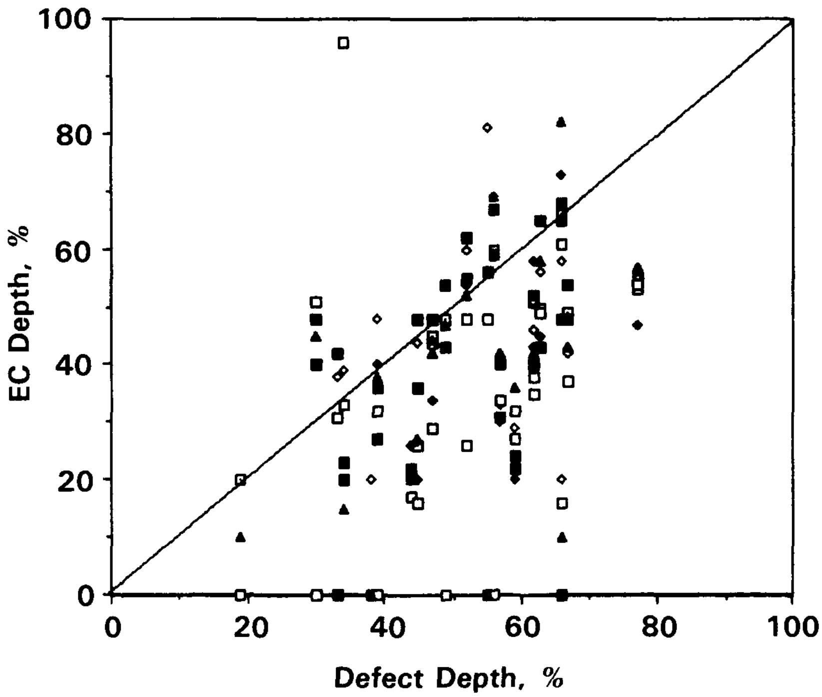


FIGURE 4.42. Metallographic Validation for Pitting/Wastage II-Type Defects (baseline and DAARR teams)

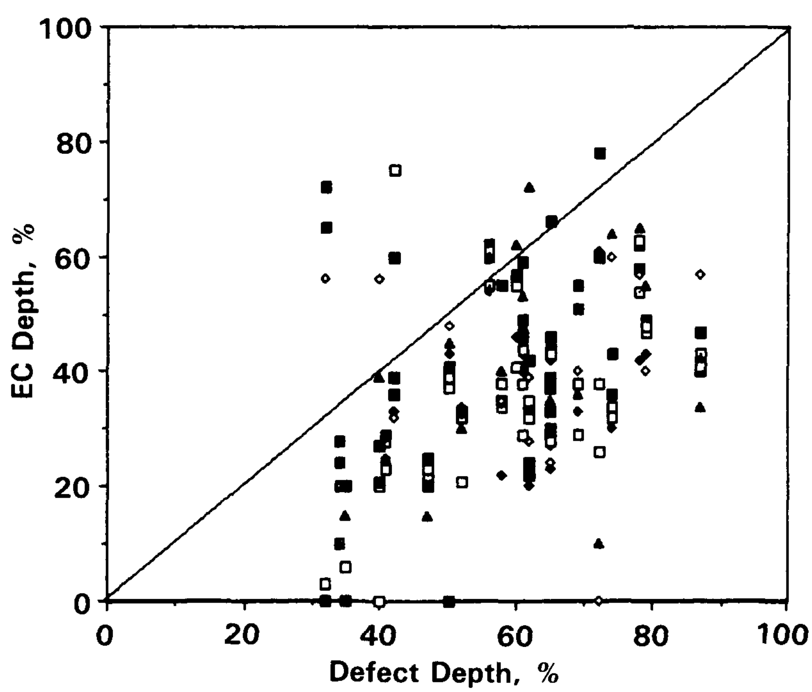


FIGURE 4.43. Metallographic Validation for Pitting/Wastage I-Type Defects (baseline and DAARR teams)

TABLE 4.5. Effect of Defect Type and Distribution on EC Sizing Accuracy

Defect Type	Metallography Wall Loss, % 20 to 50	51 to 70	≥70
Wastage	+4 ± 10(8)[(a)]		
Pitting		-8 ± 8(6)	
Pitting/Wastage II	-5 ± 12(10)	-13 ± 14(11)	-23(1)
Pitting/Wastage I	-9 ± 14(8)	-21 ± 11(12)	-31 ± 8(5)

(a) x (mean) ± (standard deviation) (sample size)

of the sizing differences problematic. However, the data clearly indicate that increasing the complexity and severity of the degradation produced by pitting and/or wastage increases the tendency for EC to underestimate wall loss.

One AATRR team displayed improved sizing accuracy when compared with the other baseline, DAARR, and AATRR teams. The results presented in Section 4.3 revealed that Team V had the best overall sizing accuracy. Although Team V's fitted intercept and slope were not significantly different from some of the other teams, their dispersion was the lowest (except for Team U with only 13 defects >20%) and their R^2 value was the highest of any team. Team V employed two inspection techniques that probably explain, in part, their improved sizing performance. First, special frequency mixes were developed specifically for the Surry generator and used to enhance the signal-to-noise ratio by suppressing the effects of dents, support plates, and copper deposits. Second, rotating EC and focused ultrasonic probes were used to reinspect 22 of the tubes previously inspected by conventional bobbin coil EC. The wall loss determined from the supplemental inspection was then compared to the bobbin coil results and a correction factor computed. In this case the bobbin coil data was adjusted by +15% to correct for an apparent underestimate of defect depth. Both of these factors, namely, special frequency mixes and augmentation of the EC/bobbin coil data apparently were responsible for the improved sizing accuracy.

4.4.2 Defect Detection

The results of the validation show that the probability of detecting defects depends on the volume of the wall loss and conditions within the generator such as dents, Cu, pits, etc. Denting at the TSP intersections interfered with the EC signals, and POD at this location was essentially zero. The shallow nature of OD defects found within the TSP crevice region undoubtedly contributed to the low detection. However, no defects were reported in the four specimens with ID cracking of dented TSP intersections and analysis of the data tapes indicated that the signal distortions were generally too severe for defect detection.

Although the POD for pitting/wastage type defects was good above 40% wall loss, all inspection teams missed some of these defects. The missed defect indications were subsequently found on the baseline and DAARR data tapes when reanalyzed by the PNL analyst. This suggests that the analysts either bypassed the indication, or for some reason did not interpret the signal to be a defect.

An example where an analyst might not call a signal to be a defect can be seen in Figure 4.44. Note that at 400 kHz, the phase angle is at 134°, which would relate to an OD indication. But at 100 kHz, the same defect has a phase angle of 45°, which relates to an ID indication. Two analysts did not interpret this signal to be a defect.

Utilization of an automated data screening system, such as used by Team V, would lead to improved POD. Obvious signals like those from the grinder mark shown in Figure 4.45 would be detected using this method. This defect was missed by one of the inspection teams.

4.4.3. False Defect Calls

Deposits on the OD surfaces were found to be the primary cause of the false positive calls made by the inspection teams. Most of the false calls were located in the U-bend and TSP regions of the generator, and tubes from these locations were generally coated with a Cu-rich deposit described in Section 3.1. Examination of the EC data showed that two types of defect indications were responsible for the false calls. The first type of indication appeared as a shallow OD defect and was most easily detected at 100 kHz frequency. After removal from the generator, correlations were observed between this type of EC signal and locations where there was a lack of, or an interruption in the deposit. The second type of indication was characteristic of a permeability variation (PV) signal and was reported as an ID defect. Removing the deposits by chemical cleaning eliminated these signals from most of the specimens, although a small residual PV-type signal remained in a few specimens. Visual inspection of all specimens and metallography on selected specimens found no evidence of defects. Only superficial fabrication marks and the spots without the thin oxide coating on the OD (see Figure 3.1) were noted at locations where EC indications were reported. The regions may correlate with interruptions in the Cu-rich deposits.

The Cu signals due to interruptions in the Cu-rich deposits were seen in large numbers. Depending on their location, amplitude, and shape, as seen in Specimen 568 (R4 C3) Figure 4.46, some of these signals were called defects. These signals, caused from a lack of Cu, were easily detected and were mistakenly called as defects.

Specimens with defect indications were removed and EC inspected to validate the presence of defects called by EC inspection teams. After cleaning, the signal in Specimen 568 (which was interpreted as a defect), was no longer visible (Figure 4.47). In all cases, these indications were no longer present after cleaning. Additional destructive examination of some of these samples showed no evidence of a defect in either the OD or ID of these tubes.

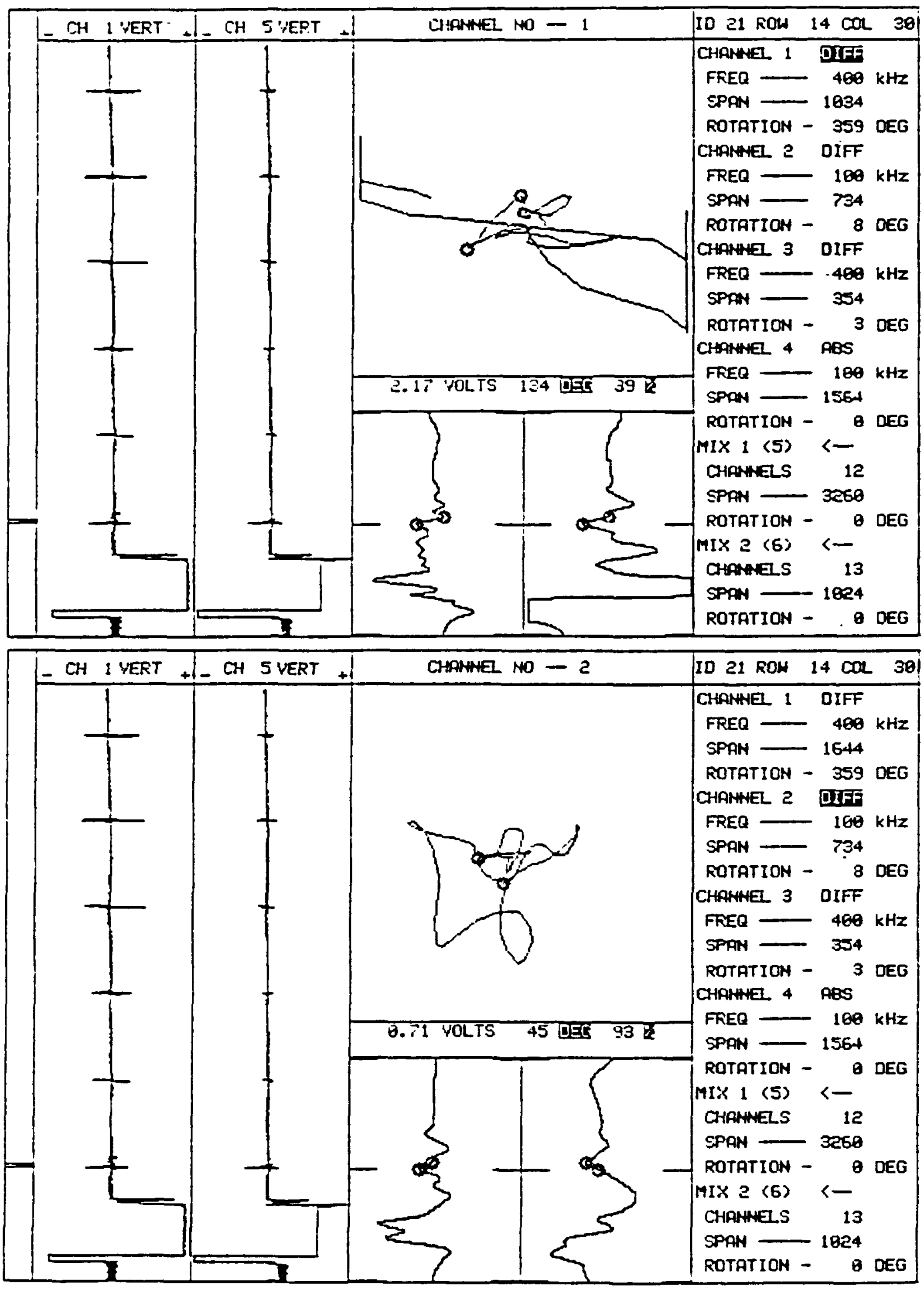


FIGURE 4.44. Defect Signal from Specimen 637C (R14 C30 HL) Showing Phase Relation Which Relates to an OD Defect at 400 kHz and an ID Defect at 100 kHz

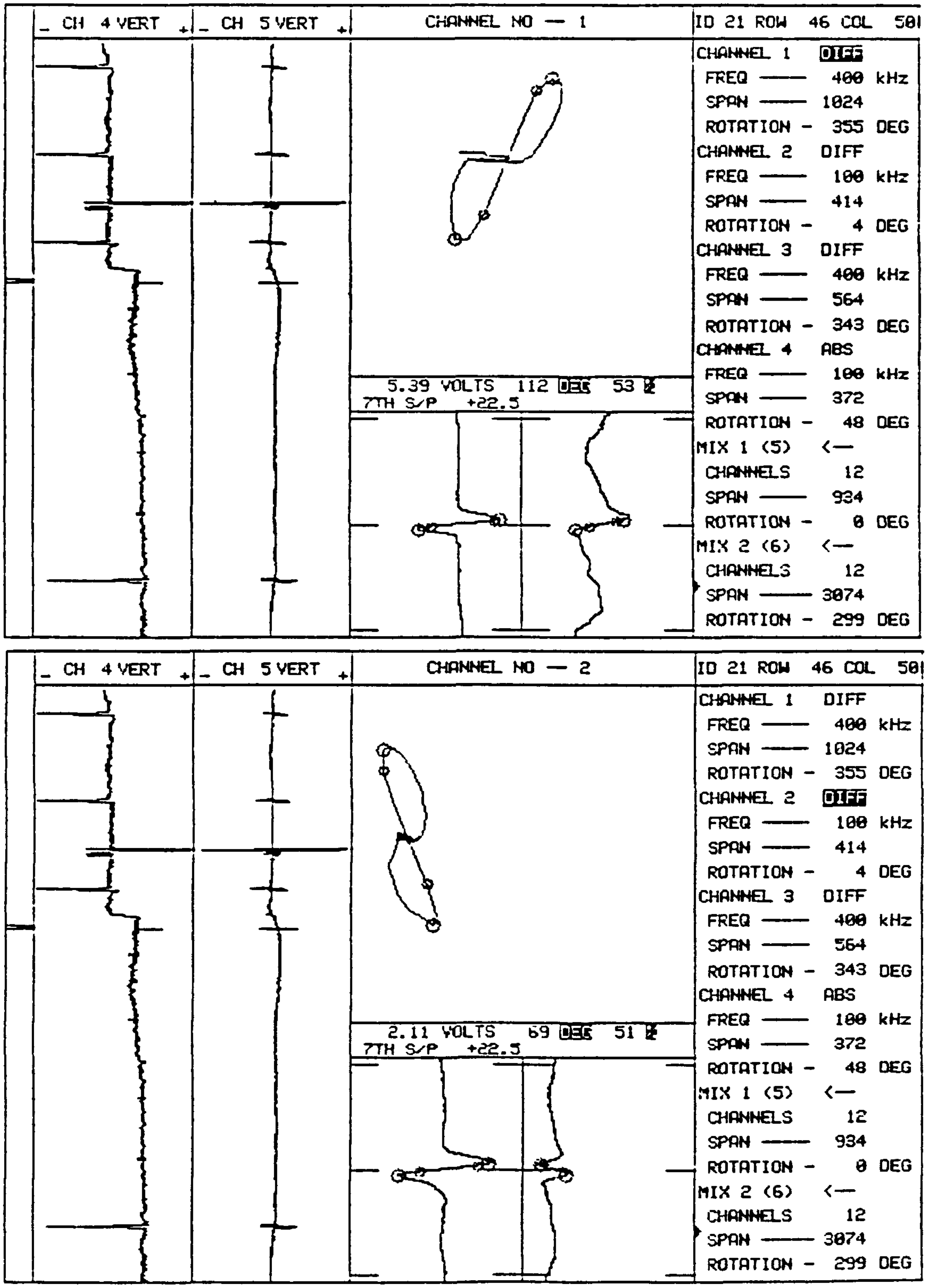


FIGURE 4.45. Eddy Current Signals from Grinder Mark on U-bend Specimen 429A (R46 C50 HL)

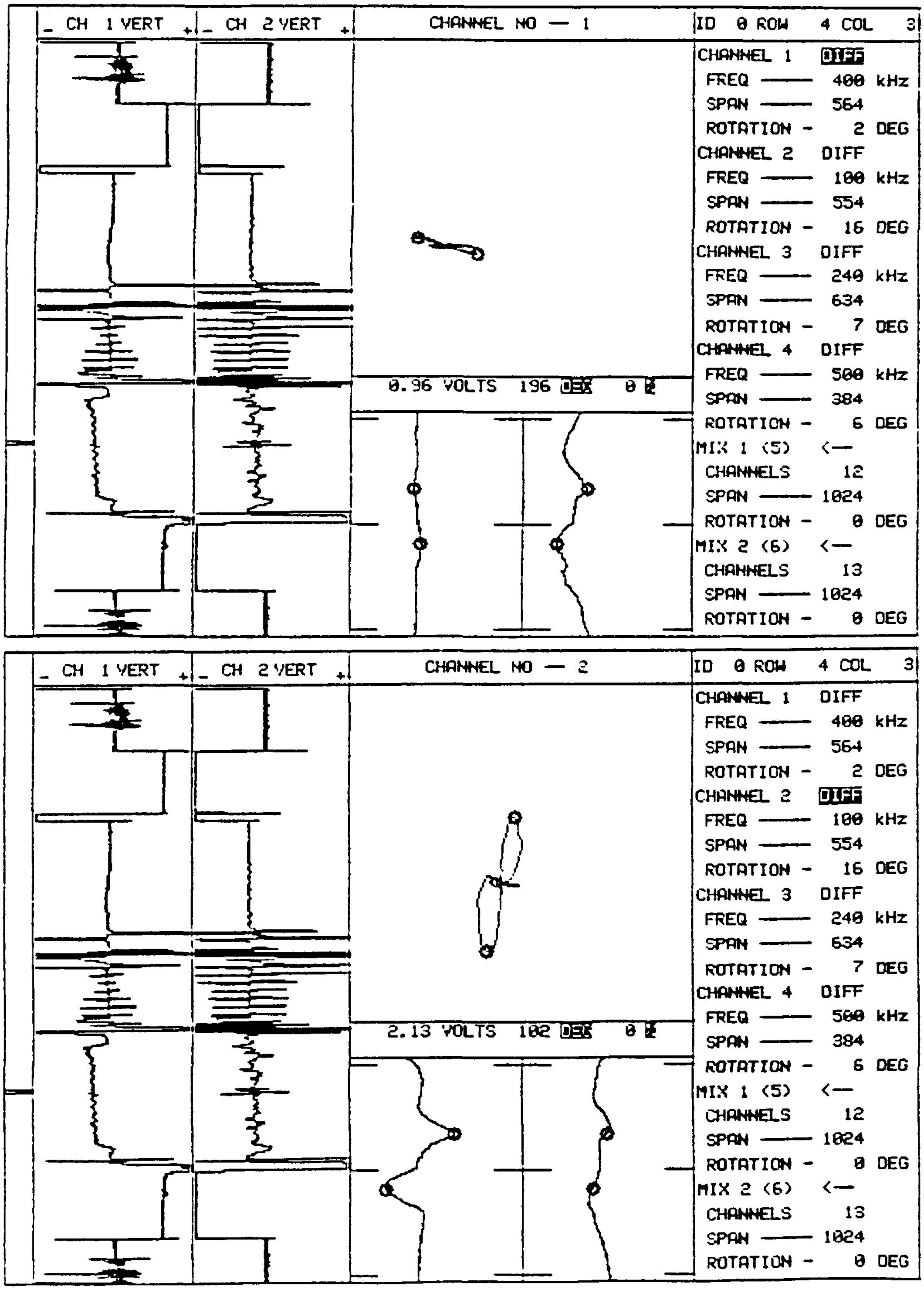


FIGURE 4.46. U-bend Specimen 568 (R4 C3) Showing a Defect Called Signal in U-bend Area Which Turned Out to Be Lack of Copper

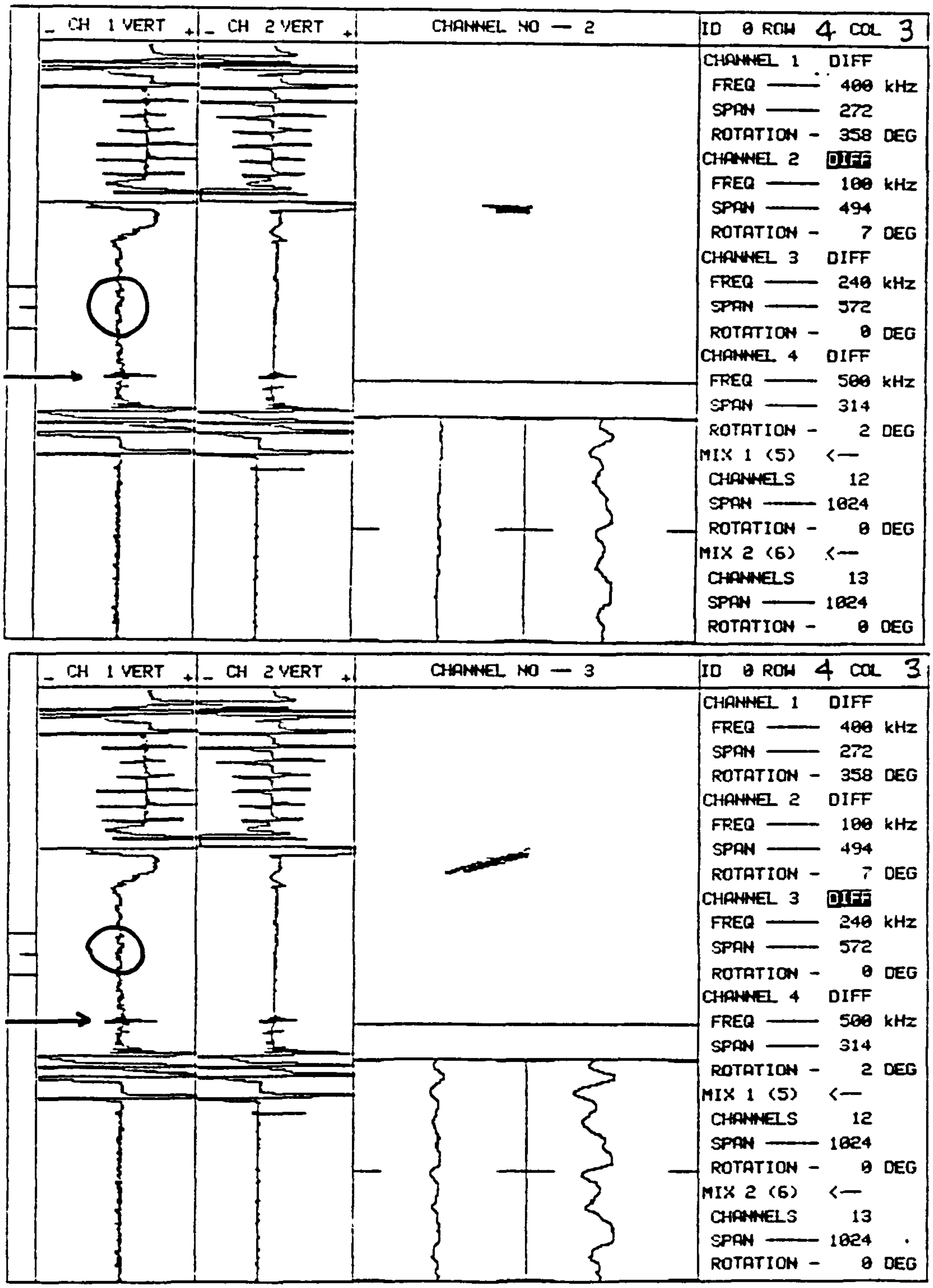


FIGURE 4.47. Specimen 568 (R4 C3) After Cleaning

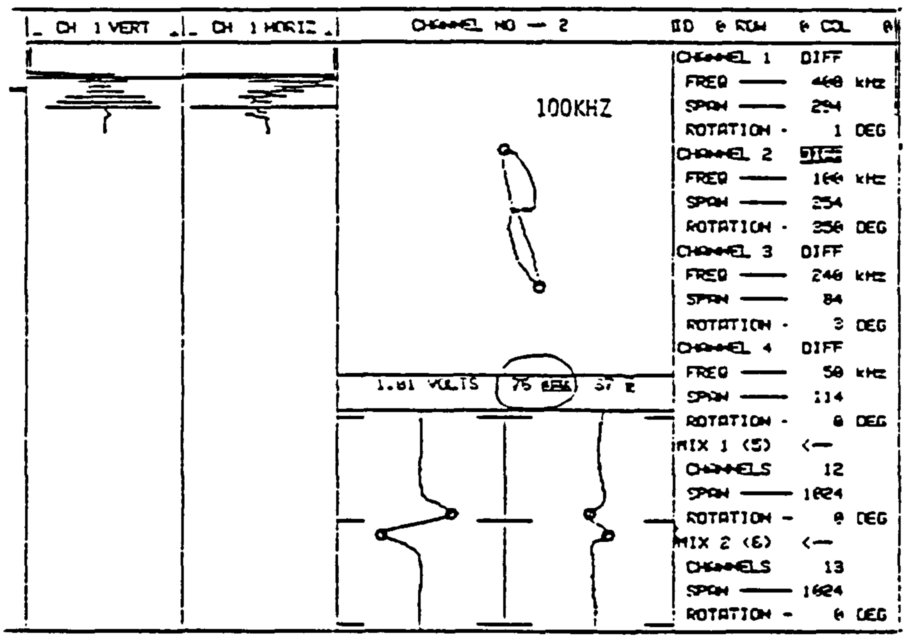
The evidence from EC NDE shows that it is not possible to determine the difference between a signal generated from a lack of Cu spot and a defect that has been coated with a Cu deposit (such as that found in the Surry generator). An experiment was performed to validate this conclusion. The American Society of Mechanical Engineers (ASME) in-line standard is used in the industry as the basis for comparing, evaluating, and sizing defects that have been detected in a generator. In the experiment, the response from an in-line standard was recorded before and after Cu plating. The studies showed that the Cu plating simulated the Cu deposit condition found in the Surry generator. The effects of the Cu are clearly shown in Figure 4.48. The response from the 40% through-wall defect before Cu plating is accurately defined. However, after the standard was Cu plated, the response, while still detectable, was dramatically altered. The phase angle response from the 40% defect changed to the degree that the defect would be classified as a non-defect.

Another example of the condition is shown in Figure 4.49. The specimen was part of the round robin studies performed on cracked tubes. Without the presence of Cu, the defect was sized as a 26% through-wall crack. Metallography confirmed that the crack was 38% through-wall. After Cu coating, a defect was detected, but it was analyzed as being a nondefined or not relevant signal. The conclusion reached from the experiment is that nondefined signals or signals of a questionable nature should be evaluated with a supplemental or alternate inspection method.

Another area of false calls is related to PV. This condition is caused by a low permeability layer at different locations along the length of the tubing. This permeability layer gave an EC signal that was representative of an ID defect indication. The technique to suppress this condition is to use a saturation probe which is constructed with magnets around the coil, which under conditions of a very low permeability will suppress the signal. When the permeability was high enough, a residual signal remained that in many cases could not be distinguished from that of an ID defect.

This problem is illustrated by the data presented in Table 4.1. Teams A through E used saturating probes, and their false call rate due to PVs was minimized. Teams V and X, on the other hand, and did not use saturation probes, and their false call rates were high because of the PV condition. Team Y collected data both on the probe insertion and removal, with a saturation coil electrically driven and turned on only when the probe was being removed. This allowed for a comparison of a signal without saturation and after saturation was applied, and helped to determine if the signal was being caused by permeability change. Team Y's false call rate was not due to signals generated by permeability change, but was attributed to the lack of Cu condition.

40% THRU WALL DEFECT



40% THRU WALL DEFECT

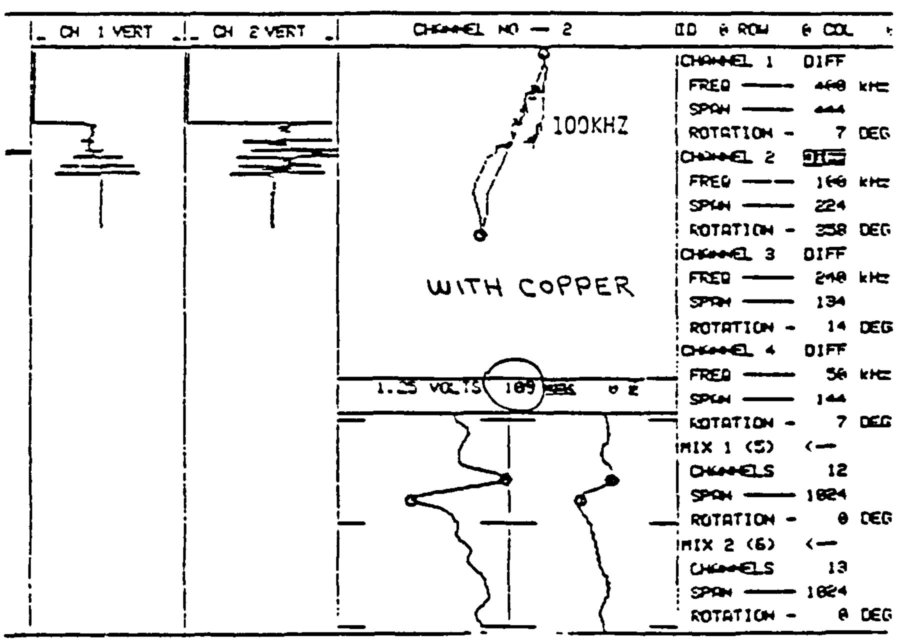


FIGURE 4.48. ASME Standard Showing a 40% Through-Wall Defect Before and After Copper Plating

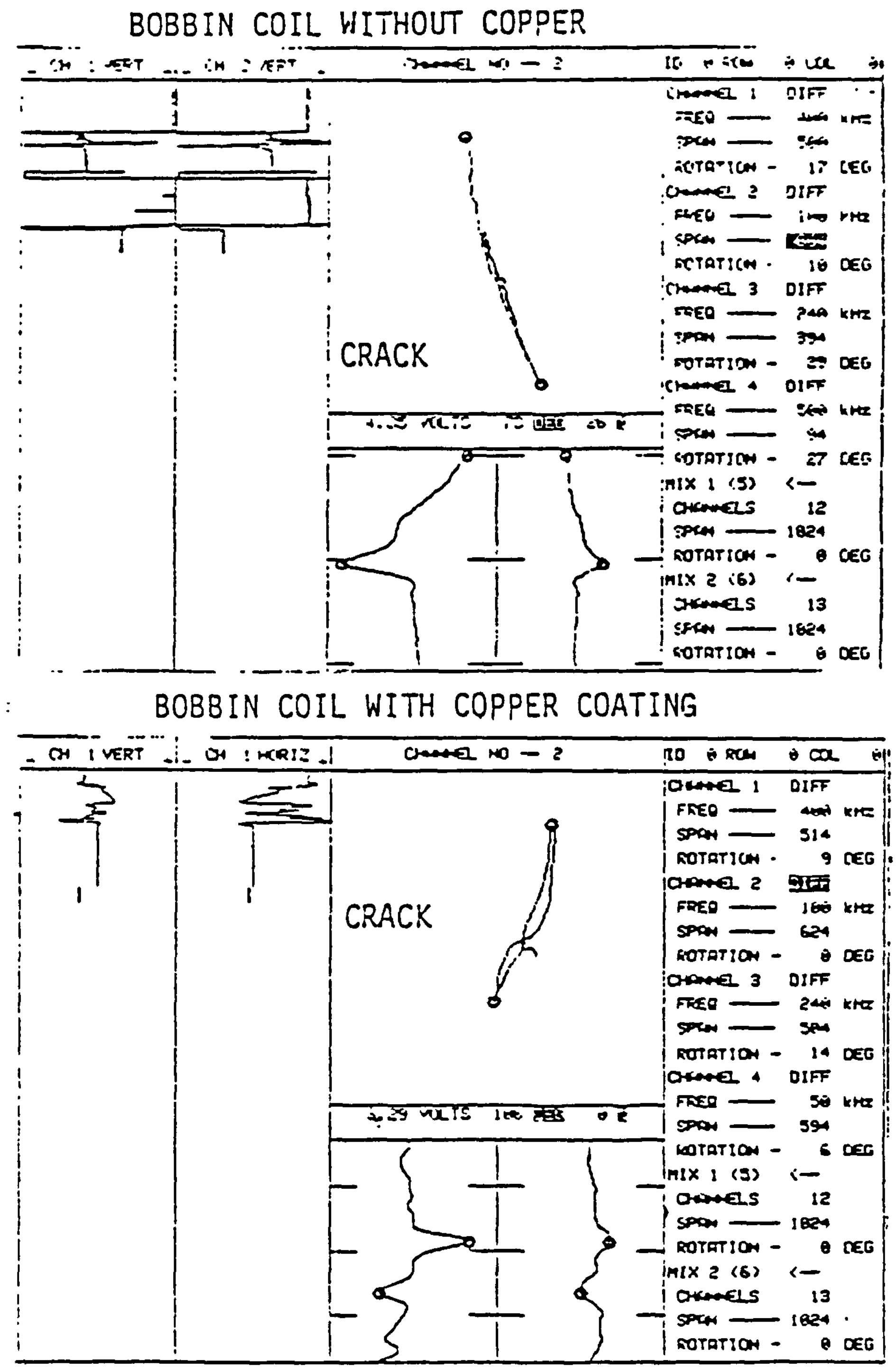


FIGURE 4.49. Changes in EC Signals from a One-Inch Crack (38% deep) Before and After Copper Plating

5.0 CONCLUSIONS

Metallurgical and visual examination of specimens from all regions of the Surry 2A steam generator identified a variety of defect types at specific locations. Pitting and wastage were the predominant defects present. These defects were located in the sludge pile region above the top of the tube sheet (TTS), within the crevice region between the tube and support plates, and to a lesser extent at antivibration bar (AVB) contact areas. The severity of the pitting/wastage type degradation was generally <20% through-wall except for specimens from the sludge pile region above the hot leg TTS where the wall loss ranged up to 87%. Sufficient numbers of specimens with other types of degradation were not found and thus, the following conclusions regarding the reliability of eddy current (EC) inspections in detecting and sizing defects relates primarily to pitting/wastage type defects.

- The probability of detecting pitting/wastage type defects increased with increasing wall loss and approached 0.9 for defects with wall losses greater than 40%. Automated data screening techniques seemed to improve the probability of detection (POD) for pitting/wastage defects over conventional analysis methods.

- Eddy current depth estimates show wide variations between teams for the same defect indication and also between specimens with similar wall losses. The team-to-team variations from a given specimen appear to result from differences in analysis procedures and analyst interpretation. This team-to-team variance could be reduced by using consistent analysis procedures. The specimen-to-specimen variations appear to be related to the complex defect morphology and the resulting complex EC signals.

- Conventional EC tended to underestimate the depth of pitting/wastage type defects; the sizing accuracy decreases as the complexity of the defect morphology and wall loss increases.

- Improved sizing accuracy was obtained for one team that employed special frequency mixes to enhance the signal-to-noise ratio by suppression of signals due to denting, copper deposits, and support plates. Also, ultrasonic and rotating EC probes were used to augment conventional EC/bobbin coil data.

- Denting at the tube support plate (TSP) intersections interfered with the EC signals and made defect detection and sizing impossible. The POD for defects at the dented TSPs was zero.

- Copper-rich deposits on the tube OD surfaces interfered with the EC signals which resulted in false calls being made in the U-bend and support plate regions of the generator. Defect-like EC signals were produced at regions where there was an interruption in the Cu-rich deposits.

- Pitting/wastage defects did not appreciably degrade tube burst strength.
- Empirical relationships of tube integrity adequately predicted margin-to-failure of pitting/wastage degraded tubes.
- Axial intergranular stress corrosion cracking initiated at the tube inside diameter in dented specimens with calculated strains as low as 10%.

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APPENDIX A

METALLURGICAL VALIDATION DATA BASE

APPENDIX A

GLOSSARY FOR THE METALLURGICAL VALIDATION DATA BASE

Spec Id	Unique number assigned to the specimen for identification purposes
Tube Row	Row number of the tube the specimen came from
Tube Col	Column number of the tube the specimen came from (99 denotes unknown for some inner row U-bend specimens)
Type	Reason for selecting a particular section for examination

(Category I - defect called by at least one team)

ADEF	defect called only during the advanced/alternate eddy current inspections
DEF	defect called during baseline or round robin eddy current inspections

(Category II - no defect called but high potential due to location)

CREV	tube sheet crevice
H/S	tube support plate intersections from hard/soft locations relative to the flow channel
IRU	inner row U-bend
RT	roll transition region
SLDG	sludge pile region
STRN	dented tube support plate intersection with profilometry results

Category III - no defect called and low potential due to location)

COND	non-defect condition(s) reported by eddy current inspections
FRAC	selected because section fractured during removal
ORU	outer row U-bend

	STRT	specimen between the tube support plate intersections

Loc Ref — Leg and location reference or support plate nearest to where the specimen came from

HTTS	CTTS	top of tube sheet
HL1	CL1	support plate #1
HL2	CL2	support plate #2
HL3	CL3	support plate #3
HL4	CL4	support plate #4
HL5	CL5	support plate #5
HL6	CL6	support plate #6
HL7	CL7	support plate #7

Spec Dist 1 — Distance in inches from bottom end of the specimen to the location reference

Spec Dist 2 — Distance in inches from top end of the specimen to the location reference

V Exam — Visual examination code

1 — outer diameter surface examination (information related to the primary reason for examining the tube, e.g., to validate a specific defect call)

2 — inner diameter surface examination (usually after plastic deformation to open tight inner diameter cracks)

3 — outer diameter surface examination (supplementary information regarding the tube condition at support plate intersections or antivibration bar contacts included in the specimen but outside the primary region of interest)

4 — examination of the fracture surfaces of tube segments broken near the bottom of the tube sheet during specimen removal

5 — examination of the inner diameter surface at the top of tube sheet after plastic deformation to check for inner diameter cracking (tube segments below metallographic samples were used)

V Ref — Visual examination reference code

AVB — visual examination refers to antivibration bar contact points

TSP — visual examination refers to a tube support plate intersection

V Type — Codes for defects found by visual examination

BT	bulged tube
CK	axial cracks
CCK	circumferential oriented cracks
D	dent
DEP	surface deposit
FAB	superficial fabrication mark
GM	grinder mark
IGA?	possible intergranular attack
IGF	intergranular fracture
IGF?	possible intergranular fracture
LCC	localized circumferential corrosion
P	pitting
RE DAM	removal damage
SC	scratch
SPOTS	local areas without thin protective oxide film
W	wastage
WEAR	surface wear from contact with anti-vibration bar

V Wall Loss — Code for visual estimate of wall loss

L	$\leq 20\%$
M	21% - 40%
H	$\geq 40\%$

V EXT1 — Axial location of bottom of degraded (corroded) region relative to:

top of tube sheet for top of tube sheet specimens
tube support plate for tube support plate and U-bend specimens

V EXT2 — Axial location of top of degraded (corroded) region relative to:

top of tube sheet for top of tube sheet specimens

tube support plate for tube support plate and U-bend specimens

M TYPE — Codes for defects found by metallographic examination

CCK	circumferential oriented cracks
GM	grinder mark
IGA	intergranular attack
IGSCC	intergranular stress corrosion cracking
LCC	localized circumferential corrosion
P	pitting
SC	scratch
W	wastage
WEAR	surface wear from contact with antivibration bar

M WALL LOSS — Metallographic estimate of % of wall loss

M EXT1	Axial location where maximum wall penetration was measured relative to:
	top of tube sheet for top of tube sheet specimens
	tube support plate for tube support plate and U-bend specimens
STRAIN	Calculated strain in % for profilometry inspected specimens from dented tube support plate intersections

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
569.3	15	49	DEF	CTTS	- 5.0	3.5	1		W	L	0.2	2.0				
570.3	24	60	DEF	CTTS	- 5.0	3.8	1		W	L	0.0	1.8				
571.3	26	48	DEF	CTTS	- 3.0	5.6	1		W	L	0.0	1.5				
574.3	9	69	DEF	CTTS	- 5.0	7.0	1		W	L	1.7	3.0				
575.3	14	27	ADEF	CTTS	- 5.0	5.4	1		W	L	0.0	1.8	W	4	1.5	
575.3	14	27	ADEF	CTTS	- 5.0	5.4	5		NONE		0.0	0.0				
576.3	18	35	ADEF	CTTS	- 5.0	5.1	1		W	L	0.0	4.0	W	5	3.3	
577.3	12	34	ADEF	CTTS	- 5.0	5.3	1		W	L	0.0	2.0	W	5	1.0	
577.3	12	34	ADEF	CTTS	- 5.0	5.3	5		NONE		0.0	0.0				
579.3	16	29	DEF	CTTS	- 5.0	6.3	1		W	L	0.0	2.5	W	7	2.2	
670.3	5	29	DEF	CTTS	- 3.0	5.0	1		W	L	0.0	1.4				
671.3	7	48	ADEF	CTTS	- 3.0	5.0	1		W	L	0.0	1.0				
674.3	6	75	DEF	CTTS	- 3.0	4.5	1		P/W	L	0.0	1.4	W	15	0.4	
675.3	6	73	DEF	CTTS	- 3.0	4.8	1		P/W	L	0.0	1.8				
677.3	7	64	DEF	CTTS	- 3.0	4.8	1		W	L	0.0	2.8				
678.3	7	27	DEF	CTTS	- 3.0	5.0	1		P/W	L	0.0	2.5	W	8	1.8	
679.3	7	61	DEF	CTTS	- 3.0	4.8	1		W	L	0.0	2.8				
680.3	20	33	DEF	CTTS	- 3.0	2.8	1		P/W	L	0.0	2.5				
684.3	8	67	DEF	CTTS	- 3.0	7.5	1		W	L	0.0	4.0				
685.3	8	68	DEF	CTTS	- 3.0	7.0	1		W	L	0.5	3.5				
686.3	8	70	DEF	CTTS	- 3.0	7.0	1		W	L	0.0	3.3				
687.3	9	40	DEF	CTTS	- 3.0	7.0	1		W	L	0.0	2.3				
688.3	9	70	DEF	CTTS	- 3.0	7.0	1		W	L	0.5	3.5				
690.3	10	27	DEF	CTTS	- 3.0	7.3	1		W	L	0.8	2.8				
690.3	10	27	DEF	CTTS	- 3.0	7.3	2		NONE							
691.3	10	29	DEF	CTTS	- 3.0	7.0	1		W	L	0.0	3.0				
692.3	10	50	DEF	CTTS	- 3.0	7.3	1		W	L	0.0	2.0				
693.3	10	68	DEF	CTTS	- 3.0	7.0	1		W/LCC	L	0.0	4.0				
695.3	11	72	DEF	CTTS	- 3.0	7.0	1		W	L	0.0	2.5				
696.3	12	48	DEF	CTTS	- 3.0	7.0	1		W	L	0.0	2.0				
697.3	12	67	ADEF	CTTS	- 3.0	7.8	1		W	L	0.0	4.0				
698.3	8	28	DEF	CTTS	- 3.0	7.0	1		W	L	0.0	2.0				
698.3	8	28	DEF	CTTS	- 3.0	7.0	2		NONE							
702.3	12	70	DEF	CTTS	- 3.0	6.8	1		W	L	0.0	2.5				
702.3	12	70	DEF	CTTS	- 3.0	6.8	2		NONE							
703.3	13	53	DEF	CTTS	- 3.0	6.8	1		W	L	0.0	2.0				
704.3	13	44	DEF	CTTS	- 3.0	6.0	1		W	L	0.0	2.8				
705.3	13	70	DEF	CTTS	- 3.0	6.8	1		W	M	0.5	2.3	W	11	2.1	
706.3	14	41	ADEF	CTTS	- 3.0	5.0	1		W	L	0.0	2.0				
707.3	14	43	DEF	CTTS	- 3.0	9.5	1		W	L	0.0	2.5				
708.3	14	52	DEF	CTTS	- 3.0	9.5	1		NONE							
709.3	14	53	DEF	CTTS	- 3.0	9.5	1		W	L	0.0	2.5				
709.3	14	53	DEF	CTTS	- 3.0	9.5	2		NONE							
710.3	14	69	DEF	CTTS	- 3.0	9.8	1		W	L	0.0	2.5				
718.3	15	69	DEF	CTTS	- 3.0	9.8	1		W	L	0.0	4.0				
719.3	15	70	DEF	CTTS	- 3.0	9.8	1		W	L	0.0	3.6				
719.3	15	70	DEF	CTTS	- 3.0	9.8	2		NONE							
720.3	16	35	ADEF	CTTS	- 3.0	6.3	1		W	L	0.0	2.8				
724.3	5	26	ADEF	CTTS	- 3.0	8.0	1		W	L	0.0	2.6	W	15	1.0	
728.3	11	54	ADEF	CTTS	12.0	22.0	1		NONE							
729.3	12	54	ADEF	CTTS	- 3.0	10.0	1		W	L	0.0	2.1				
735.3	14	72	ADEF	CTTS	- 3.0	7.8	1		W	L	0.0	1.3				
736.3	15	33	ADEF	CTTS	- 3.0	7.5	1		W	L	0.0	2.8				
739.3	15	63	ADEF	CTTS	- 3.0	8.0	1		P/W	L	0.0	3.4				
740.3	15	66	ADEF	CTTS	- 3.0	10.1	1		P/W	L	0.0	7.0				
741.3	16	32	ADEF	CTTS	- 3.0	10.0	1		W	L	0.0	2.5				
742.3	16	36	ADEF	CTTS	- 3.0	8.0	1		W	L	0.0	3.9				
743.3	16	37	ADEF	CTTS	- 3.0	8.0	1		P/W	L	0.0	6.6	P	12	6.5	
746.3	16	45	DEF	CTTS	- 3.0	8.0	1		P/W	L	0.0	5.1				
746.3	16	45	DEF	CTTS	- 3.0	8.0	2		NONE							
749.3	16	63	DEF	CTTS	- 3.0	8.5	1		P/W	L	0.0	6.2				
749.3	16	63	DEF	CTTS	- 3.0	8.5	2		NONE							

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
750.3	17	32	ADEF	CTTS	- 3.0	8.0	1		P/W	L	0.0	4.6				
750.3	17	32	ADEF	CTTS	- 3.0	8.0	2		NONE							
751.3	17	34	ADEF	CTTS	- 3.0	8.0	1		P/W	L	0.0	5.6	W	12	5.4	
752.3	17	35	DEF	CTTS	- 3.0	8.0	1		W	L	0.0	5.7				
752.3	17	35	DEF	CTTS	- 3.0	8.0	2		NONE							
753.3	17	51	ADEF	CTTS	- 3.0	10.0	1		W	L	0.0	3.0				
754.3	17	53	ADEF	CTTS	- 3.0	8.3	1		W	L	0.0	3.0				
755.3	17	55	ADEF	CTTS	- 3.0	8.0	1		P/W	L	0.0	4.5				
756.3	17	64	DEF	CTTS	- 3.0	8.5	1		W	L	0.6	4.6				
757.3	17	69	DEF	CTTS	- 3.0	7.5	1		W	L	0.0	3.3				
757.3	17	69	DEF	CTTS	- 3.0	7.5	2		NONE							
758.3	17	70	ADEF	CTTS	- 3.0	10.0	1		W	L	0.6	2.6				
759.3	18	31	ADEF	CTTS	- 3.0	6.5	1		W	L	0.0	3.5				
760.3	18	34	ADEF	CTTS	- 3.0	7.5	1		P/W	L	0.0	5.3				
762.3	18	68	DEF	CTTS	- 3.0	7.5	1		W	L	0.0	2.8				
763.3	19	32	DEF	CTTS	- 3.0	7.5	1		W	L	0.0	2.1				
763.3	19	32	DEF	CTTS	- 3.0	7.5	2		NONE							
764.3	19	34	ADEF	CTTS	- 3.0	7.5	1		W	L	0.0	2.5				
767.3	19	46	ADEF	CTTS	6.0	26.0	1		NONE							
776.3	24	26	ADEF	CTTS	- 3.0	10.0	1		NONE							
781.3	30	52	ADEF	CTTS	14.0	24.0	1		NONE							
783.3	2	29	DEF	CTTS	- 3.0	7.0	1		W	L	0.0	0.3				
783.3	2	29	DEF	CTTS	- 3.0	7.0	2		NONE							
271.3	9	60	DEF	HTTS	- 1.0	5.5	1		P/W/LCC	H	0.0	1.4	P/W	78	0.5	
272.3	6	60	DEF	HTTS	- 1.0	4.5	1		P/W/LCC	H	0.0	0.8	P/W	87	0.5	
528.3	4	52	DEF	HTTS	- 5.0	10.0	1		P/W	H	0.0	2.3	P/W	40	1.1	
528.3	4	52	DEF	HTTS	- 5.0	10.0	5		NONE		0.0	0.0				
529.3	12	31	DEF	HTTS	- 5.0	10.2	1		P/W	L	0.0	1.4	P/W	15	0.7	
529.3	12	31	DEF	HTTS	- 5.0	10.2	5		NONE		0.0	0.0				
530.3	12	48	DEF	HTTS	- 5.0	5.0	1		W/LCC	L	0.0	0.3	LCC/W	23	0.3	
530.3	12	48	DEF	HTTS	- 5.0	5.0	5		NONE		0.0	0.0				
531.3	12	70	DEF	HTTS	- 5.0	11.2	1		P/W	H	0.0	0.8	P/W	47	0.6	
531.3	12	70	DEF	HTTS	- 5.0	11.2	5		NONE		0.0	0.0				
532.3	17	32	DEF	HTTS	- 5.0	12.0	1		P/W	M	0.0	1.3	P/W	50	0.5	
532.3	17	32	DEF	HTTS	- 5.0	12.0	5		NONE		0.0	0.0				
533.3	17	69	DEF	HTTS	- 5.0	11.5	1		P/W	H	0.0	1.8	P/W	52	0.7	
533.3	17	69	DEF	HTTS	- 5.0	11.5	5		NONE		0.0	0.0				
534.3	26	48	DEF	HTTS	- 5.0	11.5	1		P/W	M	0.0	1.8	P/W	38	0.6	
534.3	26	48	DEF	HTTS	- 5.0	11.5	5		NONE		0.0	0.0				
543.3	21	36	DEF	HTTS	- 1.0	9.0	1						W	20	1.0	
544.3	22	38	DEF	HTTS	- 1.0	9.0	1		P/W	M	0.0	1.2	P/W	34	0.7	
581.3	11	71	DEF	HTTS	- 5.0	4.5	1		P/W	M	0.0	0.7	P/W	49	0.6	
581.3	11	71	DEF	HTTS	- 5.0	4.5	5		NONE		0.0	0.0				
582.3	13	73	DEF	HTTS	- 5.0	4.6	1		P/W	H	0.0	0.8	P/W	57	0.8	
582.3	13	73	DEF	HTTS	- 5.0	4.6	5		NONE		0.0	0.0				
583.3	4	30	DEF	HTTS	- 5.0	3.2	1		P/W	H	0.0	1.8	P/W	65	1.6	
583.3	4	30	DEF	HTTS	- 5.0	3.2	5		NONE		0.0	0.0				
584.3	9	69	DEF	HTTS	- 5.0	4.5	1		P/W	H	0.0	1.6	P/W	61	1.1	
584.3	9	69	DEF	HTTS	- 5.0	4.5	5		NONE		0.0	0.0				
585.3	18	65	DEF	HTTS	- 5.0	5.3	1		P/W	M	0.0	1.0	P/W	42	0.5	
585.3	18	65	DEF	HTTS	- 5.0	5.3	5		NONE		0.0	0.0				
587.3	6	65	DEF	HTTS	- 5.0	5.6	1		P/W	M	0.0	1.2	P	60	0.9	
587.3	6	65	DEF	HTTS	- 5.0	5.6	5		NONE		0.0	0.0				
588.3	6	75	DEF	HTTS	- 5.0	5.2	1		P/W	H	0.0	0.6	P/W	72	0.5	
589.3	3	29	DEF	HTTS	- 5.0	4.5	1		P/W	M	0.0	0.4	P/W	38	0.3	
589.3	3	29	DEF	HTTS	- 5.0	4.5	5		NONE		0.0	0.0				
591.3	5	18	DEF	HTTS	- 5.0	6.0	1		P/W	H	0.0	0.6	P	68	0.5	
591.3	5	18	DEF	HTTS	- 5.0	6.0	5		NONE		0.0	0.0				
592.3	6	44	DEF	HTTS	- 5.0	5.6	1		P/W	H	0.0	0.6				
595.3	4	25	DEF	HTTS	- 5.0	5.5	1		LCC/P	M	0.0	0.5	LCC/P	67	0.4	
595.3	4	25	DEF	HTTS	- 5.0	5.5	5		NONE		0.0	0.0				
596.3	6	29	DEF	HTTS	- 5.0	5.9	1		P/W	H	0.0	0.5	P	53	0.5	

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
596.3	6	29	DEF	HTTS	- 5.0	5.9	5		NONE		0.0	0.0				
597.3	5	77	DEF	HTTS	- 5.0	5.5	1		P/W	H	0.0	1.8	P/W	65	1.3	
598.3	3	50	DEF	HTTS	- 5.0	9.5	1		W	L	0.0	0.3				
599.3	4	51	DEF	HTTS	- 5.0	5.6	1		P/W	H	0.0	1.8	P/W	35	0.7	
599.3	4	51	DEF	HTTS	- 5.0	5.6	5		NONE		0.0	0.0				
600.3	5	37	DEF	HTTS	- 5.0	2.4	1		P/W	H	0.0	1.2	P/W	77	1.0	
601.3	7	48	DEF	HTTS	- 5.0	5.4	1		P/W	H	0.0	1.2				
602.3	8	69	DEF	HTTS	- 5.0	4.9	1		P/W	H	0.0	0.9				
603.3	8	54	DEF	HTTS	- 5.0	2.8	1		P/W	H	0.0	1.3				
604.3	8	44	DEF	HTTS	- 5.0	6.4	1		P/W	H	0.0	0.8	P/W	56	0.5	
605.3	8	27	DEF	HTTS	- 5.0	6.4	1		W	L	0.0	0.5				
606.3	7	64	DEF	HTTS	- 5.0	6.9	1		P/W	H	0.0	1.2	P/W	65	0.9	
607.3	7	60	DEF	HTTS	- 5.0	7.0	1		P/W	H	0.0	1.0	P/W	62	0.7	
608.3	9	58	DEF	HTTS	- 5.0	6.4	1		P/W	M	0.0	1.2	P/W	45	0.5	
609.3	9	28	DEF	HTTS	- 5.0	4.5	1		P/W	M	0.0	1.0	P/W	39	0.8	
610.3	8	83	ADEF	HTTS	- 5.0	6.0	1		NONE							
611.3	8	73	DEF	HTTS	- 5.0	6.8	1		P/W	M	0.0	0.5				
612.3	9	40	DEF	HTTS	- 5.0	5.5	1		P/W	H	0.0	0.8	P/W	52	0.7	
613.3	12	36	ADEF	HTTS	- 5.0	6.8	1		P/W	M	0.0	0.8	P/W	20	0.6	
614.3	12	34	DEF	HTTS	- 5.0	6.9	1		P/W	M	0.0	1.8				
615.3	12	30	DEF	HTTS	- 5.0	7.0	1		P/W	M	0.0	1.5				
616.3	12	28	DEF	HTTS	- 5.0	7.0	1		P/W	H	0.0	1.5	P/W	66	0.9	
617.3	11	62	DEF	HTTS	- 5.0	6.9	1		P/W	H	0.0	0.9	P/W	69	0.5	
618.3	11	57	DEF	HTTS	- 5.0	6.3	1		P/W	H	0.0	0.9	P/W	62	0.8	
619.3	11	29	DEF	HTTS	- 5.0	7.0	1		P/W	H	0.0	1.2	P	65	1.1	
620.3	10	68	DEF	HTTS	- 5.0	6.9	1		P/W	H	0.0	1.1	P/W	56	0.5	
621.3	10	65	DEF	HTTS	- 5.0	7.0	1		P/W	M	0.0	0.9	P/W	58	0.7	
622.3	10	60	DEF	HTTS	- 5.0	6.8	1		P/W	H	0.0	0.8				
623.3	10	30	DEF	HTTS	- 5.0	6.8	1		P/W	M	0.0	1.0	P/W	55	0.5	
625.3	10	53	DEF	HTTS	- 5.0	6.6	1		P/W	H	0.0	0.9	P/W	61	0.5	
626.3	10	44	DEF	HTTS	- 5.0	7.1	1		P/W	M	0.0	0.8	P/W	66	0.5	
627.3	10	24	DEF	HTTS	- 5.0	7.0	1		P/W	H	0.0	0.8	P/W	62	0.7	
628.3	9	72	DEF	HTTS	- 5.0	6.1	1		P/W	H	0.0	0.8				
629.3	12	54	DEF	HTTS	- 5.0	6.6	1		P/W	H	0.0	1.0	P/W	74	0.9	
630.3	12	76	DEF	HTTS	- 5.0	6.6	1		P/W	M	0.0	0.9	P/W	30	0.7	
631.3	13	29	DEF	HTTS	- 5.0	6.8	1		P/W	H	0.0	2.0				
632.3	13	37	DEF	HTTS	- 5.0	6.5	1		W	M	0.0	0.5	W	45	0.3	
633.3	13	44	DEF	HTTS	- 5.0	6.9	1		W/CCK	M	0.0	0.9	W/CCK	42	0.2	
634.3	13	58	DEF	HTTS	- 5.0	6.6	1		P/W	M	0.0	1.1	P/W	60	0.8	
635.3	13	61	DEF	HTTS	- 5.0	6.5	1		P/W	H	0.0	1.3				
636.3	14	27	DEF	HTTS	- 5.0	7.0	1		P/W	M	0.0	1.5	P/W	44	1.0	
637.3	14	30	DEF	HTTS	- 5.0	7.0	1		P/W	M	0.0	1.9	P/W	33	1.0	
638.3	14	43	DEF	HTTS	- 5.0	6.6	1		W	L	0.0	1.3	W	33	0.4	
639.3	14	57	DEF	HTTS	- 5.0	6.5	1		P/W	H	0.0	1.1	P/W	79	0.8	
641.3	7	27	ADEF	HTTS	- 5.0	4.5	1		P/W	L	0.0	0.8	P	18	0.8	
642.3	7	34	DEF	HTTS	- 5.0	6.8	1		P/W	M	0.0	1.0				
647.3	15	29	DEF	HTTS	- 5.0	7.5	1		P/W	M	0.0	1.8				
648.3	15	53	DEF	HTTS	- 5.0	7.0	1		P/W	H	0.0	1.4	P/W	63	0.8	
649.3	15	66	DEF	HTTS	- 5.0	7.0	1		P/W	M	0.0	0.9	P/W	47	0.7	
651.3	16	37	DEF	HTTS	- 5.0	7.0	1		P/W	L	0.0	2.8	W	12	1.1	
652.3	16	42	DEF	HTTS	- 5.0	6.9	1		P/W	M	0.0	3.5				
653.3	16	63	DEF	HTTS	- 5.0	6.9	1		P/W	H	0.0	1.2	P/W	50	0.9	
654.3	17	35	DEF	HTTS	- 5.0	7.0	1		P/W	M	0.0	2.4				
655.3	17	45	DEF	HTTS	- 5.0	6.8	1		P/W	M	0.0	3.0	P/W	34	1.3	
656.3	17	51	DEF	HTTS	- 5.0	7.1	1		P/W	M	0.0	1.4	P/W	33	1.2	
657.3	17	62	DEF	HTTS	- 5.0	7.1	1		P/W	H	0.0	1.1				
658.3	15	33	DEF	HTTS	- 5.0	6.9	1		P/W	H	0.0	2.3	P/W	67	2.3	
659.3	15	37	DEF	HTTS	- 5.0	6.6	1		W	M	0.0	1.4	W	25	1.2	
660.3	15	49	DEF	HTTS	- 5.0	7.0	1		W/LCC	L	0.0	1.3	W	23	0.6	
661.3	17	73	DEF	HTTS	- 5.0	7.0	1		P/W	H	0.0	0.8				
681.3	18	50	DEF	HTTS	- 3.0	5.3	1		P/W	M	0.0	1.8				
682.3	15	70	DEF	HTTS	- 3.0	5.0	1		P/W	M	0.0	1.8	P/W	41	0.6	

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
683.3	16	29	DEF	HTTS	- 3.0	5.0	1		P/W	M	0.0	1.3	P/W	32	0.6	
711.3	20	59	DEF	HTTS	- 3.0	7.0	1		P/W	L	0.0	0.5	P	14	0.6	
712.3	20	62	DEF	HTTS	- 3.0	8.0	1		P/W	H	0.0	2.0				
713.3	20	64	DEF	HTTS	- 3.0	7.3	1		P/W	L	0.0	2.0	P	17	0.5	
714.3	21	62	DEF	HTTS	- 3.0	8.0	1		P/W	H	0.0	1.2	P/W	62	0.7	
715.3	24	60	DEF	HTTS	- 3.0	8.0	1		W/LCC	L	0.0	2.0	LCC/W	18	0.3	
721.3	21	61	DEF	HTTS	- 3.0	7.0	1		P/W	H	0.0	1.3	P/W	59	0.7	
722.3	21	70	DEF	HTTS	- 3.0	8.3	1		P/W	H	0.0	1.2	P	48	0.5	
723.3	22	66	DEF	HTTS	- 3.0	7.0	1		P/W	H	0.0	1.0	P	67	0.5	
790.3	10	28	DEF	HTTS	- 3.0	7.5	1		P/W/LCC	M	0.0	1.0				
791.3	14	36	DEF	HTTS	- 3.0	5.5	1		W	M	0.0	0.5	W	52	0.3	
792.3	16	35	DEF	HTTS	- 3.0	6.3	1		P/W	M	0.0	1.8				
793.3	16	55	DEF	HTTS	- 3.0	6.3	1		P/W	M	0.0	1.0				
794.3	16	57	DEF	HTTS	- 3.0	6.5	1		P/W/LCC	H	0.0	1.3				
795.3	17	55	DEF	HTTS	- 3.0	6.5	1		P/W	M	0.0	1.3				
796.3	17	56	DEF	HTTS	- 3.0	6.5	1		P/W	H	0.0	1.3				
797.3	17	57	DEF	HTTS	- 3.0	6.5	1		P/W	M	0.0	1.3				
798.3	18	31	DEF	HTTS	- 3.0	7.0	1		P/W	H	0.0	2.0				
799.3	18	46	DEF	HTTS	- 3.0	7.5	1		P/W/CK	H	0.0	3.0	IGSCC	80	1.7	
807.3	19	48	DEF	HTTS	- 3.0	6.5	1		P/W	M	0.0	1.8				
812.3	20	33	DEF	HTTS	- 3.0	6.5	1		P/W	M	0.0	1.3				
813.3	20	40	DEF	HTTS	- 3.0	6.8	1		P/W	M	0.0	2.3				
814.3	20	41	DEF	HTTS	- 3.0	6.5	1		W	M	0.0	2.0				
815.3	20	43	DEF	HTTS	- 3.0	7.0	1		W	L	0.0	2.0				
816.3	20	47	DEF	HTTS	- 3.0	6.5	1		W	M	0.0	1.8				
817.3	21	41	DEF	HTTS	- 3.0	6.8	1		P/W	M	0.0	1.5				
818.3	21	44	DEF	HTTS	- 3.0	7.3	1		W	L	0.0	0.6				
819.3	21	47	DEF	HTTS	- 3.0	7.5	1		P/W	M	0.0	1.0	W	32	0.4	
821.3	22	41	DEF	HTTS	- 3.0	7.0	1		P/W	M	0.0	1.2				
822.3	22	63	DEF	HTTS	- 3.0	7.3	1		P/W	L	0.0	0.8				
823.3	23	41	DEF	HTTS	- 3.0	7.0	1		P/W	M	0.0	0.8				
824.3	23	44	DEF	HTTS	- 3.0	6.5	1		P/W	M	0.0	0.7	P	15	0.5	
825.3	23	62	DEF	HTTS	- 3.0	7.0	1		P/W	L	0.0	0.5				
826.3	24	62	DEF	HTTS	- 3.0	7.0	1		P/W	H	0.0	0.8				
827.3	25	59	DEF	HTTS	- 3.0	8.0	1		P/W	H	0.0	0.8	P/W	19	0.9	
828.3	26	52	DEF	HTTS	- 3.0	7.8	1		P/W	M	0.0	2.0				
830.3	27	35	DEF	HTTS	- 3.0	7.5	1		P/W	M	0.0	0.5	P/W	18	0.4	
952.0	4	48	ADEF	CL1	-17.8	- 7.8	1		NONE							
957.0	6	81	ADEF	CL1	-10.8	- 0.8	1		NONE							
959.0	8	54	ADEF	CL1	- 0.7	9.3	1		NONE							
960.0	10	53	ADEF	CL1	-16.3	- 6.3	1		NONE							
961.0	16	63	DEF	CL1	12.2	22.2	1		FAB		17.0	17.0				
962.0	17	53	DEF	CL1	4.4	14.4	1		NONE							
963.0	27	27	ADEF	CL1	-10.2	- 0.2	1		RE DAM							
966.0	32	19	DEF	CL1	- 4.2	7.3	1		NONE							
967.0	34	76	DEF	CL1	- 4.3	5.7	1		P/W	H	0.3	0.3				
967.0	34	76	DEF	CL1	- 4.3	5.7	3	TSP	W/P	L	0.0	0.0				
981.0	22	63	DEF	CL2	- 5.2	4.8	1		NONE							
968.0	34	76	DEF	CL3	- 4.8	5.2	1	TSP	NONE		0.0	0.0				
988.0	22	38	ADEF	CL3	- 9.0	1.0	1		NONE							
988.0	22	38	ADEF	CL3	- 9.0	1.0	2		NONE							
988.0	22	38	ADEF	CL3	- 9.0	1.0	3	TSP	W	L	0.0	0.0				
949.0	1	28	DEF	CL4	2.7	12.7	1		NONE							
965.0	27	35	ADEF	CL4	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
965.0	27	35	ADEF	CL4	- 5.0	5.0	2	TSP	NONE		0.0	0.0				
990.0	1	29	DEF	CL4	-16.4	- 6.4	1		NONE							
1000.0	40	28	DEF	CL4	- 9.2	0.8	1		NONE							
1000.0	40	28	DEF	CL4	- 9.2	0.8	3	TSP	W/P	L	0.0	0.0				
1006.0	12	54	ADEF	CL6	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
1006.0	12	54	ADEF	CL6	- 5.0	5.0	2	TSP	NONE		0.0	0.0				

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
1010.0	20	47	DEF	CL6	- 5.5	4.5	1		SPOTS		-0.5	-0.5				
1010.0	20	47	DEF	CL6	- 5.5	4.5	3	TSP	W/P	L	0.0	0.0				
1014.0	39	31	ADEF	CL6	-19.8	- 9.8	1		NONE							
1014.0	39	31	ADEF	CL6	-19.8	- 9.8	2		NONE							
493.0	11	54	DEF	CL7	- 3.0	6.0	1		SPOTS		-0.5	-0.5				
493.0	11	54	DEF	CL7	- 3.0	6.0	2	TSP	NONE		0.0	0.0				
493.0	11	54	DEF	CL7	- 3.0	6.0	3	TSP	P/W	L	0.0	0.0				
527.0	7	64	DEF	CL7	- 3.0	6.0	1		RE DAM							
527.0	7	64	DEF	CL7	- 3.0	6.0	2	TSP	NONE		0.0	0.0				
558.0	4	19	ADEF	CL7	- 2.0	17.5	1		NONE							
558.0	4	19	ADEF	CL7	- 2.0	17.5	2	TSP	NONE		0.0	0.0				
558.0	4	19	ADEF	CL7	- 2.0	17.5	3	TSP	NONE		0.0	0.0				
559.0	4	18	ADEF	CL7	- 1.0	9.0	1		SC		0.0	1.0	SC	4	0.6	
1022.0	17	32	ADEF	CL7	-35.0	-15.0	1		NONE							
863.0	12	62	ADEF	HL1	- 6.0	4.0	1		SPOTS		-0.8	-0.8				
863.0	12	62	ADEF	HL1	- 6.0	4.0	2		NONE							
863.0	12	62	ADEF	HL1	- 6.0	4.0	3	TSP	NONE		0.0	0.0				
864.0	12	70	ADEF	HL1	19.0	29.0	1		NONE							
864.0	12	70	ADEF	HL1	19.0	29.0	2		NONE							
876.0	22	72	ADEF	HL1	- 7.0	3.0	1		FAB		-3.0	-1.0				
876.0	22	72	ADEF	HL1	- 7.0	3.0	2		NONE							
876.0	22	72	ADEF	HL1	- 7.0	3.0	3	TSP	W	L	0.0	0.0				
878.0	7	48	ADEF	HL2	- 9.0	1.0	1		SPOTS							
878.0	7	48	ADEF	HL2	- 9.0	1.0	2	TSP	NONE		0.0	0.0				
878.0	7	48	ADEF	HL2	- 9.0	1.0	3	TSP	W	L	0.0	0.0				
880.0	8	79	DEF	HL2	- 4.0	6.0	1		SPOTS		1.2	1.5				
880.0	8	79	DEF	HL2	- 4.0	6.0	3	TSP	W/P	L	0.0	0.0				
883.0	11	71	DEF	HL2	- 4.3	5.7	1		SPOTS		1.2	1.2				
883.0	11	71	DEF	HL2	- 4.3	5.7	3	TSP	W/P	L	0.0	0.0				
886.0	13	73	DEF	HL2	- 5.0	5.0	1	TSP	P	L	0.0	0.0				
888.0	14	55	ADEF	HL2	-22.0	- 6.8	1		NONE							
888.0	14	55	ADEF	HL2	-22.0	- 6.8	2		NONE							
875.0	20	33	ADEF	HL3	- 1.9	8.1	1		NONE							
875.0	20	33	ADEF	HL3	- 1.9	8.1	3	TSP	W/P	L	0.0	0.0				
900.0	29	70	DEF	HL3	14.6	24.6	1		SPOTS/SC/FAB		20.0	21.0				
666.0	7	57	ADEF	HL4	13.0	23.0	1		NONE							
666.0	7	57	ADEF	HL4	13.0	23.0	2		NONE							
884.0	11	71	DEF	HL4	- 4.0	6.0	1		SPOTS		0.5	1.5				
884.0	11	71	DEF	HL4	- 4.0	6.0	3	TSP	W/P/IGA?	L	0.0	0.0				
905.0	8	28	DEF	HL4	-14.1	- 4.1	1		SPOTS		-13.0	-4.0				
913.0	14	72	ADEF	HL4	- 9.6	-19.6	1		SPOTS		-11.0	-20.0				
913.0	14	72	ADEF	HL4	- 9.6	-19.6	2		NONE							
915.0	14	73	ADEF	HL4	- 5.0	5.0	1	TSP	P	M	0.0	0.0				
915.0	14	73	ADEF	HL4	- 5.0	5.0	2	TSP	NONE		0.0	0.0				
917.0	16	35	ADEF	HL4	-28.8	-18.8	1		SPOTS		-28.0	-19.0				
917.0	16	35	ADEF	HL4	-28.8	-18.8	2		NONE							
919.0	35	56	ADEF	HL4	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
919.0	35	56	ADEF	HL4	- 5.0	5.0	2	TSP	NONE		0.0	0.0				
920.0	38	59	ADEF	HL4	13.0	23.0	1		NONE							
920.0	38	59	ADEF	HL4	13.0	23.0	2		NONE							
663.0	10	60	DEF	HL5	- 1.9	8.1	1		FAB		3.0	3.0				
663.0	10	60	DEF	HL5	- 1.9	8.1	3	TSP	W/P	L	0.0	0.0				
665.0	7	57	DEF	HL5	- 4.5	5.5	1		SPOTS		0.0	1.0				
665.0	7	57	DEF	HL5	- 4.5	5.5	3	TSP	W	L	0.0	0.0				
701.0	14	52	DEF	HL5	- 1.9	8.1	1		SPOTS		2.1	5.1				
701.0	14	52	DEF	HL5	- 1.9	8.1	3	TSP	W/P	L	0.0	0.0				
932.0	18	50	ADEF	HL5	-21.0	-11.0	1		SPOTS		-15.3	-15.3				
932.0	18	50	ADEF	HL5	-21.0	-11.0	2		NONE							
933.0	29	66	ADEF	HL5	-13.0	0.0	1		FAB		-12.0	-2.0				
933.0	29	66	ADEF	HL5	-13.0	0.0	2		NONE							
662.0	10	60	DEF	HL6	- 3.5	6.5	1		FAB		1.2	1.2				
662.0	10	60	DEF	HL6	- 3.5	6.5	3	TSP	W	L	0.0	0.0				

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
664.0	9	60	DEF	HL6	- 1.9	8.1	1		FAB		3.3	3.3				
664.0	9	60	DEF	HL6	- 1.9	8.1	3	TSP	W	L	0.0	0.0				
931.0	14	27	ADEF	HL6	0.5	10.5	1		NONE							
931.0	14	27	ADEF	HL6	0.5	10.5	3	TSP	W/P	L	0.0	0.0				
938.0	12	45	DEF	HL6	- 2.7	8.9	1		SPOTS		3.0	3.0				
938.0	12	45	DEF	HL6	- 2.7	8.9	3	TSP	W	L	0.0	0.0				
554.0	9	69	DEF	HL7	- 6.0	6.0	1		RE DAM							
554.0	9	69	DEF	HL7	- 6.0	6.0	2	TSP	NONE		0.0	0.0				
1025.0	20	69	DEF	HL7	-29.8	-19.8	1		SPOTS		-25.0	-25.0				
1026.0	46	50	DEF	HL7	-29.4	-14.7	1		HOLE		-25.0	-25.0				
418.1	28	47	DEF	CL7	0.0	24.0	1		NONE							
491.1	13	29	DEF	CL7	0.0	24.0	1		SPOTS							
491.1	13	29	DEF	CL7	0.0	24.0	3	AVB	NONE		21.0	21.0				
491.1	13	29	DEF	CL7	0.0	24.0	3	AVB	NONE		19.0	19.0				
492.1	12	29	DEF	CL7	0.0	24.0	1		NONE							
492.1	12	29	DEF	CL7	0.0	24.0	3	AVB	NONE		19.0	19.0				
492.1	12	29	DEF	CL7	0.0	24.0	3	AVB	NONE		22.0	22.0				
497.1	10	29	DEF	CL7	0.0	24.0	1		NONE							
497.1	10	29	DEF	CL7	0.0	24.0	3	AVB	IGA?		19.0	19.0	P/IGA	4	19.0	
498.1	10	28	DEF	CL7	0.0	24.0	1		NONE				NONE	0	4.0	
498.1	10	28	DEF	CL7	0.0	24.0	3	AVB	NONE		18.0	18.0				
501.1	9	28	DEF	CL7	0.0	24.0	1		SPOTS							
501.1	9	28	DEF	CL7	0.0	24.0	3	AVB	P	L	17.0	17.0				
501.1	9	28	DEF	CL7	0.0	24.0	3	AVB	NONE		19.0	19.0				
504.1	8	27	DEF	CL7	0.0	21.0	1		SPOTS							
504.1	8	27	DEF	CL7	0.0	21.0	3	AVB	NONE		17.0	17.0				
507.1	7	27	DEF	CL7	0.0	24.0	1		NONE							
507.1	7	27	DEF	CL7	0.0	24.0	3	AVB	NONE		17.0	17.0				
507.1	7	27	DEF	CL7	0.0	24.0	3	AVB	NONE		21.0	21.0				
515.1	3	29	ADEF	CL7	0.0	24.0	1		SPOTS/FAB							
515.1	3	29	ADEF	CL7	0.0	24.0	2		NONE							
561.1	5	74	DEF	CL7	0.0	13.0	1		DEP				NONE	0	2.4	
563.0	3	82	ADEF	CL7	0.0	21.0	1		NONE							
564.1	4	82	DEF	CL7	0.0	26.0	1		NONE							
564.1	4	82	DEF	CL7	0.0	26.0	2		NONE							
566.1	8	83	DEF	CL7	0.0	34.0	1		NONE							
566.1	8	83	DEF	CL7	0.0	34.0	3	AVB	NONE		20.0	20.0				
566.1	8	83	DEF	CL7	0.0	34.0	3	AVB	NONE		14.0	14.0				
568.0	4	3	ADEF	CL7	0.0	26.0	1		SPOTS/FAB							
568.0	4	3	ADEF	CL7	0.0	26.0	2		NONE							
428.1	46	45	DEF	HL7	0.0	32.0	1		GM	H	14.0	14.0	GM	72	14.0	
429.1	46	50	DEF	HL7	2.0	34.0	1		GM	H	20.0	20.0	GM	66	20.0	
430.2	35	56	DEF	HL7	32.0	64.0	1		SPOTS							
430.2	35	56	DEF	HL7	32.0	64.0	3	AVB	NONE		53.0	53.0	NONE	0	53.0	
430.2	35	56	DEF	HL7	32.0	64.0	3		SPOTS		61.0	61.0	NONE	0	61.0	
432.1	33	51	DEF	HL7	0.0	29.0	1		SPOTS							
438.1	24	60	DEF	HL7	10.0	40.0	1		SPOTS							
439.1	23	55	DEF	HL7	6.0	30.0	1		NONE							
439.1	23	55	DEF	HL7	6.0	30.0	3	AVB	NONE							
445.1	19	51	DEF	HL7	6.0	32.0	1		SPOTS							
448.1	17	51	DEF	HL7	4.0	28.0	1		SPOTS							
448.1	17	51	DEF	HL7	4.0	28.0	3	AVB	WEAR	L	23.0	23.0				
449.1	15	49	DEF	HL7	0.0	28.0	1		SPOTS							
449.1	15	49	DEF	HL7	0.0	28.0	3	AVB	NONE		23.0	23.0				
450.1	14	52	DEF	HL7	0.0	18.0	1		SPOTS							

