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SUMMARY REPORT FOR 1990 INSERVICE INSPECTION (ISI) OF SRS 100-L REACTOR TANK (U)

by

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SUMMARY REPORT FOR 1990 INSERVICE INSPECTION (ISI) OF SRS 100-L REACTOR TANK (U)

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Savannah River Site
Aiken, SC 29808

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INTRODUCTION

The integrity of the SRS reactor tanks is a key factor affecting their suitability for continued service since, unlike the external piping system and components, the tanks are virtually irreplaceable. Cracking in various areas of the process water piping systems has occurred beginning in about 1960 as a result of several degradation mechanisms, chiefly intergranular stress corrosion cracking (IGSCC) and chloride-induced transgranular cracking. IGSCC, currently the primary degradation mechanism, also occurred in the "knuckle" region (tank wall-to-bottom tube sheet transition piece) unique to C Reactor and was eventually responsible for that reactor being deactivated in 1985.

A program of visual examinations of the SRS reactor tanks began in 1968, with 20 percent of the accessible weld area being inspected on a five-year frequency. In late 1986 and early 1987 the scope of these inspections was expanded to include a 100 percent visual examination of accessible welds in P, L, and K Reactor tanks. No evidence of cracking was detected in any of these inspections. As noted in the Inservice Inspection (ISI) Plan for the process water system prepared in 1988, volumetric and surface examinations are preferred and are currently being implemented (1): SRL Equipment Engineering Section (EES) efforts to develop such a capability using ultrasonic (UT) and eddy current (ET) techniques, culminated in a robotic inspection system ready for initial deployment in 1989.

The 1989 P Reactor tank inspection, covering 40% of the accessible weld heat affected zones (HAZ), was the first inspection using the new system. The equipment performed well and no evidence of degradation of the tank wall weld zones by IGSCC was found (2). The K Reactor tank inspection in 1990 was the second inspection with the new equipment. It covered 60% of the accessible weld HAZ. As in P Reactor, no evidence of degradation by IGSCC was detected (3).

The third such inspection was conducted in L Reactor tank, beginning in October 1990. An initial window of about four months in the outage schedule was established for this inspection, within which a prioritized program covering a minimum of about 60% of the accessible weld HAZ was initiated (4). During the course of the inspection DOE directed that this scope be increased to cover 100% of the accessible welds (5). Accordingly, as authorized by Scope Change Notice SCN 403 (approved January 31, 1991), the window was lengthened and the inspection was completed in April 1991, six months after it was begun. This report documents the results of the L Reactor tank inspection, which was performed under Test Authorization TA1-2300 and Special Procedure 2458, Rev. 0 (6, 7).

SUMMARY

The primary objective of this inspection was to determine if the accessible welds and selected portions of base metal in the L Reactor tank wall contain any indications of IGSCC. This inspection included areas in and beyond the weld HAZ, extending out as far as two to three inches from the centerline of the welds, plus selected areas of base metal at the intersection of the main tank vertical and mid-girth welds. No evidence of such degradation was found in any of the areas examined. Further, additional inspections were conducted of areas that had been damaged and repaired during original fabrication, and on a sample of areas containing linear indications observed during the 1986 visual inspection of the tank. No evidence of IGSCC or other service induced degradation was detected in these areas, either.

A number of other non-relevant indications which were determined to be a result of tank fabrication processes were detected and were recorded in the permanent data base for reference in future inspections. These include areas of weld repair during original fabrication; evidence of current and

former attachments to the tank (both outside and inside); geometric and subsurface reflectors associated with some welds; weld surface irregularities; and imperfections in the tank wall surface, such as minor dents and gouges. These findings were acceptable to the original tank construction codes and standards (if indeed they were even detectable by the less sensitive nondestructive testing methods available at that time), are within the acceptance standards applicable for these ultrasonic inspections, and do not constitute a concern with respect to the structural integrity of the tank.

The inspection was initially planned to cover a minimum of 60% of the accessible welds, plus repair areas and a sample of the indications from the 1986 visual inspection. Direction was received from DOE while the inspection was in progress to expand the scope to cover 100% of the accessible weld areas, and the plan was adjusted accordingly. Initial setup of the tank, which prior to inspection contained Mark 60B target assemblies and nearly a full charge of Mark 22 fuel assemblies, began on October 15, 1990. The inspection was completed on April 12, 1991, having met all objectives. The total elapsed time was 180 days, slightly less than one-third of which (55 days) was actually required for inspection activities. The remainder was required for tank setups and all other noninspection activities, including interruptions due to requirements to conduct certain other essential programs such as K Reactor chargeback and fuel inventory verifications, which temporarily diverted manpower from the L tank inspection task.

PURPOSE AND SCOPE OF INSPECTION

This inspection comprised the initial volumetric inspection required by the ISI Plan for the 100-L Reactor tank. The primary objective of the L tank inspection was the detection and sizing of IGSCC in the HAZ of the accessible weldments of the reactor tank, and the evaluation of any such IGSCC with respect to the approved acceptance criteria (8). Additionally, any indications of anomalies resulting from the original tank fabrication process were investigated, evaluated against the acceptance standards, and documented for future reference.

In accordance with the provisions of the ISI Plan and requirements specified by DOE, the following accessible weld areas were examined by UT and ET techniques:

100%	Tank shell vertical welds (L-VC1, L-VC2, L-VC3, L-VD1, L-VD2, L-VD3)[a]
100%	Tank-to-expansion ring horizontal weld (L-H2) and horizontal weld in expansion ring immediately above (L-H1)[b]
100%	Tank shell horizontal mid-girth weld (L-H3)
100%	Tank shell-to-tank bottom nozzle assembly (TBNA) extension ring horizontal weld (L-H4)
100%	TBNA extension ring-to-TBNA horizontal weld (L-H5)
100%	Outlet nozzle-to-tank vertical welds (L-VF1 through L-VF12)[c]
100%	TBNA extension ring vertical welds between L-H4 and L-H5, (L-VE1, L-VE2)
100%	Vertical welds in expansion ring between L-H1 and L-H2, (L-VB1, L-VB2, L-VB5, L-VB6)[d]

[a]See weld identifications in Figures 1-A through 1-G.

[b]Not required by ISI Plan.

[c]Only the upper 12 inches of these approximately 22-inch-long welds are presently accessible for inspection.

[d]Two additional welds (L-VB3 and L-VB4) are believed to be located in the vicinity of motion measurement brackets and are, therefore, inaccessible for inspection due to interference with the inspection equipment.

The area to be examined was specified in Reference 9 as base metal and the HAZ within two inches on either side of the weld centerline. In most cases this coverage was extended to three inches on each side of the weld centerline, for the UT scans perpendicular to the weld. The parallel UT scans covered two inches on either side of the weld centerline, as specified. Regions of the tank base metal in the vicinity of the intersection of the main tank shell vertical and horizontal welds were also scheduled for inspection.

Further, additional inspections by UT and/or ET were scheduled to cover areas of repair during original fabrication and a sample of the indications noted in the 1986 visual examination. As noted in Reference 4, the L tank shell was dropped during fabrication, resulting in minor damage which was repaired. The edge by the intended field weld was crimped and straightened in several places (see Figure 6). Two dented or "cave-in" areas were repaired by cold working, and another was reportedly repaired by the additional use of weld metal followed by grinding (see Figures 4 and 5). During the 1986 100% visual examination, 29 unusual marks were noted. Fourteen of these were inspected further by cleaning off the oxide film and using dye penetrant (PT). The PT inspection showed no indication of cracking. Seven of these indications, including three that were penetrant tested in 1986, were included in the present (1990) UT/ET inspection.

The inclusion of these repair areas, the sample of the indications from the 1986 inspection, the fact that the L tank shell was fabricated from six plates of Type 304 SS (rather than four as in K and P tanks), and the 100% coverage of all accessible welds, collectively represent a substantial increase in scope of the L tank UT/ET inspection relative to the K and P tank inspection programs conducted in 1990 and 1989, respectively.

The area of the expansion ring in the vicinity of welds L-H1 and L-H2 was inspected by ET only, consistent with the tank inspection procedure. An alternate UT transducer and procedure designed for the 3/16-inch thick expansion ring were qualified and available for backup use to the ET procedure if results should so indicate. As in the P and K reactor inspections, inspection of some of the welds in the vicinity of the outlet nozzles was limited by the capability of the robotic system to access geometrically complex areas. Also, inspection of the T-joint weld joining the TBNA to the bottom tube sheet could not be accomplished with the present robot; this capability is still under development.

For reference purposes, Figures 1-A through 1-G are unfolded views of the major weld areas in the vertical section of the tank. The view is from the center of the tank looking outward. These figures also identify the data packages in the various inspection sectors. Also for reference, Figures 2 and 3 indicate the locations of all welds and other areas scanned. Figure 2 is a composite view of these for the overall L tank inspection; again, the view is from the center of the tank looking outward. Figures 3-A through 3-F are expanded portions of Figure 2 corresponding to the six phases of the inspection.

INSPECTION SYSTEM DESCRIPTION

The reactor tank inspection system was developed by the Equipment Engineering Section (EES) of the Savannah River Laboratory (SRL) according to the requirements of the Functional Specification (10) and NDE Methodology (9). These references contain details of the equipment and inspection techniques. The basic inspection system consists of: (1) a remotely operated robotic manipulator capable of conducting ultrasonic and eddy current examinations of all accessible areas of the reactor tank wall; (2) equipment for in-tank lighting, cameras, and calibration of the UT/ET system; (3) instrumentation and controls for the full range of UT, ET, and video operations; (4) a two-ton gantry crane for insertion and removal of equipment to and from

the reactor tank; and (5) support equipment for communication between the process room and the control trailer, including lighting, closed circuit television, audio, etc. In addition, the onsite facility mockup of the P, L, and K Reactor tanks in Building 305-A was used to test, qualify, and demonstrate the in-tank tooling prior to its first use in P Reactor, and to train and qualify inspection personnel.

The NDE data acquisition system is based on an Intraspect/98™ Ultrasonic (UT) imaging system and a Zetec™ MIZ 18 eddy current testing (ET) system. The capabilities of the Intraspect/98™ have been evaluated in detail with respect to SRS applications (11). The NDE data acquisition system is supplemented by high-resolution in-tank REES™ cameras. In all, the complement of in-tank inspection equipment consists of one UT/ET robot, one calibration mast, and three camera/light tools, each containing one camera and two lights. An additional robot is available as a spare.

The system used for the L tank inspection was essentially the same as that used in the 1990 K tank inspection except for a few modifications made as a result of the Quality Improvement Program (QIP) to improve reliability and performance. Some of these are:

New power supply for the robot lower arm potentiometers.
New design low pass filter on the UT strobe line.
Improved wireless headset system.
New sealing techniques on the robot lower arm connectors and elbow motor drive cables.
New lower torque elbow motors on the robots.
Buzzers on the camera tripods (for communication with the process room).
A second intercom in the control trailer.
Maintenance procedures modified to improve camera tuning and to include probe mounting procedure.
Improved UT software (Version 6.2).

Three other changes of particular significance were made that have been credited with substantially improving analysis time and efficiency of scanning. The first involved substitution of optical disk drives for the previous tape drives, which significantly reduced the time required to download and analyze the inspection data. The optical disk drives were installed in the early stages of the L inspection. The second change resulted from the discovery and elimination during the inspection of a weakness in the software, which previously during the reactor tank inspection program caused intermittent error messages between the NDE system and the host computer. The error messages in turn caused a loss of data and required the corresponding scan to be repeated. Elimination of this weakness yielded a significant improvement in overall scanning efficiency. The third change involved repositioning the UT and ET probes in the sled, located at the end of the lower arm. Prior to starting the L tank inspection the UT probe was positioned so that it was in front of the ET probe during normal scanning. Benefits of this change were reduced probe lift-off and much less mechanical abuse of the lower arm.

PROGRAM OVERSIGHT AND IMPLEMENTATION

During the design and development of the inspection systems, a number of internal design reviews as well as external oversight committee reviews were conducted. These activities are discussed in Reference 2.

Upon completion of the K tank inspection in March, 1990, preparations for the inspection of the L tank were started. The RTIP L Implementation team met on a weekly basis and was made up of

representatives from EES, Reactor Engineering (RE), Reactor Operations (RO), Reactor Operations-Component Handling (RO-CH), Engineering and Projects Division (EPD), Reactor Programs (RP), and Outage Management (OM). The implementation team utilized the same meeting format and approach that was successfully used for the P and K preparations. As a result, the L inspection was started with a minimum of delays or problems.

Immediately prior to the start of the L inspection, a formal Preservice Review (PSR) was conducted. The purpose of the PSR was to formally review and evaluate the capability of the RTIP inspection systems and program to perform satisfactorily from a functional point of view and also to review and evaluate the adequacy of the L area preparations to support the start of the tank inspection. Representatives from EES, RE, RO, Reactor QA (RQA), DOE, RO-CH, HP, and DOE consultants participated in the review. While some concerns were expressed regarding the L area preparations, it was concluded that the preparations for the start of the inspection were adequate. The findings of the L PSR were documented in a final report (12).

In addition to the PSR, a two day briefing session was conducted by EES RTIP personnel. This briefing provided the purpose, nature, and details of the inspection equipment, procedures, operations, and interface requirements. Lessons learned from the P and K inspections were also reviewed. Representatives from RO, RO-CH, DOE, and RE participated in the briefings. These briefings directly contributed to the efficient start and continuation of the L inspection.

Oversight of the L inspection was provided by internal WSRC organizations (e.g., Reactor QA and Reactor Engineering) and also by independent consultants employed by DOE. The DOE consultants interfaced with the RTIP personnel on a weekly basis during the course of the inspection. Their activities included oversight of the UT and ET data acquisition and analysis, documentation, and adherence to procedures. No major discrepancies were identified by the consultants during the L inspection (21).

QUALITY ASSURANCE PROGRAM

The RTIP Quality Assurance plan (13) is applicable to both the development of the NDE inspection equipment systems and to the implementation of the NDE inspection program. The RTIP QA plan defines the responsibilities and procedural controls to be administered by the Program Management Team to assure that preestablished requirements (Functional Specification and NDE Methodology) are met. The RTIP QA plan is consistent with the WSRC Quality Assurance Program requirements and is periodically reviewed in order to assure applicability and adequateness.

Elements of the Site QA Plan which are applicable to the implementation of the inspection program are listed in the RTIP QA Plan. These elements are supported by task-specific procedures which are identified in Appendix B.

A proceduralized Quality Improvement Plan (QIP) was established and implemented during the P and K inspections. Suggestions for program and equipment improvements were solicited from EES, RE, RO, RO-CH, DOE, Reactor Maintenance, and other interfacing organizations. All suggestions were recorded, evaluated, and their disposition communicated to the originator. This process directly contributed to the marked improvement of the RTIP program during the K inspection and also directly contributed to the success of the L inspection (see Inspection System Description). This process will continue to be a part of the inspection program during future inspections.

RTIP QUALIFICATIONS

The WSRC/EES inspection team was supplemented by subcontracted NDE specialists. All contracted NDE analysts who participated in the L inspection possessed a high degree of experience in the manual detection and sizing of IGSCC in the commercial nuclear industry and were certified by the EPRI NDE Center. In addition, all contracted analysts and the EES RTIP UT personnel were required to comply with the two basic elements of the RTIP UT qualification program:

- All WSRC and contracted UT personnel must be certified to a minimum of Level II in the UT method in accordance with the applicable document which implements the requirements of the American Society for Nondestructive Testing's (ASNT) Recommended Practice SNT-TC-1A. Certifications of contracted personnel were reviewed and accepted by a RTIP EES Level III.

- WSRC and contracted UT personnel, the Amdata Intraspect/98 ultrasonic system, and the EES RTIP ultrasonic inspection procedure RTIP 008 (14) must successfully pass a site-specific performance demonstration developed and administered by the EPRI NDE Center.

The site-specific EPRI performance demonstration is discussed in References 2 and 3.

The majority of the UT personnel who participated in the L inspection were the same specialists that performed the P and K inspections. These personnel are:

Previously Qualified as UT Data Acquisitionists:

B. D. Howard	EES RTIP UT Level III
W. P. Gunnels	Contracted UT Level II

Previously Qualified for IGSCC Detection (UT Analyst):

B. D. Howard	EES RTIP UT Level III
C. L. Allen	EES RTIP UT Level II
M. A. McKaig	Contracted UT Level III
L. D. Kidd	Contracted UT Level II

Previously Qualified for IGSCC Length Sizing (UT Analyst):

B. D. Howard	EES RTIP UT Level III
C. L. Allen	EES RTIP UT Level II
M. A. McKaig	Contracted UT Level III
L. D. Kidd	Contracted UT Level II

Previously Qualified for IGSCC Depth Sizing (UT Analyst):

B. D. Howard	EES RTIP UT Level III
C. L. Allen	EES RTIP UT Level II
M. A. McKaig	Contracted UT Level III
L. D. Kidd	Contracted UT Level II

During the performance of the K tank inspection, additional training was performed to provide supplemental UT acquisitionists and analysts. An onsite performance demonstration was administered by EPRI in February of 1990 with the following personnel successfully meeting the requirements.

Qualified as UT Data Acquisitionists:

J. Robinson*	WSRC SE&SQ UT Level II
P. Gibbons*	WSRC SE&SQ UT Level II
L. Pitman	WSRC SE&SQ UT Level II
S. Williams	Contracted UT Level II
D. J. Blevins	Contracted UT Level II

* Did not participate in the L inspection.

Qualified for IGSCC Detection (UT Analyst):

D. B. Sells	Contracted UT Level II
C. L. LaSoya	Contracted UT Level II

Qualified for IGSCC Length Sizing (UT Analyst):

D. B. Sells	Contracted UT Level II
C. L. LaSoya	Contracted UT Level II

Qualified for IGSCC Depth Sizing (UT Analyst):

D. B. Sells	Contracted UT Level II
C. L. LaSoya	Contracted UT Level II

In addition to the UT qualifications, a similar process was used to qualify the RTIP ET personnel, system, and procedure (RTIP 009, Ref. 15).

The original ET qualification (prior to the P inspection) was performed using the plates developed for the UT performance demonstration. The ET capabilities were witnessed and attested to by EPRI personnel. Also, a formal procedure demonstration was performed by the EES RTIP ET Level III with SRS Quality Assurance personnel in attendance per the requirements of RTIP 009, Attachment 1. These qualifications are considered to meet the ASME Code requirements. The ET person who participated in the original qualification and also participated in the L inspection is:

V. Cech	EES RTIP ET Level III (On loan from SE&SQ)

Subsequent to the K inspection, replacement personnel were supplied by the subcontractor. These personnel were trained and qualified by the RTIP ET Level III prior to the start of the L inspection. These personnel were:

T. Boyers	Contracted ET Level III
R. Drumm	Contracted ET Level II data acquisitionist
W. Zimmer	Contracted ET Level II data acquisitionist

REACTOR TANK UT ACCEPTANCE CRITERIA

Prior to performing the P Reactor tank UT inspection in 1989, acceptance criteria were developed to disposition any indications that might be found. The criteria were developed by a special working group that included nationally recognized experts. As described in Reference 2, the acceptance criteria provide specific response requirements for indications that meet or exceed any of three standards. These standards are developed specifically for IGSCC, or more generally for planar indications that are open to the tank surface. The three size criteria and required responses are summarized as follows:

(1) An indication greater than or equal to 20 percent throughwall and 5 inches in length exceeds the reexamination standard. These indications are acceptable for continued operation but must be reexamined within 18 months.

(2) An indication greater than or equal to 20 percent throughwall and 10 inches in length exceeds the acceptance standard. These indications require additional analysis using specific configuration, location, and material property data to demonstrate acceptability for continued operation. If acceptable, they shall be reinspected at an interval to be determined by the analysis.

(3) An indication less than 20 percent throughwall and greater than 20 inches in length is also subject to additional analysis and/or supplemental examination. If found to be acceptable for continued operation, it shall be reinspected at an interval determined by the analysis.

(4) An indication which does not exceed any of the above standards is acceptable for continued operation. The ISI Plan for the SRS Reactor Process Water System requires reinspection of all areas every five years (1).

As noted above, these criteria apply specifically to IGSCC. As worded originally, the criteria might be interpreted to apply to weld metal also. However, only the heat affected zone portions of the weldments are susceptible to IGSCC; the weld metal is not susceptible to IGSCC. Accordingly, the original criteria approved by DOE for P Reactor were modified by adding guidelines for addressing any indications that might be found within the weld metal or UT signals resulting from geometric reflectors.

The revised criteria including guidance for weld evaluations were incorporated in Reference 8 and used as the applicable criteria throughout both the K and L Reactor tank inspections. Formal approval was received from DOE on March 13, 1990 (16).

INSPECTION PERFORMANCE

The 1990 L Reactor tank inspection was accomplished during the period October 1990-April 1991. A total elapsed time of 180 calendar days was consumed, including time required to relocate components in the tank before and after each phase of the inspection to create sufficient vacant positions to charge the inspection equipment. The 180-day total also includes other noninspection time such as crew rest on weekends, inspection equipment moves in the reactor tank, troubleshooting and maintenance, program interruptions (e.g., fuel verification and K chargeback activities by Reactor Operations-Component Handling (RO-CH) personnel), etc. The time required to return the tank components to normal following the inspection and exit the process room was not included, because the camera tools were left in the tank for several days to assist in other work.