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
573.1	18	65	RT	CTTS	-21.0	-18.0	1		NONE							
573.1	18	65	RT	CTTS	-21.0	-18.0	2		NONE							
573.3	18	65	SLDG	CTTS	- 5.0	6.9	1		W	L	2.0	3.5				
575.1	14	27	RT	CTTS	-21.0	-18.0	1		NONE							
575.1	14	27	RT	CTTS	-21.0	-18.0	2		NONE							
575.2	14	27	CREV	CTTS	-18.0	- 5.0	1		NONE							
575.2	14	27	CREV	CTTS	-18.0	- 5.0	2		NONE							
576.1	18	35	RT	CTTS	-21.0	-18.0	1		NONE							
576.1	18	35	RT	CTTS	-21.0	-18.0	2		NONE							
576.2	18	35	CREV	CTTS	-18.0	- 5.0	1		NONE							
576.2	18	35	CREV	CTTS	-18.0	- 5.0	2		NONE							
577.1	12	34	RT	CTTS	-21.0	-18.0	1		NONE							
577.1	12	34	RT	CTTS	-21.0	-18.0	2		NONE							
577.2	12	34	CREV	CTTS	-18.0	- 5.0	1		NONE							
577.2	12	34	CREV	CTTS	-18.0	- 5.0	2		NONE							
579.1	16	29	RT	CTTS	-21.0	-18.0	1		NONE							
579.1	16	29	RT	CTTS	-21.0	-18.0	2		NONE							
579.2	16	29	CREV	CTTS	-18.0	- 5.0	1		NONE							
579.2	16	29	CREV	CTTS	-18.0	- 5.0	2		NONE							
580.1	27	35	RT	CTTS	-21.0	-18.0	1		NONE							
580.1	27	35	RT	CTTS	-21.0	-18.0	2		NONE							
580.2	27	35	CREV	CTTS	-18.0	- 5.0	1		NONE							
580.2	27	35	CREV	CTTS	-18.0	- 5.0	2		NONE							
580.3	27	35	SLDG	CTTS	- 5.0	6.5	1		W	L	0.5	1.3	W	24	0.6	
580.3	27	35	SLDG	CTTS	- 5.0	6.5	5		NONE		0.0	0.0				
669.3	6	38	SLDG	CTTS	- 3.0	4.0	1		P/W	L	0.0	2.8				
672.3	6	44	SLDG	CTTS	- 3.0	4.5	1		W	L	0.0	1.5				
673.3	6	53	SLDG	CTTS	- 3.0	5.0	1		W	L	0.0	2.7				
676.3	7	65	SLDG	CTTS	- 3.0	4.8	1		W	L	0.0	2.8				
680.2	20	33	CREV	CTTS	-13.5	- 5.0	1		NONE							
680.2	20	33	CREV	CTTS	-13.5	- 5.0	2		NONE							
694.3	11	63	SLDG	CTTS	- 3.0	7.0	1		P/W	L	0.5	4.3				
716.3	4	25	SLDG	CTTS	- 3.0	6.5	1		W	L	0.0	0.3				
717.3	4	63	SLDG	CTTS	- 3.0	7.0	1		W	L	0.0	2.1				
725.3	8	44	SLDG	CTTS	- 3.0	10.1	1		W	L	0.0	1.9				
730.3	12	57	SLDG	CTTS	- 3.0	10.3	1		W	L	0.0	2.9				
731.3	13	41	SLDG	CTTS	- 3.0	10.0	1		W	L	0.0	2.1				
732.3	14	55	SLDG	CTTS	- 3.0	7.8	1		W	L	0.0	3.0				
738.3	15	37	SLDG	CTTS	- 3.0	11.0	1		P/W	L	0.0	6.6				
747.3	16	60	SLDG	CTTS	- 3.0	10.0	1		P/W	L	0.0	6.0				
748.3	16	62	SLDG	CTTS	- 3.0	10.0	1		P/W	L	0.0	6.5				
761.3	18	53	SLDG	CTTS	- 3.0	10.0	1		W	L	0.0	3.0				
765.3	19	37	SLDG	CTTS	- 3.0	10.0	1		W	L	0.0	5.0				
766.3	19	39	SLDG	CTTS	- 3.0	9.0	1		P/W	M	1.0	4.0				
768.3	19	51	SLDG	CTTS	- 3.0	6.0	1		W	L	1.5	2.0				
769.3	20	43	SLDG	CTTS	- 3.0	9.0	1		P/W	L	1.1	4.1				
772.3	21	44	SLDG	CTTS	- 3.0	9.0	1		W	L	0.0	5.0				
777.3	27	59	SLDG	CTTS	- 3.0	9.0	1		W	L	0.0	0.5				
779.3	28	56	SLDG	CTTS	- 3.0	9.0	1		W	L	0.0	0.5				
780.3	29	48	SLDG	CTTS	- 3.0	6.0	1		W	L	0.0	0.8				
784.3	3	50	SLDG	CTTS	- 3.0	6.5	1		W	L	0.0	0.3				
271.2	9	60	CREV	HTTS	- 4.0	- 1.0	1						IGA	< 1	-2.5	
272.2	6	60	CREV	HTTS	- 4.5	- 1.0	1						IGA	< 1	-2.5	
543.2	21	36	CREV	HTTS	-17.0	- 1.0	1						IGA	< 2	-2.5	
543.2	21	36	CREV	HTTS	-17.0	- 1.0	1						IGA	< 2	-16.0	
544.2	22	38	CREV	HTTS	-21.0	- 1.0	1						IGA	< 2	-16.0	
544.2	22	38	CREV	HTTS	-21.0	- 1.0	1						IGA	< 2	-2.5	
581.1	11	71	RT	HTTS	-21.0	-18.0	1		NONE							
581.1	11	71	RT	HTTS	-21.0	-18.0	2		NONE							
581.2	11	71	CREV	HTTS	-18.0	- 5.0	1		NONE							
581.2	11	71	CREV	HTTS	-18.0	- 5.0	2		NONE							
582.1	13	73	RT	HTTS	-21.0	-18.0	1		NONE							

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
582.1	13	73	RT	HTTS	-21.0	-18.0	2		NONE							
582.2	13	73	CREV	HTTS	-18.0	- 5.0	1		NONE				IGA	< 3	-11.0	
582.2	13	73	CREV	HTTS	-18.0	- 5.0	2		NONE							
583.1	4	30	RT	HTTS	-21.0	-18.0	1		NONE							
583.1	4	30	RT	HTTS	-21.0	-18.0	2		NONE							
583.2	4	30	CREV	HTTS	-18.0	- 5.0	1		NONE							
583.2	4	30	CREV	HTTS	-18.0	- 5.0	2		NONE							
584.1	9	69	RT	HTTS	-21.0	-18.0	1		NONE							
584.1	9	69	RT	HTTS	-21.0	-18.0	2		NONE							
584.2	9	69	CREV	HTTS	-18.0	- 5.0	1		NONE				IGA	< 3	-8.0	
584.2	9	69	CREV	HTTS	-18.0	- 5.0	2		NONE							
585.2	18	65	CREV	HTTS	-18.0	- 5.0	1		NONE							
585.2	18	65	CREV	HTTS	-18.0	- 5.0	2		NONE							
589.2	3	29	CREV	HTTS	-14.3	- 5.0	1		NONE							
589.2	3	29	CREV	HTTS	-14.3	- 5.0	2		NONE							
590.3	2	29	SLDG	HTTS	- 5.0	4.6	1		W	L	0.0	0.3				
591.2	5	18	CREV	HTTS	-14.3	- 5.0	1		NONE							
591.2	5	18	CREV	HTTS	-14.3	- 5.0	2		NONE							
593.3	5	26	SLDG	HTTS	- 5.0	3.8	1		P/W	M	0.0	0.5				
593.3	5	26	SLDG	HTTS	- 5.0	3.8	5		NONE		0.0	0.0				
594.3	3	28	SLDG	HTTS	- 5.0	5.6	1		P/W	L	0.0	0.4				
599.2	4	51	CREV	HTTS	-18.0	- 5.0	1		NONE							
599.2	4	51	CREV	HTTS	-18.0	- 5.0	2		NONE							
643.3	4	39	SLDG	HTTS	- 5.0	3.8	1		W	L	0.0	0.3				
644.3	4	48	SLDG	HTTS	- 5.0	5.6	1		W	L	0.0	0.3				
645.2	4	63	CREV	HTTS	-14.6	- 5.0	1		NONE							
645.2	4	63	CREV	HTTS	-14.6	- 5.0	2		NONE							
645.3	4	63	SLDG	HTTS	- 5.0	6.0	1		P/W	L	0.0	0.4				
835.3	1	28	SLDG	HTTS	- 3.0	5.0	1		NONE							
836.3	1	38	SLDG	HTTS	- 3.0	4.0	1		NONE							
1057.0	23	38	RT	HTTS	-19.0	-18.0	1		NONE				IGA	< 3	-18.5	
1057.0	23	38	RT	HTTS	-19.0	-18.0	2		NONE							
950.0	2	29	H/S	CL1	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
951.0	4	30	H/S	CL1	- 5.0	5.0	1	TSP	W	L	0.0	0.0				
954.0	5	17	H/S	CL1	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
1015.0	5	18	H/S	CL1	- 5.0	5.0	1	TSP	W	L	0.0	0.0				
1032.0	5	26	H/S	CL1	- 5.0	5.0	1	TSP	W	L	0.0	0.0				
953.0	4	48	H/S	CL2	- 5.0	5.0	1	TSP	W	L	0.0	0.0				
955.0	5	17	H/S	CL2	- 5.0	5.0	1	TSP	W	L	0.0	0.0				
970.0	4	82	H/S	CL2	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
1028.0	2	29	H/S	CL2	- 5.0	5.0	1	TSP	D/W/P	L	0.0	0.0				
1028.0	2	29	H/S	CL2	- 5.0	5.0	2	TSP	NONE		0.0	0.0				
1029.0	5	18	H/S	CL2	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
983.0	1	38	H/S	CL3	- 5.0	5.0	1	TSP	W	L	0.0	0.0				
1027.0	1	28	H/S	CL3	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
985.0	3	29	H/S	CL4	- 5.0	5.0	1	TSP	D/P/W	L	0.0	0.0				
985.0	3	29	H/S	CL4	- 5.0	5.0	2	TSP	NONE		0.0	0.0				
991.0	4	52	H/S	CL4	- 5.0	5.0	1	TSP	D/W/P	L	0.0	0.0				
991.0	4	52	H/S	CL4	- 5.0	5.0	2	TSP	NONE		0.0	0.0				
996.0	5	76	H/S	CL4	- 5.0	5.0	1	TSP	W	L	0.0	0.0				
997.0	5	82	H/S	CL4	- 5.0	5.0	1		P	L	0.2	0.2				
997.0	5	82	H/S	CL4	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
1031.0	5	18	H/S	CL4	- 5.0	5.0	1	TSP	W	L	0.0	0.0				
1033.0	5	26	H/S	CL5	- 5.0	5.0	1	TSP	W	L	0.0	0.0				
992.0	4	52	H/S	CL6	- 5.0	5.0	1	TSP	D/P	L	0.0	0.0				
992.0	4	52	H/S	CL6	- 5.0	5.0	2	TSP	NONE		0.0	0.0				
1004.0	5	26	H/S	CL6	- 5.0	5.0	1	TSP	D/P/W/IGA?	L	0.0	0.0				
1004.0	5	26	H/S	CL6	- 5.0	5.0	2	TSP	NONE		0.0	0.0				
1034.0	5	82	H/S	CL6	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
523.0	4	42	H/S	CL7	- 2.0	6.0	1	TSP	P/W	L	0.0	0.0				

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
523 0	4	42	H/S	CL7	- 2 0	6 0	2	TSP	NONE		0 0	0 0				
524 0	4	43	H/S	CL7	- 1 0	6 0	1	TSP	P/W	L	0 0	0 0				
837 0	1	27	H/S	HL1	- 5 0	5 0	1	TSP	W/P	L	0 0	0 0				
838 0	1	28	H/S	HL1	- 5 0	5 0	1	TSP	P	L	0 0	0 0				
839 0	1	29	H/S	HL1	- 5 0	5 0	1	TSP	W/P	L	0 0	0 0				
851 0	5	26	H/S	HL1	- 5 0	5 0	1	TSP	D/P/W/IGA?	L	0 0	0 0	P/W	4	0 0	
851 0	5	26	H/S	HL1	- 5 0	5 0	2	TSP	CK		0 0	0 0	IGSCC	36	0 0	
855 0	5	64	H/S	HL1	- 5 0	5 0	1	TSP	W	L	0 0	0 0				
856 0	5	77	H/S	HL1	- 5 0	5 0	1	TSP	D/W/P	L	0 0	0 0	W/IGA	< 2	0 0	
856 0	5	77	H/S	HL1	- 5 0	5 0	2	TSP	CK		0 0	0 0	IGSCC	27	0 0	
857 0	5	82	H/S	HL1	- 5 0	5 0	1	TSP	W/P	L	0 0	0 0				
1039 0	4	28	H/S	HL1	- 5 0	5 0	1	TSP	D/P/W	L	0 0	0 0				
1041 0	4	51	STRN	HL1	- 5 0	5 0	1	TSP	D/W/P/IGA?	L	0 0	0 0	P/W/IGA	12	0 0	26 9
1041 0	4	51	STRN	HL1	- 5 0	5 0	2	TSP	CK		0 0	0 0	IGSCC	88	0 0	26 9
1042 0	5	37	H/S	HL1	- 5 0	5 0	1	TSP	D/W/P/IGA?	L	0 0	0 0				
1042 0	5	37	H/S	HL1	- 5 0	5 0	2	TSP	CK		0 0	0 0				
1047 0	42	31	STRN	HL1	- 5 0	5 0	1	TSP	D/W/P	L	0 0	0 0				29 3
858 0	5	82	H/S	HL2	- 5 0	5 0	1	TSP	W/P	L	0 0	0 0				
877 0	2	28	H/S	HL2	- 5 0	5 0	1	TSP	D/P/W/CK	L	0 0	0 0				
877 0	2	28	H/S	HL2	- 5 0	5 0	2	TSP	CK		0 0	0 0				
1040 0	4	20	STRN	HL2	- 5 0	5 0	1	TSP	D/W/P/IGA?	L	0 0	0 0				20 7
840 0	1	29	H/S	HL3	- 5 0	5 0	1	TSP	W/P	L	0 0	0 0				
859 0	5	82	H/S	HL3	- 5 0	5 0	1	TSP	W/P	L	0 0	0 0				
1043 0	10	39	STRN	HL3	- 5 0	5 0	1	TSP	D/W/P	L	0 0	0 0				24 4
841 0	4	30	H/S	HL4	- 5 0	5 0	1	TSP	D/W/P	L	0 0	0 0				
860 0	5	82	H/S	HL4	- 5 0	5 0	1	TSP	W/P	L	0 0	0 0				
902 0	3	28	STRN	HL4	- 5 0	5 0	1	TSP	D/P/W/IGA?	L	0 0	0 0				20 7
903 0	4	28	STRN	HL4	- 5 0	5 0	1	TSP	D/P/IGA?	L	0 0	0 0				20 7
908 0	10	39	STRN	HL4	- 5 0	5 0	1	TSP	D/W/P/CK	L	0 0	0 0				17 9
908 0	10	39	STRN	HL4	- 5 0	5 0	2	TSP	NONE		0 0	0 0				17 9
921 0	42	47	STRN	HL4	- 5 0	5 0	1	TSP	D/W/P	L	0 0	0 0	W	< 2	0 0	11 1
921 0	42	47	STRN	HL4	- 5 0	5 0	2	TSP	CK		0 0	0 0	IGSCC	44	0 0	11 1
924 0	4	36	STRN	HL4	- 5 0	5 0	1	TSP	D/W/P/IGA?	L	0 0	0 0				14 1
924 0	4	36	STRN	HL4	- 5 0	5 0	2	TSP	NONE		0 0	0 0				14 1
861 0	5	82	H/S	HL5	- 5 0	5 0	1	TSP	W/P	L	0 0	0 0				
861 0	5	82	H/S	HL5	- 5 0	5 0	2	TSP	NONE		0 0	0 0				
909 0	10	39	STRN	HL5	- 5 0	5 0	1	TSP	D/W/P/CK	L	0 0	0 0	IGA	6	0 0	11 9
909 0	10	39	STRN	HL5	- 5 0	5 0	2	TSP	CK		0 0	0 0	IGSCC	70	0 0	11 9
922 0	4	20	STRN	HL5	- 5 0	5 0	1	TSP	D/P/W	L	0 0	0 0				9 9
922 0	4	20	STRN	HL5	- 5 0	5 0	2	TSP	NONE		0 0	0 0				9 9
923 0	4	36	STRN	HL5	- 5 0	5 0	1	TSP	D/W/P	L	0 0	0 0				13 4
923 0	4	36	STRN	HL5	- 5 0	5 0	2	TSP	NONE		0 0	0 0				13 4
925 0	4	51	STRN	HL5	- 5 0	5 0	1	TSP	D/W/P/IGA?	L	0 0	0 0	P/W/IGA	5	0 0	27 0
925 0	4	51	STRN	HL5	- 5 0	5 0	2	TSP	CK		0 0	0 0	IGSCC	67	0 0	27 0
927 0	5	37	STRN	HL5	- 5 0	5 0	1	TSP	D/W/P/IGA?	L	0 0	0 0				12 5
927 0	5	37	STRN	HL5	- 5 0	5 0	2	TSP	NONE		0 0	0 0				12 5
929 0	12	36	STRN	HL5	- 5 0	5 0	1	TSP	D/W/P	L	0 0	0 0				10 1
929 0	12	36	STRN	HL5	- 5 0	5 0	2	TSP	NONE		0 0	0 0				10 1
935 0	45	52	STRN	HL5	- 5 0	5 0	1	TSP	D/W/P/IGA?	L	0 0	0 0	P/W/IGA	10	0 0	17 1
935 0	45	52	STRN	HL5	- 5 0	5 0	2	TSP	CK		0 0	0 0	IGSCC	64	0 0	17 1
862 0	5	82	H/S	HL6	- 5 0	5 0	1	TSP	W/P	L	0 0	0 0				
926 0	4	51	STRN	HL6	- 5 0	5 0	1	TSP	D/W/P/IGA?	L	0 0	0 0	P/W/IGA	6	0 0	39 1
926 0	4	51	STRN	HL6	- 5 0	5 0	2	TSP	CK		0 0	0 0	IGSCC	57	0 0	39 1
944 0	40	34	STRN	HL6	- 5 0	5 0	1	TSP	D/W/LCC	L	0 0	0 0				28 5
945 0	44	37	STRN	HL6	- 5 0	5 0	1	TSP	D/W/P	L	0 0	0 0				18 6
946 0	44	48	STRN	HL6	- 5 0	5 0	1	TSP	D/W/P/IGA?	L	0 0	0 0				14 7
947 0	45	55	STRN	HL6	- 5 0	5 0	1	TSP	D/W/P/IGA?	L	0 0	0 0	W/IGA	5	0 0	16 5
947 0	45	55	STRN	HL6	- 5 0	5 0	2	TSP	NONE		0 0	0 0	NONE	0	0 0	16 5
451 0	45	50	STRN	HL7	- 7 0	3 0	1	TSP	D/W/CK	L	0 0	0 0				79 8
452 0	42	31	STRN	HL7	- 5 0	2 0	1	TSP	D/W	L	0 0	0 0				35 7
453 0	42	47	STRN	HL7	- 4 7	4 0	1	TSP	D/P/W	L	0 0	0 0				60 4
454 0	40	34	STRN	HL7	- 5 0	1 5	1	TSP	D/W/P/CK	L	0 0	0 0				88 3

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
455.0	9	47	STRN	HL7	- 3.0	5.0	1	TSP	D/P/W	L	0.0	0.0	P/W	8	0.0	7.0
455.0	9	47	STRN	HL7	- 3.0	5.0	2	TSP	NONE		0.0	0.0	NONE	0	0.0	7.0
525.0	12	36	STRN	HL7	- 2.0	6.0	1	TSP	RE DAM		0.0	0.0				5.4
525.0	12	36	STRN	HL7	- 2.0	6.0	2	TSP	NONE		0.0	0.0				5.4
553.0	9	70	STRN	HL7	- 6.0	6.0	1	TSP	P/W	L	0.0	0.0				4.2
553.0	9	70	STRN	HL7	- 6.0	6.0	2	TSP	NONE		0.0	0.0				4.2
560.0	5	18	H/S	HL7	- 4.0	16.0	1	TSP	P/W	L	0.0	0.0				
560.0	5	18	H/S	HL7	- 4.0	16.0	2	TSP	NONE		0.0	0.0				
565.1	5	82	H/S	HL7	- 2.0	19.0	1	TSP	NONE							
567.0	21	71	STRN	HL7	- 4.0	6.0	1	TSP	W/P	L	0.0	0.0				4.9
567.0	21	71	STRN	HL7	- 4.0	6.0	2	TSP	NONE		0.0	0.0				4.9
340.1	3	86	IRU	CL7	0.0	7.0	1		NONE							
340.1	3	86	IRU	CL7	0.0	7.0	2		NONE							
340.2	3	86	IRU	CL7	7.0	14.0	1		NONE							
340.2	3	86	IRU	CL7	7.0	14.0	2		NONE							
340.3	3	86	IRU	CL7	14.0	21.0	1		NONE							
340.3	3	86	IRU	CL7	14.0	21.0	2		NONE							
405.1	3	85	IRU	CL7	0.0	7.0	1		NONE							
405.1	3	85	IRU	CL7	0.0	7.0	2		NONE							
405.2	3	85	IRU	CL7	7.0	14.0	1		NONE							
405.2	3	85	IRU	CL7	7.0	14.0	2		NONE							
405.3	3	85	IRU	CL7	14.0	21.0	1		NONE							
405.3	3	85	IRU	CL7	14.0	21.0	2		NONE							
406.1	3	87	IRU	CL7	0.0	7.0	1		NONE							
406.1	3	87	IRU	CL7	0.0	7.0	2		NONE							
406.2	3	87	IRU	CL7	7.0	14.0	1		NONE							
406.2	3	87	IRU	CL7	7.0	14.0	2		NONE							
406.3	3	87	IRU	CL7	14.0	21.0	1		NONE							
406.3	3	87	IRU	CL7	14.0	21.0	2		NONE							
514.0	4	28	IRU	CL7	0.0	26.0	1		NONE							
1048.1	2	26	IRU	CL7	0.0	4.0	1		NONE							
1048.1	2	26	IRU	CL7	0.0	4.0	2		NONE							
1048.2	2	26	IRU	CL7	4.0	13.0	1		CK		8.5	8.5				
1048.2	2	26	IRU	CL7	4.0	13.0	2		NONE							
1048.3	2	26	IRU	CL7	13.0	17.0	1		NONE							
1048.3	2	26	IRU	CL7	13.0	17.0	2		NONE							
1049.1	2	27	IRU	CL7	0.0	4.0	1		NONE							
1049.1	2	27	IRU	CL7	0.0	4.0	2		NONE							
1049.2	2	27	IRU	CL7	4.0	13.0	1		CK/CCK		8.5	8.5	IGSCC	55	8.5	
1049.2	2	27	IRU	CL7	4.0	13.0	2						NONE	0	8.5	
1049.3	2	27	IRU	CL7	13.0	17.0	1		NONE							
1049.3	2	27	IRU	CL7	13.0	17.0	2		NONE							
1050.1	2	28	IRU	CL7	0.0	4.0	1		NONE				NONE	0	1.5	
1050.1	2	28	IRU	CL7	0.0	4.0	2		NONE				NONE	0	1.5	
1050.2	2	28	IRU	CL7	4.0	13.0	1		CK		8.5	8.5				
1050.2	2	28	IRU	CL7	4.0	13.0	2		NONE							
1050.3	2	28	IRU	CL7	13.0	17.0	1		NONE							
1050.3	2	28	IRU	CL7	13.0	17.0	2		NONE							
1051.1	2	99	IRU	CL7	0.0	4.0	1		NONE							
1051.1	2	99	IRU	CL7	0.0	4.0	2		NONE							
1051.2	2	99	IRU	CL7	4.0	13.0	1		NONE							
1051.2	2	99	IRU	CL7	4.0	13.0	2		NONE							
1051.3	2	99	IRU	CL7	13.0	18.0	1		NONE							
1051.3	2	99	IRU	CL7	13.0	18.0	2		NONE							
1053.1	3	99	IRU	CL7	0.0	7.0	1		NONE							
1053.1	3	99	IRU	CL7	0.0	7.0	2		NONE							
1053.2	3	99	IRU	CL7	7.0	15.0	1		NONE							
1053.2	3	99	IRU	CL7	7.0	15.0	2		NONE							
1053.3	3	99	IRU	CL7	15.0	22.0	1		NONE							
1053.3	3	99	IRU	CL7	15.0	22.0	2		NONE							

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
1054.1	3	99	IRU	CL7	0.0	7.0	1		NONE							
1054.1	3	99	IRU	CL7	0.0	7.0	2		NONE							
1054.2	3	99	IRU	CL7	7.0	14.0	1		NONE							
1054.2	3	99	IRU	CL7	7.0	14.0	2		NONE							
1054.3	3	99	IRU	CL7	14.0	21.0	1		NONE							
1054.3	3	99	IRU	CL7	14.0	21.0	2		NONE							
557.0	3	19	IRU	HL7	- 3.0	20.0	1		NONE							
557.0	3	19	IRU	HL7	- 3.0	20.0	2		NONE							

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
689.3	9	72	COND	CTTS	- 3.0	7.0	1		P/W	L	0.0	2.5				
726.3	9	59	COND	CTTS	- 3.0	7.5	1		P/W	L	0.0	3.5				
727.3	10	46	COND	CTTS	- 3.0	7.3	1		W	L	0.0	1.5				
733.3	14	57	COND	CTTS	- 3.0	8.0	1		P/W	L	0.0	5.5				
776.3	22	66	COND	CTTS	- 3.0	7.5	1		W	L	0.0	1.5				
778.3	28	47	COND	CTTS	- 3.0	6.5	1		W	L	0.0	0.9				
782.3	1	38	COND	CTTS	- 3.0	7.5	1		NONE							
785.3	4	22	COND	CTTS	- 3.0	7.5	1		NONE							
543.1	21	36	FRAC	HTTS	-21.0	-17.0	2		CCK		-21.0	-18.0				
589.1	3	29	FRAC	HTTS	-21.0	-17.5	4		IGF?		-17.5	-17.5				
591.1	5	18	FRAC	HTTS	-21.0	-17.0	4		IGF?		-17.9	-17.0	IGA	< 3	-17.9	
591.1	5	18	FRAC	HTTS	-21.0	-17.0	4		IGF		-20.5	-20.0				
594.1	3	28	FRAC	HTTS	-21.0	-16.0	4		IGF?		-16.0	-16.0				
624.3	10	11	COND	HTTS	- 5.0	6.6	1		NONE							
650.3	16	16	COND	HTTS	- 5.0	6.8	1		W	L	0.0	0.4				
788.3	7	65	COND	HTTS	9.0	19.5	1		NONE							
798.1	18	31	FRAC	HTTS	-21.0	-20.0	4		IGF		-20.0	-20.0				
829.3	27	28	COND	HTTS	- 3.0	7.8	1		P/W	M	0.0	0.8	P	33	0.6	
831.3	29	70	COND	HTTS	- 3.0	10.8	1		NONE							
832.3	33	30	COND	HTTS	- 3.0	7.5	1		P/W	L	0.0	0.5				
833.3	34	59	COND	HTTS	- 3.0	7.8	1		P/W	L	0.0	0.5				
834.3	1	10	COND	HTTS	- 3.0	5.0	1		NONE							
1055.0	17	48	FRAC	HTTS	-21.0	-19.8	4		IGF		-19.8	-19.8	CCK	64	-20.0	
1056.0	15	40	FRAC	HTTS	-21.0	-19.7	4		IGF		-19.7	-19.7	CCK	64	-20.0	
948.0	1	28	STRT	CL1	-35.0	-15.0	1		RE DAM							
958.0	7	42	STRT	CL1	-35.0	-15.0	1		NONE							
964.0	27	35	STRT	CL1	2.4	12.4	1		NONE							
1017.0	16	36	STRT	CL1	12.7	22.7	1		NONE							
1035.0	8	73	COND	CL1	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
1037.0	14	36	COND	CL1	- 5.0	5.0	1	TSP	BT		0.0	0.0				
971.0	8	73	COND	CL2	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
975.0	10	68	STRT	CL2	4.0	14.0	1		NONE							
977.0	14	36	COND	CL2	- 5.0	5.0	1	TSP	BT/W/P	L	0.0	0.0				
980.0	15	50	COND	CL2	-11.7	- 1.7	1		RE DAM							
1018.0	16	36	STRT	CL2	5.2	15.2	1		SPOTS		9.0	11.0				
1038.0	40	28	COND	CL2	17.4	27.4	1		NONE							
956.0	5	17	STRT	CL3	-35.0	-15.0	1		NONE							
972.0	8	73	COND	CL3	- 5.0	5.0	1	TSP	W	L	0.0	0.0				
978.0	14	36	COND	CL3	- 5.0	5.0	1	TSP	BT/W/P	L	0.0	0.0				
984.0	3	29	COND	CL3	17.3	27.3	1		NONE							
986.0	12	34	STRT	CL3	1.2	11.2	1		NONE							
1030.0	5	18	STRT	CL3	-35.0	-15.0	1		NONE							
973.0	8	73	COND	CL4	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
989.0	22	38	COND	CL4	-11.3	0.2	1		NONE							
989.0	22	38	COND	CL4	-11.3	0.2	3	TSP	W	L	0.0	0.0				
998.0	10	63	STRT	CL4	-35.0	-15.0	1		NONE							
979.0	14	36	COND	CL5	- 5.0	5.0	1	TSP	BT/P	L	0.0	0.0				
1002.0	12	36	COND	CL5	16.5	26.5	1		RE DAM							
1003.0	17	56	COND	CL5	15.7	25.7	1		SPOTS		16.0	26.0				
1019.0	16	36	COND	CL5	- 5.0	5.0	1	TSP	D/W/P	L	0.0	0.0				
1036.0	8	73	COND	CL5	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
974.0	8	73	COND	CL6	- 5.0	5.0	1	TSP	W/P	L	0.0	0.0				
976.0	10	68	STRT	CL6	11.9	21.9	1		NONE							
1005.0	7	65	COND	CL6	0.5	13.4	1		NONE							
1007.0	18	34	STRT	CL6	11.5	21.5	1		NONE							
1009.0	19	37	STRT	CL6	4.4	14.4	1		NONE							
1011.0	24	26	STRT	CL6	6.4	16.4	1		FAB		8.0	17.0				
1012.0	29	28	STRT	CL6	11.5	21.5	1		D		17.0	17.0				
1013.0	29	70	STRT	CL6	-35.0	-15.0	1		NONE							
1021.0	17	32	STRT	CL6	4.4	14.4	1		SPOTS		8.5	10.5				

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
1016 0	5	18	STRT	CL7	-35 0	-15 0	1		NONE							
1020 0	16	36	STRT	CL7	-35 0	-15 0	1		NONE							
699 0	16	57	STRT	HL1	-35 0	-15 0	1		NONE							
865 0	14	36	COND	HL1	- 5 0	5 0	1	TSP	BT		0 0	0 0				
871 0	15	33	STRT	HL1	3 6	13 6	1		SPOTS		7 5	9 5				
872 0	16	36	COND	HL1	- 5 0	5 0	1	TSP	NONE		0 0	0 0				
874 0	20	33	STRT	HL1	- 0 7	9 3	1		FAB		4 5	4 5				
866 0	14	36	COND	HL2	- 5 0	5 0	1	TSP	BT/W	L	0 0	0 0				
881 0	9	47	STRT	HL2	-35 0	-15 0	1		NONE							
889 0	14	55	COND	HL2	5 0	21 9	1		NONE							
889 0	14	55	COND	HL2	5 0	21 9	2		NONE							
891 0	16	37	STRT	HL2	2 0	12 0	1		SPOTS/FAB		4 0	9 0				
893 0	29	48	STRT	HL2	-35 0	-15 0	1		NONE							
668 0	7	61	COND	HL3	-14 8	- 4 8	1		NONE							
700 0	23	55	COND	HL3	-12 5	- 2 5	1		NONE							
867 0	14	36	COND	HL3	- 5 0	5 0	1	TSP	BT/P	L	0 0	0 0				
897 0	26	70	COND	HL3	12 0	23 0	1		SPOTS/SC		16 5	17 0				
898 0	27	70	COND	HL3	13 0	24 0	1		SPOTS/SC		19 0	19 0				
899 0	28	70	COND	HL3	13 0	25 0	1		SPOTS		20 0	23 0				
901 0	39	31	STRT	HL3	-35 0	-15 0	1		NONE							
868 0	14	36	COND	HL4	- 5 0	5 0	1	TSP	BT		0 0	0 0				
873 0	16	36	COND	HL4	- 5 0	5 0	1	TSP	D/W	L	0 0	0 0				
904 0	7	64	COND	HL4	- 5 0	5 0	1	TSP	W/P	L	0 0	0 0				
906 0	8	67	COND	HL4	- 5 0	5 0	1	TSP	W/P	L	0 0	0 0				
911 0	13	44	STRT	HL4	-35 0	-15 0	1		NONE							
918 0	24	60	STRT	HL4	-35 0	-15 0	1		NONE							
667 0	11	57	COND	HL5	-29 2	-19 2	1		SPOTS		-28 0	-19 0				
869 0	14	36	COND	HL5	- 5 0	5 0	1	TSP	BT/W	L	0 0	0 0				
879 0	7	48	COND	HL5	18 6	28 6	1		FAB		23 2	23 2				
907 0	8	67	COND	HL5	- 8 8	1 2	1		SPOTS		-5 0	-3 0				
907 0	8	67	COND	HL5	- 8 8	1 2	3	TSP	W/P	L	0 0	0 0				
930 0	14	27	STRT	HL5	-35 0	-15 0	1		NONE							
934 0	38	50	COND	HL5	7 8	17 8	1		SPOTS		13 0	13 0				
1045 0	14	72	COND	HL5	-18 8	- 8 8	1		SPOTS		10 0	19 0				
870 0	14	36	COND	HL6	- 5 0	5 0	1	TSP	BT		0 0	0 0				
885 0	11	71	STRT	HL6	5 2	15 2	1		SPOTS							
887 0	13	73	STRT	HL6	5 6	15 6	1		SPOTS		11 0	11 5				
914 0	14	72	STRT	HL6	5 6	15 6	1		SPOTS		7 0	16 0				
916 0	14	73	STRT	HL6	5 6	15 6	1		SPOTS							
936 0	6	65	STRT	HL6	-35 0	-15 0	1		NONE							
939 0	13	74	STRT	HL6	5 6	15 6	1		NONE							
940 0	15	66	STRT	HL6	6 4	16 4	1		FAB		7 0	16 0				
941 0	18	68	STRT	HL6	5 2	15 2	1		SPOTS		10 2	10 2				
942 0	24	26	STRT	HL6	7 5	17 5	1		NONE							
943 0	28	35	STRT	HL6	9 9	19 9	1		SPOTS		11 0	20 0				
414 1	32	45	ORU	CL7	0 0	24 0	1		NONE							
414 2	32	45	ORU	CL7	24 0	53 0	1	AVB	NONE		32 0	32 0				
414 3	32	45	ORU	CL7	53 0	81 0	1	AVB	NONE		56 0	56 0				
416 1	31	58	ORU	CL7	0 0	23 0	1		NONE							
416 2	31	58	ORU	CL7	23 0	46 0	1	AVB	WEAR	L	31 0	31 0	WEAR	8	31 0	
416 3	31	58	ORU	CL7	46 0	69 0	1	AVB	WEAR	L	55 0	55 0	WEAR	12	55 0	
420 1	22	58	ORU	CL7	0 0	24 0	1		NONE							
420 2	22	58	ORU	CL7	24 0	50 0	1	AVB	NONE		42 0	42 0				
420 2	22	58	ORU	CL7	24 0	50 0	1	AVB	NONE		26 0	26 0				
424 1	18	53	ORU	CL7	0 0	22 0	1		FAB		4 0	4 0	NONE	0	4 0	
424 2	18	53	ORU	CL7	22 0	40 0	1	AVB	P	L	36 0	36 0	NONE	0	36 0	
424 2	18	53	ORU	CL7	22 0	40 0	1	AVB	NONE		26 0	26 0				
424 3	18	53	ORU	CL7	40 0	57 0	1	AVB	NONE		50 0	50 0				
495 1	10	63	COND	CL7	0 0	24 0	1		NONE							
495 1	10	63	COND	CL7	0 0	24 0	3	AVB	NONE		19 0	19 0				

SPEC ID	TUBE ROW	TUBE COL	TYPE	LOC REF	SPEC DIST 1	SPEC DIST 2	V EXAM	V REF	V TYPE	V WALL LOSS	V EXT1	V EXT2	M TYPE	M WALL LOSS	M EXT1	STRAIN
495.1	10	63	COND	CL7	0.0	24.0	3	AVB	NONE		22.0	22.0				
496.2	10	30	ORU	CL7	0.0	23.0	1	AVB	P	L	18.0	18.0				
502.1	8	58	ORU	CL7	0.0	22.0	1	AVB	NONE		17.0	17.0				
502.1	8	58	ORU	CL7	0.0	22.0	1	AVB	NONE		18.0	18.0				
551.1	16	68	ORU	CL7	0.0	23.0	1		NONE							
551.2	16	68	ORU	CL7	23.0	47.0	1	AVB	NONE		26.0	26.0				
551.2	16	68	ORU	CL7	23.0	47.0	1	AVB	NONE		43.0	43.0				
551.2	16	68	ORU	CL7	23.0	47.0	1	AVB	NONE		31.0	31.0				
551.3	16	68	ORU	CL7	47.0	71.0	1	AVB	NONE		51.0	51.0				
433.1	32	45	ORU	HL7	0.0	22.0	1		NONE							
433.2	32	45	ORU	HL7	22.0	41.0	1	AVB	WEAR	L	30.0	30.0				
433.3	32	45	ORU	HL7	41.0	65.0	1	AVB	W/P	L	51.0					
435.1	31	58	ORU	HL7	0.0	23.0	1		NONE							
435.2	31	58	ORU	HL7	23.0	45.0	1	AVB	WEAR	L	30.0	30.0	WEAR	5	30.0	
435.3	31	58	ORU	HL7	45.0	66.0	1	AVB	WEAR	M	55.0	55.0	WEAR	25	55.0	
440.1	22	58	ORU	HL7	0.0	24.0	1		NONE							
440.2	22	58	ORU	HL7	24.0	49.0	1	AVB	NONE		43.0	43.0				
440.2	22	58	ORU	HL7	24.0	49.0	1	AVB	NONE		26.0	26.0				
446.1	18	53	ORU	HL7	0.0	26.0	1	AVB	WEAR	L	18.0	18.0				
446.1	18	53	ORU	HL7	0.0	26.0	1	AVB	NONE		25.0	25.0				
449.2	15	49	ORU	HL7	28.0	56.0	1	AVB	NONE		43.0	43.0				
449.2	15	49	ORU	HL7	28.0	56.0	1	AVB	NONE		52.0	52.0				
449.2	15	49	ORU	HL7	28.0	56.0	1	AVB	NONE		33.0	33.0				
450.2	14	52	ORU	HL7	18.0	50.0	1	AVB	NONE		47.0	47.0				
450.2	14	52	ORU	HL7	18.0	50.0	1	AVB	NONE		39.0	39.0				
450.2	14	52	ORU	HL7	18.0	50.0	1	AVB	NONE		22.0	22.0				
450.2	14	52	ORU	HL7	18.0	50.0	1	AVB	NONE		30.0	30.0				
496.1	10	30	ORU	HL7	0.0	28.0	1	AVB	P	L	19.0	19.0				
502.2	8	58	ORU	HL7	0.0	20.0	1	AVB	NONE		18.0	18.0				
502.2	8	58	ORU	HL7	0.0	20.0	1	AVB	NONE		17.0	17.0				

APPENDIX B

NDE VALIDATION DATA BASE

APPENDIX B

GLOSSARY FOR THE NDE VALIDATION DATA BASE

Team	Acquisition Round Robin Teams are A, B, C, D, and E. Advanced/Alternate Teams are U, UU, V, VV, and W. Baseline Teams are X and Y
Spec Id	Unique number assigned to the specimen for identification purposes
Tube Row	Row number of the tube the specimen came from
Tube Col	Column number of the tube the specimen came from
Loc Ref	Leg and location reference or support plate nearest to where the specimen came from

HTTS	CTTS	top of tube sheet
HL1	CL1	support plate #1
HL2	CL2	support plate #2
HL3	CL3	support plate #3
HL4	CL4	support plate #4
HL5	CL5	support plate #5
HL6	CL6	support plate #6
HL7	CL7	support plate #7

Spec Dist 1	Distance in inches from bottom end of the specimen to the location reference
Spec Dist 2	Distance in inches from top end of the specimen to the location reference
Origin	Denotes the origin of an eddy current defect indication

OD	outer diameter surface
ID	inner diameter surface

Type — Type of defect

W	wastage
IG	intergranular attack
WG	wastage groove

Confidence — Code for level of confidence

1	sure that signal caused by a defect, confident of its depth

	2 sure that signal caused by a defect, less sure of its depth
	3 not sure there is a defect
Wall Loss	% of wall loss detected
Defect Ref	Leg and location reference or support plate nearest to the defect
Loc Dist	Axial location in inches (relative to the reference tube support plate or top of tube sheet) where the maximum wall penetration was measured
Channel	Code for eddy current frequency or mode used to size defect
	Codes 1, 2, 3, and UT were used. The definition of each code is dependent upon the team (see Volume I of the Task 9 Report). UT denotes use of an ultrasonic probe
Tested	Y denotes area which the specimen came from was tested by that team

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	271.2	9	60	HTTS	-4.0	-1.0								Y
B	271.2	9	60	HTTS	-4.0	-1.0								Y
C	271.2	9	60	HTTS	-4.0	-1.0								Y
D	271.2	9	60	HTTS	-4.0	-1.0								Y
E	271.2	9	60	HTTS	-4.0	-1.0								Y
U	271.2	9	60	HTTS	-4.0	-1.0								
UU	271.2	9	60	HTTS	-4.0	-1.0								Y
V	271.2	9	60	HTTS	-4.0	-1.0								Y
VV	271.2	9	60	HTTS	-4.0	-1.0								Y
W	271.2	9	60	HTTS	-4.0	-1.0								
X	271.2	9	60	HTTS	-4.0	-1.0								Y
Y	271.2	9	60	HTTS	-4.0	-1.0								Y
A	271.3	9	60	HTTS	-1.0	5.5	OD		2	54.0	HTTS	1.1	1	Y
B	271.3	9	60	HTTS	-1.0	5.5	OD		2	42.0	HTTS	0.9	1	Y
C	271.3	9	60	HTTS	-1.0	5.5	OD		1	58.0	HTTS	1.1	1	Y
D	271.3	9	60	HTTS	-1.0	5.5	OD		1	57.0	HTTS	0.8	1	Y
E	271.3	9	60	HTTS	-1.0	5.5	OD		1	62.0	HTTS	0.3	1	Y
U	271.3	9	60	HTTS	-1.0	5.5								
UU	271.3	9	60	HTTS	-1.0	5.5								Y
V	271.3	9	60	HTTS	-1.0	5.5	OD	WG	1	63.0	HTTS		UT	Y
VV	271.3	9	60	HTTS	-1.0	5.5								Y
W	271.3	9	60	HTTS	-1.0	5.5								
X	271.3	9	60	HTTS	-1.0	5.5	OD	WG		48.0	HTTS	0.8	1	Y
X	271.3	9	60	HTTS	-1.0	5.5	OD	WG		63.0	HTTS	0.6	1	Y
Y	271.3	9	60	HTTS	-1.0	5.5	OD			62.0	HTTS			Y
Y	271.3	9	60	HTTS	-1.0	5.5	OD			65.0	HTTS			Y
A	272.2	6	60	HTTS	-4.5	-1.0								Y
B	272.2	6	60	HTTS	-4.5	-1.0								Y
C	272.2	6	60	HTTS	-4.5	-1.0								Y
D	272.2	6	60	HTTS	-4.5	-1.0								Y
E	272.2	6	60	HTTS	-4.5	-1.0								Y
U	272.2	6	60	HTTS	-4.5	-1.0								
UU	272.2	6	60	HTTS	-4.5	-1.0								Y
V	272.2	6	60	HTTS	-4.5	-1.0								Y
VV	272.2	6	60	HTTS	-4.5	-1.0								Y
W	272.2	6	60	HTTS	-4.5	-1.0								
X	272.2	6	60	HTTS	-4.5	-1.0								Y
Y	272.2	6	60	HTTS	-4.5	-1.0								Y
A	272.3	6	60	HTTS	-1.0	4.5	OD		1	43.0	HTTS	0.8	1	Y
B	272.3	6	60	HTTS	-1.0	4.5	OD		1	42.0	HTTS	0.5	5	Y
C	272.3	6	60	HTTS	-1.0	4.5	OD		1	47.0	HTTS	0.8	1	Y
D	272.3	6	60	HTTS	-1.0	4.5	OD		1	57.0	HTTS	0.8	1	Y
E	272.3	6	60	HTTS	-1.0	4.5	OD		1	40.0	HTTS	0.5	1	Y
U	272.3	6	60	HTTS	-1.0	4.5								
UU	272.3	6	60	HTTS	-1.0	4.5								Y
V	272.3	6	60	HTTS	-1.0	4.5	OD	WG	1	61.0	HTTS		UT	Y
VV	272.3	6	60	HTTS	-1.0	4.5								Y
W	272.3	6	60	HTTS	-1.0	4.5								
X	272.3	6	60	HTTS	-1.0	4.5	OD	WG		41.0	HTTS	0.7	1	Y
Y	272.3	6	60	HTTS	-1.0	4.5	OD			34.0	HTTS			Y
A	340.1	3	86	CL7	0.0	7.0								
B	340.1	3	86	CL7	0.0	7.0								
C	340.1	3	86	CL7	0.0	7.0								
D	340.1	3	86	CL7	0.0	7.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	340.1	3	86	CL7	0.0	7.0								
U	340.1	3	86	CL7	0.0	7.0								
UU	340.1	3	86	CL7	0.0	7.0								
V	340.1	3	86	CL7	0.0	7.0								
VV	340.1	3	86	CL7	0.0	7.0								
W	340.1	3	86	CL7	0.0	7.0								
X	340.1	3	86	CL7	0.0	7.0								
Y	340.1	3	86	CL7	0.0	7.0								
A	340.2	3	86	CL7	7.0	14.0								
B	340.2	3	86	CL7	7.0	14.0								
C	340.2	3	86	CL7	7.0	14.0								
D	340.2	3	86	CL7	7.0	14.0								
E	340.2	3	86	CL7	7.0	14.0								
U	340.2	3	86	CL7	7.0	14.0								
UU	340.2	3	86	CL7	7.0	14.0								
V	340.2	3	86	CL7	7.0	14.0								
VV	340.2	3	86	CL7	7.0	14.0								
W	340.2	3	86	CL7	7.0	14.0								
X	340.2	3	86	CL7	7.0	14.0								
Y	340.2	3	86	CL7	7.0	14.0								
A	340.3	3	86	CL7	14.0	21.0								
B	340.3	3	86	CL7	14.0	21.0								
C	340.3	3	86	CL7	14.0	21.0								
D	340.3	3	86	CL7	14.0	21.0								
E	340.3	3	86	CL7	14.0	21.0								
U	340.3	3	86	CL7	14.0	21.0								
UU	340.3	3	86	CL7	14.0	21.0								
V	340.3	3	86	CL7	14.0	21.0								
VV	340.3	3	86	CL7	14.0	21.0								
W	340.3	3	86	CL7	14.0	21.0								
X	340.3	3	86	CL7	14.0	21.0								
Y	340.3	3	86	CL7	14.0	21.0								
A	405.1	3	85	CL7	0.0	7.0								
B	405.1	3	85	CL7	0.0	7.0								
C	405.1	3	85	CL7	0.0	7.0								
D	405.1	3	85	CL7	0.0	7.0								
E	405.1	3	85	CL7	0.0	7.0								
U	405.1	3	85	CL7	0.0	7.0								
UU	405.1	3	85	CL7	0.0	7.0								
V	405.1	3	85	CL7	0.0	7.0								
VV	405.1	3	85	CL7	0.0	7.0								
W	405.1	3	85	CL7	0.0	7.0								
X	405.1	3	85	CL7	0.0	7.0								
Y	405.1	3	85	CL7	0.0	7.0								
A	405.2	3	85	CL7	7.0	14.0								
B	405.2	3	85	CL7	7.0	14.0								
C	405.2	3	85	CL7	7.0	14.0								
D	405.2	3	85	CL7	7.0	14.0								
E	405.2	3	85	CL7	7.0	14.0								
U	405.2	3	85	CL7	7.0	14.0								
UU	405.2	3	85	CL7	7.0	14.0								
V	405.2	3	85	CL7	7.0	14.0								
VV	405.2	3	85	CL7	7.0	14.0								
W	405.2	3	85	CL7	7.0	14.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	405.2	3	85	CL7	7.0	14.0								
Y	405.2	3	85	CL7	7.0	14.0								
A	405.3	3	85	CL7	14.0	21.0								
B	405.3	3	85	CL7	14.0	21.0								
C	405.3	3	85	CL7	14.0	21.0								
D	405.3	3	85	CL7	14.0	21.0								
E	405.3	3	85	CL7	14.0	21.0								
U	405.3	3	85	CL7	14.0	21.0								
UU	405.3	3	85	CL7	14.0	21.0								
V	405.3	3	85	CL7	14.0	21.0								
VV	405.3	3	85	CL7	14.0	21.0								
W	405.3	3	85	CL7	14.0	21.0								
X	405.3	3	85	CL7	14.0	21.0								
Y	405.3	3	85	CL7	14.0	21.0								
A	406.1	3	87	CL7	0.0	7.0								
B	406.1	3	87	CL7	0.0	7.0								
C	406.1	3	87	CL7	0.0	7.0								
D	406.1	3	87	CL7	0.0	7.0								
E	406.1	3	87	CL7	0.0	7.0								
U	406.1	3	87	CL7	0.0	7.0								
UU	406.1	3	87	CL7	0.0	7.0								
V	406.1	3	87	CL7	0.0	7.0								
VV	406.1	3	87	CL7	0.0	7.0								
W	406.1	3	87	CL7	0.0	7.0								
X	406.1	3	87	CL7	0.0	7.0								
Y	406.1	3	87	CL7	0.0	7.0								
A	406.2	3	87	CL7	7.0	14.0								
B	406.2	3	87	CL7	7.0	14.0								
C	406.2	3	87	CL7	7.0	14.0								
D	406.2	3	87	CL7	7.0	14.0								
E	406.2	3	87	CL7	7.0	14.0								
U	406.2	3	87	CL7	7.0	14.0								
UU	406.2	3	87	CL7	7.0	14.0								
V	406.2	3	87	CL7	7.0	14.0								
VV	406.2	3	87	CL7	7.0	14.0								
W	406.2	3	87	CL7	7.0	14.0								
X	406.2	3	87	CL7	7.0	14.0								
Y	406.2	3	87	CL7	7.0	14.0								
A	406.3	3	87	CL7	14.0	21.0								
B	406.3	3	87	CL7	14.0	21.0								
C	406.3	3	87	CL7	14.0	21.0								
D	406.3	3	87	CL7	14.0	21.0								
E	406.3	3	87	CL7	14.0	21.0								
U	406.3	3	87	CL7	14.0	21.0								
UU	406.3	3	87	CL7	14.0	21.0								
V	406.3	3	87	CL7	14.0	21.0								
VV	406.3	3	87	CL7	14.0	21.0								
W	406.3	3	87	CL7	14.0	21.0								
X	406.3	3	87	CL7	14.0	21.0								
Y	406.3	3	87	CL7	14.0	21.0								
A	414.1	32	45	CL7	0.0	24.0								Y
B	414.1	32	45	CL7	0.0	24.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	414.1	32	45	CL7	0.0	24.0								Y
D	414.1	32	45	CL7	0.0	24.0								Y
E	414.1	32	45	CL7	0.0	24.0								Y
U	414.1	32	45	CL7	0.0	24.0								
UU	414.1	32	45	CL7	0.0	24.0								
V	414.1	32	45	CL7	0.0	24.0								Y
VV	414.1	32	45	CL7	0.0	24.0								Y
W	414.1	32	45	CL7	0.0	24.0								
X	414.1	32	45	CL7	0.0	24.0								Y
Y	414.1	32	45	CL7	0.0	24.0								Y
A	414.2	32	45	CL7	24.0	53.0								Y
B	414.2	32	45	CL7	24.0	53.0								Y
C	414.2	32	45	CL7	24.0	53.0								Y
D	414.2	32	45	CL7	24.0	53.0								Y
E	414.2	32	45	CL7	24.0	53.0								Y
U	414.2	32	45	CL7	24.0	53.0								
UU	414.2	32	45	CL7	24.0	53.0								
V	414.2	32	45	CL7	24.0	53.0								Y
VV	414.2	32	45	CL7	24.0	53.0								Y
W	414.2	32	45	CL7	24.0	53.0								
X	414.2	32	45	CL7	24.0	53.0								Y
Y	414.2	32	45	CL7	24.0	53.0								Y
A	414.3	32	45	CL7	53.0	81.0								Y
B	414.3	32	45	CL7	53.0	81.0								Y
C	414.3	32	45	CL7	53.0	81.0								Y
D	414.3	32	45	CL7	53.0	81.0								Y
E	414.3	32	45	CL7	53.0	81.0								Y
U	414.3	32	45	CL7	53.0	81.0								
UU	414.3	32	45	CL7	53.0	81.0								
V	414.3	32	45	CL7	53.0	81.0								Y
VV	414.3	32	45	CL7	53.0	81.0								Y
W	414.3	32	45	CL7	53.0	81.0								
X	414.3	32	45	CL7	53.0	81.0								Y
Y	414.3	32	45	CL7	53.0	81.0								Y
A	416.1	31	58	CL7	0.0	23.0								Y
B	416.1	31	58	CL7	0.0	23.0								Y
C	416.1	31	58	CL7	0.0	23.0								Y
D	416.1	31	58	CL7	0.0	23.0								Y
E	416.1	31	58	CL7	0.0	23.0								Y
U	416.1	31	58	CL7	0.0	23.0								
UU	416.1	31	58	CL7	0.0	23.0								
V	416.1	31	58	CL7	0.0	23.0								Y
VV	416.1	31	58	CL7	0.0	23.0								Y
W	416.1	31	58	CL7	0.0	23.0								
X	416.1	31	58	CL7	0.0	23.0								Y
Y	416.1	31	58	CL7	0.0	23.0								Y
A	416.2	31	58	CL7	23.0	46.0								Y
B	416.2	31	58	CL7	23.0	46.0								Y
C	416.2	31	58	CL7	23.0	46.0								Y
D	416.2	31	58	CL7	23.0	46.0								Y
E	416.2	31	58	CL7	23.0	46.0								Y
U	416.2	31	58	CL7	23.0	46.0								
UU	416.2	31	58	CL7	23.0	46.0								
V	416.2	31	58	CL7	23.0	46.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	416.2	31	58	CL7	23.0	46.0								Y
W	416.2	31	58	CL7	23.0	46.0								
X	416.2	31	58	CL7	23.0	46.0								Y
Y	416.2	31	58	CL7	23.0	46.0								Y
A	416.3	31	58	CL7	46.0	69.0								Y
B	416.3	31	58	CL7	46.0	69.0								Y
C	416.3	31	58	CL7	46.0	69.0								Y
D	416.3	31	58	CL7	46.0	69.0								Y
E	416.3	31	58	CL7	46.0	69.0								Y
U	416.3	31	58	CL7	46.0	69.0								
UU	416.3	31	58	CL7	46.0	69.0								
V	416.3	31	58	CL7	46.0	69.0								Y
VV	416.3	31	58	CL7	46.0	69.0								Y
W	416.3	31	58	CL7	46.0	69.0								
X	416.3	31	58	CL7	46.0	69.0								Y
Y	416.3	31	58	CL7	46.0	69.0								Y
A	418.1	28	47	CL7	0.0	24.0								Y
B	418.1	28	47	CL7	0.0	24.0								Y
C	418.1	28	47	CL7	0.0	24.0								Y
D	418.1	28	47	CL7	0.0	24.0								Y
E	418.1	28	47	CL7	0.0	24.0								Y
U	418.1	28	47	CL7	0.0	24.0								
UU	418.1	28	47	CL7	0.0	24.0								
V	418.1	28	47	CL7	0.0	24.0								
VV	418.1	28	47	CL7	0.0	24.0								Y
W	418.1	28	47	CL7	0.0	24.0								
X	418.1	28	47	CL7	0.0	24.0								Y
Y	418.1	28	47	CL7	0.0	24.0	OD		2	< 10.0	CL7	18.9		Y
A	420.1	22	58	CL7	0.0	24.0								Y
B	420.1	22	58	CL7	0.0	24.0								Y
C	420.1	22	58	CL7	0.0	24.0								Y
D	420.1	22	58	CL7	0.0	24.0								Y
E	420.1	22	58	CL7	0.0	24.0								Y
U	420.1	22	58	CL7	0.0	24.0								
UU	420.1	22	58	CL7	0.0	24.0								
V	420.1	22	58	CL7	0.0	24.0								Y
VV	420.1	22	58	CL7	0.0	24.0								Y
W	420.1	22	58	CL7	0.0	24.0								
X	420.1	22	58	CL7	0.0	24.0								Y
Y	420.1	22	58	CL7	0.0	24.0								Y
A	420.2	22	58	CL7	24.0	50.0								Y
B	420.2	22	58	CL7	24.0	50.0								Y
C	420.2	22	58	CL7	24.0	50.0								Y
D	420.2	22	58	CL7	24.0	50.0								Y
E	420.2	22	58	CL7	24.0	50.0								Y
U	420.2	22	58	CL7	24.0	50.0								
UU	420.2	22	58	CL7	24.0	50.0								
V	420.2	22	58	CL7	24.0	50.0								Y
VV	420.2	22	58	CL7	24.0	50.0								Y
W	420.2	22	58	CL7	24.0	50.0								
X	420.2	22	58	CL7	24.0	50.0								Y
Y	420.2	22	58	CL7	24.0	50.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	424.1	18	53	CL7	0.0	22.0								Y
B	424.1	18	53	CL7	0.0	22.0								Y
C	424.1	18	53	CL7	0.0	22.0								Y
D	424.1	18	53	CL7	0.0	22.0								Y
E	424.1	18	53	CL7	0.0	22.0								Y
U	424.1	18	53	CL7	0.0	22.0								
UU	424.1	18	53	CL7	0.0	22.0								
V	424.1	18	53	CL7	0.0	22.0								Y
VV	424.1	18	53	CL7	0.0	22.0								Y
W	424.1	18	53	CL7	0.0	22.0								
X	424.1	18	53	CL7	0.0	22.0								Y
Y	424.1	18	53	CL7	0.0	22.0								Y
A	424.2	18	53	CL7	22.0	40.0								Y
B	424.2	18	53	CL7	22.0	40.0								Y
C	424.2	18	53	CL7	22.0	40.0								Y
D	424.2	18	53	CL7	22.0	40.0								Y
E	424.2	18	53	CL7	22.0	40.0								Y
U	424.2	18	53	CL7	22.0	40.0								
UU	424.2	18	53	CL7	22.0	40.0								
V	424.2	18	53	CL7	22.0	40.0								Y
VV	424.2	18	53	CL7	22.0	40.0								Y
W	424.2	18	53	CL7	22.0	40.0								
X	424.2	18	53	CL7	22.0	40.0								Y
Y	424.2	18	53	CL7	22.0	40.0								Y
A	424.3	18	53	CL7	40.0	57.0								Y
B	424.3	18	53	CL7	40.0	57.0								Y
C	424.3	18	53	CL7	40.0	57.0								Y
D	424.3	18	53	CL7	40.0	57.0								Y
E	424.3	18	53	CL7	40.0	57.0								Y
U	424.3	18	53	CL7	40.0	57.0								
UU	424.3	18	53	CL7	40.0	57.0								
V	424.3	18	53	CL7	40.0	57.0								Y
VV	424.3	18	53	CL7	40.0	57.0								Y
W	424.3	18	53	CL7	40.0	57.0								
X	424.3	18	53	CL7	40.0	57.0								Y
Y	424.3	18	53	CL7	40.0	57.0								Y
A	428.1	46	45	HL7	0.0	32.0	OD		1	66.0	HL7	18.8	1	Y
A	428.1	46	45	HL7	0.0	32.0	OD		1	60.0	HL7	23.5	1	Y
B	428.1	46	45	HL7	0.0	32.0	OD		1	65.0	HL7	23.2	1	Y
B	428.1	46	45	HL7	0.0	32.0	OD		1	66.0	HL7	27.3	1	Y
C	428.1	46	45	HL7	0.0	32.0	OD		1	61.0	HL7	22.5	1	Y
D	428.1	46	45	HL7	0.0	32.0	OD		1	73.0	HL7	22.5	1	Y
E	428.1	46	45	HL7	0.0	32.0	OD		1	76.0	HL7	21.7	1	Y
U	428.1	46	45	HL7	0.0	32.0								
UU	428.1	46	45	HL7	0.0	32.0								
V	428.1	46	45	HL7	0.0	32.0								
VV	428.1	46	45	HL7	0.0	32.0			1	66.0	HL7	23.0		Y
W	428.1	46	45	HL7	0.0	32.0								
X	428.1	46	45	HL7	0.0	32.0	OD	WG		64.0	HL7	23.7	1	Y
Y	428.1	46	45	HL7	0.0	32.0	OD		1	62.0	HL7	20.5		Y
A	429.1	46	50	HL7	2.0	34.0	OD		1	53.0	HL7	22.7	1	Y
B	429.1	46	50	HL7	2.0	34.0	OD		1	51.0	HL7	22.9	1	Y
C	429.1	46	50	HL7	2.0	34.0								Y
D	429.1	46	50	HL7	2.0	34.0	OD		1	51.0	HL7	22.8	1	Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	429 1	46	50	HL7	2 0	34 0	OD		1	59 0	HL7	22 5	1	Y
U	429 1	46	50	HL7	2 0	34 0								
UU	429 1	46	50	HL7	2 0	34 0								
V	429 1	46	50	HL7	2 0	34 0								
VV	429 1	46	50	HL7	2 0	34 0			1	62 0	HL7	23 0		Y
W	429 1	46	50	HL7	2 0	34 0								
X	429 1	46	50	HL7	2 0	34 0	OD	WG		58 0	HL7	22 6	1	Y
Y	429 1	46	50	HL7	2 0	34 0	ID			< 10 0	HL7	2 4		Y
Y	429 1	46	50	HL7	2 0	34 0	OD			50 0	HL7	19 7		Y
A	430 2	35	56	HL7	32 0	64 0								Y
B	430 2	35	56	HL7	32 0	64 0								Y
C	430 2	35	56	HL7	32 0	64 0								Y
D	430 2	35	56	HL7	32 0	64 0								Y
E	430 2	35	56	HL7	32 0	64 0								Y
U	430 2	35	56	HL7	32 0	64 0								
UU	430 2	35	56	HL7	32 0	64 0								
V	430 2	35	56	HL7	32 0	64 0								Y
VV	430 2	35	56	HL7	32 0	64 0								Y
W	430 2	35	56	HL7	32 0	64 0								
X	430 2	35	56	HL7	32 0	64 0								Y
Y	430 2	35	56	HL7	32 0	64 0	OD		2	25 0	HL7	47 2		Y
A	432 1	33	51	HL7	0 0	29 0								Y
B	432 1	33	51	HL7	0 0	29 0								Y
C	432 1	33	51	HL7	0 0	29 0								Y
D	432 1	33	51	HL7	0 0	29 0								Y
E	432 1	33	51	HL7	0 0	29 0								Y
U	432 1	33	51	HL7	0 0	29 0								
UU	432 1	33	51	HL7	0 0	29 0								
V	432 1	33	51	HL7	0 0	29 0								Y
VV	432 1	33	51	HL7	0 0	29 0								Y
W	432 1	33	51	HL7	0 0	29 0								
X	432 1	33	51	HL7	0 0	29 0								Y
Y	432 1	33	51	HL7	0 0	29 0	OD			< 10 0	HL7	4 7		Y
Y	432 1	33	51	HL7	0 0	29 0	OD			< 10 0	HL7	21 3		Y
A	433 1	32	45	HL7	0 0	22 0								Y
B	433 1	32	45	HL7	0 0	22 0								Y
C	433 1	32	45	HL7	0 0	22 0								Y
D	433 1	32	45	HL7	0 0	22 0								Y
E	433 1	32	45	HL7	0 0	22 0								Y
U	433 1	32	45	HL7	0 0	22 0								
UU	433 1	32	45	HL7	0 0	22 0								
V	433 1	32	45	HL7	0 0	22 0								Y
VV	433 1	32	45	HL7	0 0	22 0								Y
W	433 1	32	45	HL7	0 0	22 0								
X	433 1	32	45	HL7	0 0	22 0								Y
Y	433 1	32	45	HL7	0 0	22 0								Y
A	433 2	32	45	HL7	22 0	41 0								Y
B	433 2	32	45	HL7	22 0	41 0								Y
C	433 2	32	45	HL7	22 0	41 0								Y
D	433 2	32	45	HL7	22 0	41 0								Y
E	433 2	32	45	HL7	22 0	41 0								Y
U	433 2	32	45	HL7	22 0	41 0								
UU	433 2	32	45	HL7	22 0	41 0								
V	433 2	32	45	HL7	22 0	41 0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	433.2	32	45	HL7	22.0	41.0								Y
W	433.2	32	45	HL7	22.0	41.0								
X	433.2	32	45	HL7	22.0	41.0								Y
Y	433.2	32	45	HL7	22.0	41.0								Y
A	433.3	32	45	HL7	41.0	65.0								Y
B	433.3	32	45	HL7	41.0	65.0								Y
C	433.3	32	45	HL7	41.0	65.0								Y
D	433.3	32	45	HL7	41.0	65.0								Y
E	433.3	32	45	HL7	41.0	65.0								Y
U	433.3	32	45	HL7	41.0	65.0								
UU	433.3	32	45	HL7	41.0	65.0								
V	433.3	32	45	HL7	41.0	65.0								Y
VV	433.3	32	45	HL7	41.0	65.0								Y
W	433.3	32	45	HL7	41.0	65.0								
X	433.3	32	45	HL7	41.0	65.0								Y
Y	433.3	32	45	HL7	41.0	65.0								Y
A	435.1	31	58	HL7	0.0	23.0								Y
B	435.1	31	58	HL7	0.0	23.0								Y
C	435.1	31	58	HL7	0.0	23.0								Y
D	435.1	31	58	HL7	0.0	23.0								Y
E	435.1	31	58	HL7	0.0	23.0								Y
U	435.1	31	58	HL7	0.0	23.0								
UU	435.1	31	58	HL7	0.0	23.0								
V	435.1	31	58	HL7	0.0	23.0								Y
VV	435.1	31	58	HL7	0.0	23.0								Y
W	435.1	31	58	HL7	0.0	23.0								
X	435.1	31	58	HL7	0.0	23.0								Y
Y	435.1	31	58	HL7	0.0	23.0								Y
A	435.2	31	58	HL7	23.0	45.0								Y
B	435.2	31	58	HL7	23.0	45.0								Y
C	435.2	31	58	HL7	23.0	45.0								Y
D	435.2	31	58	HL7	23.0	45.0								Y
E	435.2	31	58	HL7	23.0	45.0								Y
U	435.2	31	58	HL7	23.0	45.0								
UU	435.2	31	58	HL7	23.0	45.0								
V	435.2	31	58	HL7	23.0	45.0								Y
VV	435.2	31	58	HL7	23.0	45.0								Y
W	435.2	31	58	HL7	23.0	45.0								
X	435.2	31	58	HL7	23.0	45.0								Y
Y	435.2	31	58	HL7	23.0	45.0								Y
A	435.3	31	58	HL7	45.0	66.0								Y
B	435.3	31	58	HL7	45.0	66.0								Y
C	435.3	31	58	HL7	45.0	66.0								Y
D	435.3	31	58	HL7	45.0	66.0								Y
E	435.3	31	58	HL7	45.0	66.0								Y
U	435.3	31	58	HL7	45.0	66.0								
UU	435.3	31	58	HL7	45.0	66.0								
V	435.3	31	58	HL7	45.0	66.0								Y
VV	435.3	31	58	HL7	45.0	66.0								Y
W	435.3	31	58	HL7	45.0	66.0								
X	435.3	31	58	HL7	45.0	66.0								Y
Y	435.3	31	58	HL7	45.0	66.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	438.1	24	60	HL7	10.0	40.0								Y
B	438.1	24	60	HL7	10.0	40.0								Y
C	438.1	24	60	HL7	10.0	40.0								Y
D	438.1	24	60	HL7	10.0	40.0								Y
E	438.1	24	60	HL7	10.0	40.0								Y
U	438.1	24	60	HL7	10.0	40.0								
UU	438.1	24	60	HL7	10.0	40.0								
V	438.1	24	60	HL7	10.0	40.0								Y
VV	438.1	24	60	HL7	10.0	40.0								
W	438.1	24	60	HL7	10.0	40.0								
X	438.1	24	60	HL7	10.0	40.0								Y
Y	438.1	24	60	HL7	10.0	40.0	OD			< 10.0	HL7	17.7		Y
Y	438.1	24	60	HL7	10.0	40.0	OD			< 10.0	HL7	29.1		Y
A	439.1	23	55	HL7	6.0	30.0								Y
B	439.1	23	55	HL7	6.0	30.0								Y
C	439.1	23	55	HL7	6.0	30.0								Y
D	439.1	23	55	HL7	6.0	30.0								Y
E	439.1	23	55	HL7	6.0	30.0								Y
U	439.1	23	55	HL7	6.0	30.0								
UU	439.1	23	55	HL7	6.0	30.0								
V	439.1	23	55	HL7	6.0	30.0								Y
VV	439.1	23	55	HL7	6.0	30.0								Y
W	439.1	23	55	HL7	6.0	30.0								
X	439.1	23	55	HL7	6.0	30.0								Y
Y	439.1	23	55	HL7	6.0	30.0	OD			< 10.0	HL7	15.7		Y
Y	439.1	23	55	HL7	6.0	30.0	OD			< 10.0	HL7	22.0		Y
A	440.1	22	58	HL7	0.0	24.0								Y
B	440.1	22	58	HL7	0.0	24.0								Y
C	440.1	22	58	HL7	0.0	24.0								Y
D	440.1	22	58	HL7	0.0	24.0								Y
E	440.1	22	58	HL7	0.0	24.0								Y
U	440.1	22	58	HL7	0.0	24.0								
UU	440.1	22	58	HL7	0.0	24.0								
V	440.1	22	58	HL7	0.0	24.0								Y
VV	440.1	22	58	HL7	0.0	24.0								Y
W	440.1	22	58	HL7	0.0	24.0								
X	440.1	22	58	HL7	0.0	24.0								Y
Y	440.1	22	58	HL7	0.0	24.0								Y
A	440.2	22	58	HL7	24.0	49.0								Y
B	440.2	22	58	HL7	24.0	49.0								Y
C	440.2	22	58	HL7	24.0	49.0								Y
D	440.2	22	58	HL7	24.0	49.0								Y
E	440.2	22	58	HL7	24.0	49.0								Y
U	440.2	22	58	HL7	24.0	49.0								
UU	440.2	22	58	HL7	24.0	49.0								
V	440.2	22	58	HL7	24.0	49.0								Y
VV	440.2	22	58	HL7	24.0	49.0								Y
W	440.2	22	58	HL7	24.0	49.0								
X	440.2	22	58	HL7	24.0	49.0								Y
Y	440.2	22	58	HL7	24.0	49.0								Y
A	445.1	19	51	HL7	6.0	32.0								Y
B	445.1	19	51	HL7	6.0	32.0								Y
C	445.1	19	51	HL7	6.0	32.0								Y
D	445.1	19	51	HL7	6.0	32.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	445.1	19	51	HL7	6.0	32.0								Y
U	445.1	19	51	HL7	6.0	32.0								
UU	445.1	19	51	HL7	6.0	32.0								
V	445.1	19	51	HL7	6.0	32.0								Y
VV	445.1	19	51	HL7	6.0	32.0								Y
W	445.1	19	51	HL7	6.0	32.0								
X	445.1	19	51	HL7	6.0	32.0								Y
Y	445.1	19	51	HL7	6.0	32.0	OD			< 10.0	HL7	15.0		Y
Y	445.1	19	51	HL7	6.0	32.0	OD			< 10.0	HL7	18.9		Y
A	446.1	18	53	HL7	0.0	26.0								Y
B	446.1	18	53	HL7	0.0	26.0								Y
C	446.1	18	53	HL7	0.0	26.0								Y
D	446.1	18	53	HL7	0.0	26.0								Y
E	446.1	18	53	HL7	0.0	26.0								Y
U	446.1	18	53	HL7	0.0	26.0								
UU	446.1	18	53	HL7	0.0	26.0								
V	446.1	18	53	HL7	0.0	26.0								Y
VV	446.1	18	53	HL7	0.0	26.0								Y
W	446.1	18	53	HL7	0.0	26.0								
X	446.1	18	53	HL7	0.0	26.0								Y
Y	446.1	18	53	HL7	0.0	26.0								Y
A	448.1	17	51	HL7	4.0	28.0								Y
B	448.1	17	51	HL7	4.0	28.0								Y
C	448.1	17	51	HL7	4.0	28.0								Y
D	448.1	17	51	HL7	4.0	28.0								Y
E	448.1	17	51	HL7	4.0	28.0								Y
U	448.1	17	51	HL7	4.0	28.0								
UU	448.1	17	51	HL7	4.0	28.0								
V	448.1	17	51	HL7	4.0	28.0								Y
VV	448.1	17	51	HL7	4.0	28.0								Y
W	448.1	17	51	HL7	4.0	28.0								
X	448.1	17	51	HL7	4.0	28.0								Y
Y	448.1	17	51	HL7	4.0	28.0	OD			< 10.0	HL7	10.2		Y
Y	448.1	17	51	HL7	4.0	28.0	OD			< 10.0	HL7	15.7		Y
A	449.1	15	49	HL7	0.0	28.0								Y
B	449.1	15	49	HL7	0.0	28.0								Y
C	449.1	15	49	HL7	0.0	28.0								Y
D	449.1	15	49	HL7	0.0	28.0								Y
E	449.1	15	49	HL7	0.0	28.0								Y
U	449.1	15	49	HL7	0.0	28.0								
UU	449.1	15	49	HL7	0.0	28.0								
V	449.1	15	49	HL7	0.0	28.0								Y
VV	449.1	15	49	HL7	0.0	28.0								Y
W	449.1	15	49	HL7	0.0	28.0								
X	449.1	15	49	HL7	0.0	28.0								Y
Y	449.1	15	49	HL7	0.0	28.0	OD			< 10.0	HL7	13.4		Y
Y	449.1	15	49	HL7	0.0	28.0	OD		2	20.0	HL7	13.4		Y
A	449.2	15	49	HL7	28.0	56.0								Y
B	449.2	15	49	HL7	28.0	56.0								Y
C	449.2	15	49	HL7	28.0	56.0								Y
D	449.2	15	49	HL7	28.0	56.0								Y
E	449.2	15	49	HL7	28.0	56.0								Y
U	449.2	15	49	HL7	28.0	56.0								
UU	449.2	15	49	HL7	28.0	56.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
V	449 2	15	49	HL7	28 0	56 0								Y
VV	449 2	15	49	HL7	28 0	56 0								Y
W	449 2	15	49	HL7	28 0	56 0								
X	449 2	15	49	HL7	28 0	56 0								Y
Y	449 2	15	49	HL7	28 0	56 0								Y
A	450 1	14	52	HL7	0 0	18 0								Y
B	450 1	14	52	HL7	0 0	18 0								Y
C	450 1	14	52	HL7	0 0	18 0								Y
D	450 1	14	52	HL7	0 0	18 0								Y
E	450 1	14	52	HL7	0 0	18 0								Y
U	450 1	14	52	HL7	0 0	18 0								
UU	450 1	14	52	HL7	0 0	18 0								
V	450 1	14	52	HL7	0 0	18 0								Y
VV	450 1	14	52	HL7	0 0	18 0								Y
W	450 1	14	52	HL7	0 0	18 0								
X	450 1	14	52	HL7	0 0	18 0								Y
Y	450 1	14	52	HL7	0 0	18 0	OD			< 10 0	HL7	8 7		Y
A	450 2	14	52	HL7	18 0	50 0								Y
B	450 2	14	52	HL7	18 0	50 0								Y
C	450 2	14	52	HL7	18 0	50 0								Y
D	450 2	14	52	HL7	18 0	50 0								Y
E	450 2	14	52	HL7	18 0	50 0								Y
U	450 2	14	52	HL7	18 0	50 0								
UU	450 2	14	52	HL7	18 0	50 0								
V	450 2	14	52	HL7	18 0	50 0								Y
VV	450 2	14	52	HL7	18 0	50 0								Y
W	450 2	14	52	HL7	18 0	50 0								
X	450 2	14	52	HL7	18 0	50 0								Y
Y	450 2	14	52	HL7	18 0	50 0								Y
A	451 0	45	50	HL7	- 7 0	3 0								
B	451 0	45	50	HL7	- 7 0	3 0								
C	451 0	45	50	HL7	- 7 0	3 0								
D	451 0	45	50	HL7	- 7 0	3 0								
E	451 0	45	50	HL7	- 7 0	3 0								
U	451 0	45	50	HL7	- 7 0	3 0								
UU	451 0	45	50	HL7	- 7 0	3 0								
V	451 0	45	50	HL7	- 7 0	3 0								
VV	451 0	45	50	HL7	- 7 0	3 0								Y
W	451 0	45	50	HL7	- 7 0	3 0								
X	451 0	45	50	HL7	- 7 0	3 0								
Y	451 0	45	50	HL7	- 7 0	3 0								
A	452 0	42	31	HL7	- 5 0	2 0								
B	452 0	42	31	HL7	- 5 0	2 0								
C	452 0	42	31	HL7	- 5 0	2 0								
D	452 0	42	31	HL7	- 5 0	2 0								
E	452 0	42	31	HL7	- 5 0	2 0								
U	452 0	42	31	HL7	- 5 0	2 0								
UU	452 0	42	31	HL7	- 5 0	2 0								
V	452 0	42	31	HL7	- 5 0	2 0								
VV	452 0	42	31	HL7	- 5 0	2 0								
W	452 0	42	31	HL7	- 5 0	2 0								
X	452 0	42	31	HL7	- 5 0	2 0								
Y	452 0	42	31	HL7	- 5 0	2 0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	453.0	42	47	HL7	- 4.7	4.0								
B	453.0	42	47	HL7	- 4.7	4.0								
C	453.0	42	47	HL7	- 4.7	4.0								
D	453.0	42	47	HL7	- 4.7	4.0								
E	453.0	42	47	HL7	- 4.7	4.0								
U	453.0	42	47	HL7	- 4.7	4.0								
UU	453.0	42	47	HL7	- 4.7	4.0								
V	453.0	42	47	HL7	- 4.7	4.0								
VV	453.0	42	47	HL7	- 4.7	4.0								
W	453.0	42	47	HL7	- 4.7	4.0								
X	453.0	42	47	HL7	- 4.7	4.0								
Y	453.0	42	47	HL7	- 4.7	4.0								
A	454.0	40	34	HL7	- 5.0	1.5								
B	454.0	40	34	HL7	- 5.0	1.5								
C	454.0	40	34	HL7	- 5.0	1.5								
D	454.0	40	34	HL7	- 5.0	1.5								
E	454.0	40	34	HL7	- 5.0	1.5								
U	454.0	40	34	HL7	- 5.0	1.5								
UU	454.0	40	34	HL7	- 5.0	1.5								
V	454.0	40	34	HL7	- 5.0	1.5								
VV	454.0	40	34	HL7	- 5.0	1.5								
W	454.0	40	34	HL7	- 5.0	1.5								
X	454.0	40	34	HL7	- 5.0	1.5								
Y	454.0	40	34	HL7	- 5.0	1.5								
A	455.0	9	47	HL7	- 3.0	5.0								Y
B	455.0	9	47	HL7	- 3.0	5.0								Y
C	455.0	9	47	HL7	- 3.0	5.0								Y
D	455.0	9	47	HL7	- 3.0	5.0								Y
E	455.0	9	47	HL7	- 3.0	5.0								Y
U	455.0	9	47	HL7	- 3.0	5.0								
UU	455.0	9	47	HL7	- 3.0	5.0								
V	455.0	9	47	HL7	- 3.0	5.0								
VV	455.0	9	47	HL7	- 3.0	5.0								Y
W	455.0	9	47	HL7	- 3.0	5.0								
X	455.0	9	47	HL7	- 3.0	5.0								Y
Y	455.0	9	47	HL7	- 3.0	5.0								Y
A	491.1	13	29	CL7	0.0	24.0								Y
B	491.1	13	29	CL7	0.0	24.0								Y
C	491.1	13	29	CL7	0.0	24.0								Y
D	491.1	13	29	CL7	0.0	24.0								Y
E	491.1	13	29	CL7	0.0	24.0								Y
U	491.1	13	29	CL7	0.0	24.0								Y
UU	491.1	13	29	CL7	0.0	24.0								
V	491.1	13	29	CL7	0.0	24.0								Y
VV	491.1	13	29	CL7	0.0	24.0								Y
W	491.1	13	29	CL7	0.0	24.0								
X	491.1	13	29	CL7	0.0	24.0	OD	WG		20.0	CL7	6.7	1	Y
Y	491.1	13	29	CL7	0.0	24.0								Y
A	492.1	12	29	CL7	0.0	24.0								Y
B	492.1	12	29	CL7	0.0	24.0								Y
C	492.1	12	29	CL7	0.0	24.0								Y
D	492.1	12	29	CL7	0.0	24.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	492.1	12	29	CL7	0.0	24.0								Y
U	492.1	12	29	CL7	0.0	24.0								
UU	492.1	12	29	CL7	0.0	24.0								
V	492.1	12	29	CL7	0.0	24.0								Y
VV	492.1	12	29	CL7	0.0	24.0								Y
W	492.1	12	29	CL7	0.0	24.0								
X	492.1	12	29	CL7	0.0	24.0	OD	WG		20.0	CL7	5.8	1	Y
Y	492.1	12	29	CL7	0.0	24.0								Y
A	493.0	11	54	CL7	- 3.0	6.0								Y
B	493.0	11	54	CL7	- 3.0	6.0								Y
C	493.0	11	54	CL7	- 3.0	6.0								Y
D	493.0	11	54	CL7	- 3.0	6.0								Y
E	493.0	11	54	CL7	- 3.0	6.0								Y
U	493.0	11	54	CL7	- 3.0	6.0								
UU	493.0	11	54	CL7	- 3.0	6.0								
V	493.0	11	54	CL7	- 3.0	6.0								
VV	493.0	11	54	CL7	- 3.0	6.0								Y
W	493.0	11	54	CL7	- 3.0	6.0								
X	493.0	11	54	CL7	- 3.0	6.0	OD	WG		29.0	CL7	-0.5	1	Y
Y	493.0	11	54	CL7	- 3.0	6.0								Y
A	495.1	10	63	CL7	0.0	24.0								Y
B	495.1	10	63	CL7	0.0	24.0								Y
C	495.1	10	63	CL7	0.0	24.0								Y
D	495.1	10	63	CL7	0.0	24.0								Y
E	495.1	10	63	CL7	0.0	24.0								Y
U	495.1	10	63	CL7	0.0	24.0								
UU	495.1	10	63	CL7	0.0	24.0								
V	495.1	10	63	CL7	0.0	24.0								Y
VV	495.1	10	63	CL7	0.0	24.0								Y
W	495.1	10	63	CL7	0.0	24.0								
X	495.1	10	63	CL7	0.0	24.0								Y
Y	495.1	10	63	CL7	0.0	24.0								Y
A	496.1	10	30	HL7	0.0	28.0								Y
B	496.1	10	30	HL7	0.0	28.0								Y
C	496.1	10	30	HL7	0.0	28.0								Y
D	496.1	10	30	HL7	0.0	28.0								Y
E	496.1	10	30	HL7	0.0	28.0								Y
U	496.1	10	30	HL7	0.0	28.0								
UU	496.1	10	30	HL7	0.0	28.0								
V	496.1	10	30	HL7	0.0	28.0								Y
VV	496.1	10	30	HL7	0.0	28.0								Y
W	496.1	10	30	HL7	0.0	28.0								
X	496.1	10	30	HL7	0.0	28.0								Y
Y	496.1	10	30	HL7	0.0	28.0								Y
A	496.2	10	30	CL7	0.0	23.0								Y
B	496.2	10	30	CL7	0.0	23.0								Y
C	496.2	10	30	CL7	0.0	23.0								Y
D	496.2	10	30	CL7	0.0	23.0								Y
E	496.2	10	30	CL7	0.0	23.0								Y
U	496.2	10	30	CL7	0.0	23.0								
UU	496.2	10	30	CL7	0.0	23.0								
V	496.2	10	30	CL7	0.0	23.0								Y
VV	496.2	10	30	CL7	0.0	23.0								Y
W	496.2	10	30	CL7	0.0	23.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	496.2	10	30	CL7	0.0	23.0								Y
Y	496.2	10	30	CL7	0.0	23.0								Y
A	497.1	10	29	CL7	0.0	24.0								Y
B	497.1	10	29	CL7	0.0	24.0								Y
C	497.1	10	29	CL7	0.0	24.0								Y
D	497.1	10	29	CL7	0.0	24.0								Y
E	497.1	10	29	CL7	0.0	24.0								Y
U	497.1	10	29	CL7	0.0	24.0								
UU	497.1	10	29	CL7	0.0	24.0								
V	497.1	10	29	CL7	0.0	24.0								Y
VV	497.1	10	29	CL7	0.0	24.0								Y
W	497.1	10	29	CL7	0.0	24.0								
X	497.1	10	29	CL7	0.0	24.0	OD	WG		30.0	CL7	4.6	1	Y
Y	497.1	10	29	CL7	0.0	24.0								Y
A	498.1	10	28	CL7	0.0	24.0								Y
B	498.1	10	28	CL7	0.0	24.0								Y
C	498.1	10	28	CL7	0.0	24.0								Y
D	498.1	10	28	CL7	0.0	24.0								Y
E	498.1	10	28	CL7	0.0	24.0								Y
U	498.1	10	28	CL7	0.0	24.0								
UU	498.1	10	28	CL7	0.0	24.0								
V	498.1	10	28	CL7	0.0	24.0								Y
VV	498.1	10	28	CL7	0.0	24.0								Y
W	498.1	10	28	CL7	0.0	24.0								
X	498.1	10	28	CL7	0.0	24.0	OD	WG		27.0	CL7	4.8	1	Y
Y	498.1	10	28	CL7	0.0	24.0								Y
A	501.1	9	28	CL7	0.0	24.0								Y
B	501.1	9	28	CL7	0.0	24.0								Y
C	501.1	9	28	CL7	0.0	24.0								Y
D	501.1	9	28	CL7	0.0	24.0								Y
E	501.1	9	28	CL7	0.0	24.0								Y
U	501.1	9	28	CL7	0.0	24.0								
UU	501.1	9	28	CL7	0.0	24.0								
V	501.1	9	28	CL7	0.0	24.0								
VV	501.1	9	28	CL7	0.0	24.0								Y
W	501.1	9	28	CL7	0.0	24.0								
X	501.1	9	28	CL7	0.0	24.0	OD	WG		22.0	CL7	4.6	1	Y
Y	501.1	9	28	CL7	0.0	24.0								Y
A	502.1	8	58	CL7	0.0	22.0								Y
B	502.1	8	58	CL7	0.0	22.0								Y
C	502.1	8	58	CL7	0.0	22.0								Y
D	502.1	8	58	CL7	0.0	22.0								Y
E	502.1	8	58	CL7	0.0	22.0								Y
U	502.1	8	58	CL7	0.0	22.0								
UU	502.1	8	58	CL7	0.0	22.0								
V	502.1	8	58	CL7	0.0	22.0								Y
VV	502.1	8	58	CL7	0.0	22.0								Y
W	502.1	8	58	CL7	0.0	22.0								
X	502.1	8	58	CL7	0.0	22.0								Y
Y	502.1	8	58	CL7	0.0	22.0								Y
A	502.2	8	58	HL7	0.0	20.0								Y
B	502.2	8	58	HL7	0.0	20.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	502.2	8	58	HL7	0.0	20.0								Y
D	502.2	8	58	HL7	0.0	20.0								Y
E	502.2	8	58	HL7	0.0	20.0								Y
U	502.2	8	58	HL7	0.0	20.0								
UU	502.2	8	58	HL7	0.0	20.0								
V	502.2	8	58	HL7	0.0	20.0								Y
VV	502.2	8	58	HL7	0.0	20.0								Y
W	502.2	8	58	HL7	0.0	20.0								
X	502.2	8	58	HL7	0.0	20.0								Y
Y	502.2	8	58	HL7	0.0	20.0								Y
A	504.1	8	27	CL7	0.0	21.0								Y
B	504.1	8	27	CL7	0.0	21.0								Y
C	504.1	8	27	CL7	0.0	21.0								Y
D	504.1	8	27	CL7	0.0	21.0								Y
E	504.1	8	27	CL7	0.0	21.0								Y
U	504.1	8	27	CL7	0.0	21.0								
UU	504.1	8	27	CL7	0.0	21.0								
V	504.1	8	27	CL7	0.0	21.0								
VV	504.1	8	27	CL7	0.0	21.0								Y
W	504.1	8	27	CL7	0.0	21.0								
X	504.1	8	27	CL7	0.0	21.0	OD	WG		55.0	CL7	5.8	1	Y
Y	504.1	8	27	CL7	0.0	21.0								Y
A	507.1	7	27	CL7	0.0	24.0								Y
B	507.1	7	27	CL7	0.0	24.0								Y
C	507.1	7	27	CL7	0.0	24.0								Y
D	507.1	7	27	CL7	0.0	24.0								Y
E	507.1	7	27	CL7	0.0	24.0								Y
U	507.1	7	27	CL7	0.0	24.0								
UU	507.1	7	27	CL7	0.0	24.0								
V	507.1	7	27	CL7	0.0	24.0								
VV	507.1	7	27	CL7	0.0	24.0								Y
W	507.1	7	27	CL7	0.0	24.0								
X	507.1	7	27	CL7	0.0	24.0	OD	WG		32.0	CL7	6.7	1	Y
Y	507.1	7	27	CL7	0.0	24.0								Y
A	514.0	4	28	CL7	0.0	26.0								Y
B	514.0	4	28	CL7	0.0	26.0								Y
C	514.0	4	28	CL7	0.0	26.0								Y
D	514.0	4	28	CL7	0.0	26.0								Y
E	514.0	4	28	CL7	0.0	26.0								Y
U	514.0	4	28	CL7	0.0	26.0								Y
UU	514.0	4	28	CL7	0.0	26.0								
V	514.0	4	28	CL7	0.0	26.0								
VV	514.0	4	28	CL7	0.0	26.0								Y
W	514.0	4	28	CL7	0.0	26.0								
X	514.0	4	28	CL7	0.0	26.0								Y
Y	514.0	4	28	CL7	0.0	26.0								Y
A	515.1	3	29	CL7	0.0	24.0								
B	515.1	3	29	CL7	0.0	24.0								
C	515.1	3	29	CL7	0.0	24.0								
D	515.1	3	29	CL7	0.0	24.0								
E	515.1	3	29	CL7	0.0	24.0								
U	515.1	3	29	CL7	0.0	24.0	OD	W	2	< 20.0	CL7	5.0		Y
UU	515.1	3	29	CL7	0.0	24.0								
V	515.1	3	29	CL7	0.0	24.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	515.1	3	29	CL7	0.0	24.0								Y
W	515.1	3	29	CL7	0.0	24.0								
X	515.1	3	29	CL7	0.0	24.0								Y
Y	515.1	3	29	CL7	0.0	24.0								Y
A	523.0	4	42	CL7	- 2.0	6.0								
B	523.0	4	42	CL7	- 2.0	6.0								
C	523.0	4	42	CL7	- 2.0	6.0								
D	523.0	4	42	CL7	- 2.0	6.0								
E	523.0	4	42	CL7	- 2.0	6.0								
U	523.0	4	42	CL7	- 2.0	6.0								
UU	523.0	4	42	CL7	- 2.0	6.0								
V	523.0	4	42	CL7	- 2.0	6.0								
VV	523.0	4	42	CL7	- 2.0	6.0								
W	523.0	4	42	CL7	- 2.0	6.0								
X	523.0	4	42	CL7	- 2.0	6.0								Y
Y	523.0	4	42	CL7	- 2.0	6.0								Y
A	524.0	4	43	CL7	- 1.0	6.0								
B	524.0	4	43	CL7	- 1.0	6.0								
C	524.0	4	43	CL7	- 1.0	6.0								
D	524.0	4	43	CL7	- 1.0	6.0								
E	524.0	4	43	CL7	- 1.0	6.0								
U	524.0	4	43	CL7	- 1.0	6.0								
UU	524.0	4	43	CL7	- 1.0	6.0								
V	524.0	4	43	CL7	- 1.0	6.0								
VV	524.0	4	43	CL7	- 1.0	6.0								
W	524.0	4	43	CL7	- 1.0	6.0								
X	524.0	4	43	CL7	- 1.0	6.0								Y
Y	524.0	4	43	CL7	- 1.0	6.0								Y
A	525.0	12	36	HL7	- 2.0	6.0								Y
B	525.0	12	36	HL7	- 2.0	6.0								Y
C	525.0	12	36	HL7	- 2.0	6.0								Y
D	525.0	12	36	HL7	- 2.0	6.0								Y
E	525.0	12	36	HL7	- 2.0	6.0								Y
U	525.0	12	36	HL7	- 2.0	6.0								
UU	525.0	12	36	HL7	- 2.0	6.0								
V	525.0	12	36	HL7	- 2.0	6.0								
VV	525.0	12	36	HL7	- 2.0	6.0								Y
W	525.0	12	36	HL7	- 2.0	6.0								
X	525.0	12	36	HL7	- 2.0	6.0								Y
Y	525.0	12	36	HL7	- 2.0	6.0								Y
A	527.0	7	64	CL7	- 3.0	6.0								Y
B	527.0	7	64	CL7	- 3.0	6.0								Y
C	527.0	7	64	CL7	- 3.0	6.0								Y
D	527.0	7	64	CL7	- 3.0	6.0								Y
E	527.0	7	64	CL7	- 3.0	6.0								Y
U	527.0	7	64	CL7	- 3.0	6.0								
UU	527.0	7	64	CL7	- 3.0	6.0								
V	527.0	7	64	CL7	- 3.0	6.0								
VV	527.0	7	64	CL7	- 3.0	6.0								Y
W	527.0	7	64	CL7	- 3.0	6.0								
X	527.0	7	64	CL7	- 3.0	6.0	OD	WG		38.0	CL7	-0.6	1	Y
Y	527.0	7	64	CL7	- 3.0	6.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	528.3	4	52	HTTS	- 5.0	10.0	OD		1	< 20.0	HTTS	1.2	1	Y
B	528.3	4	52	HTTS	- 5.0	10.0								Y
C	528.3	4	52	HTTS	- 5.0	10.0	OD		1	21.0	HTTS	1.3	1	Y
D	528.3	4	52	HTTS	- 5.0	10.0	OD		2	56.0	HTTS	0.6	1	Y
E	528.3	4	52	HTTS	- 5.0	10.0	OD		1	27.0	HTTS	0.5	1	Y
U	528.3	4	52	HTTS	- 5.0	10.0								
UU	528.3	4	52	HTTS	- 5.0	10.0								Y
V	528.3	4	52	HTTS	- 5.0	10.0	OD	WG	1	32.0	HTTS		UT	Y
VV	528.3	4	52	HTTS	- 5.0	10.0			3		HTTS	0.9		Y
W	528.3	4	52	HTTS	- 5.0	10.0								Y
X	528.3	4	52	HTTS	- 5.0	10.0								Y
Y	528.3	4	52	HTTS	- 5.0	10.0	OD		2	39.0	HTTS			Y
A	529.3	12	31	HTTS	- 5.0	10.2								Y
B	529.3	12	31	HTTS	- 5.0	10.2								Y
C	529.3	12	31	HTTS	- 5.0	10.2								Y
D	529.3	12	31	HTTS	- 5.0	10.2	OD		1	< 20.0	HTTS	3.5	1	Y
E	529.3	12	31	HTTS	- 5.0	10.2								Y
U	529.3	12	31	HTTS	- 5.0	10.2	OD	IG	2	< 20.0	HTTS	1.0		Y
UU	529.3	12	31	HTTS	- 5.0	10.2								
V	529.3	12	31	HTTS	- 5.0	10.2	OD	WG	2	26.0	HTTS		1	Y
VV	529.3	12	31	HTTS	- 5.0	10.2								
W	529.3	12	31	HTTS	- 5.0	10.2								
X	529.3	12	31	HTTS	- 5.0	10.2								Y
Y	529.3	12	31	HTTS	- 5.0	10.2	OD			< 10.0	HTTS			Y
A	530.3	12	48	HTTS	- 5.0	5.0								Y
B	530.3	12	48	HTTS	- 5.0	5.0								Y
C	530.3	12	48	HTTS	- 5.0	5.0								Y
D	530.3	12	48	HTTS	- 5.0	5.0								Y
E	530.3	12	48	HTTS	- 5.0	5.0								Y
U	530.3	12	48	HTTS	- 5.0	5.0								
UU	530.3	12	48	HTTS	- 5.0	5.0			2	23.0	HTTS	0.4		Y
V	530.3	12	48	HTTS	- 5.0	5.0	OD	WG	3	< 20.0	HTTS		1	Y
VV	530.3	12	48	HTTS	- 5.0	5.0			2	17.0	HTTS	0.4		Y
W	530.3	12	48	HTTS	- 5.0	5.0								
X	530.3	12	48	HTTS	- 5.0	5.0								Y
Y	530.3	12	48	HTTS	- 5.0	5.0	OD			< 10.0	HTTS			Y
A	531.3	12	70	HTTS	- 5.0	11.2	OD		1	22.0	HTTS	0.7	1	Y
B	531.3	12	70	HTTS	- 5.0	11.2	OD		1	< 20.0	HTTS	0.4	1	Y
C	531.3	12	70	HTTS	- 5.0	11.2	OD		2	25.0	HTTS	0.5	1	Y
D	531.3	12	70	HTTS	- 5.0	11.2	OD		1	< 20.0	HTTS	1.8	1	Y
E	531.3	12	70	HTTS	- 5.0	11.2	OD		1	< 20.0	HTTS	1.1	1	Y
U	531.3	12	70	HTTS	- 5.0	11.2	OD	IG	2	27.0	HTTS	1.0		Y
UU	531.3	12	70	HTTS	- 5.0	11.2								
V	531.3	12	70	HTTS	- 5.0	11.2	OD	WG	2	38.0	HTTS		3	Y
VV	531.3	12	70	HTTS	- 5.0	11.2								
W	531.3	12	70	HTTS	- 5.0	11.2								
X	531.3	12	70	HTTS	- 5.0	11.2	OD	WG		23.0	HTTS	0.5	1	Y
Y	531.3	12	70	HTTS	- 5.0	11.2	OD			15.0	HTTS			Y
A	532.3	17	32	HTTS	- 5.0	12.0	OD		2	21.0	HTTS	0.7	1	Y
B	532.3	17	32	HTTS	- 5.0	12.0	OD		2	24.0	HTTS	0.3	1	Y
C	532.3	17	32	HTTS	- 5.0	12.0	OD		2	28.0	HTTS	1.1	1	Y
D	532.3	17	32	HTTS	- 5.0	12.0	OD		1	< 20.0	HTTS	0.8	1	Y
E	532.3	17	32	HTTS	- 5.0	12.0	OD		1	22.0	HTTS	0.7	1	Y
U	532.3	17	32	HTTS	- 5.0	12.0	OD	IG	2	25.0	HTTS	1.0		Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	532.3	17	32	HTTS	- 5.0	12.0								
V	532.3	17	32	HTTS	- 5.0	12.0	OD	WG	2	50.0	HTTS		3	Y
VV	532.3	17	32	HTTS	- 5.0	12.0								
W	532.3	17	32	HTTS	- 5.0	12.0				80.0	HTTS	0.5		Y
X	532.3	17	32	HTTS	- 5.0	12.0	OD	WG		28.0	HTTS	0.6	1	Y
Y	532.3	17	32	HTTS	- 5.0	12.0	OD			< 10.0	HTTS			Y
A	533.3	17	69	HTTS	- 5.0	11.5	OD		1	32.0	HTTS	0.8	1	Y
B	533.3	17	69	HTTS	- 5.0	11.5	OD		2	34.0	HTTS	0.0	5	Y
C	533.3	17	69	HTTS	- 5.0	11.5	OD		1	33.0	HTTS	0.9	1	Y
D	533.3	17	69	HTTS	- 5.0	11.5	OD		1	34.0	HTTS	1.4	1	Y
E	533.3	17	69	HTTS	- 5.0	11.5	OD		1	33.0	HTTS	0.9	1	Y
U	533.3	17	69	HTTS	- 5.0	11.5	OD	IG	2	36.0	HTTS	1.0		Y
UU	533.3	17	69	HTTS	- 5.0	11.5								
V	533.3	17	69	HTTS	- 5.0	11.5	OD	WG	1	45.0	HTTS		UT	Y
VV	533.3	17	69	HTTS	- 5.0	11.5								
W	533.3	17	69	HTTS	- 5.0	11.5								
X	533.3	17	69	HTTS	- 5.0	11.5	OD	WG		21.0	HTTS	0.0	1	Y
Y	533.3	17	69	HTTS	- 5.0	11.5	OD			30.0	HTTS			Y
A	534.3	26	48	HTTS	- 5.0	11.5	OD		2	45.0	HTTS	0.7	1	Y
B	534.3	26	48	HTTS	- 5.0	11.5	OD		2	48.0	HTTS	0.9	1	Y
C	534.3	26	48	HTTS	- 5.0	11.5	OD		2	48.0	HTTS	1.2	1	Y
D	534.3	26	48	HTTS	- 5.0	11.5	OD		1	57.0	HTTS	1.6	1	Y
E	534.3	26	48	HTTS	- 5.0	11.5	OD		1	52.0	HTTS	0.5	1	Y
U	534.3	26	48	HTTS	- 5.0	11.5								
UU	534.3	26	48	HTTS	- 5.0	11.5			2	31.0	HTTS	1.4		Y
V	534.3	26	48	HTTS	- 5.0	11.5	OD	WG	2	57.0	HTTS		3	Y
VV	534.3	26	48	HTTS	- 5.0	11.5			3	10.0	HTTS	1.4		Y
W	534.3	26	48	HTTS	- 5.0	11.5								
X	534.3	26	48	HTTS	- 5.0	11.5								Y
Y	534.3	26	48	HTTS	- 5.0	11.5	OD		2	52.0	HTTS			Y
A	543.1	21	36	HTTS	-21.0	-17.0								Y
B	543.1	21	36	HTTS	-21.0	-17.0								Y
C	543.1	21	36	HTTS	-21.0	-17.0								Y
D	543.1	21	36	HTTS	-21.0	-17.0								Y
E	543.1	21	36	HTTS	-21.0	-17.0								Y
U	543.1	21	36	HTTS	-21.0	-17.0								
UU	543.1	21	36	HTTS	-21.0	-17.0								Y
V	543.1	21	36	HTTS	-21.0	-17.0								Y
VV	543.1	21	36	HTTS	-21.0	-17.0								Y
W	543.1	21	36	HTTS	-21.0	-17.0								
X	543.1	21	36	HTTS	-21.0	-17.0								Y
Y	543.1	21	36	HTTS	-21.0	-17.0								Y
A	543.2	21	36	HTTS	-17.0	- 1.0								Y
B	543.2	21	36	HTTS	-17.0	- 1.0								Y
C	543.2	21	36	HTTS	-17.0	- 1.0								Y
D	543.2	21	36	HTTS	-17.0	- 1.0								Y
E	543.2	21	36	HTTS	-17.0	- 1.0								Y
U	543.2	21	36	HTTS	-17.0	- 1.0								
UU	543.2	21	36	HTTS	-17.0	- 1.0								Y
V	543.2	21	36	HTTS	-17.0	- 1.0								Y
VV	543.2	21	36	HTTS	-17.0	- 1.0								Y
W	543.2	21	36	HTTS	-17.0	- 1.0								
X	543.2	21	36	HTTS	-17.0	- 1.0								Y
Y	543.2	21	36	HTTS	-17.0	- 1.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	543.3	21	36	HTTS	- 1.0	9.0	OD		1	27.0	HTTS	0.6	1	Y
B	543.3	21	36	HTTS	- 1.0	9.0	OD		2	36.0	HTTS	0.4	1	Y
C	543.3	21	36	HTTS	- 1.0	9.0	OD		2	30.0	HTTS	0.7	1	Y
D	543.3	21	36	HTTS	- 1.0	9.0	OD		1	29.0	HTTS	0.4	1	Y
E	543.3	21	36	HTTS	- 1.0	9.0								Y
U	543.3	21	36	HTTS	- 1.0	9.0								
UU	543.3	21	36	HTTS	- 1.0	9.0			2	33.0	HTTS	0.7		Y
V	543.3	21	36	HTTS	- 1.0	9.0	OD	WG	2	49.0	HTTS		3	Y
VV	543.3	21	36	HTTS	- 1.0	9.0			2	40.0	HTTS	0.7		Y
W	543.3	21	36	HTTS	- 1.0	9.0								
X	543.3	21	36	HTTS	- 1.0	9.0	OD	WG		40.0	HTTS	0.6	1	Y
Y	543.3	21	36	HTTS	- 1.0	9.0	OD			32.0	HTTS			Y
A	544.2	22	38	HTTS	-21.0	- 1.0								Y
B	544.2	22	38	HTTS	-21.0	- 1.0								Y
C	544.2	22	38	HTTS	-21.0	- 1.0								Y
D	544.2	22	38	HTTS	-21.0	- 1.0								Y
E	544.2	22	38	HTTS	-21.0	- 1.0								Y
U	544.2	22	38	HTTS	-21.0	- 1.0								
UU	544.2	22	38	HTTS	-21.0	- 1.0								
V	544.2	22	38	HTTS	-21.0	- 1.0								Y
VV	544.2	22	38	HTTS	-21.0	- 1.0								
W	544.2	22	38	HTTS	-21.0	- 1.0								
X	544.2	22	38	HTTS	-21.0	- 1.0								Y
Y	544.2	22	38	HTTS	-21.0	- 1.0								Y
A	544.3	22	38	HTTS	- 1.0	9.0	OD		1	< 20.0	HTTS	0.5	2	Y
B	544.3	22	38	HTTS	- 1.0	9.0	OD		2	< 20.0	HTTS	0.7	1	Y
C	544.3	22	38	HTTS	- 1.0	9.0	OD		2	28.0	HTTS	0.9	1	Y
D	544.3	22	38	HTTS	- 1.0	9.0	OD		1	< 20.0	HTTS	1.5	1	Y
E	544.3	22	38	HTTS	- 1.0	9.0	OD		1	24.0	HTTS	0.9	1	Y
U	544.3	22	38	HTTS	- 1.0	9.0								
UU	544.3	22	38	HTTS	- 1.0	9.0								
V	544.3	22	38	HTTS	- 1.0	9.0	OD	WG	2	34.0	HTTS		3	Y
VV	544.3	22	38	HTTS	- 1.0	9.0								
W	544.3	22	38	HTTS	- 1.0	9.0								
X	544.3	22	38	HTTS	- 1.0	9.0	OD	WG		10.0	HTTS	0.0	1	Y
Y	544.3	22	38	HTTS	- 1.0	9.0	OD			< 10.0	HTTS			Y
A	551.1	16	68	CL7	0.0	23.0								Y
B	551.1	16	68	CL7	0.0	23.0								Y
C	551.1	16	68	CL7	0.0	23.0								Y
D	551.1	16	68	CL7	0.0	23.0								Y
E	551.1	16	68	CL7	0.0	23.0								Y
U	551.1	16	68	CL7	0.0	23.0								Y
UU	551.1	16	68	CL7	0.0	23.0								
V	551.1	16	68	CL7	0.0	23.0								Y
VV	551.1	16	68	CL7	0.0	23.0								
W	551.1	16	68	CL7	0.0	23.0								
X	551.1	16	68	CL7	0.0	23.0								Y
Y	551.1	16	68	CL7	0.0	23.0								Y
A	551.2	16	68	CL7	23.0	47.0								Y
B	551.2	16	68	CL7	23.0	47.0								Y
C	551.2	16	68	CL7	23.0	47.0								Y
D	551.2	16	68	CL7	23.0	47.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	551.2	16	68	CL7	23.0	47.0								Y
U	551.2	16	68	CL7	23.0	47.0								Y
UU	551.2	16	68	CL7	23.0	47.0								
V	551.2	16	68	CL7	23.0	47.0								Y
VV	551.2	16	68	CL7	23.0	47.0								
W	551.2	16	68	CL7	23.0	47.0								
X	551.2	16	68	CL7	23.0	47.0								Y
Y	551.2	16	68	CL7	23.0	47.0								Y
A	551.3	16	68	CL7	47.0	71.0								Y
B	551.3	16	68	CL7	47.0	71.0								Y
C	551.3	16	68	CL7	47.0	71.0								Y
D	551.3	16	68	CL7	47.0	71.0								Y
E	551.3	16	68	CL7	47.0	71.0								Y
U	551.3	16	68	CL7	47.0	71.0								Y
UU	551.3	16	68	CL7	47.0	71.0								
V	551.3	16	68	CL7	47.0	71.0								Y
VV	551.3	16	68	CL7	47.0	71.0								
W	551.3	16	68	CL7	47.0	71.0								
X	551.3	16	68	CL7	47.0	71.0								Y
Y	551.3	16	68	CL7	47.0	71.0								Y
A	553.0	9	70	HL7	- 6.0	6.0								Y
B	553.0	9	70	HL7	- 6.0	6.0								Y
C	553.0	9	70	HL7	- 6.0	6.0								Y
D	553.0	9	70	HL7	- 6.0	6.0								Y
E	553.0	9	70	HL7	- 6.0	6.0								Y
U	553.0	9	70	HL7	- 6.0	6.0								
UU	553.0	9	70	HL7	- 6.0	6.0								
V	553.0	9	70	HL7	- 6.0	6.0								
VV	553.0	9	70	HL7	- 6.0	6.0								Y
W	553.0	9	70	HL7	- 6.0	6.0								
X	553.0	9	70	HL7	- 6.0	6.0								Y
Y	553.0	9	70	HL7	- 6.0	6.0								
A	554.0	9	69	HL7	- 6.0	6.0								Y
B	554.0	9	69	HL7	- 6.0	6.0								Y
C	554.0	9	69	HL7	- 6.0	6.0								Y
D	554.0	9	69	HL7	- 6.0	6.0								Y
E	554.0	9	69	HL7	- 6.0	6.0								Y
U	554.0	9	69	HL7	- 6.0	6.0								
UU	554.0	9	69	HL7	- 6.0	6.0								
V	554.0	9	69	HL7	- 6.0	6.0								Y
VV	554.0	9	69	HL7	- 6.0	6.0								Y
W	554.0	9	69	HL7	- 6.0	6.0								
X	554.0	9	69	HL7	- 6.0	6.0	OD	WG		13.0	HL7	0.7	1	Y
Y	554.0	9	69	HL7	- 6.0	6.0								Y
A	557.0	3	19	HL7	- 3.0	20.0								
B	557.0	3	19	HL7	- 3.0	20.0								
C	557.0	3	19	HL7	- 3.0	20.0								
D	557.0	3	19	HL7	- 3.0	20.0								
E	557.0	3	19	HL7	- 3.0	20.0								
U	557.0	3	19	HL7	- 3.0	20.0								
UU	557.0	3	19	HL7	- 3.0	20.0								
V	557.0	3	19	HL7	- 3.0	20.0								
VV	557.0	3	19	HL7	- 3.0	20.0								Y
W	557.0	3	19	HL7	- 3.0	20.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	557.0	3	19	HL7	-3.0	20.0								Y
Y	557.0	3	19	HL7	-3.0	20.0								
A	558.0	4	19	CL7	-2.0	17.5								
B	558.0	4	19	CL7	-2.0	17.5								
C	558.0	4	19	CL7	-2.0	17.5								
D	558.0	4	19	CL7	-2.0	17.5								
E	558.0	4	19	CL7	-2.0	17.5								
U	558.0	4	19	CL7	-2.0	17.5	OD		3		CL7	2.0		Y
UU	558.0	4	19	CL7	-2.0	17.5								
V	558.0	4	19	CL7	-2.0	17.5								
VV	558.0	4	19	CL7	-2.0	17.5								
W	558.0	4	19	CL7	-2.0	17.5								
X	558.0	4	19	CL7	-2.0	17.5								Y
Y	558.0	4	19	CL7	-2.0	17.5								Y
A	559.0	4	18	CL7	-1.0	9.0								
B	559.0	4	18	CL7	-1.0	9.0								
C	559.0	4	18	CL7	-1.0	9.0								
D	559.0	4	18	CL7	-1.0	9.0								
E	559.0	4	18	CL7	-1.0	9.0								
U	559.0	4	18	CL7	-1.0	9.0	OD		3		CL7	2.0		Y
UU	559.0	4	18	CL7	-1.0	9.0								
V	559.0	4	18	CL7	-1.0	9.0								
VV	559.0	4	18	CL7	-1.0	9.0								
W	559.0	4	18	CL7	-1.0	9.0								
X	559.0	4	18	CL7	-1.0	9.0								Y
Y	559.0	4	18	CL7	-1.0	9.0								Y
A	560.0	5	18	HL7	-4.0	16.0								
B	560.0	5	18	HL7	-4.0	16.0								Y
C	560.0	5	18	HL7	-4.0	16.0								Y
D	560.0	5	18	HL7	-4.0	16.0								Y
E	560.0	5	18	HL7	-4.0	16.0								Y
U	560.0	5	18	HL7	-4.0	16.0								
UU	560.0	5	18	HL7	-4.0	16.0								
V	560.0	5	18	HL7	-4.0	16.0								
VV	560.0	5	18	HL7	-4.0	16.0								Y
W	560.0	5	18	HL7	-4.0	16.0								
X	560.0	5	18	HL7	-4.0	16.0								
Y	560.0	5	18	HL7	-4.0	16.0								Y
A	561.1	5	74	CL7	0.0	13.0								Y
B	561.1	5	74	CL7	0.0	13.0								Y
C	561.1	5	74	CL7	0.0	13.0								Y
D	561.1	5	74	CL7	0.0	13.0								Y
E	561.1	5	74	CL7	0.0	13.0								Y
U	561.1	5	74	CL7	0.0	13.0								
UU	561.1	5	74	CL7	0.0	13.0								
V	561.1	5	74	CL7	0.0	13.0								
VV	561.1	5	74	CL7	0.0	13.0								Y
W	561.1	5	74	CL7	0.0	13.0								
X	561.1	5	74	CL7	0.0	13.0	ID	CR		41.0	CL7	2.8	2	Y
Y	561.1	5	74	CL7	0.0	13.0								Y
A	563.0	3	82	CL7	0.0	21.0								
B	563.0	3	82	CL7	0.0	21.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	563.0	3	82	CL7	0.0	21.0								
D	563.0	3	82	CL7	0.0	21.0								
E	563.0	3	82	CL7	0.0	21.0								
U	563.0	3	82	CL7	0.0	21.0	OD	W	2	< 20.0	CL7	6.0		Y
UU	563.0	3	82	CL7	0.0	21.0								
V	563.0	3	82	CL7	0.0	21.0								
VV	563.0	3	82	CL7	0.0	21.0								
W	563.0	3	82	CL7	0.0	21.0								
X	563.0	3	82	CL7	0.0	21.0								Y
Y	563.0	3	82	CL7	0.0	21.0								
A	564.1	4	82	CL7	0.0	26.0								Y
B	564.1	4	82	CL7	0.0	26.0								Y
C	564.1	4	82	CL7	0.0	26.0								Y
D	564.1	4	82	CL7	0.0	26.0								Y
E	564.1	4	82	CL7	0.0	26.0								Y
U	564.1	4	82	CL7	0.0	26.0								Y
UU	564.1	4	82	CL7	0.0	26.0								
V	564.1	4	82	CL7	0.0	26.0								
VV	564.1	4	82	CL7	0.0	26.0								Y
W	564.1	4	82	CL7	0.0	26.0								
X	564.1	4	82	CL7	0.0	26.0	ID	CR		40.0	CL7	5.1	2	Y
Y	564.1	4	82	CL7	0.0	26.0								
A	565.1	5	82	HL7	- 2.0	19.0								Y
B	565.1	5	82	HL7	- 2.0	19.0								Y
C	565.1	5	82	HL7	- 2.0	19.0								Y
D	565.1	5	82	HL7	- 2.0	19.0								Y
E	565.1	5	82	HL7	- 2.0	19.0								Y
U	565.1	5	82	HL7	- 2.0	19.0								
UU	565.1	5	82	HL7	- 2.0	19.0								
V	565.1	5	82	HL7	- 2.0	19.0								Y
VV	565.1	5	82	HL7	- 2.0	19.0								Y
W	565.1	5	82	HL7	- 2.0	19.0								
X	565.1	5	82	HL7	- 2.0	19.0								Y
Y	565.1	5	82	HL7	- 2.0	19.0								
A	566.1	8	83	CL7	0.0	34.0								Y
B	566.1	8	83	CL7	0.0	34.0								Y
C	566.1	8	83	CL7	0.0	34.0								Y
D	566.1	8	83	CL7	0.0	34.0								Y
E	566.1	8	83	CL7	0.0	34.0								Y
U	566.1	8	83	CL7	0.0	34.0								
UU	566.1	8	83	CL7	0.0	34.0								
V	566.1	8	83	CL7	0.0	34.0								Y
VV	566.1	8	83	CL7	0.0	34.0								Y
W	566.1	8	83	CL7	0.0	34.0								
X	566.1	8	83	CL7	0.0	34.0	ID	CR		35.0	CL7	2.9	1	Y
Y	566.1	8	83	CL7	0.0	34.0								Y
A	567.0	21	71	HL7	- 4.0	6.0								Y
B	567.0	21	71	HL7	- 4.0	6.0								Y
C	567.0	21	71	HL7	- 4.0	6.0								Y
D	567.0	21	71	HL7	- 4.0	6.0								Y
E	567.0	21	71	HL7	- 4.0	6.0								Y
U	567.0	21	71	HL7	- 4.0	6.0								
UU	567.0	21	71	HL7	- 4.0	6.0								
V	567.0	21	71	HL7	- 4.0	6.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	567.0	21	71	HL7	- 4.0	6.0								
W	567.0	21	71	HL7	- 4.0	6.0								
X	567.0	21	71	HL7	- 4.0	6.0								Y
Y	567.0	21	71	HL7	- 4.0	6.0								Y
A	568.0	4	3	CL7	0.0	26.0								
B	568.0	4	3	CL7	0.0	26.0								
C	568.0	4	3	CL7	0.0	26.0								
D	568.0	4	3	CL7	0.0	26.0								
E	568.0	4	3	CL7	0.0	26.0								
U	568.0	4	3	CL7	0.0	26.0	OD	W	2	< 20.0	CL7	4.0		Y
UU	568.0	4	3	CL7	0.0	26.0								
V	568.0	4	3	CL7	0.0	26.0								
VV	568.0	4	3	CL7	0.0	26.0								
W	568.0	4	3	CL7	0.0	26.0								
X	568.0	4	3	CL7	0.0	26.0								Y
Y	568.0	4	3	CL7	0.0	26.0								Y
A	569.3	15	49	CTTS	- 5.0	3.5	OD		1	< 20.0	CTTS	1.0	1	Y
B	569.3	15	49	CTTS	- 5.0	3.5								Y
C	569.3	15	49	CTTS	- 5.0	3.5								Y
D	569.3	15	49	CTTS	- 5.0	3.5								Y
E	569.3	15	49	CTTS	- 5.0	3.5								Y
U	569.3	15	49	CTTS	- 5.0	3.5								
UU	569.3	15	49	CTTS	- 5.0	3.5			2	18.0	CTTS	1.7		Y
V	569.3	15	49	CTTS	- 5.0	3.5								Y
VV	569.3	15	49	CTTS	- 5.0	3.5								Y
W	569.3	15	49	CTTS	- 5.0	3.5								
X	569.3	15	49	CTTS	- 5.0	3.5								Y
Y	569.3	15	49	CTTS	- 5.0	3.5								Y
A	570.3	24	60	CTTS	- 5.0	3.8								Y
B	570.3	24	60	CTTS	- 5.0	3.8								Y
C	570.3	24	60	CTTS	- 5.0	3.8								Y
D	570.3	24	60	CTTS	- 5.0	3.8								Y
E	570.3	24	60	CTTS	- 5.0	3.8								Y
U	570.3	24	60	CTTS	- 5.0	3.8								
UU	570.3	24	60	CTTS	- 5.0	3.8								
V	570.3	24	60	CTTS	- 5.0	3.8	OD	WG	2	< 20.0	CTTS		3	Y
VV	570.3	24	60	CTTS	- 5.0	3.8								
W	570.3	24	60	CTTS	- 5.0	3.8								
X	570.3	24	60	CTTS	- 5.0	3.8								Y
Y	570.3	24	60	CTTS	- 5.0	3.8	OD			< 10.0	CTTS			Y
A	571.3	26	48	CTTS	- 3.0	5.6								Y
B	571.3	26	48	CTTS	- 3.0	5.6								Y
C	571.3	26	48	CTTS	- 3.0	5.6								Y
D	571.3	26	48	CTTS	- 3.0	5.6	OD			< 20.0	CTTS	1.3		Y
E	571.3	26	48	CTTS	- 3.0	5.6								Y
U	571.3	26	48	CTTS	- 3.0	5.6								
UU	571.3	26	48	CTTS	- 3.0	5.6								Y
V	571.3	26	48	CTTS	- 3.0	5.6								Y
VV	571.3	26	48	CTTS	- 3.0	5.6								Y
W	571.3	26	48	CTTS	- 3.0	5.6								
X	571.3	26	48	CTTS	- 3.0	5.6								Y
Y	571.3	26	48	CTTS	- 3.0	5.6								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	573.1	18	65	CTTS	-21.0	-18.0								Y
B	573.1	18	65	CTTS	-21.0	-18.0								Y
C	573.1	18	65	CTTS	-21.0	-18.0								Y
D	573.1	18	65	CTTS	-21.0	-18.0								Y
E	573.1	18	65	CTTS	-21.0	-18.0								Y
U	573.1	18	65	CTTS	-21.0	-18.0								
UU	573.1	18	65	CTTS	-21.0	-18.0								
V	573.1	18	65	CTTS	-21.0	-18.0								Y
VV	573.1	18	65	CTTS	-21.0	-18.0								
W	573.1	18	65	CTTS	-21.0	-18.0								
X	573.1	18	65	CTTS	-21.0	-18.0								Y
Y	573.1	18	65	CTTS	-21.0	-18.0								Y
A	573.3	18	65	CTTS	- 5.0	6.9								Y
B	573.3	18	65	CTTS	- 5.0	6.9								Y
C	573.3	18	65	CTTS	- 5.0	6.9								Y
D	573.3	18	65	CTTS	- 5.0	6.9								Y
E	573.3	18	65	CTTS	- 5.0	6.9								Y
U	573.3	18	65	CTTS	- 5.0	6.9								
UU	573.3	18	65	CTTS	- 5.0	6.9								
V	573.3	18	65	CTTS	- 5.0	6.9								Y
VV	573.3	18	65	CTTS	- 5.0	6.9								
W	573.3	18	65	CTTS	- 5.0	6.9								
X	573.3	18	65	CTTS	- 5.0	6.9								Y
Y	573.3	18	65	CTTS	- 5.0	6.9								Y
A	574.3	9	69	CTTS	- 5.0	7.0								Y
B	574.3	9	69	CTTS	- 5.0	7.0								Y
C	574.3	9	69	CTTS	- 5.0	7.0	OD		2	< 20.0	CTTS	2.1	1	Y
D	574.3	9	69	CTTS	- 5.0	7.0								Y
E	574.3	9	69	CTTS	- 5.0	7.0								Y
U	574.3	9	69	CTTS	- 5.0	7.0								
UU	574.3	9	69	CTTS	- 5.0	7.0								
V	574.3	9	69	CTTS	- 5.0	7.0								
VV	574.3	9	69	CTTS	- 5.0	7.0								
W	574.3	9	69	CTTS	- 5.0	7.0								
X	574.3	9	69	CTTS	- 5.0	7.0								Y
Y	574.3	9	69	CTTS	- 5.0	7.0	OD			< 10.0	CTTS			Y
A	575.1	14	27	CTTS	-21.0	-18.0								Y
B	575.1	14	27	CTTS	-21.0	-18.0								Y
C	575.1	14	27	CTTS	-21.0	-18.0								Y
D	575.1	14	27	CTTS	-21.0	-18.0								Y
E	575.1	14	27	CTTS	-21.0	-18.0								Y
U	575.1	14	27	CTTS	-21.0	-18.0								Y
UU	575.1	14	27	CTTS	-21.0	-18.0								Y
V	575.1	14	27	CTTS	-21.0	-18.0								Y
VV	575.1	14	27	CTTS	-21.0	-18.0								Y
W	575.1	14	27	CTTS	-21.0	-18.0								
X	575.1	14	27	CTTS	-21.0	-18.0								Y
Y	575.1	14	27	CTTS	-21.0	-18.0								Y
A	575.2	14	27	CTTS	-18.0	- 5.0								Y
B	575.2	14	27	CTTS	-18.0	- 5.0								Y
C	575.2	14	27	CTTS	-18.0	- 5.0								Y
D	575.2	14	27	CTTS	-18.0	- 5.0								Y
E	575.2	14	27	CTTS	-18.0	- 5.0								Y
U	575.2	14	27	CTTS	-18.0	- 5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	575.2	14	27	CTTS	-18.0	- 5.0								Y
V	575.2	14	27	CTTS	-18.0	- 5.0								Y
VV	575.2	14	27	CTTS	-18.0	- 5.0								Y
W	575.2	14	27	CTTS	-18.0	- 5.0								
X	575.2	14	27	CTTS	-18.0	- 5.0								Y
Y	575.2	14	27	CTTS	-18.0	- 5.0								Y
A	575.3	14	27	CTTS	- 5.0	5.4								Y
B	575.3	14	27	CTTS	- 5.0	5.4								Y
C	575.3	14	27	CTTS	- 5.0	5.4								Y
D	575.3	14	27	CTTS	- 5.0	5.4								Y
E	575.3	14	27	CTTS	- 5.0	5.4								Y
U	575.3	14	27	CTTS	- 5.0	5.4	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	575.3	14	27	CTTS	- 5.0	5.4								Y
V	575.3	14	27	CTTS	- 5.0	5.4								Y
VV	575.3	14	27	CTTS	- 5.0	5.4								Y
W	575.3	14	27	CTTS	- 5.0	5.4								
X	575.3	14	27	CTTS	- 5.0	5.4								Y
Y	575.3	14	27	CTTS	- 5.0	5.4								Y
A	576.1	18	35	CTTS	-21.0	-18.0								Y
B	576.1	18	35	CTTS	-21.0	-18.0								Y
C	576.1	18	35	CTTS	-21.0	-18.0								Y
D	576.1	18	35	CTTS	-21.0	-18.0								Y
E	576.1	18	35	CTTS	-21.0	-18.0								Y
U	576.1	18	35	CTTS	-21.0	-18.0								Y
UU	576.1	18	35	CTTS	-21.0	-18.0								Y
V	576.1	18	35	CTTS	-21.0	-18.0								Y
VV	576.1	18	35	CTTS	-21.0	-18.0								Y
W	576.1	18	35	CTTS	-21.0	-18.0								
X	576.1	18	35	CTTS	-21.0	-18.0								Y
Y	576.1	18	35	CTTS	-21.0	-18.0								Y
A	576.2	18	35	CTTS	-18.0	- 5.0								Y
B	576.2	18	35	CTTS	-18.0	- 5.0								Y
C	576.2	18	35	CTTS	-18.0	- 5.0								Y
D	576.2	18	35	CTTS	-18.0	- 5.0								Y
E	576.2	18	35	CTTS	-18.0	- 5.0								Y
U	576.2	18	35	CTTS	-18.0	- 5.0								Y
UU	576.2	18	35	CTTS	-18.0	- 5.0								Y
V	576.2	18	35	CTTS	-18.0	- 5.0								Y
VV	576.2	18	35	CTTS	-18.0	- 5.0								Y
W	576.2	18	35	CTTS	-18.0	- 5.0								
X	576.2	18	35	CTTS	-18.0	- 5.0								Y
Y	576.2	18	35	CTTS	-18.0	- 5.0								Y
A	576.3	18	35	CTTS	- 5.0	5.1								Y
B	576.3	18	35	CTTS	- 5.0	5.1								Y
C	576.3	18	35	CTTS	- 5.0	5.1								Y
D	576.3	18	35	CTTS	- 5.0	5.1								Y
E	576.3	18	35	CTTS	- 5.0	5.1								Y
U	576.3	18	35	CTTS	- 5.0	5.1	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	576.3	18	35	CTTS	- 5.0	5.1								Y
V	576.3	18	35	CTTS	- 5.0	5.1								Y
VV	576.3	18	35	CTTS	- 5.0	5.1								Y
W	576.3	18	35	CTTS	- 5.0	5.1								
X	576.3	18	35	CTTS	- 5.0	5.1								Y
Y	576.3	18	35	CTTS	- 5.0	5.1								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	577.1	12	34	CTTS	-21.0	-18.0								Y
B	577.1	12	34	CTTS	-21.0	-18.0								Y
C	577.1	12	34	CTTS	-21.0	-18.0								Y
D	577.1	12	34	CTTS	-21.0	-18.0								Y
E	577.1	12	34	CTTS	-21.0	-18.0								Y
U	577.1	12	34	CTTS	-21.0	-18.0								Y
UU	577.1	12	34	CTTS	-21.0	-18.0								Y
V	577.1	12	34	CTTS	-21.0	-18.0								Y
VV	577.1	12	34	CTTS	-21.0	-18.0								Y
W	577.1	12	34	CTTS	-21.0	-18.0								
X	577.1	12	34	CTTS	-21.0	-18.0								Y
Y	577.1	12	34	CTTS	-21.0	-18.0								Y
A	577.2	12	34	CTTS	-18.0	- 5.0								Y
B	577.2	12	34	CTTS	-18.0	- 5.0								Y
C	577.2	12	34	CTTS	-18.0	- 5.0								Y
D	577.2	12	34	CTTS	-18.0	- 5.0								Y
E	577.2	12	34	CTTS	-18.0	- 5.0								Y
U	577.2	12	34	CTTS	-18.0	- 5.0								Y
UU	577.2	12	34	CTTS	-18.0	- 5.0								Y
V	577.2	12	34	CTTS	-18.0	- 5.0								Y
VV	577.2	12	34	CTTS	-18.0	- 5.0								Y
W	577.2	12	34	CTTS	-18.0	- 5.0								
X	577.2	12	34	CTTS	-18.0	- 5.0								Y
Y	577.2	12	34	CTTS	-18.0	- 5.0								Y
A	577.3	12	34	CTTS	- 5.0	5.3								Y
B	577.3	12	34	CTTS	- 5.0	5.3								Y
C	577.3	12	34	CTTS	- 5.0	5.3								Y
D	577.3	12	34	CTTS	- 5.0	5.3								Y
E	577.3	12	34	CTTS	- 5.0	5.3								Y
U	577.3	12	34	CTTS	- 5.0	5.3								Y
UU	577.3	12	34	CTTS	- 5.0	5.3								Y
V	577.3	12	34	CTTS	- 5.0	5.3								Y
VV	577.3	12	34	CTTS	- 5.0	5.3			3		CTTS	0.8		Y
W	577.3	12	34	CTTS	- 5.0	5.3								
X	577.3	12	34	CTTS	- 5.0	5.3								Y
Y	577.3	12	34	CTTS	- 5.0	5.3								Y
A	579.1	16	29	CTTS	-21.0	-18.0								Y