Slightly less than one-third of the total time was actually used for the inspection work proper. The inspection activities took place over a period of 55 days, therefore all other noninspection work as described above required a total of 125 days. The 55-day inspection period for the 100% L tank inspection compares favorably to the 28 days (actual inspection time) required for the 60% K-tank inspection in 1990, considering that L tank has one additional set of main tank vertical welds[a] and that the L tank scope also included substantial scanning of suspected repair areas and indications from the 1986 visual examination, as noted previously. The L tank inspection time also reflects gains realized from the QIP program, described earlier.

On the other hand, noninspection time was considerably greater in L than in K, largely due to the presence of essentially a full charge of MK22 and MK60B components in the L tank, necessitating resetting the tank six different times corresponding to the six phases of the test. The year-end holiday season, restricted overtime, and program interruptions also contributed to the large (125-day) noninspection time in L.

The dates corresponding to the key activities in the six phases of the L tank inspection are:

		Tank Setup		Inspection	
	No. of Sectors	Start	Complete	Start	Complete
Phase 1	4	10/15/90	10/26/90	11/5/90	11/16/90
Phase 2	3	11/16/90	11/27/90	12/2/90	12/13/90
Phase 3	3	1/7/91	1/26/91	1/29/91	2/6/91
Phase 4	3	2/11/91	2/21/91	2/25/91	3/7/91
Phase 5	3	3/11/91	3/19/91	3/20/91	3/25/91
Phase 6	2	3/27/91	4/5/91	4/8/91	4/12/91

The dates listed in the Inspection column above include times to relocate and functionally check the inspection equipment when moving from one sector to another. The relatively long delay between completion of Phase 2 and beginning setup for Phase 3 reflects primarily the interruption for K chargeback and the heavy Christmas holiday vacation time. The relatively long time for Phase 3 setup was caused primarily by an interruption to conduct fuel inventory verification activities in P and L reactors.

The six phases referred to above correspond to the six regions of the L tank vacated sequentially to permit insertion of the inspection equipment. The reactor tank was subdivided into 18 inspection sectors, each corresponding roughly to the extent of the tank circumference that can be reached by the robot from a single fuel access port position. With fuel and target components in the tank, it is possible to relocate sufficient components to vacate nominally three adjacent sectors at a time; in certain cases, depending on particular sector combinations, it is possible to vacate four adjacent sectors.

[a] L tank was fabricated from six plates rather than four as in P and K Reactors, therefore, it has three sets of vertical welds rather than two. Each set consists of a weld in the top half and another in the bottom half, offset from each other as indicated in Figure 2.

The sequence of sectors inspected in L tank is:

Test Phase	Sector	Tank Coordinate of UT/ET Robot
1	2F	X10-Y36
1	3A	X10-Y48
1	3B	X10-Y60
1	3C	X13-Y69
2	1F	X43-Y27
2	2A	X37-Y21
2	2B	X31-Y15
3	1C	X46-Y60
3	1B	X43-Y69
3	1A	X37-Y75
4	3D	X19-Y75
4	3E	X25-Y81
4	3F	X31-Y81
5	2C	X25-Y15
5	2D	X19-Y21
5	2E	X13-Y27
6	1D	X46-Y48
6	1E	X46-Y36

The vertical inspection range of the UT/ET end effector in each robot position was adjusted in three discrete increments, or "windows" (upper, middle, and lower) to cover the entire accessible height of the tank. The locations of these windows are indicated by the horizontal dashed lines in Figures 1-A through 1-G.

About 305 linear feet of reactor weld and HAZ were inspected in this test. Including overlap of the inspection areas of the circumferential welds between adjacent sectors, the UT/ET probes actually examined about 335 linear feet of weld and HAZ.

REPORTING

In accordance with the requirements of inspection procedure RTIP 002 (17), the inspection results were reviewed by a WSRC Inspection Review Committee (IRC). The initial members of the 1990 L tank IRC were:

J. M. Morrison, Chairman	Reactor Programs
E. G. Caveness	Equipment Engineering/RTIP
D. R. Ketcham	Reactor Engineering
J. L. Jiminez	Reactor Operations
T. S. Bargeloh	Reactor Quality Assurance
E. J. Majzlik	Equipment Engineering/Materials
C. D. Cowfer	Reactor Engineering

Several changes in IRC membership were made over the course of the inspection as a result of reassignments and workload conflicts. W. C. Collins replaced Mr. Bargeloh at the end of November 1990 as the Reactor Quality Assurance member. Beginning in February 1991 Mr. Jimenez' position was filled alternately by G. I. Butler, Jr., H. A. Hicks, and P. J. Svoboda, Reactor Operations L UT Test Coordinators.

The IRC was responsible for reviewing the UT/ET results and data packages, as presented by the appropriate Level III analysts, in accordance with the requirements of the approved flaw acceptance criteria (8). In so doing, the IRC was responsible for dispositioning the results, such as by acceptance or by deferral with request for additional inspection and analysis, and issuing a report following each committee meeting. The IRC was further responsible for reporting the results to WSRC and DOE management on a daily basis as the inspection progressed, for conduct of occasional briefings on progress and status, and for preparation of this summary report.

For purpose of data review and disposition, the IRC met a total of 22 times and generated 22 daily reports, numbered 1 through 22. Copies of these reports are presented in Appendix A. The IRC reviewed a total of 46 UT weld data packages and 58 ET weld data packages, as follows:

UT: SRS-008-L-001 through SRS-008-L-044*
ET: SRS-009-001L through SRS-009-055L**

In addition to the above, nine special ET base metal and weld scans were conducted to investigate areas of special features, reported fabrication repairs, and indications from the 1986 visual inspection. These data packages are numbered as follows:

SRS-009-BM-3A-L
SRS-009-BM-3B-L
SRS-009-BM-3C-L
SRS-009-BM-2B-L
SRS-009-BM-1F-L
SRS-009-BM-2A-L
SRS-009-BM-3D-L
SRS-009-BM-3F-L
SRS-009-LVC

All scans conducted are shown in Figures 2 and 3-A through 3-F. Original copies of all the above data packages have been archived in the permanent inspection records file (18).

INSPECTION RESULTS

The primary goal of this inspection was to determine if the inspection areas of the accessible L Reactor tank weld HAZ indicate any signs of IGSCC. The second important goal was to inspect areas of reported tank damage and repair during fabrication for any indication of inservice degradation. The third goal was to inspect a sample of the indications found in the 1986 100% visual inspection to confirm the previous visual and PT findings of no associated indications of IGSCC.

The inspection results clearly showed no evidence of service-induced degradation in any of the above inspection areas. As was the case in the P and K Reactor tank inspections (2, 3), other indications that reflect tank fabrication processes were found. These were included in the analysts' detailed reports and are available for reference as required in subsequent inspections. Some examples are described below, including the interpretation of the results associated with investigating the reported tank repairs and visual indications. None of these findings represent an

* Data packages 19 and 33 each consist of two individual packages, 19 and 19A, and 33 and 33A respectively.

** Data packages 18, 23, and 24 each consist of two separate packages, 18 and 18A, 23 and 23A, and 24 and 24A, respectively.

adverse impact on the structural integrity of the reactor tank. The criteria underlying this conclusion are embodied in the approved UT acceptance criteria (8). All UT and ET data obtained during the inspection were permanently recorded on optical disks. These disks and selected videotape records have been placed in archival storage for future reference under approved QA procedures (18). No inspection nonconformance reports (NCRs) were generated during the L-tank inspection. Specific results are summarized below:

(1) Vertical welds:

The three sets of main tank vertical welds in L tank were located positively in Sectors 1E, 2F, and 3C/3E (see Figure 2):

Sector	Weld	Approximate Offset, inches
3E	L-VC1 (upper)	} 56
3C	L-VD1 (lower)	
1E	L-VC2 (upper)	} 17
1E	L-VD2 (lower)	
2F	L-VC3 (upper)	} 17
2F	L-VD3 (lower)	

The set of vertical welds in Sector 2F (L-VC3 and L-VD3) is consistent with the traditional locations based on past visual inspections. The other two sets are not consistent with these locations, as summarized in Table 1 below. Although the weld sets in Sectors 1E and 3C/3E are not located in the traditional locations, weld L-VD2 was also noted in the 1986 100% visual inspection to be located in the present (actual) location. The difference between the actual and traditional locations is attributed to the difficulty in past inspections of visually locating these welds, which had been ground flush during original fabrication and tend to be obscured by oxide deposits resulting from reactor operation.

TABLE 1
LOCATION OF VERTICAL WELDS

WELD	TRADITIONAL LOCATION[a]	CONFIRMED TRADITIONAL LOCATION	ACTUAL LOCATION[b]
L-VC3, L-VD3	X02-Y36 (Right side of Nozzle 4)	Yes	S=265.1, 282.4 (Right side of Nozzle 4)
L-VD1	X02-Y60 (Left side of Nozzle 5)	No	S=389.6 (Right side of Nozzle 5)
L-VC1	X47-Y81 (Left side of Nozzle 1)	No	S=446.1 (Above Nozzle 6)
L-VC2, L-VD2	X34-Y06 (Left side of Nozzle 3)	No	S=41.6, 24.2 (Left side of Nozzle 2)

[a]X-Y Coordinate is periscope location.
[b]Positions correspond to S coordinates (inches) in the reactor tank UT system; see Fig. 2 and 3.

As in the other reactors, the upper and lower vertical welds are not continuous over the entire height of the main tank shell, but are offset at the mid-girth weld as shown in Figures 1-A, 1-E, and 1-G. Figure 2 consolidates all these welds in a single display. The offsets are greater than in P and K tanks (4 inches), however, and vary in "left-right" relative position. This reflects the six plates of different circumferential lengths used in L tank, as compared to 4 plates of approximate equal length used to fabricate P and K. The bottom vertical weld is rotated clockwise from the top weld, as viewed from the center of the tank, for L-VC3/L-VD3, but counterclockwise from the top for L-VC1/L-VD1 and L-VC2/L-VD2.

(2) Weld repairs:

Evidence of ten definite and at least four possible weld repairs was found. There was no particular concentration of these in any one weld; rather, they occurred randomly in welds L-VD1, L-VD2, L-VD3, L-VC2, L-H3, L-H4, and L-H5. The repairs varied in length, typically 5 to 8 inches with some shorter and others longer. They occurred on both OD and ID surfaces of the tank. As specified in the UT acceptance criteria, these repair areas do not represent a concern with respect to structural integrity of the tank. In every case there was no evidence of cracking or other service-induced degradation. Overall, the observed incidence of repairs was quite low, considering that this was a 100% inspection of accessible welds.

(3) Attachments:

As in the P and K tanks, considerable evidence of both present and former attachments to the tank was found during the inspection. All six of the motion measurement brackets welded to the inside top of the 0.5-inch main tank shell immediately below the expansion ring were located. These are located in Sectors 1A, 1F, 2B, 2F, 3A, and 3F. The motion measurement system is no longer in use, but the brackets remain. The brackets and nearby portion of the expansion ring could be inspected only visually and no evidence of degradation was apparent.

Elsewhere, evidence was found in more than 193 separate locations where attachments had been originally welded to the tank and subsequently removed by cutting and/or grinding prior to service. About 62% of these occurred on the OD surface of the tank (close to the percentage observed in K tank), where in most cases it was not possible to determine conclusively if the item is still there or removed. In a few cases the UT data suggest that the attachment is still present. For example, it appears that a 2-inch by 0.5-inch attachment remains on the OD surface near weld L-H5 (tank bottom nozzle assembly to extension ring) in Sector 1C, see IRC Report #13, Appendix A.

These attachments included lifting lugs and alignment pins used during fabrication and construction, thermocouple pads for tank temperature measurement, etc. None of these areas of present or former attachments showed any indication of cracking.

(4) Other fabrication anomalies:

Geometric reflectors, weld surface irregularities, minor dents and gouges, and weld metal deposits associated with former attachments were found in a number of areas. Specific notes on these findings are contained in the IRC reports in Appendix A. None of these presents a concern to the structural integrity of the L tank.

Only two subsurface or "embedded" reflectors were detected within the fabrication weld nugget in the entire inspection, indicating a very high degree of weld quality. Both of these occurred in weld L-H5, one in Sector 1C and the other in Sector 3B. In Sector 3B, the reflector was about 5 inches long and located 0.220 inch beneath the ID surface. It had no measurable throughwall dimension and no connection to either the ID or OD surface. It was located at the sidewall of the weld in an area indicative of repair near outlet nozzle #5. In Sector 1C, a reflector interpreted as sidewall lack of fusion was detected. It was 2.5 inches long and 0.220 inches beneath the ID surface. Again, no surface breaks and no measurable throughwall dimension were detected. These findings were not sufficient to warrant further analysis and do not represent a concern to tank structural integrity.

(5) Previous Visual Indications

A sample of seven of the 29 indications noted in the 100% visual tank wall weld inspection conducted during the period July-October, 1986, was selected for reinspection. In the 1986 inspection, 14 of the 29 indications were also tested by dye penetrant (PT). In all cases, no indication of cracking was found (19).

The sample of these indications selected for the 1990 UT/ET inspection included three of the indications that had been PT'd in 1986 and four that had not been PT'd. All seven of these indications were inspected by ET and in several instances all or part of the area corresponding to their report location was also inspected by UT. In no case was any evidence of cracking or other service induced degradation detected, as summarized in Table 2. This confirms the conclusion reached in 1986 that there is no evidence of cracking in these locations and the indications previously observed are not a concern with respect to structural integrity of the reactor tank.

TABLE 2
INSPECTION RESULTS FOR VISUAL INDICATIONS

1986 Visual Indication No.[a]	1991 Designation[b]	Description of Visual Indication	1986 PT Results	1991 ET/UT Results
9	2B-1	18" long multiple red vertical lines across mid-girth weld	Negative[c]	Negative[c]
12	2F-2	2" sharp, black vertical line across lower girth weld	NA[d]	Negative
13	2F-3	1 1/2" sharp black vertical line below nozzle girth weld	NA	Negative
14	2F-1	12" long group of black weld defects in vertical weld	NA	Negative
15	2A-1	8" and 4" long black vertical lines below top girth weld	NA	Negative
16	2A-2	24" long multiple red vertical lines below mid-girth weld	Negative	Negative
17	3B-2	12" long multiple black vertical lines at mid-girth weld	Negative	Negative

Notes: PT = Penetrant testing
ET = Eddy current testing
UT = Ultrasonic testing

[a]Indication numbers as given in Reference 19.
[b]See Figures 2 and 3.
[c]Negative = no indication of cracking in either PT or ET/UT inspections.
[d]NA = Penetrant testing not performed in 1986 inspection.

(6) Repair Areas

The L Reactor tank was fabricated by New York Shipbuilding Corporation between June 1952 and June 1953. During fabrication using normal shop supports and cranes it was dropped approximately two feet to the floor. This caused some damage to the shell plates which was repaired at the factory (20). The location of the damaged areas is based on sketchy information. At the start of the 1990 UT/ET inspection, the best information available was that shown in Figures 4, 5, and 6, taken from Reference 20. These figures indicate the location of several "cave in" or dented areas that were subsequently repaired by cold working, one "scar-welded" area which was also repaired with the addition of weld metal followed by grinding the area smooth, and a "crimped" area at the bottom of the shell where the main tank field weld (L-H4) is located. As described in Reference 20, these and other areas were inspected by periscope in October 1985 as part of the L Reactor restart program, with no adverse findings.

The information in Figures 4, 5, and 6 was used in setting up the 1990 UT/ET inspection, with full recognition that the repair areas might be difficult to locate, since most of them were repaired without use of welding. In some cases the planned inspection areas were extended with special ET scans to assure covering the desired repair area and/or to provide additional data for comparison. The evidence from the inspection tends to reinforce the assumed location of the repair areas shown in Figures 4, 5, and 6. In no case was any sign of cracking or other service induced degradation detected in this examination, as outlined in the following subsections. The fact that the repair areas remain difficult to detect even with the sophisticated ET/UT instrumentation used in this inspection, attests to the high quality of the repairs made during fabrication.

a. Scar-welded Area (Figure 4):

Special ET scan 3B-1 (Figure 2) was made to investigate this area. As indicated in Figure 2, the scan area was extended significantly to assure that the scar-welded area was covered. As described in IRC Reports 6 and 7 in Appendix A, very little evidence of weld metal was detected. However, there were a number of areas identified where weak ET signals were indicative of slight creases, ridges, gouges, high and low spots. These are mapped in the attachment to IRC Report 7. The concentration of these features in this area was greater than found elsewhere in L tank, and it was concluded that this region is probably the scar-welded area noted in Figure 4. No evidence of cracking or other service induced degradation was detected.

b. Cave In Area Near System 6 (Figure 4):

As described in IRC Report 17, vertical weld L-VC1 above System 6 was found to have an unusual profile. ET scans were conducted out to 6 inches on either side of the weld down to about 16 inches above the mid-girth weld L-H3 (see Figure 2). The results showed that the weld is slightly peaked toward the ID and depressed on either side; this profile is illustrated in the attachment to IRC Report 17. This appearance was interpreted as being indicative of an area where a cave in was repaired by cold working techniques. To provide additional verification, a special ET base metal scan was run extending beyond the right side of System 6; this scan disclosed nothing unusual. It was concluded, therefore, that the cave in area noted in Figure 4 appears to coincide with vertical weld L-VC1, even though Figure 4 makes no special note of this. No evidence of service induced degradation was noted.

c. Cave In Area from Welding Repairs (Figure 5):

The location of this area based on Figure 5 would appear to be associated with a vertical weld between Systems 2 and 3. As shown in Figure 2, the nearest vertical weld in this region is L-VC2. UT scans of this weld showed nothing unusual (IRC Report 22) other than a slightly irregular weld width, two possible weld repairs, and several attachment removal areas. A large area of base metal was scanned (2A-1, see Figure 2) covering the area in the upper plate between Systems 2 and 3. The results were negative in this scan with no unusual features noted. It was concluded that the repair in this area identified in Figure 5 was effective and no sign of any related service induced degradation is apparent.

d. Crimped Area Along Bottom of Shell (Figure 6):

Figure 6 indicates that the bottom of the main tank shell starting at System 1 and extending toward System 2 had been crimped in three areas during fabrication. Any corresponding degradation in this area should be detected by the normal UT scan of weld L-H4, where the tank shell was field welded to the tank bottom nozzle assembly. No evidence of such degradation was found in this area or anywhere along weld L-H4. It was concluded that this repair was effective and no service induced problems have resulted.

REFERENCES

(1) DPSTM-88-100-1, "ISI Plan for the Savannah River Production Reactors Process Water System," December 1988.

(2) WSRC-RP-89-1311, "Final Summary Report for 1989 Inservice Inspection (ISI) of SRS 100-P Reactor Tank," December 15, 1989.

(3) WSRC-RP-90-396, "Summary Report for 1990 Inservice Inspection (ISI) of SRS 100-K Reactor Tank (U)," May 15, 1990.

(4) J. L. Gallagher, letter to F. R. McCoy, III, "Ultrasonic Testing Program for L Reactor Vessel," August 16, 1990.

(5) U. Y. Park, memorandum to J. M. Morrison, "Re: L UT Morning Report," January 28, 1991.

(6) TA1-2300, "Ultrasonic Inspection of Reactor Tank Welds," WSRC-OX-89-9-001, July 12, 1989.

(7) SP-2458, Revision O, "Ultrasonic Inspection of L Reactor Tank (TA1-2300, U)" TA WSRC-OX-89-00009-0001, TA expires 8/25/91.

(8) WSRC-RP-89-208, Revision 2, "Reactor Tank UT Acceptance Criteria," January 1990.

(9) Savannah River Laboratory, Technical Division, Equipment Engineering, Reactor Tank Inspection Program," NDE Methodology," Rev. 4, effective date January 17, 1990.

(10) EED 870463, "Functional Specification for Ultrasonic Survey Capability of Savannah River Reactors, P, L, and K," September 1986; Rev. 4, January 17, 1990.

(11) IR-AMD-011, "Automated Detection and Sizing of Intergranular Stress Corrosion Cracking with the AmData Intraspect/98," January 1989.

(12) E. J. Majzlik, Jr., Memorandum to J. M. Morrison and E. G. Caveness, "Preservice Review - L-Area Reactor Inspection Final Report (U)," SRL-MAT-90553, October 31, 1990.

(13) EED 880364, "QA Plan-Reactor Tank Inspection Program," effective date May 27, 1988.

(14) Procedure RTIP-008, "Automated Ultrasonic Inspection of SRS Reactor Tanks," Rev. 2, January 9, 1990.

(15) Procedure RTIP-009, "Automated Eddy Current Examination," Rev. 1, January 9, 1990.

(16) F. R. McCoy, III, letter to J. L. Gallagher, "Reactor Tank Ultrasonic Testing (UT) Inspection Acceptance Criteria, Revision 2 (letter, J. L. Gallagher to R. E. Tiller, 2-27-90)," March 13, 1990.

REFERENCES (Continued)

(17) Procedure RTIP-002, "Data Communication - Phase II," September 8, 1989.

(18) DPSOL 324-2-2005, EES Procedure, "EED Records," Rev. 2, July 14, 1988.

(19) P. R. Vormelker et al., "Area Metallurgical Report - L-Reactor Tank Wall Inspection," EED 860302, November 3, 1986.

(20) E. M. Vessel, "Area Metallurgical Report-L Area Reactor Tank Inspection," EED 850520, December 3, 1985.

(21) Robert L. Cloud & Associates, Inc., "RLCA Overview of the SRS L-Reactor Tank In-Service Inspection," RLCA/P 171/11-91/001, Rev. 0, May 28, 1991.