B	579.1	16	29	CTTS	-21.0	-18.0								Y
C	579.1	16	29	CTTS	-21.0	-18.0								Y
D	579.1	16	29	CTTS	-21.0	-18.0								Y
E	579.1	16	29	CTTS	-21.0	-18.0								Y
U	579.1	16	29	CTTS	-21.0	-18.0								Y
UU	579.1	16	29	CTTS	-21.0	-18.0								Y
V	579.1	16	29	CTTS	-21.0	-18.0								Y
VV	579.1	16	29	CTTS	-21.0	-18.0								Y
W	579.1	16	29	CTTS	-21.0	-18.0								
X	579.1	16	29	CTTS	-21.0	-18.0								Y
Y	579.1	16	29	CTTS	-21.0	-18.0								Y
A	579.2	16	29	CTTS	-18.0	- 5.0								Y
B	579.2	16	29	CTTS	-18.0	- 5.0								Y
C	579.2	16	29	CTTS	-18.0	- 5.0								Y
D	579.2	16	29	CTTS	-18.0	- 5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	579.2	16	29	CTTS	-18.0	- 5.0								Y
U	579.2	16	29	CTTS	-18.0	- 5.0								Y
UU	579.2	16	29	CTTS	-18.0	- 5.0								Y
V	579.2	16	29	CTTS	-18.0	- 5.0								Y
VV	579.2	16	29	CTTS	-18.0	- 5.0								Y
W	579.2	16	29	CTTS	-18.0	- 5.0								
X	579.2	16	29	CTTS	-18.0	- 5.0								Y
Y	579.2	16	29	CTTS	-18.0	- 5.0								Y
A	579.3	16	29	CTTS	- 5.0	6.3								Y
B	579.3	16	29	CTTS	- 5.0	6.3								Y
C	579.3	16	29	CTTS	- 5.0	6.3								Y
D	579.3	16	29	CTTS	- 5.0	6.3								Y
E	579.3	16	29	CTTS	- 5.0	6.3								Y
U	579.3	16	29	CTTS	- 5.0	6.3	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	579.3	16	29	CTTS	- 5.0	6.3								Y
V	579.3	16	29	CTTS	- 5.0	6.3								Y
VV	579.3	16	29	CTTS	- 5.0	6.3			3		CTTS	1.3		Y
W	579.3	16	29	CTTS	- 5.0	6.3								
X	579.3	16	29	CTTS	- 5.0	6.3								Y
Y	579.3	16	29	CTTS	- 5.0	6.3	OD			< 10.0	CTTS			Y
A	580.1	27	35	CTTS	-21.0	-18.0								Y
B	580.1	27	35	CTTS	-21.0	-18.0								Y
C	580.1	27	35	CTTS	-21.0	-18.0								Y
D	580.1	27	35	CTTS	-21.0	-18.0								Y
E	580.1	27	35	CTTS	-21.0	-18.0								Y
U	580.1	27	35	CTTS	-21.0	-18.0								Y
UU	580.1	27	35	CTTS	-21.0	-18.0								Y
V	580.1	27	35	CTTS	-21.0	-18.0								Y
VV	580.1	27	35	CTTS	-21.0	-18.0								Y
W	580.1	27	35	CTTS	-21.0	-18.0								
X	580.1	27	35	CTTS	-21.0	-18.0								Y
Y	580.1	27	35	CTTS	-21.0	-18.0								Y
A	580.2	27	35	CTTS	-18.0	- 5.0								Y
B	580.2	27	35	CTTS	-18.0	- 5.0								Y
C	580.2	27	35	CTTS	-18.0	- 5.0								Y
D	580.2	27	35	CTTS	-18.0	- 5.0								Y
E	580.2	27	35	CTTS	-18.0	- 5.0								Y
U	580.2	27	35	CTTS	-18.0	- 5.0								Y
UU	580.2	27	35	CTTS	-18.0	- 5.0								Y
V	580.2	27	35	CTTS	-18.0	- 5.0								Y
VV	580.2	27	35	CTTS	-18.0	- 5.0								Y
W	580.2	27	35	CTTS	-18.0	- 5.0								
X	580.2	27	35	CTTS	-18.0	- 5.0								Y
Y	580.2	27	35	CTTS	-18.0	- 5.0								Y
A	580.3	27	35	CTTS	- 5.0	6.5								Y
B	580.3	27	35	CTTS	- 5.0	6.5								Y
C	580.3	27	35	CTTS	- 5.0	6.5								Y
D	580.3	27	35	CTTS	- 5.0	6.5								Y
E	580.3	27	35	CTTS	- 5.0	6.5								Y
U	580.3	27	35	CTTS	- 5.0	6.5								Y
UU	580.3	27	35	CTTS	- 5.0	6.5								Y
V	580.3	27	35	CTTS	- 5.0	6.5								Y
VV	580.3	27	35	CTTS	- 5.0	6.5								Y
W	580.3	27	35	CTTS	- 5.0	6.5								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	580.3	27	35	CTTS	- 5.0	6.5								Y
Y	580.3	27	35	CTTS	- 5.0	6.5								Y
A	581.1	11	71	HTTS	-21.0	-18.0								Y
B	581.1	11	71	HTTS	-21.0	-18.0								Y
C	581.1	11	71	HTTS	-21.0	-18.0								Y
D	581.1	11	71	HTTS	-21.0	-18.0								Y
E	581.1	11	71	HTTS	-21.0	-18.0								Y
U	581.1	11	71	HTTS	-21.0	-18.0								Y
UU	581.1	11	71	HTTS	-21.0	-18.0								Y
V	581.1	11	71	HTTS	-21.0	-18.0								Y
VV	581.1	11	71	HTTS	-21.0	-18.0								Y
W	581.1	11	71	HTTS	-21.0	-18.0								
X	581.1	11	71	HTTS	-21.0	-18.0								Y
Y	581.1	11	71	HTTS	-21.0	-18.0								Y
A	581.2	11	71	HTTS	-18.0	- 5.0								Y
B	581.2	11	71	HTTS	-18.0	- 5.0								Y
C	581.2	11	71	HTTS	-18.0	- 5.0								Y
D	581.2	11	71	HTTS	-18.0	- 5.0								Y
E	581.2	11	71	HTTS	-18.0	- 5.0								Y
U	581.2	11	71	HTTS	-18.0	- 5.0								Y
UU	581.2	11	71	HTTS	-18.0	- 5.0								Y
V	581.2	11	71	HTTS	-18.0	- 5.0								Y
VV	581.2	11	71	HTTS	-18.0	- 5.0								Y
W	581.2	11	71	HTTS	-18.0	- 5.0								
X	581.2	11	71	HTTS	-18.0	- 5.0								Y
Y	581.2	11	71	HTTS	-18.0	- 5.0								Y
A	581.3	11	71	HTTS	- 5.0	4.5	OD		1	48.0	HTTS	0.7	1	Y
B	581.3	11	71	HTTS	- 5.0	4.5	OD		2	43.0	HTTS	0.5	1	Y
C	581.3	11	71	HTTS	- 5.0	4.5	OD		2	43.0	HTTS	0.6	1	Y
D	581.3	11	71	HTTS	- 5.0	4.5	OD		1	47.0	HTTS	0.5	1	Y
E	581.3	11	71	HTTS	- 5.0	4.5	OD		1	54.0	HTTS	0.4	1	Y
U	581.3	11	71	HTTS	- 5.0	4.5	OD	IG	2	50.0	HTTS	1.0		Y
UU	581.3	11	71	HTTS	- 5.0	4.5			2	45.0	HTTS	0.6		Y
V	581.3	11	71	HTTS	- 5.0	4.5	OD	WG	1	47.0	HTTS		UT	Y
VV	581.3	11	71	HTTS	- 5.0	4.5			2	30.0	HTTS	0.6		Y
W	581.3	11	71	HTTS	- 5.0	4.5								
X	581.3	11	71	HTTS	- 5.0	4.5	OD	WG			HTTS	0.6	1	Y
Y	581.3	11	71	HTTS	- 5.0	4.5	OD			47.0	HTTS			Y
A	582.1	13	73	HTTS	-21.0	-18.0								Y
B	582.1	13	73	HTTS	-21.0	-18.0								Y
C	582.1	13	73	HTTS	-21.0	-18.0								Y
D	582.1	13	73	HTTS	-21.0	-18.0								Y
E	582.1	13	73	HTTS	-21.0	-18.0								Y
U	582.1	13	73	HTTS	-21.0	-18.0								Y
UU	582.1	13	73	HTTS	-21.0	-18.0								Y
V	582.1	13	73	HTTS	-21.0	-18.0								Y
VV	582.1	13	73	HTTS	-21.0	-18.0								Y
W	582.1	13	73	HTTS	-21.0	-18.0								
X	582.1	13	73	HTTS	-21.0	-18.0								Y
Y	582.1	13	73	HTTS	-21.0	-18.0								Y
A	582.2	13	73	HTTS	-18.0	- 5.0								Y
B	582.2	13	73	HTTS	-18.0	- 5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	582.2	13	73	HTTS	-18.0	- 5.0								Y
D	582.2	13	73	HTTS	-18.0	- 5.0								Y
E	582.2	13	73	HTTS	-18.0	- 5.0								Y
U	582.2	13	73	HTTS	-18.0	- 5.0								Y
UU	582.2	13	73	HTTS	-18.0	- 5.0								Y
V	582.2	13	73	HTTS	-18.0	- 5.0								Y
VV	582.2	13	73	HTTS	-18.0	- 5.0								Y
W	582.2	13	73	HTTS	-18.0	- 5.0								
X	582.2	13	73	HTTS	-18.0	- 5.0								Y
Y	582.2	13	73	HTTS	-18.0	- 5.0								Y
A	582.3	13	73	HTTS	- 5.0	4.6	OD		1	34.0	HTTS	1.0	1	Y
B	582.3	13	73	HTTS	- 5.0	4.6	OD		1	30.0	HTTS	0.5	1	Y
C	582.3	13	73	HTTS	- 5.0	4.6	OD		2	31.0	HTTS	0.9	1	Y
D	582.3	13	73	HTTS	- 5.0	4.6	OD		1	33.0	HTTS	1.2	1	Y
E	582.3	13	73	HTTS	- 5.0	4.6	OD		1	40.0	HTTS	0.8	1	Y
U	582.3	13	73	HTTS	- 5.0	4.6	OD	IG	2	40.0	HTTS	1.0		Y
UU	582.3	13	73	HTTS	- 5.0	4.6			2	34.0	HTTS	0.9		Y
V	582.3	13	73	HTTS	- 5.0	4.6	OD	WG	2	53.0	HTTS		3	Y
VV	582.3	13	73	HTTS	- 5.0	4.6			2	33.0	HTTS	0.9		Y
W	582.3	13	73	HTTS	- 5.0	4.6								
X	582.3	13	73	HTTS	- 5.0	4.6	OD	WG		34.0	HTTS	1.0	1	Y
Y	582.3	13	73	HTTS	- 5.0	4.6	OD			42.0	HTTS			Y
A	583.1	4	30	HTTS	-21.0	-18.0								Y
B	583.1	4	30	HTTS	-21.0	-18.0								Y
C	583.1	4	30	HTTS	-21.0	-18.0								Y
D	583.1	4	30	HTTS	-21.0	-18.0								Y
E	583.1	4	30	HTTS	-21.0	-18.0								Y
U	583.1	4	30	HTTS	-21.0	-18.0								
UU	583.1	4	30	HTTS	-21.0	-18.0								Y
V	583.1	4	30	HTTS	-21.0	-18.0								Y
VV	583.1	4	30	HTTS	-21.0	-18.0								Y
W	583.1	4	30	HTTS	-21.0	-18.0								Y
X	583.1	4	30	HTTS	-21.0	-18.0								Y
Y	583.1	4	30	HTTS	-21.0	-18.0								Y
A	583.2	4	30	HTTS	-18.0	- 5.0								Y
B	583.2	4	30	HTTS	-18.0	- 5.0								Y
C	583.2	4	30	HTTS	-18.0	- 5.0								Y
D	583.2	4	30	HTTS	-18.0	- 5.0								Y
E	583.2	4	30	HTTS	-18.0	- 5.0								Y
U	583.2	4	30	HTTS	-18.0	- 5.0								
UU	583.2	4	30	HTTS	-18.0	- 5.0								Y
V	583.2	4	30	HTTS	-18.0	- 5.0								Y
VV	583.2	4	30	HTTS	-18.0	- 5.0								Y
W	583.2	4	30	HTTS	-18.0	- 5.0								Y
X	583.2	4	30	HTTS	-18.0	- 5.0								Y
Y	583.2	4	30	HTTS	-18.0	- 5.0								Y
A	583.3	4	30	HTTS	- 5.0	3.2	OD		2	44.0	HTTS	0.4	1	Y
B	583.3	4	30	HTTS	- 5.0	3.2	OD		1	42.0	HTTS	1.4	1	Y
C	583.3	4	30	HTTS	- 5.0	3.2	OD		2	66.0	HTTS	0.3	1	Y
D	583.3	4	30	HTTS	- 5.0	3.2	OD		1	38.0	HTTS	1.3	1	Y
E	583.3	4	30	HTTS	- 5.0	3.2	OD		1	46.0	HTTS	1.4	1	Y
U	583.3	4	30	HTTS	- 5.0	3.2								
UU	583.3	4	30	HTTS	- 5.0	3.2			2	76.0	HTTS	1.4		Y
V	583.3	4	30	HTTS	- 5.0	3.2	OD	WG	1	68.0	HTTS		UT	Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	583.3	4	30	HTTS	- 5.0	3.2			2	31.0	HTTS	1.4		Y
W	583.3	4	30	HTTS	- 5.0	3.2				65.0	HTTS	1.7		Y
X	583.3	4	30	HTTS	- 5.0	3.2	OD	WG		43.0	HTTS	1.6	1	Y
Y	583.3	4	30	HTTS	- 5.0	3.2	OD			45.0	HTTS			Y
A	584.1	9	69	HTTS	-21.0	-18.0								Y
B	584.1	9	69	HTTS	-21.0	-18.0								Y
C	584.1	9	69	HTTS	-21.0	-18.0								Y
D	584.1	9	69	HTTS	-21.0	-18.0								Y
E	584.1	9	69	HTTS	-21.0	-18.0								Y
U	584.1	9	69	HTTS	-21.0	-18.0								
UU	584.1	9	69	HTTS	-21.0	-18.0								Y
V	584.1	9	69	HTTS	-21.0	-18.0								Y
VV	584.1	9	69	HTTS	-21.0	-18.0								Y
W	584.1	9	69	HTTS	-21.0	-18.0								
X	584.1	9	69	HTTS	-21.0	-18.0								Y
Y	584.1	9	69	HTTS	-21.0	-18.0								Y
A	584.2	9	69	HTTS	-18.0	- 5.0								Y
B	584.2	9	69	HTTS	-18.0	- 5.0								Y
C	584.2	9	69	HTTS	-18.0	- 5.0								Y
D	584.2	9	69	HTTS	-18.0	- 5.0								Y
E	584.2	9	69	HTTS	-18.0	- 5.0								Y
U	584.2	9	69	HTTS	-18.0	- 5.0								
UU	584.2	9	69	HTTS	-18.0	- 5.0								Y
V	584.2	9	69	HTTS	-18.0	- 5.0								Y
VV	584.2	9	69	HTTS	-18.0	- 5.0								Y
W	584.2	9	69	HTTS	-18.0	- 5.0								
X	584.2	9	69	HTTS	-18.0	- 5.0								Y
Y	584.2	9	69	HTTS	-18.0	- 5.0								Y
A	584.3	9	69	HTTS	- 5.0	4.5	OD		2	38.0	HTTS	0.6	1	Y
B	584.3	9	69	HTTS	- 5.0	4.5	OD		3	40.0	HTTS	0.6	1	Y
C	584.3	9	69	HTTS	- 5.0	4.5	OD		3	59.0	HTTS	0.3	5	Y
D	584.3	9	69	HTTS	- 5.0	4.5	OD		2	44.0	HTTS	0.3	1	Y
E	584.3	9	69	HTTS	- 5.0	4.5	OD		1	49.0	HTTS	0.4	1	Y
U	584.3	9	69	HTTS	- 5.0	4.5								
UU	584.3	9	69	HTTS	- 5.0	4.5			2	22.0	HTTS	0.6		Y
V	584.3	9	69	HTTS	- 5.0	4.5	OD	WG	2	42.0	HTTS		1	Y
VV	584.3	9	69	HTTS	- 5.0	4.5			2	17.0	HTTS	0.6		Y
W	584.3	9	69	HTTS	- 5.0	4.5								
X	584.3	9	69	HTTS	- 5.0	4.5	OD	WG		29.0	HTTS	0.7	1	Y
Y	584.3	9	69	HTTS	- 5.0	4.5	OD			53.0	HTTS			Y
A	585.2	18	65	HTTS	-18.0	- 5.0								Y
B	585.2	18	65	HTTS	-18.0	- 5.0								Y
C	585.2	18	65	HTTS	-18.0	- 5.0								Y
D	585.2	18	65	HTTS	-18.0	- 5.0								Y
E	585.2	18	65	HTTS	-18.0	- 5.0								Y
U	585.2	18	65	HTTS	-18.0	- 5.0								
UU	585.2	18	65	HTTS	-18.0	- 5.0								Y
V	585.2	18	65	HTTS	-18.0	- 5.0								Y
VV	585.2	18	65	HTTS	-18.0	- 5.0								Y
W	585.2	18	65	HTTS	-18.0	- 5.0								
X	585.2	18	65	HTTS	-18.0	- 5.0								Y
Y	585.2	18	65	HTTS	-18.0	- 5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	585.3	18	65	HTTS	- 5.0	5.3	OD		2	75.0	HTTS	1.0	1	Y
B	585.3	18	65	HTTS	- 5.0	5.3	OD		1	33.0	HTTS	0.4	1	Y
C	585.3	18	65	HTTS	- 5.0	5.3	OD		2	60.0	HTTS	0.8	5	Y
D	585.3	18	65	HTTS	- 5.0	5.3	OD		1	32.0	HTTS	0.5	1	Y
E	585.3	18	65	HTTS	- 5.0	5.3	OD		1	39.0	HTTS	1.0	1	Y
U	585.3	18	65	HTTS	- 5.0	5.3								
UU	585.3	18	65	HTTS	- 5.0	5.3			2	78.0	HTTS	0.7		Y
V	585.3	18	65	HTTS	- 5.0	5.3	OD	WG	2	47.0	HTTS		3	Y
VV	585.3	18	65	HTTS	- 5.0	5.3			2	32.0	HTTS	0.7		Y
W	585.3	18	65	HTTS	- 5.0	5.3								
X	585.3	18	65	HTTS	- 5.0	5.3	OD	WG		26.0	HTTS	1.0	1	Y
X	585.3	18	65	HTTS	- 5.0	5.3	OD	WG		36.0	HTTS	0.6	1	Y
Y	585.3	18	65	HTTS	- 5.0	5.3	OD			36.0	HTTS			Y
A	587.3	6	65	HTTS	- 5.0	5.6	OD		2	49.0	HTTS	1.0	1	Y
B	587.3	6	65	HTTS	- 5.0	5.6	OD		2	43.0	HTTS	1.0	1	Y
C	587.3	6	65	HTTS	- 5.0	5.6	OD		2	51.0	HTTS	1.1	1	Y
D	587.3	6	65	HTTS	- 5.0	5.6	OD		1	56.0	HTTS	2.0	1	Y
E	587.3	6	65	HTTS	- 5.0	5.6	OD		1	56.0	HTTS	0.7	1	Y
U	587.3	6	65	HTTS	- 5.0	5.6								
UU	587.3	6	65	HTTS	- 5.0	5.6			2	35.0	HTTS	0.9		Y
V	587.3	6	65	HTTS	- 5.0	5.6	OD	WG	2	64.0	HTTS		3	Y
VV	587.3	6	65	HTTS	- 5.0	5.6			3	32.0	HTTS	0.9		Y
W	587.3	6	65	HTTS	- 5.0	5.6								
X	587.3	6	65	HTTS	- 5.0	5.6	OD	WG		21.0	HTTS	0.9	1	Y
X	587.3	6	65	HTTS	- 5.0	5.6	OD	WG		38.0	HTTS	1.2	1	Y
Y	587.3	6	65	HTTS	- 5.0	5.6								Y
A	588.3	6	75	HTTS	- 5.0	5.2	OD		2	26.0	HTTS	0.4	2	Y
B	588.3	6	75	HTTS	- 5.0	5.2	OD		3	61.0	HTTS	0.5	1	Y
C	588.3	6	75	HTTS	- 5.0	5.2	OD		2	78.0	HTTS	0.5	5	Y
D	588.3	6	75	HTTS	- 5.0	5.2								Y
E	588.3	6	75	HTTS	- 5.0	5.2	OD		1	60.0	HTTS	0.9	1	Y
U	588.3	6	75	HTTS	- 5.0	5.2								
UU	588.3	6	75	HTTS	- 5.0	5.2								
V	588.3	6	75	HTTS	- 5.0	5.2	OD	WG	2	54.0	HTTS		1	Y
VV	588.3	6	75	HTTS	- 5.0	5.2								
W	588.3	6	75	HTTS	- 5.0	5.2								
X	588.3	6	75	HTTS	- 5.0	5.2	OD	WG		38.0	HTTS	0.4	1	Y
Y	588.3	6	75	HTTS	- 5.0	5.2	OD			< 10.0	HTTS			Y
A	589.1	3	29	HTTS	-21.0	-17.5								Y
B	589.1	3	29	HTTS	-21.0	-17.5								Y
C	589.1	3	29	HTTS	-21.0	-17.5								Y
D	589.1	3	29	HTTS	-21.0	-17.5								Y
E	589.1	3	29	HTTS	-21.0	-17.5								Y
U	589.1	3	29	HTTS	-21.0	-17.5								
UU	589.1	3	29	HTTS	-21.0	-17.5								Y
V	589.1	3	29	HTTS	-21.0	-17.5								Y
VV	589.1	3	29	HTTS	-21.0	-17.5								Y
W	589.1	3	29	HTTS	-21.0	-17.5								
X	589.1	3	29	HTTS	-21.0	-17.5								Y
Y	589.1	3	29	HTTS	-21.0	-17.5								Y
A	589.2	3	29	HTTS	-14.3	- 5.0								Y
B	589.2	3	29	HTTS	-14.3	- 5.0								Y
C	589.2	3	29	HTTS	-14.3	- 5.0								Y
D	589.2	3	29	HTTS	-14.3	- 5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	589.2	3	29	HTTS	-14.3	- 5.0								Y
U	589.2	3	29	HTTS	-14.3	- 5.0								
UU	589.2	3	29	HTTS	-14.3	- 5.0								Y
V	589.2	3	29	HTTS	-14.3	- 5.0								Y
VV	589.2	3	29	HTTS	-14.3	- 5.0								Y
W	589.2	3	29	HTTS	-14.3	- 5.0								
X	589.2	3	29	HTTS	-14.3	- 5.0								Y
Y	589.2	3	29	HTTS	-14.3	- 5.0								Y
A	589.3	3	29	HTTS	- 5.0	4.5								Y
B	589.3	3	29	HTTS	- 5.0	4.5								Y
C	589.3	3	29	HTTS	- 5.0	4.5								Y
D	589.3	3	29	HTTS	- 5.0	4.5	OD			< 20.0	HTTS	2.1		Y
E	589.3	3	29	HTTS	- 5.0	4.5								Y
U	589.3	3	29	HTTS	- 5.0	4.5								
UU	589.3	3	29	HTTS	- 5.0	4.5			2	37.0	HTTS	0.2		Y
V	589.3	3	29	HTTS	- 5.0	4.5	OD	WG	3	40.0	HTTS		1	Y
VV	589.3	3	29	HTTS	- 5.0	4.5								Y
W	589.3	3	29	HTTS	- 5.0	4.5								
X	589.3	3	29	HTTS	- 5.0	4.5								Y
Y	589.3	3	29	HTTS	- 5.0	4.5								Y
A	590.3	2	29	HTTS	- 5.0	4.6								Y
B	590.3	2	29	HTTS	- 5.0	4.6								Y
C	590.3	2	29	HTTS	- 5.0	4.6								Y
D	590.3	2	29	HTTS	- 5.0	4.6								Y
E	590.3	2	29	HTTS	- 5.0	4.6								Y
U	590.3	2	29	HTTS	- 5.0	4.6								
UU	590.3	2	29	HTTS	- 5.0	4.6								Y
V	590.3	2	29	HTTS	- 5.0	4.6								Y
VV	590.3	2	29	HTTS	- 5.0	4.6								Y
W	590.3	2	29	HTTS	- 5.0	4.6								
X	590.3	2	29	HTTS	- 5.0	4.6								Y
Y	590.3	2	29	HTTS	- 5.0	4.6								Y
A	591.1	5	18	HTTS	-21.0	-17.0								Y
B	591.1	5	18	HTTS	-21.0	-17.0								Y
C	591.1	5	18	HTTS	-21.0	-17.0								Y
D	591.1	5	18	HTTS	-21.0	-17.0								Y
E	591.1	5	18	HTTS	-21.0	-17.0								Y
U	591.1	5	18	HTTS	-21.0	-17.0								
UU	591.1	5	18	HTTS	-21.0	-17.0								Y
V	591.1	5	18	HTTS	-21.0	-17.0								Y
VV	591.1	5	18	HTTS	-21.0	-17.0								Y
W	591.1	5	18	HTTS	-21.0	-17.0								
X	591.1	5	18	HTTS	-21.0	-17.0								Y
Y	591.1	5	18	HTTS	-21.0	-17.0								Y
A	591.2	5	18	HTTS	-14.3	- 5.0								Y
B	591.2	5	18	HTTS	-14.3	- 5.0								Y
C	591.2	5	18	HTTS	-14.3	- 5.0								Y
D	591.2	5	18	HTTS	-14.3	- 5.0								Y
E	591.2	5	18	HTTS	-14.3	- 5.0								Y
U	591.2	5	18	HTTS	-14.3	- 5.0								
UU	591.2	5	18	HTTS	-14.3	- 5.0								Y
V	591.2	5	18	HTTS	-14.3	- 5.0								Y
VV	591.2	5	18	HTTS	-14.3	- 5.0								Y
W	591.2	5	18	HTTS	-14.3	- 5.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	591.2	5	18	HTTS	-14.3	- 5.0								Y
Y	591.2	5	18	HTTS	-14.3	- 5.0								Y
A	591.3	5	18	HTTS	- 5.0	6.0	OD	WG	2	37.0	HTTS	0.5	5	Y
B	591.3	5	18	HTTS	- 5.0	6.0	OD		2	48.0	HTTS	0.6	1	Y
C	591.3	5	18	HTTS	- 5.0	6.0	OD		2	65.0	HTTS	0.4	1	Y
D	591.3	5	18	HTTS	- 5.0	6.0	OD		1	42.0	HTTS	0.3	1	Y
E	591.3	5	18	HTTS	- 5.0	6.0	OD		1	56.0	HTTS	0.4	1	Y
U	591.3	5	18	HTTS	- 5.0	6.0								
UU	591.3	5	18	HTTS	- 5.0	6.0			2	45.0	HTTS	0.8		Y
V	591.3	5	18	HTTS	- 5.0	6.0	OD	WG	2	58.0	HTTS		3	Y
VV	591.3	5	18	HTTS	- 5.0	6.0			2	55.0	HTTS	0.8		Y
W	591.3	5	18	HTTS	- 5.0	6.0								
X	591.3	5	18	HTTS	- 5.0	6.0	OD	WG		41.0	HTTS	0.6	1	Y
Y	591.3	5	18	HTTS	- 5.0	6.0								Y
A	592.3	6	44	HTTS	- 5.0	5.6	OD		1	29.0	HTTS	0.8	1	Y
B	592.3	6	44	HTTS	- 5.0	5.6	OD		1	27.0	HTTS	0.8	1	Y
C	592.3	6	44	HTTS	- 5.0	5.6	OD		1	33.0	HTTS	1.5	1	Y
D	592.3	6	44	HTTS	- 5.0	5.6	OD		1	33.0	HTTS	1.2	1	Y
E	592.3	6	44	HTTS	- 5.0	5.6	OD		1	33.0	HTTS	0.6	1	Y
U	592.3	6	44	HTTS	- 5.0	5.6								
UU	592.3	6	44	HTTS	- 5.0	5.6			2	25.0	HTTS	1.1		Y
V	592.3	6	44	HTTS	- 5.0	5.6	OD	WG	2	39.0	HTTS		3	Y
VV	592.3	6	44	HTTS	- 5.0	5.6			3	35.0	HTTS	1.1		Y
W	592.3	6	44	HTTS	- 5.0	5.6								
X	592.3	6	44	HTTS	- 5.0	5.6	OD	WG		22.0	HTTS	0.7	1	Y
Y	592.3	6	44	HTTS	- 5.0	5.6	OD			32.0	HTTS			Y
Y	592.3	6	44	HTTS	- 5.0	5.6	OD			60.0	HTTS			Y
A	593.3	5	26	HTTS	- 5.0	3.8								Y
B	593.3	5	26	HTTS	- 5.0	3.8								Y
C	593.3	5	26	HTTS	- 5.0	3.8								Y
D	593.3	5	26	HTTS	- 5.0	3.8								Y
E	593.3	5	26	HTTS	- 5.0	3.8								Y
U	593.3	5	26	HTTS	- 5.0	3.8								
UU	593.3	5	26	HTTS	- 5.0	3.8								Y
V	593.3	5	26	HTTS	- 5.0	3.8								Y
VV	593.3	5	26	HTTS	- 5.0	3.8								Y
W	593.3	5	26	HTTS	- 5.0	3.8								
X	593.3	5	26	HTTS	- 5.0	3.8								Y
Y	593.3	5	26	HTTS	- 5.0	3.8								Y
A	594.1	3	28	HTTS	-21.0	-16.0								Y
B	594.1	3	28	HTTS	-21.0	-16.0								Y
C	594.1	3	28	HTTS	-21.0	-16.0								Y
D	594.1	3	28	HTTS	-21.0	-16.0								Y
E	594.1	3	28	HTTS	-21.0	-16.0								Y
U	594.1	3	28	HTTS	-21.0	-16.0								
UU	594.1	3	28	HTTS	-21.0	-16.0								Y
V	594.1	3	28	HTTS	-21.0	-16.0								Y
VV	594.1	3	28	HTTS	-21.0	-16.0								Y
W	594.1	3	28	HTTS	-21.0	-16.0								
X	594.1	3	28	HTTS	-21.0	-16.0								Y
Y	594.1	3	28	HTTS	-21.0	-16.0								Y
A	594.3	3	28	HTTS	- 5.0	5.6								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
B	594.3	3	28	HTTS	- 5.0	5.6								Y
C	594.3	3	28	HTTS	- 5.0	5.6								Y
D	594.3	3	28	HTTS	- 5.0	5.6								Y
E	594.3	3	28	HTTS	- 5.0	5.6								Y
U	594.3	3	28	HTTS	- 5.0	5.6								
UU	594.3	3	28	HTTS	- 5.0	5.6								Y
V	594.3	3	28	HTTS	- 5.0	5.6								Y
VV	594.3	3	28	HTTS	- 5.0	5.6								Y
W	594.3	3	28	HTTS	- 5.0	5.6								
X	594.3	3	28	HTTS	- 5.0	5.6								Y
Y	594.3	3	28	HTTS	- 5.0	5.6								Y
A	595.3	4	25	HTTS	- 5.0	5.5	OD		2	41.0	HTTS		2	Y
B	595.3	4	25	HTTS	- 5.0	5.5	OD		3		HTTS	0.0	5	Y
C	595.3	4	25	HTTS	- 5.0	5.5	OD		2	88.0	HTTS		5	Y
D	595.3	4	25	HTTS	- 5.0	5.5								Y
E	595.3	4	25	HTTS	- 5.0	5.5								Y
U	595.3	4	25	HTTS	- 5.0	5.5								
UU	595.3	4	25	HTTS	- 5.0	5.5			2	46.0	HTTS	0.5		Y
V	595.3	4	25	HTTS	- 5.0	5.5	OD	WG	2	45.0	HTTS		1	Y
VV	595.3	4	25	HTTS	- 5.0	5.5			2	27.0	HTTS	0.5		Y
W	595.3	4	25	HTTS	- 5.0	5.5								
X	595.3	4	25	HTTS	- 5.0	5.5	OD	WG		61.0	HTTS	0.2	2	Y
Y	595.3	4	25	HTTS	- 5.0	5.5	OD			23.0	HTTS			Y
Y	595.3	4	25	HTTS	- 5.0	5.5	OD			77.0	HTTS			Y
A	596.3	6	29	HTTS	- 5.0	5.9	OD		1	31.0	HTTS	1.0	1	Y
B	596.3	6	29	HTTS	- 5.0	5.9	OD		1	32.0	HTTS	0.7	1	Y
C	596.3	6	29	HTTS	- 5.0	5.9	OD		2	37.0	HTTS	0.8	1	Y
D	596.3	6	29	HTTS	- 5.0	5.9	OD		1	26.0	HTTS	0.9	1	Y
E	596.3	6	29	HTTS	- 5.0	5.9	OD		1	36.0	HTTS	0.4	1	Y
U	596.3	6	29	HTTS	- 5.0	5.9								
UU	596.3	6	29	HTTS	- 5.0	5.9			2	39.0	HTTS	0.7		Y
V	596.3	6	29	HTTS	- 5.0	5.9	OD	WG	2	57.0	HTTS		3	Y
VV	596.3	6	29	HTTS	- 5.0	5.9			3	26.0	HTTS	0.7		Y
W	596.3	6	29	HTTS	- 5.0	5.9								
X	596.3	6	29	HTTS	- 5.0	5.9	OD	WG		31.0	HTTS	0.7	1	Y
Y	596.3	6	29	HTTS	- 5.0	5.9	OD			40.0	HTTS			Y
A	597.3	5	77	HTTS	- 5.0	5.5	OD		1	29.0	HTTS	0.7	1	Y
B	597.3	5	77	HTTS	- 5.0	5.5	OD		1	27.0	HTTS	0.2	1	Y
C	597.3	5	77	HTTS	- 5.0	5.5	OD		2	37.0	HTTS	1.2	1	Y
D	597.3	5	77	HTTS	- 5.0	5.5	OD		1	28.0	HTTS	0.6	1	Y
E	597.3	5	77	HTTS	- 5.0	5.5	OD		1	39.0	HTTS	0.3	1	Y
U	597.3	5	77	HTTS	- 5.0	5.5								
UU	597.3	5	77	HTTS	- 5.0	5.5			2	31.0	HTTS	0.6		Y
V	597.3	5	77	HTTS	- 5.0	5.5	OD	WG	2	68.0	HTTS		3	Y
VV	597.3	5	77	HTTS	- 5.0	5.5			2	20.0	HTTS	0.6		Y
W	597.3	5	77	HTTS	- 5.0	5.5								
X	597.3	5	77	HTTS	- 5.0	5.5	OD	WG		28.0	HTTS	0.0	1	Y
Y	597.3	5	77	HTTS	- 5.0	5.5								
A	598.3	3	50	HTTS	- 5.0	9.5								Y
B	598.3	3	50	HTTS	- 5.0	9.5								Y
C	598.3	3	50	HTTS	- 5.0	9.5								Y
D	598.3	3	50	HTTS	- 5.0	9.5	OD			< 20.0	HTTS	2.7		Y
E	598.3	3	50	HTTS	- 5.0	9.5								Y
U	598.3	3	50	HTTS	- 5.0	9.5								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	598.3	3	50	HTTS	- 5.0	9.5								Y
V	598.3	3	50	HTTS	- 5.0	9.5								Y
VV	598.3	3	50	HTTS	- 5.0	9.5								Y
W	598.3	3	50	HTTS	- 5.0	9.5								
X	598.3	3	50	HTTS	- 5.0	9.5								Y
Y	598.3	3	50	HTTS	- 5.0	9.5								Y
A	599.2	4	51	HTTS	-18.0	- 5.0								Y
B	599.2	4	51	HTTS	-18.0	- 5.0								Y
C	599.2	4	51	HTTS	-18.0	- 5.0								Y
D	599.2	4	51	HTTS	-18.0	- 5.0								Y
E	599.2	4	51	HTTS	-18.0	- 5.0								Y
U	599.2	4	51	HTTS	-18.0	- 5.0								
UU	599.2	4	51	HTTS	-18.0	- 5.0								Y
V	599.2	4	51	HTTS	-18.0	- 5.0								Y
VV	599.2	4	51	HTTS	-18.0	- 5.0								Y
W	599.2	4	51	HTTS	-18.0	- 5.0								
X	599.2	4	51	HTTS	-18.0	- 5.0								Y
Y	599.2	4	51	HTTS	-18.0	- 5.0								Y
A	599.3	4	51	HTTS	- 5.0	5.6	OD		1	< 20.0	HTTS	1.0	1	Y
B	599.3	4	51	HTTS	- 5.0	5.6								Y
C	599.3	4	51	HTTS	- 5.0	5.6								Y
D	599.3	4	51	HTTS	- 5.0	5.6	OD			< 20.0	HTTS	0.9		Y
E	599.3	4	51	HTTS	- 5.0	5.6	OD			< 20.0	HTTS	0.7		Y
U	599.3	4	51	HTTS	- 5.0	5.6								
UU	599.3	4	51	HTTS	- 5.0	5.6			2	21.0	HTTS	0.9		Y
V	599.3	4	51	HTTS	- 5.0	5.6	OD	WG	2	32.0	HTTS		3	Y
VV	599.3	4	51	HTTS	- 5.0	5.6			3	16.0	HTTS	0.9		Y
W	599.3	4	51	HTTS	- 5.0	5.6								
X	599.3	4	51	HTTS	- 5.0	5.6	OD	WG		8.0	HTTS	0.8	1	Y
Y	599.3	4	51	HTTS	- 5.0	5.6	OD			10.0	HTTS			Y
Y	599.3	4	51	HTTS	- 5.0	5.6	OD			15.0	HTTS			Y
A	600.3	5	37	HTTS	- 5.0	2.4	OD		1	53.0	HTTS	0.6	1	Y
B	600.3	5	37	HTTS	- 5.0	2.4	OD		1	47.0	HTTS	1.6	1	Y
C	600.3	5	37	HTTS	- 5.0	2.4	OD		2	55.0	HTTS	0.6	1	Y
D	600.3	5	37	HTTS	- 5.0	2.4	OD		1	55.0	HTTS	0.3	1	Y
E	600.3	5	37	HTTS	- 5.0	2.4	OD		1	54.0	HTTS	0.6	1	Y
U	600.3	5	37	HTTS	- 5.0	2.4								
UU	600.3	5	37	HTTS	- 5.0	2.4			2	79.0	HTTS	1.7		Y
V	600.3	5	37	HTTS	- 5.0	2.4	OD	WG	2	66.0	HTTS		3	Y
VV	600.3	5	37	HTTS	- 5.0	2.4			2	54.0	HTTS	1.7		Y
W	600.3	5	37	HTTS	- 5.0	2.4								
X	600.3	5	37	HTTS	- 5.0	2.4	OD	WG		54.0	HTTS	0.6	1	Y
X	600.3	5	37	HTTS	- 5.0	2.4	OD	WG		46.0	HTTS	1.3	1	Y
Y	600.3	5	37	HTTS	- 5.0	2.4	OD			48.0	HTTS			Y
Y	600.3	5	37	HTTS	- 5.0	2.4	OD			57.0	HTTS			Y
A	601.3	7	48	HTTS	- 5.0	5.4								Y
B	601.3	7	48	HTTS	- 5.0	5.4	OD		2	27.0	HTTS	0.0	5	Y
C	601.3	7	48	HTTS	- 5.0	5.4	OD		2	40.0	HTTS	1.3	1	Y
D	601.3	7	48	HTTS	- 5.0	5.4	OD		1	35.0	HTTS	1.3	1	Y
E	601.3	7	48	HTTS	- 5.0	5.4	OD		1	37.0	HTTS	0.6	1	Y
U	601.3	7	48	HTTS	- 5.0	5.4								
UU	601.3	7	48	HTTS	- 5.0	5.4			2	54.0	HTTS	0.6		Y
V	601.3	7	48	HTTS	- 5.0	5.4	OD	WG	2	40.0	HTTS		3	Y
VV	601.3	7	48	HTTS	- 5.0	5.4			3	23.0	HTTS	0.6		Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
W	601.3	7	48	HTTS	-5.0	5.4								
X	601.3	7	48	HTTS	-5.0	5.4	OD	WG		25.0	HTTS	0.6	1	Y
Y	601.3	7	48	HTTS	-5.0	5.4	OD			38.0	HTTS			Y
A	602.3	8	69	HTTS	-5.0	4.9	OD		1	27.0	HTTS	0.6	1	Y
B	602.3	8	69	HTTS	-5.0	4.9	OD		1	25.0	HTTS	0.5	1	Y
C	602.3	8	69	HTTS	-5.0	4.9	OD		2	26.0	HTTS	0.6	1	Y
D	602.3	8	69	HTTS	-5.0	4.9	OD		1	27.0	HTTS	0.6	1	Y
E	602.3	8	69	HTTS	-5.0	4.9	OD		1	33.0	HTTS	0.4	1	Y
U	602.3	8	69	HTTS	-5.0	4.9								
UU	602.3	8	69	HTTS	-5.0	4.9			2	60.0	HTTS	0.6		Y
V	602.3	8	69	HTTS	-5.0	4.9	OD	WG	2	48.0	HTTS		3	Y
VV	602.3	8	69	HTTS	-5.0	4.9			2	26.0	HTTS	0.6		Y
W	602.3	8	69	HTTS	-5.0	4.9								
X	602.3	8	69	HTTS	-5.0	4.9	OD	WG		22.0	HTTS	0.7	1	Y
X	602.3	8	69	HTTS	-5.0	4.9	OD	WG		28.0	HTTS	0.0	1	Y
Y	602.3	8	69	HTTS	-5.0	4.9	OD			32.0	HTTS			Y
A	603.3	8	54	HTTS	-5.0	2.8	OD		2	63.0	HTTS	0.8	1	Y
B	603.3	8	54	HTTS	-5.0	2.8								Y
C	603.3	8	54	HTTS	-5.0	2.8	OD		3	56.0	HTTS	0.6	1	Y
D	603.3	8	54	HTTS	-5.0	2.8	OD		1	71.0	HTTS	0.5	1	Y
E	603.3	8	54	HTTS	-5.0	2.8	OD		1	87.0	HTTS	0.3	1	Y
U	603.3	8	54	HTTS	-5.0	2.8								
UU	603.3	8	54	HTTS	-5.0	2.8			2	40.0	HTTS	0.5		Y
V	603.3	8	54	HTTS	-5.0	2.8	OD	WG	2	51.0	HTTS		1	Y
VV	603.3	8	54	HTTS	-5.0	2.8			3		HTTS	0.5		Y
W	603.3	8	54	HTTS	-5.0	2.8								
X	603.3	8	54	HTTS	-5.0	2.8								Y
Y	603.3	8	54	HTTS	-5.0	2.8	OD		2	77.0	HTTS			Y
A	604.3	8	44	HTTS	-5.0	6.4	OD		2	60.0	HTTS	0.5	1	Y
B	604.3	8	44	HTTS	-5.0	6.4	OD		3		HTTS	0.5	1	Y
C	604.3	8	44	HTTS	-5.0	6.4	OD		2	59.0	HTTS	1.2	1	Y
D	604.3	8	44	HTTS	-5.0	6.4	OD		1	69.0	HTTS	0.9	1	Y
E	604.3	8	44	HTTS	-5.0	6.4	OD		1	67.0	HTTS	0.8	1	Y
U	604.3	8	44	HTTS	-5.0	6.4								
UU	604.3	8	44	HTTS	-5.0	6.4								
V	604.3	8	44	HTTS	-5.0	6.4	OD	WG	2	58.0	HTTS		1	Y
VV	604.3	8	44	HTTS	-5.0	6.4								
W	604.3	8	44	HTTS	-5.0	6.4								
X	604.3	8	44	HTTS	-5.0	6.4								Y
Y	604.3	8	44	HTTS	-5.0	6.4	OD		2	69.0	HTTS			Y
A	605.3	8	27	HTTS	-5.0	6.4								Y
B	605.3	8	27	HTTS	-5.0	6.4								Y
C	605.3	8	27	HTTS	-5.0	6.4								Y
D	605.3	8	27	HTTS	-5.0	6.4								Y
E	605.3	8	27	HTTS	-5.0	6.4	OD		2	22.0	HTTS	2.8	1	Y
U	605.3	8	27	HTTS	-5.0	6.4								
UU	605.3	8	27	HTTS	-5.0	6.4								Y
V	605.3	8	27	HTTS	-5.0	6.4								Y
VV	605.3	8	27	HTTS	-5.0	6.4								Y
W	605.3	8	27	HTTS	-5.0	6.4								
X	605.3	8	27	HTTS	-5.0	6.4								Y
Y	605.3	8	27	HTTS	-5.0	6.4								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	606.3	7	64	HTTS	- 5.0	6.9	OD		1	29.0	HTTS	0.8	1	Y
B	606.3	7	64	HTTS	- 5.0	6.9	OD		1	23.0	HTTS	0.5	1	Y
C	606.3	7	64	HTTS	- 5.0	6.9	OD		2	30.0	HTTS	0.6	1	Y
D	606.3	7	64	HTTS	- 5.0	6.9	OD		1	24.0	HTTS	0.7	1	Y
E	606.3	7	64	HTTS	- 5.0	6.9	OD		1	33.0	HTTS	0.4	1	Y
U	606.3	7	64	HTTS	- 5.0	6.9								
UU	606.3	7	64	HTTS	- 5.0	6.9			2	41.0	HTTS	0.7		Y
V	606.3	7	64	HTTS	- 5.0	6.9	OD	WG	2	45.0	HTTS		3	Y
VV	606.3	7	64	HTTS	- 5.0	6.9			2	29.0	HTTS	0.7		Y
W	606.3	7	64	HTTS	- 5.0	6.9								
X	606.3	7	64	HTTS	- 5.0	6.9	OD	WG		28.0	HTTS	0.7	1	Y
Y	606.3	7	64	HTTS	- 5.0	6.9	OD			35.0	HTTS			Y
A	607.3	7	60	HTTS	- 5.0	7.0	OD		1	23.0	HTTS	0.8	1	Y
B	607.3	7	60	HTTS	- 5.0	7.0	OD		2	35.0	HTTS	0.6	1	Y
C	607.3	7	60	HTTS	- 5.0	7.0	OD		1	34.0	HTTS	1.1	1	Y
D	607.3	7	60	HTTS	- 5.0	7.0	OD		1	39.0	HTTS	1.4	1	Y
E	607.3	7	60	HTTS	- 5.0	7.0	OD		1	22.0	HTTS	0.9	1	Y
U	607.3	7	60	HTTS	- 5.0	7.0								
UU	607.3	7	60	HTTS	- 5.0	7.0								
V	607.3	7	60	HTTS	- 5.0	7.0	OD	WG	1	49.0	HTTS		3	Y
VV	607.3	7	60	HTTS	- 5.0	7.0								
W	607.3	7	60	HTTS	- 5.0	7.0								
X	607.3	7	60	HTTS	- 5.0	7.0	OD	WG		35.0	HTTS	0.7	1	Y
Y	607.3	7	60	HTTS	- 5.0	7.0	OD			23.0	HTTS			Y
A	608.3	9	58	HTTS	- 5.0	6.4	OD		1	26.0	HTTS	0.9	1	Y
B	608.3	9	58	HTTS	- 5.0	6.4	OD		2	20.0	HTTS	0.5	1	Y
C	608.3	9	58	HTTS	- 5.0	6.4	OD		3	36.0	HTTS	0.5	1	Y
D	608.3	9	58	HTTS	- 5.0	6.4	OD		1	44.0	HTTS	0.9	1	Y
E	608.3	9	58	HTTS	- 5.0	6.4	OD		1	48.0	HTTS	0.4	1	Y
U	608.3	9	58	HTTS	- 5.0	6.4								
UU	608.3	9	58	HTTS	- 5.0	6.4			2	34.0	HTTS	0.6		Y
V	608.3	9	58	HTTS	- 5.0	6.4	OD	WG	2	32.0	HTTS		1	Y
VV	608.3	9	58	HTTS	- 5.0	6.4			2	8.0	HTTS	0.6		Y
W	608.3	9	58	HTTS	- 5.0	6.4				< 10.0	HTTS	0.6		Y
X	608.3	9	58	HTTS	- 5.0	6.4	OD	WG		16.0	HTTS	0.6	1	Y
Y	608.3	9	58	HTTS	- 5.0	6.4	OD			27.0	HTTS			Y
A	609.3	9	28	HTTS	- 5.0	4.5	OD		2	32.0	HTTS	0.6	1	Y
B	609.3	9	28	HTTS	- 5.0	4.5	OD		3	40.0	HTTS	0.5	1	Y
C	609.3	9	28	HTTS	- 5.0	4.5	OD		2	36.0	HTTS	1.0	1	Y
D	609.3	9	28	HTTS	- 5.0	4.5	OD		1	48.0	HTTS	0.8	1	Y
E	609.3	9	28	HTTS	- 5.0	4.5	OD		1	27.0	HTTS	0.9	1	Y
U	609.3	9	28	HTTS	- 5.0	4.5								
UU	609.3	9	28	HTTS	- 5.0	4.5								
V	609.3	9	28	HTTS	- 5.0	4.5	OD	WG	2	54.0	HTTS		3	Y
VV	609.3	9	28	HTTS	- 5.0	4.5								
W	609.3	9	28	HTTS	- 5.0	4.5								Y
X	609.3	9	28	HTTS	- 5.0	4.5								Y
Y	609.3	9	28	HTTS	- 5.0	4.5	OD		2	38.0	HTTS			Y
A	610.3	8	83	HTTS	- 5.0	6.0								Y
B	610.3	8	83	HTTS	- 5.0	6.0								Y
C	610.3	8	83	HTTS	- 5.0	6.0								Y
D	610.3	8	83	HTTS	- 5.0	6.0								Y
E	610.3	8	83	HTTS	- 5.0	6.0								Y
U	610.3	8	83	HTTS	- 5.0	6.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	610.3	8	83	HTTS	- 5.0	6.0								Y
V	610.3	8	83	HTTS	- 5.0	6.0								Y
VV	610.3	8	83	HTTS	- 5.0	6.0			3	8.0	HTTS			Y
W	610.3	8	83	HTTS	- 5.0	6.0								
X	610.3	8	83	HTTS	- 5.0	6.0								Y
Y	610.3	8	83	HTTS	- 5.0	6.0								Y
A	611.3	8	73	HTTS	- 5.0	6.8	OD		2	< 20.0	HTTS	0.7	1	Y
B	611.3	8	73	HTTS	- 5.0	6.8	OD		2	26.0	HTTS	0.5	1	Y
C	611.3	8	73	HTTS	- 5.0	6.8								Y
D	611.3	8	73	HTTS	- 5.0	6.8	OD		1	28.0	HTTS	0.3	1	Y
E	611.3	8	73	HTTS	- 5.0	6.8	OD		2	29.0	HTTS	0.3	1	Y
U	611.3	8	73	HTTS	- 5.0	6.8								
UU	611.3	8	73	HTTS	- 5.0	6.8								Y
V	611.3	8	73	HTTS	- 5.0	6.8	OD	WG	2	30.0	HTTS		1	Y
VV	611.3	8	73	HTTS	- 5.0	6.8			2	21.0	HTTS	0.6		Y
W	611.3	8	73	HTTS	- 5.0	6.8								
X	611.3	8	73	HTTS	- 5.0	6.8	OD	WG		21.0	HTTS	0.6	1	Y
X	611.3	8	73	HTTS	- 5.0	6.8	OD	WG		17.0	HTTS	0.0	1	Y
Y	611.3	8	73	HTTS	- 5.0	6.8	OD			27.0	HTTS			Y
A	612.3	9	40	HTTS	- 5.0	5.5	OD		2	48.0	HTTS	0.8	1	Y
B	612.3	9	40	HTTS	- 5.0	5.5	OD		3	54.0	HTTS	0.7	1	Y
C	612.3	9	40	HTTS	- 5.0	5.5	OD		2	55.0	HTTS	0.5	1	Y
D	612.3	9	40	HTTS	- 5.0	5.5	OD		1	60.0	HTTS	0.5	1	Y
E	612.3	9	40	HTTS	- 5.0	5.5	OD		1	62.0	HTTS	0.4	1	Y
U	612.3	9	40	HTTS	- 5.0	5.5								
UU	612.3	9	40	HTTS	- 5.0	5.5			2	33.0	HTTS	1.0		Y
V	612.3	9	40	HTTS	- 5.0	5.5	OD	WG	2	41.0	HTTS		1	Y
VV	612.3	9	40	HTTS	- 5.0	5.5			2	30.0	HTTS	1.0		Y
W	612.3	9	40	HTTS	- 5.0	5.5								
X	612.3	9	40	HTTS	- 5.0	5.5	OD	WG		26.0	HTTS	0.6	1	Y
Y	612.3	9	40	HTTS	- 5.0	5.5	OD			52.0	HTTS			Y
A	613.3	12	36	HTTS	- 5.0	6.8								Y
B	613.3	12	36	HTTS	- 5.0	6.8								Y
C	613.3	12	36	HTTS	- 5.0	6.8								Y
D	613.3	12	36	HTTS	- 5.0	6.8								Y
E	613.3	12	36	HTTS	- 5.0	6.8								Y
U	613.3	12	36	HTTS	- 5.0	6.8								
UU	613.3	12	36	HTTS	- 5.0	6.8								Y
V	613.3	12	36	HTTS	- 5.0	6.8	OD	WG	2	< 20.0	HTTS		3	Y
VV	613.3	12	36	HTTS	- 5.0	6.8								Y
W	613.3	12	36	HTTS	- 5.0	6.8								
X	613.3	12	36	HTTS	- 5.0	6.8								Y
Y	613.3	12	36	HTTS	- 5.0	6.8								Y
A	614.3	12	34	HTTS	- 5.0	6.9	OD		1	33.0	HTTS	0.8	1	Y
B	614.3	12	34	HTTS	- 5.0	6.9	OD		1	35.0	HTTS	0.5	1	Y
C	614.3	12	34	HTTS	- 5.0	6.9	OD		1	40.0	HTTS	1.0	1	Y
D	614.3	12	34	HTTS	- 5.0	6.9	OD		1	40.0	HTTS	3.2	1	Y
E	614.3	12	34	HTTS	- 5.0	6.9	OD		1	36.0	HTTS	1.2	1	Y
U	614.3	12	34	HTTS	- 5.0	6.9	OD	IG	2	47.0	HTTS	1.0		Y
UU	614.3	12	34	HTTS	- 5.0	6.9								
V	614.3	12	34	HTTS	- 5.0	6.9	OD	WG	2	54.0	HTTS		3	Y
VV	614.3	12	34	HTTS	- 5.0	6.9								
W	614.3	12	34	HTTS	- 5.0	6.9				75.0	HTTS	0.9		Y
X	614.3	12	34	HTTS	- 5.0	6.9								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
Y	614 3	12	34	HTTS	- 5 0	6 9	OD		2	47 0	HTTS			Y
A	615 3	12	30	HTTS	- 5 0	7 0								Y
B	615 3	12	30	HTTS	- 5 0	7 0								Y
C	615 3	12	30	HTTS	- 5 0	7 0	OD		1	27 0	HTTS	1 4	1	Y
D	615 3	12	30	HTTS	- 5 0	7 0	OD		1	< 20 0	HTTS	1 7	1	Y
E	615 3	12	30	HTTS	- 5 0	7 0	OD			< 20 0	HTTS	1 2		Y
U	615 3	12	30	HTTS	- 5 0	7 0	OD	IG	2	< 20 0	HTTS	1 0		Y
UU	615 3	12	30	HTTS	- 5 0	7 0								
V	615 3	12	30	HTTS	- 5 0	7 0	OD	WG	2	29 0	HTTS		3	Y
VV	615 3	12	30	HTTS	- 5 0	7 0								
W	615 3	12	30	HTTS	- 5 0	7 0								Y
X	615 3	12	30	HTTS	- 5 0	7 0	OD	WG		26 0	HTTS	0 0	1	Y
Y	615 3	12	30	HTTS	- 5 0	7 0	OD			< 10 0	HTTS			Y
A	616 3	12	28	HTTS	- 5 0	7 0	OD		2	66 0	HTTS	1 3	1	Y
B	616 3	12	28	HTTS	- 5 0	7 0								Y
C	616 3	12	28	HTTS	- 5 0	7 0	OD		1	48 0	HTTS	1 6	1	Y
D	616 3	12	28	HTTS	- 5 0	7 0	OD		1	58 0	HTTS	1 7	1	Y
E	616 3	12	28	HTTS	- 5 0	7 0								Y
U	616 3	12	28	HTTS	- 5 0	7 0								
UU	616 3	12	28	HTTS	- 5 0	7 0								
V	616 3	12	28	HTTS	- 5 0	7 0	OD	WG	2	38 0	HTTS		1	Y
VV	616 3	12	28	HTTS	- 5 0	7 0								
W	616 3	12	28	HTTS	- 5 0	7 0								Y
X	616 3	12	28	HTTS	- 5 0	7 0	OD	WG		16 0	HTTS	1 5	1	Y
Y	616 3	12	28	HTTS	- 5 0	7 0	OD			< 10 0	HTTS			Y
A	617 3	11	62	HTTS	- 5 0	6 9	OD		2	29 0	HTTS	0 8	1	Y
B	617 3	11	62	HTTS	- 5 0	6 9	OD		2	33 0	HTTS	0 6	1	Y
C	617 3	11	62	HTTS	- 5 0	6 9	OD		2	55 0	HTTS	0 8	1	Y
D	617 3	11	62	HTTS	- 5 0	6 9	OD		1	40 0	HTTS	1 7	1	Y
E	617 3	11	62	HTTS	- 5 0	6 9	OD		1	51 0	HTTS	0 7	1	Y
U	617 3	11	62	HTTS	- 5 0	6 9								
UU	617 3	11	62	HTTS	- 5 0	6 9								
V	617 3	11	62	HTTS	- 5 0	6 9	OD	WG	2	68 0	HTTS		3	Y
VV	617 3	11	62	HTTS	- 5 0	6 9								
W	617 3	11	62	HTTS	- 5 0	6 9				30 0	HTTS	0 6		Y
X	617 3	11	62	HTTS	- 5 0	6 9	OD	WG		38 0	HTTS	0 6	1	Y
Y	617 3	11	62	HTTS	- 5 0	6 9	OD			36 0	HTTS			Y
A	618 3	11	57	HTTS	- 5 0	6 3	OD		2	34 0	HTTS	0 7	1	Y
B	618 3	11	57	HTTS	- 5 0	6 3	OD		1	< 20 0	HTTS	1 1	1	Y
C	618 3	11	57	HTTS	- 5 0	6 3	OD		2	24 0	HTTS	0 7	1	Y
D	618 3	11	57	HTTS	- 5 0	6 3	OD		1	28 0	HTTS	2 1	1	Y
E	618 3	11	57	HTTS	- 5 0	6 3	OD		1	42 0	HTTS	0 5	1	Y
U	618 3	11	57	HTTS	- 5 0	6 3								
UU	618 3	11	57	HTTS	- 5 0	6 3			2	45 0	HTTS	0 6		Y
V	618 3	11	57	HTTS	- 5 0	6 3	OD	WG	2	53 0	HTTS		3	Y
VV	618 3	11	57	HTTS	- 5 0	6 3			2	23 0	HTTS	0 6		Y
W	618 3	11	57	HTTS	- 5 0	6 3								
X	618 3	11	57	HTTS	- 5 0	6 3	OD	WG		32 0	HTTS	0 6	1	Y
Y	618 3	11	57	HTTS	- 5 0	6 3	OD			19 0	HTTS			Y
Y	618 3	11	57	HTTS	- 5 0	6 3	OD			72 0	HTTS			Y
A	619 3	11	29	HTTS	- 5 0	7 0	OD		1	70 0	HTTS	1 1	1	Y
B	619 3	11	29	HTTS	- 5 0	7 0	OD		1	69 0	HTTS	0 7	1	Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	619.3	11	29	HTTS	- 5.0	7.0	OD		1	74.0	HTTS	0.9	1	Y
D	619.3	11	29	HTTS	- 5.0	7.0	OD		1	76.0	HTTS	2.3	1	Y
E	619.3	11	29	HTTS	- 5.0	7.0	OD		1	76.0	HTTS	1.3	1	Y
U	619.3	11	29	HTTS	- 5.0	7.0								
UU	619.3	11	29	HTTS	- 5.0	7.0								
V	619.3	11	29	HTTS	- 5.0	7.0	OD	WG	2	73.0	HTTS		3	Y
VV	619.3	11	29	HTTS	- 5.0	7.0								
W	619.3	11	29	HTTS	- 5.0	7.0				80.0	HTTS	1.0		Y
X	619.3	11	29	HTTS	- 5.0	7.0	OD	WG		67.0	HTTS	1.2	1	Y
Y	619.3	11	29	HTTS	- 5.0	7.0	OD			72.0	HTTS			Y
A	620.3	10	68	HTTS	- 5.0	6.9	OD		1	55.0	HTTS	0.6	1	Y
B	620.3	10	68	HTTS	- 5.0	6.9	OD		1	54.0	HTTS	0.3	1	Y
C	620.3	10	68	HTTS	- 5.0	6.9	OD		1	66.0	HTTS	0.6	1	Y
D	620.3	10	68	HTTS	- 5.0	6.9	OD		1	62.0	HTTS	0.2	1	Y
E	620.3	10	68	HTTS	- 5.0	6.9	OD		1	62.0	HTTS	0.6	1	Y
U	620.3	10	68	HTTS	- 5.0	6.9	OD	IG	2	59.0	HTTS	1.0		Y
UU	620.3	10	68	HTTS	- 5.0	6.9								
V	620.3	10	68	HTTS	- 5.0	6.9	OD	WG	1	54.0	HTTS		UT	Y
VV	620.3	10	68	HTTS	- 5.0	6.9								
W	620.3	10	68	HTTS	- 5.0	6.9				50.0	HTTS	0.6		Y
X	620.3	10	68	HTTS	- 5.0	6.9	OD	WG		61.0	HTTS	0.5	1	Y
Y	620.3	10	68	HTTS	- 5.0	6.9	OD			60.0	HTTS			Y
A	621.3	10	65	HTTS	- 5.0	7.0	OD		1	34.0	HTTS	0.8	1	Y
B	621.3	10	65	HTTS	- 5.0	7.0	OD		1	22.0	HTTS	0.3	1	Y
C	621.3	10	65	HTTS	- 5.0	7.0	OD		1	35.0	HTTS	1.1	1	Y
D	621.3	10	65	HTTS	- 5.0	7.0	OD		1	35.0	HTTS	1.4	1	Y
E	621.3	10	65	HTTS	- 5.0	7.0	OD		1	55.0	HTTS	0.9	1	Y
U	621.3	10	65	HTTS	- 5.0	7.0								
UU	621.3	10	65	HTTS	- 5.0	7.0								
V	621.3	10	65	HTTS	- 5.0	7.0	OD	WG	1	46.0	HTTS		3	Y
VV	621.3	10	65	HTTS	- 5.0	7.0								
W	621.3	10	65	HTTS	- 5.0	7.0				68.0	HTTS	0.5		Y
X	621.3	10	65	HTTS	- 5.0	7.0	OD	WG		38.0	HTTS	0.6	1	Y
Y	621.3	10	65	HTTS	- 5.0	7.0	OD			40.0	HTTS			Y
A	622.3	10	60	HTTS	- 5.0	6.8	OD		1	27.0	HTTS	0.6	1	Y
B	622.3	10	60	HTTS	- 5.0	6.8	OD		1	27.0	HTTS	0.2	1	Y
C	622.3	10	60	HTTS	- 5.0	6.8	OD		2	29.0	HTTS	0.9	1	Y
D	622.3	10	60	HTTS	- 5.0	6.8	OD		1	28.0	HTTS	0.6	1	Y
E	622.3	10	60	HTTS	- 5.0	6.8	OD		1	39.0	HTTS	0.4	1	Y
U	622.3	10	60	HTTS	- 5.0	6.8								
UU	622.3	10	60	HTTS	- 5.0	6.8			2	51.0	HTTS	0.6		Y
V	622.3	10	60	HTTS	- 5.0	6.8	OD	WG	1	62.0	HTTS		3	Y
VV	622.3	10	60	HTTS	- 5.0	6.8			2	31.0	HTTS	0.6		Y
W	622.3	10	60	HTTS	- 5.0	6.8								
X	622.3	10	60	HTTS	- 5.0	6.8	OD	WG		34.0	HTTS	0.6	1	Y
Y	622.3	10	60	HTTS	- 5.0	6.8	OD			43.0	HTTS			Y
A	623.3	10	30	HTTS	- 5.0	6.8								Y
B	623.3	10	30	HTTS	- 5.0	6.8								Y
C	623.3	10	30	HTTS	- 5.0	6.8	OD		2	56.0	HTTS	0.9	1	Y
D	623.3	10	30	HTTS	- 5.0	6.8	OD		1	81.0	HTTS	2.6	1	Y
E	623.3	10	30	HTTS	- 5.0	6.8								Y
U	623.3	10	30	HTTS	- 5.0	6.8								
UU	623.3	10	30	HTTS	- 5.0	6.8								
V	623.3	10	30	HTTS	- 5.0	6.8	OD	WG	2	66.0	HTTS		3	Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	623.3	10	30	HTTS	- 5.0	6.8								
W	623.3	10	30	HTTS	- 5.0	6.8				35.0	HTTS	0.5		Y
X	623.3	10	30	HTTS	- 5.0	6.8	OD	WG		48.0	HTTS	0.6	1	Y
Y	623.3	10	30	HTTS	- 5.0	6.8								Y
A	624.3	10	11	HTTS	- 5.0	6.6								Y
B	624.3	10	11	HTTS	- 5.0	6.6								Y
C	624.3	10	11	HTTS	- 5.0	6.6								Y
D	624.3	10	11	HTTS	- 5.0	6.6								Y
E	624.3	10	11	HTTS	- 5.0	6.6								Y
U	624.3	10	11	HTTS	- 5.0	6.6								
UU	624.3	10	11	HTTS	- 5.0	6.6								Y
V	624.3	10	11	HTTS	- 5.0	6.6								Y
VV	624.3	10	11	HTTS	- 5.0	6.6								Y
W	624.3	10	11	HTTS	- 5.0	6.6								
X	624.3	10	11	HTTS	- 5.0	6.6								Y
Y	624.3	10	11	HTTS	- 5.0	6.6								Y
A	625.3	10	53	HTTS	- 5.0	6.6	OD		1	38.0	HTTS	0.6	1	Y
B	625.3	10	53	HTTS	- 5.0	6.6	OD		2	43.0	HTTS	0.5	5	Y
C	625.3	10	53	HTTS	- 5.0	6.6	OD		1	41.0	HTTS	1.2	1	Y
D	625.3	10	53	HTTS	- 5.0	6.6	OD		1	47.0	HTTS	1.2	1	Y
E	625.3	10	53	HTTS	- 5.0	6.6	OD		1	46.0	HTTS	0.4	1	Y
U	625.3	10	53	HTTS	- 5.0	6.6								
UU	625.3	10	53	HTTS	- 5.0	6.6			2	55.0	HTTS	0.6		Y
V	625.3	10	53	HTTS	- 5.0	6.6	OD	WG	1	55.0	HTTS		3	Y
VV	625.3	10	53	HTTS	- 5.0	6.6			2	51.0	HTTS	0.6		Y
W	625.3	10	53	HTTS	- 5.0	6.6								
X	625.3	10	53	HTTS	- 5.0	6.6	OD	WG		44.0	HTTS	0.6	1	Y
Y	625.3	10	53	HTTS	- 5.0	6.6	OD			48.0	HTTS			Y
A	626.3	10	44	HTTS	- 5.0	7.1								Y
B	626.3	10	44	HTTS	- 5.0	7.1	OD		3	73.0	HTTS	0.4	1	Y
C	626.3	10	44	HTTS	- 5.0	7.1	OD		2	65.0	HTTS	0.7	1	Y
D	626.3	10	44	HTTS	- 5.0	7.1	OD		1	< 20.0	HTTS	2.0	1	Y
E	626.3	10	44	HTTS	- 5.0	7.1	OD		1	68.0	HTTS	0.7	1	Y
U	626.3	10	44	HTTS	- 5.0	7.1								
UU	626.3	10	44	HTTS	- 5.0	7.1								
V	626.3	10	44	HTTS	- 5.0	7.1	OD	WG	2	64.0	HTTS		1	Y
VV	626.3	10	44	HTTS	- 5.0	7.1								
W	626.3	10	44	HTTS	- 5.0	7.1				55.0	HTTS	0.5		Y
X	626.3	10	44	HTTS	- 5.0	7.1	OD	WG		61.0	HTTS	0.0	1	Y
Y	626.3	10	44	HTTS	- 5.0	7.1	OD			82.0	HTTS			Y
A	627.3	10	24	HTTS	- 5.0	7.0	OD		1	52.0	HTTS	0.7	1	Y
B	627.3	10	24	HTTS	- 5.0	7.0	OD		1	58.0	HTTS	0.4	1	Y
C	627.3	10	24	HTTS	- 5.0	7.0	OD		1	51.0	HTTS	1.0	1	Y
D	627.3	10	24	HTTS	- 5.0	7.0	OD		1	51.0	HTTS	1.4	1	Y
E	627.3	10	24	HTTS	- 5.0	7.0	OD		1	40.0	HTTS	0.5	1	Y
U	627.3	10	24	HTTS	- 5.0	7.0								
UU	627.3	10	24	HTTS	- 5.0	7.0								
V	627.3	10	24	HTTS	- 5.0	7.0	OD	WG	2	52.0	HTTS		3	Y
VV	627.3	10	24	HTTS	- 5.0	7.0								
W	627.3	10	24	HTTS	- 5.0	7.0				60.0	HTTS	0.7		Y
X	627.3	10	24	HTTS	- 5.0	7.0	OD	WG		38.0	HTTS	0.0	1	Y
Y	627.3	10	24	HTTS	- 5.0	7.0	OD			52.0	HTTS			Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	628.3	9	72	HTTS	- 5.0	6.1	OD		1	49.0	HTTS	0.7	1	Y
B	628.3	9	72	HTTS	- 5.0	6.1	OD		2	51.0	HTTS	0.5	1	Y
C	628.3	9	72	HTTS	- 5.0	6.1	OD		2	54.0	HTTS	0.5	1	Y
D	628.3	9	72	HTTS	- 5.0	6.1	OD		1	56.0	HTTS	0.4	1	Y
E	628.3	9	72	HTTS	- 5.0	6.1	OD		1	62.0	HTTS	0.3	1	Y
U	628.3	9	72	HTTS	- 5.0	6.1								
UU	628.3	9	72	HTTS	- 5.0	6.1			2	65.0	HTTS	0.6		Y
V	628.3	9	72	HTTS	- 5.0	6.1	OD	WG	2	65.0	HTTS		3	Y
VV	628.3	9	72	HTTS	- 5.0	6.1			2	41.0	HTTS	0.6		Y
W	628.3	9	72	HTTS	- 5.0	6.1								
X	628.3	9	72	HTTS	- 5.0	6.1	OD	WG		47.0	HTTS	0.5	1	Y
Y	628.3	9	72	HTTS	- 5.0	6.1	OD			62.0	HTTS			Y
A	629.3	12	54	HTTS	- 5.0	6.6	OD		1	34.0	HTTS	0.6	1	Y
B	629.3	12	54	HTTS	- 5.0	6.6	OD		1	30.0	HTTS	0.5	1	Y
C	629.3	12	54	HTTS	- 5.0	6.6	OD		2	36.0	HTTS	0.5	1	Y
D	629.3	12	54	HTTS	- 5.0	6.6	OD		1	60.0	HTTS	0.6	1	Y
E	629.3	12	54	HTTS	- 5.0	6.6	OD		1	43.0	HTTS	0.4	1	Y
U	629.3	12	54	HTTS	- 5.0	6.6								
UU	629.3	12	54	HTTS	- 5.0	6.6			2	34.0	HTTS	0.6		Y
V	629.3	12	54	HTTS	- 5.0	6.6	OD	WG	2	68.0	HTTS		3	Y
VV	629.3	12	54	HTTS	- 5.0	6.6			2	38.0	HTTS	0.6		Y
W	629.3	12	54	HTTS	- 5.0	6.6								
X	629.3	12	54	HTTS	- 5.0	6.6	OD	WG		32.0	HTTS	0.6	1	Y
Y	629.3	12	54	HTTS	- 5.0	6.6	OD			43.0	HTTS			Y
Y	629.3	12	54	HTTS	- 5.0	6.6	OD			64.0	HTTS			Y
A	630.3	12	76	HTTS	- 5.0	6.6	OD		3	51.0	HTTS	0.9	1	Y
B	630.3	12	76	HTTS	- 5.0	6.6								Y
C	630.3	12	76	HTTS	- 5.0	6.6	OD		3	48.0	HTTS	0.5	1	Y
D	630.3	12	76	HTTS	- 5.0	6.6								Y
E	630.3	12	76	HTTS	- 5.0	6.6	OD		1	40.0	HTTS	1.0	1	Y
U	630.3	12	76	HTTS	- 5.0	6.6								
UU	630.3	12	76	HTTS	- 5.0	6.6								
V	630.3	12	76	HTTS	- 5.0	6.6	OD	WG	2	38.0	HTTS		1	Y
VV	630.3	12	76	HTTS	- 5.0	6.6								
W	630.3	12	76	HTTS	- 5.0	6.6								
X	630.3	12	76	HTTS	- 5.0	6.6								Y
Y	630.3	12	76	HTTS	- 5.0	6.6	OD		1	45.0	HTTS			Y
A	631.3	13	29	HTTS	- 5.0	6.8	OD		2	30.0	HTTS	1.2	1	Y
B	631.3	13	29	HTTS	- 5.0	6.8	OD		2	28.0	HTTS	0.9	1	Y
C	631.3	13	29	HTTS	- 5.0	6.8	OD		2	39.0	HTTS	1.6	1	Y
D	631.3	13	29	HTTS	- 5.0	6.8	OD		1	37.0	HTTS	2.0	1	Y
E	631.3	13	29	HTTS	- 5.0	6.8	OD		1	49.0	HTTS	1.0	1	Y
U	631.3	13	29	HTTS	- 5.0	6.8	OD	IG	2	35.0	HTTS	1.0		Y
UU	631.3	13	29	HTTS	- 5.0	6.8								
V	631.3	13	29	HTTS	- 5.0	6.8	OD	WG	2	41.0	HTTS		3	Y
VV	631.3	13	29	HTTS	- 5.0	6.8								
W	631.3	13	29	HTTS	- 5.0	6.8								
X	631.3	13	29	HTTS	- 5.0	6.8	OD	WG		31.0	HTTS	1.3	1	Y
Y	631.3	13	29	HTTS	- 5.0	6.8								Y
A	632.3	13	37	HTTS	- 5.0	6.5	OD		2	25.0	HTTS	0.3	2	Y
B	632.3	13	37	HTTS	- 5.0	6.5	OD		2	67.0	HTTS	0.2	1	Y
C	632.3	13	37	HTTS	- 5.0	6.5	OD		2	67.0	HTTS	0.8	1	Y
D	632.3	13	37	HTTS	- 5.0	6.5	OD		1	60.0	HTTS	1.1	3	Y
E	632.3	13	37	HTTS	- 5.0	6.5								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
U	632 3	13	37	HTTS	- 5 0	6 5								
UU	632 3	13	37	HTTS	- 5 0	6 5								
V	632 3	13	37	HTTS	- 5 0	6 5	OD	WG	2	57 0	HTTS		1	Y
VV	632 3	13	37	HTTS	- 5 0	6 5								
W	632 3	13	37	HTTS	- 5 0	6 5								
X	632 3	13	37	HTTS	- 5 0	6 5	OD	WG		69 0	HTTS	0 0	1	Y
X	632 3	13	37	HTTS	- 5 0	6 5	OD	WG		69 0	HTTS	0 5	3	Y
Y	632 3	13	37	HTTS	- 5 0	6 5	OD			77 0	HTTS			Y
A	633 3	13	44	HTTS	- 5 0	6 9	OD		1	25 0	HTTS	0 6	1	Y
B	633 3	13	44	HTTS	- 5 0	6 9								Y
C	633 3	13	44	HTTS	- 5 0	6 9	OD		2	24 0	HTTS	0 8	1	Y
D	633 3	13	44	HTTS	- 5 0	6 9								Y
E	633 3	13	44	HTTS	- 5 0	6 9	OD		1	21 0	HTTS	0 7	1	Y
U	633 3	13	44	HTTS	- 5 0	6 9								
UU	633 3	13	44	HTTS	- 5 0	6 9								
V	633 3	13	44	HTTS	- 5 0	6 9	OD	WG	2	36 0	HTTS		3	Y
VV	633 3	13	44	HTTS	- 5 0	6 9								
W	633 3	13	44	HTTS	- 5 0	6 9								
X	633 3	13	44	HTTS	- 5 0	6 9								Y
Y	633 3	13	44	HTTS	- 5 0	6 9	OD		2	25 0	HTTS			Y
A	634 3	13	58	HTTS	- 5 0	6 6	OD		1	55 0	HTTS	0 7	1	Y
B	634 3	13	58	HTTS	- 5 0	6 6	OD		2	46 0	HTTS	0 0	5	Y
C	634 3	13	58	HTTS	- 5 0	6 6	OD		1	57 0	HTTS	1 0	1	Y
D	634 3	13	58	HTTS	- 5 0	6 6	OD		1	57 0	HTTS	0 9	1	Y
E	634 3	13	58	HTTS	- 5 0	6 6	OD		1	57 0	HTTS	0 7	1	Y
U	634 3	13	58	HTTS	- 5 0	6 6								
UU	634 3	13	58	HTTS	- 5 0	6 6								
V	634 3	13	58	HTTS	- 5 0	6 6	OD	WG	2	56 0	HTTS		3	Y
VV	634 3	13	58	HTTS	- 5 0	6 6								
W	634 3	13	58	HTTS	- 5 0	6 6				72 0	HTTS	0 7		Y
X	634 3	13	58	HTTS	- 5 0	6 6	OD	WG		41 0	HTTS	0 0	1	Y
Y	634 3	13	58	HTTS	- 5 0	6 6	OD			38 0	HTTS			Y
Y	634 3	13	58	HTTS	- 5 0	6 6	OD			62 0	HTTS			Y
A	635 3	13	61	HTTS	- 5 0	6 5	OD		1	42 0	HTTS	0 9	1	Y
B	635 3	13	61	HTTS	- 5 0	6 5	OD		1	37 0	HTTS	0 3	1	Y
C	635 3	13	61	HTTS	- 5 0	6 5	OD		1	41 0	HTTS	0 9	1	Y
D	635 3	13	61	HTTS	- 5 0	6 5	OD		1	40 0	HTTS	1 4	1	Y
E	635 3	13	61	HTTS	- 5 0	6 5	OD		1	42 0	HTTS	0 8	1	Y
U	635 3	13	61	HTTS	- 5 0	6 5								
UU	635 3	13	61	HTTS	- 5 0	6 5								
V	635 3	13	61	HTTS	- 5 0	6 5	OD	WG	1	52 0	HTTS		3	Y
VV	635 3	13	61	HTTS	- 5 0	6 5								
W	635 3	13	61	HTTS	- 5 0	6 5								
X	635 3	13	61	HTTS	- 5 0	6 5	OD	WG		38 0	HTTS	0 0	1	Y
Y	635 3	13	61	HTTS	- 5 0	6 5	OD			41 0	HTTS			Y
A	636 3	14	27	HTTS	- 5 0	7 0	OD		1	22 0	HTTS	1 1	1	Y
B	636 3	14	27	HTTS	- 5 0	7 0	OD		1	26 0	HTTS	0 8	1	Y
C	636 3	14	27	HTTS	- 5 0	7 0	OD		1	22 0	HTTS	1 4	1	Y
D	636 3	14	27	HTTS	- 5 0	7 0	OD		1	< 20 0	HTTS	2 3	1	Y
E	636 3	14	27	HTTS	- 5 0	7 0	OD		1	21 0	HTTS	1 2	1	Y
U	636 3	14	27	HTTS	- 5 0	7 0	OD	IG	2	25 0	HTTS	1 0		Y
UU	636 3	14	27	HTTS	- 5 0	7 0								
V	636 3	14	27	HTTS	- 5 0	7 0	OD	WG	2	39 0	HTTS		3	Y
VV	636 3	14	27	HTTS	- 5 0	7 0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
W	636.3	14	27	HTTS	- 5.0	7.0								
X	636.3	14	27	HTTS	- 5.0	7.0	OD	WG		17.0	HTTS	1.4	1	Y
Y	636.3	14	27	HTTS	- 5.0	7.0	OD			20.0	HTTS			Y
A	637.3	14	30	HTTS	- 5.0	7.0	OD		2	42.0	HTTS	1.5	1	Y
B	637.3	14	30	HTTS	- 5.0	7.0	OD		2	31.0	HTTS	1.1	1	Y
C	637.3	14	30	HTTS	- 5.0	7.0								Y
D	637.3	14	30	HTTS	- 5.0	7.0	OD		1	38.0	HTTS	1.5	1	Y
E	637.3	14	30	HTTS	- 5.0	7.0	OD		2	42.0	HTTS	1.5	1	Y
U	637.3	14	30	HTTS	- 5.0	7.0	OD	IG	2	38.0	HTTS	1.0		Y
UU	637.3	14	30	HTTS	- 5.0	7.0								
V	637.3	14	30	HTTS	- 5.0	7.0	OD	WG	2	35.0	HTTS		3	Y
VV	637.3	14	30	HTTS	- 5.0	7.0								
W	637.3	14	30	HTTS	- 5.0	7.0				< 10.0	HTTS	1.3		Y
X	637.3	14	30	HTTS	- 5.0	7.0	OD	WG		31.0	HTTS	1.4	1	Y
Y	637.3	14	30	HTTS	- 5.0	7.0								Y
A	638.3	14	43	HTTS	- 5.0	6.6	OD		1	22.0	HTTS	0.7	1	Y
B	638.3	14	43	HTTS	- 5.0	6.6	OD		2	< 20.0	HTTS	0.4	1	Y
C	638.3	14	43	HTTS	- 5.0	6.6	OD		1	26.0	HTTS	1.2	1	Y
D	638.3	14	43	HTTS	- 5.0	6.6	OD		1	33.0	HTTS	1.4	1	Y
E	638.3	14	43	HTTS	- 5.0	6.6	OD		1	37.0	HTTS	0.8	1	Y
U	638.3	14	43	HTTS	- 5.0	6.6								
UU	638.3	14	43	HTTS	- 5.0	6.6								
V	638.3	14	43	HTTS	- 5.0	6.6	OD	WG	2	40.0	HTTS		3	Y
VV	638.3	14	43	HTTS	- 5.0	6.6								
W	638.3	14	43	HTTS	- 5.0	6.6								
X	638.3	14	43	HTTS	- 5.0	6.6	OD	WG		23.0	HTTS	-0.5	1	Y
Y	638.3	14	43	HTTS	- 5.0	6.6								Y
A	639.3	14	57	HTTS	- 5.0	6.5	OD		1	47.0	HTTS	1.0	1	Y
B	639.3	14	57	HTTS	- 5.0	6.5	OD		1	43.0	HTTS	0.4	1	Y
C	639.3	14	57	HTTS	- 5.0	6.5	OD		1	49.0	HTTS	0.9	1	Y
D	639.3	14	57	HTTS	- 5.0	6.5	OD		1	40.0	HTTS	0.9	1	Y
E	639.3	14	57	HTTS	- 5.0	6.5	OD		1	48.0	HTTS	1.2	1	Y
U	639.3	14	57	HTTS	- 5.0	6.5								
UU	639.3	14	57	HTTS	- 5.0	6.5								
V	639.3	14	57	HTTS	- 5.0	6.5	OD	WG	1	58.0	HTTS		3	Y
VV	639.3	14	57	HTTS	- 5.0	6.5								
W	639.3	14	57	HTTS	- 5.0	6.5				55.0	HTTS	0.6		Y
X	639.3	14	57	HTTS	- 5.0	6.5	OD	WG		48.0	HTTS	-0.5	2	Y
Y	639.3	14	57	HTTS	- 5.0	6.5	OD		1	55.0	HTTS			Y
A	641.3	7	27	HTTS	- 5.0	4.5								Y
B	641.3	7	27	HTTS	- 5.0	4.5								Y
C	641.3	7	27	HTTS	- 5.0	4.5								Y
D	641.3	7	27	HTTS	- 5.0	4.5								Y
E	641.3	7	27	HTTS	- 5.0	4.5								Y
U	641.3	7	27	HTTS	- 5.0	4.5								
UU	641.3	7	27	HTTS	- 5.0	4.5								Y
V	641.3	7	27	HTTS	- 5.0	4.5	OD	WG	3	< 20.0	HTTS		3	Y
VV	641.3	7	27	HTTS	- 5.0	4.5								Y
W	641.3	7	27	HTTS	- 5.0	4.5								
X	641.3	7	27	HTTS	- 5.0	4.5								Y
Y	641.3	7	27	HTTS	- 5.0	4.5								Y
A	642.3	7	34	HTTS	- 5.0	6.8								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
B	642.3	7	34	HTTS	- 5.0	6.8	OD		2	37.0	HTTS	0.8	1	Y
C	642.3	7	34	HTTS	- 5.0	6.8	OD		1	25.0	HTTS	0.8	1	Y
D	642.3	7	34	HTTS	- 5.0	6.8	OD		1	48.0	HTTS	2.9	1	Y
E	642.3	7	34	HTTS	- 5.0	6.8	OD		1	29.0	HTTS	1.0	1	Y
U	642.3	7	34	HTTS	- 5.0	6.8								
UU	642.3	7	34	HTTS	- 5.0	6.8								
V	642.3	7	34	HTTS	- 5.0	6.8	OD	WG	2	57.0	HTTS		3	Y
VV	642.3	7	34	HTTS	- 5.0	6.8								
W	642.3	7	34	HTTS	- 5.0	6.8								
X	642.3	7	34	HTTS	- 5.0	6.8								Y
Y	642.3	7	34	HTTS	- 5.0	6.8	OD		2	52.0	HTTS			Y
A	643.3	4	39	HTTS	- 5.0	3.8								Y
B	643.3	4	39	HTTS	- 5.0	3.8								Y
C	643.3	4	39	HTTS	- 5.0	3.8								Y
D	643.3	4	39	HTTS	- 5.0	3.8								Y
E	643.3	4	39	HTTS	- 5.0	3.8								Y
U	643.3	4	39	HTTS	- 5.0	3.8								
UU	643.3	4	39	HTTS	- 5.0	3.8								Y
V	643.3	4	39	HTTS	- 5.0	3.8								Y
VV	643.3	4	39	HTTS	- 5.0	3.8								Y
W	643.3	4	39	HTTS	- 5.0	3.8								
X	643.3	4	39	HTTS	- 5.0	3.8								Y
Y	643.3	4	39	HTTS	- 5.0	3.8								Y
A	644.3	4	48	HTTS	- 5.0	5.6								Y
B	644.3	4	48	HTTS	- 5.0	5.6								Y
C	644.3	4	48	HTTS	- 5.0	5.6								Y
D	644.3	4	48	HTTS	- 5.0	5.6								Y
E	644.3	4	48	HTTS	- 5.0	5.6								Y
U	644.3	4	48	HTTS	- 5.0	5.6								
UU	644.3	4	48	HTTS	- 5.0	5.6								Y
V	644.3	4	48	HTTS	- 5.0	5.6								Y
VV	644.3	4	48	HTTS	- 5.0	5.6								Y
W	644.3	4	48	HTTS	- 5.0	5.6								
X	644.3	4	48	HTTS	- 5.0	5.6								
Y	644.3	4	48	HTTS	- 5.0	5.6								Y
A	645.2	4	63	HTTS	-14.6	- 5.0								Y
B	645.2	4	63	HTTS	-14.6	- 5.0								Y
C	645.2	4	63	HTTS	-14.6	- 5.0								Y
D	645.2	4	63	HTTS	-14.6	- 5.0								Y
E	645.2	4	63	HTTS	-14.6	- 5.0								Y
U	645.2	4	63	HTTS	-14.6	- 5.0								
UU	645.2	4	63	HTTS	-14.6	- 5.0								Y
V	645.2	4	63	HTTS	-14.6	- 5.0								Y
VV	645.2	4	63	HTTS	-14.6	- 5.0								Y
W	645.2	4	63	HTTS	-14.6	- 5.0								
X	645.2	4	63	HTTS	-14.6	- 5.0								Y
Y	645.2	4	63	HTTS	-14.6	- 5.0								Y
A	645.3	4	63	HTTS	- 5.0	6.0								Y
B	645.3	4	63	HTTS	- 5.0	6.0								Y
C	645.3	4	63	HTTS	- 5.0	6.0								Y
D	645.3	4	63	HTTS	- 5.0	6.0								Y
E	645.3	4	63	HTTS	- 5.0	6.0								Y
U	645.3	4	63	HTTS	- 5.0	6.0								
UU	645.3	4	63	HTTS	- 5.0	6.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
V	645.3	4	63	HTTS	- 5.0	6.0								Y
VV	645.3	4	63	HTTS	- 5.0	6.0								Y
W	645.3	4	63	HTTS	- 5.0	6.0								
X	645.3	4	63	HTTS	- 5.0	6.0								Y
Y	645.3	4	63	HTTS	- 5.0	6.0								Y
A	647.3	15	29	HTTS	- 5.0	7.5								Y
B	647.3	15	29	HTTS	- 5.0	7.5								Y
C	647.3	15	29	HTTS	- 5.0	7.5	OD		2	30.0	HTTS	1.4	1	Y
D	647.3	15	29	HTTS	- 5.0	7.5	OD		1	28.0	HTTS	1.4	1	Y
E	647.3	15	29	HTTS	- 5.0	7.5	OD		1	25.0	HTTS	1.5	1	Y
U	647.3	15	29	HTTS	- 5.0	7.5	OD	IG	2	< 20.0	HTTS	1.0		Y
UU	647.3	15	29	HTTS	- 5.0	7.5								
V	647.3	15	29	HTTS	- 5.0	7.5	OD	WG	2	39.0	HTTS		1	Y
VV	647.3	15	29	HTTS	- 5.0	7.5								
W	647.3	15	29	HTTS	- 5.0	7.5								
X	647.3	15	29	HTTS	- 5.0	7.5	OD	WG		17.0	HTTS	0.6	1	Y
Y	647.3	15	29	HTTS	- 5.0	7.5	OD			< 10.0	HTTS			Y
A	648.3	15	53	HTTS	- 5.0	7.0	OD		1	50.0	HTTS	0.9	1	Y
B	648.3	15	53	HTTS	- 5.0	7.0	OD		1	45.0	HTTS	1.1	1	Y
C	648.3	15	53	HTTS	- 5.0	7.0	OD		1	43.0	HTTS	1.1	1	Y
D	648.3	15	53	HTTS	- 5.0	7.0	OD		1	56.0	HTTS	1.0	1	Y
E	648.3	15	53	HTTS	- 5.0	7.0	OD		1	65.0	HTTS	1.0	1	Y
U	648.3	15	53	HTTS	- 5.0	7.0								
UU	648.3	15	53	HTTS	- 5.0	7.0			2	55.0	HTTS	1.2		Y
V	648.3	15	53	HTTS	- 5.0	7.0	OD	WG	2	58.0	HTTS		3	Y
VV	648.3	15	53	HTTS	- 5.0	7.0			3	37.0	HTTS	1.2		Y
W	648.3	15	53	HTTS	- 5.0	7.0				53.0	HTTS	1.1		Y
X	648.3	15	53	HTTS	- 5.0	7.0	OD	WG		17.0	HTTS	0.7	1	Y
X	648.3	15	53	HTTS	- 5.0	7.0	OD	WG		49.0	HTTS	1.1	1	Y
Y	648.3	15	53	HTTS	- 5.0	7.0	OD			58.0	HTTS			Y
A	649.3	15	66	HTTS	- 5.0	7.0	OD		1	45.0	HTTS	0.7	1	Y
B	649.3	15	66	HTTS	- 5.0	7.0	OD		1	34.0	HTTS	0.6	1	Y
C	649.3	15	66	HTTS	- 5.0	7.0	OD		1	44.0	HTTS	0.9	1	Y
D	649.3	15	66	HTTS	- 5.0	7.0	OD		1	43.0	HTTS	1.4	1	Y
E	649.3	15	66	HTTS	- 5.0	7.0	OD		1	48.0	HTTS	0.8	1	Y
U	649.3	15	66	HTTS	- 5.0	7.0	OD	IG	2	37.0	HTTS	1.0		Y
UU	649.3	15	66	HTTS	- 5.0	7.0								
V	649.3	15	66	HTTS	- 5.0	7.0	OD	WG	2	48.0	HTTS		1	Y
VV	649.3	15	66	HTTS	- 5.0	7.0								
W	649.3	15	66	HTTS	- 5.0	7.0								
X	649.3	15	66	HTTS	- 5.0	7.0	OD	WG		29.0	HTTS	0.0	1	Y
Y	649.3	15	66	HTTS	- 5.0	7.0	OD			42.0	HTTS			Y
A	650.3	16	16	HTTS	- 5.0	6.8								Y
B	650.3	16	16	HTTS	- 5.0	6.8								Y
C	650.3	16	16	HTTS	- 5.0	6.8								Y
D	650.3	16	16	HTTS	- 5.0	6.8								Y
E	650.3	16	16	HTTS	- 5.0	6.8								Y
U	650.3	16	16	HTTS	- 5.0	6.8								
UU	650.3	16	16	HTTS	- 5.0	6.8								Y
V	650.3	16	16	HTTS	- 5.0	6.8								Y
VV	650.3	16	16	HTTS	- 5.0	6.8								Y
W	650.3	16	16	HTTS	- 5.0	6.8								
X	650.3	16	16	HTTS	- 5.0	6.8								Y
Y	650.3	16	16	HTTS	- 5.0	6.8								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	651.3	16	37	HTTS	- 5.0	7.0	OD		1	< 20.0	HTTS	1.0	1	Y
B	651.3	16	37	HTTS	- 5.0	7.0								Y
C	651.3	16	37	HTTS	- 5.0	7.0	OD		1	26.0	HTTS	1.5	1	Y
D	651.3	16	37	HTTS	- 5.0	7.0	OD		1	< 20.0	HTTS	1.7	1	Y
E	651.3	16	37	HTTS	- 5.0	7.0	OD		1	22.0	HTTS	0.9	1	Y
U	651.3	16	37	HTTS	- 5.0	7.0	OD	IG	2	< 20.0	HTTS	1.0		Y
UU	651.3	16	37	HTTS	- 5.0	7.0								
V	651.3	16	37	HTTS	- 5.0	7.0	OD	WG	2	49.0	HTTS		3	Y
VV	651.3	16	37	HTTS	- 5.0	7.0								
W	651.3	16	37	HTTS	- 5.0	7.0								
X	651.3	16	37	HTTS	- 5.0	7.0	OD	WG		8.0	HTTS	0.0	1	Y
Y	651.3	16	37	HTTS	- 5.0	7.0	OD			38.0	HTTS			Y
Y	651.3	16	37	HTTS	- 5.0	7.0	OD			15.0	HTTS			Y
A	652.3	16	42	HTTS	- 5.0	6.9	OD		1	< 20.0	HTTS	1.4	1	Y
B	652.3	16	42	HTTS	- 5.0	6.9	OD		2	< 20.0	HTTS	0.7	1	Y
C	652.3	16	42	HTTS	- 5.0	6.9	OD		1	< 20.0	HTTS	1.3	1	Y
D	652.3	16	42	HTTS	- 5.0	6.9	OD		1	< 20.0	HTTS	1.3	1	Y
E	652.3	16	42	HTTS	- 5.0	6.9	OD			< 20.0	HTTS	1.5		Y
U	652.3	16	42	HTTS	- 5.0	6.9								
UU	652.3	16	42	HTTS	- 5.0	6.9								
V	652.3	16	42	HTTS	- 5.0	6.9	OD	WG	2	36.0	HTTS		3	Y
VV	652.3	16	42	HTTS	- 5.0	6.9								
W	652.3	16	42	HTTS	- 5.0	6.9								
X	652.3	16	42	HTTS	- 5.0	6.9	OD	WG		3.0	HTTS	0.0	1	Y
Y	652.3	16	42	HTTS	- 5.0	6.9	OD			20.0	HTTS			Y
A	653.3	16	63	HTTS	- 5.0	6.9	OD		1	39.0	HTTS	0.6	1	Y
B	653.3	16	63	HTTS	- 5.0	6.9	OD		2	43.0	HTTS	0.0	5	Y
C	653.3	16	63	HTTS	- 5.0	6.9								Y
D	653.3	16	63	HTTS	- 5.0	6.9	OD		1	48.0	HTTS	0.7	1	Y
E	653.3	16	63	HTTS	- 5.0	6.9	OD		1	41.0	HTTS	0.8	1	Y
U	653.3	16	63	HTTS	- 5.0	6.9								
UU	653.3	16	63	HTTS	- 5.0	6.9								
V	653.3	16	63	HTTS	- 5.0	6.9	OD	WG	1	53.0	HTTS		UT	Y
VV	653.3	16	63	HTTS	- 5.0	6.9								
W	653.3	16	63	HTTS	- 5.0	6.9								
X	653.3	16	63	HTTS	- 5.0	6.9	OD	WG		37.0	HTTS	0.0	1	Y
Y	653.3	16	63	HTTS	- 5.0	6.9	OD			45.0	HTTS			Y
A	654.3	17	35	HTTS	- 5.0	7.0	OD		1	23.0	HTTS	1.8	1	Y
B	654.3	17	35	HTTS	- 5.0	7.0	OD		1	24.0	HTTS	1.9	1	Y
C	654.3	17	35	HTTS	- 5.0	7.0	OD		2	22.0	HTTS	1.7	1	Y
D	654.3	17	35	HTTS	- 5.0	7.0	OD		1	< 20.0	HTTS	1.6	1	Y
E	654.3	17	35	HTTS	- 5.0	7.0	OD		1	24.0	HTTS	1.4	1	Y
U	654.3	17	35	HTTS	- 5.0	7.0								
UU	654.3	17	35	HTTS	- 5.0	7.0			2	21.0	HTTS	2.0		Y
V	654.3	17	35	HTTS	- 5.0	7.0	OD	WG	2	32.0	HTTS		3	Y
VV	654.3	17	35	HTTS	- 5.0	7.0			2	23.0	HTTS	2.0		Y
W	654.3	17	35	HTTS	- 5.0	7.0								
X	654.3	17	35	HTTS	- 5.0	7.0	OD	WG		23.0	HTTS	1.5	1	Y
Y	654.3	17	35	HTTS	- 5.0	7.0	OD			14.0	HTTS			Y
A	655.3	17	45	HTTS	- 5.0	6.8	OD		2	96.0	HTTS	0.9	1	Y
B	655.3	17	45	HTTS	- 5.0	6.8	OD		3		HTTS	1.1	1	Y
C	655.3	17	45	HTTS	- 5.0	6.8	OD		2	< 20.0	HTTS	1.4	1	Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
D	655.3	17	45	HTTS	- 5.0	6.8	OD		2	39.0	HTTS	0.5	1	Y
E	655.3	17	45	HTTS	- 5.0	6.8	OD		1	23.0	HTTS	1.4	1	Y
U	655.3	17	45	HTTS	- 5.0	6.8								
UU	655.3	17	45	HTTS	- 5.0	6.8								Y
V	655.3	17	45	HTTS	- 5.0	6.8	OD	WG	2	27.0	HTTS		1	Y
VV	655.3	17	45	HTTS	- 5.0	6.8			2	50.0	HTTS	0.9		Y
W	655.3	17	45	HTTS	- 5.0	6.8								
X	655.3	17	45	HTTS	- 5.0	6.8	OD	WG		21.0	HTTS	1.5	1	Y
X	655.3	17	45	HTTS	- 5.0	6.8	OD	WG		33.0	HTTS	0.7	1	Y
Y	655.3	17	45	HTTS	- 5.0	6.8	OD			15.0	HTTS			Y
A	656.3	17	51	HTTS	- 5.0	7.1	OD		1	< 20.0	HTTS	0.5	2	Y
B	656.3	17	51	HTTS	- 5.0	7.1								Y
C	656.3	17	51	HTTS	- 5.0	7.1								Y
D	656.3	17	51	HTTS	- 5.0	7.1								Y
E	656.3	17	51	HTTS	- 5.0	7.1								Y
U	656.3	17	51	HTTS	- 5.0	7.1								
UU	656.3	17	51	HTTS	- 5.0	7.1								
V	656.3	17	51	HTTS	- 5.0	7.1	OD	WG	2	26.0	HTTS		1	Y
VV	656.3	17	51	HTTS	- 5.0	7.1								
W	656.3	17	51	HTTS	- 5.0	7.1								
X	656.3	17	51	HTTS	- 5.0	7.1								Y
Y	656.3	17	51	HTTS	- 5.0	7.1	OD			< 10.0	HTTS			Y
A	657.3	17	62	HTTS	- 5.0	7.1	OD		1	69.0	HTTS	1.0	1	Y
B	657.3	17	62	HTTS	- 5.0	7.1	OD		2	70.0	HTTS	0.2	1	Y
C	657.3	17	62	HTTS	- 5.0	7.1	OD		1	70.0	HTTS	1.3	1	Y
D	657.3	17	62	HTTS	- 5.0	7.1	OD		1	71.0	HTTS	0.8	1	Y
E	657.3	17	62	HTTS	- 5.0	7.1	OD		1	74.0	HTTS	1.0	1	Y
U	657.3	17	62	HTTS	- 5.0	7.1								
UU	657.3	17	62	HTTS	- 5.0	7.1								
V	657.3	17	62	HTTS	- 5.0	7.1	OD	WG	2	59.0	HTTS		3	Y
VV	657.3	17	62	HTTS	- 5.0	7.1								
W	657.3	17	62	HTTS	- 5.0	7.1								
X	657.3	17	62	HTTS	- 5.0	7.1	OD	WG		43.0	HTTS	0.0	1	Y
Y	657.3	17	62	HTTS	- 5.0	7.1	OD			72.0	HTTS			Y
Y	657.3	17	62	HTTS	- 5.0	7.1	OD			35.0	HTTS			Y
A	658.3	15	33	HTTS	- 5.0	6.9	OD		2	23.0	HTTS		1	Y
A	658.3	15	33	HTTS	- 5.0	6.9	OD		1	49.0	HTTS	2.2	1	Y
B	658.3	15	33	HTTS	- 5.0	6.9	OD		1	48.0	HTTS	1.7	1	Y
C	658.3	15	33	HTTS	- 5.0	6.9	OD		2	54.0	HTTS	1.0	1	Y
D	658.3	15	33	HTTS	- 5.0	6.9	OD		1	42.0	HTTS	3.6	1	Y
E	658.3	15	33	HTTS	- 5.0	6.9	OD		1	48.0	HTTS	0.9	1	Y
U	658.3	15	33	HTTS	- 5.0	6.9	OD	IG	2	50.0	HTTS	3.0		Y
UU	658.3	15	33	HTTS	- 5.0	6.9								