FIGURE 1-A. L REACTOR EXAMINATION ENVELOPES

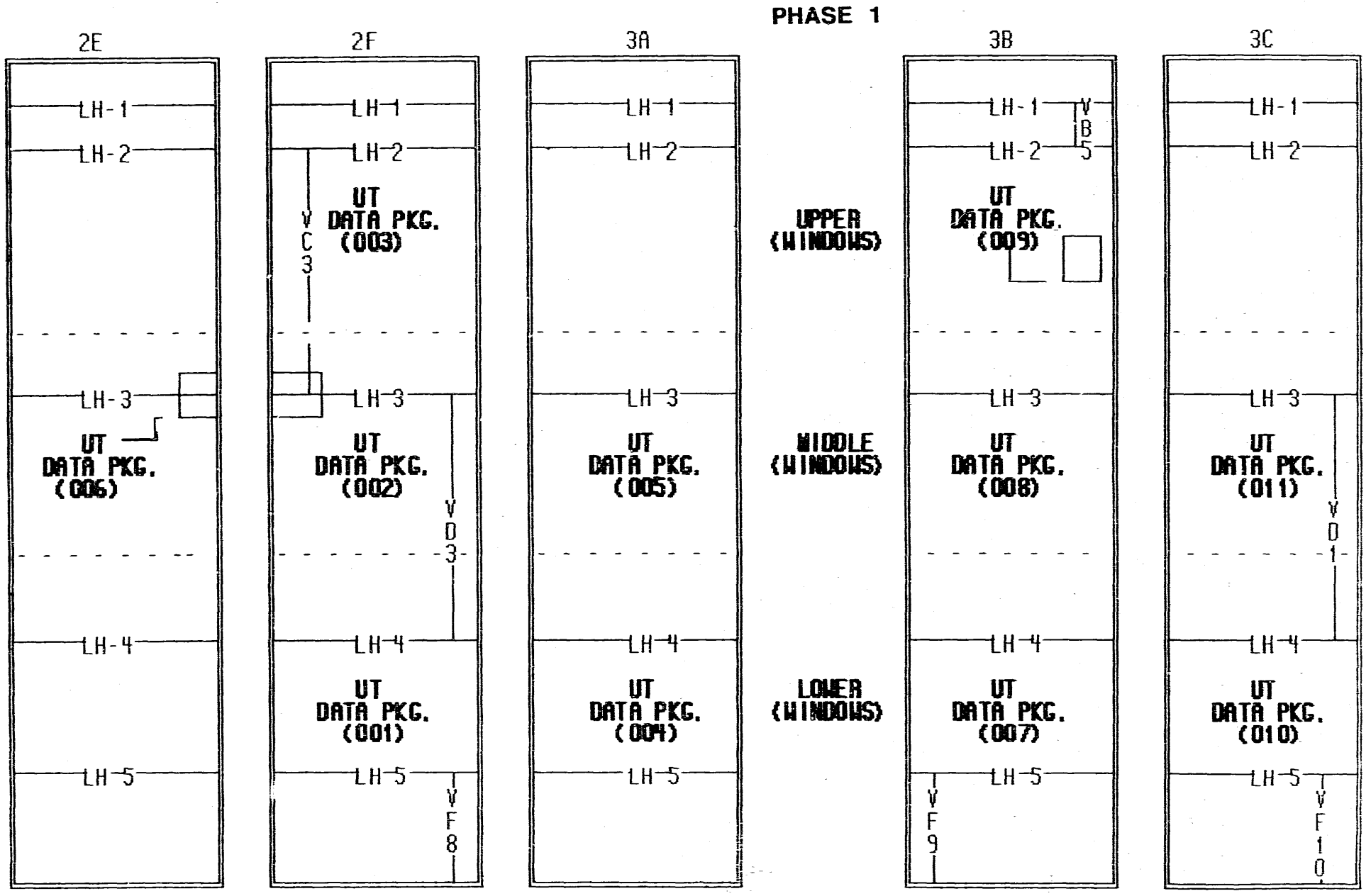


FIGURE 1-B. L REACTOR EXAMINATION ENVELOPES

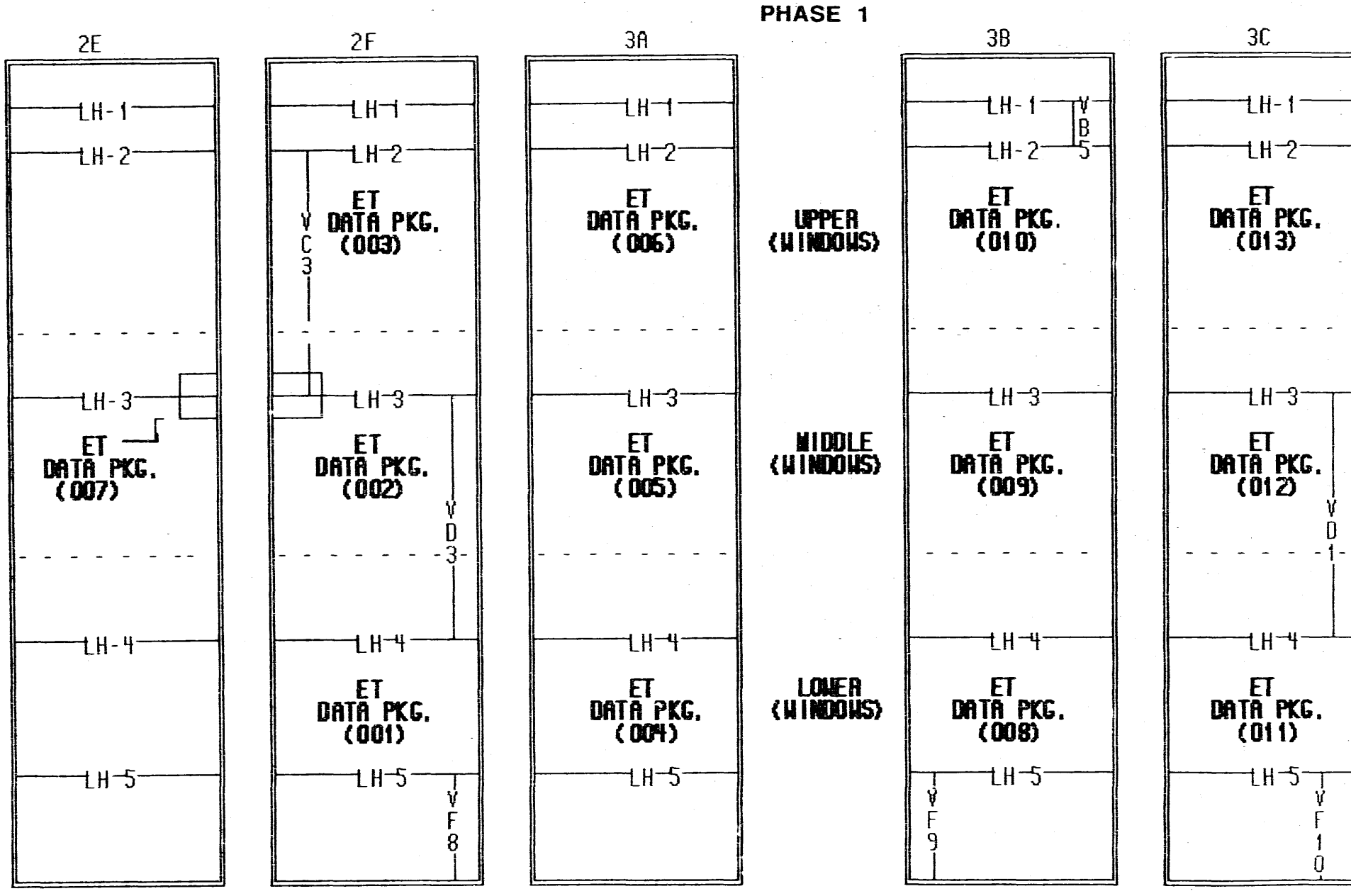


FIGURE 1-C. L REACTOR EXAMINATION ENVELOPES

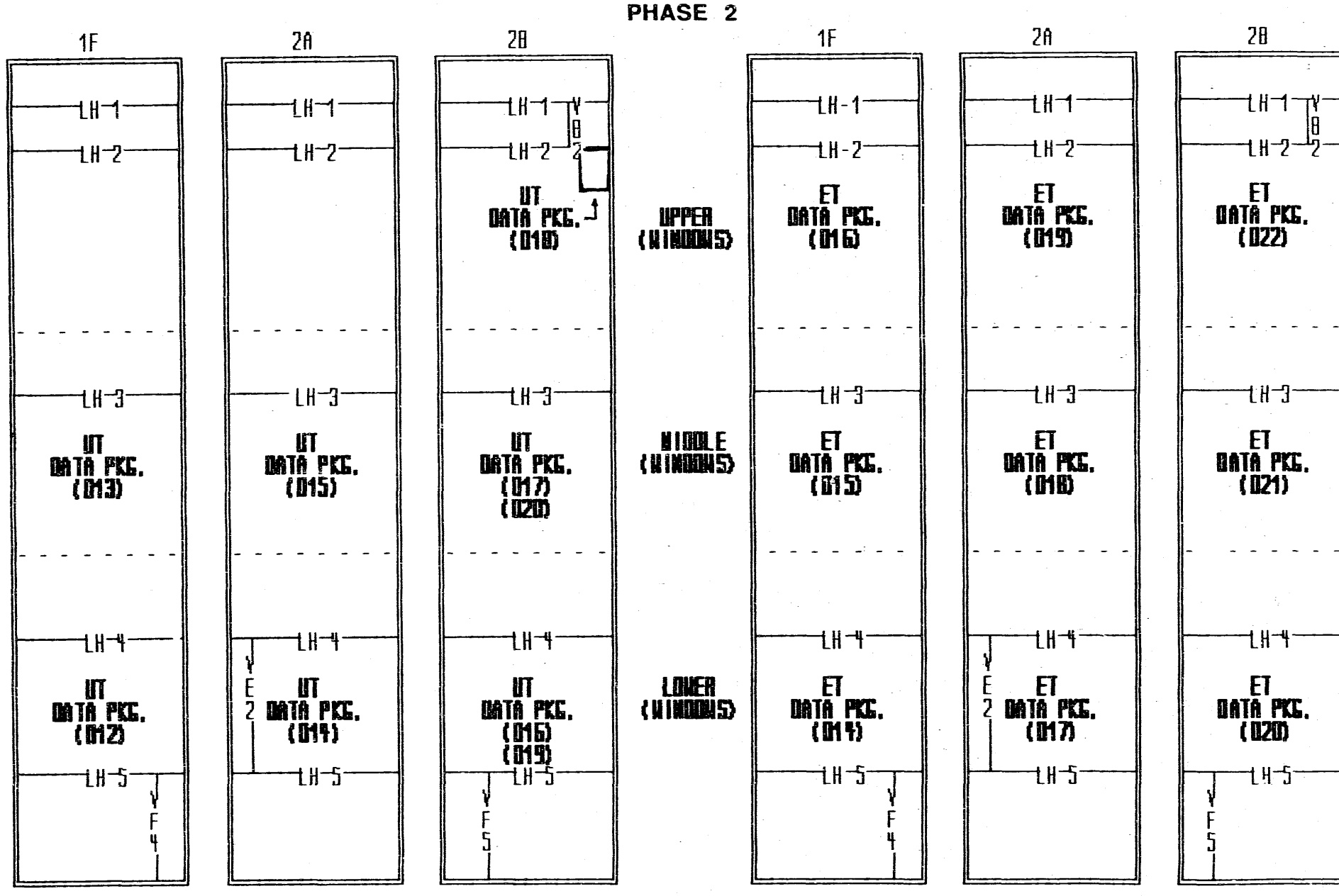


FIGURE 1-D. L REACTOR EXAMINATION ENVELOPES

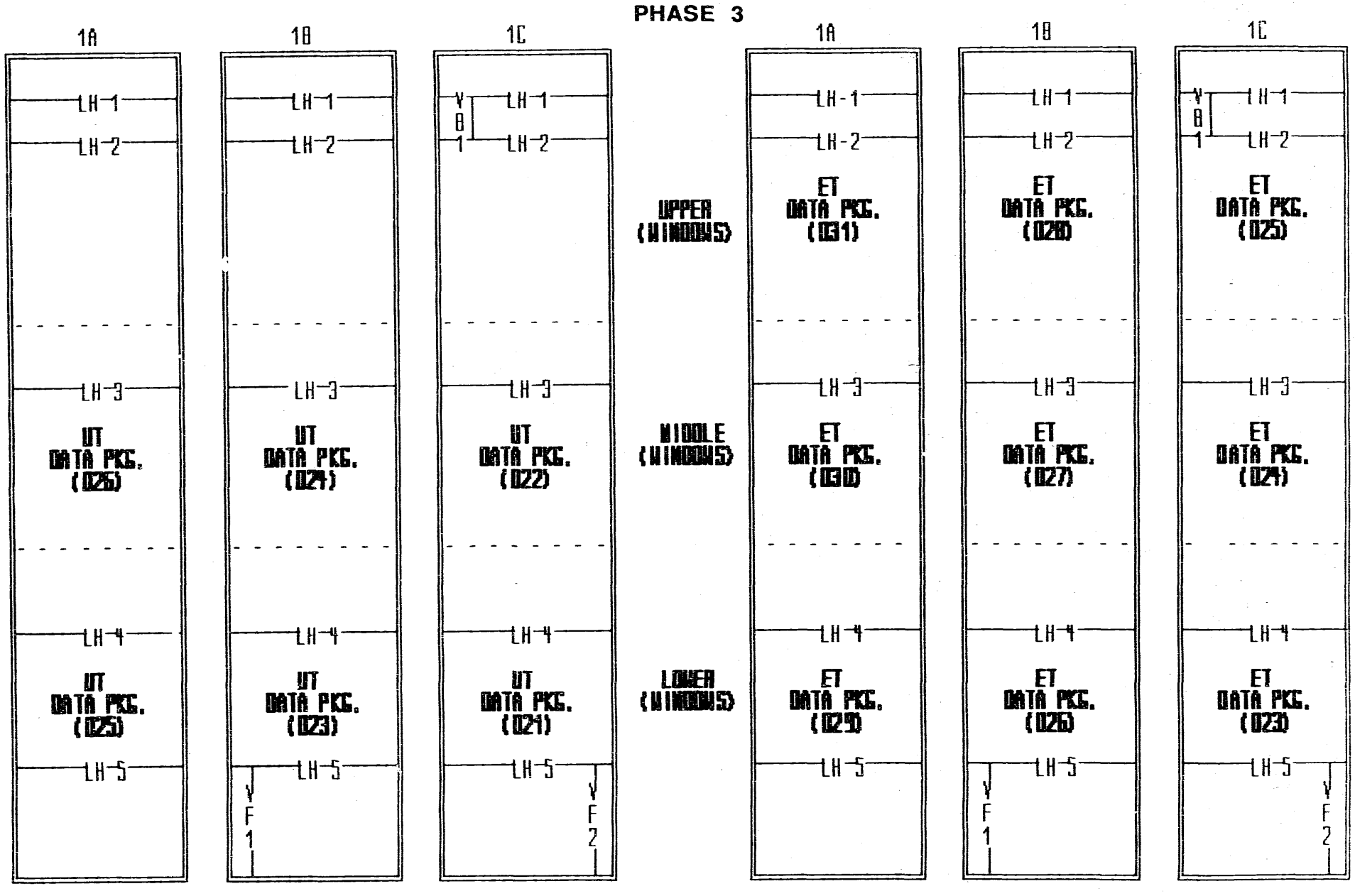


FIGURE 1-E. L REACTOR EXAMINATION ENVELOPES

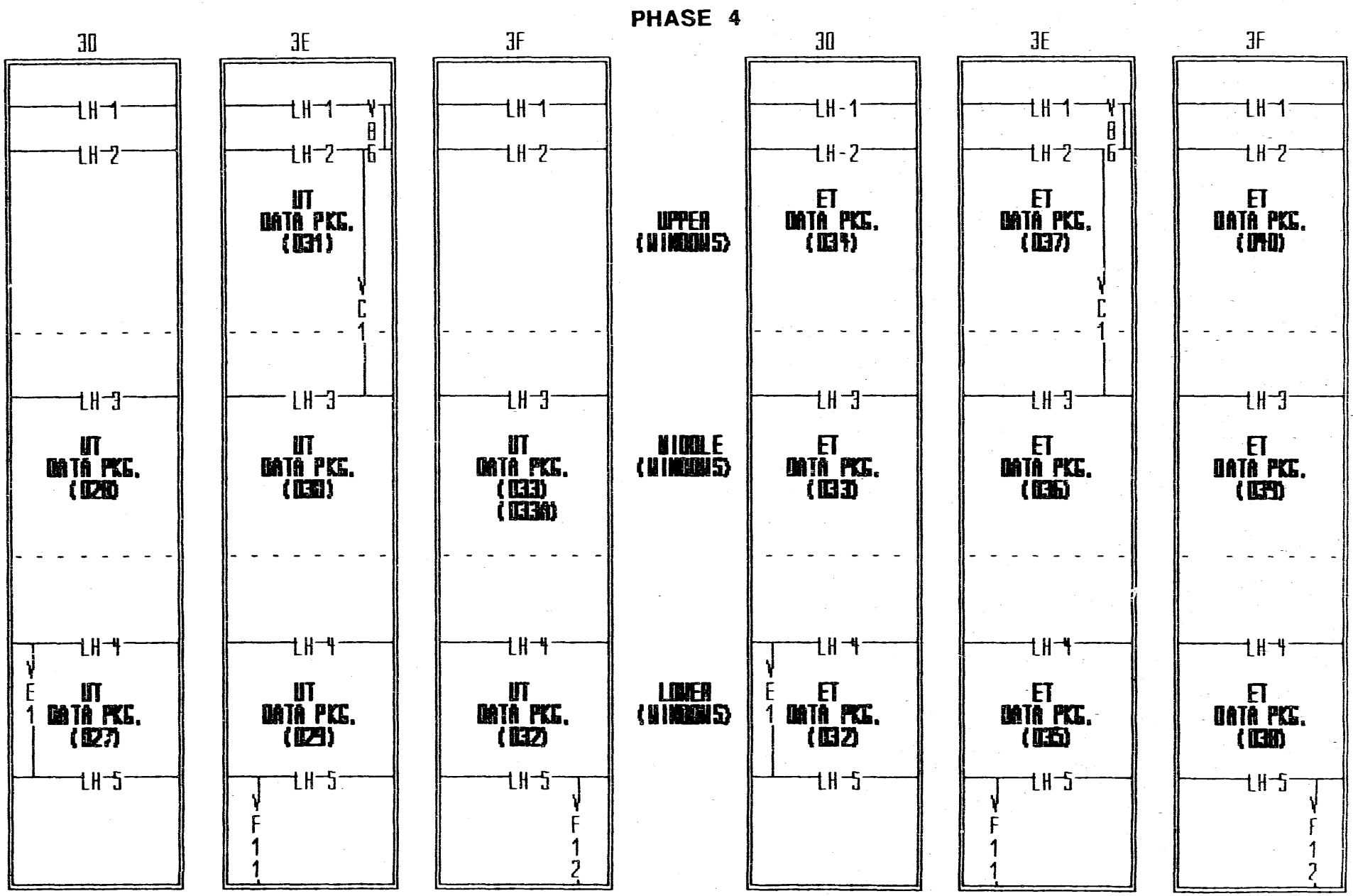


FIGURE 1-F. L REACTOR EXAMINATION ENVELOPES

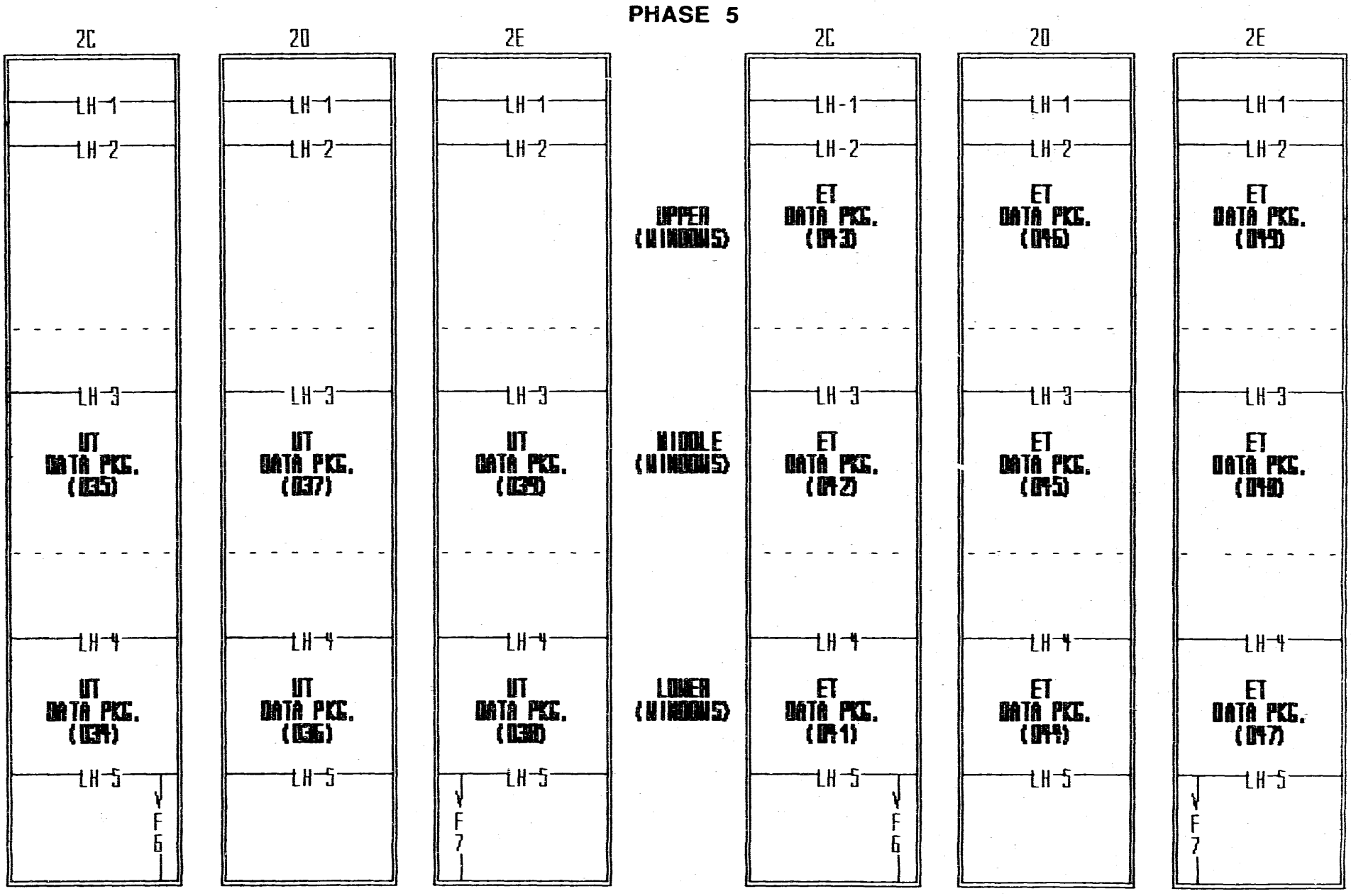
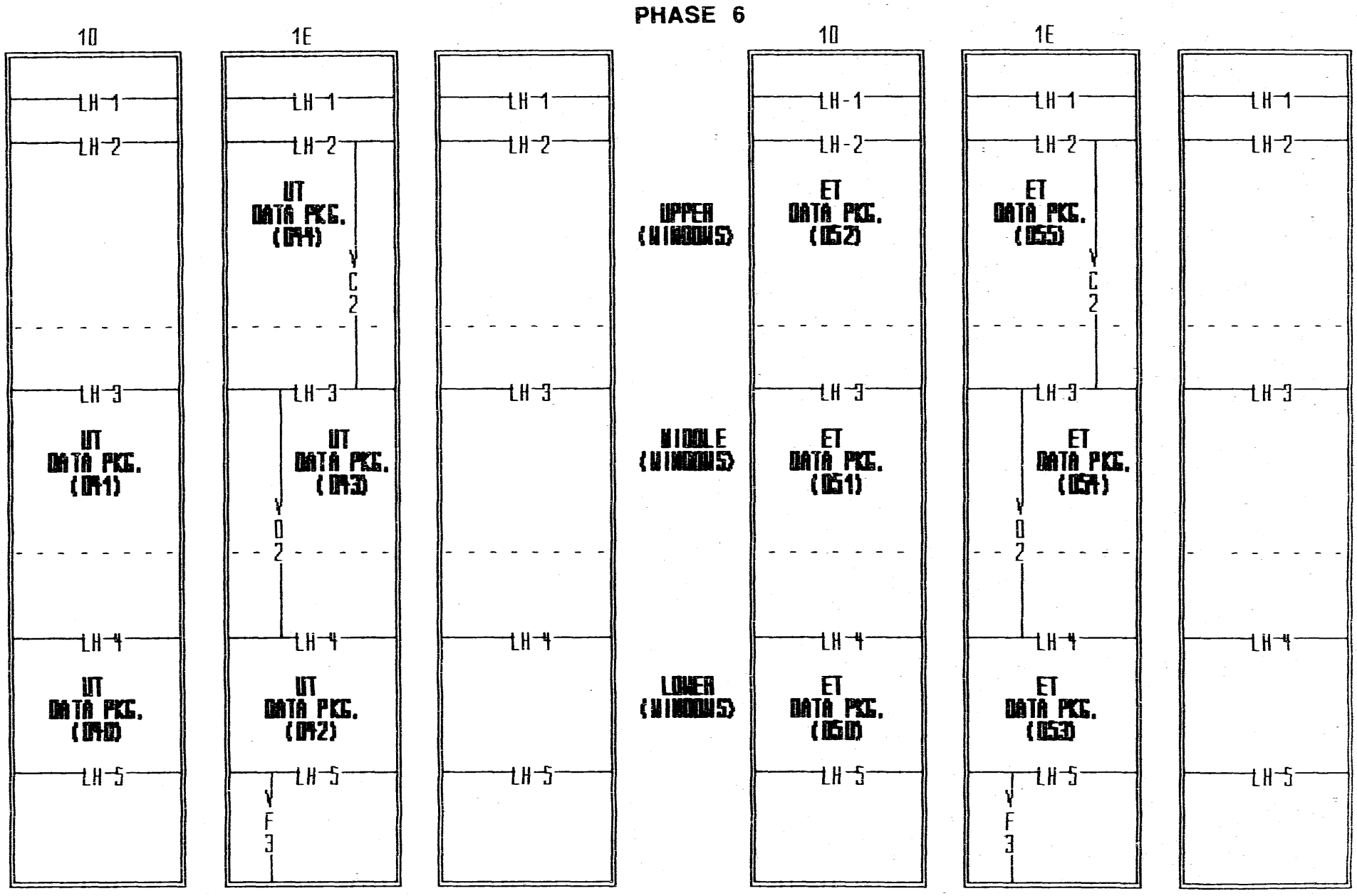


FIGURE 1-G. L REACTOR EXAMINATION ENVELOPES



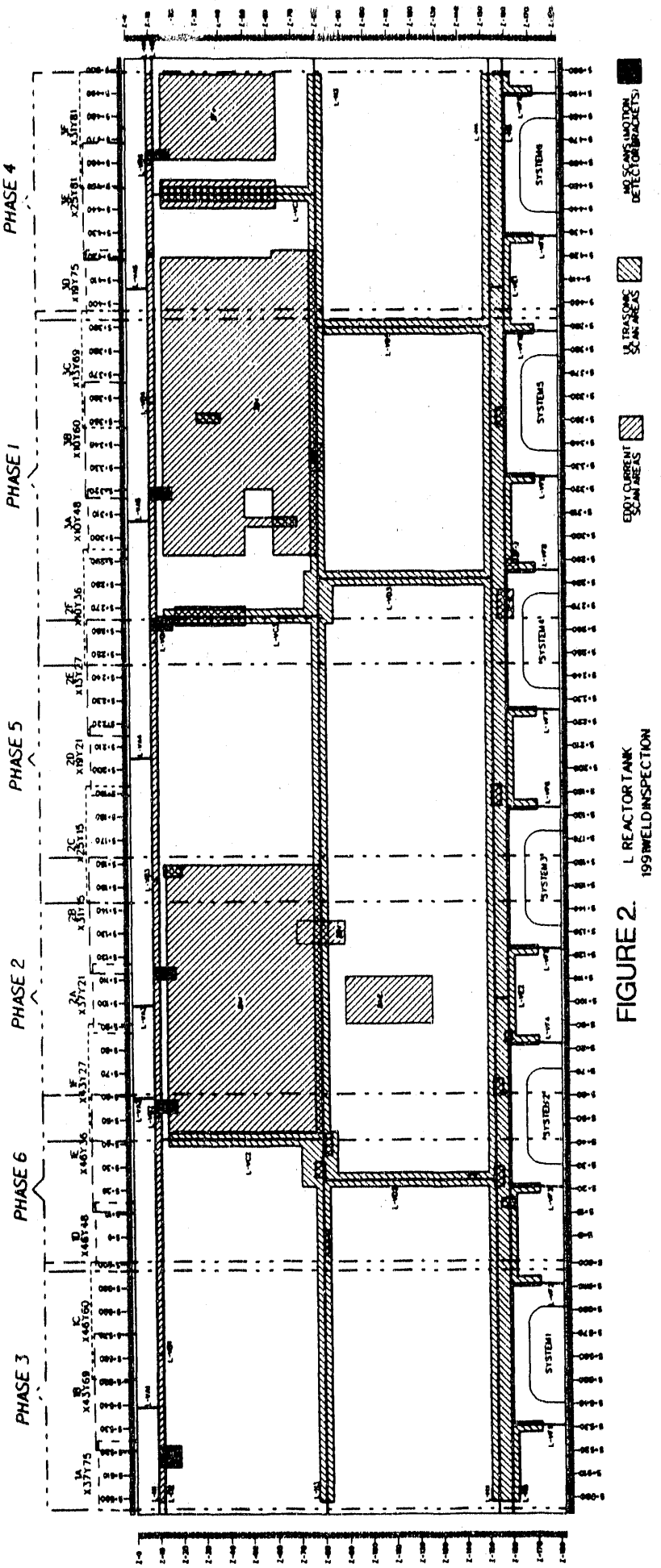


FIGURE 2. L REACTOR TANK
1991 WELD INSPECTION

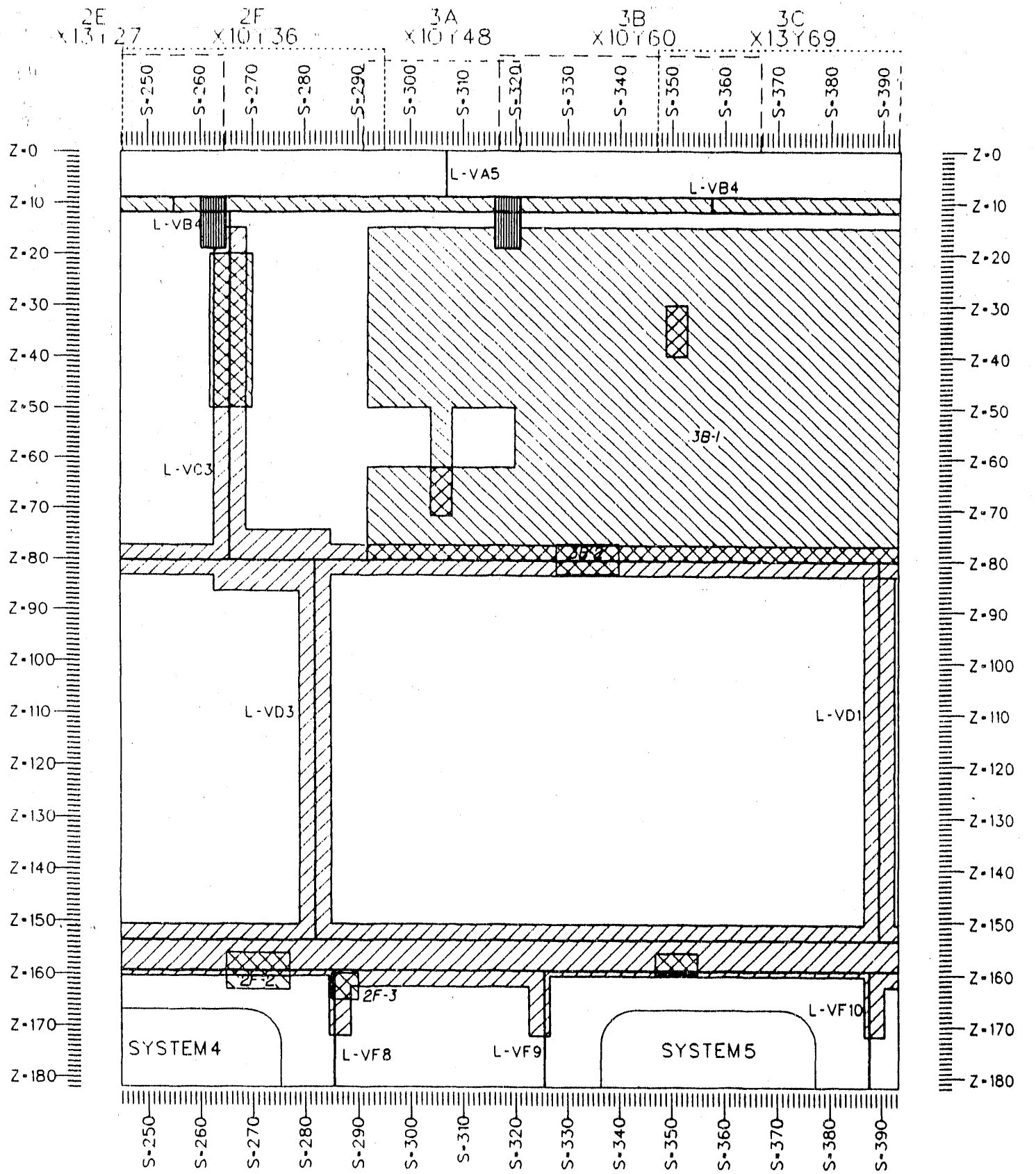


FIGURE 3-A. L REACTOR TANK INPECTION
1991PHASE 1

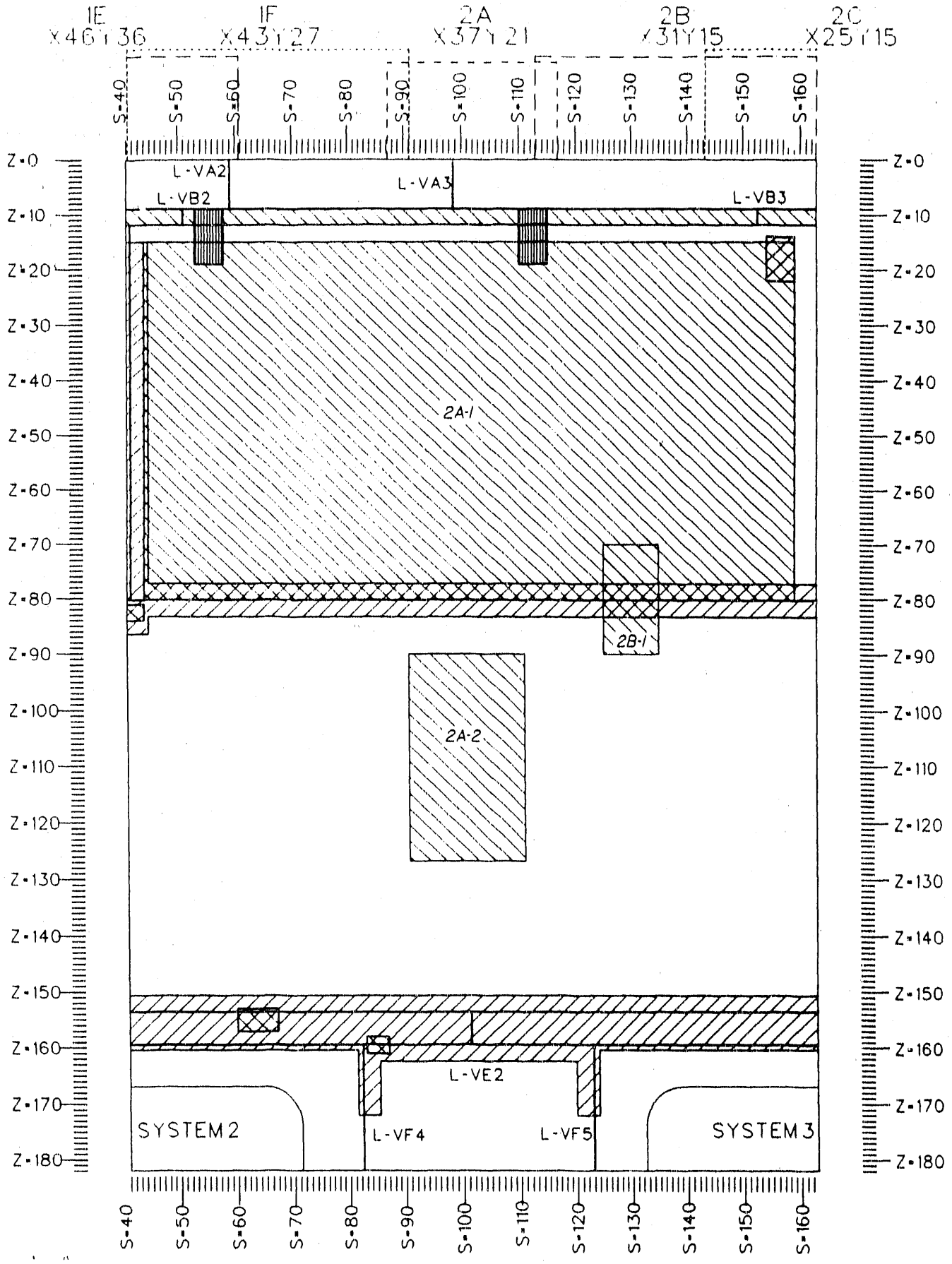


FIGURE 3-B. L REACTOR TANK INPECTION
1991PHASE 2

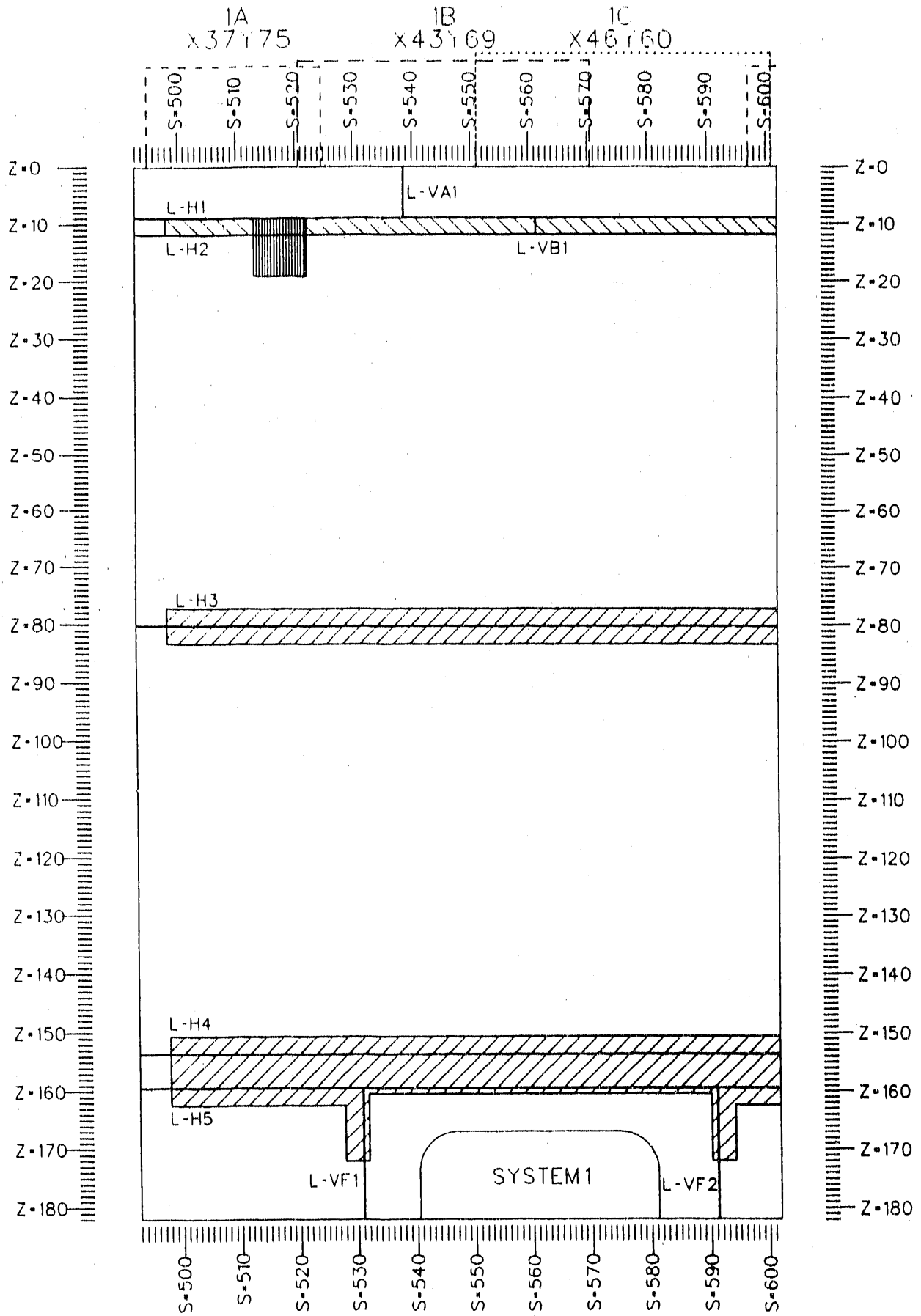


FIGURE 3-C. L REACTOR TANK INPECTION
1991PHASE 3

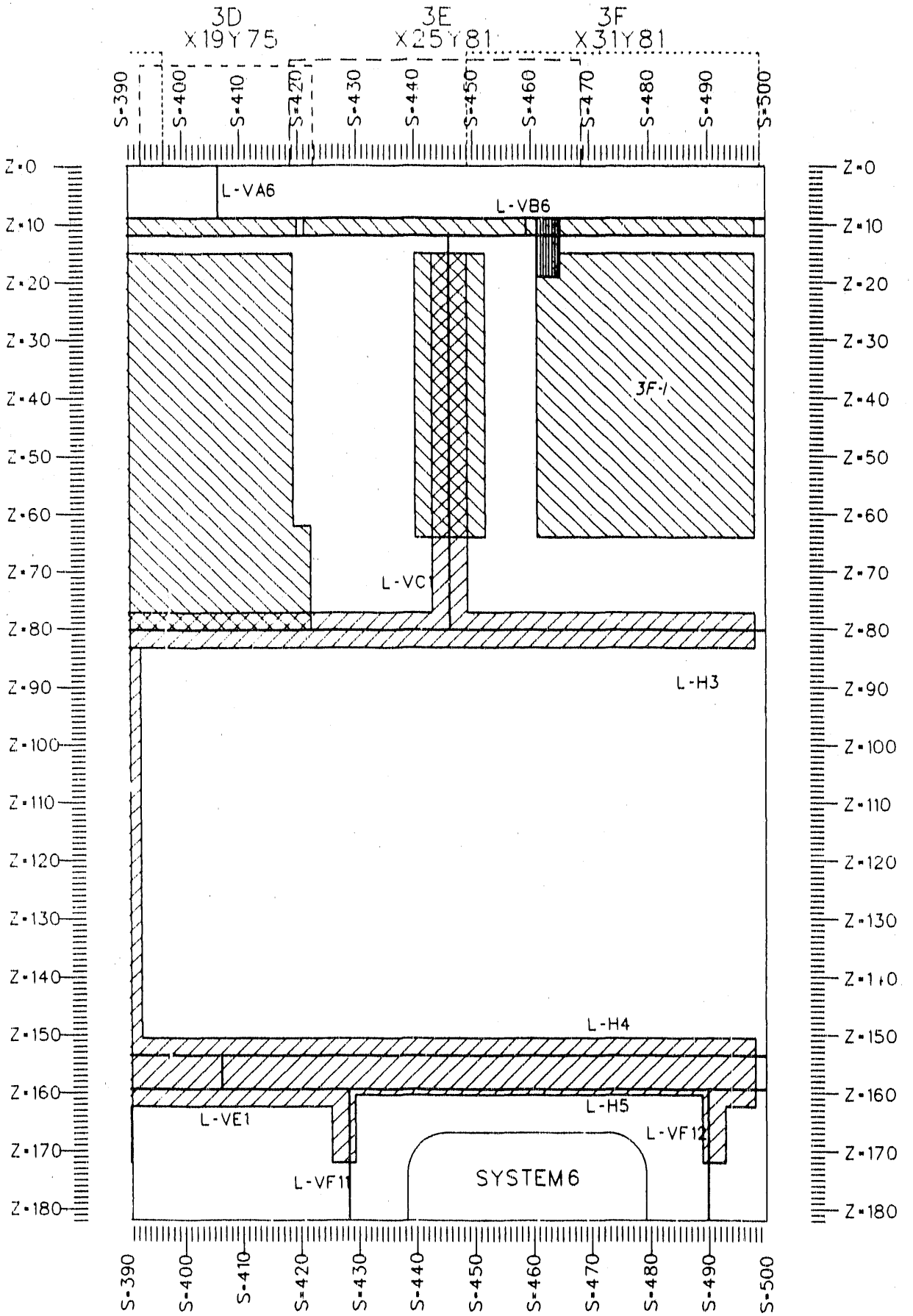


FIGURE 3-D. L REACTOR TANK INPECTION
1991 PHASE 4

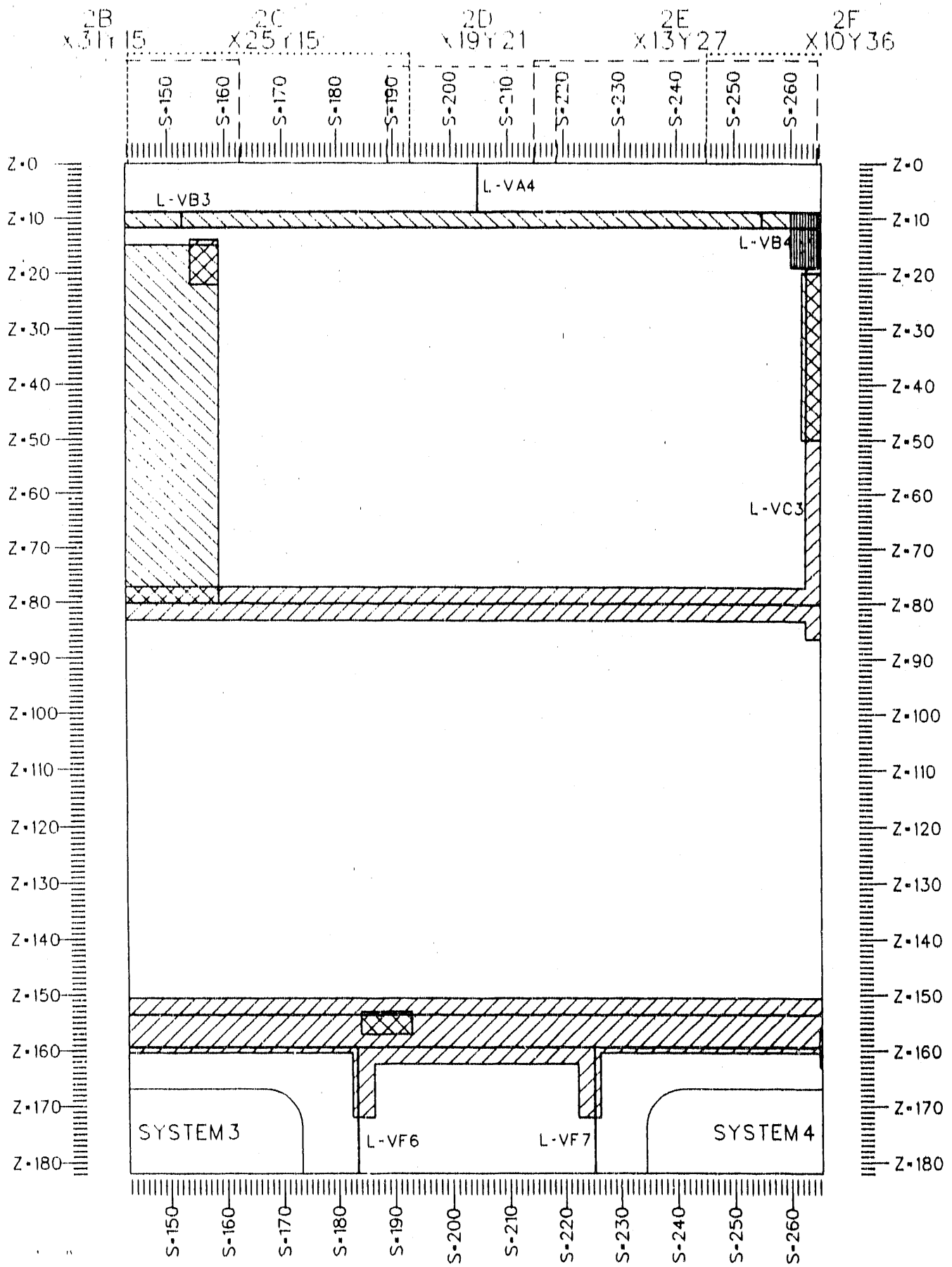