V	658.3	15	33	HTTS	- 5.0	6.9	OD	WG	2	58.0	HTTS		3	Y
VV	658.3	15	33	HTTS	- 5.0	6.9								
W	658.3	15	33	HTTS	- 5.0	6.9								
X	658.3	15	33	HTTS	- 5.0	6.9	OD	WG		37.0	HTTS	-2.2	3	Y
X	658.3	15	33	HTTS	- 5.0	6.9	OD	WG		37.0	HTTS	-0.3	3	Y
Y	658.3	15	33	HTTS	- 5.0	6.9	OD		1	43.0	HTTS			Y
A	659.3	15	37	HTTS	- 5.0	6.6	OD		2	28.0	HTTS	0.9	1	Y
B	659.3	15	37	HTTS	- 5.0	6.6	OD		1	30.0	HTTS	0.3	1	Y
C	659.3	15	37	HTTS	- 5.0	6.6	OD		2	30.0	HTTS	0.9	1	Y
D	659.3	15	37	HTTS	- 5.0	6.6	OD		1	35.0	HTTS	1.4	1	Y
E	659.3	15	37	HTTS	- 5.0	6.6	OD		1	38.0	HTTS	0.2	1	Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
U	659.3	15	37	HTTS	- 5.0	6.6								
UU	659.3	15	37	HTTS	- 5.0	6.6			2	34.0	HTTS	1.0		Y
V	659.3	15	37	HTTS	- 5.0	6.6	OD	WG	2	47.0	HTTS		3	Y
VV	659.3	15	37	HTTS	- 5.0	6.6			2	40.0	HTTS	1.0		Y
W	659.3	15	37	HTTS	- 5.0	6.6								
X	659.3	15	37	HTTS	- 5.0	6.6	OD	WG		36.0	HTTS	0.9	1	Y
Y	659.3	15	37	HTTS	- 5.0	6.6	OD			33.0	HTTS			Y
A	660.3	15	49	HTTS	- 5.0	7.0	OD		2	< 20.0	HTTS	0.3	2	Y
B	660.3	15	49	HTTS	- 5.0	7.0	OD		3		HTTS	0.0	5	Y
C	660.3	15	49	HTTS	- 5.0	7.0	OD		2	24.0	HTTS	0.9	1	Y
D	660.3	15	49	HTTS	- 5.0	7.0	OD		2	< 20.0	HTTS	1.8	1	Y
E	660.3	15	49	HTTS	- 5.0	7.0								Y
U	660.3	15	49	HTTS	- 5.0	7.0								
UU	660.3	15	49	HTTS	- 5.0	7.0			2	60.0	HTTS	0.5		Y
V	660.3	15	49	HTTS	- 5.0	7.0	OD	WG	2	< 20.0	HTTS		1	Y
VV	660.3	15	49	HTTS	- 5.0	7.0			2	37.0	HTTS	0.5		Y
W	660.3	15	49	HTTS	- 5.0	7.0								
X	660.3	15	49	HTTS	- 5.0	7.0	OD	WG			HTTS	0.4	1	Y
Y	660.3	15	49	HTTS	- 5.0	7.0	OD			< 10.0	HTTS			Y
A	661.3	17	73	HTTS	- 5.0	7.0	OD		2	70.0	HTTS	0.9	1	Y
B	661.3	17	73	HTTS	- 5.0	7.0	OD		2	71.0	HTTS	0.0	5	Y
C	661.3	17	73	HTTS	- 5.0	7.0	OD		2	29.0	HTTS	0.9	1	Y
D	661.3	17	73	HTTS	- 5.0	7.0	OD		1	50.0	HTTS	1.1	1	Y
E	661.3	17	73	HTTS	- 5.0	7.0	OD		1	72.0	HTTS	1.0	1	Y
U	661.3	17	73	HTTS	- 5.0	7.0	OD	IG	2	31.0	HTTS	1.0		Y
UU	661.3	17	73	HTTS	- 5.0	7.0								
V	661.3	17	73	HTTS	- 5.0	7.0	OD	WG	2	67.0	HTTS		3	Y
VV	661.3	17	73	HTTS	- 5.0	7.0								
W	661.3	17	73	HTTS	- 5.0	7.0								
X	661.3	17	73	HTTS	- 5.0	7.0	OD	WG		29.0	HTTS	0.0	1	Y
Y	661.3	17	73	HTTS	- 5.0	7.0	OD			75.0	HTTS			Y
Y	661.3	17	73	HTTS	- 5.0	7.0	OD			17.0	HTTS			Y
A	662.0	10	60	HL6	- 3.5	6.5								Y
B	662.0	10	60	HL6	- 3.5	6.5								Y
C	662.0	10	60	HL6	- 3.5	6.5								Y
D	662.0	10	60	HL6	- 3.5	6.5								Y
E	662.0	10	60	HL6	- 3.5	6.5								Y
U	662.0	10	60	HL6	- 3.5	6.5								
UU	662.0	10	60	HL6	- 3.5	6.5								
V	662.0	10	60	HL6	- 3.5	6.5								Y
VV	662.0	10	60	HL6	- 3.5	6.5								Y
W	662.0	10	60	HL6	- 3.5	6.5								
X	662.0	10	60	HL6	- 3.5	6.5								Y
Y	662.0	10	60	HL6	- 3.5	6.5	OD			< 10.0	HL6	1.6		Y
A	663.0	10	60	HL5	- 1.9	8.1								Y
B	663.0	10	60	HL5	- 1.9	8.1								Y
C	663.0	10	60	HL5	- 1.9	8.1								Y
D	663.0	10	60	HL5	- 1.9	8.1								Y
E	663.0	10	60	HL5	- 1.9	8.1								Y
U	663.0	10	60	HL5	- 1.9	8.1								
UU	663.0	10	60	HL5	- 1.9	8.1								
V	663.0	10	60	HL5	- 1.9	8.1								Y
VV	663.0	10	60	HL5	- 1.9	8.1								Y
W	663.0	10	60	HL5	- 1.9	8.1								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	663.0	10	60	HL5	- 1.9	8.1								Y
Y	663.0	10	60	HL5	- 1.9	8.1	OD			< 10.0	HL5	3.1		Y
A	664.0	9	60	HL6	- 1.9	8.1								Y
B	664.0	9	60	HL6	- 1.9	8.1								Y
C	664.0	9	60	HL6	- 1.9	8.1								Y
D	664.0	9	60	HL6	- 1.9	8.1								Y
E	664.0	9	60	HL6	- 1.9	8.1								Y
U	664.0	9	60	HL6	- 1.9	8.1								
UU	664.0	9	60	HL6	- 1.9	8.1								
V	664.0	9	60	HL6	- 1.9	8.1								Y
VV	664.0	9	60	HL6	- 1.9	8.1								Y
W	664.0	9	60	HL6	- 1.9	8.1								
X	664.0	9	60	HL6	- 1.9	8.1								Y
Y	664.0	9	60	HL6	- 1.9	8.1	OD			< 10.0	HL6	3.1		Y
A	665.0	7	57	HL5	- 4.5	5.5								Y
B	665.0	7	57	HL5	- 4.5	5.5								Y
C	665.0	7	57	HL5	- 4.5	5.5								Y
D	665.0	7	57	HL5	- 4.5	5.5								Y
E	665.0	7	57	HL5	- 4.5	5.5								Y
U	665.0	7	57	HL5	- 4.5	5.5								
UU	665.0	7	57	HL5	- 4.5	5.5								
V	665.0	7	57	HL5	- 4.5	5.5								Y
VV	665.0	7	57	HL5	- 4.5	5.5								Y
W	665.0	7	57	HL5	- 4.5	5.5								
X	665.0	7	57	HL5	- 4.5	5.5	OD	WG		50.0	HL5	0.5	1	Y
Y	665.0	7	57	HL5	- 4.5	5.5								Y
A	666.0	7	57	HL4	13.0	23.0								Y
B	666.0	7	57	HL4	13.0	23.0								Y
C	666.0	7	57	HL4	13.0	23.0								Y
D	666.0	7	57	HL4	13.0	23.0								Y
E	666.0	7	57	HL4	13.0	23.0								Y
U	666.0	7	57	HL4	13.0	23.0								
UU	666.0	7	57	HL4	13.0	23.0								
V	666.0	7	57	HL4	13.0	23.0	ID		3	50.0	HL4	18.8	3	Y
VV	666.0	7	57	HL4	13.0	23.0								Y
W	666.0	7	57	HL4	13.0	23.0								
X	666.0	7	57	HL4	13.0	23.0								Y
Y	666.0	7	57	HL4	13.0	23.0								Y
A	667.0	11	57	HL5	-29.2	-19.2								Y
B	667.0	11	57	HL5	-29.2	-19.2								Y
C	667.0	11	57	HL5	-29.2	-19.2								Y
D	667.0	11	57	HL5	-29.2	-19.2								Y
E	667.0	11	57	HL5	-29.2	-19.2								Y
U	667.0	11	57	HL5	-29.2	-19.2								
UU	667.0	11	57	HL5	-29.2	-19.2								
V	667.0	11	57	HL5	-29.2	-19.2								Y
VV	667.0	11	57	HL5	-29.2	-19.2								Y
W	667.0	11	57	HL5	-29.2	-19.2								
X	667.0	11	57	HL5	-29.2	-19.2								Y
Y	667.0	11	57	HL5	-29.2	-19.2								Y
A	668.0	7	61	HL3	-14.8	- 4.8								Y
B	668.0	7	61	HL3	-14.8	- 4.8								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	668.0	7	61	HL3	-14.8	- 4.8								Y
D	668.0	7	61	HL3	-14.8	- 4.8								Y
E	668.0	7	61	HL3	-14.8	- 4.8								Y
U	668.0	7	61	HL3	-14.8	- 4.8								
UU	668.0	7	61	HL3	-14.8	- 4.8								
V	668.0	7	61	HL3	-14.8	- 4.8								Y
VV	668.0	7	61	HL3	-14.8	- 4.8								
W	668.0	7	61	HL3	-14.8	- 4.8								
X	668.0	7	61	HL3	-14.8	- 4.8								Y
Y	668.0	7	61	HL3	-14.8	- 4.8								Y
A	669.3	6	38	CTTS	- 3.0	4.0								Y
B	669.3	6	38	CTTS	- 3.0	4.0								Y
C	669.3	6	38	CTTS	- 3.0	4.0								Y
D	669.3	6	38	CTTS	- 3.0	4.0								Y
E	669.3	6	38	CTTS	- 3.0	4.0								Y
U	669.3	6	38	CTTS	- 3.0	4.0								
UU	669.3	6	38	CTTS	- 3.0	4.0								Y
V	669.3	6	38	CTTS	- 3.0	4.0								
VV	669.3	6	38	CTTS	- 3.0	4.0								Y
W	669.3	6	38	CTTS	- 3.0	4.0								
X	669.3	6	38	CTTS	- 3.0	4.0								Y
Y	669.3	6	38	CTTS	- 3.0	4.0								Y
A	670.3	5	29	CTTS	- 3.0	5.0								Y
B	670.3	5	29	CTTS	- 3.0	5.0								Y
C	670.3	5	29	CTTS	- 3.0	5.0								Y
D	670.3	5	29	CTTS	- 3.0	5.0	OD			< 20.0	CTTS	2.8		Y
E	670.3	5	29	CTTS	- 3.0	5.0								Y
U	670.3	5	29	CTTS	- 3.0	5.0								
UU	670.3	5	29	CTTS	- 3.0	5.0								Y
V	670.3	5	29	CTTS	- 3.0	5.0								
VV	670.3	5	29	CTTS	- 3.0	5.0								Y
W	670.3	5	29	CTTS	- 3.0	5.0								
X	670.3	5	29	CTTS	- 3.0	5.0								Y
Y	670.3	5	29	CTTS	- 3.0	5.0								Y
A	671.3	7	48	CTTS	- 3.0	5.0								Y
B	671.3	7	48	CTTS	- 3.0	5.0								Y
C	671.3	7	48	CTTS	- 3.0	5.0								Y
D	671.3	7	48	CTTS	- 3.0	5.0								Y
E	671.3	7	48	CTTS	- 3.0	5.0								Y
U	671.3	7	48	CTTS	- 3.0	5.0								
UU	671.3	7	48	CTTS	- 3.0	5.0								Y
V	671.3	7	48	CTTS	- 3.0	5.0								
VV	671.3	7	48	CTTS	- 3.0	5.0			3	28.0	CTTS			Y
W	671.3	7	48	CTTS	- 3.0	5.0								
X	671.3	7	48	CTTS	- 3.0	5.0								Y
Y	671.3	7	48	CTTS	- 3.0	5.0								Y
A	672.3	6	44	CTTS	- 3.0	4.5								Y
B	672.3	6	44	CTTS	- 3.0	4.5								Y
C	672.3	6	44	CTTS	- 3.0	4.5								Y
D	672.3	6	44	CTTS	- 3.0	4.5								Y
E	672.3	6	44	CTTS	- 3.0	4.5								Y
U	672.3	6	44	CTTS	- 3.0	4.5								
UU	672.3	6	44	CTTS	- 3.0	4.5								Y
V	672.3	6	44	CTTS	- 3.0	4.5								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	672.3	6	44	CTTS	- 3.0	4.5								Y
W	672.3	6	44	CTTS	- 3.0	4.5								
X	672.3	6	44	CTTS	- 3.0	4.5								Y
Y	672.3	6	44	CTTS	- 3.0	4.5								Y
A	673.3	6	53	CTTS	- 3.0	5.0								Y
B	673.3	6	53	CTTS	- 3.0	5.0								Y
C	673.3	6	53	CTTS	- 3.0	5.0								Y
D	673.3	6	53	CTTS	- 3.0	5.0								Y
E	673.3	6	53	CTTS	- 3.0	5.0								Y
U	673.3	6	53	CTTS	- 3.0	5.0								
UU	673.3	6	53	CTTS	- 3.0	5.0								Y
V	673.3	6	53	CTTS	- 3.0	5.0								
VV	673.3	6	53	CTTS	- 3.0	5.0								Y
W	673.3	6	53	CTTS	- 3.0	5.0								
X	673.3	6	53	CTTS	- 3.0	5.0								Y
Y	673.3	6	53	CTTS	- 3.0	5.0								Y
A	674.3	6	75	CTTS	- 3.0	4.5								Y
B	674.3	6	75	CTTS	- 3.0	4.5								Y
C	674.3	6	75	CTTS	- 3.0	4.5								Y
D	674.3	6	75	CTTS	- 3.0	4.5								Y
E	674.3	6	75	CTTS	- 3.0	4.5	OD			< 20.0	CTTS			Y
U	674.3	6	75	CTTS	- 3.0	4.5								
UU	674.3	6	75	CTTS	- 3.0	4.5			3		CTTS	0.0		Y
V	674.3	6	75	CTTS	- 3.0	4.5								
VV	674.3	6	75	CTTS	- 3.0	4.5			3	21.0	CTTS	0.0		Y
W	674.3	6	75	CTTS	- 3.0	4.5								
X	674.3	6	75	CTTS	- 3.0	4.5								Y
Y	674.3	6	75	CTTS	- 3.0	4.5								Y
A	675.3	6	73	CTTS	- 3.0	4.8	OD		3	< 20.0	CTTS	0.9	1	Y
B	675.3	6	73	CTTS	- 3.0	4.8								Y
C	675.3	6	73	CTTS	- 3.0	4.8								Y
D	675.3	6	73	CTTS	- 3.0	4.8								Y
E	675.3	6	73	CTTS	- 3.0	4.8								Y
U	675.3	6	73	CTTS	- 3.0	4.8								
UU	675.3	6	73	CTTS	- 3.0	4.8								
V	675.3	6	73	CTTS	- 3.0	4.8								
VV	675.3	6	73	CTTS	- 3.0	4.8								
W	675.3	6	73	CTTS	- 3.0	4.8								
X	675.3	6	73	CTTS	- 3.0	4.8								Y
Y	675.3	6	73	CTTS	- 3.0	4.8								Y
A	676.3	7	65	CTTS	- 3.0	4.8								Y
B	676.3	7	65	CTTS	- 3.0	4.8								Y
C	676.3	7	65	CTTS	- 3.0	4.8								Y
D	676.3	7	65	CTTS	- 3.0	4.8								Y
E	676.3	7	65	CTTS	- 3.0	4.8								Y
U	676.3	7	65	CTTS	- 3.0	4.8								
UU	676.3	7	65	CTTS	- 3.0	4.8								Y
V	676.3	7	65	CTTS	- 3.0	4.8								
VV	676.3	7	65	CTTS	- 3.0	4.8								Y
W	676.3	7	65	CTTS	- 3.0	4.8								
X	676.3	7	65	CTTS	- 3.0	4.8								Y
Y	676.3	7	65	CTTS	- 3.0	4.8								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	677.3	7	64	CTTS	- 3.0	4.8								Y
B	677.3	7	64	CTTS	- 3.0	4.8								Y
C	677.3	7	64	CTTS	- 3.0	4.8								Y
D	677.3	7	64	CTTS	- 3.0	4.8								Y
E	677.3	7	64	CTTS	- 3.0	4.8								Y
U	677.3	7	64	CTTS	- 3.0	4.8								
UU	677.3	7	64	CTTS	- 3.0	4.8								
V	677.3	7	64	CTTS	- 3.0	4.8								
VV	677.3	7	64	CTTS	- 3.0	4.8								
W	677.3	7	64	CTTS	- 3.0	4.8								
X	677.3	7	64	CTTS	- 3.0	4.8								Y
Y	677.3	7	64	CTTS	- 3.0	4.8	OD			< 10.0	CTTS			Y
A	678.3	7	27	CTTS	- 3.0	5.0								Y
B	678.3	7	27	CTTS	- 3.0	5.0								Y
C	678.3	7	27	CTTS	- 3.0	5.0								Y
D	678.3	7	27	CTTS	- 3.0	5.0	OD			< 20.0	CTTS			Y
E	678.3	7	27	CTTS	- 3.0	5.0								Y
U	678.3	7	27	CTTS	- 3.0	5.0								
UU	678.3	7	27	CTTS	- 3.0	5.0								Y
V	678.3	7	27	CTTS	- 3.0	5.0								
VV	678.3	7	27	CTTS	- 3.0	5.0								Y
W	678.3	7	27	CTTS	- 3.0	5.0								
X	678.3	7	27	CTTS	- 3.0	5.0								Y
Y	678.3	7	27	CTTS	- 3.0	5.0	OD			< 10.0	CTTS			Y
A	679.3	7	61	CTTS	- 3.0	4.8								Y
B	679.3	7	61	CTTS	- 3.0	4.8								Y
C	679.3	7	61	CTTS	- 3.0	4.8								Y
D	679.3	7	61	CTTS	- 3.0	4.8	OD		1	< 20.0	CTTS	0.8	1	Y
E	679.3	7	61	CTTS	- 3.0	4.8								Y
U	679.3	7	61	CTTS	- 3.0	4.8								
UU	679.3	7	61	CTTS	- 3.0	4.8								Y
V	679.3	7	61	CTTS	- 3.0	4.8								
VV	679.3	7	61	CTTS	- 3.0	4.8								Y
W	679.3	7	61	CTTS	- 3.0	4.8								
X	679.3	7	61	CTTS	- 3.0	4.8								Y
Y	679.3	7	61	CTTS	- 3.0	4.8	OD			10.0	CTTS			Y
A	680.2	20	33	CTTS	-13.5	- 5.0								Y
B	680.2	20	33	CTTS	-13.5	- 5.0								Y
C	680.2	20	33	CTTS	-13.5	- 5.0								Y
D	680.2	20	33	CTTS	-13.5	- 5.0								Y
E	680.2	20	33	CTTS	-13.5	- 5.0								Y
U	680.2	20	33	CTTS	-13.5	- 5.0								Y
UU	680.2	20	33	CTTS	-13.5	- 5.0								Y
V	680.2	20	33	CTTS	-13.5	- 5.0								Y
VV	680.2	20	33	CTTS	-13.5	- 5.0								Y
W	680.2	20	33	CTTS	-13.5	- 5.0								
X	680.2	20	33	CTTS	-13.5	- 5.0								Y
Y	680.2	20	33	CTTS	-13.5	- 5.0								Y
A	680.3	20	33	CTTS	- 3.0	2.8								Y
B	680.3	20	33	CTTS	- 3.0	2.8								Y
C	680.3	20	33	CTTS	- 3.0	2.8								Y
D	680.3	20	33	CTTS	- 3.0	2.8	OD			< 20.0	CTTS	2.1		Y
E	680.3	20	33	CTTS	- 3.0	2.8								Y
U	680.3	20	33	CTTS	- 3.0	2.8	OD	IG	2	< 20.0	CTTS	1.0		Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	680.3	20	33	CTTS	- 3.0	2.8								Y
V	680.3	20	33	CTTS	- 3.0	2.8								Y
VV	680.3	20	33	CTTS	- 3.0	2.8								Y
W	680.3	20	33	CTTS	- 3.0	2.8								
X	680.3	20	33	CTTS	- 3.0	2.8								Y
Y	680.3	20	33	CTTS	- 3.0	2.8								Y
A	681.3	18	50	HTTS	- 3.0	5.3	OD		2	37.0	HTTS	1.2	1	Y
B	681.3	18	50	HTTS	- 3.0	5.3	OD		1	27.0	HTTS	0.8	1	Y
C	681.3	18	50	HTTS	- 3.0	5.3	OD		1	33.0	HTTS	1.1	1	Y
D	681.3	18	50	HTTS	- 3.0	5.3	OD		1	44.0	HTTS	1.0	1	Y
E	681.3	18	50	HTTS	- 3.0	5.3	OD		1	29.0	HTTS	0.5	1	Y
U	681.3	18	50	HTTS	- 3.0	5.3								
UU	681.3	18	50	HTTS	- 3.0	5.3			2	44.0	HTTS	0.7		Y
V	681.3	18	50	HTTS	- 3.0	5.3	OD	WG	2	52.0	HTTS		1	Y
VV	681.3	18	50	HTTS	- 3.0	5.3			2	25.0	HTTS	0.7		Y
W	681.3	18	50	HTTS	- 3.0	5.3								
X	681.3	18	50	HTTS	- 3.0	5.3	OD	WG		12.0	HTTS	0.6	1	Y
X	681.3	18	50	HTTS	- 3.0	5.3	OD	WG		34.0	HTTS	1.2	1	Y
Y	681.3	18	50	HTTS	- 3.0	5.3	OD			37.0	HTTS			Y
Y	681.3	18	50	HTTS	- 3.0	5.3	OD			47.0	HTTS			Y
A	682.3	15	70	HTTS	- 3.0	5.0	OD		1	28.0	HTTS	0.6	1	Y
B	682.3	15	70	HTTS	- 3.0	5.0	OD		2	23.0	HTTS	0.0	5	Y
C	682.3	15	70	HTTS	- 3.0	5.0	OD		2	29.0	HTTS	1.2	1	Y
D	682.3	15	70	HTTS	- 3.0	5.0	OD		1	25.0	HTTS	1.1	1	Y
E	682.3	15	70	HTTS	- 3.0	5.0	OD		1	23.0	HTTS	0.7	1	Y
U	682.3	15	70	HTTS	- 3.0	5.0	OD	IG	2	26.0	HTTS	1.0		Y
UU	682.3	15	70	HTTS	- 3.0	5.0								
V	682.3	15	70	HTTS	- 3.0	5.0	OD	WG	1	50.0	HTTS		UT	Y
VV	682.3	15	70	HTTS	- 3.0	5.0								
W	682.3	15	70	HTTS	- 3.0	5.0								
X	682.3	15	70	HTTS	- 3.0	5.0	OD	WG		23.0	HTTS	0.0	1	Y
Y	682.3	15	70	HTTS	- 3.0	5.0	OD			25.0	HTTS			Y
A	683.3	16	29	HTTS	- 3.0	5.0								Y
B	683.3	16	29	HTTS	- 3.0	5.0								Y
C	683.3	16	29	HTTS	- 3.0	5.0	OD		3	72.0	HTTS	1.3	1	Y
D	683.3	16	29	HTTS	- 3.0	5.0	OD		1	56.0	HTTS	2.0	1	Y
E	683.3	16	29	HTTS	- 3.0	5.0	OD		1	65.0	HTTS	0.8	1	Y
U	683.3	16	29	HTTS	- 3.0	5.0								Y
UU	683.3	16	29	HTTS	- 3.0	5.0								
V	683.3	16	29	HTTS	- 3.0	5.0	OD	WG	2	36.0	HTTS		1	Y
VV	683.3	16	29	HTTS	- 3.0	5.0								
W	683.3	16	29	HTTS	- 3.0	5.0								
X	683.3	16	29	HTTS	- 3.0	5.0	OD	WG		3.0	HTTS	0.0	1	Y
Y	683.3	16	29	HTTS	- 3.0	5.0								Y
A	684.3	8	67	CTTS	- 3.0	7.5								Y
B	684.3	8	67	CTTS	- 3.0	7.5								Y
C	684.3	8	67	CTTS	- 3.0	7.5								Y
D	684.3	8	67	CTTS	- 3.0	7.5	OD		1	< 20.0	CTTS	1.1	1	Y
E	684.3	8	67	CTTS	- 3.0	7.5								Y
U	684.3	8	67	CTTS	- 3.0	7.5								
UU	684.3	8	67	CTTS	- 3.0	7.5								Y
V	684.3	8	67	CTTS	- 3.0	7.5								
VV	684.3	8	67	CTTS	- 3.0	7.5								Y
W	684.3	8	67	CTTS	- 3.0	7.5								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	684.3	8	67	CTTS	- 3.0	7.5								Y
Y	684.3	8	67	CTTS	- 3.0	7.5								Y
A	685.3	8	68	CTTS	- 3.0	7.0								Y
B	685.3	8	68	CTTS	- 3.0	7.0								Y
C	685.3	8	68	CTTS	- 3.0	7.0								Y
D	685.3	8	68	CTTS	- 3.0	7.0	OD			< 20.0	CTTS	2.1		Y
E	685.3	8	68	CTTS	- 3.0	7.0								Y
U	685.3	8	68	CTTS	- 3.0	7.0								
UU	685.3	8	68	CTTS	- 3.0	7.0								
V	685.3	8	68	CTTS	- 3.0	7.0								Y
VV	685.3	8	68	CTTS	- 3.0	7.0								
W	685.3	8	68	CTTS	- 3.0	7.0								
X	685.3	8	68	CTTS	- 3.0	7.0								Y
Y	685.3	8	68	CTTS	- 3.0	7.0	OD			< 10.0	CTTS			Y
A	686.3	8	70	CTTS	- 3.0	7.0								Y
B	686.3	8	70	CTTS	- 3.0	7.0								Y
C	686.3	8	70	CTTS	- 3.0	7.0	OD		1	< 20.0	CTTS	1.9	1	Y
D	686.3	8	70	CTTS	- 3.0	7.0								Y
E	686.3	8	70	CTTS	- 3.0	7.0								Y
U	686.3	8	70	CTTS	- 3.0	7.0								
UU	686.3	8	70	CTTS	- 3.0	7.0								Y
V	686.3	8	70	CTTS	- 3.0	7.0								
VV	686.3	8	70	CTTS	- 3.0	7.0								Y
W	686.3	8	70	CTTS	- 3.0	7.0								
X	686.3	8	70	CTTS	- 3.0	7.0								Y
Y	686.3	8	70	CTTS	- 3.0	7.0	OD			10.0	CTTS			Y
A	687.3	9	40	CTTS	- 3.0	7.0								Y
B	687.3	9	40	CTTS	- 3.0	7.0								Y
C	687.3	9	40	CTTS	- 3.0	7.0	OD		2	< 20.0	CTTS	1.6	1	Y
D	687.3	9	40	CTTS	- 3.0	7.0								Y
E	687.3	9	40	CTTS	- 3.0	7.0								Y
U	687.3	9	40	CTTS	- 3.0	7.0								
UU	687.3	9	40	CTTS	- 3.0	7.0								Y
V	687.3	9	40	CTTS	- 3.0	7.0								
VV	687.3	9	40	CTTS	- 3.0	7.0								Y
W	687.3	9	40	CTTS	- 3.0	7.0								
X	687.3	9	40	CTTS	- 3.0	7.0								Y
Y	687.3	9	40	CTTS	- 3.0	7.0								Y
A	688.3	9	70	CTTS	- 3.0	7.0								Y
B	688.3	9	70	CTTS	- 3.0	7.0								Y
C	688.3	9	70	CTTS	- 3.0	7.0								Y
D	688.3	9	70	CTTS	- 3.0	7.0	OD		1	< 20.0	CTTS	0.8	1	Y
E	688.3	9	70	CTTS	- 3.0	7.0								Y
U	688.3	9	70	CTTS	- 3.0	7.0								
UU	688.3	9	70	CTTS	- 3.0	7.0								
V	688.3	9	70	CTTS	- 3.0	7.0								
VV	688.3	9	70	CTTS	- 3.0	7.0								
W	688.3	9	70	CTTS	- 3.0	7.0								
X	688.3	9	70	CTTS	- 3.0	7.0								Y
Y	688.3	9	70	CTTS	- 3.0	7.0	OD			10.0	CTTS			Y
A	689.3	9	72	CTTS	- 3.0	7.0								Y
B	689.3	9	72	CTTS	- 3.0	7.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	689.3	9	72	CTTS	- 3.0	7.0								Y
D	689.3	9	72	CTTS	- 3.0	7.0								Y
E	689.3	9	72	CTTS	- 3.0	7.0								Y
U	689.3	9	72	CTTS	- 3.0	7.0								
UU	689.3	9	72	CTTS	- 3.0	7.0								
V	689.3	9	72	CTTS	- 3.0	7.0								
VV	689.3	9	72	CTTS	- 3.0	7.0								
W	689.3	9	72	CTTS	- 3.0	7.0								
X	689.3	9	72	CTTS	- 3.0	7.0								Y
Y	689.3	9	72	CTTS	- 3.0	7.0								Y
A	690.3	10	27	CTTS	- 3.0	7.3	OD		1	< 20.0	CTTS	2.2	5	Y
B	690.3	10	27	CTTS	- 3.0	7.3								Y
C	690.3	10	27	CTTS	- 3.0	7.3								Y
D	690.3	10	27	CTTS	- 3.0	7.3	OD		1	< 20.0	CTTS	2.6	1	Y
E	690.3	10	27	CTTS	- 3.0	7.3								Y
U	690.3	10	27	CTTS	- 3.0	7.3								
UU	690.3	10	27	CTTS	- 3.0	7.3								Y
V	690.3	10	27	CTTS	- 3.0	7.3								Y
VV	690.3	10	27	CTTS	- 3.0	7.3			2	7.0	CTTS	2.2		Y
W	690.3	10	27	CTTS	- 3.0	7.3								
X	690.3	10	27	CTTS	- 3.0	7.3								Y
Y	690.3	10	27	CTTS	- 3.0	7.3								Y
A	691.3	10	29	CTTS	- 3.0	7.0								Y
B	691.3	10	29	CTTS	- 3.0	7.0								Y
C	691.3	10	29	CTTS	- 3.0	7.0								Y
D	691.3	10	29	CTTS	- 3.0	7.0								Y
E	691.3	10	29	CTTS	- 3.0	7.0								Y
U	691.3	10	29	CTTS	- 3.0	7.0								
UU	691.3	10	29	CTTS	- 3.0	7.0			2	6.0	CTTS	3.0		Y
V	691.3	10	29	CTTS	- 3.0	7.0								Y
VV	691.3	10	29	CTTS	- 3.0	7.0								Y
W	691.3	10	29	CTTS	- 3.0	7.0								
X	691.3	10	29	CTTS	- 3.0	7.0								Y
Y	691.3	10	29	CTTS	- 3.0	7.0	OD			< 10.0	CTTS			Y
A	692.3	10	50	CTTS	- 3.0	7.3								Y
B	692.3	10	50	CTTS	- 3.0	7.3								Y
C	692.3	10	50	CTTS	- 3.0	7.3								Y
D	692.3	10	50	CTTS	- 3.0	7.3	OD			< 20.0	CTTS	1.4		Y
E	692.3	10	50	CTTS	- 3.0	7.3								Y
U	692.3	10	50	CTTS	- 3.0	7.3								
UU	692.3	10	50	CTTS	- 3.0	7.3								
V	692.3	10	50	CTTS	- 3.0	7.3	OD	WG	1	< 20.0	CTTS		3	Y
VV	692.3	10	50	CTTS	- 3.0	7.3								
W	692.3	10	50	CTTS	- 3.0	7.3								
X	692.3	10	50	CTTS	- 3.0	7.3								Y
Y	692.3	10	50	CTTS	- 3.0	7.3								Y
A	693.3	10	68	CTTS	- 3.0	7.0								Y
B	693.3	10	68	CTTS	- 3.0	7.0								Y
C	693.3	10	68	CTTS	- 3.0	7.0								Y
D	693.3	10	68	CTTS	- 3.0	7.0								Y
E	693.3	10	68	CTTS	- 3.0	7.0								Y
U	693.3	10	68	CTTS	- 3.0	7.0	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	693.3	10	68	CTTS	- 3.0	7.0								Y
V	693.3	10	68	CTTS	- 3.0	7.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	693.3	10	68	CTTS	- 3.0	7.0								Y
W	693.3	10	68	CTTS	- 3.0	7.0								
X	693.3	10	68	CTTS	- 3.0	7.0								Y
Y	693.3	10	68	CTTS	- 3.0	7.0	OD			< 10.0	CTTS			Y
A	694.3	11	63	CTTS	- 3.0	7.0								Y
B	694.3	11	63	CTTS	- 3.0	7.0								Y
C	694.3	11	63	CTTS	- 3.0	7.0								Y
D	694.3	11	63	CTTS	- 3.0	7.0								Y
E	694.3	11	63	CTTS	- 3.0	7.0								Y
U	694.3	11	63	CTTS	- 3.0	7.0								
UU	694.3	11	63	CTTS	- 3.0	7.0								
V	694.3	11	63	CTTS	- 3.0	7.0								
VV	694.3	11	63	CTTS	- 3.0	7.0								
W	694.3	11	63	CTTS	- 3.0	7.0								
X	694.3	11	63	CTTS	- 3.0	7.0								Y
Y	694.3	11	63	CTTS	- 3.0	7.0								Y
A	695.3	11	72	CTTS	- 3.0	7.0								Y
B	695.3	11	72	CTTS	- 3.0	7.0								Y
C	695.3	11	72	CTTS	- 3.0	7.0								Y
D	695.3	11	72	CTTS	- 3.0	7.0	OD			< 20.0	CTTS	0.7		Y
E	695.3	11	72	CTTS	- 3.0	7.0								Y
U	695.3	11	72	CTTS	- 3.0	7.0	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	695.3	11	72	CTTS	- 3.0	7.0								
V	695.3	11	72	CTTS	- 3.0	7.0								Y
VV	695.3	11	72	CTTS	- 3.0	7.0								
W	695.3	11	72	CTTS	- 3.0	7.0								
X	695.3	11	72	CTTS	- 3.0	7.0								Y
Y	695.3	11	72	CTTS	- 3.0	7.0								Y
A	696.3	12	48	CTTS	- 3.0	7.0								Y
B	696.3	12	48	CTTS	- 3.0	7.0								Y
C	696.3	12	48	CTTS	- 3.0	7.0								Y
D	696.3	12	48	CTTS	- 3.0	7.0	OD			< 20.0	CTTS			Y
E	696.3	12	48	CTTS	- 3.0	7.0								Y
U	696.3	12	48	CTTS	- 3.0	7.0								
UU	696.3	12	48	CTTS	- 3.0	7.0								
V	696.3	12	48	CTTS	- 3.0	7.0								Y
VV	696.3	12	48	CTTS	- 3.0	7.0								
W	696.3	12	48	CTTS	- 3.0	7.0								
X	696.3	12	48	CTTS	- 3.0	7.0								Y
Y	696.3	12	48	CTTS	- 3.0	7.0								Y
A	697.3	12	67	CTTS	- 3.0	7.8								Y
B	697.3	12	67	CTTS	- 3.0	7.8								Y
C	697.3	12	67	CTTS	- 3.0	7.8								Y
D	697.3	12	67	CTTS	- 3.0	7.8								Y
E	697.3	12	67	CTTS	- 3.0	7.8								Y
U	697.3	12	67	CTTS	- 3.0	7.8	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	697.3	12	67	CTTS	- 3.0	7.8								Y
V	697.3	12	67	CTTS	- 3.0	7.8								Y
VV	697.3	12	67	CTTS	- 3.0	7.8								Y
W	697.3	12	67	CTTS	- 3.0	7.8								
X	697.3	12	67	CTTS	- 3.0	7.8								Y
Y	697.3	12	67	CTTS	- 3.0	7.8								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	698.3	8	28	CTTS	- 3.0	7.0								Y
B	698.3	8	28	CTTS	- 3.0	7.0								Y
C	698.3	8	28	CTTS	- 3.0	7.0	OD		1	< 20.0	CTTS	2.1	1	Y
D	698.3	8	28	CTTS	- 3.0	7.0								Y
E	698.3	8	28	CTTS	- 3.0	7.0								Y
U	698.3	8	28	CTTS	- 3.0	7.0								
UU	698.3	8	28	CTTS	- 3.0	7.0								Y
V	698.3	8	28	CTTS	- 3.0	7.0								
VV	698.3	8	28	CTTS	- 3.0	7.0								Y
W	698.3	8	28	CTTS	- 3.0	7.0								
X	698.3	8	28	CTTS	- 3.0	7.0	OD	WG		13.0	CTTS	2.1	1	Y
Y	698.3	8	28	CTTS	- 3.0	7.0	OD			< 10.0	CTTS			Y
A	699.0	16	57	HL1	-35.0	-15.0								Y
B	699.0	16	57	HL1	-35.0	-15.0								Y
C	699.0	16	57	HL1	-35.0	-15.0								Y
D	699.0	16	57	HL1	-35.0	-15.0								Y
E	699.0	16	57	HL1	-35.0	-15.0								Y
U	699.0	16	57	HL1	-35.0	-15.0								
UU	699.0	16	57	HL1	-35.0	-15.0								Y
V	699.0	16	57	HL1	-35.0	-15.0								Y
VV	699.0	16	57	HL1	-35.0	-15.0								Y
W	699.0	16	57	HL1	-35.0	-15.0								
X	699.0	16	57	HL1	-35.0	-15.0								Y
Y	699.0	16	57	HL1	-35.0	-15.0								Y
A	700.0	23	55	HL3	-12.5	- 2.5								Y
B	700.0	23	55	HL3	-12.5	- 2.5								Y
C	700.0	23	55	HL3	-12.5	- 2.5								Y
D	700.0	23	55	HL3	-12.5	- 2.5								Y
E	700.0	23	55	HL3	-12.5	- 2.5								Y
U	700.0	23	55	HL3	-12.5	- 2.5								
UU	700.0	23	55	HL3	-12.5	- 2.5								
V	700.0	23	55	HL3	-12.5	- 2.5								Y
VV	700.0	23	55	HL3	-12.5	- 2.5								Y
W	700.0	23	55	HL3	-12.5	- 2.5								
X	700.0	23	55	HL3	-12.5	- 2.5								Y
Y	700.0	23	55	HL3	-12.5	- 2.5								Y
A	701.0	14	52	HL5	- 1.9	8.1								Y
B	701.0	14	52	HL5	- 1.9	8.1								Y
C	701.0	14	52	HL5	- 1.9	8.1								Y
D	701.0	14	52	HL5	- 1.9	8.1								Y
E	701.0	14	52	HL5	- 1.9	8.1								Y
U	701.0	14	52	HL5	- 1.9	8.1								
UU	701.0	14	52	HL5	- 1.9	8.1								
V	701.0	14	52	HL5	- 1.9	8.1								Y
VV	701.0	14	52	HL5	- 1.9	8.1								
W	701.0	14	52	HL5	- 1.9	8.1								
X	701.0	14	52	HL5	- 1.9	8.1								Y
Y	701.0	14	52	HL5	- 1.9	8.1	OD			< 10.0	HL5	3.1		Y
A	702.3	12	70	CTTS	- 3.0	6.8								Y
B	702.3	12	70	CTTS	- 3.0	6.8								Y
C	702.3	12	70	CTTS	- 3.0	6.8								Y
D	702.3	12	70	CTTS	- 3.0	6.8	OD		1	< 20.0	CTTS	1.1	1	Y
E	702.3	12	70	CTTS	- 3.0	6.8								Y
U	702.3	12	70	CTTS	- 3.0	6.8	OD	IG	2	< 20.0	CTTS	1.0		Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	702.3	12	70	CTTS	- 3.0	6.8								Y
V	702.3	12	70	CTTS	- 3.0	6.8								Y
VV	702.3	12	70	CTTS	- 3.0	6.8								Y
W	702.3	12	70	CTTS	- 3.0	6.8								
X	702.3	12	70	CTTS	- 3.0	6.8								Y
Y	702.3	12	70	CTTS	- 3.0	6.8	OD			< 10.0	CTTS			Y
A	703.3	13	53	CTTS	- 3.0	6.8								Y
B	703.3	13	53	CTTS	- 3.0	6.8								Y
C	703.3	13	53	CTTS	- 3.0	6.8								Y
D	703.3	13	53	CTTS	- 3.0	6.8	OD			< 20.0	CTTS	1.5		Y
E	703.3	13	53	CTTS	- 3.0	6.8								Y
U	703.3	13	53	CTTS	- 3.0	6.8								
UU	703.3	13	53	CTTS	- 3.0	6.8								
V	703.3	13	53	CTTS	- 3.0	6.8								Y
VV	703.3	13	53	CTTS	- 3.0	6.8								
W	703.3	13	53	CTTS	- 3.0	6.8								
X	703.3	13	53	CTTS	- 3.0	6.8								Y
Y	703.3	13	53	CTTS	- 3.0	6.8								Y
A	704.3	13	44	CTTS	- 3.0	6.0								Y
B	704.3	13	44	CTTS	- 3.0	6.0								Y
C	704.3	13	44	CTTS	- 3.0	6.0								Y
D	704.3	13	44	CTTS	- 3.0	6.0								Y
E	704.3	13	44	CTTS	- 3.0	6.0								Y
U	704.3	13	44	CTTS	- 3.0	6.0								
UU	704.3	13	44	CTTS	- 3.0	6.0								Y
V	704.3	13	44	CTTS	- 3.0	6.0								
VV	704.3	13	44	CTTS	- 3.0	6.0								Y
W	704.3	13	44	CTTS	- 3.0	6.0								
X	704.3	13	44	CTTS	- 3.0	6.0								Y
Y	704.3	13	44	CTTS	- 3.0	6.0	OD			< 10.0	CTTS			Y
A	705.3	13	70	CTTS	- 3.0	6.8								Y
B	705.3	13	70	CTTS	- 3.0	6.8								Y
C	705.3	13	70	CTTS	- 3.0	6.8								Y
D	705.3	13	70	CTTS	- 3.0	6.8								Y
E	705.3	13	70	CTTS	- 3.0	6.8								Y
U	705.3	13	70	CTTS	- 3.0	6.8	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	705.3	13	70	CTTS	- 3.0	6.8								
V	705.3	13	70	CTTS	- 3.0	6.8								Y
VV	705.3	13	70	CTTS	- 3.0	6.8								
W	705.3	13	70	CTTS	- 3.0	6.8								
X	705.3	13	70	CTTS	- 3.0	6.8								Y
Y	705.3	13	70	CTTS	- 3.0	6.8	OD			< 10.0	CTTS			Y
A	706.3	14	41	CTTS	- 3.0	5.0								Y
B	706.3	14	41	CTTS	- 3.0	5.0								Y
C	706.3	14	41	CTTS	- 3.0	5.0								Y
D	706.3	14	41	CTTS	- 3.0	5.0								Y
E	706.3	14	41	CTTS	- 3.0	5.0								Y
U	706.3	14	41	CTTS	- 3.0	5.0	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	706.3	14	41	CTTS	- 3.0	5.0								Y
V	706.3	14	41	CTTS	- 3.0	5.0								Y
VV	706.3	14	41	CTTS	- 3.0	5.0								Y
W	706.3	14	41	CTTS	- 3.0	5.0								
X	706.3	14	41	CTTS	- 3.0	5.0								Y
Y	706.3	14	41	CTTS	- 3.0	5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	707.3	14	43	CTTS	- 3.0	9.5								Y
B	707.3	14	43	CTTS	- 3.0	9.5								Y
C	707.3	14	43	CTTS	- 3.0	9.5								Y
D	707.3	14	43	CTTS	- 3.0	9.5	OD			< 20.0	CTTS	1.5		Y
E	707.3	14	43	CTTS	- 3.0	9.5								Y
U	707.3	14	43	CTTS	- 3.0	9.5								
UU	707.3	14	43	CTTS	- 3.0	9.5			2	6.0	CTTS	0.9		Y
V	707.3	14	43	CTTS	- 3.0	9.5								Y
VV	707.3	14	43	CTTS	- 3.0	9.5								Y
W	707.3	14	43	CTTS	- 3.0	9.5								
X	707.3	14	43	CTTS	- 3.0	9.5								Y
Y	707.3	14	43	CTTS	- 3.0	9.5								Y
A	708.3	14	52	CTTS	- 3.0	9.5								Y
B	708.3	14	52	CTTS	- 3.0	9.5								Y
C	708.3	14	52	CTTS	- 3.0	9.5								Y
D	708.3	14	52	CTTS	- 3.0	9.5	OD			< 20.0	CTTS	0.6		Y
E	708.3	14	52	CTTS	- 3.0	9.5								Y
U	708.3	14	52	CTTS	- 3.0	9.5								
UU	708.3	14	52	CTTS	- 3.0	9.5								Y
V	708.3	14	52	CTTS	- 3.0	9.5	OD	WG	2	< 20.0	CTTS		3	Y
VV	708.3	14	52	CTTS	- 3.0	9.5								Y
W	708.3	14	52	CTTS	- 3.0	9.5								
X	708.3	14	52	CTTS	- 3.0	9.5								Y
Y	708.3	14	52	CTTS	- 3.0	9.5								Y
A	709.3	14	53	CTTS	- 3.0	9.5								Y
B	709.3	14	53	CTTS	- 3.0	9.5								Y
C	709.3	14	53	CTTS	- 3.0	9.5								Y
D	709.3	14	53	CTTS	- 3.0	9.5	OD			< 20.0	CTTS	0.4		Y
E	709.3	14	53	CTTS	- 3.0	9.5								Y
U	709.3	14	53	CTTS	- 3.0	9.5	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	709.3	14	53	CTTS	- 3.0	9.5								Y
V	709.3	14	53	CTTS	- 3.0	9.5	OD	WG	2	< 20.0	CTTS		3	Y
VV	709.3	14	53	CTTS	- 3.0	9.5								Y
W	709.3	14	53	CTTS	- 3.0	9.5								
X	709.3	14	53	CTTS	- 3.0	9.5								Y
Y	709.3	14	53	CTTS	- 3.0	9.5								Y
A	710.3	14	69	CTTS	- 3.0	9.8								Y
B	710.3	14	69	CTTS	- 3.0	9.8								Y
C	710.3	14	69	CTTS	- 3.0	9.8								Y
D	710.3	14	69	CTTS	- 3.0	9.8								Y
E	710.3	14	69	CTTS	- 3.0	9.8								Y
U	710.3	14	69	CTTS	- 3.0	9.8	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	710.3	14	69	CTTS	- 3.0	9.8								
V	710.3	14	69	CTTS	- 3.0	9.8								Y
VV	710.3	14	69	CTTS	- 3.0	9.8								
W	710.3	14	69	CTTS	- 3.0	9.8								
X	710.3	14	69	CTTS	- 3.0	9.8								Y
Y	710.3	14	69	CTTS	- 3.0	9.8	OD		2	20.0	CTTS			Y
A	711.3	20	59	HTTS	- 3.0	7.0								Y
B	711.3	20	59	HTTS	- 3.0	7.0								Y
C	711.3	20	59	HTTS	- 3.0	7.0								Y
D	711.3	20	59	HTTS	- 3.0	7.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	711.3	20	59	HTTS	- 3.0	7.0								Y
U	711.3	20	59	HTTS	- 3.0	7.0								
UU	711.3	20	59	HTTS	- 3.0	7.0								
V	711.3	20	59	HTTS	- 3.0	7.0	OD	WG	2	< 20.0	HTTS		1	Y
VV	711.3	20	59	HTTS	- 3.0	7.0								
W	711.3	20	59	HTTS	- 3.0	7.0								
X	711.3	20	59	HTTS	- 3.0	7.0								Y
Y	711.3	20	59	HTTS	- 3.0	7.0	OD		3	33.0	HTTS			Y
A	712.3	20	62	HTTS	- 3.0	8.0	OD		2	50.0	HTTS	0.7	1	Y
B	712.3	20	62	HTTS	- 3.0	8.0	OD		3	43.0	HTTS	0.7	1	Y
C	712.3	20	62	HTTS	- 3.0	8.0	OD		3	43.0	HTTS	0.5	1	Y
D	712.3	20	62	HTTS	- 3.0	8.0	OD		1	56.0	HTTS	0.6	1	Y
E	712.3	20	62	HTTS	- 3.0	8.0	OD		2	60.0	HTTS	0.5	1	Y
U	712.3	20	62	HTTS	- 3.0	8.0								
UU	712.3	20	62	HTTS	- 3.0	8.0			2	28.0	HTTS	0.8		Y
V	712.3	20	62	HTTS	- 3.0	8.0	OD	WG	2	64.0	HTTS		3	Y
VV	712.3	20	62	HTTS	- 3.0	8.0			2	42.0	HTTS	0.8		Y
W	712.3	20	62	HTTS	- 3.0	8.0								
X	712.3	20	62	HTTS	- 3.0	8.0	OD	WG		32.0	HTTS	0.7	1	Y
Y	712.3	20	62	HTTS	- 3.0	8.0	OD			56.0	HTTS			Y
A	713.3	20	64	HTTS	- 3.0	7.3								Y
B	713.3	20	64	HTTS	- 3.0	7.3								Y
C	713.3	20	64	HTTS	- 3.0	7.3								Y
D	713.3	20	64	HTTS	- 3.0	7.3								Y
E	713.3	20	64	HTTS	- 3.0	7.3								Y
U	713.3	20	64	HTTS	- 3.0	7.3								
UU	713.3	20	64	HTTS	- 3.0	7.3			2	33.0	HTTS	0.4		Y
V	713.3	20	64	HTTS	- 3.0	7.3	OD	WG	2	< 20.0	HTTS		3	Y
VV	713.3	20	64	HTTS	- 3.0	7.3			2	2.0	HTTS	0.4		Y
W	713.3	20	64	HTTS	- 3.0	7.3								
X	713.3	20	64	HTTS	- 3.0	7.3								Y
Y	713.3	20	64	HTTS	- 3.0	7.3	OD		2	44.0	HTTS			Y
A	714.3	21	62	HTTS	- 3.0	8.0	OD		2	35.0	HTTS	0.9	1	Y
B	714.3	21	62	HTTS	- 3.0	8.0	OD		2	43.0	HTTS	0.5	1	Y
C	714.3	21	62	HTTS	- 3.0	8.0	OD		2	38.0	HTTS	0.5	1	Y
D	714.3	21	62	HTTS	- 3.0	8.0	OD		1	46.0	HTTS	1.2	1	Y
E	714.3	21	62	HTTS	- 3.0	8.0	OD		2	38.0	HTTS	0.4	1	Y
U	714.3	21	62	HTTS	- 3.0	8.0								
UU	714.3	21	62	HTTS	- 3.0	8.0			2	56.0	HTTS	0.6		Y
V	714.3	21	62	HTTS	- 3.0	8.0	OD	WG	2	59.0	HTTS		3	Y
VV	714.3	21	62	HTTS	- 3.0	8.0			2	42.0	HTTS	0.6		Y
W	714.3	21	62	HTTS	- 3.0	8.0								
X	714.3	21	62	HTTS	- 3.0	8.0	OD	WG		38.0	HTTS	0.7	1	Y
Y	714.3	21	62	HTTS	- 3.0	8.0	OD			42.0	HTTS			Y
A	715.3	24	60	HTTS	- 3.0	8.0	OD		3	< 20.0	HTTS	0.6	2	Y
B	715.3	24	60	HTTS	- 3.0	8.0								Y
C	715.3	24	60	HTTS	- 3.0	8.0	OD		3	72.0	HTTS	1.0	1	Y
D	715.3	24	60	HTTS	- 3.0	8.0								Y
E	715.3	24	60	HTTS	- 3.0	8.0	OD		2	50.0	HTTS	0.7	1	Y
U	715.3	24	60	HTTS	- 3.0	8.0								
UU	715.3	24	60	HTTS	- 3.0	8.0								
V	715.3	24	60	HTTS	- 3.0	8.0	OD	WG	2	< 20.0	HTTS		3	Y
VV	715.3	24	60	HTTS	- 3.0	8.0								
W	715.3	24	60	HTTS	- 3.0	8.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	715.3	24	60	HTTS	- 3.0	8.0								Y
Y	715.3	24	60	HTTS	- 3.0	8.0	OD		2	58.0	HTTS			Y
A	716.3	4	25	CTTS	- 3.0	6.5								Y
B	716.3	4	25	CTTS	- 3.0	6.5								Y
C	716.3	4	25	CTTS	- 3.0	6.5								Y
D	716.3	4	25	CTTS	- 3.0	6.5								Y
E	716.3	4	25	CTTS	- 3.0	6.5								Y
U	716.3	4	25	CTTS	- 3.0	6.5								Y
UU	716.3	4	25	CTTS	- 3.0	6.5								Y
V	716.3	4	25	CTTS	- 3.0	6.5								
VV	716.3	4	25	CTTS	- 3.0	6.5								Y
W	716.3	4	25	CTTS	- 3.0	6.5								
X	716.3	4	25	CTTS	- 3.0	6.5								Y
Y	716.3	4	25	CTTS	- 3.0	6.5								Y
A	717.3	4	63	CTTS	- 3.0	7.0								Y
B	717.3	4	63	CTTS	- 3.0	7.0								Y
C	717.3	4	63	CTTS	- 3.0	7.0								Y
D	717.3	4	63	CTTS	- 3.0	7.0								Y
E	717.3	4	63	CTTS	- 3.0	7.0								Y
U	717.3	4	63	CTTS	- 3.0	7.0								
UU	717.3	4	63	CTTS	- 3.0	7.0								
V	717.3	4	63	CTTS	- 3.0	7.0								
VV	717.3	4	63	CTTS	- 3.0	7.0								
W	717.3	4	63	CTTS	- 3.0	7.0								
X	717.3	4	63	CTTS	- 3.0	7.0								Y
Y	717.3	4	63	CTTS	- 3.0	7.0								Y
A	718.3	15	69	CTTS	- 3.0	9.8								Y
B	718.3	15	69	CTTS	- 3.0	9.8								Y
C	718.3	15	69	CTTS	- 3.0	9.8								Y
D	718.3	15	69	CTTS	- 3.0	9.8								Y
E	718.3	15	69	CTTS	- 3.0	9.8								Y
U	718.3	15	69	CTTS	- 3.0	9.8	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	718.3	15	69	CTTS	- 3.0	9.8								
V	718.3	15	69	CTTS	- 3.0	9.8								Y
VV	718.3	15	69	CTTS	- 3.0	9.8								
W	718.3	15	69	CTTS	- 3.0	9.8								
X	718.3	15	69	CTTS	- 3.0	9.8								Y
Y	718.3	15	69	CTTS	- 3.0	9.8	OD			< 10.0	CTTS			Y
A	719.3	15	70	CTTS	- 3.0	9.8								Y
B	719.3	15	70	CTTS	- 3.0	9.8								Y
C	719.3	15	70	CTTS	- 3.0	9.8								Y
D	719.3	15	70	CTTS	- 3.0	9.8								Y
E	719.3	15	70	CTTS	- 3.0	9.8								Y
U	719.3	15	70	CTTS	- 3.0	9.8	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	719.3	15	70	CTTS	- 3.0	9.8								
V	719.3	15	70	CTTS	- 3.0	9.8								Y
VV	719.3	15	70	CTTS	- 3.0	9.8								
W	719.3	15	70	CTTS	- 3.0	9.8								
X	719.3	15	70	CTTS	- 3.0	9.8								Y
Y	719.3	15	70	CTTS	- 3.0	9.8	OD			< 10.0	CTTS			Y
A	720.3	16	35	CTTS	- 3.0	6.3								Y
B	720.3	16	35	CTTS	- 3.0	6.3								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	720.3	16	35	CTTS	- 3.0	6.3								Y
D	720.3	16	35	CTTS	- 3.0	6.3								Y
E	720.3	16	35	CTTS	- 3.0	6.3								Y
U	720.3	16	35	CTTS	- 3.0	6.3	OD	IG	2	< 20.0	CTTS	1.0		Y
U	720.3	16	35	CTTS	- 3.0	6.3	OD	W	2	< 20.0	CTTS	6.0		Y
UU	720.3	16	35	CTTS	- 3.0	6.3								Y
V	720.3	16	35	CTTS	- 3.0	6.3								Y
VV	720.3	16	35	CTTS	- 3.0	6.3								Y
W	720.3	16	35	CTTS	- 3.0	6.3								
X	720.3	16	35	CTTS	- 3.0	6.3								Y
Y	720.3	16	35	CTTS	- 3.0	6.3								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	721.3	21	61	HTTS	- 3.0	7.0	OD		2	32.0	HTTS	0.5	1	Y
B	721.3	21	61	HTTS	- 3.0	7.0	OD		2	< 20.0	HTTS	0.3	1	Y
C	721.3	21	61	HTTS	- 3.0	7.0	OD		1	22.0	HTTS	1.0	1	Y
D	721.3	21	61	HTTS	- 3.0	7.0	OD		1	29.0	HTTS	1.1	1	Y
E	721.3	21	61	HTTS	- 3.0	7.0	OD		1	24.0	HTTS	0.7	1	Y
U	721.3	21	61	HTTS	- 3.0	7.0								
UU	721.3	21	61	HTTS	- 3.0	7.0								
V	721.3	21	61	HTTS	- 3.0	7.0	OD	WG	2	29.0	HTTS		1	Y
VV	721.3	21	61	HTTS	- 3.0	7.0								
W	721.3	21	61	HTTS	- 3.0	7.0								
X	721.3	21	61	HTTS	- 3.0	7.0	OD	WG		27.0	HTTS	0.0	1	Y
Y	721.3	21	61	HTTS	- 3.0	7.0	OD			< 10.0	HTTS			Y
Y	721.3	21	61	HTTS	- 3.0	7.0	OD			36.0	HTTS			Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	722.3	21	70	HTTS	- 3.0	8.3	OD		2	60.0	HTTS	0.7	1	Y
B	722.3	21	70	HTTS	- 3.0	8.3	OD		2	60.0	HTTS	0.0	1	Y
C	722.3	21	70	HTTS	- 3.0	8.3	OD		2	57.0	HTTS	0.8	1	Y
D	722.3	21	70	HTTS	- 3.0	8.3	OD		1	69.0	HTTS	0.8	1	Y
E	722.3	21	70	HTTS	- 3.0	8.3	OD		1	67.0	HTTS	0.8	1	Y
U	722.3	21	70	HTTS	- 3.0	8.3								
UU	722.3	21	70	HTTS	- 3.0	8.3								
V	722.3	21	70	HTTS	- 3.0	8.3	OD	WG	1	40.0	HTTS		UT	Y
VV	722.3	21	70	HTTS	- 3.0	8.3								
W	722.3	21	70	HTTS	- 3.0	8.3								
X	722.3	21	70	HTTS	- 3.0	8.3								Y
Y	722.3	21	70	HTTS	- 3.0	8.3	OD		2	20.0	HTTS			Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	723.3	22	66	HTTS	- 3.0	7.0	OD		1	58.0	HTTS	0.7	1	Y
B	723.3	22	66	HTTS	- 3.0	7.0	OD		2	54.0	HTTS	0.0	5	Y
C	723.3	22	66	HTTS	- 3.0	7.0	OD		1	56.0	HTTS	1.1	1	Y
D	723.3	22	66	HTTS	- 3.0	7.0	OD		1	59.0	HTTS	1.4	1	Y
E	723.3	22	66	HTTS	- 3.0	7.0	OD		1	58.0	HTTS	0.9	1	Y
U	723.3	22	66	HTTS	- 3.0	7.0								
UU	723.3	22	66	HTTS	- 3.0	7.0								
V	723.3	22	66	HTTS	- 3.0	7.0	OD	WG	2	61.0	HTTS		3	Y
VV	723.3	22	66	HTTS	- 3.0	7.0								
W	723.3	22	66	HTTS	- 3.0	7.0								
X	723.3	22	66	HTTS	- 3.0	7.0	OD	WG		45.0	HTTS	0.0	1	Y
Y	723.3	22	66	HTTS	- 3.0	7.0	OD			57.0	HTTS			Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	724.3	5	26	CTTS	- 3.0	8.0								Y
B	724.3	5	26	CTTS	- 3.0	8.0								Y
C	724.3	5	26	CTTS	- 3.0	8.0								Y
D	724.3	5	26	CTTS	- 3.0	8.0								Y
E	724.3	5	26	CTTS	- 3.0	8.0								Y
U	724.3	5	26	CTTS	- 3.0	8.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	724.3	5	26	CTTS	- 3.0	8.0			2	57.0	CTTS	0.1		Y
V	724.3	5	26	CTTS	- 3.0	8.0								
VV	724.3	5	26	CTTS	- 3.0	8.0			3	34.0	CTTS	0.1		Y
W	724.3	5	26	CTTS	- 3.0	8.0								
X	724.3	5	26	CTTS	- 3.0	8.0								Y
Y	724.3	5	26	CTTS	- 3.0	8.0								Y
A	725.3	8	44	CTTS	- 3.0	10.1								Y
B	725.3	8	44	CTTS	- 3.0	10.1								Y
C	725.3	8	44	CTTS	- 3.0	10.1								Y
D	725.3	8	44	CTTS	- 3.0	10.1								Y
E	725.3	8	44	CTTS	- 3.0	10.1								Y
U	725.3	8	44	CTTS	- 3.0	10.1								
UU	725.3	8	44	CTTS	- 3.0	10.1								Y
V	725.3	8	44	CTTS	- 3.0	10.1								
VV	725.3	8	44	CTTS	- 3.0	10.1								Y
W	725.3	8	44	CTTS	- 3.0	10.1								
X	725.3	8	44	CTTS	- 3.0	10.1								Y
Y	725.3	8	44	CTTS	- 3.0	10.1								Y
A	726.3	9	59	CTTS	- 3.0	7.5								Y
B	726.3	9	59	CTTS	- 3.0	7.5								Y
C	726.3	9	59	CTTS	- 3.0	7.5								Y
D	726.3	9	59	CTTS	- 3.0	7.5								Y
E	726.3	9	59	CTTS	- 3.0	7.5								Y
U	726.3	9	59	CTTS	- 3.0	7.5								
UU	726.3	9	59	CTTS	- 3.0	7.5								Y
V	726.3	9	59	CTTS	- 3.0	7.5								
VV	726.3	9	59	CTTS	- 3.0	7.5								Y
W	726.3	9	59	CTTS	- 3.0	7.5								
X	726.3	9	59	CTTS	- 3.0	7.5								Y
Y	726.3	9	59	CTTS	- 3.0	7.5								Y
A	727.3	10	46	CTTS	- 3.0	7.3								Y
B	727.3	10	46	CTTS	- 3.0	7.3								Y
C	727.3	10	46	CTTS	- 3.0	7.3								Y
D	727.3	10	46	CTTS	- 3.0	7.3								Y
E	727.3	10	46	CTTS	- 3.0	7.3								Y
U	727.3	10	46	CTTS	- 3.0	7.3								
UU	727.3	10	46	CTTS	- 3.0	7.3								Y
V	727.3	10	46	CTTS	- 3.0	7.3								Y
VV	727.3	10	46	CTTS	- 3.0	7.3								Y
W	727.3	10	46	CTTS	- 3.0	7.3								
X	727.3	10	46	CTTS	- 3.0	7.3								Y
Y	727.3	10	46	CTTS	- 3.0	7.3								Y
A	728.3	11	54	CTTS	12.0	22.0								Y
B	728.3	11	54	CTTS	12.0	22.0								Y
C	728.3	11	54	CTTS	12.0	22.0								Y
D	728.3	11	54	CTTS	12.0	22.0								Y
E	728.3	11	54	CTTS	12.0	22.0								Y
U	728.3	11	54	CTTS	12.0	22.0								
UU	728.3	11	54	CTTS	12.0	22.0			2	3.0	CTTS	17.5		Y
V	728.3	11	54	CTTS	12.0	22.0								
VV	728.3	11	54	CTTS	12.0	22.0								Y
W	728.3	11	54	CTTS	12.0	22.0								
X	728.3	11	54	CTTS	12.0	22.0								Y
Y	728.3	11	54	CTTS	12.0	22.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	729.3	12	54	CTTS	- 3.0	10.0								Y
B	729.3	12	54	CTTS	- 3.0	10.0								Y
C	729.3	12	54	CTTS	- 3.0	10.0								Y
D	729.3	12	54	CTTS	- 3.0	10.0								Y
E	729.3	12	54	CTTS	- 3.0	10.0								Y
U	729.3	12	54	CTTS	- 3.0	10.0								
UU	729.3	12	54	CTTS	- 3.0	10.0								
V	729.3	12	54	CTTS	- 3.0	10.0	OD	WG	2	< 20.0	CTTS		3	Y
VV	729.3	12	54	CTTS	- 3.0	10.0								
W	729.3	12	54	CTTS	- 3.0	10.0								
X	729.3	12	54	CTTS	- 3.0	10.0								Y
Y	729.3	12	54	CTTS	- 3.0	10.0								Y
A	730.3	12	57	CTTS	- 3.0	10.3								Y
B	730.3	12	57	CTTS	- 3.0	10.3								Y
C	730.3	12	57	CTTS	- 3.0	10.3								Y
D	730.3	12	57	CTTS	- 3.0	10.3								Y
E	730.3	12	57	CTTS	- 3.0	10.3								Y
U	730.3	12	57	CTTS	- 3.0	10.3								
UU	730.3	12	57	CTTS	- 3.0	10.3								
V	730.3	12	57	CTTS	- 3.0	10.3								Y
VV	730.3	12	57	CTTS	- 3.0	10.3								
W	730.3	12	57	CTTS	- 3.0	10.3								
X	730.3	12	57	CTTS	- 3.0	10.3								Y
Y	730.3	12	57	CTTS	- 3.0	10.3								Y
A	731.3	13	41	CTTS	- 3.0	10.0								Y
B	731.3	13	41	CTTS	- 3.0	10.0								Y
C	731.3	13	41	CTTS	- 3.0	10.0								Y
D	731.3	13	41	CTTS	- 3.0	10.0								Y
E	731.3	13	41	CTTS	- 3.0	10.0								Y
U	731.3	13	41	CTTS	- 3.0	10.0								
UU	731.3	13	41	CTTS	- 3.0	10.0								Y
V	731.3	13	41	CTTS	- 3.0	10.0								
VV	731.3	13	41	CTTS	- 3.0	10.0								Y
W	731.3	13	41	CTTS	- 3.0	10.0								
X	731.3	13	41	CTTS	- 3.0	10.0								Y
Y	731.3	13	41	CTTS	- 3.0	10.0								Y
A	732.3	14	55	CTTS	- 3.0	7.8								Y
B	732.3	14	55	CTTS	- 3.0	7.8								Y
C	732.3	14	55	CTTS	- 3.0	7.8								Y
D	732.3	14	55	CTTS	- 3.0	7.8								Y
E	732.3	14	55	CTTS	- 3.0	7.8								Y
U	732.3	14	55	CTTS	- 3.0	7.8								
UU	732.3	14	55	CTTS	- 3.0	7.8								Y
V	732.3	14	55	CTTS	- 3.0	7.8								Y
VV	732.3	14	55	CTTS	- 3.0	7.8								Y
W	732.3	14	55	CTTS	- 3.0	7.8								
X	732.3	14	55	CTTS	- 3.0	7.8								Y
Y	732.3	14	55	CTTS	- 3.0	7.8								Y
A	733.3	14	57	CTTS	- 3.0	8.0								Y
B	733.3	14	57	CTTS	- 3.0	8.0								Y
C	733.3	14	57	CTTS	- 3.0	8.0								Y
D	733.3	14	57	CTTS	- 3.0	8.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	733.3	14	57	CTTS	- 3.0	8.0								Y
U	733.3	14	57	CTTS	- 3.0	8.0								
UU	733.3	14	57	CTTS	- 3.0	8.0								Y
V	733.3	14	57	CTTS	- 3.0	8.0								Y
VV	733.3	14	57	CTTS	- 3.0	8.0								Y
W	733.3	14	57	CTTS	- 3.0	8.0								
X	733.3	14	57	CTTS	- 3.0	8.0								Y
Y	733.3	14	57	CTTS	- 3.0	8.0								Y
A	735.3	14	72	CTTS	- 3.0	7.8								Y
B	735.3	14	72	CTTS	- 3.0	7.8								Y
C	735.3	14	72	CTTS	- 3.0	7.8								Y
D	735.3	14	72	CTTS	- 3.0	7.8								Y
E	735.3	14	72	CTTS	- 3.0	7.8								Y
U	735.3	14	72	CTTS	- 3.0	7.8	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	735.3	14	72	CTTS	- 3.0	7.8								Y
V	735.3	14	72	CTTS	- 3.0	7.8								Y
VV	735.3	14	72	CTTS	- 3.0	7.8								Y
W	735.3	14	72	CTTS	- 3.0	7.8								
X	735.3	14	72	CTTS	- 3.0	7.8								Y
Y	735.3	14	72	CTTS	- 3.0	7.8								Y
A	736.3	15	33	CTTS	- 3.0	7.5								Y
B	736.3	15	33	CTTS	- 3.0	7.5								Y
C	736.3	15	33	CTTS	- 3.0	7.5								Y
D	736.3	15	33	CTTS	- 3.0	7.5								Y
E	736.3	15	33	CTTS	- 3.0	7.5								Y
U	736.3	15	33	CTTS	- 3.0	7.5	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	736.3	15	33	CTTS	- 3.0	7.5								Y
V	736.3	15	33	CTTS	- 3.0	7.5								Y
VV	736.3	15	33	CTTS	- 3.0	7.5								Y
W	736.3	15	33	CTTS	- 3.0	7.5								
X	736.3	15	33	CTTS	- 3.0	7.5								Y
Y	736.3	15	33	CTTS	- 3.0	7.5								Y
A	738.3	15	37	CTTS	- 3.0	11.0								Y
B	738.3	15	37	CTTS	- 3.0	11.0								Y
C	738.3	15	37	CTTS	- 3.0	11.0								Y
D	738.3	15	37	CTTS	- 3.0	11.0								Y
E	738.3	15	37	CTTS	- 3.0	11.0								Y
U	738.3	15	37	CTTS	- 3.0	11.0								
UU	738.3	15	37	CTTS	- 3.0	11.0								Y
V	738.3	15	37	CTTS	- 3.0	11.0								
VV	738.3	15	37	CTTS	- 3.0	11.0								Y
W	738.3	15	37	CTTS	- 3.0	11.0								
X	738.3	15	37	CTTS	- 3.0	11.0								Y
Y	738.3	15	37	CTTS	- 3.0	11.0								Y
A	739.3	15	63	CTTS	- 3.0	8.0								Y
B	739.3	15	63	CTTS	- 3.0	8.0								Y
C	739.3	15	63	CTTS	- 3.0	8.0								Y
D	739.3	15	63	CTTS	- 3.0	8.0								Y
E	739.3	15	63	CTTS	- 3.0	8.0								Y
U	739.3	15	63	CTTS	- 3.0	8.0								Y
UU	739.3	15	63	CTTS	- 3.0	8.0								
V	739.3	15	63	CTTS	- 3.0	8.0	OD	WG	2	< 20.0	CTTS		3	Y
VV	739.3	15	63	CTTS	- 3.0	8.0								
W	739.3	15	63	CTTS	- 3.0	8.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	739.3	15	63	CTTS	- 3.0	8.0								Y
Y	739.3	15	63	CTTS	- 3.0	8.0								Y
A	740.3	15	66	CTTS	- 3.0	10.1								Y
B	740.3	15	66	CTTS	- 3.0	10.1								Y
C	740.3	15	66	CTTS	- 3.0	10.1								Y
D	740.3	15	66	CTTS	- 3.0	10.1								Y
E	740.3	15	66	CTTS	- 3.0	10.1								Y
U	740.3	15	66	CTTS	- 3.0	10.1	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	740.3	15	66	CTTS	- 3.0	10.1								
V	740.3	15	66	CTTS	- 3.0	10.1								Y
VV	740.3	15	66	CTTS	- 3.0	10.1								
W	740.3	15	66	CTTS	- 3.0	10.1								
X	740.3	15	66	CTTS	- 3.0	10.1								Y
Y	740.3	15	66	CTTS	- 3.0	10.1								Y
A	741.3	16	32	CTTS	- 3.0	10.0								Y
B	741.3	16	32	CTTS	- 3.0	10.0								Y
C	741.3	16	32	CTTS	- 3.0	10.0								Y
D	741.3	16	32	CTTS	- 3.0	10.0								Y
E	741.3	16	32	CTTS	- 3.0	10.0								Y
U	741.3	16	32	CTTS	- 3.0	10.0	OD	W	2	< 20.0	CTTS	3.0		Y
UU	741.3	16	32	CTTS	- 3.0	10.0								Y
V	741.3	16	32	CTTS	- 3.0	10.0								Y
VV	741.3	16	32	CTTS	- 3.0	10.0								Y
W	741.3	16	32	CTTS	- 3.0	10.0								
X	741.3	16	32	CTTS	- 3.0	10.0								Y
Y	741.3	16	32	CTTS	- 3.0	10.0								Y
A	742.3	16	36	CTTS	- 3.0	8.0								Y
B	742.3	16	36	CTTS	- 3.0	8.0								Y
C	742.3	16	36	CTTS	- 3.0	8.0								Y
D	742.3	16	36	CTTS	- 3.0	8.0								Y
E	742.3	16	36	CTTS	- 3.0	8.0								
U	742.3	16	36	CTTS	- 3.0	8.0	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	742.3	16	36	CTTS	- 3.0	8.0								Y
V	742.3	16	36	CTTS	- 3.0	8.0								Y
VV	742.3	16	36	CTTS	- 3.0	8.0								Y
W	742.3	16	36	CTTS	- 3.0	8.0								
X	742.3	16	36	CTTS	- 3.0	8.0								Y
Y	742.3	16	36	CTTS	- 3.0	8.0								Y
A	743.3	16	37	CTTS	- 3.0	8.0								Y
B	743.3	16	37	CTTS	- 3.0	8.0								Y
C	743.3	16	37	CTTS	- 3.0	8.0								Y
D	743.3	16	37	CTTS	- 3.0	8.0								Y
E	743.3	16	37	CTTS	- 3.0	8.0								Y
U	743.3	16	37	CTTS	- 3.0	8.0	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	743.3	16	37	CTTS	- 3.0	8.0								Y
V	743.3	16	37	CTTS	- 3.0	8.0								Y
VV	743.3	16	37	CTTS	- 3.0	8.0			3		CTTS	2.1		Y
W	743.3	16	37	CTTS	- 3.0	8.0								
X	743.3	16	37	CTTS	- 3.0	8.0								Y
Y	743.3	16	37	CTTS	- 3.0	8.0								Y
A	746.3	16	45	CTTS	- 3.0	8.0								Y
B	746.3	16	45	CTTS	- 3.0	8.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	746.3	16	45	CTTS	- 3.0	8.0								Y
D	746.3	16	45	CTTS	- 3.0	8.0								Y
E	746.3	16	45	CTTS	- 3.0	8.0								Y
U	746.3	16	45	CTTS	- 3.0	8.0								
UU	746.3	16	45	CTTS	- 3.0	8.0								Y
V	746.3	16	45	CTTS	- 3.0	8.0	OD	WG	2	20.0	CTTS		3	Y
VV	746.3	16	45	CTTS	- 3.0	8.0			3	11.0	CTTS	2.3		Y
W	746.3	16	45	CTTS	- 3.0	8.0								
X	746.3	16	45	CTTS	- 3.0	8.0								Y
Y	746.3	16	45	CTTS	- 3.0	8.0	OD		1	20.0	CTTS			Y
A	747.3	16	60	CTTS	- 3.0	10.0								Y
B	747.3	16	60	CTTS	- 3.0	10.0								Y
C	747.3	16	60	CTTS	- 3.0	10.0								Y
D	747.3	16	60	CTTS	- 3.0	10.0								Y
E	747.3	16	60	CTTS	- 3.0	10.0								Y
U	747.3	16	60	CTTS	- 3.0	10.0								
UU	747.3	16	60	CTTS	- 3.0	10.0								Y
V	747.3	16	60	CTTS	- 3.0	10.0								Y
VV	747.3	16	60	CTTS	- 3.0	10.0								Y
W	747.3	16	60	CTTS	- 3.0	10.0								
X	747.3	16	60	CTTS	- 3.0	10.0								Y
Y	747.3	16	60	CTTS	- 3.0	10.0								Y
A	748.3	16	62	CTTS	- 3.0	10.0								Y
B	748.3	16	62	CTTS	- 3.0	10.0								Y
C	748.3	16	62	CTTS	- 3.0	10.0								Y
D	748.3	16	62	CTTS	- 3.0	10.0								Y
E	748.3	16	62	CTTS	- 3.0	10.0								Y
U	748.3	16	62	CTTS	- 3.0	10.0								
UU	748.3	16	62	CTTS	- 3.0	10.0								
V	748.3	16	62	CTTS	- 3.0	10.0								Y
VV	748.3	16	62	CTTS	- 3.0	10.0								
W	748.3	16	62	CTTS	- 3.0	10.0								
X	748.3	16	62	CTTS	- 3.0	10.0								Y
Y	748.3	16	62	CTTS	- 3.0	10.0								Y
A	749.3	16	63	CTTS	- 3.0	8.5								Y
B	749.3	16	63	CTTS	- 3.0	8.5								Y
C	749.3	16	63	CTTS	- 3.0	8.5	OD		1	39.0	CTTS	0.8	1	Y
D	749.3	16	63	CTTS	- 3.0	8.5								Y
E	749.3	16	63	CTTS	- 3.0	8.5								Y
U	749.3	16	63	CTTS	- 3.0	8.5								
UU	749.3	16	63	CTTS	- 3.0	8.5								
V	749.3	16	63	CTTS	- 3.0	8.5								Y
VV	749.3	16	63	CTTS	- 3.0	8.5								
W	749.3	16	63	CTTS	- 3.0	8.5								
X	749.3	16	63	CTTS	- 3.0	8.5								Y
Y	749.3	16	63	CTTS	- 3.0	8.5								Y
A	750.3	17	32	CTTS	- 3.0	8.0								Y
B	750.3	17	32	CTTS	- 3.0	8.0								Y
C	750.3	17	32	CTTS	- 3.0	8.0								Y
D	750.3	17	32	CTTS	- 3.0	8.0								Y
E	750.3	17	32	CTTS	- 3.0	8.0								Y
U	750.3	17	32	CTTS	- 3.0	8.0	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	750.3	17	32	CTTS	- 3.0	8.0								Y
V	750.3	17	32	CTTS	- 3.0	8.0	OD	WG	2	26.0	CTTS		3	Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	750.3	17	32	CTTS	- 3.0	8.0			3		CTTS	1.7		Y
W	750.3	17	32	CTTS	- 3.0	8.0								
X	750.3	17	32	CTTS	- 3.0	8.0								Y
Y	750.3	17	32	CTTS	- 3.0	8.0								Y
A	751.3	17	34	CTTS	- 3.0	8.0								Y
B	751.3	17	34	CTTS	- 3.0	8.0								Y
C	751.3	17	34	CTTS	- 3.0	8.0								Y
D	751.3	17	34	CTTS	- 3.0	8.0								Y
E	751.3	17	34	CTTS	- 3.0	8.0								Y
U	751.3	17	34	CTTS	- 3.0	8.0	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	751.3	17	34	CTTS	- 3.0	8.0								Y
V	751.3	17	34	CTTS	- 3.0	8.0								Y
VV	751.3	17	34	CTTS	- 3.0	8.0								Y
W	751.3	17	34	CTTS	- 3.0	8.0								
X	751.3	17	34	CTTS	- 3.0	8.0								Y
Y	751.3	17	34	CTTS	- 3.0	8.0								Y
A	752.3	17	35	CTTS	- 3.0	8.0								Y
B	752.3	17	35	CTTS	- 3.0	8.0								Y
C	752.3	17	35	CTTS	- 3.0	8.0	OD		2	< 20.0	CTTS	2.7	1	Y
D	752.3	17	35	CTTS	- 3.0	8.0	OD			< 20.0	CTTS	3.3		Y
E	752.3	17	35	CTTS	- 3.0	8.0								Y
U	752.3	17	35	CTTS	- 3.0	8.0								
UU	752.3	17	35	CTTS	- 3.0	8.0								Y
V	752.3	17	35	CTTS	- 3.0	8.0								
VV	752.3	17	35	CTTS	- 3.0	8.0								Y
W	752.3	17	35	CTTS	- 3.0	8.0								
X	752.3	17	35	CTTS	- 3.0	8.0	OD	WG		7.0	CTTS	2.5	1	Y
Y	752.3	17	35	CTTS	- 3.0	8.0	OD			< 10.0	CTTS			Y
A	753.3	17	51	CTTS	- 3.0	10.0								Y
B	753.3	17	51	CTTS	- 3.0	10.0								Y
C	753.3	17	51	CTTS	- 3.0	10.0								Y
D	753.3	17	51	CTTS	- 3.0	10.0								Y
E	753.3	17	51	CTTS	- 3.0	10.0								Y
U	753.3	17	51	CTTS	- 3.0	10.0								
UU	753.3	17	51	CTTS	- 3.0	10.0								Y
V	753.3	17	51	CTTS	- 3.0	10.0								Y
VV	753.3	17	51	CTTS	- 3.0	10.0			3	28.0	CTTS	3.8		Y
W	753.3	17	51	CTTS	- 3.0	10.0								
X	753.3	17	51	CTTS	- 3.0	10.0								Y
Y	753.3	17	51	CTTS	- 3.0	10.0								Y
A	754.3	17	53	CTTS	- 3.0	8.3								Y
B	754.3	17	53	CTTS	- 3.0	8.3								Y
C	754.3	17	53	CTTS	- 3.0	8.3								Y
D	754.3	17	53	CTTS	- 3.0	8.3								Y
E	754.3	17	53	CTTS	- 3.0	8.3								Y
U	754.3	17	53	CTTS	- 3.0	8.3								
UU	754.3	17	53	CTTS	- 3.0	8.3								
V	754.3	17	53	CTTS	- 3.0	8.3	OD	WG	2	< 20.0	CTTS		1	Y
VV	754.3	17	53	CTTS	- 3.0	8.3								
W	754.3	17	53	CTTS	- 3.0	8.3								
X	754.3	17	53	CTTS	- 3.0	8.3								Y
Y	754.3	17	53	CTTS	- 3.0	8.3								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	755.3	17	55	CTTS	- 3.0	8.0								Y
B	755.3	17	55	CTTS	- 3.0	8.0								Y
C	755.3	17	55	CTTS	- 3.0	8.0								Y
D	755.3	17	55	CTTS	- 3.0	8.0								Y
E	755.3	17	55	CTTS	- 3.0	8.0								Y
U	755.3	17	55	CTTS	- 3.0	8.0								
UU	755.3	17	55	CTTS	- 3.0	8.0								Y
V	755.3	17	55	CTTS	- 3.0	8.0	OD	WG	3	< 20.0	CTTS		3	Y
VV	755.3	17	55	CTTS	- 3.0	8.0								Y
W	755.3	17	55	CTTS	- 3.0	8.0								
X	755.3	17	55	CTTS	- 3.0	8.0								Y
Y	755.3	17	55	CTTS	- 3.0	8.0								Y
A	756.3	17	64	CTTS	- 3.0	8.5								Y
B	756.3	17	64	CTTS	- 3.0	8.5								Y
C	756.3	17	64	CTTS	- 3.0	8.5								Y
D	756.3	17	64	CTTS	- 3.0	8.5								Y
E	756.3	17	64	CTTS	- 3.0	8.5								Y
U	756.3	17	64	CTTS	- 3.0	8.5								
UU	756.3	17	64	CTTS	- 3.0	8.5								
V	756.3	17	64	CTTS	- 3.0	8.5								Y
VV	756.3	17	64	CTTS	- 3.0	8.5								
W	756.3	17	64	CTTS	- 3.0	8.5								
X	756.3	17	64	CTTS	- 3.0	8.5								Y
Y	756.3	17	64	CTTS	- 3.0	8.5	OD			18.0	CTTS			Y
A	757.3	17	69	CTTS	- 3.0	7.5								Y
B	757.3	17	69	CTTS	- 3.0	7.5								Y
C	757.3	17	69	CTTS	- 3.0	7.5								Y
D	757.3	17	69	CTTS	- 3.0	7.5	OD			< 20.0	CTTS			Y
E	757.3	17	69	CTTS	- 3.0	7.5								Y
U	757.3	17	69	CTTS	- 3.0	7.5	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	757.3	17	69	CTTS	- 3.0	7.5								
V	757.3	17	69	CTTS	- 3.0	7.5	OD	WG	2	< 20.0	CTTS		3	Y
VV	757.3	17	69	CTTS	- 3.0	7.5								
W	757.3	17	69	CTTS	- 3.0	7.5								
X	757.3	17	69	CTTS	- 3.0	7.5								Y
Y	757.3	17	69	CTTS	- 3.0	7.5	OD			10.0	CTTS			Y
A	758.3	17	70	CTTS	- 3.0	10.0								Y
B	758.3	17	70	CTTS	- 3.0	10.0								Y
C	758.3	17	70	CTTS	- 3.0	10.0								Y
D	758.3	17	70	CTTS	- 3.0	10.0								Y
E	758.3	17	70	CTTS	- 3.0	10.0								Y
U	758.3	17	70	CTTS	- 3.0	10.0	OD	IG	2	< 20.0	CTTS	1.0		Y
U	758.3	17	70	CTTS	- 3.0	10.0	OD	W	2	< 20.0	CTTS	2.0		Y
UU	758.3	17	70	CTTS	- 3.0	10.0								
V	758.3	17	70	CTTS	- 3.0	10.0	OD	WG	2	< 20.0	CTTS		3	Y
VV	758.3	17	70	CTTS	- 3.0	10.0								
W	758.3	17	70	CTTS	- 3.0	10.0								
X	758.3	17	70	CTTS	- 3.0	10.0								Y
Y	758.3	17	70	CTTS	- 3.0	10.0								Y
A	759.3	18	31	CTTS	- 3.0	6.5								Y
B	759.3	18	31	CTTS	- 3.0	6.5								Y
C	759.3	18	31	CTTS	- 3.0	6.5								Y
D	759.3	18	31	CTTS	- 3.0	6.5								Y
E	759.3	18	31	CTTS	- 3.0	6.5								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
U	759.3	18	31	CTTS	- 3.0	6.5	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	759.3	18	31	CTTS	- 3.0	6.5								Y
V	759.3	18	31	CTTS	- 3.0	6.5								Y
VV	759.3	18	31	CTTS	- 3.0	6.5								Y
W	759.3	18	31	CTTS	- 3.0	6.5								
X	759.3	18	31	CTTS	- 3.0	6.5								Y
Y	759.3	18	31	CTTS	- 3.0	6.5								Y
A	760.3	18	34	CTTS	- 3.0	7.5								Y
B	760.3	18	34	CTTS	- 3.0	7.5								Y
C	760.3	18	34	CTTS	- 3.0	7.5								Y
D	760.3	18	34	CTTS	- 3.0	7.5								Y
E	760.3	18	34	CTTS	- 3.0	7.5								Y
U	760.3	18	34	CTTS	- 3.0	7.5	OD	IG	3		CTTS	1.0		Y
UU	760.3	18	34	CTTS	- 3.0	7.5								Y
V	760.3	18	34	CTTS	- 3.0	7.5								
VV	760.3	18	34	CTTS	- 3.0	7.5								Y
W	760.3	18	34	CTTS	- 3.0	7.5								
X	760.3	18	34	CTTS	- 3.0	7.5								Y
Y	760.3	18	34	CTTS	- 3.0	7.5								Y
A	761.3	18	53	CTTS	- 3.0	10.0								Y
B	761.3	18	53	CTTS	- 3.0	10.0								Y
C	761.3	18	53	CTTS	- 3.0	10.0								Y
D	761.3	18	53	CTTS	- 3.0	10.0								Y
E	761.3	18	53	CTTS	- 3.0	10.0								Y
U	761.3	18	53	CTTS	- 3.0	10.0								
UU	761.3	18	53	CTTS	- 3.0	10.0								
V	761.3	18	53	CTTS	- 3.0	10.0								Y
VV	761.3	18	53	CTTS	- 3.0	10.0								
W	761.3	18	53	CTTS	- 3.0	10.0								
X	761.3	18	53	CTTS	- 3.0	10.0								Y
Y	761.3	18	53	CTTS	- 3.0	10.0								Y
A	762.3	18	68	CTTS	- 3.0	7.5								Y
B	762.3	18	68	CTTS	- 3.0	7.5								Y
C	762.3	18	68	CTTS	- 3.0	7.5								Y
D	762.3	18	68	CTTS	- 3.0	7.5								Y
E	762.3	18	68	CTTS	- 3.0	7.5								Y
U	762.3	18	68	CTTS	- 3.0	7.5	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	762.3	18	68	CTTS	- 3.0	7.5								Y
V	762.3	18	68	CTTS	- 3.0	7.5								Y
VV	762.3	18	68	CTTS	- 3.0	7.5								Y
W	762.3	18	68	CTTS	- 3.0	7.5								
X	762.3	18	68	CTTS	- 3.0	7.5								Y
Y	762.3	18	68	CTTS	- 3.0	7.5	OD			15.0	CTTS			Y
A	763.3	19	32	CTTS	- 3.0	7.5								Y
B	763.3	19	32	CTTS	- 3.0	7.5								Y
C	763.3	19	32	CTTS	- 3.0	7.5								Y
D	763.3	19	32	CTTS	- 3.0	7.5								Y
E	763.3	19	32	CTTS	- 3.0	7.5								Y
U	763.3	19	32	CTTS	- 3.0	7.5	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	763.3	19	32	CTTS	- 3.0	7.5								Y
V	763.3	19	32	CTTS	- 3.0	7.5								Y
VV	763.3	19	32	CTTS	- 3.0	7.5			3		CTTS	1.2		Y
W	763.3	19	32	CTTS	- 3.0	7.5								
X	763.3	19	32	CTTS	- 3.0	7.5								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
Y	763.3	19	32	CTTS	- 3.0	7.5	OD			< 10.0	CTTS			Y
A	764.3	19	34	CTTS	- 3.0	7.5								Y
B	764.3	19	34	CTTS	- 3.0	7.5								Y
C	764.3	19	34	CTTS	- 3.0	7.5								Y
D	764.3	19	34	CTTS	- 3.0	7.5								Y
E	764.3	19	34	CTTS	- 3.0	7.5								Y
U	764.3	19	34	CTTS	- 3.0	7.5	OD	IG	2	< 20.0	CTTS	1.0		Y
UU	764.3	19	34	CTTS	- 3.0	7.5								Y
V	764.3	19	34	CTTS	- 3.0	7.5								Y
VV	764.3	19	34	CTTS	- 3.0	7.5								Y
W	764.3	19	34	CTTS	- 3.0	7.5								
X	764.3	19	34	CTTS	- 3.0	7.5								Y
Y	764.3	19	34	CTTS	- 3.0	7.5								Y
A	765.3	19	37	CTTS	- 3.0	10.0								Y
B	765.3	19	37	CTTS	- 3.0	10.0								Y
C	765.3	19	37	CTTS	- 3.0	10.0								Y
D	765.3	19	37	CTTS	- 3.0	10.0								Y
E	765.3	19	37	CTTS	- 3.0	10.0								Y
U	765.3	19	37	CTTS	- 3.0	10.0	OD	IG	3		CTTS	1.0		Y
UU	765.3	19	37	CTTS	- 3.0	10.0								Y
V	765.3	19	37	CTTS	- 3.0	10.0								Y
VV	765.3	19	37	CTTS	- 3.0	10.0								Y
W	765.3	19	37	CTTS	- 3.0	10.0								
X	765.3	19	37	CTTS	- 3.0	10.0								Y
Y	765.3	19	37	CTTS	- 3.0	10.0								Y
A	766.3	19	39	CTTS	- 3.0	9.0								Y
B	766.3	19	39	CTTS	- 3.0	9.0								Y
C	766.3	19	39	CTTS	- 3.0	9.0								Y
D	766.3	19	39	CTTS	- 3.0	9.0								Y
E	766.3	19	39	CTTS	- 3.0	9.0								Y
U	766.3	19	39	CTTS	- 3.0	9.0								
UU	766.3	19	39	CTTS	- 3.0	9.0								Y
V	766.3	19	39	CTTS	- 3.0	9.0								Y
VV	766.3	19	39	CTTS	- 3.0	9.0								Y
W	766.3	19	39	CTTS	- 3.0	9.0								
X	766.3	19	39	CTTS	- 3.0	9.0								Y
Y	766.3	19	39	CTTS	- 3.0	9.0								Y
A	767.3	19	46	CTTS	6.0	26.0								Y
B	767.3	19	46	CTTS	6.0	26.0								Y
C	767.3	19	46	CTTS	6.0	26.0								Y
D	767.3	19	46	CTTS	6.0	26.0								Y
E	767.3	19	46	CTTS	6.0	26.0								Y