FIGURE 3-E. L REACTOR TANK INPECTION
PHASE 5

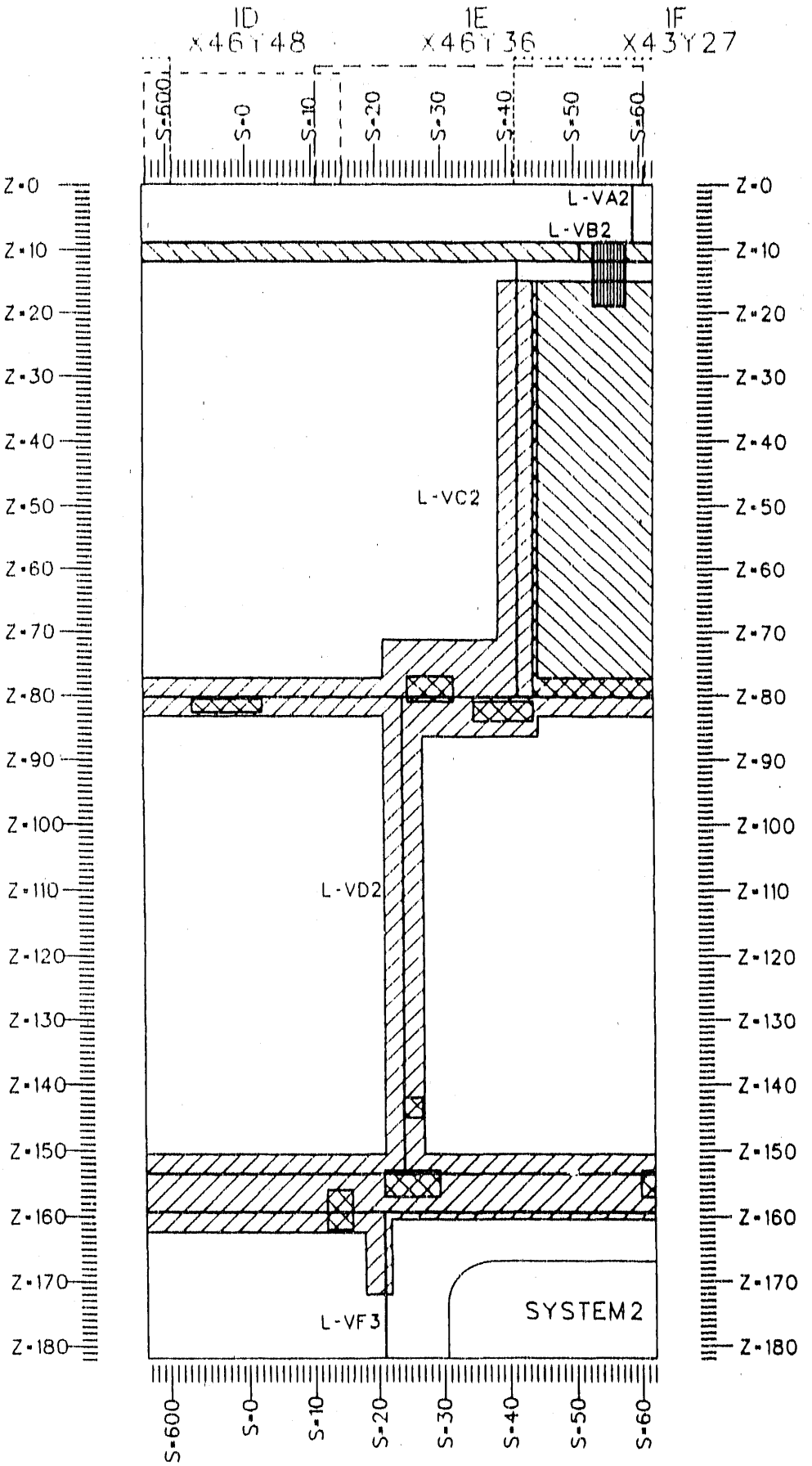


FIGURE 3-F. L REACTOR TANK INPECTION
1991PHASE 6

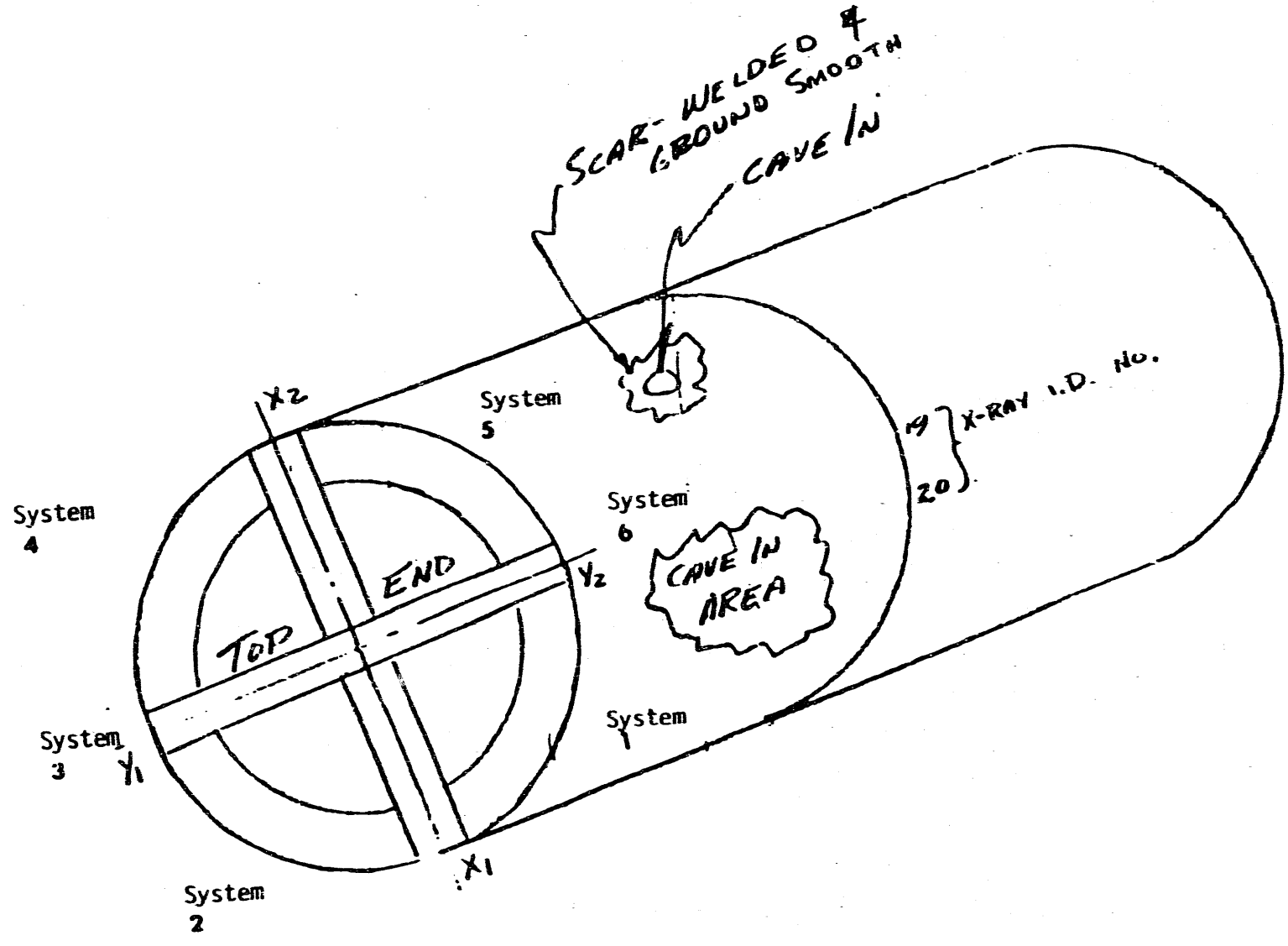


FIGURE 4. DAMAGED AREA ON UPPER VERTICAL WALL OF L-AREA REACTOR TANK

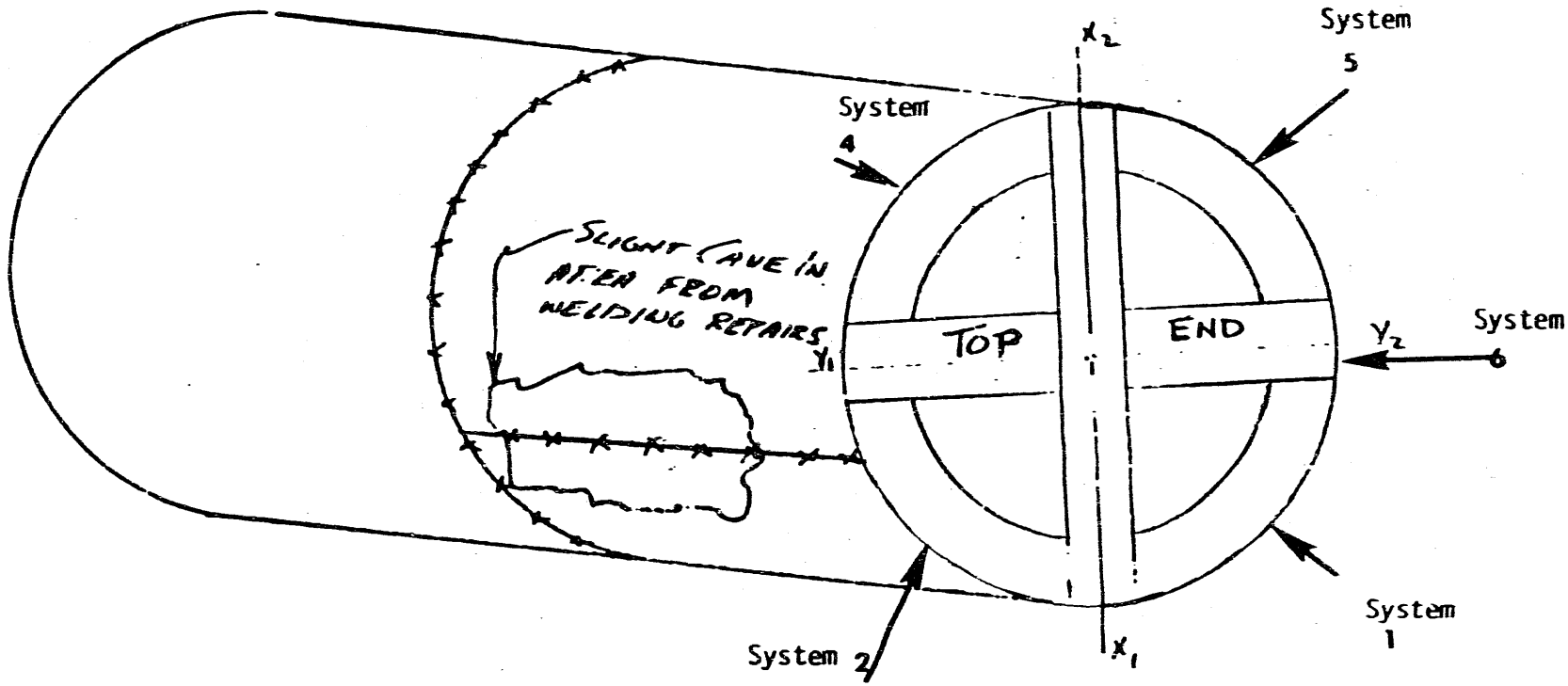


FIGURE 5. DAMAGED AREA ON UPPER VERTICAL WELD BETWEEN SYSTEMS 2 AND 3.

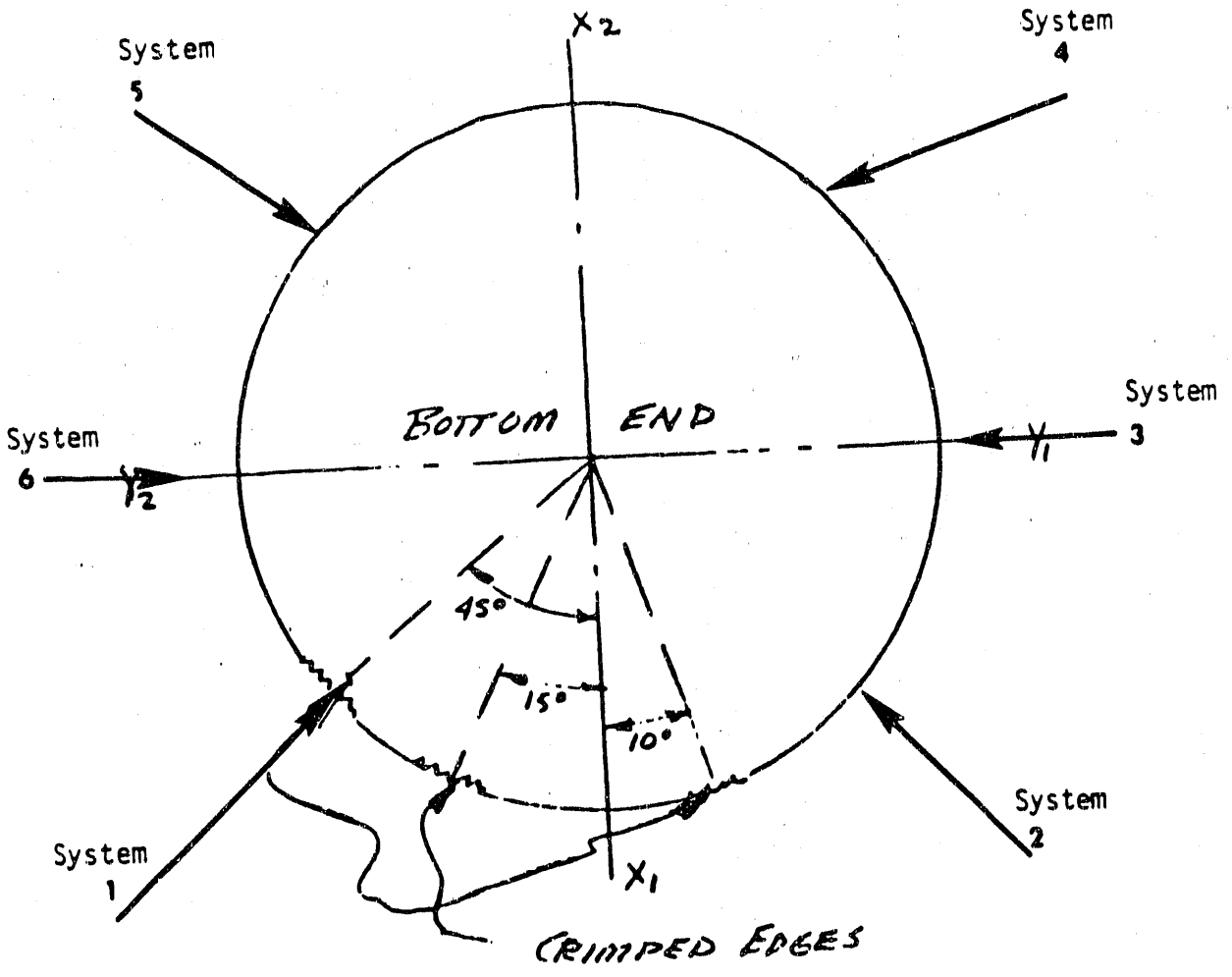


FIGURE 6. DAMAGE AREA AT THE BOTTOM TANK GIRTH WELD BETWEEN NOZZLES 1 AND 2 AND 6-INCHES ABOVE THE NOZZLES.