U	767.3	19	46	CTTS	6.0	26.0								
UU	767.3	19	46	CTTS	6.0	26.0			2	4.0	CTTS	11.0		Y
V	767.3	19	46	CTTS	6.0	26.0								Y
VV	767.3	19	46	CTTS	6.0	26.0								Y
W	767.3	19	46	CTTS	6.0	26.0								
X	767.3	19	46	CTTS	6.0	26.0								Y
Y	767.3	19	46	CTTS	6.0	26.0								Y
A	768.3	19	51	CTTS	- 3.0	6.0								Y
B	768.3	19	51	CTTS	- 3.0	6.0								Y
C	768.3	19	51	CTTS	- 3.0	6.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
D	768.3	19	51	CTTS	- 3.0	6.0								Y
E	768.3	19	51	CTTS	- 3.0	6.0								Y
U	768.3	19	51	CTTS	- 3.0	6.0								
UU	768.3	19	51	CTTS	- 3.0	6.0								
V	768.3	19	51	CTTS	- 3.0	6.0								Y
VV	768.3	19	51	CTTS	- 3.0	6.0								
W	768.3	19	51	CTTS	- 3.0	6.0								
X	768.3	19	51	CTTS	- 3.0	6.0								Y
Y	768.3	19	51	CTTS	- 3.0	6.0								Y
A	769.3	20	43	CTTS	- 3.0	9.0								Y
B	769.3	20	43	CTTS	- 3.0	9.0								Y
C	769.3	20	43	CTTS	- 3.0	9.0								Y
D	769.3	20	43	CTTS	- 3.0	9.0								Y
E	769.3	20	43	CTTS	- 3.0	9.0								Y
U	769.3	20	43	CTTS	- 3.0	9.0								
UU	769.3	20	43	CTTS	- 3.0	9.0								Y
V	769.3	20	43	CTTS	- 3.0	9.0								Y
VV	769.3	20	43	CTTS	- 3.0	9.0								Y
W	769.3	20	43	CTTS	- 3.0	9.0								
X	769.3	20	43	CTTS	- 3.0	9.0								Y
Y	769.3	20	43	CTTS	- 3.0	9.0								Y
A	772.3	21	44	CTTS	- 3.0	9.0								Y
B	772.3	21	44	CTTS	- 3.0	9.0								Y
C	772.3	21	44	CTTS	- 3.0	9.0								Y
D	772.3	21	44	CTTS	- 3.0	9.0								Y
E	772.3	21	44	CTTS	- 3.0	9.0								Y
U	772.3	21	44	CTTS	- 3.0	9.0								
UU	772.3	21	44	CTTS	- 3.0	9.0								Y
V	772.3	21	44	CTTS	- 3.0	9.0								Y
VV	772.3	21	44	CTTS	- 3.0	9.0								Y
W	772.3	21	44	CTTS	- 3.0	9.0								
X	772.3	21	44	CTTS	- 3.0	9.0								Y
Y	772.3	21	44	CTTS	- 3.0	9.0								Y
A	775.3	22	66	CTTS	- 3.0	7.5								Y
B	775.3	22	66	CTTS	- 3.0	7.5								Y
C	775.3	22	66	CTTS	- 3.0	7.5								Y
D	775.3	22	66	CTTS	- 3.0	7.5								Y
E	775.3	22	66	CTTS	- 3.0	7.5								Y
U	775.3	22	66	CTTS	- 3.0	7.5								
UU	775.3	22	66	CTTS	- 3.0	7.5								
V	775.3	22	66	CTTS	- 3.0	7.5								Y
VV	775.3	22	66	CTTS	- 3.0	7.5								
W	775.3	22	66	CTTS	- 3.0	7.5								
X	775.3	22	66	CTTS	- 3.0	7.5								Y
Y	775.3	22	66	CTTS	- 3.0	7.5								Y
A	776.3	24	26	CTTS	- 3.0	10.0								Y
B	776.3	24	26	CTTS	- 3.0	10.0								Y
C	776.3	24	26	CTTS	- 3.0	10.0								Y
D	776.3	24	26	CTTS	- 3.0	10.0								Y
E	776.3	24	26	CTTS	- 3.0	10.0								Y
U	776.3	24	26	CTTS	- 3.0	10.0								Y
UU	776.3	24	26	CTTS	- 3.0	10.0								Y
V	776.3	24	26	CTTS	- 3.0	10.0	OD	WG	3	< 20.0	CTTS		3	Y
VV	776.3	24	26	CTTS	- 3.0	10.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
W	776.3	24	26	CTTS	- 3.0	10.0								
X	776.3	24	26	CTTS	- 3.0	10.0								Y
Y	776.3	24	26	CTTS	- 3.0	10.0								Y
A	777.3	27	59	CTTS	- 3.0	9.0								Y
B	777.3	27	59	CTTS	- 3.0	9.0								Y
C	777.3	27	59	CTTS	- 3.0	9.0								Y
D	777.3	27	59	CTTS	- 3.0	9.0								Y
E	777.3	27	59	CTTS	- 3.0	9.0								Y
U	777.3	27	59	CTTS	- 3.0	9.0								
UU	777.3	27	59	CTTS	- 3.0	9.0								
V	777.3	27	59	CTTS	- 3.0	9.0								Y
VV	777.3	27	59	CTTS	- 3.0	9.0								
W	777.3	27	59	CTTS	- 3.0	9.0								
X	777.3	27	59	CTTS	- 3.0	9.0								Y
Y	777.3	27	59	CTTS	- 3.0	9.0								Y
A	778.3	28	47	CTTS	- 3.0	6.5								Y
B	778.3	28	47	CTTS	- 3.0	6.5								Y
C	778.3	28	47	CTTS	- 3.0	6.5								Y
D	778.3	28	47	CTTS	- 3.0	6.5								Y
E	778.3	28	47	CTTS	- 3.0	6.5								Y
U	778.3	28	47	CTTS	- 3.0	6.5								
UU	778.3	28	47	CTTS	- 3.0	6.5								Y
V	778.3	28	47	CTTS	- 3.0	6.5								
VV	778.3	28	47	CTTS	- 3.0	6.5								Y
W	778.3	28	47	CTTS	- 3.0	6.5								
X	778.3	28	47	CTTS	- 3.0	6.5								Y
Y	778.3	28	47	CTTS	- 3.0	6.5								Y
A	779.3	28	56	CTTS	- 3.0	9.0								Y
B	779.3	28	56	CTTS	- 3.0	9.0								Y
C	779.3	28	56	CTTS	- 3.0	9.0								Y
D	779.3	28	56	CTTS	- 3.0	9.0								Y
E	779.3	28	56	CTTS	- 3.0	9.0								Y
U	779.3	28	56	CTTS	- 3.0	9.0								
UU	779.3	28	56	CTTS	- 3.0	9.0								Y
V	779.3	28	56	CTTS	- 3.0	9.0								Y
VV	779.3	28	56	CTTS	- 3.0	9.0								Y
W	779.3	28	56	CTTS	- 3.0	9.0								
X	779.3	28	56	CTTS	- 3.0	9.0								Y
Y	779.3	28	56	CTTS	- 3.0	9.0								Y
A	780.3	29	48	CTTS	- 3.0	6.0								Y
B	780.3	29	48	CTTS	- 3.0	6.0								Y
C	780.3	29	48	CTTS	- 3.0	6.0								Y
D	780.3	29	48	CTTS	- 3.0	6.0								Y
E	780.3	29	48	CTTS	- 3.0	6.0								Y
U	780.3	29	48	CTTS	- 3.0	6.0								
UU	780.3	29	48	CTTS	- 3.0	6.0								
V	780.3	29	48	CTTS	- 3.0	6.0								Y
VV	780.3	29	48	CTTS	- 3.0	6.0								
W	780.3	29	48	CTTS	- 3.0	6.0								
X	780.3	29	48	CTTS	- 3.0	6.0								Y
Y	780.3	29	48	CTTS	- 3.0	6.0								Y
A	781.3	30	52	CTTS	14.0	24.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
B	781.3	30	52	CTTS	14.0	24.0								Y
C	781.3	30	52	CTTS	14.0	24.0								Y
D	781.3	30	52	CTTS	14.0	24.0								Y
E	781.3	30	52	CTTS	14.0	24.0								Y
U	781.3	30	52	CTTS	14.0	24.0								
UU	781.3	30	52	CTTS	14.0	24.0			2	4.0	CTTS	19.0		Y
V	781.3	30	52	CTTS	14.0	24.0								
VV	781.3	30	52	CTTS	14.0	24.0								Y
W	781.3	30	52	CTTS	14.0	24.0								
X	781.3	30	52	CTTS	14.0	24.0								Y
Y	781.3	30	52	CTTS	14.0	24.0								
A	782.3	1	38	CTTS	- 3.0	7.5								Y
B	782.3	1	38	CTTS	- 3.0	7.5								Y
C	782.3	1	38	CTTS	- 3.0	7.5								Y
D	782.3	1	38	CTTS	- 3.0	7.5								Y
E	782.3	1	38	CTTS	- 3.0	7.5								Y
U	782.3	1	38	CTTS	- 3.0	7.5								
UU	782.3	1	38	CTTS	- 3.0	7.5								Y
V	782.3	1	38	CTTS	- 3.0	7.5								
VV	782.3	1	38	CTTS	- 3.0	7.5								Y
W	782.3	1	38	CTTS	- 3.0	7.5								
X	782.3	1	38	CTTS	- 3.0	7.5								Y
Y	782.3	1	38	CTTS	- 3.0	7.5								Y
A	783.3	2	29	CTTS	- 3.0	7.0								Y
B	783.3	2	29	CTTS	- 3.0	7.0								Y
C	783.3	2	29	CTTS	- 3.0	7.0								Y
D	783.3	2	29	CTTS	- 3.0	7.0								Y
E	783.3	2	29	CTTS	- 3.0	7.0								Y
U	783.3	2	29	CTTS	- 3.0	7.0								
UU	783.3	2	29	CTTS	- 3.0	7.0								Y
V	783.3	2	29	CTTS	- 3.0	7.0								
VV	783.3	2	29	CTTS	- 3.0	7.0								Y
W	783.3	2	29	CTTS	- 3.0	7.0								
X	783.3	2	29	CTTS	- 3.0	7.0	OD	WG		100.0	CTTS	0.0	1	Y
Y	783.3	2	29	CTTS	- 3.0	7.0								Y
A	784.3	3	50	CTTS	- 3.0	6.5								Y
B	784.3	3	50	CTTS	- 3.0	6.5								Y
C	784.3	3	50	CTTS	- 3.0	6.5								Y
D	784.3	3	50	CTTS	- 3.0	6.5								Y
E	784.3	3	50	CTTS	- 3.0	6.5								Y
U	784.3	3	50	CTTS	- 3.0	6.5								
UU	784.3	3	50	CTTS	- 3.0	6.5								Y
V	784.3	3	50	CTTS	- 3.0	6.5								
VV	784.3	3	50	CTTS	- 3.0	6.5								Y
W	784.3	3	50	CTTS	- 3.0	6.5								
X	784.3	3	50	CTTS	- 3.0	6.5								Y
Y	784.3	3	50	CTTS	- 3.0	6.5								Y
A	785.3	4	22	CTTS	- 3.0	7.5								Y
B	785.3	4	22	CTTS	- 3.0	7.5								Y
C	785.3	4	22	CTTS	- 3.0	7.5								Y
D	785.3	4	22	CTTS	- 3.0	7.5								Y
E	785.3	4	22	CTTS	- 3.0	7.5								Y
U	785.3	4	22	CTTS	- 3.0	7.5								
UU	785.3	4	22	CTTS	- 3.0	7.5								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
V	785.3	4	22	CTTS	- 3.0	7.5								
VV	785.3	4	22	CTTS	- 3.0	7.5								Y
W	785.3	4	22	CTTS	- 3.0	7.5								
X	785.3	4	22	CTTS	- 3.0	7.5								Y
Y	785.3	4	22	CTTS	- 3.0	7.5								Y
A	788.3	7	65	HTTS	9.0	19.5								Y
B	788.3	7	65	HTTS	9.0	19.5								Y
C	788.3	7	65	HTTS	9.0	19.5								Y
D	788.3	7	65	HTTS	9.0	19.5								Y
E	788.3	7	65	HTTS	9.0	19.5								Y
U	788.3	7	65	HTTS	9.0	19.5								
UU	788.3	7	65	HTTS	9.0	19.5								
V	788.3	7	65	HTTS	9.0	19.5								Y
VV	788.3	7	65	HTTS	9.0	19.5								
W	788.3	7	65	HTTS	9.0	19.5								
X	788.3	7	65	HTTS	9.0	19.5								Y
Y	788.3	7	65	HTTS	9.0	19.5								Y
A	790.3	10	28	HTTS	- 3.0	7.5	OD		1	27.0	HTTS	0.8	1	Y
B	790.3	10	28	HTTS	- 3.0	7.5	OD		3	26.0	HTTS	0.7	1	Y
C	790.3	10	28	HTTS	- 3.0	7.5	OD		3	88.0	HTTS	1.2	1	Y
D	790.3	10	28	HTTS	- 3.0	7.5	OD		1	49.0	HTTS	2.9	1	Y
E	790.3	10	28	HTTS	- 3.0	7.5	OD		1	41.0	HTTS	1.0	1	Y
U	790.3	10	28	HTTS	- 3.0	7.5								
UU	790.3	10	28	HTTS	- 3.0	7.5								
V	790.3	10	28	HTTS	- 3.0	7.5	OD	WG	2	38.0	HTTS		3	Y
VV	790.3	10	28	HTTS	- 3.0	7.5								
W	790.3	10	28	HTTS	- 3.0	7.5				25.0	HTTS	1.4		Y
X	790.3	10	28	HTTS	- 3.0	7.5	OD	WG		31.0	HTTS	0.7	1	Y
Y	790.3	10	28	HTTS	- 3.0	7.5	OD			34.0	HTTS			Y
A	791.3	14	36	HTTS	- 3.0	5.5								Y
B	791.3	14	36	HTTS	- 3.0	5.5								Y
C	791.3	14	36	HTTS	- 3.0	5.5								Y
D	791.3	14	36	HTTS	- 3.0	5.5								Y
E	791.3	14	36	HTTS	- 3.0	5.5								Y
U	791.3	14	36	HTTS	- 3.0	5.5								Y
UU	791.3	14	36	HTTS	- 3.0	5.5			2	95.0	HTTS	0.0		Y
V	791.3	14	36	HTTS	- 3.0	5.5								Y
VV	791.3	14	36	HTTS	- 3.0	5.5			2	95.0	HTTS	0.0		Y
W	791.3	14	36	HTTS	- 3.0	5.5								
X	791.3	14	36	HTTS	- 3.0	5.5	OD	WG		99.0	HTTS	0.0	1	Y
Y	791.3	14	36	HTTS	- 3.0	5.5								Y
A	792.3	16	35	HTTS	- 3.0	6.3	OD		1	23.0	HTTS	1.0	1	Y
B	792.3	16	35	HTTS	- 3.0	6.3	OD		1	23.0	HTTS	0.6	1	Y
C	792.3	16	35	HTTS	- 3.0	6.3	OD		1	26.0	HTTS	1.4	1	Y
D	792.3	16	35	HTTS	- 3.0	6.3	OD		1	22.0	HTTS	1.5	1	Y
E	792.3	16	35	HTTS	- 3.0	6.3	OD		1	29.0	HTTS	1.7	1	Y
U	792.3	16	35	HTTS	- 3.0	6.3	OD	IG	2	30.0	HTTS	1.0		Y
UU	792.3	16	35	HTTS	- 3.0	6.3								
V	792.3	16	35	HTTS	- 3.0	6.3	OD	WG	1	48.0	HTTS		3	Y
VV	792.3	16	35	HTTS	- 3.0	6.3								
W	792.3	16	35	HTTS	- 3.0	6.3								
X	792.3	16	35	HTTS	- 3.0	6.3	OD	WG		27.0	HTTS	0.0	3	Y
Y	792.3	16	35	HTTS	- 3.0	6.3	OD			27.0	HTTS			Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	793.3	16	55	HTTS	- 3.0	6.3								
B	793.3	16	55	HTTS	- 3.0	6.3								Y
C	793.3	16	55	HTTS	- 3.0	6.3	OD		2	< 20.0	HTTS	0.8	1	Y
D	793.3	16	55	HTTS	- 3.0	6.3								Y
E	793.3	16	55	HTTS	- 3.0	6.3								Y
U	793.3	16	55	HTTS	- 3.0	6.3								
UU	793.3	16	55	HTTS	- 3.0	6.3								
V	793.3	16	55	HTTS	- 3.0	6.3	OD	WG	2	< 20.0	HTTS		3	Y
VV	793.3	16	55	HTTS	- 3.0	6.3								
W	793.3	16	55	HTTS	- 3.0	6.3								
X	793.3	16	55	HTTS	- 3.0	6.3	OD	WG		0.0	HTTS	0.0	1	Y
Y	793.3	16	55	HTTS	- 3.0	6.3	OD			25.0	HTTS			Y
A	794.3	16	57	HTTS	- 3.0	6.5	OD		1	70.0	HTTS	1.1	1	Y
B	794.3	16	57	HTTS	- 3.0	6.5	OD		1	68.0	HTTS	0.7	1	Y
C	794.3	16	57	HTTS	- 3.0	6.5	OD		2	66.0	HTTS	1.0	1	Y
D	794.3	16	57	HTTS	- 3.0	6.5	OD		1	76.0	HTTS	1.1	1	Y
E	794.3	16	57	HTTS	- 3.0	6.5	OD		1	80.0	HTTS	0.8	1	Y
U	794.3	16	57	HTTS	- 3.0	6.5								
UU	794.3	16	57	HTTS	- 3.0	6.5			2	60.0	HTTS	0.7		Y
V	794.3	16	57	HTTS	- 3.0	6.5	OD	WG	2	73.0	HTTS		3	Y
VV	794.3	16	57	HTTS	- 3.0	6.5			2	38.0	HTTS	0.7		Y
W	794.3	16	57	HTTS	- 3.0	6.5								
X	794.3	16	57	HTTS	- 3.0	6.5	OD	WG			HTTS	0.6	1	Y
X	794.3	16	57	HTTS	- 3.0	6.5	OD	WG		72.0	HTTS	1.0	1	Y
Y	794.3	16	57	HTTS	- 3.0	6.5	OD			73.0	HTTS			Y
A	795.3	17	55	HTTS	- 3.0	6.5	OD		1	< 20.0	HTTS	0.3	2	Y
B	795.3	17	55	HTTS	- 3.0	6.5								Y
C	795.3	17	55	HTTS	- 3.0	6.5								Y
D	795.3	17	55	HTTS	- 3.0	6.5								Y
E	795.3	17	55	HTTS	- 3.0	6.5								Y
U	795.3	17	55	HTTS	- 3.0	6.5								
UU	795.3	17	55	HTTS	- 3.0	6.5								
V	795.3	17	55	HTTS	- 3.0	6.5	OD	WG	3	70.0	HTTS		3	Y
VV	795.3	17	55	HTTS	- 3.0	6.5								
W	795.3	17	55	HTTS	- 3.0	6.5								
X	795.3	17	55	HTTS	- 3.0	6.5								Y
Y	795.3	17	55	HTTS	- 3.0	6.5	OD		2	45.0	HTTS			Y
A	796.3	17	56	HTTS	- 3.0	6.5	OD		2	47.0	HTTS	0.9	1	Y
B	796.3	17	56	HTTS	- 3.0	6.5	OD		3	32.0	HTTS	1.0	1	Y
C	796.3	17	56	HTTS	- 3.0	6.5	OD		2	45.0	HTTS	0.9	1	Y
D	796.3	17	56	HTTS	- 3.0	6.5	OD		1	48.0	HTTS	0.9	1	Y
E	796.3	17	56	HTTS	- 3.0	6.5	OD		1	50.0	HTTS	0.7	1	Y
U	796.3	17	56	HTTS	- 3.0	6.5								
UU	796.3	17	56	HTTS	- 3.0	6.5				45.0	HTTS	1.5		Y
V	796.3	17	56	HTTS	- 3.0	6.5	OD	WG	2	58.0	HTTS		3	Y
VV	796.3	17	56	HTTS	- 3.0	6.5			2	55.0	HTTS	1.5		Y
W	796.3	17	56	HTTS	- 3.0	6.5								
X	796.3	17	56	HTTS	- 3.0	6.5	OD	WG		52.0	HTTS	1.0	1	Y
Y	796.3	17	56	HTTS	- 3.0	6.5	OD			< 10.0	HTTS			Y
A	797.3	17	57	HTTS	- 3.0	6.5	OD		1	48.0	HTTS	0.9	1	Y
B	797.3	17	57	HTTS	- 3.0	6.5	OD		1	43.0	HTTS	0.6	1	Y
C	797.3	17	57	HTTS	- 3.0	6.5	OD		1	50.0	HTTS	0.9	1	Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
D	797.3	17	57	HTTS	- 3.0	6.5	OD		1	52.0	HTTS	1.1	1	Y
E	797.3	17	57	HTTS	- 3.0	6.5	OD		1	46.0	HTTS	1.1	1	Y
U	797.3	17	57	HTTS	- 3.0	6.5								
UU	797.3	17	57	HTTS	- 3.0	6.5								
V	797.3	17	57	HTTS	- 3.0	6.5	OD	WG	2	59.0	HTTS		3	Y
VV	797.3	17	57	HTTS	- 3.0	6.5								
W	797.3	17	57	HTTS	- 3.0	6.5								
X	797.3	17	57	HTTS	- 3.0	6.5	OD	WG		45.0	HTTS	-0.6	1	Y
Y	797.3	17	57	HTTS	- 3.0	6.5	OD		1	52.0	HTTS			Y
A	798.1	18	31	HTTS	-21.0	-20.0								Y
B	798.1	18	31	HTTS	-21.0	-20.0								Y
C	798.1	18	31	HTTS	-21.0	-20.0								Y
D	798.1	18	31	HTTS	-21.0	-20.0								Y
E	798.1	18	31	HTTS	-21.0	-20.0								Y
U	798.1	18	31	HTTS	-21.0	-20.0								Y
UU	798.1	18	31	HTTS	-21.0	-20.0								
V	798.1	18	31	HTTS	-21.0	-20.0								Y
VV	798.1	18	31	HTTS	-21.0	-20.0								
W	798.1	18	31	HTTS	-21.0	-20.0								
X	798.1	18	31	HTTS	-21.0	-20.0								Y
Y	798.1	18	31	HTTS	-21.0	-20.0								Y
A	798.3	18	31	HTTS	- 3.0	7.0	OD		2	31.0	HTTS	0.6	1	Y
B	798.3	18	31	HTTS	- 3.0	7.0	OD		2	< 20.0	HTTS	0.7	1	Y
C	798.3	18	31	HTTS	- 3.0	7.0	OD		2	55.0	HTTS	0.9	1	Y
D	798.3	18	31	HTTS	- 3.0	7.0	OD		1	54.0	HTTS	0.9	1	Y
E	798.3	18	31	HTTS	- 3.0	7.0	OD		2	32.0	HTTS	1.1	1	Y
U	798.3	18	31	HTTS	- 3.0	7.0	OD	IG	2	24.0	HTTS	1.0		Y
UU	798.3	18	31	HTTS	- 3.0	7.0								
V	798.3	18	31	HTTS	- 3.0	7.0	OD	WG	2	38.0	HTTS		3	Y
VV	798.3	18	31	HTTS	- 3.0	7.0								
W	798.3	18	31	HTTS	- 3.0	7.0								
X	798.3	18	31	HTTS	- 3.0	7.0	OD	WG		40.0	HTTS	0.0	1	Y
X	798.3	18	31	HTTS	- 3.0	7.0	OD	WG		43.0	HTTS	0.5	1	Y
X	798.3	18	31	HTTS	- 3.0	7.0	OD	WG		51.0	HTTS	0.9	1	Y
Y	798.3	18	31	HTTS	- 3.0	7.0	OD			< 10.0	HTTS			Y
A	799.3	18	46	HTTS	- 3.0	7.5	OD		2	58.0	HTTS	1.9	5	Y
B	799.3	18	46	HTTS	- 3.0	7.5	OD		2	41.0	HTTS	2.2	1	Y
C	799.3	18	46	HTTS	- 3.0	7.5	OD		2	60.0	HTTS	1.8	1	Y
D	799.3	18	46	HTTS	- 3.0	7.5	OD		2	57.0	HTTS	1.5	1	Y
E	799.3	18	46	HTTS	- 3.0	7.5	OD		2	65.0	HTTS	1.8	1	Y
U	799.3	18	46	HTTS	- 3.0	7.5								
UU	799.3	18	46	HTTS	- 3.0	7.5			2	39.0	HTTS	1.3		Y
V	799.3	18	46	HTTS	- 3.0	7.5	OD	WG		68.0	HTTS		3	Y
VV	799.3	18	46	HTTS	- 3.0	7.5			2	26.0	HTTS	1.3		Y
W	799.3	18	46	HTTS	- 3.0	7.5								
X	799.3	18	46	HTTS	- 3.0	7.5	OD	WG		25.0	HTTS	1.0	1	Y
X	799.3	18	46	HTTS	- 3.0	7.5	OD	WG		3.0	HTTS	0.6	1	Y
X	799.3	18	46	HTTS	- 3.0	7.5	OD	WG			HTTS	1.9	1	Y
Y	799.3	18	46	HTTS	- 3.0	7.5	OD			< 10.0	HTTS			Y
A	807.3	19	48	HTTS	- 3.0	6.5								Y
B	807.3	19	48	HTTS	- 3.0	6.5								Y
C	807.3	19	48	HTTS	- 3.0	6.5	OD		2	< 20.0	HTTS	0.3	1	Y
D	807.3	19	48	HTTS	- 3.0	6.5	OD		2	< 20.0	HTTS	0.4	1	Y
E	807.3	19	48	HTTS	- 3.0	6.5	OD			< 20.0	HTTS	0.4		Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
U	807.3	19	48	HTTS	- 3.0	6.5								
UU	807.3	19	48	HTTS	- 3.0	6.5			2	48.0	HTTS	0.9		Y
V	807.3	19	48	HTTS	- 3.0	6.5	OD	WG	2	< 20.0	HTTS		3	Y
VV	807.3	19	48	HTTS	- 3.0	6.5			2	23.0	HTTS	0.9		Y
W	807.3	19	48	HTTS	- 3.0	6.5								
X	807.3	19	48	HTTS	- 3.0	6.5								Y
Y	807.3	19	48	HTTS	- 3.0	6.5	OD			< 10.0	HTTS			Y
A	812.3	20	33	HTTS	- 3.0	6.5	OD		1	< 20.0	HTTS	0.6	2	Y
B	812.3	20	33	HTTS	- 3.0	6.5	OD		1	< 20.0	HTTS	0.6	1	Y
C	812.3	20	33	HTTS	- 3.0	6.5	OD		2	30.0	HTTS	1.2	1	Y
D	812.3	20	33	HTTS	- 3.0	6.5	OD		1	33.0	HTTS	1.2	1	Y
E	812.3	20	33	HTTS	- 3.0	6.5	OD		1	38.0	HTTS	1.1	1	Y
U	812.3	20	33	HTTS	- 3.0	6.5	OD	IG	2	< 20.0	HTTS	1.0		Y
UU	812.3	20	33	HTTS	- 3.0	6.5								
V	812.3	20	33	HTTS	- 3.0	6.5	OD	WG	2	25.0	HTTS		3	Y
VV	812.3	20	33	HTTS	- 3.0	6.5								
W	812.3	20	33	HTTS	- 3.0	6.5								
X	812.3	20	33	HTTS	- 3.0	6.5	OD	WG		38.0	HTTS	0.0	1	Y
Y	812.3	20	33	HTTS	- 3.0	6.5	OD			< 10.0	HTTS			Y
A	813.3	20	40	HTTS	- 3.0	6.8	OD		1	20.0	HTTS	0.8	1	Y
B	813.3	20	40	HTTS	- 3.0	6.8	OD		1	20.0	HTTS	0.7	1	Y
C	813.3	20	40	HTTS	- 3.0	6.8	OD		1	24.0	HTTS	1.0	1	Y
D	813.3	20	40	HTTS	- 3.0	6.8	OD		1	< 20.0	HTTS		1	Y
E	813.3	20	40	HTTS	- 3.0	6.8	OD			< 20.0	HTTS	0.8		Y
U	813.3	20	40	HTTS	- 3.0	6.8								
UU	813.3	20	40	HTTS	- 3.0	6.8								
V	813.3	20	40	HTTS	- 3.0	6.8	OD	WG	2	37.0	HTTS		3	Y
VV	813.3	20	40	HTTS	- 3.0	6.8								
W	813.3	20	40	HTTS	- 3.0	6.8								
X	813.3	20	40	HTTS	- 3.0	6.8	OD	WG		10.0	HTTS	0.0	3	Y
Y	813.3	20	40	HTTS	- 3.0	6.8	OD			20.0	HTTS			Y
A	814.3	20	41	HTTS	- 3.0	6.5	OD		1	< 20.0	HTTS	1.1	1	Y
B	814.3	20	41	HTTS	- 3.0	6.5								Y
C	814.3	20	41	HTTS	- 3.0	6.5	OD		1	28.0	HTTS	0.9	1	Y
D	814.3	20	41	HTTS	- 3.0	6.5	OD		1	< 20.0	HTTS	1.7	1	Y
E	814.3	20	41	HTTS	- 3.0	6.5	OD		1	< 20.0	HTTS	1.3	1	Y
U	814.3	20	41	HTTS	- 3.0	6.5								
UU	814.3	20	41	HTTS	- 3.0	6.5								
V	814.3	20	41	HTTS	- 3.0	6.5	OD	WG	2	25.0	HTTS		3	Y
VV	814.3	20	41	HTTS	- 3.0	6.5								
W	814.3	20	41	HTTS	- 3.0	6.5								
X	814.3	20	41	HTTS	- 3.0	6.5	OD	WG		2.0	HTTS	0.0	1	Y
Y	814.3	20	41	HTTS	- 3.0	6.5	OD			< 10.0	HTTS			Y
A	815.3	20	43	HTTS	- 3.0	7.0	OD		1	< 20.0	HTTS	1.1	1	Y
B	815.3	20	43	HTTS	- 3.0	7.0	OD		1	< 20.0	HTTS	1.2	1	Y
C	815.3	20	43	HTTS	- 3.0	7.0	OD		1	< 20.0	HTTS	1.3	1	Y
D	815.3	20	43	HTTS	- 3.0	7.0	OD		1	< 20.0	HTTS	1.5	1	Y
E	815.3	20	43	HTTS	- 3.0	7.0	OD		1	< 20.0	HTTS	1.4	1	Y
U	815.3	20	43	HTTS	- 3.0	7.0								
UU	815.3	20	43	HTTS	- 3.0	7.0			2	17.0	HTTS	1.4		Y
V	815.3	20	43	HTTS	- 3.0	7.0	OD	WG	2	29.0	HTTS		3	Y
VV	815.3	20	43	HTTS	- 3.0	7.0			2	14.0	HTTS	1.4		Y
W	815.3	20	43	HTTS	- 3.0	7.0								
X	815.3	20	43	HTTS	- 3.0	7.0	OD	WG		11.0	HTTS	1.3	1	Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
Y	815.3	20	43	HTTS	- 3.0	7.0	OD			< 10.0	HTTS			Y
A	816.3	20	47	HTTS	- 3.0	6.5	OD		2	28.0	HTTS	0.8	1	Y
B	816.3	20	47	HTTS	- 3.0	6.5	OD		3	21.0	HTTS	0.5	1	Y
C	816.3	20	47	HTTS	- 3.0	6.5	OD		2	25.0	HTTS	0.5	1	Y
D	816.3	20	47	HTTS	- 3.0	6.5	OD		2	26.0	HTTS	0.3	1	Y
E	816.3	20	47	HTTS	- 3.0	6.5	OD		1	29.0	HTTS	0.8	1	Y
U	816.3	20	47	HTTS	- 3.0	6.5								
UU	816.3	20	47	HTTS	- 3.0	6.5			2	47.0	HTTS	0.8		Y
V	816.3	20	47	HTTS	- 3.0	6.5	OD	WG	2	32.0	HTTS		3	Y
VV	816.3	20	47	HTTS	- 3.0	6.5			2	31.0	HTTS	0.8		Y
W	816.3	20	47	HTTS	- 3.0	6.5								
X	816.3	20	47	HTTS	- 3.0	6.5								Y
Y	816.3	20	47	HTTS	- 3.0	6.5	OD			< 10.0	HTTS			Y
A	817.3	21	41	HTTS	- 3.0	6.8	OD		1	< 20.0	HTTS	0.8	1	Y
B	817.3	21	41	HTTS	- 3.0	6.8	OD		1	< 20.0	HTTS	0.9	1	Y
C	817.3	21	41	HTTS	- 3.0	6.8	OD		2	< 20.0	HTTS	1.3	1	Y
D	817.3	21	41	HTTS	- 3.0	6.8	OD		1	< 20.0	HTTS	0.8	1	Y
E	817.3	21	41	HTTS	- 3.0	6.8	OD		1	23.0	HTTS	0.8	1	Y
U	817.3	21	41	HTTS	- 3.0	6.8								
UU	817.3	21	41	HTTS	- 3.0	6.8			2	12.0	HTTS	1.1		Y
V	817.3	21	41	HTTS	- 3.0	6.8	OD	WG	2	54.0	HTTS		3	Y
VV	817.3	21	41	HTTS	- 3.0	6.8			2	25.0	HTTS	1.1		Y
W	817.3	21	41	HTTS	- 3.0	6.8								
X	817.3	21	41	HTTS	- 3.0	6.8	OD	WG		23.0	HTTS	0.8	1	Y
Y	817.3	21	41	HTTS	- 3.0	6.8	OD			15.0	HTTS			Y
A	818.3	21	44	HTTS	- 3.0	7.3	OD		2	45.0	HTTS	0.9	1	Y
B	818.3	21	44	HTTS	- 3.0	7.3	OD		1	27.0	HTTS	0.8	1	Y
C	818.3	21	44	HTTS	- 3.0	7.3	OD		1	57.0	HTTS	1.4	1	Y
D	818.3	21	44	HTTS	- 3.0	7.3	OD		1	47.0	HTTS	1.3	1	Y
E	818.3	21	44	HTTS	- 3.0	7.3	OD		1	44.0	HTTS	1.2	1	Y
U	818.3	21	44	HTTS	- 3.0	7.3								
UU	818.3	21	44	HTTS	- 3.0	7.3								
V	818.3	21	44	HTTS	- 3.0	7.3	OD	WG	2	38.0	HTTS		3	Y
VV	818.3	21	44	HTTS	- 3.0	7.3								
W	818.3	21	44	HTTS	- 3.0	7.3								
X	818.3	21	44	HTTS	- 3.0	7.3								Y
Y	818.3	21	44	HTTS	- 3.0	7.3	OD			< 10.0	HTTS			Y
Y	818.3	21	44	HTTS	- 3.0	7.3	OD		2	45.0	HTTS			Y
A	819.3	21	47	HTTS	- 3.0	7.5	OD		2	< 20.0	HTTS	0.3	2	Y
B	819.3	21	47	HTTS	- 3.0	7.5	OD		3		HTTS	0.0	5	Y
C	819.3	21	47	HTTS	- 3.0	7.5	OD		2	33.0	HTTS	1.1	1	Y
D	819.3	21	47	HTTS	- 3.0	7.5	OD		2	50.0	HTTS	0.5	1	Y
E	819.3	21	47	HTTS	- 3.0	7.5	OD		1	52.0	HTTS	0.4	1	Y
U	819.3	21	47	HTTS	- 3.0	7.5								
UU	819.3	21	47	HTTS	- 3.0	7.5								
V	819.3	21	47	HTTS	- 3.0	7.5	OD	WG	2	< 20.0	HTTS		1	Y
VV	819.3	21	47	HTTS	- 3.0	7.5								
W	819.3	21	47	HTTS	- 3.0	7.5								
X	819.3	21	47	HTTS	- 3.0	7.5	OD	WG		13.0	HTTS	0.0	1	Y
Y	819.3	21	47	HTTS	- 3.0	7.5	OD			< 10.0	HTTS			Y
A	821.3	22	41	HTTS	- 3.0	7.0	OD		1	< 20.0	HTTS	0.8	1	Y
B	821.3	22	41	HTTS	- 3.0	7.0	OD		1	< 20.0	HTTS	0.6	1	Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	821.3	22	41	HTTS	- 3.0	7.0	OD		2	< 20.0	HTTS	0.7	1	Y
D	821.3	22	41	HTTS	- 3.0	7.0	OD		1	< 20.0	HTTS	0.6	1	Y
E	821.3	22	41	HTTS	- 3.0	7.0	OD		1	23.0	HTTS	0.5	1	Y
U	821.3	22	41	HTTS	- 3.0	7.0								
UU	821.3	22	41	HTTS	- 3.0	7.0			2	15.0	HTTS	1.0		Y
V	821.3	22	41	HTTS	- 3.0	7.0	OD	WG	2	33.0	HTTS		3	Y
VV	821.3	22	41	HTTS	- 3.0	7.0			2	24.0	HTTS	1.0		Y
W	821.3	22	41	HTTS	- 3.0	7.0								
X	821.3	22	41	HTTS	- 3.0	7.0	OD	WG		21.0	HTTS	0.7	1	Y
Y	821.3	22	41	HTTS	- 3.0	7.0	OD			< 10.0	HTTS			Y
A	822.3	22	63	HTTS	- 3.0	7.3								Y
B	822.3	22	63	HTTS	- 3.0	7.3								Y
C	822.3	22	63	HTTS	- 3.0	7.3								Y
D	822.3	22	63	HTTS	- 3.0	7.3								Y
E	822.3	22	63	HTTS	- 3.0	7.3	OD		1	32.0	HTTS	0.3	1	Y
U	822.3	22	63	HTTS	- 3.0	7.3								
UU	822.3	22	63	HTTS	- 3.0	7.3								Y
V	822.3	22	63	HTTS	- 3.0	7.3	OD	WG	2	< 20.0	HTTS		3	Y
VV	822.3	22	63	HTTS	- 3.0	7.3								Y
W	822.3	22	63	HTTS	- 3.0	7.3								
X	822.3	22	63	HTTS	- 3.0	7.3								Y
Y	822.3	22	63	HTTS	- 3.0	7.3								Y
A	823.3	23	41	HTTS	- 3.0	7.0	OD		2	< 20.0	HTTS	0.5	2	Y
B	823.3	23	41	HTTS	- 3.0	7.0	OD		3		HTTS	0.0		Y
C	823.3	23	41	HTTS	- 3.0	7.0								Y
D	823.3	23	41	HTTS	- 3.0	7.0	OD			30.0	HTTS	1.1		Y
E	823.3	23	41	HTTS	- 3.0	7.0	OD		1	51.0	HTTS	0.8	1	Y
U	823.3	23	41	HTTS	- 3.0	7.0								
UU	823.3	23	41	HTTS	- 3.0	7.0								
V	823.3	23	41	HTTS	- 3.0	7.0	OD	WG	2	29.0	HTTS		3	Y
VV	823.3	23	41	HTTS	- 3.0	7.0								
W	823.3	23	41	HTTS	- 3.0	7.0								
X	823.3	23	41	HTTS	- 3.0	7.0	OD	WG		23.0	HTTS	0.0	1	Y
Y	823.3	23	41	HTTS	- 3.0	7.0	OD			54.0	HTTS			Y
A	824.3	23	44	HTTS	- 3.0	6.5								Y
B	824.3	23	44	HTTS	- 3.0	6.5								Y
C	824.3	23	44	HTTS	- 3.0	6.5								Y
D	824.3	23	44	HTTS	- 3.0	6.5								Y
E	824.3	23	44	HTTS	- 3.0	6.5	OD		2	22.0	HTTS	0.6	1	Y
U	824.3	23	44	HTTS	- 3.0	6.5								
UU	824.3	23	44	HTTS	- 3.0	6.5								
V	824.3	23	44	HTTS	- 3.0	6.5								Y
VV	824.3	23	44	HTTS	- 3.0	6.5								
W	824.3	23	44	HTTS	- 3.0	6.5								
X	824.3	23	44	HTTS	- 3.0	6.5								Y
Y	824.3	23	44	HTTS	- 3.0	6.5	OD			< 10.0	HTTS			Y
A	825.3	23	62	HTTS	- 3.0	7.0								Y
B	825.3	23	62	HTTS	- 3.0	7.0								Y
C	825.3	23	62	HTTS	- 3.0	7.0								Y
D	825.3	23	62	HTTS	- 3.0	7.0								Y
E	825.3	23	62	HTTS	- 3.0	7.0	OD		2	67.0	HTTS	0.3	1	Y
U	825.3	23	62	HTTS	- 3.0	7.0								
UU	825.3	23	62	HTTS	- 3.0	7.0								Y
V	825.3	23	62	HTTS	- 3.0	7.0	OD	WG	2	< 20.0	HTTS		1	Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	825.3	23	62	HTTS	- 3.0	7.0			3		HTTS	0.3		Y
W	825.3	23	62	HTTS	- 3.0	7.0								
X	825.3	23	62	HTTS	- 3.0	7.0								Y
Y	825.3	23	62	HTTS	- 3.0	7.0	OD		2	50.0	HTTS			Y
A	826.3	24	62	HTTS	- 3.0	7.0	OD		1	49.0	HTTS	0.6	1	Y
B	826.3	24	62	HTTS	- 3.0	7.0	OD		1	47.0	HTTS	0.6	1	Y
C	826.3	24	62	HTTS	- 3.0	7.0	OD		1	48.0	HTTS	1.2	1	Y
D	826.3	24	62	HTTS	- 3.0	7.0	OD		1	49.0	HTTS	1.1	1	Y
E	826.3	24	62	HTTS	- 3.0	7.0	OD		1	51.0	HTTS	0.9	1	Y
U	826.3	24	62	HTTS	- 3.0	7.0								
UU	826.3	24	62	HTTS	- 3.0	7.0								
V	826.3	24	62	HTTS	- 3.0	7.0	OD	WG	2	57.0	HTTS		3	Y
VV	826.3	24	62	HTTS	- 3.0	7.0								
W	826.3	24	62	HTTS	- 3.0	7.0								
X	826.3	24	62	HTTS	- 3.0	7.0	OD	WG		39.0	HTTS	0.0	1	Y
Y	826.3	24	62	HTTS	- 3.0	7.0								Y
A	827.3	25	59	HTTS	- 3.0	8.0								Y
B	827.3	25	59	HTTS	- 3.0	8.0								Y
C	827.3	25	59	HTTS	- 3.0	8.0								Y
D	827.3	25	59	HTTS	- 3.0	8.0	OD			< 20.0	HTTS	2.8		Y
E	827.3	25	59	HTTS	- 3.0	8.0	OD		2	56.0	HTTS	0.4	1	Y
U	827.3	25	59	HTTS	- 3.0	8.0								
UU	827.3	25	59	HTTS	- 3.0	8.0			2	38.0	HTTS	0.8		Y
V	827.3	25	59	HTTS	- 3.0	8.0	OD	WG	1	45.0	HTTS		UT	Y
VV	827.3	25	59	HTTS	- 3.0	8.0								Y
W	827.3	25	59	HTTS	- 3.0	8.0								
X	827.3	25	59	HTTS	- 3.0	8.0	OD	WG		19.0	HTTS	0.0	1	Y
Y	827.3	25	59	HTTS	- 3.0	8.0								Y
A	828.3	26	52	HTTS	- 3.0	7.8								Y
B	828.3	26	52	HTTS	- 3.0	7.8								Y
C	828.3	26	52	HTTS	- 3.0	7.8								Y
D	828.3	26	52	HTTS	- 3.0	7.8	OD		2	26.0	HTTS	0.4	1	Y
E	828.3	26	52	HTTS	- 3.0	7.8								Y
U	828.3	26	52	HTTS	- 3.0	7.8								
UU	828.3	26	52	HTTS	- 3.0	7.8								Y
V	828.3	26	52	HTTS	- 3.0	7.8								Y
VV	828.3	26	52	HTTS	- 3.0	7.8			3	7.0	HTTS	0.4		Y
W	828.3	26	52	HTTS	- 3.0	7.8								
X	828.3	26	52	HTTS	- 3.0	7.8								Y
Y	828.3	26	52	HTTS	- 3.0	7.8								Y
A	829.3	27	28	HTTS	- 3.0	7.8								Y
B	829.3	27	28	HTTS	- 3.0	7.8								Y
C	829.3	27	28	HTTS	- 3.0	7.8								Y
D	829.3	27	28	HTTS	- 3.0	7.8								Y
E	829.3	27	28	HTTS	- 3.0	7.8								Y
U	829.3	27	28	HTTS	- 3.0	7.8								Y
UU	829.3	27	28	HTTS	- 3.0	7.8								
V	829.3	27	28	HTTS	- 3.0	7.8								Y
VV	829.3	27	28	HTTS	- 3.0	7.8								
W	829.3	27	28	HTTS	- 3.0	7.8								
X	829.3	27	28	HTTS	- 3.0	7.8								Y
Y	829.3	27	28	HTTS	- 3.0	7.8								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	830.3	27	35	HTTS	- 3.0	7.5								Y
B	830.3	27	35	HTTS	- 3.0	7.5								Y
C	830.3	27	35	HTTS	- 3.0	7.5								Y
D	830.3	27	35	HTTS	- 3.0	7.5	OD		1	< 20.0	HTTS	0.9	1	Y
E	830.3	27	35	HTTS	- 3.0	7.5	OD			< 20.0	HTTS	0.8		Y
U	830.3	27	35	HTTS	- 3.0	7.5								Y
UU	830.3	27	35	HTTS	- 3.0	7.5								
V	830.3	27	35	HTTS	- 3.0	7.5								Y
VV	830.3	27	35	HTTS	- 3.0	7.5								
W	830.3	27	35	HTTS	- 3.0	7.5								
X	830.3	27	35	HTTS	- 3.0	7.5								Y
Y	830.3	27	35	HTTS	- 3.0	7.5	OD		2	27.0	HTTS			Y
A	831.3	29	70	HTTS	- 3.0	10.8								Y
B	831.3	29	70	HTTS	- 3.0	10.8								Y
C	831.3	29	70	HTTS	- 3.0	10.8								Y
D	831.3	29	70	HTTS	- 3.0	10.8								Y
E	831.3	29	70	HTTS	- 3.0	10.8								Y
U	831.3	29	70	HTTS	- 3.0	10.8								
UU	831.3	29	70	HTTS	- 3.0	10.8								Y
V	831.3	29	70	HTTS	- 3.0	10.8								Y
VV	831.3	29	70	HTTS	- 3.0	10.8								Y
W	831.3	29	70	HTTS	- 3.0	10.8								
X	831.3	29	70	HTTS	- 3.0	10.8								Y
Y	831.3	29	70	HTTS	- 3.0	10.8								Y
A	832.3	33	30	HTTS	- 3.0	7.5								Y
B	832.3	33	30	HTTS	- 3.0	7.5								Y
C	832.3	33	30	HTTS	- 3.0	7.5								Y
D	832.3	33	30	HTTS	- 3.0	7.5								Y
E	832.3	33	30	HTTS	- 3.0	7.5								Y
U	832.3	33	30	HTTS	- 3.0	7.5								Y
UU	832.3	33	30	HTTS	- 3.0	7.5								
V	832.3	33	30	HTTS	- 3.0	7.5								Y
VV	832.3	33	30	HTTS	- 3.0	7.5								
W	832.3	33	30	HTTS	- 3.0	7.5								
X	832.3	33	30	HTTS	- 3.0	7.5								Y
Y	832.3	33	30	HTTS	- 3.0	7.5								Y
A	833.3	34	59	HTTS	- 3.0	7.8								Y
B	833.3	34	59	HTTS	- 3.0	7.8								Y
C	833.3	34	59	HTTS	- 3.0	7.8								Y
D	833.3	34	59	HTTS	- 3.0	7.8								Y
E	833.3	34	59	HTTS	- 3.0	7.8								Y
U	833.3	34	59	HTTS	- 3.0	7.8								
UU	833.3	34	59	HTTS	- 3.0	7.8								Y
V	833.3	34	59	HTTS	- 3.0	7.8								Y
VV	833.3	34	59	HTTS	- 3.0	7.8								Y
W	833.3	34	59	HTTS	- 3.0	7.8								
X	833.3	34	59	HTTS	- 3.0	7.8								Y
Y	833.3	34	59	HTTS	- 3.0	7.8								Y
A	834.3	1	10	HTTS	- 3.0	5.0								Y
B	834.3	1	10	HTTS	- 3.0	5.0								Y
C	834.3	1	10	HTTS	- 3.0	5.0								Y
D	834.3	1	10	HTTS	- 3.0	5.0								Y
E	834.3	1	10	HTTS	- 3.0	5.0								Y
U	834.3	1	10	HTTS	- 3.0	5.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	834.3	1	10	HTTS	- 3.0	5.0								Y
V	834.3	1	10	HTTS	- 3.0	5.0								Y
VV	834.3	1	10	HTTS	- 3.0	5.0								Y
W	834.3	1	10	HTTS	- 3.0	5.0								
X	834.3	1	10	HTTS	- 3.0	5.0								Y
Y	834.3	1	10	HTTS	- 3.0	5.0								Y
A	835.3	1	28	HTTS	- 3.0	5.0								Y
B	835.3	1	28	HTTS	- 3.0	5.0								Y
C	835.3	1	28	HTTS	- 3.0	5.0								Y
D	835.3	1	28	HTTS	- 3.0	5.0								Y
E	835.3	1	28	HTTS	- 3.0	5.0								Y
U	835.3	1	28	HTTS	- 3.0	5.0								
UU	835.3	1	28	HTTS	- 3.0	5.0								Y
V	835.3	1	28	HTTS	- 3.0	5.0								Y
VV	835.3	1	28	HTTS	- 3.0	5.0								Y
W	835.3	1	28	HTTS	- 3.0	5.0								
X	835.3	1	28	HTTS	- 3.0	5.0								Y
Y	835.3	1	28	HTTS	- 3.0	5.0								Y
A	836.3	1	38	HTTS	- 3.0	4.0								Y
B	836.3	1	38	HTTS	- 3.0	4.0								Y
C	836.3	1	38	HTTS	- 3.0	4.0								Y
D	836.3	1	38	HTTS	- 3.0	4.0								Y
E	836.3	1	38	HTTS	- 3.0	4.0								Y
U	836.3	1	38	HTTS	- 3.0	4.0								
UU	836.3	1	38	HTTS	- 3.0	4.0								Y
V	836.3	1	38	HTTS	- 3.0	4.0								Y
VV	836.3	1	38	HTTS	- 3.0	4.0								Y
W	836.3	1	38	HTTS	- 3.0	4.0								
X	836.3	1	38	HTTS	- 3.0	4.0								Y
Y	836.3	1	38	HTTS	- 3.0	4.0								Y
A	837.0	1	27	HL1	- 5.0	5.0								
B	837.0	1	27	HL1	- 5.0	5.0								
C	837.0	1	27	HL1	- 5.0	5.0								Y
D	837.0	1	27	HL1	- 5.0	5.0								
E	837.0	1	27	HL1	- 5.0	5.0								Y
U	837.0	1	27	HL1	- 5.0	5.0								
UU	837.0	1	27	HL1	- 5.0	5.0								
V	837.0	1	27	HL1	- 5.0	5.0								
VV	837.0	1	27	HL1	- 5.0	5.0								Y
W	837.0	1	27	HL1	- 5.0	5.0								
X	837.0	1	27	HL1	- 5.0	5.0								Y
Y	837.0	1	27	HL1	- 5.0	5.0								Y
A	838.0	1	28	HL1	- 5.0	5.0								
B	838.0	1	28	HL1	- 5.0	5.0								
C	838.0	1	28	HL1	- 5.0	5.0								Y
D	838.0	1	28	HL1	- 5.0	5.0								
E	838.0	1	28	HL1	- 5.0	5.0								
U	838.0	1	28	HL1	- 5.0	5.0								
UU	838.0	1	28	HL1	- 5.0	5.0								
V	838.0	1	28	HL1	- 5.0	5.0								
VV	838.0	1	28	HL1	- 5.0	5.0								Y
W	838.0	1	28	HL1	- 5.0	5.0								
X	838.0	1	28	HL1	- 5.0	5.0								
Y	838.0	1	28	HL1	- 5.0	5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	839.0	1	29	HL1	- 5.0	5.0								Y
B	839.0	1	29	HL1	- 5.0	5.0								Y
C	839.0	1	29	HL1	- 5.0	5.0								Y
D	839.0	1	29	HL1	- 5.0	5.0								Y
E	839.0	1	29	HL1	- 5.0	5.0								Y
U	839.0	1	29	HL1	- 5.0	5.0								
UU	839.0	1	29	HL1	- 5.0	5.0								
V	839.0	1	29	HL1	- 5.0	5.0								
VV	839.0	1	29	HL1	- 5.0	5.0								Y
W	839.0	1	29	HL1	- 5.0	5.0								
X	839.0	1	29	HL1	- 5.0	5.0								Y
Y	839.0	1	29	HL1	- 5.0	5.0								Y
A	840.0	1	29	HL3	- 5.0	5.0								
B	840.0	1	29	HL3	- 5.0	5.0								Y
C	840.0	1	29	HL3	- 5.0	5.0								Y
D	840.0	1	29	HL3	- 5.0	5.0								
E	840.0	1	29	HL3	- 5.0	5.0								
U	840.0	1	29	HL3	- 5.0	5.0								
UU	840.0	1	29	HL3	- 5.0	5.0								
V	840.0	1	29	HL3	- 5.0	5.0								
VV	840.0	1	29	HL3	- 5.0	5.0								Y
W	840.0	1	29	HL3	- 5.0	5.0								
X	840.0	1	29	HL3	- 5.0	5.0								
Y	840.0	1	29	HL3	- 5.0	5.0								Y
A	841.0	4	30	HL4	- 5.0	5.0								
B	841.0	4	30	HL4	- 5.0	5.0								
C	841.0	4	30	HL4	- 5.0	5.0								
D	841.0	4	30	HL4	- 5.0	5.0								
E	841.0	4	30	HL4	- 5.0	5.0								
U	841.0	4	30	HL4	- 5.0	5.0								
UU	841.0	4	30	HL4	- 5.0	5.0								
V	841.0	4	30	HL4	- 5.0	5.0								
VV	841.0	4	30	HL4	- 5.0	5.0								Y
W	841.0	4	30	HL4	- 5.0	5.0								
X	841.0	4	30	HL4	- 5.0	5.0								
Y	841.0	4	30	HL4	- 5.0	5.0								
A	851.0	5	26	HL1	- 5.0	5.0								
B	851.0	5	26	HL1	- 5.0	5.0								Y
C	851.0	5	26	HL1	- 5.0	5.0								Y
D	851.0	5	26	HL1	- 5.0	5.0								Y
E	851.0	5	26	HL1	- 5.0	5.0								Y
U	851.0	5	26	HL1	- 5.0	5.0								
UU	851.0	5	26	HL1	- 5.0	5.0								
V	851.0	5	26	HL1	- 5.0	5.0								Y
VV	851.0	5	26	HL1	- 5.0	5.0								Y
W	851.0	5	26	HL1	- 5.0	5.0								
X	851.0	5	26	HL1	- 5.0	5.0								
Y	851.0	5	26	HL1	- 5.0	5.0								Y
A	855.0	5	64	HL1	- 5.0	5.0								
B	855.0	5	64	HL1	- 5.0	5.0								
C	855.0	5	64	HL1	- 5.0	5.0								Y
D	855.0	5	64	HL1	- 5.0	5.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	855.0	5	64	HL1	- 5.0	5.0								
U	855.0	5	64	HL1	- 5.0	5.0								
UU	855.0	5	64	HL1	- 5.0	5.0								
V	855.0	5	64	HL1	- 5.0	5.0								
VV	855.0	5	64	HL1	- 5.0	5.0								Y
W	855.0	5	64	HL1	- 5.0	5.0								
X	855.0	5	64	HL1	- 5.0	5.0								
Y	855.0	5	64	HL1	- 5.0	5.0								
A	856.0	5	77	HL1	- 5.0	5.0								Y
B	856.0	5	77	HL1	- 5.0	5.0								Y
C	856.0	5	77	HL1	- 5.0	5.0								Y
D	856.0	5	77	HL1	- 5.0	5.0								Y
E	856.0	5	77	HL1	- 5.0	5.0								Y
U	856.0	5	77	HL1	- 5.0	5.0								
UU	856.0	5	77	HL1	- 5.0	5.0								
V	856.0	5	77	HL1	- 5.0	5.0								Y
VV	856.0	5	77	HL1	- 5.0	5.0								Y
W	856.0	5	77	HL1	- 5.0	5.0								
X	856.0	5	77	HL1	- 5.0	5.0								Y
Y	856.0	5	77	HL1	- 5.0	5.0								
A	857.0	5	82	HL1	- 5.0	5.0								Y
B	857.0	5	82	HL1	- 5.0	5.0								Y
C	857.0	5	82	HL1	- 5.0	5.0								Y
D	857.0	5	82	HL1	- 5.0	5.0								Y
E	857.0	5	82	HL1	- 5.0	5.0								Y
U	857.0	5	82	HL1	- 5.0	5.0								
UU	857.0	5	82	HL1	- 5.0	5.0								
V	857.0	5	82	HL1	- 5.0	5.0								Y
VV	857.0	5	82	HL1	- 5.0	5.0								Y
W	857.0	5	82	HL1	- 5.0	5.0								
X	857.0	5	82	HL1	- 5.0	5.0								Y
Y	857.0	5	82	HL1	- 5.0	5.0								
A	858.0	5	82	HL2	- 5.0	5.0								Y
B	858.0	5	82	HL2	- 5.0	5.0								Y
C	858.0	5	82	HL2	- 5.0	5.0								Y
D	858.0	5	82	HL2	- 5.0	5.0								Y
E	858.0	5	82	HL2	- 5.0	5.0								Y
U	858.0	5	82	HL2	- 5.0	5.0								
UU	858.0	5	82	HL2	- 5.0	5.0								
V	858.0	5	82	HL2	- 5.0	5.0								Y
VV	858.0	5	82	HL2	- 5.0	5.0								Y
W	858.0	5	82	HL2	- 5.0	5.0								
X	858.0	5	82	HL2	- 5.0	5.0								Y
Y	858.0	5	82	HL2	- 5.0	5.0								
A	859.0	5	82	HL3	- 5.0	5.0								Y
B	859.0	5	82	HL3	- 5.0	5.0								Y
C	859.0	5	82	HL3	- 5.0	5.0								Y
D	859.0	5	82	HL3	- 5.0	5.0								Y
E	859.0	5	82	HL3	- 5.0	5.0								Y
U	859.0	5	82	HL3	- 5.0	5.0								
UU	859.0	5	82	HL3	- 5.0	5.0								
V	859.0	5	82	HL3	- 5.0	5.0								Y
VV	859.0	5	82	HL3	- 5.0	5.0								Y
W	859.0	5	82	HL3	- 5.0	5.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	859.0	5	82	HL3	- 5.0	5.0								Y
Y	859.0	5	82	HL3	- 5.0	5.0								
A	860.0	5	82	HL4	- 5.0	5.0								Y
B	860.0	5	82	HL4	- 5.0	5.0								Y
C	860.0	5	82	HL4	- 5.0	5.0								Y
D	860.0	5	82	HL4	- 5.0	5.0								Y
E	860.0	5	82	HL4	- 5.0	5.0								Y
U	860.0	5	82	HL4	- 5.0	5.0								
UU	860.0	5	82	HL4	- 5.0	5.0								
V	860.0	5	82	HL4	- 5.0	5.0								Y
VV	860.0	5	82	HL4	- 5.0	5.0								Y
W	860.0	5	82	HL4	- 5.0	5.0								
X	860.0	5	82	HL4	- 5.0	5.0								Y
Y	860.0	5	82	HL4	- 5.0	5.0								
A	861.0	5	82	HL5	- 5.0	5.0								Y
B	861.0	5	82	HL5	- 5.0	5.0								Y
C	861.0	5	82	HL5	- 5.0	5.0								Y
D	861.0	5	82	HL5	- 5.0	5.0								Y
E	861.0	5	82	HL5	- 5.0	5.0								Y
U	861.0	5	82	HL5	- 5.0	5.0								
UU	861.0	5	82	HL5	- 5.0	5.0								
V	861.0	5	82	HL5	- 5.0	5.0								Y
VV	861.0	5	82	HL5	- 5.0	5.0								Y
W	861.0	5	82	HL5	- 5.0	5.0								
X	861.0	5	82	HL5	- 5.0	5.0								Y
Y	861.0	5	82	HL5	- 5.0	5.0								
A	862.0	5	82	HL6	- 5.0	5.0								Y
B	862.0	5	82	HL6	- 5.0	5.0								Y
C	862.0	5	82	HL6	- 5.0	5.0								Y
D	862.0	5	82	HL6	- 5.0	5.0								Y
E	862.0	5	82	HL6	- 5.0	5.0								Y
U	862.0	5	82	HL6	- 5.0	5.0								
UU	862.0	5	82	HL6	- 5.0	5.0								
V	862.0	5	82	HL6	- 5.0	5.0								Y
VV	862.0	5	82	HL6	- 5.0	5.0								Y
W	862.0	5	82	HL6	- 5.0	5.0								
X	862.0	5	82	HL6	- 5.0	5.0								Y
Y	862.0	5	82	HL6	- 5.0	5.0								
A	863.0	12	62	HL1	- 6.0	4.0								Y
B	863.0	12	62	HL1	- 6.0	4.0								Y
C	863.0	12	62	HL1	- 6.0	4.0								Y
D	863.0	12	62	HL1	- 6.0	4.0								Y
E	863.0	12	62	HL1	- 6.0	4.0								Y
U	863.0	12	62	HL1	- 6.0	4.0								
UU	863.0	12	62	HL1	- 6.0	4.0								
V	863.0	12	62	HL1	- 6.0	4.0	ID		3	50.0	HL1	-1.0	3	Y
VV	863.0	12	62	HL1	- 6.0	4.0								
W	863.0	12	62	HL1	- 6.0	4.0								
X	863.0	12	62	HL1	- 6.0	4.0								Y
Y	863.0	12	62	HL1	- 6.0	4.0								Y
A	864.0	12	70	HL1	19.0	29.0								Y
B	864.0	12	70	HL1	19.0	29.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	864.0	12	70	HL1	19.0	29.0								Y
D	864.0	12	70	HL1	19.0	29.0								Y
E	864.0	12	70	HL1	19.0	29.0								Y
U	864.0	12	70	HL1	19.0	29.0								Y
UU	864.0	12	70	HL1	19.0	29.0								
V	864.0	12	70	HL1	19.0	29.0	ID		3	30.0	HL1	24.0	3	Y
VV	864.0	12	70	HL1	19.0	29.0								
W	864.0	12	70	HL1	19.0	29.0								
X	864.0	12	70	HL1	19.0	29.0								Y
Y	864.0	12	70	HL1	19.0	29.0								Y
A	865.0	14	36	HL1	- 5.0	5.0								Y
B	865.0	14	36	HL1	- 5.0	5.0								Y
C	865.0	14	36	HL1	- 5.0	5.0								Y
D	865.0	14	36	HL1	- 5.0	5.0								Y
E	865.0	14	36	HL1	- 5.0	5.0								Y
U	865.0	14	36	HL1	- 5.0	5.0								Y
UU	865.0	14	36	HL1	- 5.0	5.0								Y
V	865.0	14	36	HL1	- 5.0	5.0								Y
VV	865.0	14	36	HL1	- 5.0	5.0								Y
W	865.0	14	36	HL1	- 5.0	5.0								
X	865.0	14	36	HL1	- 5.0	5.0								Y
Y	865.0	14	36	HL1	- 5.0	5.0								Y
A	866.0	14	36	HL2	- 5.0	5.0								Y
B	866.0	14	36	HL2	- 5.0	5.0								Y
C	866.0	14	36	HL2	- 5.0	5.0								Y
D	866.0	14	36	HL2	- 5.0	5.0								Y
E	866.0	14	36	HL2	- 5.0	5.0								Y
U	866.0	14	36	HL2	- 5.0	5.0								Y
UU	866.0	14	36	HL2	- 5.0	5.0								
V	866.0	14	36	HL2	- 5.0	5.0								Y
VV	866.0	14	36	HL2	- 5.0	5.0								Y
W	866.0	14	36	HL2	- 5.0	5.0								
X	866.0	14	36	HL2	- 5.0	5.0								Y
Y	866.0	14	36	HL2	- 5.0	5.0								Y
A	867.0	14	36	HL3	- 5.0	5.0								Y
B	867.0	14	36	HL3	- 5.0	5.0								Y
C	867.0	14	36	HL3	- 5.0	5.0								Y
D	867.0	14	36	HL3	- 5.0	5.0								Y
E	867.0	14	36	HL3	- 5.0	5.0								Y
U	867.0	14	36	HL3	- 5.0	5.0								Y
UU	867.0	14	36	HL3	- 5.0	5.0								
V	867.0	14	36	HL3	- 5.0	5.0								Y
VV	867.0	14	36	HL3	- 5.0	5.0								Y
W	867.0	14	36	HL3	- 5.0	5.0								
X	867.0	14	36	HL3	- 5.0	5.0								Y
Y	867.0	14	36	HL3	- 5.0	5.0								Y
A	868.0	14	36	HL4	- 5.0	5.0								Y
B	868.0	14	36	HL4	- 5.0	5.0								Y
C	868.0	14	36	HL4	- 5.0	5.0								Y
D	868.0	14	36	HL4	- 5.0	5.0								Y
E	868.0	14	36	HL4	- 5.0	5.0								Y
U	868.0	14	36	HL4	- 5.0	5.0								Y
UU	868.0	14	36	HL4	- 5.0	5.0								
V	868.0	14	36	HL4	- 5.0	5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	868.0	14	36	HL4	-5.0	5.0								Y
W	868.0	14	36	HL4	-5.0	5.0								
X	868.0	14	36	HL4	-5.0	5.0								Y
Y	868.0	14	36	HL4	-5.0	5.0								Y
A	869.0	14	36	HL5	-5.0	5.0								Y
B	869.0	14	36	HL5	-5.0	5.0								Y
C	869.0	14	36	HL5	-5.0	5.0								Y
D	869.0	14	36	HL5	-5.0	5.0								Y
E	869.0	14	36	HL5	-5.0	5.0								Y
U	869.0	14	36	HL5	-5.0	5.0								Y
UU	869.0	14	36	HL5	-5.0	5.0								
V	869.0	14	36	HL5	-5.0	5.0								Y
VV	869.0	14	36	HL5	-5.0	5.0								Y
W	869.0	14	36	HL5	-5.0	5.0								
X	869.0	14	36	HL5	-5.0	5.0								Y
Y	869.0	14	36	HL5	-5.0	5.0								Y
A	870.0	14	36	HL6	-5.0	5.0								Y
B	870.0	14	36	HL6	-5.0	5.0								Y
C	870.0	14	36	HL6	-5.0	5.0								Y
D	870.0	14	36	HL6	-5.0	5.0								Y
E	870.0	14	36	HL6	-5.0	5.0								Y
U	870.0	14	36	HL6	-5.0	5.0								Y
UU	870.0	14	36	HL6	-5.0	5.0								
V	870.0	14	36	HL6	-5.0	5.0								Y
VV	870.0	14	36	HL6	-5.0	5.0								Y
W	870.0	14	36	HL6	-5.0	5.0								
X	870.0	14	36	HL6	-5.0	5.0								Y
Y	870.0	14	36	HL6	-5.0	5.0								Y
A	871.0	15	33	HL1	3.6	13.6								Y
B	871.0	15	33	HL1	3.6	13.6								Y
C	871.0	15	33	HL1	3.6	13.6								Y
D	871.0	15	33	HL1	3.6	13.6								Y
E	871.0	15	33	HL1	3.6	13.6								Y
U	871.0	15	33	HL1	3.6	13.6								Y
UU	871.0	15	33	HL1	3.6	13.6								
V	871.0	15	33	HL1	3.6	13.6								Y
VV	871.0	15	33	HL1	3.6	13.6								
W	871.0	15	33	HL1	3.6	13.6								
X	871.0	15	33	HL1	3.6	13.6								Y
Y	871.0	15	33	HL1	3.6	13.6								Y
A	872.0	16	36	HL1	-5.0	5.0								Y
B	872.0	16	36	HL1	-5.0	5.0								Y
C	872.0	16	36	HL1	-5.0	5.0								Y
D	872.0	16	36	HL1	-5.0	5.0								Y
E	872.0	16	36	HL1	-5.0	5.0								
U	872.0	16	36	HL1	-5.0	5.0								Y
UU	872.0	16	36	HL1	-5.0	5.0								
V	872.0	16	36	HL1	-5.0	5.0								Y
VV	872.0	16	36	HL1	-5.0	5.0								
W	872.0	16	36	HL1	-5.0	5.0								
X	872.0	16	36	HL1	-5.0	5.0								Y
Y	872.0	16	36	HL1	-5.0	5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	873.0	16	36	HL4	-5.0	5.0								Y
B	873.0	16	36	HL4	-5.0	5.0								Y
C	873.0	16	36	HL4	-5.0	5.0								Y
D	873.0	16	36	HL4	-5.0	5.0								Y
E	873.0	16	36	HL4	-5.0	5.0								
U	873.0	16	36	HL4	-5.0	5.0								Y
UU	873.0	16	36	HL4	-5.0	5.0								
V	873.0	16	36	HL4	-5.0	5.0								Y
VV	873.0	16	36	HL4	-5.0	5.0								
W	873.0	16	36	HL4	-5.0	5.0								
X	873.0	16	36	HL4	-5.0	5.0								Y
Y	873.0	16	36	HL4	-5.0	5.0								Y
A	874.0	20	33	HL1	-0.7	9.3								Y
B	874.0	20	33	HL1	-0.7	9.3								Y
C	874.0	20	33	HL1	-0.7	9.3								Y
D	874.0	20	33	HL1	-0.7	9.3								Y
E	874.0	20	33	HL1	-0.7	9.3								Y
U	874.0	20	33	HL1	-0.7	9.3								Y
UU	874.0	20	33	HL1	-0.7	9.3								
V	874.0	20	33	HL1	-0.7	9.3								Y
VV	874.0	20	33	HL1	-0.7	9.3								
W	874.0	20	33	HL1	-0.7	9.3								
X	874.0	20	33	HL1	-0.7	9.3								Y
Y	874.0	20	33	HL1	-0.7	9.3								Y
A	875.0	20	33	HL3	-1.9	8.1								Y
B	875.0	20	33	HL3	-1.9	8.1								Y
C	875.0	20	33	HL3	-1.9	8.1								Y
D	875.0	20	33	HL3	-1.9	8.1								Y
E	875.0	20	33	HL3	-1.9	8.1								Y
U	875.0	20	33	HL3	-1.9	8.1	OD	W	2	< 20.0	HL3	8.0		Y
UU	875.0	20	33	HL3	-1.9	8.1								
V	875.0	20	33	HL3	-1.9	8.1								Y
VV	875.0	20	33	HL3	-1.9	8.1								
W	875.0	20	33	HL3	-1.9	8.1								
X	875.0	20	33	HL3	-1.9	8.1								Y
Y	875.0	20	33	HL3	-1.9	8.1								Y
A	876.0	22	72	HL1	-7.0	3.0								Y
B	876.0	22	72	HL1	-7.0	3.0								Y
C	876.0	22	72	HL1	-7.0	3.0								Y
D	876.0	22	72	HL1	-7.0	3.0								Y
E	876.0	22	72	HL1	-7.0	3.0								Y
U	876.0	22	72	HL1	-7.0	3.0								
UU	876.0	22	72	HL1	-7.0	3.0								
V	876.0	22	72	HL1	-7.0	3.0	ID		3	50.0	HL1	-2.0	3	Y
VV	876.0	22	72	HL1	-7.0	3.0								
W	876.0	22	72	HL1	-7.0	3.0								
X	876.0	22	72	HL1	-7.0	3.0								Y
Y	876.0	22	72	HL1	-7.0	3.0								Y
A	877.0	2	28	HL2	-5.0	5.0								
B	877.0	2	28	HL2	-5.0	5.0								
C	877.0	2	28	HL2	-5.0	5.0								Y
D	877.0	2	28	HL2	-5.0	5.0								
E	877.0	2	28	HL2	-5.0	5.0								
U	877.0	2	28	HL2	-5.0	5.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	877.0	2	28	HL2	- 5.0	5.0								
V	877.0	2	28	HL2	- 5.0	5.0								
VV	877.0	2	28	HL2	- 5.0	5.0								Y
W	877.0	2	28	HL2	- 5.0	5.0								
X	877.0	2	28	HL2	- 5.0	5.0								
Y	877.0	2	28	HL2	- 5.0	5.0								Y
A	878.0	7	48	HL2	- 9.0	1.0								Y
B	878.0	7	48	HL2	- 9.0	1.0								Y
C	878.0	7	48	HL2	- 9.0	1.0								Y
D	878.0	7	48	HL2	- 9.0	1.0								Y
E	878.0	7	48	HL2	- 9.0	1.0								Y
U	878.0	7	48	HL2	- 9.0	1.0								
UU	878.0	7	48	HL2	- 9.0	1.0								
V	878.0	7	48	HL2	- 9.0	1.0	ID		3	50.0	HL2	-4.0	3	Y
VV	878.0	7	48	HL2	- 9.0	1.0								Y
W	878.0	7	48	HL2	- 9.0	1.0								
X	878.0	7	48	HL2	- 9.0	1.0								Y
Y	878.0	7	48	HL2	- 9.0	1.0								Y
A	879.0	7	48	HL5	18.6	28.6								Y
B	879.0	7	48	HL5	18.6	28.6								Y
C	879.0	7	48	HL5	18.6	28.6								Y
D	879.0	7	48	HL5	18.6	28.6								Y
E	879.0	7	48	HL5	18.6	28.6								Y
U	879.0	7	48	HL5	18.6	28.6								
UU	879.0	7	48	HL5	18.6	28.6								
V	879.0	7	48	HL5	18.6	28.6								Y
VV	879.0	7	48	HL5	18.6	28.6								Y
W	879.0	7	48	HL5	18.6	28.6								
X	879.0	7	48	HL5	18.6	28.6								Y
Y	879.0	7	48	HL5	18.6	28.6								Y
A	880.0	8	79	HL2	- 4.0	6.0	OD		3	< 20.0	HL2	1.0	2	Y
B	880.0	8	79	HL2	- 4.0	6.0								Y
C	880.0	8	79	HL2	- 4.0	6.0								Y
D	880.0	8	79	HL2	- 4.0	6.0								Y
E	880.0	8	79	HL2	- 4.0	6.0								Y
U	880.0	8	79	HL2	- 4.0	6.0								
UU	880.0	8	79	HL2	- 4.0	6.0								
V	880.0	8	79	HL2	- 4.0	6.0								Y
VV	880.0	8	79	HL2	- 4.0	6.0								Y
W	880.0	8	79	HL2	- 4.0	6.0								
X	880.0	8	79	HL2	- 4.0	6.0								Y
Y	880.0	8	79	HL2	- 4.0	6.0								Y
A	881.0	9	47	HL2	-35.0	-15.0								Y
B	881.0	9	47	HL2	-35.0	-15.0								Y
C	881.0	9	47	HL2	-35.0	-15.0								Y
D	881.0	9	47	HL2	-35.0	-15.0								Y
E	881.0	9	47	HL2	-35.0	-15.0								Y
U	881.0	9	47	HL2	-35.0	-15.0								
UU	881.0	9	47	HL2	-35.0	-15.0								
V	881.0	9	47	HL2	-35.0	-15.0								Y
VV	881.0	9	47	HL2	-35.0	-15.0								Y
W	881.0	9	47	HL2	-35.0	-15.0								
X	881.0	9	47	HL2	-35.0	-15.0								Y
Y	881.0	9	47	HL2	-35.0	-15.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	883.0	11	71	HL2	- 4.3	5.7	OD		3	< 20.0	HL2	0.7	5	Y
B	883.0	11	71	HL2	- 4.3	5.7	OD		3	< 20.0	HL2	0.0	5	Y
C	883.0	11	71	HL2	- 4.3	5.7								Y
D	883.0	11	71	HL2	- 4.3	5.7								Y
E	883.0	11	71	HL2	- 4.3	5.7								Y
U	883.0	11	71	HL2	- 4.3	5.7								Y
UU	883.0	11	71	HL2	- 4.3	5.7								
V	883.0	11	71	HL2	- 4.3	5.7								Y
VV	883.0	11	71	HL2	- 4.3	5.7								Y
W	883.0	11	71	HL2	- 4.3	5.7								
X	883.0	11	71	HL2	- 4.3	5.7								Y
Y	883.0	11	71	HL2	- 4.3	5.7								Y
A	884.0	11	71	HL4	- 4.0	6.0	OD		3	< 20.0	HL4	1.0	1	Y
B	884.0	11	71	HL4	- 4.0	6.0								Y
C	884.0	11	71	HL4	- 4.0	6.0								Y
D	884.0	11	71	HL4	- 4.0	6.0								Y
E	884.0	11	71	HL4	- 4.0	6.0								Y
U	884.0	11	71	HL4	- 4.0	6.0								Y
UU	884.0	11	71	HL4	- 4.0	6.0								
V	884.0	11	71	HL4	- 4.0	6.0								Y
VV	884.0	11	71	HL4	- 4.0	6.0								Y
W	884.0	11	71	HL4	- 4.0	6.0								
X	884.0	11	71	HL4	- 4.0	6.0								Y
Y	884.0	11	71	HL4	- 4.0	6.0								Y
A	885.0	11	71	HL6	5.2	15.2								Y
B	885.0	11	71	HL6	5.2	15.2								Y
C	885.0	11	71	HL6	5.2	15.2								Y
D	885.0	11	71	HL6	5.2	15.2								Y
E	885.0	11	71	HL6	5.2	15.2								Y
U	885.0	11	71	HL6	5.2	15.2								Y
UU	885.0	11	71	HL6	5.2	15.2								
V	885.0	11	71	HL6	5.2	15.2								Y
VV	885.0	11	71	HL6	5.2	15.2								Y
W	885.0	11	71	HL6	5.2	15.2								
X	885.0	11	71	HL6	5.2	15.2								Y
Y	885.0	11	71	HL6	5.2	15.2								Y
A	886.0	13	73	HL2	- 5.0	5.0	OD		3	< 20.0	HL2		2	Y
B	886.0	13	73	HL2	- 5.0	5.0								Y
C	886.0	13	73	HL2	- 5.0	5.0								Y
D	886.0	13	73	HL2	- 5.0	5.0								Y
E	886.0	13	73	HL2	- 5.0	5.0								Y
U	886.0	13	73	HL2	- 5.0	5.0								Y
UU	886.0	13	73	HL2	- 5.0	5.0								
V	886.0	13	73	HL2	- 5.0	5.0								Y
VV	886.0	13	73	HL2	- 5.0	5.0								Y
W	886.0	13	73	HL2	- 5.0	5.0								
X	886.0	13	73	HL2	- 5.0	5.0								Y
Y	886.0	13	73	HL2	- 5.0	5.0								Y
A	887.0	13	73	HL6	5.6	15.6								Y
B	887.0	13	73	HL6	5.6	15.6								Y
C	887.0	13	73	HL6	5.6	15.6								Y
D	887.0	13	73	HL6	5.6	15.6								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	887.0	13	73	HL6	5.6	15.6								Y
U	887.0	13	73	HL6	5.6	15.6								Y
UU	887.0	13	73	HL6	5.6	15.6								
V	887.0	13	73	HL6	5.6	15.6								Y
VV	887.0	13	73	HL6	5.6	15.6								Y
W	887.0	13	73	HL6	5.6	15.6								
X	887.0	13	73	HL6	5.6	15.6								Y
Y	887.0	13	73	HL6	5.6	15.6								Y
A	888.0	14	55	HL2	-22.0	- 6.8								Y
B	888.0	14	55	HL2	-22.0	- 6.8								Y
C	888.0	14	55	HL2	-22.0	- 6.8								Y
D	888.0	14	55	HL2	-22.0	- 6.8								Y
E	888.0	14	55	HL2	-22.0	- 6.8								Y
U	888.0	14	55	HL2	-22.0	- 6.8								
UU	888.0	14	55	HL2	-22.0	- 6.8								
V	888.0	14	55	HL2	-22.0	- 6.8	ID		3	50.0	HL2		3	Y
VV	888.0	14	55	HL2	-22.0	- 6.8								
W	888.0	14	55	HL2	-22.0	- 6.8								
X	888.0	14	55	HL2	-22.0	- 6.8								Y
Y	888.0	14	55	HL2	-22.0	- 6.8								Y
A	889.0	14	55	HL2	5.0	21.9								Y
B	889.0	14	55	HL2	5.0	21.9								Y
C	889.0	14	55	HL2	5.0	21.9								Y
D	889.0	14	55	HL2	5.0	21.9								Y
E	889.0	14	55	HL2	5.0	21.9								Y
U	889.0	14	55	HL2	5.0	21.9								
UU	889.0	14	55	HL2	5.0	21.9								
V	889.0	14	55	HL2	5.0	21.9								Y
VV	889.0	14	55	HL2	5.0	21.9								
W	889.0	14	55	HL2	5.0	21.9								
X	889.0	14	55	HL2	5.0	21.9								Y
Y	889.0	14	55	HL2	5.0	21.9								Y
A	891.0	16	37	HL2	2.0	12.0								Y
B	891.0	16	37	HL2	2.0	12.0								Y
C	891.0	16	37	HL2	2.0	12.0								Y
D	891.0	16	37	HL2	2.0	12.0								Y
E	891.0	16	37	HL2	2.0	12.0								Y
U	891.0	16	37	HL2	2.0	12.0								Y
UU	891.0	16	37	HL2	2.0	12.0								
V	891.0	16	37	HL2	2.0	12.0								Y
VV	891.0	16	37	HL2	2.0	12.0								
W	891.0	16	37	HL2	2.0	12.0								
X	891.0	16	37	HL2	2.0	12.0								Y
Y	891.0	16	37	HL2	2.0	12.0								Y
A	893.0	29	48	HL2	-35.0	-15.0								Y
B	893.0	29	48	HL2	-35.0	-15.0								Y
C	893.0	29	48	HL2	-35.0	-15.0								Y
D	893.0	29	48	HL2	-35.0	-15.0								Y
E	893.0	29	48	HL2	-35.0	-15.0								Y
U	893.0	29	48	HL2	-35.0	-15.0								
UU	893.0	29	48	HL2	-35.0	-15.0								
V	893.0	29	48	HL2	-35.0	-15.0								Y
VV	893.0	29	48	HL2	-35.0	-15.0								Y
W	893.0	29	48	HL2	-35.0	-15.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	893.0	29	48	HL2	-35.0	-15.0								Y
Y	893.0	29	48	HL2	-35.0	-15.0								Y
A	897.0	26	70	HL3	12.0	23.0								Y
B	897.0	26	70	HL3	12.0	23.0								Y
C	897.0	26	70	HL3	12.0	23.0								Y
D	897.0	26	70	HL3	12.0	23.0								Y
E	897.0	26	70	HL3	12.0	23.0								Y
U	897.0	26	70	HL3	12.0	23.0								
UU	897.0	26	70	HL3	12.0	23.0								
V	897.0	26	70	HL3	12.0	23.0								Y
VV	897.0	26	70	HL3	12.0	23.0								Y
W	897.0	26	70	HL3	12.0	23.0								
X	897.0	26	70	HL3	12.0	23.0								Y
Y	897.0	26	70	HL3	12.0	23.0								Y
A	898.0	27	70	HL3	13.0	24.0								Y
B	898.0	27	70	HL3	13.0	24.0								Y
C	898.0	27	70	HL3	13.0	24.0								Y
D	898.0	27	70	HL3	13.0	24.0								Y
E	898.0	27	70	HL3	13.0	24.0								Y
U	898.0	27	70	HL3	13.0	24.0								
UU	898.0	27	70	HL3	13.0	24.0								
V	898.0	27	70	HL3	13.0	24.0								Y
VV	898.0	27	70	HL3	13.0	24.0								Y
W	898.0	27	70	HL3	13.0	24.0								
X	898.0	27	70	HL3	13.0	24.0								Y
Y	898.0	27	70	HL3	13.0	24.0								Y
A	899.0	28	70	HL3	13.0	25.0								Y
B	899.0	28	70	HL3	13.0	25.0								Y
C	899.0	28	70	HL3	13.0	25.0								Y
D	899.0	28	70	HL3	13.0	25.0								Y
E	899.0	28	70	HL3	13.0	25.0								Y
U	899.0	28	70	HL3	13.0	25.0								
UU	899.0	28	70	HL3	13.0	25.0								
V	899.0	28	70	HL3	13.0	25.0								Y
VV	899.0	28	70	HL3	13.0	25.0								Y
W	899.0	28	70	HL3	13.0	25.0								
X	899.0	28	70	HL3	13.0	25.0								Y
Y	899.0	28	70	HL3	13.0	25.0								Y
A	900.0	29	70	HL3	14.6	24.6								Y
B	900.0	29	70	HL3	14.6	24.6								Y
C	900.0	29	70	HL3	14.6	24.6								Y
D	900.0	29	70	HL3	14.6	24.6								Y
E	900.0	29	70	HL3	14.6	24.6								Y
U	900.0	29	70	HL3	14.6	24.6								
UU	900.0	29	70	HL3	14.6	24.6								
V	900.0	29	70	HL3	14.6	24.6								Y
VV	900.0	29	70	HL3	14.6	24.6								Y
W	900.0	29	70	HL3	14.6	24.6								
X	900.0	29	70	HL3	14.6	24.6								Y
Y	900.0	29	70	HL3	14.6	24.6	OD			< 10.0	HL3	19.7		Y
A	901.0	39	31	HL3	-35.0	-15.0								Y
B	901.0	39	31	HL3	-35.0	-15.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	901.0	39	31	HL3	-35.0	-15.0								Y
D	901.0	39	31	HL3	-35.0	-15.0								Y
E	901.0	39	31	HL3	-35.0	-15.0								Y
U	901.0	39	31	HL3	-35.0	-15.0								
UU	901.0	39	31	HL3	-35.0	-15.0								
V	901.0	39	31	HL3	-35.0	-15.0								Y
VV	901.0	39	31	HL3	-35.0	-15.0								
W	901.0	39	31	HL3	-35.0	-15.0								
X	901.0	39	31	HL3	-35.0	-15.0								Y
Y	901.0	39	31	HL3	-35.0	-15.0								Y
A	902.0	3	28	HL4	- 5.0	5.0								
B	902.0	3	28	HL4	- 5.0	5.0								
C	902.0	3	28	HL4	- 5.0	5.0								
D	902.0	3	28	HL4	- 5.0	5.0								
E	902.0	3	28	HL4	- 5.0	5.0								
U	902.0	3	28	HL4	- 5.0	5.0								
UU	902.0	3	28	HL4	- 5.0	5.0								
V	902.0	3	28	HL4	- 5.0	5.0								
VV	902.0	3	28	HL4	- 5.0	5.0								Y
W	902.0	3	28	HL4	- 5.0	5.0								
X	902.0	3	28	HL4	- 5.0	5.0								
Y	902.0	3	28	HL4	- 5.0	5.0								
A	903.0	4	28	HL4	- 5.0	5.0								
B	903.0	4	28	HL4	- 5.0	5.0								
C	903.0	4	28	HL4	- 5.0	5.0								
D	903.0	4	28	HL4	- 5.0	5.0								
E	903.0	4	28	HL4	- 5.0	5.0								
U	903.0	4	28	HL4	- 5.0	5.0								
UU	903.0	4	28	HL4	- 5.0	5.0								
V	903.0	4	28	HL4	- 5.0	5.0								
VV	903.0	4	28	HL4	- 5.0	5.0								Y
W	903.0	4	28	HL4	- 5.0	5.0								
X	903.0	4	28	HL4	- 5.0	5.0								
Y	903.0	4	28	HL4	- 5.0	5.0								
A	904.0	7	64	HL4	- 5.0	5.0								Y
B	904.0	7	64	HL4	- 5.0	5.0								Y
C	904.0	7	64	HL4	- 5.0	5.0								Y
D	904.0	7	64	HL4	- 5.0	5.0								Y
E	904.0	7	64	HL4	- 5.0	5.0								Y
U	904.0	7	64	HL4	- 5.0	5.0								
UU	904.0	7	64	HL4	- 5.0	5.0								
V	904.0	7	64	HL4	- 5.0	5.0								Y
VV	904.0	7	64	HL4	- 5.0	5.0								Y
W	904.0	7	64	HL4	- 5.0	5.0								
X	904.0	7	64	HL4	- 5.0	5.0								Y
Y	904.0	7	64	HL4	- 5.0	5.0								Y
A	905.0	8	28	HL4	-14.1	- 4.1								Y
B	905.0	8	28	HL4	-14.1	- 4.1								Y
C	905.0	8	28	HL4	-14.1	- 4.1								Y
D	905.0	8	28	HL4	-14.1	- 4.1								Y
E	905.0	8	28	HL4	-14.1	- 4.1								Y
U	905.0	8	28	HL4	-14.1	- 4.1								
UU	905.0	8	28	HL4	-14.1	- 4.1								
V	905.0	8	28	HL4	-14.1	- 4.1								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	905.0	8	28	HL4	-14.1	- 4.1								
W	905.0	8	28	HL4	-14.1	- 4.1								
X	905.0	8	28	HL4	-14.1	- 4.1	OD	WG		20.0	HL4	-9.1		Y
Y	905.0	8	28	HL4	-14.1	- 4.1								Y
A	906.0	8	67	HL4	- 5.0	5.0								Y
B	906.0	8	67	HL4	- 5.0	5.0								Y
C	906.0	8	67	HL4	- 5.0	5.0								Y
D	906.0	8	67	HL4	- 5.0	5.0								Y
E	906.0	8	67	HL4	- 5.0	5.0								Y
U	906.0	8	67	HL4	- 5.0	5.0								
UU	906.0	8	67	HL4	- 5.0	5.0								
V	906.0	8	67	HL4	- 5.0	5.0								Y
VV	906.0	8	67	HL4	- 5.0	5.0								
W	906.0	8	67	HL4	- 5.0	5.0								
X	906.0	8	67	HL4	- 5.0	5.0								Y
Y	906.0	8	67	HL4	- 5.0	5.0								Y
A	907.0	8	67	HL5	- 8.8	1.2								Y
B	907.0	8	67	HL5	- 8.8	1.2								Y
C	907.0	8	67	HL5	- 8.8	1.2								Y
D	907.0	8	67	HL5	- 8.8	1.2								Y
E	907.0	8	67	HL5	- 8.8	1.2								Y
U	907.0	8	67	HL5	- 8.8	1.2								
UU	907.0	8	67	HL5	- 8.8	1.2								
V	907.0	8	67	HL5	- 8.8	1.2								Y
VV	907.0	8	67	HL5	- 8.8	1.2								
W	907.0	8	67	HL5	- 8.8	1.2								
X	907.0	8	67	HL5	- 8.8	1.2								Y
Y	907.0	8	67	HL5	- 8.8	1.2								Y
A	908.0	10	39	HL4	- 5.0	5.0								
B	908.0	10	39	HL4	- 5.0	5.0								
C	908.0	10	39	HL4	- 5.0	5.0								
D	908.0	10	39	HL4	- 5.0	5.0								
E	908.0	10	39	HL4	- 5.0	5.0								
U	908.0	10	39	HL4	- 5.0	5.0								
UU	908.0	10	39	HL4	- 5.0	5.0								
V	908.0	10	39	HL4	- 5.0	5.0								
VV	908.0	10	39	HL4	- 5.0	5.0								Y
W	908.0	10	39	HL4	- 5.0	5.0								
X	908.0	10	39	HL4	- 5.0	5.0								
Y	908.0	10	39	HL4	- 5.0	5.0								
A	909.0	10	39	HL5	- 5.0	5.0								
B	909.0	10	39	HL5	- 5.0	5.0								
C	909.0	10	39	HL5	- 5.0	5.0								
D	909.0	10	39	HL5	- 5.0	5.0								
E	909.0	10	39	HL5	- 5.0	5.0								
U	909.0	10	39	HL5	- 5.0	5.0								
UU	909.0	10	39	HL5	- 5.0	5.0								
V	909.0	10	39	HL5	- 5.0	5.0								
VV	909.0	10	39	HL5	- 5.0	5.0								Y
W	909.0	10	39	HL5	- 5.0	5.0								
X	909.0	10	39	HL5	- 5.0	5.0								
Y	909.0	10	39	HL5	- 5.0	5.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	911.0	13	44	HL4	-35.0	-15.0								Y
B	911.0	13	44	HL4	-35.0	-15.0								Y
C	911.0	13	44	HL4	-35.0	-15.0								Y
D	911.0	13	44	HL4	-35.0	-15.0								Y
E	911.0	13	44	HL4	-35.0	-15.0								Y
U	911.0	13	44	HL4	-35.0	-15.0								
UU	911.0	13	44	HL4	-35.0	-15.0								
V	911.0	13	44	HL4	-35.0	-15.0								
VV	911.0	13	44	HL4	-35.0	-15.0								
W	911.0	13	44	HL4	-35.0	-15.0								
X	911.0	13	44	HL4	-35.0	-15.0								Y
Y	911.0	13	44	HL4	-35.0	-15.0								Y
A	913.0	14	72	HL4	- 9.6	-19.6								Y
B	913.0	14	72	HL4	- 9.6	-19.6								Y
C	913.0	14	72	HL4	- 9.6	-19.6								Y
D	913.0	14	72	HL4	- 9.6	-19.6								Y
E	913.0	14	72	HL4	- 9.6	-19.6								Y
U	913.0	14	72	HL4	- 9.6	-19.6								Y
UU	913.0	14	72	HL4	- 9.6	-19.6								
V	913.0	14	72	HL4	- 9.6	-19.6	ID		3	50.0	HL4	-14.0	3	Y
VV	913.0	14	72	HL4	- 9.6	-19.6								
W	913.0	14	72	HL4	- 9.6	-19.6								
X	913.0	14	72	HL4	- 9.6	-19.6								Y
Y	913.0	14	72	HL4	- 9.6	-19.6								Y
A	914.0	14	72	HL6	5.6	15.6								Y
B	914.0	14	72	HL6	5.6	15.6								Y
C	914.0	14	72	HL6	5.6	15.6								Y
D	914.0	14	72	HL6	5.6	15.6								Y
E	914.0	14	72	HL6	5.6	15.6								Y
U	914.0	14	72	HL6	5.6	15.6								Y
UU	914.0	14	72	HL6	5.6	15.6								
V	914.0	14	72	HL6	5.6	15.6								Y
VV	914.0	14	72	HL6	5.6	15.6								
W	914.0	14	72	HL6	5.6	15.6								
X	914.0	14	72	HL6	5.6	15.6								Y
Y	914.0	14	72	HL6	5.6	15.6								Y
A	915.0	14	73	HL4	- 5.0	5.0								Y
B	915.0	14	73	HL4	- 5.0	5.0								Y
C	915.0	14	73	HL4	- 5.0	5.0								Y