Appendix A

Copies of Inspection Review Committee Daily Reports

RTIP IRC Daily Report — Report No.: 1

RTIP - 002 (Exhibit 1) — Date: 11-8-90

Members In Attendance:

	Name	Signature
Chairman:	J.M. Morrison	J. M. Morrison
EES/RTIP:	E.G. Caveness	E. G. Caveness
Rx. Eng.:	C.D. Cowfer	C.D. Cowfer
Rx. ~~Ops~~ ENG.:	D.R. Ketcham	D.R. Ketcham
EES/MAT:	E.J. Majdik	E.J. Majdik
QA:	T.S. Bargeloh	T.S. Bargeloh
Rx. Ops:	J. Jimenez	J. Jimenez

Inspection Reports Reviewed:
SRS-008-L001 (ET) and SRS-009-001L (ET)

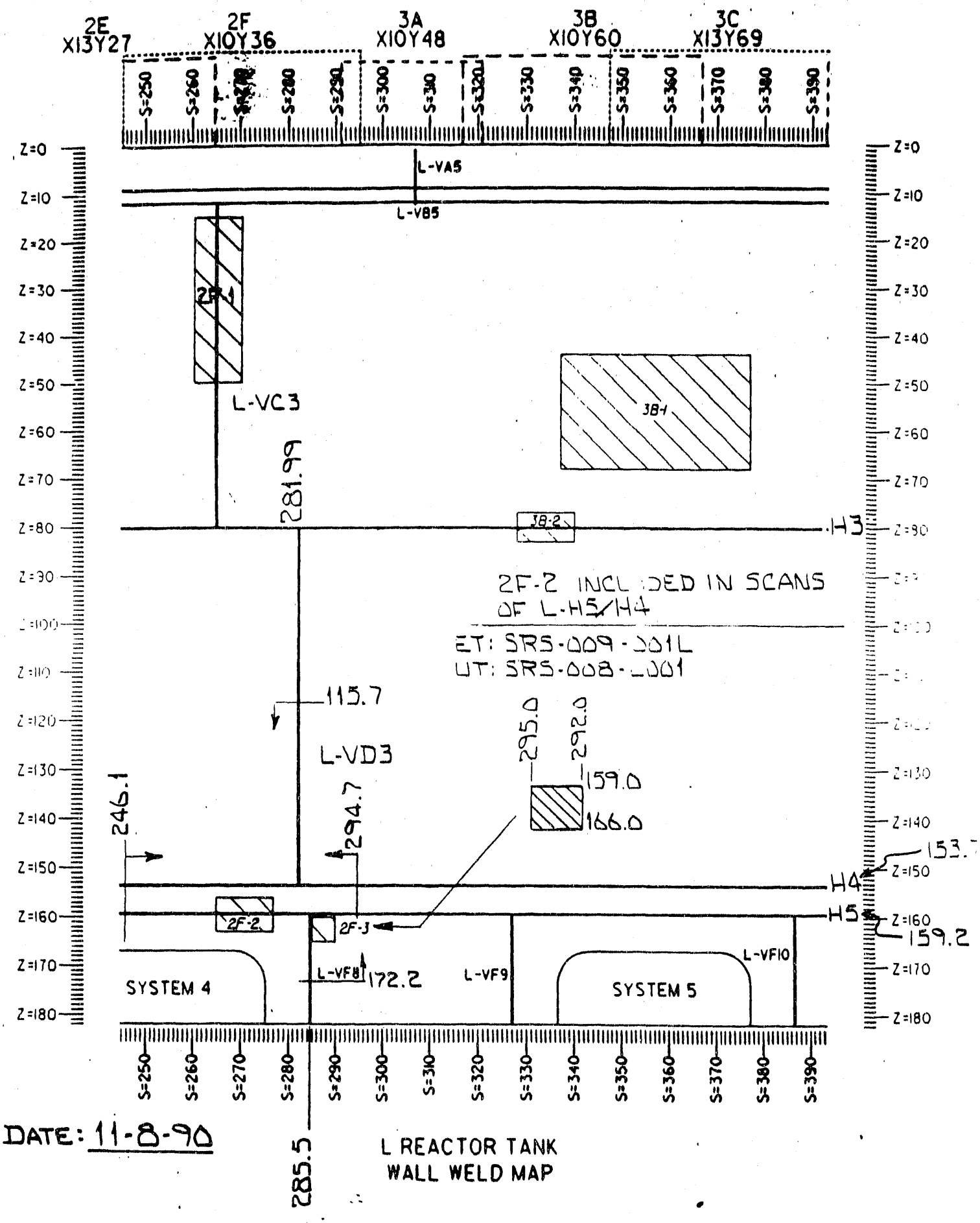
Relevant Indication (Tank Location and Dimensions):
None.

Classification of Indication:
N/A

NCR's Generated: (Yes) (No)

NCR Nos.: ____

Comments: Vertical welds V-C3 and V-D3 in Sector 2F. All welds examined were clean, no indication of defects. Special Area 2F-3 appears to be an attachment removal area. ~~One~~ Near L-H4 is an area with 2 weld deposits on I.D., one on O.D., each ~2" long, no depth. All 3 are just above L-H4. No confirmed embedded weld reflectors were found. There are indications of several weld repairs on the O.D. of L-V D3, some extending almost to the inside surface. Tank has very little oxide. UT and robot performance is very good.



DATE: 11-8-90

L REACTOR TANK
WALL WELD MAP

RTIP IRC Daily Report — Report No.: 2

RTIP - 002 (Exhibit 1) — Date: 11-9-90

Members In Attendance:

	Name	Signature
Chairman:	J. M. Morrison	J M Morrison
EES/RTIP:	E. G. Caveness	EG Caveness
Rx. Eng.:	C. D. Cowfer	C D Cowfer
Rx. Ops.:	J. Jimenez	J Jimenez
EES/MAT:	E. J. Majzlik	E J Majzlik
W.C. COUNTS QA.:	F. S. Bargeloh	F S Bargeloh
Rx. Eng.:	D. R. Ketcham	D. R. Ketcham

Inspection Reports Reviewed:

SRS-008-L002 and -L003 (UT) and SRS-009-002L and -003L (ET)

Relevant Indication [Tank Location and Dimensions]:

None.

Classification of Indication:

N/A

NCR's Generated: (Yes) (No)

NCR Nos.: N/A

Comments: Data covered middle and upper windows of Sector 2F. Motion measurement bracket located at top. Base metal scan made between vertical welds, no reportable indications. Weld L-H3 very

(Cont'd. next page)

irregular, probable repair area, considerable grinding, light no openings to surface either O.D. or I.D. Some weld geometry noted on lower portion of L-VC3. Evidence of former attachments on L-VC3, 2 ID, one OD. (OD could be alignment pin or thermocouple pad).

Special scan, area 2F-1 (old indication #14) was completed with no findings.

ET data confirmed UT in all cases checked.

100 L REACTOR TANK INSPECTION
CIRCUMFERENTIAL WELD "H-3"
PIN LOCATION 2-F
CIRCUMFERENTIAL COORDINATES: 246.6 TO 270.6

EVALUATION OF ULTRASONIC DATA:

1. **HIGH AMPLITUDE REFLECTIONS FROM UPPER EDGE OR TOE OF THE WELD PRIMARILY BETWEEN 253 AND 258. THESE ARE SEEN ONLY FROM THE 180° SCANNING DIRECTION (DOWN).**

2. **THE 90° AND -90° SCANNING DIRECTIONS REVEAL THAT THE WELD IS A MINIMUM OF 1" WIDE IN THE AREA OF INTEREST. THE WIDE WELD IS THROUGH-WALL.**

VISUAL OBSERVATIONS:

1. **THERE HAS BEEN INTERMITTENT GRINDING IN THE AREA OF INTEREST.**

2. **THE HIGH AMPLITUDE REFLECTORS ARE PROBABLY AREAS IN WHICH THERE HAS BEEN SOME OVER-GRINDING WHICH CREATES A 'LIP' ALONG THE EDGE OF THE WELD.**

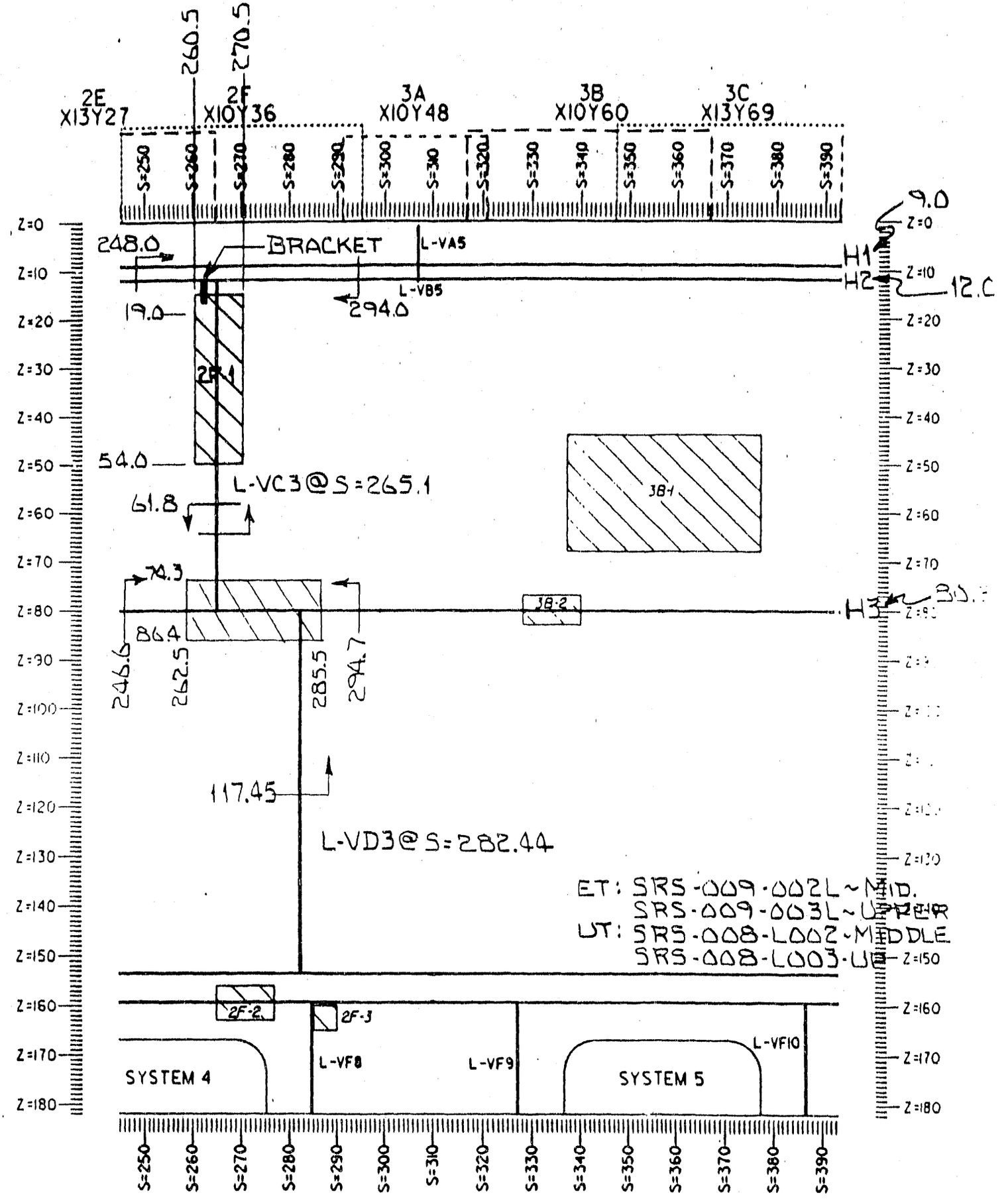
3. **VISUAL INSPECTION WAS CARRIED OUT AT A MAGNIFICATION OF OVER 25X. MORE THAN ONE HOUR WAS SPENT VIEWING THE AREA OF INTEREST. NO CRACK-LIKE OPENINGS ARE VISIBLE IN THE AREA OF INTEREST.**

CONCLUSIONS BASED ON ULTRASONIC AND VISUAL OBSERVATIONS:

THE AREA OF INTEREST HAS NO CRACK-LIKE INDICATIONS.

Michael A. McKaig — Michael A. McKaig

Boyd Howard 11/9/90 — Boyd D. Howard



DATE: 11-9-90

L REACTOR TANK
WALL WELD MAP

11/9/90

Record of Significant Observation

The inspection team reported a visual indication observed during the course of conducting a visual scan of Weld L-H3 at the extreme left side of Sector 2F. At approximately 4" to 6" into Sector 2E, the overhead camera with high-magnification lens (25X) detected a vertical linear indication in the vicinity of L-H3. The indication appears to be up to about 4 inches in length. Inspection by UT and ET is not possible without relocating the robot 2 positions to the left.

The IRC decided the following actions:

1. Work will proceed to complete inspection of the presently open sectors (2F, 3A, 3B, and 3C).

2. An NCR, if appropriate, will be written on the finding after full evaluation has been made by both UT and ET examination methods.

3. Action will be undertaken beginning immediately to determine if this finding is coincident with Indication #11 found during the 1986 visual examination.

4. Action will be taken immediately to verify using the mockup tank in Building 305-A if the robot can be safely relocated in Sector 2F sufficiently to permit UT/ET examination of the area of concern, without damage to adjacent assemblies. This action should be complete by November 12, 1990.

5. Provided Step 4 is successful, the robot will be relocated within Sector 2F to accomplish the desired inspection, whenever feasible and as soon as practical prior to leaving the Phase 1 sectors currently vacated (2F, 3A, 3B, 3C).

6. In the event Step 5 is not feasible, alternative actions will be evaluated by the IRC.

J M Morrison, IRC Chairman
RED E.D. Coveness
D.R. Kitchen, RED.
E J Mozleski 685
J Jiminez ROD

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002

Inspection of L Reactor Tank

IRC MEETING: No. 3 Date: 11-12-90 Location: 704-L

MEMBERS in ATTENDANCE

NAME Print	Signature	Organization
J. M. Morrison	J. M. Morrison	RRD IRC CHAIRMAN
E. G. Caveness	E. G. Caveness	EES/RTIP
C. D. Cowfer	C. D. Cowfer	RE
D. R. Ketcham	D. R. Ketcham	RE
E. J. Majzlik	E. J. Majzlik	EES/MAT
J. Jimenez	J. Jimenez	ROD
T. S. Bargeloh	T. S. Bargeloh	QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-004L

Ultrasonics: SRS-008-L004

Relevant Indications Reported: Yes____ No✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No✓ NCR Ident:_____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 3 Date: 11-12-90 Location: 704-L

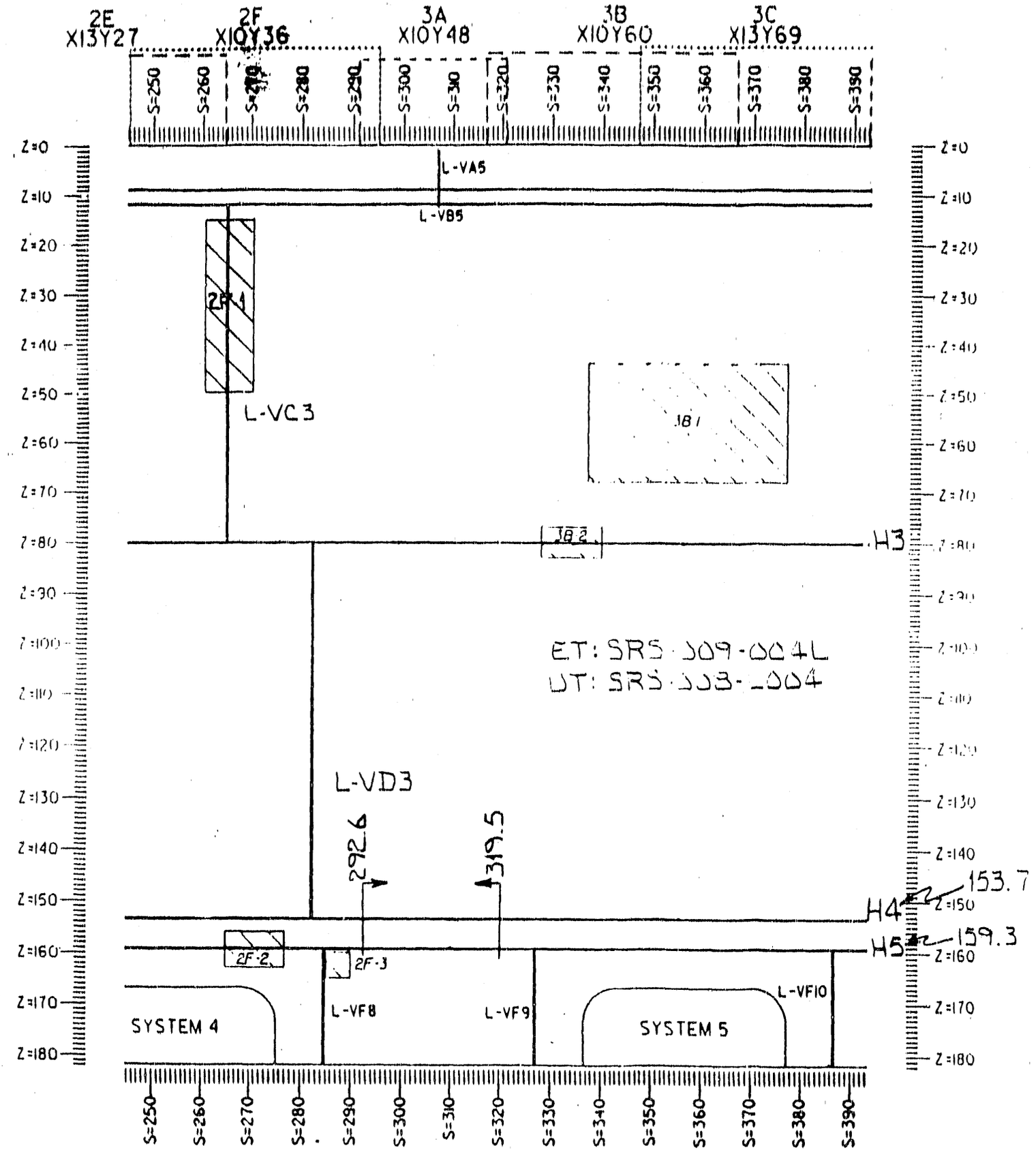
COMMENTS

UT/ET data reviewed for bottom windows of Sector 3A. ET results indicate a small vertical gouge 0.8" long x 0.1" wide about 2.5" above L-H4. Another area evaluated as an attachment removal area was located on the ID between H4 and H5, also a weld metal deposition spot. No vertical weld exists between H4 and H5. UT results confirm the ET results on the ID near H4 and H5. On the OD, 4 attachment/removal areas were located (vertical) below H4 and 2 (horizontal) above H4. Also confirmed the attachment/removal area on OD above L-H5, which was found at the extreme right side of Sector 2F last week. No other findings.

REPORTED BY:

Signature/Date: J M Morrison

IRC REPORT CONTINUATION PAGE



DATE: 11-12-90

L REACTOR TANK
WALL WELD MAP

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002

Inspection of L Reactor Tank

IRC MEETING: No. 4 Date: 11-12-90 Location: 305-1A

MEMBERS in ATTENDANCE

NAME Print	Signature	Organization
J. M. Morrison	J M Morrison	RRD IRC CHAIRMAN
E. G. Caveness	E.G. Caveness	EES/RTIP
E. J. Majzlik	E J Majzlik, Jr.	EES/MAT
J. Jimenez	J Jimenez	ROD
D. R. Ketcham	D.R. Ketcham	RE
C. D. Cowfer	C D Cowfer	RE

INSPECTION REPORTS REVIEWED: (None)

Eddy Current: SRS-009-_____ Ultrasonics: SRS-008-_____

Relevant Indications Reported: Yes___ No✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes___ No✓ NCR Ident:_____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 4 Date: 11-12-90 Location: 305-1A

COMMENTS

This was a special called meeting of the IRC to review the results of special scans of the area at the interface of Sectors 2E and 2F where a linear indication was apparently observed on Nov. 9. Analysis (independent) of ET data is complete, while only the Andata UT analysis is complete. Data packages will be presented to the IRC tomorrow morning.

The indication in question was definitely located via the robot coordinate system at about S=246" just below the L-H3 weld. A UT scan was done, 8" on either side of L-H3, ranging from about S=237" to greater than S=265". An ET scan was made from S=237" to about S=246", 6" on either side of L-H3.

No reflectors were located by either ET or UT over

REPORTED BY:

Signature/Date: J M Morris

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 4 Date: 11-12-98 Location: 305-1A

COMMENTS

the entire scan area.

Observations are:

(1) Any indication would have to have been < 0.015" deep to escape UT detection, based on sensitivity and demonstrated performance. (ET sensitivity is less, about 0.050")

(2) Area appears clean, but some oxide could be present.

(3) Area of indication is slightly depressed relative to surrounding surface, since grinding marks did not touch the (visual) indication

(4) The visual indication is estimated at 2" to 4" long (vertical) and maybe 4-8 mils wide. Its depth is equivalent to only perhaps one or two human hairs (4 mils dia.). JMM 11/12

(5) The indication was visible only with high magnification

REPORTED BY:

Signature/Date: J M Morman

IRC REPORT CONTINUATION PAGE | | PAGE 3 OF 4

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 4 **Date:** 11-12-90 **Location:** 305-1A

COMMENTS

(25X), and the camera viewed the indication from a slight angle.