D	915.0	14	73	HL4	- 5.0	5.0								Y
E	915.0	14	73	HL4	- 5.0	5.0								Y
U	915.0	14	73	HL4	- 5.0	5.0								
UU	915.0	14	73	HL4	- 5.0	5.0								
V	915.0	14	73	HL4	- 5.0	5.0	ID		3	50.0	HL4		3	Y
VV	915.0	14	73	HL4	- 5.0	5.0								
W	915.0	14	73	HL4	- 5.0	5.0								
X	915.0	14	73	HL4	- 5.0	5.0								Y
Y	915.0	14	73	HL4	- 5.0	5.0								Y
A	916.0	14	73	HL6	5.6	15.6								Y
B	916.0	14	73	HL6	5.6	15.6								Y
C	916.0	14	73	HL6	5.6	15.6								Y
D	916.0	14	73	HL6	5.6	15.6								Y
E	916.0	14	73	HL6	5.6	15.6								Y
U	916.0	14	73	HL6	5.6	15.6								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	916.0	14	73	HL6	5.6	15.6								
V	916.0	14	73	HL6	5.6	15.6								Y
VV	916.0	14	73	HL6	5.6	15.6								
W	916.0	14	73	HL6	5.6	15.6								
X	916.0	14	73	HL6	5.6	15.6								Y
Y	916.0	14	73	HL6	5.6	15.6								Y
A	917.0	16	35	HL4	-28.8	-18.8								Y
B	917.0	16	35	HL4	-28.8	-18.8								Y
C	917.0	16	35	HL4	-28.8	-18.8								Y
D	917.0	16	35	HL4	-28.8	-18.8								Y
E	917.0	16	35	HL4	-28.8	-18.8								Y
U	917.0	16	35	HL4	-28.8	-18.8								Y
UU	917.0	16	35	HL4	-28.8	-18.8								
V	917.0	16	35	HL4	-28.8	-18.8	ID		3	< 20.0	HL4	-23.8	3	Y
VV	917.0	16	35	HL4	-28.8	-18.8								
W	917.0	16	35	HL4	-28.8	-18.8								
X	917.0	16	35	HL4	-28.8	-18.8								Y
Y	917.0	16	35	HL4	-28.8	-18.8								Y
A	918.0	24	60	HL4	-35.0	-15.0								Y
B	918.0	24	60	HL4	-35.0	-15.0								Y
C	918.0	24	60	HL4	-35.0	-15.0								Y
D	918.0	24	60	HL4	-35.0	-15.0								Y
E	918.0	24	60	HL4	-35.0	-15.0								Y
U	918.0	24	60	HL4	-35.0	-15.0								
UU	918.0	24	60	HL4	-35.0	-15.0								
V	918.0	24	60	HL4	-35.0	-15.0								Y
VV	918.0	24	60	HL4	-35.0	-15.0								
W	918.0	24	60	HL4	-35.0	-15.0								
X	918.0	24	60	HL4	-35.0	-15.0								Y
Y	918.0	24	60	HL4	-35.0	-15.0								Y
A	919.0	35	56	HL4	- 5.0	5.0								Y
B	919.0	35	56	HL4	- 5.0	5.0								Y
C	919.0	35	56	HL4	- 5.0	5.0								Y
D	919.0	35	56	HL4	- 5.0	5.0								Y
E	919.0	35	56	HL4	- 5.0	5.0								Y
U	919.0	35	56	HL4	- 5.0	5.0								
UU	919.0	35	56	HL4	- 5.0	5.0								
V	919.0	35	56	HL4	- 5.0	5.0	ID		3	50.0	HL4		3	Y
VV	919.0	35	56	HL4	- 5.0	5.0								Y
W	919.0	35	56	HL4	- 5.0	5.0								
X	919.0	35	56	HL4	- 5.0	5.0								Y
Y	919.0	35	56	HL4	- 5.0	5.0								Y
A	920.0	38	59	HL4	13.0	23.0								Y
B	920.0	38	59	HL4	13.0	23.0								Y
C	920.0	38	59	HL4	13.0	23.0								Y
D	920.0	38	59	HL4	13.0	23.0								Y
E	920.0	38	59	HL4	13.0	23.0								Y
U	920.0	38	59	HL4	13.0	23.0								
UU	920.0	38	59	HL4	13.0	23.0								
V	920.0	38	59	HL4	13.0	23.0	ID		3	50.0	HL4	18.0	3	Y
VV	920.0	38	59	HL4	13.0	23.0								Y
W	920.0	38	59	HL4	13.0	23.0								
X	920.0	38	59	HL4	13.0	23.0								Y
Y	920.0	38	59	HL4	13.0	23.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	921.0	42	47	HL4	- 5.0	5.0								
B	921.0	42	47	HL4	- 5.0	5.0								
C	921.0	42	47	HL4	- 5.0	5.0								
D	921.0	42	47	HL4	- 5.0	5.0								
E	921.0	42	47	HL4	- 5.0	5.0								
U	921.0	42	47	HL4	- 5.0	5.0								
UU	921.0	42	47	HL4	- 5.0	5.0								
V	921.0	42	47	HL4	- 5.0	5.0								
VV	921.0	42	47	HL4	- 5.0	5.0								
W	921.0	42	47	HL4	- 5.0	5.0								
X	921.0	42	47	HL4	- 5.0	5.0								
Y	921.0	42	47	HL4	- 5.0	5.0								
A	922.0	4	20	HL5	- 5.0	5.0								
B	922.0	4	20	HL5	- 5.0	5.0								
C	922.0	4	20	HL5	- 5.0	5.0								
D	922.0	4	20	HL5	- 5.0	5.0								
E	922.0	4	20	HL5	- 5.0	5.0								
U	922.0	4	20	HL5	- 5.0	5.0								
UU	922.0	4	20	HL5	- 5.0	5.0								
V	922.0	4	20	HL5	- 5.0	5.0								
VV	922.0	4	20	HL5	- 5.0	5.0								
W	922.0	4	20	HL5	- 5.0	5.0								
X	922.0	4	20	HL5	- 5.0	5.0								
Y	922.0	4	20	HL5	- 5.0	5.0								Y
A	923.0	4	36	HL5	- 5.0	5.0								
B	923.0	4	36	HL5	- 5.0	5.0								
C	923.0	4	36	HL5	- 5.0	5.0								
D	923.0	4	36	HL5	- 5.0	5.0								
E	923.0	4	36	HL5	- 5.0	5.0								
U	923.0	4	36	HL5	- 5.0	5.0								
UU	923.0	4	36	HL5	- 5.0	5.0								
V	923.0	4	36	HL5	- 5.0	5.0								
VV	923.0	4	36	HL5	- 5.0	5.0								
W	923.0	4	36	HL5	- 5.0	5.0								
X	923.0	4	36	HL5	- 5.0	5.0								
Y	923.0	4	36	HL5	- 5.0	5.0								Y
A	924.0	4	36	HL4	- 5.0	5.0								
B	924.0	4	36	HL4	- 5.0	5.0								
C	924.0	4	36	HL4	- 5.0	5.0								
D	924.0	4	36	HL4	- 5.0	5.0								
E	924.0	4	36	HL4	- 5.0	5.0								
U	924.0	4	36	HL4	- 5.0	5.0								
UU	924.0	4	36	HL4	- 5.0	5.0								
V	924.0	4	36	HL4	- 5.0	5.0								
VV	924.0	4	36	HL4	- 5.0	5.0								
W	924.0	4	36	HL4	- 5.0	5.0								
X	924.0	4	36	HL4	- 5.0	5.0								
Y	924.0	4	36	HL4	- 5.0	5.0								
A	925.0	4	51	HL5	- 5.0	5.0								
B	925.0	4	51	HL5	- 5.0	5.0								
C	925.0	4	51	HL5	- 5.0	5.0								
D	925.0	4	51	HL5	- 5.0	5.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	925.0	4	51	HL5	- 5.0	5.0								
U	925.0	4	51	HL5	- 5.0	5.0								
UU	925.0	4	51	HL5	- 5.0	5.0								
V	925.0	4	51	HL5	- 5.0	5.0								
VV	925.0	4	51	HL5	- 5.0	5.0								Y
W	925.0	4	51	HL5	- 5.0	5.0								
X	925.0	4	51	HL5	- 5.0	5.0								
Y	925.0	4	51	HL5	- 5.0	5.0								
A	926.0	4	51	HL6	- 5.0	5.0								
B	926.0	4	51	HL6	- 5.0	5.0								
C	926.0	4	51	HL6	- 5.0	5.0								
D	926.0	4	51	HL6	- 5.0	5.0								
E	926.0	4	51	HL6	- 5.0	5.0								
U	926.0	4	51	HL6	- 5.0	5.0								
UU	926.0	4	51	HL6	- 5.0	5.0								
V	926.0	4	51	HL6	- 5.0	5.0								
VV	926.0	4	51	HL6	- 5.0	5.0								Y
W	926.0	4	51	HL6	- 5.0	5.0								
X	926.0	4	51	HL6	- 5.0	5.0								
Y	926.0	4	51	HL6	- 5.0	5.0								
A	927.0	5	37	HL5	- 5.0	5.0								
B	927.0	5	37	HL5	- 5.0	5.0								
C	927.0	5	37	HL5	- 5.0	5.0								
D	927.0	5	37	HL5	- 5.0	5.0								
E	927.0	5	37	HL5	- 5.0	5.0								
U	927.0	5	37	HL5	- 5.0	5.0								
UU	927.0	5	37	HL5	- 5.0	5.0								
V	927.0	5	37	HL5	- 5.0	5.0								
VV	927.0	5	37	HL5	- 5.0	5.0								Y
W	927.0	5	37	HL5	- 5.0	5.0								
X	927.0	5	37	HL5	- 5.0	5.0								
Y	927.0	5	37	HL5	- 5.0	5.0								Y
A	929.0	12	36	HL5	- 5.0	5.0								Y
B	929.0	12	36	HL5	- 5.0	5.0								Y
C	929.0	12	36	HL5	- 5.0	5.0								Y
D	929.0	12	36	HL5	- 5.0	5.0								Y
E	929.0	12	36	HL5	- 5.0	5.0								Y
U	929.0	12	36	HL5	- 5.0	5.0								
UU	929.0	12	36	HL5	- 5.0	5.0								
V	929.0	12	36	HL5	- 5.0	5.0								
VV	929.0	12	36	HL5	- 5.0	5.0								Y
W	929.0	12	36	HL5	- 5.0	5.0								
X	929.0	12	36	HL5	- 5.0	5.0								Y
Y	929.0	12	36	HL5	- 5.0	5.0								Y
A	930.0	14	27	HL5	-35.0	-15.0								Y
B	930.0	14	27	HL5	-35.0	-15.0								Y
C	930.0	14	27	HL5	-35.0	-15.0								Y
D	930.0	14	27	HL5	-35.0	-15.0								Y
E	930.0	14	27	HL5	-35.0	-15.0								Y
U	930.0	14	27	HL5	-35.0	-15.0								Y
UU	930.0	14	27	HL5	-35.0	-15.0								
V	930.0	14	27	HL5	-35.0	-15.0								Y
VV	930.0	14	27	HL5	-35.0	-15.0								
W	930.0	14	27	HL5	-35.0	-15.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	930.0	14	27	HL5	-35.0	-15.0								Y
Y	930.0	14	27	HL5	-35.0	-15.0								Y
A	931.0	14	27	HL6	0.5	10.5								Y
B	931.0	14	27	HL6	0.5	10.5								Y
C	931.0	14	27	HL6	0.5	10.5								Y
D	931.0	14	27	HL6	0.5	10.5								Y
E	931.0	14	27	HL6	0.5	10.5								Y
U	931.0	14	27	HL6	0.5	10.5	OD	W	2	< 20.0	HL6	10.0		Y
UU	931.0	14	27	HL6	0.5	10.5								
V	931.0	14	27	HL6	0.5	10.5								Y
VV	931.0	14	27	HL6	0.5	10.5								
W	931.0	14	27	HL6	0.5	10.5								
X	931.0	14	27	HL6	0.5	10.5								Y
Y	931.0	14	27	HL6	0.5	10.5								Y
A	932.0	18	50	HL5	-21.0	-11.0								Y
B	932.0	18	50	HL5	-21.0	-11.0								Y
C	932.0	18	50	HL5	-21.0	-11.0								Y
D	932.0	18	50	HL5	-21.0	-11.0								Y
E	932.0	18	50	HL5	-21.0	-11.0								Y
U	932.0	18	50	HL5	-21.0	-11.0								
UU	932.0	18	50	HL5	-21.0	-11.0								
V	932.0	18	50	HL5	-21.0	-11.0	ID		3	50.0	HL5	-16.0	1	Y
VV	932.0	18	50	HL5	-21.0	-11.0								Y
W	932.0	18	50	HL5	-21.0	-11.0								
X	932.0	18	50	HL5	-21.0	-11.0								Y
Y	932.0	18	50	HL5	-21.0	-11.0								Y
A	933.0	29	66	HL5	-13.0	0.0								Y
B	933.0	29	66	HL5	-13.0	0.0								Y
C	933.0	29	66	HL5	-13.0	0.0								Y
D	933.0	29	66	HL5	-13.0	0.0								Y
E	933.0	29	66	HL5	-13.0	0.0								Y
U	933.0	29	66	HL5	-13.0	0.0								
UU	933.0	29	66	HL5	-13.0	0.0								
V	933.0	29	66	HL5	-13.0	0.0	ID		3	50.0	HL5	-5.0	3	Y
VV	933.0	29	66	HL5	-13.0	0.0								Y
W	933.0	29	66	HL5	-13.0	0.0								
X	933.0	29	66	HL5	-13.0	0.0								Y
Y	933.0	29	66	HL5	-13.0	0.0								Y
A	934.0	38	50	HL5	7.8	17.8								Y
B	934.0	38	50	HL5	7.8	17.8								Y
C	934.0	38	50	HL5	7.8	17.8								Y
D	934.0	38	50	HL5	7.8	17.8								Y
E	934.0	38	50	HL5	7.8	17.8								Y
U	934.0	38	50	HL5	7.8	17.8								
UU	934.0	38	50	HL5	7.8	17.8								
V	934.0	38	50	HL5	7.8	17.8								
VV	934.0	38	50	HL5	7.8	17.8								Y
W	934.0	38	50	HL5	7.8	17.8								
X	934.0	38	50	HL5	7.8	17.8								Y
Y	934.0	38	50	HL5	7.8	17.8								Y
A	935.0	45	52	HL5	- 5.0	5.0								
B	935.0	45	52	HL5	- 5.0	5.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	935.0	45	52	HL5	- 5.0	5.0								
D	935.0	45	52	HL5	- 5.0	5.0								
E	935.0	45	52	HL5	- 5.0	5.0								
U	935.0	45	52	HL5	- 5.0	5.0								
UU	935.0	45	52	HL5	- 5.0	5.0								
V	935.0	45	52	HL5	- 5.0	5.0								
VV	935.0	45	52	HL5	- 5.0	5.0								
W	935.0	45	52	HL5	- 5.0	5.0								
X	935.0	45	52	HL5	- 5.0	5.0								Y
Y	935.0	45	52	HL5	- 5.0	5.0								Y
A	936.0	6	65	HL6	-35.0	-15.0								Y
B	936.0	6	65	HL6	-35.0	-15.0								Y
C	936.0	6	65	HL6	-35.0	-15.0								Y
D	936.0	6	65	HL6	-35.0	-15.0								Y
E	936.0	6	65	HL6	-35.0	-15.0								Y
U	936.0	6	65	HL6	-35.0	-15.0								
UU	936.0	6	65	HL6	-35.0	-15.0								
V	936.0	6	65	HL6	-35.0	-15.0								Y
VV	936.0	6	65	HL6	-35.0	-15.0								Y
W	936.0	6	65	HL6	-35.0	-15.0								
X	936.0	6	65	HL6	-35.0	-15.0								Y
Y	936.0	6	65	HL6	-35.0	-15.0								Y
A	938.0	12	45	HL6	- 2.7	8.9								Y
B	938.0	12	45	HL6	- 2.7	8.9								Y
C	938.0	12	45	HL6	- 2.7	8.9								Y
D	938.0	12	45	HL6	- 2.7	8.9								Y
E	938.0	12	45	HL6	- 2.7	8.9								Y
U	938.0	12	45	HL6	- 2.7	8.9								
UU	938.0	12	45	HL6	- 2.7	8.9								
V	938.0	12	45	HL6	- 2.7	8.9								Y
VV	938.0	12	45	HL6	- 2.7	8.9								
W	938.0	12	45	HL6	- 2.7	8.9								
X	938.0	12	45	HL6	- 2.7	8.9								Y
Y	938.0	12	45	HL6	- 2.7	8.9	OD			< 10.0	HL6	2.4		Y
Y	938.0	12	45	HL6	- 2.7	8.9	OD			< 10.0	HL6	3.9		Y
A	939.0	13	74	HL6	5.6	15.6								Y
B	939.0	13	74	HL6	5.6	15.6								Y
C	939.0	13	74	HL6	5.6	15.6								Y
D	939.0	13	74	HL6	5.6	15.6								Y
E	939.0	13	74	HL6	5.6	15.6								Y
U	939.0	13	74	HL6	5.6	15.6								Y
UU	939.0	13	74	HL6	5.6	15.6								
V	939.0	13	74	HL6	5.6	15.6								Y
VV	939.0	13	74	HL6	5.6	15.6								
W	939.0	13	74	HL6	5.6	15.6								
X	939.0	13	74	HL6	5.6	15.6								Y
Y	939.0	13	74	HL6	5.6	15.6								Y
A	940.0	15	66	HL6	6.4	16.4								Y
B	940.0	15	66	HL6	6.4	16.4								Y
C	940.0	15	66	HL6	6.4	16.4								Y
D	940.0	15	66	HL6	6.4	16.4								Y
E	940.0	15	66	HL6	6.4	16.4								Y
U	940.0	15	66	HL6	6.4	16.4								Y
UU	940.0	15	66	HL6	6.4	16.4								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
V	940.0	15	66	HL6	6.4	16.4								Y
VV	940.0	15	66	HL6	6.4	16.4								
W	940.0	15	66	HL6	6.4	16.4								
X	940.0	15	66	HL6	6.4	16.4								Y
Y	940.0	15	66	HL6	6.4	16.4								Y
A	941.0	18	68	HL6	5.2	15.2								Y
B	941.0	18	68	HL6	5.2	15.2								Y
C	941.0	18	68	HL6	5.2	15.2								Y
D	941.0	18	68	HL6	5.2	15.2								Y
E	941.0	18	68	HL6	5.2	15.2								Y
U	941.0	18	68	HL6	5.2	15.2								Y
UU	941.0	18	68	HL6	5.2	15.2								
V	941.0	18	68	HL6	5.2	15.2								Y
VV	941.0	18	68	HL6	5.2	15.2								
W	941.0	18	68	HL6	5.2	15.2								
X	941.0	18	68	HL6	5.2	15.2								Y
Y	941.0	18	68	HL6	5.2	15.2								Y
A	942.0	24	26	HL6	7.5	17.5								Y
B	942.0	24	26	HL6	7.5	17.5								Y
C	942.0	24	26	HL6	7.5	17.5								Y
D	942.0	24	26	HL6	7.5	17.5								Y
E	942.0	24	26	HL6	7.5	17.5								Y
U	942.0	24	26	HL6	7.5	17.5								Y
UU	942.0	24	26	HL6	7.5	17.5								
V	942.0	24	26	HL6	7.5	17.5								
VV	942.0	24	26	HL6	7.5	17.5								
W	942.0	24	26	HL6	7.5	17.5								
X	942.0	24	26	HL6	7.5	17.5								Y
Y	942.0	24	26	HL6	7.5	17.5								Y
A	943.0	28	35	HL6	9.9	19.9								Y
B	943.0	28	35	HL6	9.9	19.9								Y
C	943.0	28	35	HL6	9.9	19.9								Y
D	943.0	28	35	HL6	9.9	19.9								Y
E	943.0	28	35	HL6	9.9	19.9								Y
U	943.0	28	35	HL6	9.9	19.9								Y
UU	943.0	28	35	HL6	9.9	19.9								
V	943.0	28	35	HL6	9.9	19.9								Y
VV	943.0	28	35	HL6	9.9	19.9								
W	943.0	28	35	HL6	9.9	19.9								
X	943.0	28	35	HL6	9.9	19.9								Y
Y	943.0	28	35	HL6	9.9	19.9								Y
A	944.0	40	34	HL6	- 5.0	5.0								
B	944.0	40	34	HL6	- 5.0	5.0								
C	944.0	40	34	HL6	- 5.0	5.0								
D	944.0	40	34	HL6	- 5.0	5.0								
E	944.0	40	34	HL6	- 5.0	5.0								
U	944.0	40	34	HL6	- 5.0	5.0								
UU	944.0	40	34	HL6	- 5.0	5.0								
V	944.0	40	34	HL6	- 5.0	5.0								
VV	944.0	40	34	HL6	- 5.0	5.0								
W	944.0	40	34	HL6	- 5.0	5.0								
X	944.0	40	34	HL6	- 5.0	5.0								
Y	944.0	40	34	HL6	- 5.0	5.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	945.0	44	37	HL6	- 5.0	5.0								
B	945.0	44	37	HL6	- 5.0	5.0								
C	945.0	44	37	HL6	- 5.0	5.0								
D	945.0	44	37	HL6	- 5.0	5.0								
E	945.0	44	37	HL6	- 5.0	5.0								
U	945.0	44	37	HL6	- 5.0	5.0								
UU	945.0	44	37	HL6	- 5.0	5.0								
V	945.0	44	37	HL6	- 5.0	5.0								
VV	945.0	44	37	HL6	- 5.0	5.0								
W	945.0	44	37	HL6	- 5.0	5.0								
X	945.0	44	37	HL6	- 5.0	5.0								
Y	945.0	44	37	HL6	- 5.0	5.0								
A	946.0	44	48	HL6	- 5.0	5.0								
B	946.0	44	48	HL6	- 5.0	5.0								
C	946.0	44	48	HL6	- 5.0	5.0								
D	946.0	44	48	HL6	- 5.0	5.0								
E	946.0	44	48	HL6	- 5.0	5.0								
U	946.0	44	48	HL6	- 5.0	5.0								
UU	946.0	44	48	HL6	- 5.0	5.0								
V	946.0	44	48	HL6	- 5.0	5.0								
VV	946.0	44	48	HL6	- 5.0	5.0								Y
W	946.0	44	48	HL6	- 5.0	5.0								
X	946.0	44	48	HL6	- 5.0	5.0								
Y	946.0	44	48	HL6	- 5.0	5.0								
A	947.0	45	55	HL6	- 5.0	5.0								
B	947.0	45	55	HL6	- 5.0	5.0								
C	947.0	45	55	HL6	- 5.0	5.0								
D	947.0	45	55	HL6	- 5.0	5.0								
E	947.0	45	55	HL6	- 5.0	5.0								
U	947.0	45	55	HL6	- 5.0	5.0								
UU	947.0	45	55	HL6	- 5.0	5.0								
V	947.0	45	55	HL6	- 5.0	5.0								
VV	947.0	45	55	HL6	- 5.0	5.0								
W	947.0	45	55	HL6	- 5.0	5.0								
X	947.0	45	55	HL6	- 5.0	5.0								Y
Y	947.0	45	55	HL6	- 5.0	5.0								Y
A	948.0	1	28	CL1	-35.0	-15.0								Y
B	948.0	1	28	CL1	-35.0	-15.0								Y
C	948.0	1	28	CL1	-35.0	-15.0								Y
D	948.0	1	28	CL1	-35.0	-15.0								Y
E	948.0	1	28	CL1	-35.0	-15.0								Y
U	948.0	1	28	CL1	-35.0	-15.0								
UU	948.0	1	28	CL1	-35.0	-15.0								Y
V	948.0	1	28	CL1	-35.0	-15.0								
VV	948.0	1	28	CL1	-35.0	-15.0								Y
W	948.0	1	28	CL1	-35.0	-15.0								
X	948.0	1	28	CL1	-35.0	-15.0								Y
Y	948.0	1	28	CL1	-35.0	-15.0								Y
A	949.0	1	28	CL4	2.7	12.7								Y
B	949.0	1	28	CL4	2.7	12.7								Y
C	949.0	1	28	CL4	2.7	12.7								Y
D	949.0	1	28	CL4	2.7	12.7								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	949.0	1	28	CL4	2.7	12.7								Y
U	949.0	1	28	CL4	2.7	12.7								
UU	949.0	1	28	CL4	2.7	12.7								
V	949.0	1	28	CL4	2.7	12.7								
VV	949.0	1	28	CL4	2.7	12.7								Y
W	949.0	1	28	CL4	2.7	12.7								
X	949.0	1	28	CL4	2.7	12.7	OD	WG		22.0	CL4	7.7	1	Y
Y	949.0	1	28	CL4	2.7	12.7								Y
A	950.0	2	29	CL1	- 5.0	5.0								Y
B	950.0	2	29	CL1	- 5.0	5.0								Y
C	950.0	2	29	CL1	- 5.0	5.0								Y
D	950.0	2	29	CL1	- 5.0	5.0								Y
E	950.0	2	29	CL1	- 5.0	5.0								Y
U	950.0	2	29	CL1	- 5.0	5.0								
UU	950.0	2	29	CL1	- 5.0	5.0								
V	950.0	2	29	CL1	- 5.0	5.0								
VV	950.0	2	29	CL1	- 5.0	5.0								Y
W	950.0	2	29	CL1	- 5.0	5.0								
X	950.0	2	29	CL1	- 5.0	5.0								Y
Y	950.0	2	29	CL1	- 5.0	5.0								Y
A	951.0	4	30	CL1	- 5.0	5.0								Y
B	951.0	4	30	CL1	- 5.0	5.0								Y
C	951.0	4	30	CL1	- 5.0	5.0								Y
D	951.0	4	30	CL1	- 5.0	5.0								Y
E	951.0	4	30	CL1	- 5.0	5.0								Y
U	951.0	4	30	CL1	- 5.0	5.0								
UU	951.0	4	30	CL1	- 5.0	5.0								
V	951.0	4	30	CL1	- 5.0	5.0								
VV	951.0	4	30	CL1	- 5.0	5.0								Y
W	951.0	4	30	CL1	- 5.0	5.0								
X	951.0	4	30	CL1	- 5.0	5.0								Y
Y	951.0	4	30	CL1	- 5.0	5.0								Y
A	952.0	4	48	CL1	-17.8	- 7.8								Y
B	952.0	4	48	CL1	-17.8	- 7.8								Y
C	952.0	4	48	CL1	-17.8	- 7.8								Y
D	952.0	4	48	CL1	-17.8	- 7.8								Y
E	952.0	4	48	CL1	-17.8	- 7.8								Y
U	952.0	4	48	CL1	-17.8	- 7.8								
UU	952.0	4	48	CL1	-17.8	- 7.8			2	4.0	CL1	-12.8		Y
V	952.0	4	48	CL1	-17.8	- 7.8								
VV	952.0	4	48	CL1	-17.8	- 7.8								Y
W	952.0	4	48	CL1	-17.8	- 7.8								
X	952.0	4	48	CL1	-17.8	- 7.8								Y
Y	952.0	4	48	CL1	-17.8	- 7.8								Y
A	953.0	4	48	CL2	- 5.0	5.0								Y
B	953.0	4	48	CL2	- 5.0	5.0								Y
C	953.0	4	48	CL2	- 5.0	5.0								Y
D	953.0	4	48	CL2	- 5.0	5.0								Y
E	953.0	4	48	CL2	- 5.0	5.0								Y
U	953.0	4	48	CL2	- 5.0	5.0								
UU	953.0	4	48	CL2	- 5.0	5.0								
V	953.0	4	48	CL2	- 5.0	5.0								
VV	953.0	4	48	CL2	- 5.0	5.0								Y
W	953.0	4	48	CL2	- 5.0	5.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	953.0	4	48	CL2	- 5.0	5.0								Y
Y	953.0	4	48	CL2	- 5.0	5.0								Y
A	954.0	5	17	CL1	- 5.0	5.0								Y
B	954.0	5	17	CL1	- 5.0	5.0								Y
C	954.0	5	17	CL1	- 5.0	5.0								Y
D	954.0	5	17	CL1	- 5.0	5.0								Y
E	954.0	5	17	CL1	- 5.0	5.0								Y
U	954.0	5	17	CL1	- 5.0	5.0								
UU	954.0	5	17	CL1	- 5.0	5.0								
V	954.0	5	17	CL1	- 5.0	5.0								
VV	954.0	5	17	CL1	- 5.0	5.0								Y
W	954.0	5	17	CL1	- 5.0	5.0								
X	954.0	5	17	CL1	- 5.0	5.0								Y
Y	954.0	5	17	CL1	- 5.0	5.0								Y
A	955.0	5	17	CL2	- 5.0	5.0								Y
B	955.0	5	17	CL2	- 5.0	5.0								Y
C	955.0	5	17	CL2	- 5.0	5.0								Y
D	955.0	5	17	CL2	- 5.0	5.0								Y
E	955.0	5	17	CL2	- 5.0	5.0								Y
U	955.0	5	17	CL2	- 5.0	5.0								
UU	955.0	5	17	CL2	- 5.0	5.0								
V	955.0	5	17	CL2	- 5.0	5.0								
VV	955.0	5	17	CL2	- 5.0	5.0								Y
W	955.0	5	17	CL2	- 5.0	5.0								
X	955.0	5	17	CL2	- 5.0	5.0								Y
Y	955.0	5	17	CL2	- 5.0	5.0								Y
A	956.0	5	17	CL3	-35.0	-15.0								Y
B	956.0	5	17	CL3	-35.0	-15.0								Y
C	956.0	5	17	CL3	-35.0	-15.0								Y
D	956.0	5	17	CL3	-35.0	-15.0								Y
E	956.0	5	17	CL3	-35.0	-15.0								Y
U	956.0	5	17	CL3	-35.0	-15.0								
UU	956.0	5	17	CL3	-35.0	-15.0								
V	956.0	5	17	CL3	-35.0	-15.0								
VV	956.0	5	17	CL3	-35.0	-15.0								Y
W	956.0	5	17	CL3	-35.0	-15.0								
X	956.0	5	17	CL3	-35.0	-15.0								Y
Y	956.0	5	17	CL3	-35.0	-15.0								Y
A	957.0	6	81	CL1	-10.8	- 0.8								Y
B	957.0	6	81	CL1	-10.8	- 0.8								Y
C	957.0	6	81	CL1	-10.8	- 0.8								Y
D	957.0	6	81	CL1	-10.8	- 0.8								Y
E	957.0	6	81	CL1	-10.8	- 0.8								Y
U	957.0	6	81	CL1	-10.8	- 0.8								
UU	957.0	6	81	CL1	-10.8	- 0.8			2	3.0	CL1	-5.8		Y
V	957.0	6	81	CL1	-10.8	- 0.8								Y
VV	957.0	6	81	CL1	-10.8	- 0.8								Y
W	957.0	6	81	CL1	-10.8	- 0.8								
X	957.0	6	81	CL1	-10.8	- 0.8								Y
Y	957.0	6	81	CL1	-10.8	- 0.8								Y
A	958.0	7	42	CL1	-35.0	-15.0								Y
B	958.0	7	42	CL1	-35.0	-15.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	958.0	7	42	CL1	-35.0	-15.0								Y
D	958.0	7	42	CL1	-35.0	-15.0								Y
E	958.0	7	42	CL1	-35.0	-15.0								Y
U	958.0	7	42	CL1	-35.0	-15.0								
UU	958.0	7	42	CL1	-35.0	-15.0								Y
V	958.0	7	42	CL1	-35.0	-15.0								
VV	958.0	7	42	CL1	-35.0	-15.0								Y
W	958.0	7	42	CL1	-35.0	-15.0								
X	958.0	7	42	CL1	-35.0	-15.0								Y
Y	958.0	7	42	CL1	-35.0	-15.0								Y
A	959.0	8	54	CL1	-0.7	9.3								Y
B	959.0	8	54	CL1	-0.7	9.3								Y
C	959.0	8	54	CL1	-0.7	9.3								Y
D	959.0	8	54	CL1	-0.7	9.3								Y
E	959.0	8	54	CL1	-0.7	9.3								Y
U	959.0	8	54	CL1	-0.7	9.3								
UU	959.0	8	54	CL1	-0.7	9.3			2	4.0	CL1	4.3		Y
V	959.0	8	54	CL1	-0.7	9.3								Y
VV	959.0	8	54	CL1	-0.7	9.3								Y
W	959.0	8	54	CL1	-0.7	9.3								
X	959.0	8	54	CL1	-0.7	9.3								Y
Y	959.0	8	54	CL1	-0.7	9.3								Y
A	960.0	10	53	CL1	-16.3	-6.3								Y
B	960.0	10	53	CL1	-16.3	-6.3								Y
C	960.0	10	53	CL1	-16.3	-6.3								Y
D	960.0	10	53	CL1	-16.3	-6.3								Y
E	960.0	10	53	CL1	-16.3	-6.3								Y
U	960.0	10	53	CL1	-16.3	-6.3								
UU	960.0	10	53	CL1	-16.3	-6.3			2	3.0	CL1	-11.3		Y
V	960.0	10	53	CL1	-16.3	-6.3								
VV	960.0	10	53	CL1	-16.3	-6.3								Y
W	960.0	10	53	CL1	-16.3	-6.3								
X	960.0	10	53	CL1	-16.3	-6.3								Y
Y	960.0	10	53	CL1	-16.3	-6.3								Y
A	961.0	16	63	CL1	12.2	22.2	OD		1	39.0	CL1	17.2	1	Y
B	961.0	16	63	CL1	12.2	22.2								Y
C	961.0	16	63	CL1	12.2	22.2								Y
D	961.0	16	63	CL1	12.2	22.2								Y
E	961.0	16	63	CL1	12.2	22.2								Y
U	961.0	16	63	CL1	12.2	22.2								
UU	961.0	16	63	CL1	12.2	22.2								
V	961.0	16	63	CL1	12.2	22.2								Y
VV	961.0	16	63	CL1	12.2	22.2								
W	961.0	16	63	CL1	12.2	22.2								
X	961.0	16	63	CL1	12.2	22.2								Y
Y	961.0	16	63	CL1	12.2	22.2								Y
A	962.0	17	53	CL1	4.4	14.4								Y
B	962.0	17	53	CL1	4.4	14.4								Y
C	962.0	17	53	CL1	4.4	14.4								Y
D	962.0	17	53	CL1	4.4	14.4								Y
E	962.0	17	53	CL1	4.4	14.4								Y
U	962.0	17	53	CL1	4.4	14.4								
UU	962.0	17	53	CL1	4.4	14.4								
V	962.0	17	53	CL1	4.4	14.4								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	962.0	17	53	CL1	4.4	14.4								
W	962.0	17	53	CL1	4.4	14.4								
X	962.0	17	53	CL1	4.4	14.4								Y
Y	962.0	17	53	CL1	4.4	14.4	OD			< 10.0	CL1	9.4		Y
A	963.0	27	27	CL1	-10.2	- 0.2								Y
B	963.0	27	27	CL1	-10.2	- 0.2								Y
C	963.0	27	27	CL1	-10.2	- 0.2								Y
D	963.0	27	27	CL1	-10.2	- 0.2								Y
E	963.0	27	27	CL1	-10.2	- 0.2								Y
U	963.0	27	27	CL1	-10.2	- 0.2								Y
UU	963.0	27	27	CL1	-10.2	- 0.2			2	3.0	CL1	-5.2		Y
V	963.0	27	27	CL1	-10.2	- 0.2								Y
VV	963.0	27	27	CL1	-10.2	- 0.2								Y
W	963.0	27	27	CL1	-10.2	- 0.2								
X	963.0	27	27	CL1	-10.2	- 0.2								Y
Y	963.0	27	27	CL1	-10.2	- 0.2								Y
A	964.0	27	35	CL1	2.4	12.4								Y
B	964.0	27	35	CL1	2.4	12.4								Y
C	964.0	27	35	CL1	2.4	12.4								Y
D	964.0	27	35	CL1	2.4	12.4								Y
E	964.0	27	35	CL1	2.4	12.4								Y
U	964.0	27	35	CL1	2.4	12.4								Y
UU	964.0	27	35	CL1	2.4	12.4								Y
V	964.0	27	35	CL1	2.4	12.4								Y
VV	964.0	27	35	CL1	2.4	12.4								Y
W	964.0	27	35	CL1	2.4	12.4								
X	964.0	27	35	CL1	2.4	12.4								Y
Y	964.0	27	35	CL1	2.4	12.4								Y
A	965.0	27	35	CL4	- 5.0	5.0								Y
B	965.0	27	35	CL4	- 5.0	5.0								Y
C	965.0	27	35	CL4	- 5.0	5.0								Y
D	965.0	27	35	CL4	- 5.0	5.0								Y
E	965.0	27	35	CL4	- 5.0	5.0								Y
U	965.0	27	35	CL4	- 5.0	5.0								Y
UU	965.0	27	35	CL4	- 5.0	5.0								
V	965.0	27	35	CL4	- 5.0	5.0	ID		3	< 20.0	CL4		1	Y
VV	965.0	27	35	CL4	- 5.0	5.0								Y
W	965.0	27	35	CL4	- 5.0	5.0								
X	965.0	27	35	CL4	- 5.0	5.0								Y
Y	965.0	27	35	CL4	- 5.0	5.0								Y
A	966.0	32	19	CL1	- 4.2	7.3								Y
B	966.0	32	19	CL1	- 4.2	7.3	OD		1	< 20.0	CL1	0.8	1	Y
C	966.0	32	19	CL1	- 4.2	7.3								Y
D	966.0	32	19	CL1	- 4.2	7.3	OD		1	< 20.0	CL1	2.3	1	Y
E	966.0	32	19	CL1	- 4.2	7.3								Y
U	966.0	32	19	CL1	- 4.2	7.3								
UU	966.0	32	19	CL1	- 4.2	7.3								Y
V	966.0	32	19	CL1	- 4.2	7.3								
VV	966.0	32	19	CL1	- 4.2	7.3								Y
W	966.0	32	19	CL1	- 4.2	7.3								
X	966.0	32	19	CL1	- 4.2	7.3								Y
Y	966.0	32	19	CL1	- 4.2	7.3	OD		1	20.0	CL1			Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	967.0	34	76	CL1	- 4.3	5.7								Y
B	967.0	34	76	CL1	- 4.3	5.7								Y
C	967.0	34	76	CL1	- 4.3	5.7								Y
D	967.0	34	76	CL1	- 4.3	5.7								Y
E	967.0	34	76	CL1	- 4.3	5.7								Y
U	967.0	34	76	CL1	- 4.3	5.7								
UU	967.0	34	76	CL1	- 4.3	5.7								
V	967.0	34	76	CL1	- 4.3	5.7								Y
VV	967.0	34	76	CL1	- 4.3	5.7								
W	967.0	34	76	CL1	- 4.3	5.7								
X	967.0	34	76	CL1	- 4.3	5.7	OD	WG		21.0	CL1	0.7	1	Y
Y	967.0	34	76	CL1	- 4.3	5.7	OD		1	66.0	CL1	0.8		Y
A	968.0	34	76	CL3	- 4.8	5.2								Y
B	968.0	34	76	CL3	- 4.8	5.2								Y
C	968.0	34	76	CL3	- 4.8	5.2	OD		2	81.0	CL3	0.2	5	Y
D	968.0	34	76	CL3	- 4.8	5.2								Y
E	968.0	34	76	CL3	- 4.8	5.2								Y
U	968.0	34	76	CL3	- 4.8	5.2								
UU	968.0	34	76	CL3	- 4.8	5.2								
V	968.0	34	76	CL3	- 4.8	5.2								Y
VV	968.0	34	76	CL3	- 4.8	5.2								
W	968.0	34	76	CL3	- 4.8	5.2								
X	968.0	34	76	CL3	- 4.8	5.2								Y
Y	968.0	34	76	CL3	- 4.8	5.2								Y
A	970.0	4	82	CL2	- 5.0	5.0								Y
B	970.0	4	82	CL2	- 5.0	5.0								Y
C	970.0	4	82	CL2	- 5.0	5.0								Y
D	970.0	4	82	CL2	- 5.0	5.0								Y
E	970.0	4	82	CL2	- 5.0	5.0								Y
U	970.0	4	82	CL2	- 5.0	5.0								
UU	970.0	4	82	CL2	- 5.0	5.0								
V	970.0	4	82	CL2	- 5.0	5.0								
VV	970.0	4	82	CL2	- 5.0	5.0								
W	970.0	4	82	CL2	- 5.0	5.0								
X	970.0	4	82	CL2	- 5.0	5.0								Y
Y	970.0	4	82	CL2	- 5.0	5.0								
A	971.0	8	73	CL2	- 5.0	5.0								Y
B	971.0	8	73	CL2	- 5.0	5.0								Y
C	971.0	8	73	CL2	- 5.0	5.0								Y
D	971.0	8	73	CL2	- 5.0	5.0								Y
E	971.0	8	73	CL2	- 5.0	5.0								Y
U	971.0	8	73	CL2	- 5.0	5.0								
UU	971.0	8	73	CL2	- 5.0	5.0								
V	971.0	8	73	CL2	- 5.0	5.0								
VV	971.0	8	73	CL2	- 5.0	5.0								
W	971.0	8	73	CL2	- 5.0	5.0								
X	971.0	8	73	CL2	- 5.0	5.0								Y
Y	971.0	8	73	CL2	- 5.0	5.0								Y
A	972.0	8	73	CL3	- 5.0	5.0								Y
B	972.0	8	73	CL3	- 5.0	5.0								Y
C	972.0	8	73	CL3	- 5.0	5.0								Y
D	972.0	8	73	CL3	- 5.0	5.0								Y
E	972.0	8	73	CL3	- 5.0	5.0								Y
U	972.0	8	73	CL3	- 5.0	5.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	972.0	8	73	CL3	- 5.0	5.0								
V	972.0	8	73	CL3	- 5.0	5.0								
VV	972.0	8	73	CL3	- 5.0	5.0								
W	972.0	8	73	CL3	- 5.0	5.0								
X	972.0	8	73	CL3	- 5.0	5.0								Y
Y	972.0	8	73	CL3	- 5.0	5.0								Y
A	973.0	8	73	CL4	- 5.0	5.0								Y
B	973.0	8	73	CL4	- 5.0	5.0								Y
C	973.0	8	73	CL4	- 5.0	5.0								Y
D	973.0	8	73	CL4	- 5.0	5.0								Y
E	973.0	8	73	CL4	- 5.0	5.0								Y
U	973.0	8	73	CL4	- 5.0	5.0								
UU	973.0	8	73	CL4	- 5.0	5.0								
V	973.0	8	73	CL4	- 5.0	5.0								
VV	973.0	8	73	CL4	- 5.0	5.0								
W	973.0	8	73	CL4	- 5.0	5.0								
X	973.0	8	73	CL4	- 5.0	5.0								Y
Y	973.0	8	73	CL4	- 5.0	5.0								Y
A	974.0	8	73	CL6	- 5.0	5.0								Y
B	974.0	8	73	CL6	- 5.0	5.0								Y
C	974.0	8	73	CL6	- 5.0	5.0								Y
D	974.0	8	73	CL6	- 5.0	5.0								Y
E	974.0	8	73	CL6	- 5.0	5.0								Y
U	974.0	8	73	CL6	- 5.0	5.0								
UU	974.0	8	73	CL6	- 5.0	5.0								
V	974.0	8	73	CL6	- 5.0	5.0								
VV	974.0	8	73	CL6	- 5.0	5.0								
W	974.0	8	73	CL6	- 5.0	5.0								
X	974.0	8	73	CL6	- 5.0	5.0								Y
Y	974.0	8	73	CL6	- 5.0	5.0								Y
A	975.0	10	68	CL2	4.0	14.0								Y
B	975.0	10	68	CL2	4.0	14.0								Y
C	975.0	10	68	CL2	4.0	14.0								Y
D	975.0	10	68	CL2	4.0	14.0								Y
E	975.0	10	68	CL2	4.0	14.0								Y
U	975.0	10	68	CL2	4.0	14.0								Y
UU	975.0	10	68	CL2	4.0	14.0								
V	975.0	10	68	CL2	4.0	14.0								Y
VV	975.0	10	68	CL2	4.0	14.0								Y
W	975.0	10	68	CL2	4.0	14.0								
X	975.0	10	68	CL2	4.0	14.0								Y
Y	975.0	10	68	CL2	4.0	14.0								Y
A	976.0	10	68	CL6	11.9	21.9								Y
B	976.0	10	68	CL6	11.9	21.9								Y
C	976.0	10	68	CL6	11.9	21.9								Y
D	976.0	10	68	CL6	11.9	21.9								Y
E	976.0	10	68	CL6	11.9	21.9								Y
U	976.0	10	68	CL6	11.9	21.9								
UU	976.0	10	68	CL6	11.9	21.9								Y
V	976.0	10	68	CL6	11.9	21.9								Y
VV	976.0	10	68	CL6	11.9	21.9								Y
W	976.0	10	68	CL6	11.9	21.9								
X	976.0	10	68	CL6	11.9	21.9								Y
Y	976.0	10	68	CL6	11.9	21.9								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	977.0	14	36	CL2	- 5.0	5.0								Y
B	977.0	14	36	CL2	- 5.0	5.0								Y
C	977.0	14	36	CL2	- 5.0	5.0								Y
D	977.0	14	36	CL2	- 5.0	5.0								Y
E	977.0	14	36	CL2	- 5.0	5.0								Y
U	977.0	14	36	CL2	- 5.0	5.0								Y
UU	977.0	14	36	CL2	- 5.0	5.0								
V	977.0	14	36	CL2	- 5.0	5.0								Y
VV	977.0	14	36	CL2	- 5.0	5.0								
W	977.0	14	36	CL2	- 5.0	5.0								
X	977.0	14	36	CL2	- 5.0	5.0								Y
Y	977.0	14	36	CL2	- 5.0	5.0								Y
A	978.0	14	36	CL3	- 5.0	5.0								Y
B	978.0	14	36	CL3	- 5.0	5.0								Y
C	978.0	14	36	CL3	- 5.0	5.0								Y
D	978.0	14	36	CL3	- 5.0	5.0								Y
E	978.0	14	36	CL3	- 5.0	5.0								Y
U	978.0	14	36	CL3	- 5.0	5.0								Y
UU	978.0	14	36	CL3	- 5.0	5.0								
V	978.0	14	36	CL3	- 5.0	5.0								Y
VV	978.0	14	36	CL3	- 5.0	5.0								
W	978.0	14	36	CL3	- 5.0	5.0								
X	978.0	14	36	CL3	- 5.0	5.0								Y
Y	978.0	14	36	CL3	- 5.0	5.0								Y
A	979.0	14	36	CL5	- 5.0	5.0								Y
B	979.0	14	36	CL5	- 5.0	5.0								Y
C	979.0	14	36	CL5	- 5.0	5.0								Y
D	979.0	14	36	CL5	- 5.0	5.0								Y
E	979.0	14	36	CL5	- 5.0	5.0								Y
U	979.0	14	36	CL5	- 5.0	5.0								Y
UU	979.0	14	36	CL5	- 5.0	5.0								
V	979.0	14	36	CL5	- 5.0	5.0								Y
VV	979.0	14	36	CL5	- 5.0	5.0								
W	979.0	14	36	CL5	- 5.0	5.0								
X	979.0	14	36	CL5	- 5.0	5.0								Y
Y	979.0	14	36	CL5	- 5.0	5.0								Y
A	980.0	15	50	CL2	-11.7	- 1.7								Y
B	980.0	15	50	CL2	-11.7	- 1.7								Y
C	980.0	15	50	CL2	-11.7	- 1.7								Y
D	980.0	15	50	CL2	-11.7	- 1.7								Y
E	980.0	15	50	CL2	-11.7	- 1.7								Y
U	980.0	15	50	CL2	-11.7	- 1.7								
UU	980.0	15	50	CL2	-11.7	- 1.7								
V	980.0	15	50	CL2	-11.7	- 1.7								Y
VV	980.0	15	50	CL2	-11.7	- 1.7								
W	980.0	15	50	CL2	-11.7	- 1.7								
X	980.0	15	50	CL2	-11.7	- 1.7								Y
Y	980.0	15	50	CL2	-11.7	- 1.7								Y
A	981.0	22	63	CL2	- 5.2	4.8								Y
B	981.0	22	63	CL2	- 5.2	4.8								Y
C	981.0	22	63	CL2	- 5.2	4.8	DD		2	< 20.0	CL2	-0.1	5	Y
D	981.0	22	63	CL2	- 5.2	4.8								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	981.0	22	63	CL2	- 5.2	4.8								Y
U	981.0	22	63	CL2	- 5.2	4.8								
UU	981.0	22	63	CL2	- 5.2	4.8								
V	981.0	22	63	CL2	- 5.2	4.8								Y
VV	981.0	22	63	CL2	- 5.2	4.8								
W	981.0	22	63	CL2	- 5.2	4.8								
X	981.0	22	63	CL2	- 5.2	4.8								Y
Y	981.0	22	63	CL2	- 5.2	4.8								Y
A	983.0	1	38	CL3	- 5.0	5.0								
B	983.0	1	38	CL3	- 5.0	5.0								
C	983.0	1	38	CL3	- 5.0	5.0								Y
D	983.0	1	38	CL3	- 5.0	5.0								
E	983.0	1	38	CL3	- 5.0	5.0								
U	983.0	1	38	CL3	- 5.0	5.0								
UU	983.0	1	38	CL3	- 5.0	5.0								
V	983.0	1	38	CL3	- 5.0	5.0								
VV	983.0	1	38	CL3	- 5.0	5.0								Y
W	983.0	1	38	CL3	- 5.0	5.0								
X	983.0	1	38	CL3	- 5.0	5.0								Y
Y	983.0	1	38	CL3	- 5.0	5.0								Y
A	984.0	3	29	CL3	17.3	27.3								Y
B	984.0	3	29	CL3	17.3	27.3								Y
C	984.0	3	29	CL3	17.3	27.3								Y
D	984.0	3	29	CL3	17.3	27.3								Y
E	984.0	3	29	CL3	17.3	27.3								Y
U	984.0	3	29	CL3	17.3	27.3								
UU	984.0	3	29	CL3	17.3	27.3								
V	984.0	3	29	CL3	17.3	27.3								
VV	984.0	3	29	CL3	17.3	27.3								Y
W	984.0	3	29	CL3	17.3	27.3								
X	984.0	3	29	CL3	17.3	27.3								Y
Y	984.0	3	29	CL3	17.3	27.3								Y
A	985.0	3	29	CL4	- 5.0	5.0								Y
B	985.0	3	29	CL4	- 5.0	5.0								Y
C	985.0	3	29	CL4	- 5.0	5.0								Y
D	985.0	3	29	CL4	- 5.0	5.0								Y
E	985.0	3	29	CL4	- 5.0	5.0								Y
U	985.0	3	29	CL4	- 5.0	5.0								
UU	985.0	3	29	CL4	- 5.0	5.0								
V	985.0	3	29	CL4	- 5.0	5.0								
VV	985.0	3	29	CL4	- 5.0	5.0								Y
W	985.0	3	29	CL4	- 5.0	5.0								
X	985.0	3	29	CL4	- 5.0	5.0								Y
Y	985.0	3	29	CL4	- 5.0	5.0								Y
A	986.0	12	34	CL3	1.2	11.2								Y
B	986.0	12	34	CL3	1.2	11.2								Y
C	986.0	12	34	CL3	1.2	11.2								Y
D	986.0	12	34	CL3	1.2	11.2								Y
E	986.0	12	34	CL3	1.2	11.2								Y
U	986.0	12	34	CL3	1.2	11.2								Y
UU	986.0	12	34	CL3	1.2	11.2								
V	986.0	12	34	CL3	1.2	11.2								Y
VV	986.0	12	34	CL3	1.2	11.2								Y
W	986.0	12	34	CL3	1.2	11.2								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	986.0	12	34	CL3	1.2	11.2								Y
Y	986.0	12	34	CL3	1.2	11.2								Y
A	988.0	22	38	CL3	- 9.0	1.0								Y
B	988.0	22	38	CL3	- 9.0	1.0								Y
C	988.0	22	38	CL3	- 9.0	1.0								Y
D	988.0	22	38	CL3	- 9.0	1.0								Y
E	988.0	22	38	CL3	- 9.0	1.0								Y
U	988.0	22	38	CL3	- 9.0	1.0								
UU	988.0	22	38	CL3	- 9.0	1.0								
V	988.0	22	38	CL3	- 9.0	1.0	ID		3	50.0	CL3	-4.0	3	Y
VV	988.0	22	38	CL3	- 9.0	1.0								Y
W	988.0	22	38	CL3	- 9.0	1.0								
X	988.0	22	38	CL3	- 9.0	1.0								Y
Y	988.0	22	38	CL3	- 9.0	1.0								Y
A	989.0	22	38	CL4	-11.3	0.2								Y
B	989.0	22	38	CL4	-11.3	0.2								Y
C	989.0	22	38	CL4	-11.3	0.2								Y
D	989.0	22	38	CL4	-11.3	0.2								Y
E	989.0	22	38	CL4	-11.3	0.2								Y
U	989.0	22	38	CL4	-11.3	0.2								
UU	989.0	22	38	CL4	-11.3	0.2								
V	989.0	22	38	CL4	-11.3	0.2								Y
VV	989.0	22	38	CL4	-11.3	0.2								Y
W	989.0	22	38	CL4	-11.3	0.2								
X	989.0	22	38	CL4	-11.3	0.2								Y
Y	989.0	22	38	CL4	-11.3	0.2								Y
A	990.0	1	29	CL4	-16.4	- 6.4								Y
B	990.0	1	29	CL4	-16.4	- 6.4								Y
C	990.0	1	29	CL4	-16.4	- 6.4								Y
D	990.0	1	29	CL4	-16.4	- 6.4								Y
E	990.0	1	29	CL4	-16.4	- 6.4								Y
U	990.0	1	29	CL4	-16.4	- 6.4								
UU	990.0	1	29	CL4	-16.4	- 6.4								
V	990.0	1	29	CL4	-16.4	- 6.4								
VV	990.0	1	29	CL4	-16.4	- 6.4								Y
W	990.0	1	29	CL4	-16.4	- 6.4								
X	990.0	1	29	CL4	-16.4	- 6.4	OD	WG		20.0	CL4	-11.4		Y
Y	990.0	1	29	CL4	-16.4	- 6.4								Y
A	991.0	4	52	CL4	- 5.0	5.0								Y
B	991.0	4	52	CL4	- 5.0	5.0								Y
C	991.0	4	52	CL4	- 5.0	5.0								Y
D	991.0	4	52	CL4	- 5.0	5.0								Y
E	991.0	4	52	CL4	- 5.0	5.0								Y
U	991.0	4	52	CL4	- 5.0	5.0								
UU	991.0	4	52	CL4	- 5.0	5.0								
V	991.0	4	52	CL4	- 5.0	5.0								
VV	991.0	4	52	CL4	- 5.0	5.0								Y
W	991.0	4	52	CL4	- 5.0	5.0								
X	991.0	4	52	CL4	- 5.0	5.0								Y
Y	991.0	4	52	CL4	- 5.0	5.0								Y
A	992.0	4	52	CL6	- 5.0	5.0								Y
B	992.0	4	52	CL6	- 5.0	5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	992.0	4	52	CL6	- 5.0	5.0								Y
D	992.0	4	52	CL6	- 5.0	5.0								Y
E	992.0	4	52	CL6	- 5.0	5.0								Y
U	992.0	4	52	CL6	- 5.0	5.0								
UU	992.0	4	52	CL6	- 5.0	5.0								
V	992.0	4	52	CL6	- 5.0	5.0								
VV	992.0	4	52	CL6	- 5.0	5.0								Y
W	992.0	4	52	CL6	- 5.0	5.0								
X	992.0	4	52	CL6	- 5.0	5.0								Y
Y	992.0	4	52	CL6	- 5.0	5.0								Y
A	996.0	5	76	CL4	- 5.0	5.0								Y
B	996.0	5	76	CL4	- 5.0	5.0								Y
C	996.0	5	76	CL4	- 5.0	5.0								Y
D	996.0	5	76	CL4	- 5.0	5.0								Y
E	996.0	5	76	CL4	- 5.0	5.0								Y
U	996.0	5	76	CL4	- 5.0	5.0								
UU	996.0	5	76	CL4	- 5.0	5.0								
V	996.0	5	76	CL4	- 5.0	5.0								
VV	996.0	5	76	CL4	- 5.0	5.0								
W	996.0	5	76	CL4	- 5.0	5.0								
X	996.0	5	76	CL4	- 5.0	5.0								Y
Y	996.0	5	76	CL4	- 5.0	5.0								Y
A	997.0	5	82	CL4	- 5.0	5.0								Y
B	997.0	5	82	CL4	- 5.0	5.0								Y
C	997.0	5	82	CL4	- 5.0	5.0								Y
D	997.0	5	82	CL4	- 5.0	5.0								Y
E	997.0	5	82	CL4	- 5.0	5.0								Y
U	997.0	5	82	CL4	- 5.0	5.0								
UU	997.0	5	82	CL4	- 5.0	5.0								
V	997.0	5	82	CL4	- 5.0	5.0								Y
VV	997.0	5	82	CL4	- 5.0	5.0								
W	997.0	5	82	CL4	- 5.0	5.0								
X	997.0	5	82	CL4	- 5.0	5.0								Y
Y	997.0	5	82	CL4	- 5.0	5.0								
A	998.0	10	63	CL4	-35.0	-15.0								Y
B	998.0	10	63	CL4	-35.0	-15.0								Y
C	998.0	10	63	CL4	-35.0	-15.0								Y
D	998.0	10	63	CL4	-35.0	-15.0								Y
E	998.0	10	63	CL4	-35.0	-15.0								Y
U	998.0	10	63	CL4	-35.0	-15.0								
UU	998.0	10	63	CL4	-35.0	-15.0								
V	998.0	10	63	CL4	-35.0	-15.0								Y
VV	998.0	10	63	CL4	-35.0	-15.0								Y
W	998.0	10	63	CL4	-35.0	-15.0								
X	998.0	10	63	CL4	-35.0	-15.0								Y
Y	998.0	10	63	CL4	-35.0	-15.0								Y
A	1000.0	40	28	CL4	- 9.2	0.8								Y
B	1000.0	40	28	CL4	- 9.2	0.8								Y
C	1000.0	40	28	CL4	- 9.2	0.8								Y
D	1000.0	40	28	CL4	- 9.2	0.8								Y
E	1000.0	40	28	CL4	- 9.2	0.8								Y
U	1000.0	40	28	CL4	- 9.2	0.8								
UU	1000.0	40	28	CL4	- 9.2	0.8								
V	1000.0	40	28	CL4	- 9.2	0.8								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	1000.0	40	28	CL4	- 9.2	0.8								Y
W	1000.0	40	28	CL4	- 9.2	0.8								
X	1000.0	40	28	CL4	- 9.2	0.8	OD	WG		20.0	CL4	-4.2		Y
Y	1000.0	40	28	CL4	- 9.2	0.8								Y
A	1002.0	12	36	CL5	16.5	26.5								Y
B	1002.0	12	36	CL5	16.5	26.5								Y
C	1002.0	12	36	CL5	16.5	26.5								Y
D	1002.0	12	36	CL5	16.5	26.5								Y
E	1002.0	12	36	CL5	16.5	26.5								Y
U	1002.0	12	36	CL5	16.5	26.5								
UU	1002.0	12	36	CL5	16.5	26.5								
V	1002.0	12	36	CL5	16.5	26.5								
VV	1002.0	12	36	CL5	16.5	26.5								Y
W	1002.0	12	36	CL5	16.5	26.5								
X	1002.0	12	36	CL5	16.5	26.5								Y
Y	1002.0	12	36	CL5	16.5	26.5								Y
A	1003.0	17	56	CL5	15.7	25.7								Y
B	1003.0	17	56	CL5	15.7	25.7								Y
C	1003.0	17	56	CL5	15.7	25.7								Y
D	1003.0	17	56	CL5	15.7	25.7								Y
E	1003.0	17	56	CL5	15.7	25.7								Y
U	1003.0	17	56	CL5	15.7	25.7								
UU	1003.0	17	56	CL5	15.7	25.7								
V	1003.0	17	56	CL5	15.7	25.7								Y
VV	1003.0	17	56	CL5	15.7	25.7								
W	1003.0	17	56	CL5	15.7	25.7								
X	1003.0	17	56	CL5	15.7	25.7								Y
Y	1003.0	17	56	CL5	15.7	25.7								Y
A	1004.0	5	26	CL6	- 5.0	5.0								Y
B	1004.0	5	26	CL6	- 5.0	5.0								Y
C	1004.0	5	26	CL6	- 5.0	5.0								Y
D	1004.0	5	26	CL6	- 5.0	5.0								Y
E	1004.0	5	26	CL6	- 5.0	5.0								Y
U	1004.0	5	26	CL6	- 5.0	5.0								
UU	1004.0	5	26	CL6	- 5.0	5.0								
V	1004.0	5	26	CL6	- 5.0	5.0								
VV	1004.0	5	26	CL6	- 5.0	5.0								Y
W	1004.0	5	26	CL6	- 5.0	5.0								
X	1004.0	5	26	CL6	- 5.0	5.0								Y
Y	1004.0	5	26	CL6	- 5.0	5.0								Y
A	1005.0	7	65	CL6	0.5	13.4								Y
B	1005.0	7	65	CL6	0.5	13.4								Y
C	1005.0	7	65	CL6	0.5	13.4								Y
D	1005.0	7	65	CL6	0.5	13.4								Y
E	1005.0	7	65	CL6	0.5	13.4								Y
U	1005.0	7	65	CL6	0.5	13.4								
UU	1005.0	7	65	CL6	0.5	13.4								
V	1005.0	7	65	CL6	0.5	13.4								
VV	1005.0	7	65	CL6	0.5	13.4								Y
W	1005.0	7	65	CL6	0.5	13.4								
X	1005.0	7	65	CL6	0.5	13.4								Y
Y	1005.0	7	65	CL6	0.5	13.4								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	1006.0	12	54	CL6	- 5.0	5.0								Y
B	1006.0	12	54	CL6	- 5.0	5.0								Y
C	1006.0	12	54	CL6	- 5.0	5.0								Y
D	1006.0	12	54	CL6	- 5.0	5.0								Y
E	1006.0	12	54	CL6	- 5.0	5.0								Y
U	1006.0	12	54	CL6	- 5.0	5.0								
UU	1006.0	12	54	CL6	- 5.0	5.0								
V	1006.0	12	54	CL6	- 5.0	5.0	ID		3	50.0	CL6		3	Y
VV	1006.0	12	54	CL6	- 5.0	5.0								
W	1006.0	12	54	CL6	- 5.0	5.0								
X	1006.0	12	54	CL6	- 5.0	5.0								Y
Y	1006.0	12	54	CL6	- 5.0	5.0								Y
A	1007.0	18	34	CL6	11.5	21.5								Y
B	1007.0	18	34	CL6	11.5	21.5								Y
C	1007.0	18	34	CL6	11.5	21.5								Y
D	1007.0	18	34	CL6	11.5	21.5								Y
E	1007.0	18	34	CL6	11.5	21.5								Y
U	1007.0	18	34	CL6	11.5	21.5								Y
UU	1007.0	18	34	CL6	11.5	21.5								
V	1007.0	18	34	CL6	11.5	21.5								
VV	1007.0	18	34	CL6	11.5	21.5								Y
W	1007.0	18	34	CL6	11.5	21.5								
X	1007.0	18	34	CL6	11.5	21.5								Y
Y	1007.0	18	34	CL6	11.5	21.5								Y
A	1009.0	19	37	CL6	4.4	14.4								Y
B	1009.0	19	37	CL6	4.4	14.4								Y
C	1009.0	19	37	CL6	4.4	14.4								Y
D	1009.0	19	37	CL6	4.4	14.4								Y
E	1009.0	19	37	CL6	4.4	14.4								Y
U	1009.0	19	37	CL6	4.4	14.4								Y
UU	1009.0	19	37	CL6	4.4	14.4								
V	1009.0	19	37	CL6	4.4	14.4								Y
VV	1009.0	19	37	CL6	4.4	14.4								Y
W	1009.0	19	37	CL6	4.4	14.4								
X	1009.0	19	37	CL6	4.4	14.4								Y
Y	1009.0	19	37	CL6	4.4	14.4								Y
A	1010.0	20	47	CL6	- 5.5	4.5								Y
B	1010.0	20	47	CL6	- 5.5	4.5								Y
C	1010.0	20	47	CL6	- 5.5	4.5								Y
D	1010.0	20	47	CL6	- 5.5	4.5								Y
E	1010.0	20	47	CL6	- 5.5	4.5								Y
U	1010.0	20	47	CL6	- 5.5	4.5								
UU	1010.0	20	47	CL6	- 5.5	4.5								
V	1010.0	20	47	CL6	- 5.5	4.5								
VV	1010.0	20	47	CL6	- 5.5	4.5								Y
W	1010.0	20	47	CL6	- 5.5	4.5								
X	1010.0	20	47	CL6	- 5.5	4.5	OD	WG		27.0	CL6	-0.5	1	Y
Y	1010.0	20	47	CL6	- 5.5	4.5								Y
A	1011.0	24	26	CL6	6.4	16.4								Y
B	1011.0	24	26	CL6	6.4	16.4								Y
C	1011.0	24	26	CL6	6.4	16.4								Y
D	1011.0	24	26	CL6	6.4	16.4								Y
E	1011.0	24	26	CL6	6.4	16.4								Y
U	1011.0	24	26	CL6	6.4	16.4								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	1011.0	24	26	CL6	6.4	16.4								
V	1011.0	24	26	CL6	6.4	16.4								
VV	1011.0	24	26	CL6	6.4	16.4								Y
W	1011.0	24	26	CL6	6.4	16.4								
X	1011.0	24	26	CL6	6.4	16.4								Y
Y	1011.0	24	26	CL6	6.4	16.4								Y
A	1012.0	29	28	CL6	11.5	21.5								Y
B	1012.0	29	28	CL6	11.5	21.5								Y
C	1012.0	29	28	CL6	11.5	21.5								Y
D	1012.0	29	28	CL6	11.5	21.5								Y
E	1012.0	29	28	CL6	11.5	21.5								Y
U	1012.0	29	28	CL6	11.5	21.5								Y
UU	1012.0	29	28	CL6	11.5	21.5								
V	1012.0	29	28	CL6	11.5	21.5								Y
VV	1012.0	29	28	CL6	11.5	21.5								Y
W	1012.0	29	28	CL6	11.5	21.5								
X	1012.0	29	28	CL6	11.5	21.5								Y
Y	1012.0	29	28	CL6	11.5	21.5								Y
A	1013.0	29	70	CL6	-35.0	-15.0								Y
B	1013.0	29	70	CL6	-35.0	-15.0								Y
C	1013.0	29	70	CL6	-35.0	-15.0								Y
D	1013.0	29	70	CL6	-35.0	-15.0								Y
E	1013.0	29	70	CL6	-35.0	-15.0								Y
U	1013.0	29	70	CL6	-35.0	-15.0								
UU	1013.0	29	70	CL6	-35.0	-15.0								
V	1013.0	29	70	CL6	-35.0	-15.0								
VV	1013.0	29	70	CL6	-35.0	-15.0								
W	1013.0	29	70	CL6	-35.0	-15.0								
X	1013.0	29	70	CL6	-35.0	-15.0								Y
Y	1013.0	29	70	CL6	-35.0	-15.0								
A	1014.0	39	31	CL6	-19.8	- 9.8								Y
B	1014.0	39	31	CL6	-19.8	- 9.8								Y
C	1014.0	39	31	CL6	-19.8	- 9.8								Y
D	1014.0	39	31	CL6	-19.8	- 9.8								Y
E	1014.0	39	31	CL6	-19.8	- 9.8								Y
U	1014.0	39	31	CL6	-19.8	- 9.8								
UU	1014.0	39	31	CL6	-19.8	- 9.8								
V	1014.0	39	31	CL6	-19.8	- 9.8	ID		3	50.0	CL6	-14.8	2	Y
VV	1014.0	39	31	CL6	-19.8	- 9.8								Y
W	1014.0	39	31	CL6	-19.8	- 9.8								
X	1014.0	39	31	CL6	-19.8	- 9.8								Y
Y	1014.0	39	31	CL6	-19.8	- 9.8								Y
A	1015.0	5	18	CL1	- 5.0	5.0								Y
B	1015.0	5	18	CL1	- 5.0	5.0								Y
C	1015.0	5	18	CL1	- 5.0	5.0								Y
D	1015.0	5	18	CL1	- 5.0	5.0								Y
E	1015.0	5	18	CL1	- 5.0	5.0								Y
U	1015.0	5	18	CL1	- 5.0	5.0								
UU	1015.0	5	18	CL1	- 5.0	5.0								
V	1015.0	5	18	CL1	- 5.0	5.0								
VV	1015.0	5	18	CL1	- 5.0	5.0								Y
W	1015.0	5	18	CL1	- 5.0	5.0								
X	1015.0	5	18	CL1	- 5.0	5.0								Y
Y	1015.0	5	18	CL1	- 5.0	5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	1016.0	5	18	CL7	-35.0	-15.0								Y
B	1016.0	5	18	CL7	-35.0	-15.0								Y
C	1016.0	5	18	CL7	-35.0	-15.0								Y
D	1016.0	5	18	CL7	-35.0	-15.0								Y
E	1016.0	5	18	CL7	-35.0	-15.0								Y
U	1016.0	5	18	CL7	-35.0	-15.0								
UU	1016.0	5	18	CL7	-35.0	-15.0								
V	1016.0	5	18	CL7	-35.0	-15.0								
VV	1016.0	5	18	CL7	-35.0	-15.0								Y
W	1016.0	5	18	CL7	-35.0	-15.0								
X	1016.0	5	18	CL7	-35.0	-15.0								Y
Y	1016.0	5	18	CL7	-35.0	-15.0								Y
A	1017.0	16	36	CL1	12.7	22.7								Y
B	1017.0	16	36	CL1	12.7	22.7								Y
C	1017.0	16	36	CL1	12.7	22.7								Y
D	1017.0	16	36	CL1	12.7	22.7								Y
E	1017.0	16	36	CL1	12.7	22.7								
U	1017.0	16	36	CL1	12.7	22.7								Y
UU	1017.0	16	36	CL1	12.7	22.7								Y
V	1017.0	16	36	CL1	12.7	22.7								Y
VV	1017.0	16	36	CL1	12.7	22.7								Y
W	1017.0	16	36	CL1	12.7	22.7								
X	1017.0	16	36	CL1	12.7	22.7								Y
Y	1017.0	16	36	CL1	12.7	22.7								Y
A	1018.0	16	36	CL2	5.2	15.2								Y
B	1018.0	16	36	CL2	5.2	15.2								Y
C	1018.0	16	36	CL2	5.2	15.2								Y
D	1018.0	16	36	CL2	5.2	15.2								Y
E	1018.0	16	36	CL2	5.2	15.2								
U	1018.0	16	36	CL2	5.2	15.2								Y
UU	1018.0	16	36	CL2	5.2	15.2								
V	1018.0	16	36	CL2	5.2	15.2								Y
VV	1018.0	16	36	CL2	5.2	15.2								Y
W	1018.0	16	36	CL2	5.2	15.2								
X	1018.0	16	36	CL2	5.2	15.2								Y
Y	1018.0	16	36	CL2	5.2	15.2								Y
A	1019.0	16	36	CL5	- 5.0	5.0								Y
B	1019.0	16	36	CL5	- 5.0	5.0								Y
C	1019.0	16	36	CL5	- 5.0	5.0								Y
D	1019.0	16	36	CL5	- 5.0	5.0								Y
E	1019.0	16	36	CL5	- 5.0	5.0								
U	1019.0	16	36	CL5	- 5.0	5.0								Y
UU	1019.0	16	36	CL5	- 5.0	5.0								
V	1019.0	16	36	CL5	- 5.0	5.0								Y
VV	1019.0	16	36	CL5	- 5.0	5.0								Y
W	1019.0	16	36	CL5	- 5.0	5.0								
X	1019.0	16	36	CL5	- 5.0	5.0								Y
Y	1019.0	16	36	CL5	- 5.0	5.0								Y
A	1020.0	16	36	CL7	-35.0	-15.0								Y
B	1020.0	16	36	CL7	-35.0	-15.0								Y
C	1020.0	16	36	CL7	-35.0	-15.0								Y
D	1020.0	16	36	CL7	-35.0	-15.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	1020.0	16	36	CL7	-35.0	-15.0								
U	1020.0	16	36	CL7	-35.0	-15.0								Y
UU	1020.0	16	36	CL7	-35.0	-15.0								
V	1020.0	16	36	CL7	-35.0	-15.0								Y
VV	1020.0	16	36	CL7	-35.0	-15.0								Y
W	1020.0	16	36	CL7	-35.0	-15.0								
X	1020.0	16	36	CL7	-35.0	-15.0								Y
Y	1020.0	16	36	CL7	-35.0	-15.0								Y
A	1021.0	17	32	CL6	4.4	14.4								Y
B	1021.0	17	32	CL6	4.4	14.4								Y
C	1021.0	17	32	CL6	4.4	14.4								Y
D	1021.0	17	32	CL6	4.4	14.4								Y
E	1021.0	17	32	CL6	4.4	14.4								Y
U	1021.0	17	32	CL6	4.4	14.4								Y
UU	1021.0	17	32	CL6	4.4	14.4								
V	1021.0	17	32	CL6	4.4	14.4								Y
VV	1021.0	17	32	CL6	4.4	14.4								Y
W	1021.0	17	32	CL6	4.4	14.4								
X	1021.0	17	32	CL6	4.4	14.4								Y
Y	1021.0	17	32	CL6	4.4	14.4								Y
A	1022.0	17	32	CL7	-35.0	-15.0								Y
B	1022.0	17	32	CL7	-35.0	-15.0								Y
C	1022.0	17	32	CL7	-35.0	-15.0								Y
D	1022.0	17	32	CL7	-35.0	-15.0								Y
E	1022.0	17	32	CL7	-35.0	-15.0								Y
U	1022.0	17	32	CL7	-35.0	-15.0	OD	W	2	< 20.0	CL7	-22.8		Y
UU	1022.0	17	32	CL7	-35.0	-15.0								
V	1022.0	17	32	CL7	-35.0	-15.0								Y
VV	1022.0	17	32	CL7	-35.0	-15.0								Y
W	1022.0	17	32	CL7	-35.0	-15.0								
X	1022.0	17	32	CL7	-35.0	-15.0								Y
Y	1022.0	17	32	CL7	-35.0	-15.0								Y
A	1025.0	20	69	HL7	-29.8	-19.8								Y
B	1025.0	20	69	HL7	-29.8	-19.8								Y
C	1025.0	20	69	HL7	-29.8	-19.8								Y
D	1025.0	20	69	HL7	-29.8	-19.8								Y
E	1025.0	20	69	HL7	-29.8	-19.8								Y
U	1025.0	20	69	HL7	-29.8	-19.8								
UU	1025.0	20	69	HL7	-29.8	-19.8								
V	1025.0	20	69	HL7	-29.8	-19.8								Y
VV	1025.0	20	69	HL7	-29.8	-19.8								
W	1025.0	20	69	HL7	-29.8	-19.8								
X	1025.0	20	69	HL7	-29.8	-19.8								Y
Y	1025.0	20	69	HL7	-29.8	-19.8	OD	WG		< 10.0	HL7	-24.8		Y
A	1026.0	46	50	HL7	-29.4	-14.7	OD		3	100.0	HL7	-22.8	1	Y
B	1026.0	46	50	HL7	-29.4	-14.7	OD		1	95.0	HL7	-22.8	5	Y
C	1026.0	46	50	HL7	-29.4	-14.7	OD		1	97.0	HL7	-23.9	1	Y
D	1026.0	46	50	HL7	-29.4	-14.7	OD		1	97.0	HL7	-22.9	1	Y
E	1026.0	46	50	HL7	-29.4	-14.7	OD				HL7	-19.6		Y
E	1026.0	46	50	HL7	-29.4	-14.7	OD		1	99.0	HL7	-22.8	1	Y
U	1026.0	46	50	HL7	-29.4	-14.7								
UU	1026.0	46	50	HL7	-29.4	-14.7								
V	1026.0	46	50	HL7	-29.4	-14.7								
VV	1026.0	46	50	HL7	-29.4	-14.7								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
W	1026.0	46	50	HL7	-29.4	-14.7								
X	1026.0	46	50	HL7	-29.4	-14.7	OD	WG		99.0	HL7	-22.3		Y
Y	1026.0	46	50	HL7	-29.4	-14.7	ID	CR		55.0	HL7	-24.1		Y
A	1027.0	1	28	CL3	- 5.0	5.0								Y
B	1027.0	1	28	CL3	- 5.0	5.0								Y
C	1027.0	1	28	CL3	- 5.0	5.0								Y
D	1027.0	1	28	CL3	- 5.0	5.0								Y
E	1027.0	1	28	CL3	- 5.0	5.0								Y
U	1027.0	1	28	CL3	- 5.0	5.0								
UU	1027.0	1	28	CL3	- 5.0	5.0								
V	1027.0	1	28	CL3	- 5.0	5.0								
VV	1027.0	1	28	CL3	- 5.0	5.0								Y
W	1027.0	1	28	CL3	- 5.0	5.0								
X	1027.0	1	28	CL3	- 5.0	5.0								Y
Y	1027.0	1	28	CL3	- 5.0	5.0								Y
A	1028.0	2	29	CL2	- 5.0	5.0								Y
B	1028.0	2	29	CL2	- 5.0	5.0								Y
C	1028.0	2	29	CL2	- 5.0	5.0								Y
D	1028.0	2	29	CL2	- 5.0	5.0								Y
E	1028.0	2	29	CL2	- 5.0	5.0								Y
U	1028.0	2	29	CL2	- 5.0	5.0								
UU	1028.0	2	29	CL2	- 5.0	5.0								
V	1028.0	2	29	CL2	- 5.0	5.0								
VV	1028.0	2	29	CL2	- 5.0	5.0								Y
W	1028.0	2	29	CL2	- 5.0	5.0								
X	1028.0	2	29	CL2	- 5.0	5.0								Y
Y	1028.0	2	29	CL2	- 5.0	5.0								Y
A	1029.0	5	18	CL2	- 5.0	5.0								Y
B	1029.0	5	18	CL2	- 5.0	5.0								Y
C	1029.0	5	18	CL2	- 5.0	5.0								Y
D	1029.0	5	18	CL2	- 5.0	5.0								Y
E	1029.0	5	18	CL2	- 5.0	5.0								Y
U	1029.0	5	18	CL2	- 5.0	5.0								
UU	1029.0	5	18	CL2	- 5.0	5.0								
V	1029.0	5	18	CL2	- 5.0	5.0								
VV	1029.0	5	18	CL2	- 5.0	5.0								Y
W	1029.0	5	18	CL2	- 5.0	5.0								
X	1029.0	5	18	CL2	- 5.0	5.0								Y
Y	1029.0	5	18	CL2	- 5.0	5.0								Y
A	1030.0	5	18	CL3	-35.0	-15.0								Y
B	1030.0	5	18	CL3	-35.0	-15.0								Y
C	1030.0	5	18	CL3	-35.0	-15.0								Y
D	1030.0	5	18	CL3	-35.0	-15.0								Y
E	1030.0	5	18	CL3	-35.0	-15.0								Y
U	1030.0	5	18	CL3	-35.0	-15.0								
UU	1030.0	5	18	CL3	-35.0	-15.0								
V	1030.0	5	18	CL3	-35.0	-15.0								
VV	1030.0	5	18	CL3	-35.0	-15.0								Y
W	1030.0	5	18	CL3	-35.0	-15.0								
X	1030.0	5	18	CL3	-35.0	-15.0								Y
Y	1030.0	5	18	CL3	-35.0	-15.0								Y
A	1031.0	5	18	CL4	- 5.0	5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
B	1031.0	5	18	CL4	- 5.0	5.0								Y
C	1031.0	5	18	CL4	- 5.0	5.0								Y
D	1031.0	5	18	CL4	- 5.0	5.0								Y
E	1031.0	5	18	CL4	- 5.0	5.0								Y
U	1031.0	5	18	CL4	- 5.0	5.0								
UU	1031.0	5	18	CL4	- 5.0	5.0								
V	1031.0	5	18	CL4	- 5.0	5.0								
VV	1031.0	5	18	CL4	- 5.0	5.0								Y
W	1031.0	5	18	CL4	- 5.0	5.0								
X	1031.0	5	18	CL4	- 5.0	5.0								Y
Y	1031.0	5	18	CL4	- 5.0	5.0								Y
A	1032.0	5	26	CL1	- 5.0	5.0								Y
B	1032.0	5	26	CL1	- 5.0	5.0								Y
C	1032.0	5	26	CL1	- 5.0	5.0								Y
D	1032.0	5	26	CL1	- 5.0	5.0								Y
E	1032.0	5	26	CL1	- 5.0	5.0								Y
U	1032.0	5	26	CL1	- 5.0	5.0								
UU	1032.0	5	26	CL1	- 5.0	5.0								
V	1032.0	5	26	CL1	- 5.0	5.0								
VV	1032.0	5	26	CL1	- 5.0	5.0								Y
W	1032.0	5	26	CL1	- 5.0	5.0								
X	1032.0	5	26	CL1	- 5.0	5.0								Y
Y	1032.0	5	26	CL1	- 5.0	5.0								Y
A	1033.0	5	26	CL5	- 5.0	5.0								Y
B	1033.0	5	26	CL5	- 5.0	5.0								Y
C	1033.0	5	26	CL5	- 5.0	5.0								Y
D	1033.0	5	26	CL5	- 5.0	5.0								Y
E	1033.0	5	26	CL5	- 5.0	5.0								Y
U	1033.0	5	26	CL5	- 5.0	5.0								
UU	1033.0	5	26	CL5	- 5.0	5.0								
V	1033.0	5	26	CL5	- 5.0	5.0								
VV	1033.0	5	26	CL5	- 5.0	5.0								Y
W	1033.0	5	26	CL5	- 5.0	5.0								
X	1033.0	5	26	CL5	- 5.0	5.0								Y
Y	1033.0	5	26	CL5	- 5.0	5.0								Y
A	1034.0	5	82	CL6	- 5.0	5.0								Y
B	1034.0	5	82	CL6	- 5.0	5.0								Y
C	1034.0	5	82	CL6	- 5.0	5.0								Y
D	1034.0	5	82	CL6	- 5.0	5.0								Y
E	1034.0	5	82	CL6	- 5.0	5.0								Y
U	1034.0	5	82	CL6	- 5.0	5.0								
UU	1034.0	5	82	CL6	- 5.0	5.0								
V	1034.0	5	82	CL6	- 5.0	5.0								Y
VV	1034.0	5	82	CL6	- 5.0	5.0								
W	1034.0	5	82	CL6	- 5.0	5.0								
X	1034.0	5	82	CL6	- 5.0	5.0								Y
Y	1034.0	5	82	CL6	- 5.0	5.0								
A	1035.0	8	73	CL1	- 5.0	5.0								Y
B	1035.0	8	73	CL1	- 5.0	5.0								Y
C	1035.0	8	73	CL1	- 5.0	5.0								Y
D	1035.0	8	73	CL1	- 5.0	5.0								Y
E	1035.0	8	73	CL1	- 5.0	5.0								Y
U	1035.0	8	73	CL1	- 5.0	5.0								
UU	1035.0	8	73	CL1	- 5.0	5.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
V	1035.0	8	73	CL1	- 5.0	5.0								
VV	1035.0	8	73	CL1	- 5.0	5.0								
W	1035.0	8	73	CL1	- 5.0	5.0								
X	1035.0	8	73	CL1	- 5.0	5.0								Y
Y	1035.0	8	73	CL1	- 5.0	5.0								Y
A	1036.0	8	73	CL5	- 5.0	5.0								Y
B	1036.0	8	73	CL5	- 5.0	5.0								Y
C	1036.0	8	73	CL5	- 5.0	5.0								Y
D	1036.0	8	73	CL5	- 5.0	5.0								Y
E	1036.0	8	73	CL5	- 5.0	5.0								Y
U	1036.0	8	73	CL5	- 5.0	5.0								
UU	1036.0	8	73	CL5	- 5.0	5.0								
V	1036.0	8	73	CL5	- 5.0	5.0								
VV	1036.0	8	73	CL5	- 5.0	5.0								
W	1036.0	8	73	CL5	- 5.0	5.0								
X	1036.0	8	73	CL5	- 5.0	5.0								Y
Y	1036.0	8	73	CL5	- 5.0	5.0								Y
A	1037.0	14	36	CL1	- 5.0	5.0								Y
B	1037.0	14	36	CL1	- 5.0	5.0								Y
C	1037.0	14	36	CL1	- 5.0	5.0								Y
D	1037.0	14	36	CL1	- 5.0	5.0								Y
E	1037.0	14	36	CL1	- 5.0	5.0								Y
U	1037.0	14	36	CL1	- 5.0	5.0								Y
UU	1037.0	14	36	CL1	- 5.0	5.0								
V	1037.0	14	36	CL1	- 5.0	5.0								Y
VV	1037.0	14	36	CL1	- 5.0	5.0								
W	1037.0	14	36	CL1	- 5.0	5.0								
X	1037.0	14	36	CL1	- 5.0	5.0								Y
Y	1037.0	14	36	CL1	- 5.0	5.0								Y
A	1038.0	40	28	CL2	17.4	27.4								Y
B	1038.0	40	28	CL2	17.4	27.4								Y
C	1038.0	40	28	CL2	17.4	27.4								Y
D	1038.0	40	28	CL2	17.4	27.4								Y
E	1038.0	40	28	CL2	17.4	27.4								Y
U	1038.0	40	28	CL2	17.4	27.4								
UU	1038.0	40	28	CL2	17.4	27.4								
V	1038.0	40	28	CL2	17.4	27.4								
VV	1038.0	40	28	CL2	17.4	27.4								Y
W	1038.0	40	28	CL2	17.4	27.4								
X	1038.0	40	28	CL2	17.4	27.4								Y
Y	1038.0	40	28	CL2	17.4	27.4								Y
A	1039.0	4	28	HL1	- 5.0	5.0								
B	1039.0	4	28	HL1	- 5.0	5.0								
C	1039.0	4	28	HL1	- 5.0	5.0								Y
D	1039.0	4	28	HL1	- 5.0	5.0								
E	1039.0	4	28	HL1	- 5.0	5.0								
U	1039.0	4	28	HL1	- 5.0	5.0								
UU	1039.0	4	28	HL1	- 5.0	5.0								
V	1039.0	4	28	HL1	- 5.0	5.0								Y
VV	1039.0	4	28	HL1	- 5.0	5.0								Y
W	1039.0	4	28	HL1	- 5.0	5.0								
X	1039.0	4	28	HL1	- 5.0	5.0								
Y	1039.0	4	28	HL1	- 5.0	5.0								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	1040.0	4	20	HL2	- 5.0	5.0								
B	1040.0	4	20	HL2	- 5.0	5.0								
C	1040.0	4	20	HL2	- 5.0	5.0								
D	1040.0	4	20	HL2	- 5.0	5.0								
E	1040.0	4	20	HL2	- 5.0	5.0								
U	1040.0	4	20	HL2	- 5.0	5.0								
UU	1040.0	4	20	HL2	- 5.0	5.0								
V	1040.0	4	20	HL2	- 5.0	5.0								
VV	1040.0	4	20	HL2	- 5.0	5.0								
W	1040.0	4	20	HL2	- 5.0	5.0								
X	1040.0	4	20	HL2	- 5.0	5.0								
Y	1040.0	4	20	HL2	- 5.0	5.0								
A	1041.0	4	51	HL1	- 5.0	5.0								
B	1041.0	4	51	HL1	- 5.0	5.0								
C	1041.0	4	51	HL1	- 5.0	5.0								
D	1041.0	4	51	HL1	- 5.0	5.0								
E	1041.0	4	51	HL1	- 5.0	5.0								
U	1041.0	4	51	HL1	- 5.0	5.0								
UU	1041.0	4	51	HL1	- 5.0	5.0								
V	1041.0	4	51	HL1	- 5.0	5.0								
VV	1041.0	4	51	HL1	- 5.0	5.0								Y
W	1041.0	4	51	HL1	- 5.0	5.0								
X	1041.0	4	51	HL1	- 5.0	5.0								
Y	1041.0	4	51	HL1	- 5.0	5.0								
A	1042.0	5	37	HL1	- 5.0	5.0								
B	1042.0	5	37	HL1	- 5.0	5.0								
C	1042.0	5	37	HL1	- 5.0	5.0								
D	1042.0	5	37	HL1	- 5.0	5.0								
E	1042.0	5	37	HL1	- 5.0	5.0								
U	1042.0	5	37	HL1	- 5.0	5.0								
UU	1042.0	5	37	HL1	- 5.0	5.0								
V	1042.0	5	37	HL1	- 5.0	5.0								
VV	1042.0	5	37	HL1	- 5.0	5.0								Y
W	1042.0	5	37	HL1	- 5.0	5.0								
X	1042.0	5	37	HL1	- 5.0	5.0								
Y	1042.0	5	37	HL1	- 5.0	5.0								
A	1043.0	10	39	HL3	- 5.0	5.0								
B	1043.0	10	39	HL3	- 5.0	5.0								
C	1043.0	10	39	HL3	- 5.0	5.0								
D	1043.0	10	39	HL3	- 5.0	5.0								
E	1043.0	10	39	HL3	- 5.0	5.0								
U	1043.0	10	39	HL3	- 5.0	5.0								
UU	1043.0	10	39	HL3	- 5.0	5.0								
V	1043.0	10	39	HL3	- 5.0	5.0								
VV	1043.0	10	39	HL3	- 5.0	5.0								Y
W	1043.0	10	39	HL3	- 5.0	5.0								
X	1043.0	10	39	HL3	- 5.0	5.0								
Y	1043.0	10	39	HL3	- 5.0	5.0								
A	1045.0	14	72	HL5	-18.8	- 8.8								Y
B	1045.0	14	72	HL5	-18.8	- 8.8								Y
C	1045.0	14	72	HL5	-18.8	- 8.8								Y
D	1045.0	14	72	HL5	-18.8	- 8.8								Y