Conclusion:

It is concluded that the observed indication is a minor surface imperfection, with depth too small to measure with even the most sensitive UT/ET instrumentation. As such, it cannot be determined what the real cause is. An imperfection as small as this would not have been detected if it occurred during original fabrication.

Corrected page to remove editing strike-overs. JMM 12-13-90

REPORTED BY:

Signature/Date: J M Morrison

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 5 Date: 11-13-90 Location: 704-L

MEMBERS in ATTENDANCE

NAME		
Print	Signature	Organization
J. M. MORRISON	J M Morrison	RRD IRC CHAIRMAN
E. G. CAVENESS	E. G. Caveness 11/13/90	EES/RTIP
C. D. COWFER	C D Cowfer	RE
D. R. KETCHAM	D. R. Ketcham	RE
E. J. MAJZLIK	E J Majzlik Jr	EES/MAT
J. L. JIMENEZ	J Jimenez	ROD
T. S. BARGELOH		QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-005L, 006L, 007L	Ultrasonics: SRS-008-1005, L006

Relevant Indications Reported: Yes____ No✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No✓ NCR Ident:_____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 5 Date: 11-13-90 Location: 704-L

COMMENTS

Data packages (SRS-009-007L and -008-L006) were reviewed for the special scan of the visual indication discussed in the report of Meeting #4. At location S=247", and at enhanced gain of 14 dB, a UT reflector actually is imaged. (The ET scan had stopped short of this location, at S=246"). The reflector indicates to be about 1.5" long and no measurable depth. It is concluded that by fine tuning coordinates and increasing the normal gain to 14 dB, this reflector is a minor, non-relevant surface flaw indication of no measurable depth (definitely ≤0.015"). Further ET scanning for corroboration is not necessary. Nancy Turner investigated the location of 1986 visual indication #11, with the result that it is estimated as being about 12" to 15" to the right and somewhat higher than the visual indication above L-H3. It is concluded that the visual indication from 11-9-90 is not indication #11.

Data packages for Sector 3A: gmm/11-13-90

Middle window: A 30" ~~wide~~ wide envelope was scanned (E) up to the top of the window, to verify presence or absence of a repair weld. The ET scan showed some signals in an area 4"x15" (3A-1) which was scanned by UT. No flaw indications were detected. Further evaluation showed the ET signals were not weld metal, but could have been

REPORTED BY:

Signature/Date: J M Morrison 11/13/90

IRC REPORT CONTINUATION PAGE | PAGE 2 OF 3

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 5 Date: 11-13-90 Location: 704-L

COMMENTS

caused by a 3/16" raised surface or "ridge" in this area.

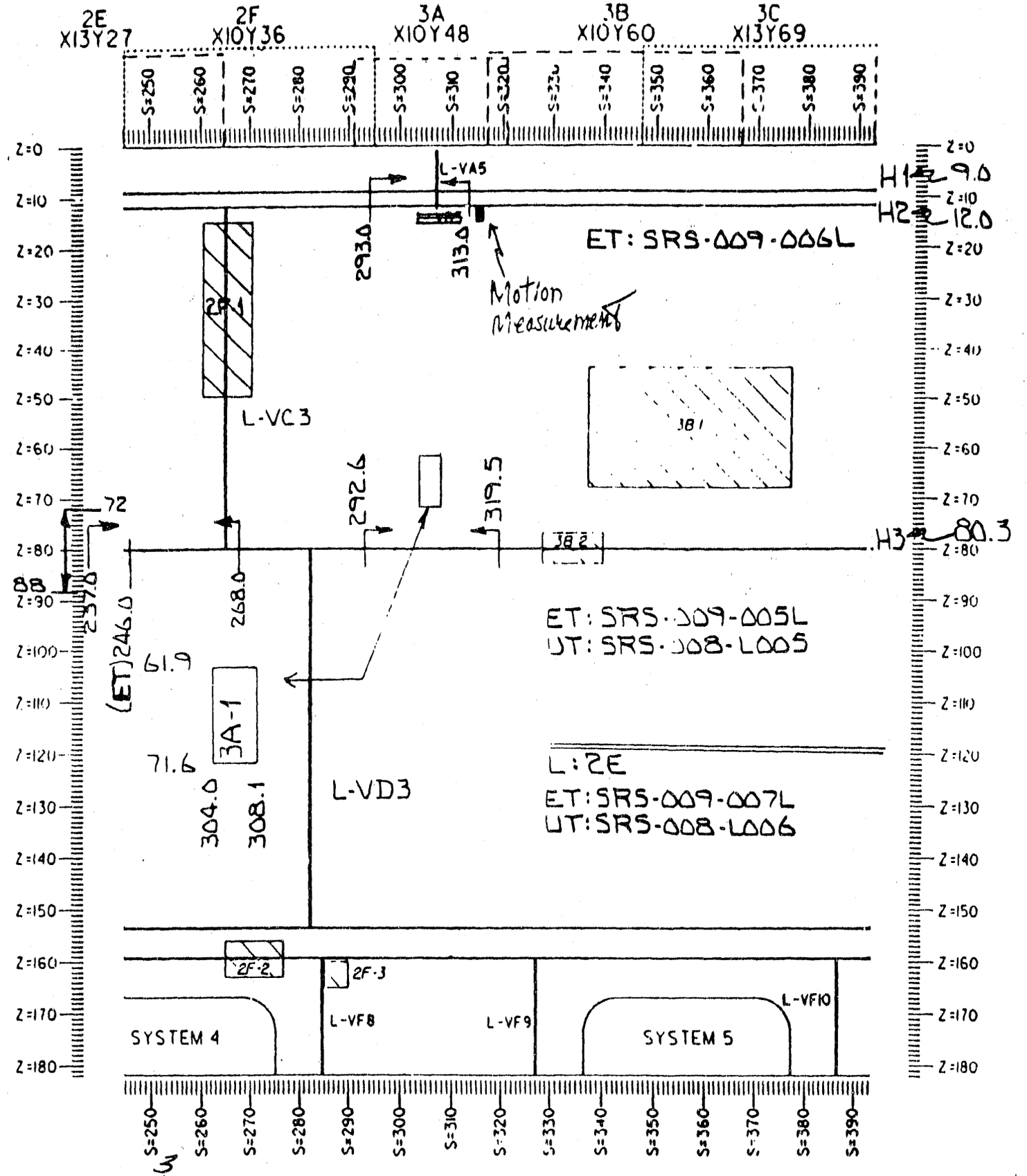
An attachment/removal area was detected by ET on OD, at S=313.5" and 2" below L-H3.

Top windows: Motion measurement bracket found at S=316". No vertical welds were located between L-H1 and L-H2. L-H1 and L-H2 were determined by ET to be clear, with no reportable indications.

REPORTED BY:

Signature/Date: J M Morrison 11/13/90

IRC REPORT CONTINUATION PAGE



DATE: 11-12-90

11/13/90

L REACTOR TANK
WALL WELD MAP

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of __L__ Reactor Tank

IRC MEETING: No. 6 Date: 11-15-90 Location: 704-L

MEMBERS in ATTENDANCE

NAME		
Print	Signature	Organization
J. M. MORRISON	J M Morrison	RRD IRC CHAIRMAN
E. G. CAVENESS	E G Caveness	EES/RTIP
C. D. COWFER	C D Cowfer	RE
D. R. KETCHAM	D R Ketcham	RE
E. J. MAJZLIK	E J Majzlik	EES/MAT
J. L. JIMENEZ	J Jimenez	ROD
T. S. BARGELOH		QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-008L, 009L, -010L	Ultrasonics: SRS-008-L007, L008, -L009

Relevant Indications Reported: Yes____ No✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No✓ NCR Ident:_____

IRC REPORT FRONT PAGE		PAGE 1 OF 3

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 6 Date: 11-15-90 Location: 704-L

COMMENTS

Data packages were reviewed for all of Sector 3B.
Bottom window: attachment removal area on ID near L-H5
On L-H5, numerous attachment removal areas ("ARA's") on ID and OD. For a length of about 5 inches above Nozzle #5 weld is much wider, indicating repair. In this length, an embedded reflector, 5 trig to loss located 0.228" beneath ID., of no measurable through-wall dimension (< 0.100"), no surface break. Exists at shoulder of weld. Confirmed no break by ET.
On L-H4, a number of ARA's were found. At S = 354.6 and Z = 157.20", indication of a lug still attached on O.D. On others, orientation of ARA's is random, either vertical or horizontal. Otherwise, weld is clean, no indications. Below L-H4, evidence of former attachments found at 5 locations, ranging from 0.5" to 1.5" below weld, using ET.

Middle window: On L-H3, UT imaged reflectors from the double beveled weld toe on the bar surface (incorrectly marked "weld repair"). No indication, UT or ET.
On Special Scan area 3B-1, no indication of weld metal was found. Some ET signals in small area immediately above were detected and may

REPORTED BY:
Signature/Date: J M Morrison 11-15-90

IRC REPORT CONTINUATION PAGE | PAGE 2 OF 3

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 6 Date: 11-15-90 Location: 704-1

COMMENTS

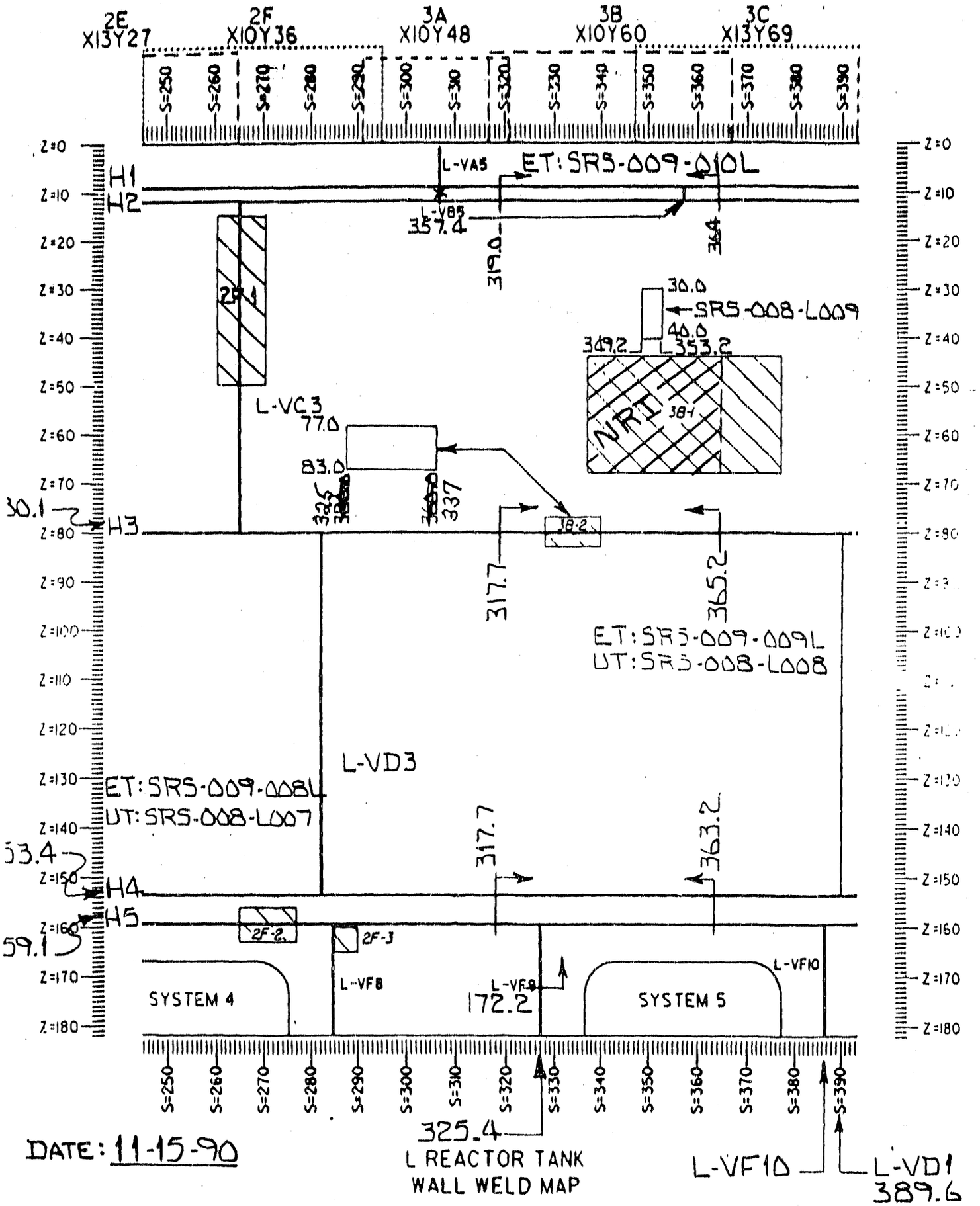
have been left off; no UT indications. In conclusion, extensive scanning has shown no clear indications of loose metal repair, Nonetheless the slight ET signals might be indicative of small ridges in the metal, conceivably one possible manifestation of a tank repair, though not confirmed.

Top window: Vertical weld L-VB5 located at S = 357.4". No indication found by ET associated with L-H1 and L-H2.

REPORTED BY:

Signature/Date: J M Manson 11-15-90

IRC REPORT CONTINUATION PAGE | PAGE 3 OF 3


2E
X13Y27
2F
X10Y36
3A
X10Y48
3B
X10Y60
3C
X13Y69
S=250
S=260
S=270
S=280
S=290
S=300
S=310
S=320
S=330
S=340
S=350
S=360
S=370
S=380
S=390
Z=0
Z=10
Z=20
Z=30
Z=40
Z=50
Z=60
Z=70
Z=80
Z=90
Z=100
Z=110
Z=120
Z=130
Z=140
Z=150
Z=160
Z=170
Z=180
H1
H2
H3
H4
H5
L-VA5
ET: SRS-009-010L
L-VB5
357.4
319.0
364
30.0
SRS-008-L009
40.0
349.2
353.2
NRI
38-1
L-VC3
77.0
83.0
325
337
30.1
18-2
317.7
365.2
ET: SRS-009-009L
UT: SRS-008-L008
L-VD3
ET: SRS-009-008L
UT: SRS-008-L007
317.7
363.2
53.4
59.1
2F-2
2F-3
L-VF8
L-VF9
172.2
L-VF10
SYSTEM 4
SYSTEM 5
325.4
L REACTOR TANK
WALL WELD MAP
L-VF10
L-VD1
389.6
DATE: 11-15-90

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 7 Date: 11-16-90 Location: 305-1A

MEMBERS in ATTENDANCE

NAME		
Print	Signature	Organization
J. M. MORRISON	J M Morrison	RRD IRC CHAIRMAN
E. G. CAVENESS	E G Caveness	EES/RTIP
C. D. COWFER	C D Cowfer	RE
D. R. KETCHAM	D R Ketcham	RE
E. J. MAJZLIK	E J Majzlik	EES/MAT
J. L. JIMENEZ	J Jimenez	ROD
T. S. BARGELOH	T S Bargeloh	QA

INSPECTION REPORTS REVIEWED:

Eddy Current:	Ultrasonics:
SRS-009-0111-0121, -0131	SRS-008-L010,-L011

Relevant Indications Reported: Yes____ No ✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No ✓ NCR Ident:_____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 7 Date: 11-16-90 Location: 305-1A

COMMENTS

Data packages were reviewed for all of Sector 3C.
Bottom Window: All welds are clean, no reportable indications. On L-VF10 found 3 Attachment removal areas (ARA's) on OD, about 1" long, and 1 ARA on I.D.
On L-H5, UT showed differences between 1/2" and 5/8" plates, as expected. Additional ARA's on OD.
L-H4: 2 long ARA's (1.5") on OD between L-H4 and L-H5, 3 more on OD, 3 (Vertical) on I.D. Main vertical weld at 389.6" = S. Very bright reflector about 1.5" above weld, apparent depth 0.446" beneath I.D, but no measurable depth. ET detected an I.D ridge in same area, parallel to L-H4. This spot is interpreted as a probable attachment or weld (fillet) fragment on O.D, still there, with I.D surface contour causing the apparent off-surface location. It is not a concern.
L-VD1 is very clean, no reportable indications. Two ARA's on I.D, spot on O.D. ET scans disclosed no reportable indications.
Middle window: L-H3 is OK, several ARA's - 3 on I.D, one on OD, all spots, no depth.
L-VD1 - very clean, no ARA's, no repairs.
ET scans showed 2 areas of possible weld repair.

REPORTED BY:

Signature/Date: J M Morrison 11-16-90

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 7 Date: 11-16-90 Location: 305-1A

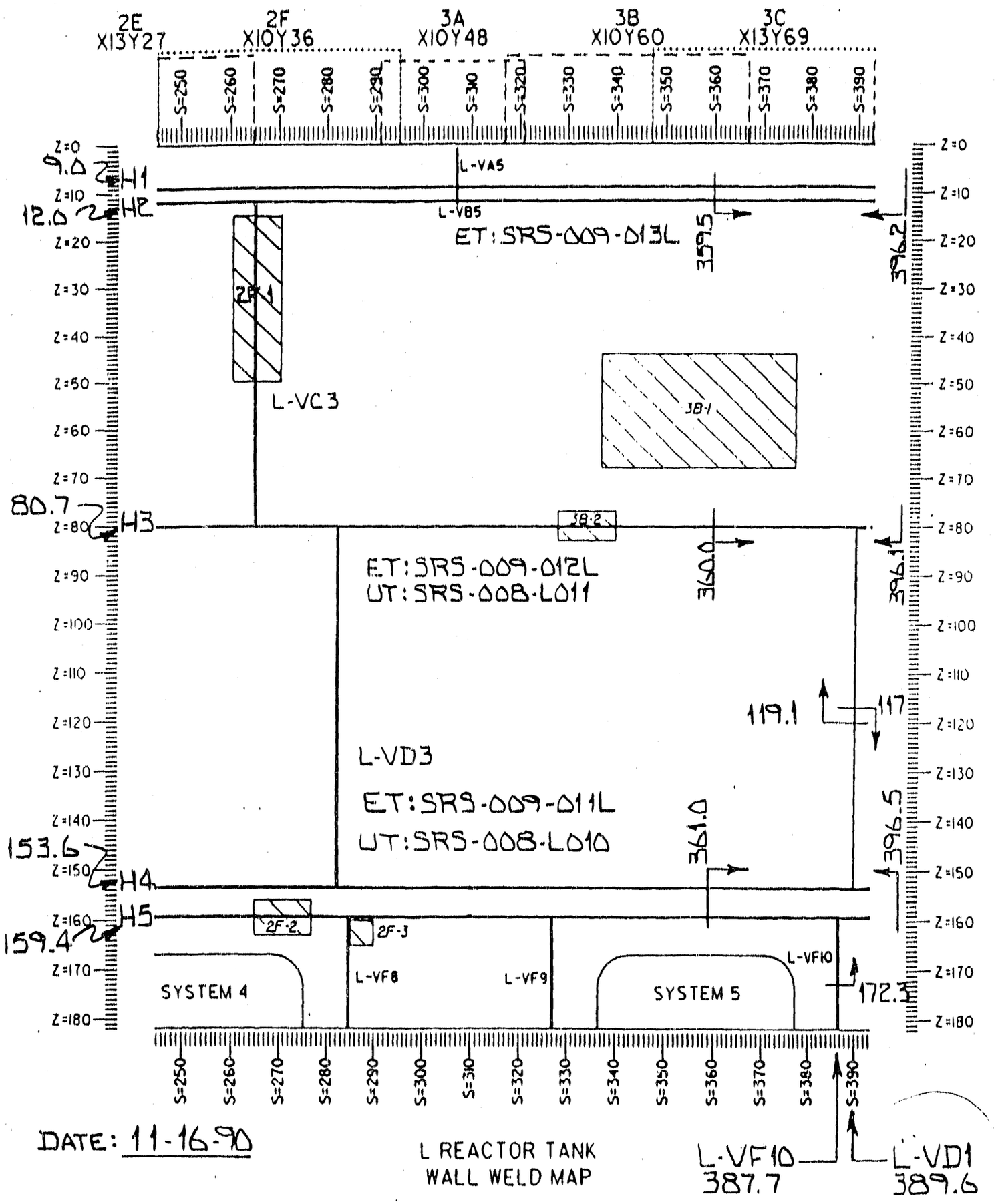
COMMENTS

Top Window: ET showed no indications or vertical welds associated with L-H1 and L-H2. ET special scans continued in and beyond the area 3B-1, for information. Very little evidence of weld metal. A number of areas were identified (weak signals) indicative of slight creases, ridges, gouges, high and low spots. There may be remnants of the reported "scar (welded area." No reportable indications were found (see special map enclosed).