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
E	1045.0	14	72	HL5	-18.8	- 8.8								Y
U	1045.0	14	72	HL5	-18.8	- 8.8								Y
UU	1045.0	14	72	HL5	-18.8	- 8.8								
V	1045.0	14	72	HL5	-18.8	- 8.8								Y
VV	1045.0	14	72	HL5	-18.8	- 8.8								
W	1045.0	14	72	HL5	-18.8	- 8.8								
X	1045.0	14	72	HL5	-18.8	- 8.8								Y
Y	1045.0	14	72	HL5	-18.8	- 8.8								Y
A	1047.0	42	31	HL1	- 5.0	5.0								
B	1047.0	42	31	HL1	- 5.0	5.0								
C	1047.0	42	31	HL1	- 5.0	5.0								
D	1047.0	42	31	HL1	- 5.0	5.0								
E	1047.0	42	31	HL1	- 5.0	5.0								
U	1047.0	42	31	HL1	- 5.0	5.0								
UU	1047.0	42	31	HL1	- 5.0	5.0								
V	1047.0	42	31	HL1	- 5.0	5.0								
VV	1047.0	42	31	HL1	- 5.0	5.0								
W	1047.0	42	31	HL1	- 5.0	5.0								
X	1047.0	42	31	HL1	- 5.0	5.0								
Y	1047.0	42	31	HL1	- 5.0	5.0								
A	1048.1	2	26	CL7	0.0	4.0								
B	1048.1	2	26	CL7	0.0	4.0								
C	1048.1	2	26	CL7	0.0	4.0								
D	1048.1	2	26	CL7	0.0	4.0								
E	1048.1	2	26	CL7	0.0	4.0								
U	1048.1	2	26	CL7	0.0	4.0								
UU	1048.1	2	26	CL7	0.0	4.0								
V	1048.1	2	26	CL7	0.0	4.0								
VV	1048.1	2	26	CL7	0.0	4.0								
W	1048.1	2	26	CL7	0.0	4.0								
X	1048.1	2	26	CL7	0.0	4.0								Y
Y	1048.1	2	26	CL7	0.0	4.0								Y
A	1048.2	2	26	CL7	4.0	13.0								
B	1048.2	2	26	CL7	4.0	13.0								
C	1048.2	2	26	CL7	4.0	13.0								
D	1048.2	2	26	CL7	4.0	13.0								
E	1048.2	2	26	CL7	4.0	13.0								
U	1048.2	2	26	CL7	4.0	13.0								
UU	1048.2	2	26	CL7	4.0	13.0								
V	1048.2	2	26	CL7	4.0	13.0								
VV	1048.2	2	26	CL7	4.0	13.0								
W	1048.2	2	26	CL7	4.0	13.0								
X	1048.2	2	26	CL7	4.0	13.0								Y
Y	1048.2	2	26	CL7	4.0	13.0								Y
A	1048.3	2	26	CL7	13.0	17.0								
B	1048.3	2	26	CL7	13.0	17.0								
C	1048.3	2	26	CL7	13.0	17.0								
D	1048.3	2	26	CL7	13.0	17.0								
E	1048.3	2	26	CL7	13.0	17.0								
U	1048.3	2	26	CL7	13.0	17.0								
UU	1048.3	2	26	CL7	13.0	17.0								
V	1048.3	2	26	CL7	13.0	17.0								
VV	1048.3	2	26	CL7	13.0	17.0								
W	1048.3	2	26	CL7	13.0	17.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
X	1048.3	2	26	CL7	13.0	17.0								Y
Y	1048.3	2	26	CL7	13.0	17.0								Y
A	1049.1	2	27	CL7	0.0	4.0								
B	1049.1	2	27	CL7	0.0	4.0								
C	1049.1	2	27	CL7	0.0	4.0								
D	1049.1	2	27	CL7	0.0	4.0								
E	1049.1	2	27	CL7	0.0	4.0								
U	1049.1	2	27	CL7	0.0	4.0								
UU	1049.1	2	27	CL7	0.0	4.0								
V	1049.1	2	27	CL7	0.0	4.0								
VV	1049.1	2	27	CL7	0.0	4.0								
W	1049.1	2	27	CL7	0.0	4.0								
X	1049.1	2	27	CL7	0.0	4.0								Y
Y	1049.1	2	27	CL7	0.0	4.0								Y
A	1049.2	2	27	CL7	4.0	13.0								
B	1049.2	2	27	CL7	4.0	13.0								
C	1049.2	2	27	CL7	4.0	13.0								
D	1049.2	2	27	CL7	4.0	13.0								
E	1049.2	2	27	CL7	4.0	13.0								
U	1049.2	2	27	CL7	4.0	13.0								
UU	1049.2	2	27	CL7	4.0	13.0								
V	1049.2	2	27	CL7	4.0	13.0								
VV	1049.2	2	27	CL7	4.0	13.0								
W	1049.2	2	27	CL7	4.0	13.0								
X	1049.2	2	27	CL7	4.0	13.0								Y
Y	1049.2	2	27	CL7	4.0	13.0								Y
A	1049.3	2	27	CL7	13.0	17.0								
B	1049.3	2	27	CL7	13.0	17.0								
C	1049.3	2	27	CL7	13.0	17.0								
D	1049.3	2	27	CL7	13.0	17.0								
E	1049.3	2	27	CL7	13.0	17.0								
U	1049.3	2	27	CL7	13.0	17.0								
UU	1049.3	2	27	CL7	13.0	17.0								
V	1049.3	2	27	CL7	13.0	17.0								
VV	1049.3	2	27	CL7	13.0	17.0								
W	1049.3	2	27	CL7	13.0	17.0								
X	1049.3	2	27	CL7	13.0	17.0								Y
Y	1049.3	2	27	CL7	13.0	17.0								Y
A	1050.1	2	28	CL7	0.0	4.0								
B	1050.1	2	28	CL7	0.0	4.0								
C	1050.1	2	28	CL7	0.0	4.0								
D	1050.1	2	28	CL7	0.0	4.0								
E	1050.1	2	28	CL7	0.0	4.0								
U	1050.1	2	28	CL7	0.0	4.0								
UU	1050.1	2	28	CL7	0.0	4.0								
V	1050.1	2	28	CL7	0.0	4.0								
VV	1050.1	2	28	CL7	0.0	4.0								Y
W	1050.1	2	28	CL7	0.0	4.0								
X	1050.1	2	28	CL7	0.0	4.0								Y
Y	1050.1	2	28	CL7	0.0	4.0								Y
A	1050.2	2	28	CL7	4.0	13.0								
B	1050.2	2	28	CL7	4.0	13.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
C	1050.2	2	28	CL7	4.0	13.0								
D	1050.2	2	28	CL7	4.0	13.0								
E	1050.2	2	28	CL7	4.0	13.0								
U	1050.2	2	28	CL7	4.0	13.0								
UU	1050.2	2	28	CL7	4.0	13.0								
V	1050.2	2	28	CL7	4.0	13.0								
VV	1050.2	2	28	CL7	4.0	13.0								Y
W	1050.2	2	28	CL7	4.0	13.0								
X	1050.2	2	28	CL7	4.0	13.0								Y
Y	1050.2	2	28	CL7	4.0	13.0								Y
A	1050.3	2	28	CL7	13.0	17.0								
B	1050.3	2	28	CL7	13.0	17.0								
C	1050.3	2	28	CL7	13.0	17.0								
D	1050.3	2	28	CL7	13.0	17.0								
E	1050.3	2	28	CL7	13.0	17.0								
U	1050.3	2	28	CL7	13.0	17.0								
UU	1050.3	2	28	CL7	13.0	17.0								
V	1050.3	2	28	CL7	13.0	17.0								
VV	1050.3	2	28	CL7	13.0	17.0								Y
W	1050.3	2	28	CL7	13.0	17.0								
X	1050.3	2	28	CL7	13.0	17.0								Y
Y	1050.3	2	28	CL7	13.0	17.0								Y
A	1051.1	2	99	CL7	0.0	4.0								
B	1051.1	2	99	CL7	0.0	4.0								
C	1051.1	2	99	CL7	0.0	4.0								
D	1051.1	2	99	CL7	0.0	4.0								
E	1051.1	2	99	CL7	0.0	4.0								
U	1051.1	2	99	CL7	0.0	4.0								
UU	1051.1	2	99	CL7	0.0	4.0								
V	1051.1	2	99	CL7	0.0	4.0								
VV	1051.1	2	99	CL7	0.0	4.0								
W	1051.1	2	99	CL7	0.0	4.0								
X	1051.1	2	99	CL7	0.0	4.0								
Y	1051.1	2	99	CL7	0.0	4.0								
A	1051.2	2	99	CL7	4.0	13.0								
B	1051.2	2	99	CL7	4.0	13.0								
C	1051.2	2	99	CL7	4.0	13.0								
D	1051.2	2	99	CL7	4.0	13.0								
E	1051.2	2	99	CL7	4.0	13.0								
U	1051.2	2	99	CL7	4.0	13.0								
UU	1051.2	2	99	CL7	4.0	13.0								
V	1051.2	2	99	CL7	4.0	13.0								
VV	1051.2	2	99	CL7	4.0	13.0								
W	1051.2	2	99	CL7	4.0	13.0								
X	1051.2	2	99	CL7	4.0	13.0								
Y	1051.2	2	99	CL7	4.0	13.0								
A	1051.3	2	99	CL7	13.0	18.0								
B	1051.3	2	99	CL7	13.0	18.0								
C	1051.3	2	99	CL7	13.0	18.0								
D	1051.3	2	99	CL7	13.0	18.0								
E	1051.3	2	99	CL7	13.0	18.0								
U	1051.3	2	99	CL7	13.0	18.0								
UU	1051.3	2	99	CL7	13.0	18.0								
V	1051.3	2	99	CL7	13.0	18.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
VV	1051.3	2	99	CL7	13.0	18.0								
W	1051.3	2	99	CL7	13.0	18.0								
X	1051.3	2	99	CL7	13.0	18.0								
Y	1051.3	2	99	CL7	13.0	18.0								
A	1053.1	3	99	CL7	0.0	7.0								
B	1053.1	3	99	CL7	0.0	7.0								
C	1053.1	3	99	CL7	0.0	7.0								
D	1053.1	3	99	CL7	0.0	7.0								
E	1053.1	3	99	CL7	0.0	7.0								
U	1053.1	3	99	CL7	0.0	7.0								
UU	1053.1	3	99	CL7	0.0	7.0								
V	1053.1	3	99	CL7	0.0	7.0								
VV	1053.1	3	99	CL7	0.0	7.0								
W	1053.1	3	99	CL7	0.0	7.0								
X	1053.1	3	99	CL7	0.0	7.0								
Y	1053.1	3	99	CL7	0.0	7.0								
A	1053.2	3	99	CL7	7.0	15.0								
B	1053.2	3	99	CL7	7.0	15.0								
C	1053.2	3	99	CL7	7.0	15.0								
D	1053.2	3	99	CL7	7.0	15.0								
E	1053.2	3	99	CL7	7.0	15.0								
U	1053.2	3	99	CL7	7.0	15.0								
UU	1053.2	3	99	CL7	7.0	15.0								
V	1053.2	3	99	CL7	7.0	15.0								
VV	1053.2	3	99	CL7	7.0	15.0								
W	1053.2	3	99	CL7	7.0	15.0								
X	1053.2	3	99	CL7	7.0	15.0								
Y	1053.2	3	99	CL7	7.0	15.0								
A	1053.3	3	99	CL7	15.0	22.0								
B	1053.3	3	99	CL7	15.0	22.0								
C	1053.3	3	99	CL7	15.0	22.0								
D	1053.3	3	99	CL7	15.0	22.0								
E	1053.3	3	99	CL7	15.0	22.0								
U	1053.3	3	99	CL7	15.0	22.0								
UU	1053.3	3	99	CL7	15.0	22.0								
V	1053.3	3	99	CL7	15.0	22.0								
VV	1053.3	3	99	CL7	15.0	22.0								
W	1053.3	3	99	CL7	15.0	22.0								
X	1053.3	3	99	CL7	15.0	22.0								
Y	1053.3	3	99	CL7	15.0	22.0								
A	1054.1	3	99	CL7	0.0	7.0								
B	1054.1	3	99	CL7	0.0	7.0								
C	1054.1	3	99	CL7	0.0	7.0								
D	1054.1	3	99	CL7	0.0	7.0								
E	1054.1	3	99	CL7	0.0	7.0								
U	1054.1	3	99	CL7	0.0	7.0								
UU	1054.1	3	99	CL7	0.0	7.0								
V	1054.1	3	99	CL7	0.0	7.0								
VV	1054.1	3	99	CL7	0.0	7.0								
W	1054.1	3	99	CL7	0.0	7.0								
X	1054.1	3	99	CL7	0.0	7.0								
Y	1054.1	3	99	CL7	0.0	7.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
A	1054.2	3	99	CL7	7.0	14.0								
B	1054.2	3	99	CL7	7.0	14.0								
C	1054.2	3	99	CL7	7.0	14.0								
D	1054.2	3	99	CL7	7.0	14.0								
E	1054.2	3	99	CL7	7.0	14.0								
U	1054.2	3	99	CL7	7.0	14.0								
UU	1054.2	3	99	CL7	7.0	14.0								
V	1054.2	3	99	CL7	7.0	14.0								
VV	1054.2	3	99	CL7	7.0	14.0								
W	1054.2	3	99	CL7	7.0	14.0								
X	1054.2	3	99	CL7	7.0	14.0								
Y	1054.2	3	99	CL7	7.0	14.0								
A	1054.3	3	99	CL7	14.0	21.0								
B	1054.3	3	99	CL7	14.0	21.0								
C	1054.3	3	99	CL7	14.0	21.0								
D	1054.3	3	99	CL7	14.0	21.0								
E	1054.3	3	99	CL7	14.0	21.0								
U	1054.3	3	99	CL7	14.0	21.0								
UU	1054.3	3	99	CL7	14.0	21.0								
V	1054.3	3	99	CL7	14.0	21.0								
VV	1054.3	3	99	CL7	14.0	21.0								
W	1054.3	3	99	CL7	14.0	21.0								
X	1054.3	3	99	CL7	14.0	21.0								
Y	1054.3	3	99	CL7	14.0	21.0								
A	1055.0	17	48	HTTS	-21.0	-19.8								Y
B	1055.0	17	48	HTTS	-21.0	-19.8								Y
C	1055.0	17	48	HTTS	-21.0	-19.8								Y
D	1055.0	17	48	HTTS	-21.0	-19.8								Y
E	1055.0	17	48	HTTS	-21.0	-19.8								Y
U	1055.0	17	48	HTTS	-21.0	-19.8								
UU	1055.0	17	48	HTTS	-21.0	-19.8								Y
V	1055.0	17	48	HTTS	-21.0	-19.8								Y
VV	1055.0	17	48	HTTS	-21.0	-19.8								Y
W	1055.0	17	48	HTTS	-21.0	-19.8								
X	1055.0	17	48	HTTS	-21.0	-19.8								Y
Y	1055.0	17	48	HTTS	-21.0	-19.8								Y
A	1056.0	15	40	HTTS	-21.0	-19.7								
B	1056.0	15	40	HTTS	-21.0	-19.7								
C	1056.0	15	40	HTTS	-21.0	-19.7								
D	1056.0	15	40	HTTS	-21.0	-19.7								
E	1056.0	15	40	HTTS	-21.0	-19.7								
U	1056.0	15	40	HTTS	-21.0	-19.7								
UU	1056.0	15	40	HTTS	-21.0	-19.7								
V	1056.0	15	40	HTTS	-21.0	-19.7								
VV	1056.0	15	40	HTTS	-21.0	-19.7								
W	1056.0	15	40	HTTS	-21.0	-19.7								
X	1056.0	15	40	HTTS	-21.0	-19.7								Y
Y	1056.0	15	40	HTTS	-21.0	-19.7								Y
A	1057.0	23	38	HTTS	-19.0	-18.0								
B	1057.0	23	38	HTTS	-19.0	-18.0								
C	1057.0	23	38	HTTS	-19.0	-18.0								
D	1057.0	23	38	HTTS	-19.0	-18.0								
E	1057.0	23	38	HTTS	-19.0	-18.0								
U	1057.0	23	38	HTTS	-19.0	-18.0								

TEAM	SPEC ID	TUBE ROW	TUBE COL	LOC REF	SPEC DIST 1	SPEC DIST 2	ORIGIN	TYPE	CONFIDENCE	WALL LOSS	DEFECT REF	LOC DIST	CHANNEL	TESTED
UU	1057.0	23	38	HTTS	-19.0	-18.0								
V	1057.0	23	38	HTTS	-19.0	-18.0								
VV	1057.0	23	38	HTTS	-19.0	-18.0								
W	1057.0	23	38	HTTS	-19.0	-18.0								
X	1057.0	23	38	HTTS	-19.0	-18.0								Y
Y	1057.0	23	38	HTTS	-19.0	-18.0								Y