REPORTED BY:

Signature/Date: J. M Morrison 11-16-90

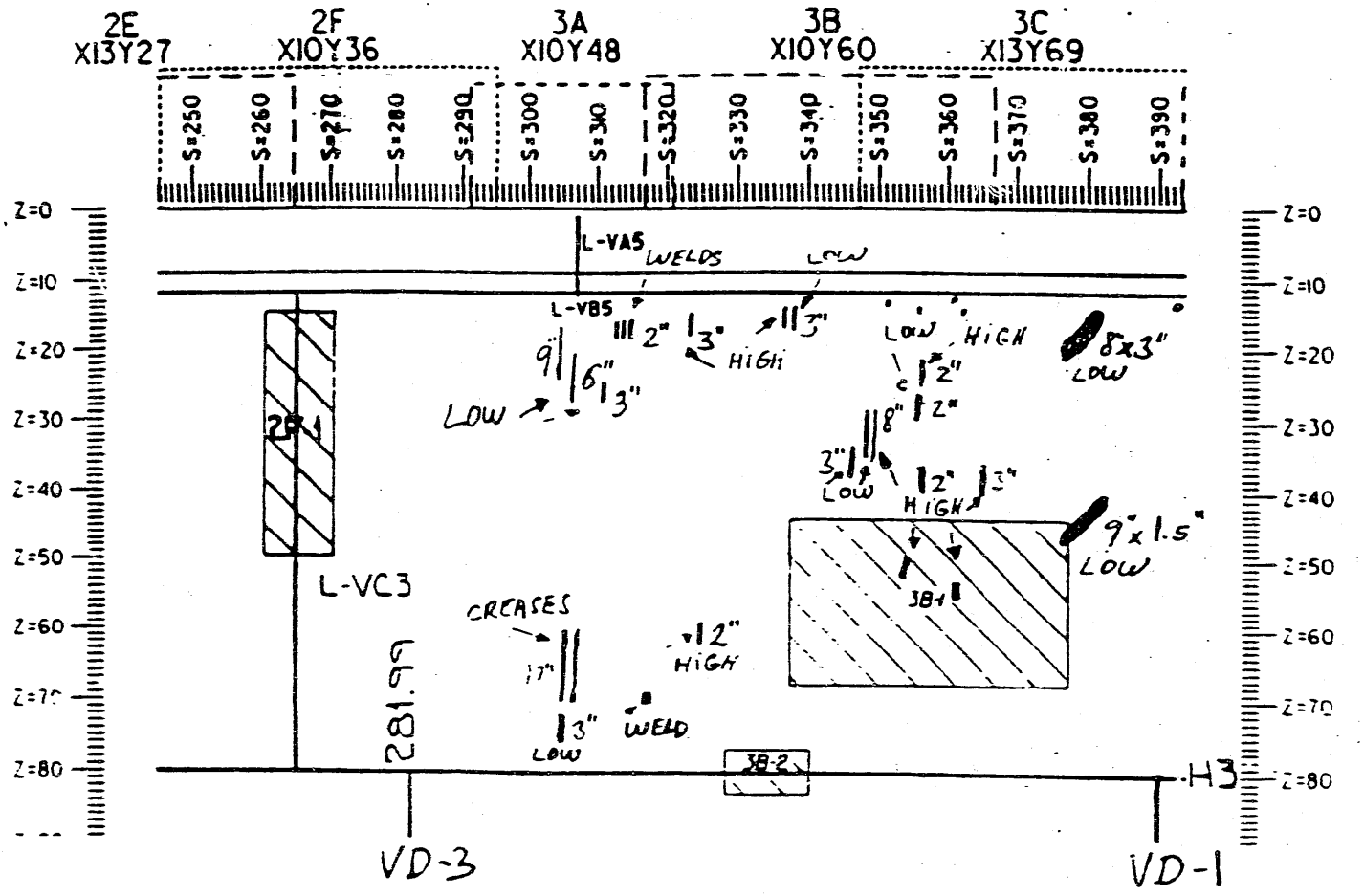
IRC REPORT CONTINUATION PAGE | PAGE 3 OF 3



DATE: 11-16-90

L REACTOR TANK
WALL WELD MAP

SUMMARY OF BASE METAL ET SCANS



11/16/90

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 8 Date: 12-5-90 Location: 704-L

MEMBERS in ATTENDANCE

NAME		
Print	Signature	Organization
J. M. MORRISON	J M Morrison	RRD IRC CHAIRMAN
E. G. CAVENESS	E G Caveness	EES/RTIP
C. D. COWFER	C D Cowfer	RE
D. R. KETCHAM		RE
E. J. MAJZLIK	E J Majzlik Jr	EES/MAT
J. L. JIMENEZ	J Jimenez	ROD
W. C. COLLINS	W C Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-014L, 015L, 016L, 017L

Ultrasonics: SRS-008-L012, L013, L014

Relevant Indications Reported: Yes____ No✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No✓ NCR Ident:____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 8 **Date:** 12/5/90 **Location:** 704-L

COMMENTS

Data reviewed for all windows of Sector 1F and bottom windows of Sector 2A.

Sector 1F: Weld L-VF4, no reportable indications (NRI). Attachment removal area (ARA) or weld repair on ID.
L-H5 - clean, only reflectors are other welds.
L-H4 - Weld is flush (0.8" to 1" crown). Weld repair on OD. Numerous ARA's - 2 vertical on ID, 5 on OD, no penetration. One area on OD indicative of a gouge with some upset metal in it. On ET, at S=66", indicates 2 passes on ID with 5/16" gap in between, about 8" long, interpreted as 2 separate passes.
L-H3: 2 OD, 1 ID reflectors termed ARA's, no depth, <1" long. One minor weld repair on ID. Confirmed by ET which also confirmed another ARA identified by UT.

Special scan (SRS-009-BM1-1F) on base metal, S=44"-88", Z=20"-80", in 0.5" strokes. Found very little of interest, only a couple of minor weld reflectors, not like Sector 3B earlier. Vertical scan direction only. Plan to continue such scanning in next of Phase 2.
L-H1 and -H2: Motion measurement bracket at left end of Sector 1F. No vertical welds located. No reportable indications.

REPORTED BY:
Signature/Date: J M Monson 12-5-90

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 8 **Date:** 12/5/90 **Location:** 704-L

COMMENTS

Sector 2A-lower window. Vertical weld L-VE2 located at S=101.5" between H4 and H5.

L-H5: 2 ARA's on ID, one gal ~ 2" square w/ beam redirectors on OD, possibly still there. In all, 6 ARA's located. No depth, NRI's. Confirmed by ET.

L-H4: 7 OD, 1 ID reflectors interpreted as ARA's. No measurable depth. Weld very wide and uneven, at times up to 1.5" wide. Area of apparent heavy rework at end (bottom) of tank shell.

ET confirms uneven L-H4 weld.

ET scanned 2A-2 (indication from 1986 exam) with UNRI.

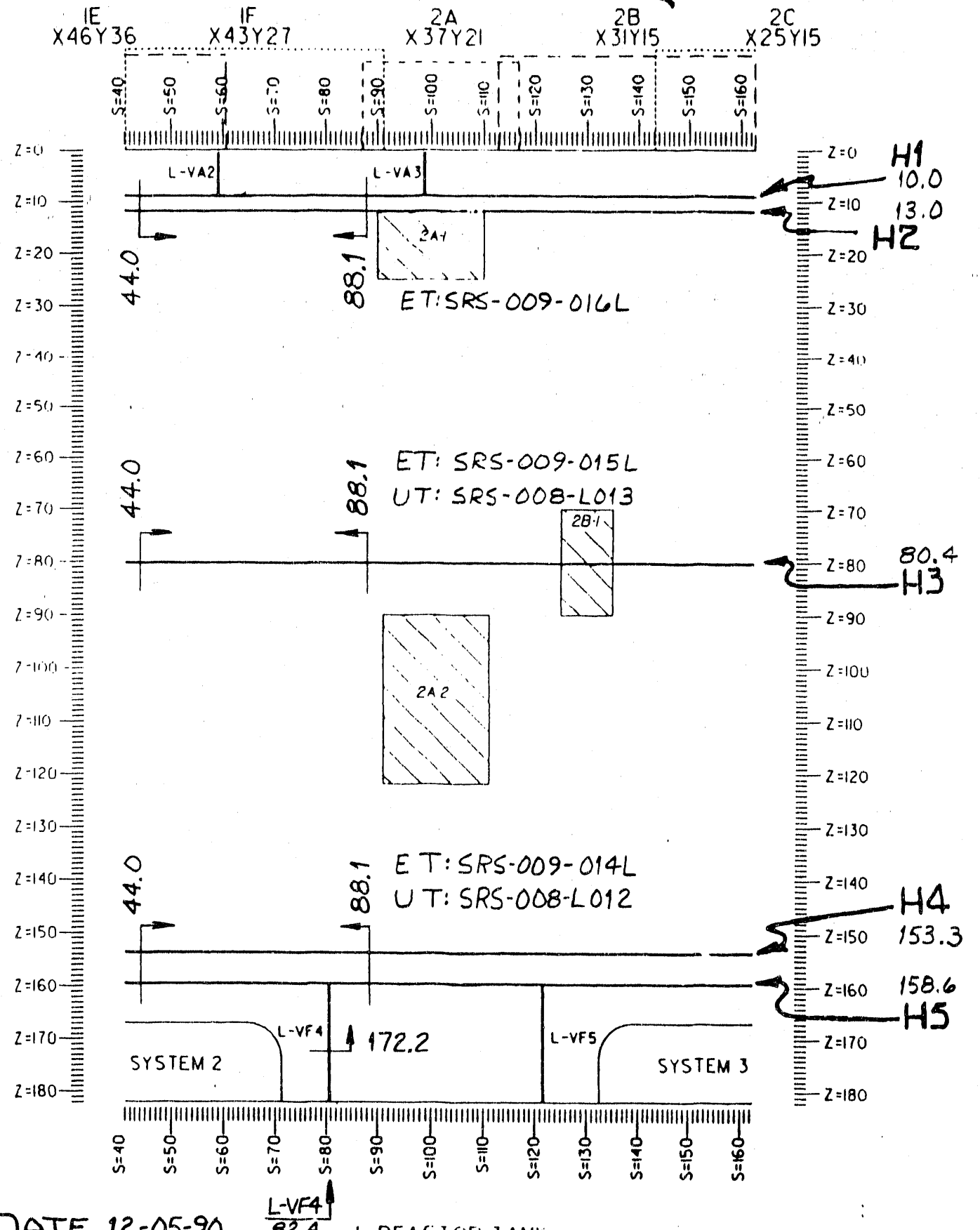
Scanning ended with no overlap between 1F and 2A, due to geometrical limitations and robot mechanical limitations. Sectors 1F and 2A should be redefined in future inspection. PTIP team will document best estimate of gap that may have existed where 4 beam directions were not obtained.

REPORTED BY:

Signature/Date: J. M. Morrison 12-5-90

IRC REPORT CONTINUATION PAGE		PAGE 3 OF 3

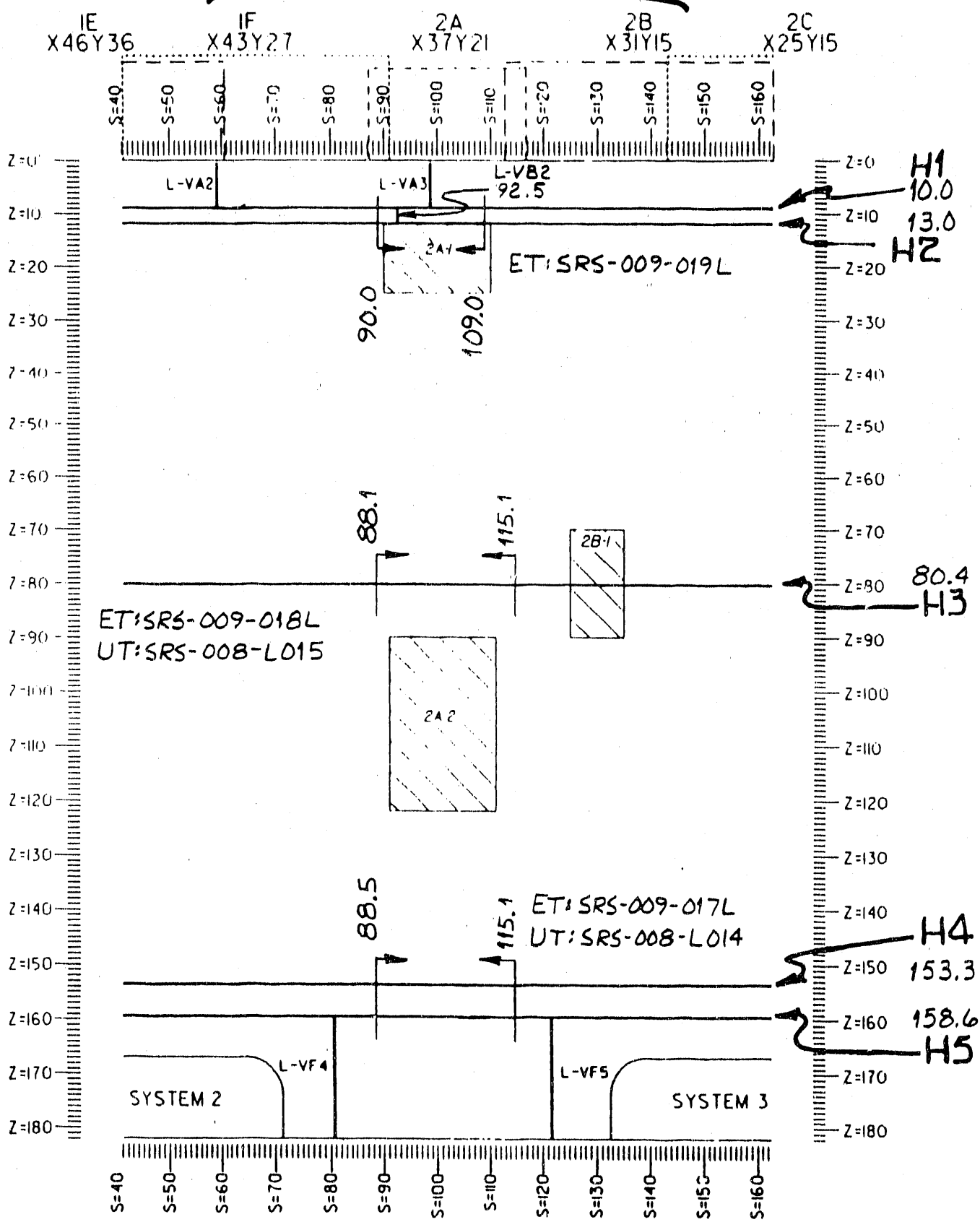
PHASE II



DATE 12-05-90

L REACTOR TANK
WALL WELD MAP

PHASE II



DATE 12-05-90

L REACTOR TANK
WALL WELD MAP

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 9 Date: 12-6-90 Location: 704-L

MEMBERS in ATTENDANCE

NAME Print	Signature	Organization
J. M. MORRISON		RRD IRC CHAIRMAN
E. G. CAVENESS	E G Caveness	EES/RTIP
C. D. COWFER	C D Cowfer	RE
D. R. KETCHAM		RE
E. J. MAJZLIK		EES/MAT
J. L. JIMENEZ	J L Jimenez	ROD
W. C. COLLINS	W C Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-01BL, -01AL, -2ABM	Ultrasonics: SRS-008-L015

Relevant Indications Reported: Yes____ No ✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No ✓ NCR Ident:_____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 9 Date: 12-6-90 Location: 704-L

COMMENTS

INSPECTION DATA FOR SECTOR 2A MIDDLE AND UPPER WINDOW WAS REVIEWED. THIS AREA INCLUDED SCANS OF L-H3, LH-1, L-H2, AREA 2A-1 AND 2A-2 AND SPECIAL ET SCAN IN AREA DESIGNATED 2ABM.

SECTOR 2A: L-H3: NO REPORTABLE INDICATIONS. THREE ATTACHMENT REMOVAL AREAS (ARA) ON OUTSIDE SURFACE LOWER SIDE OF WELD. ET SCANS FOR WELD LOCATION ONLY

L-H1: NO REPORTABLE INDICATIONS. ET SHOWS
L-H2: 1 ARA APPROXIMATELY 1" LONG WHICH MAY BE VERTICAL WELD L-V82. INTERPRETATION OF L-V82 LOCATION DATA WILL BE REVIEWED.

AREA 2A-2: UPPER PORTION WAS SCANNED BY ET. NO REPORTABLE INDICATIONS. ROBOT PROGRAMMING RESULTED IN AN UNSCANNED GAP OF APPROXIMATELY 5" IN THIS AREA. (Z = 112 - 117 NOT SCANNED). IRC REQUESTED INSPECTION TEAM TO COMPLETE SCAN OF 2A-2 BEFORE EXITING

REPORTED BY:
Signature/Date: [signature] 12/6/90

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 9 Date: 12-6-90 Location: 204-C

COMMENTS

PHASE II.

AREA 2A-1 - AN AREA OF PREVIOUS VISUAL INDICATION FROM 1986 INSPECTION. NO REPORTABLE INDICATIONS. COMPLETE COVERAGE OF AREA.

SPECIAL BASE METAL SCAN (-2ABM): AREA [S=88-115; Z=20-80] SCANNED WITH ET TO PROVIDE BASELINE INFORMATION ON PLATE CONDITION. NO REPORTABLE INDICATIONS. ET DATA VERY CLEAN, ONE SMALL WELD DEPOSIT.

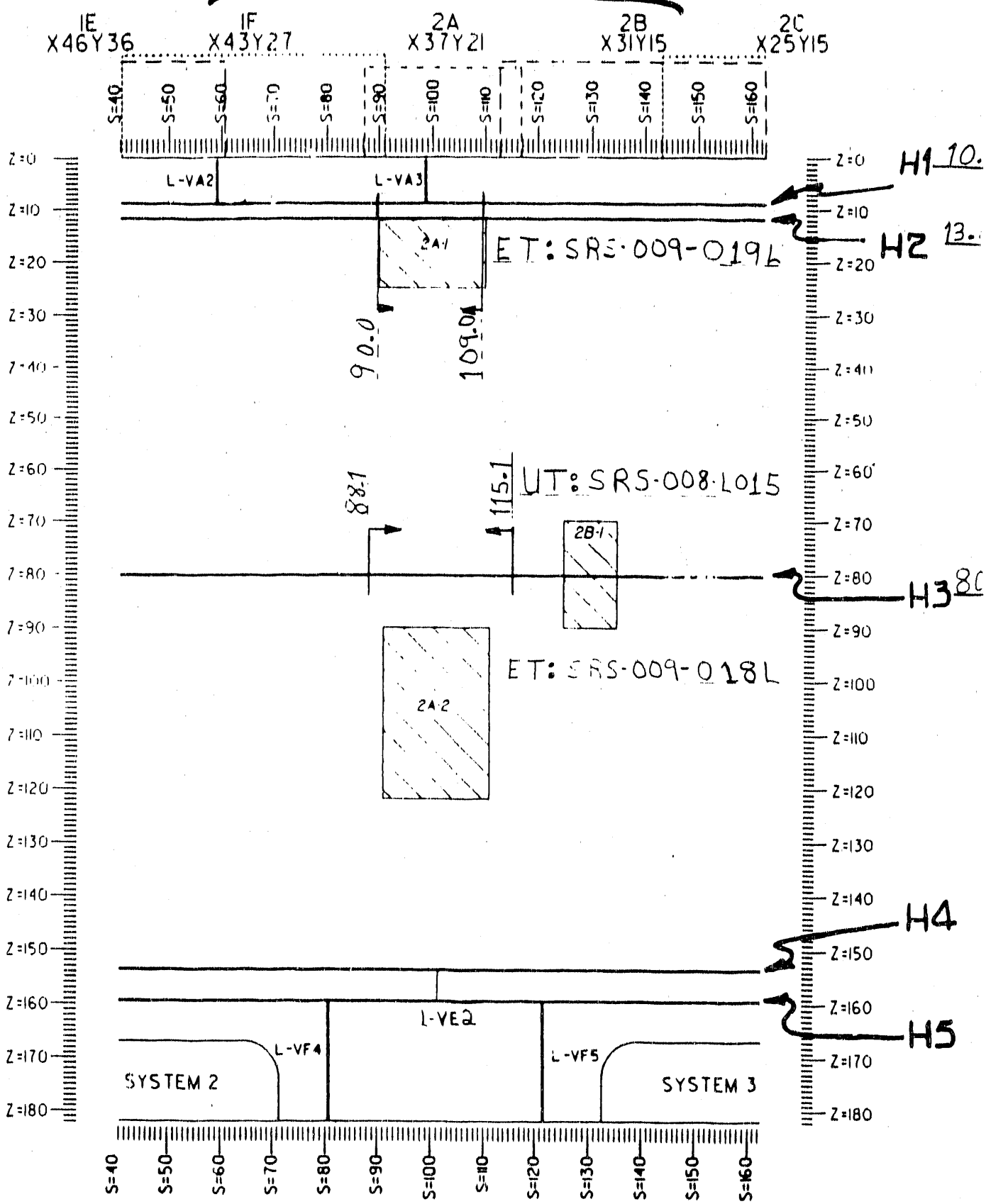
DISCUSSION of SCAN GAPS AT INTERFACE of SECTORS 1F-2A AND 2A-2B:

A POSSIBLE GAP of 1" BETWEEN UT SCANS AT 1F-2A INTERFACE WAS DISCUSSED. IRC REQUESTED INSPECTION TEAM TO REPOSITION ROBOT AND SCAN THE GAP AREA IN THIS LOCATION AND ANY GAP WHICH MIGHT EXIST AT 2A-2B INTERFACE BEFORE EXITING PHASE II. THE TEAM WILL PROVIDE AN ESTIMATE OF TIME TO COMPLETE THESE SCANS. PRELIMINARY ESTIMATE IS TWO DAYS.

REPORTED BY:

Signature/Date: E J Mayhew 12-6-90

PHASE II



DATE 12-06-90

L REACTOR TANK
WALL WELD MAP

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 10 Date: 12-10-90 Location: 704-L

MEMBERS in ATTENDANCE

NAME Print	Signature	Organization
J. M. MORRISON		RRD IRC CHAIRMAN
E. G. CAVENESS	E. G. Caveness	EES/RTIP
C. D. COWFER		RE
D. R. KETCHAM	D. R. Ketcham	RE
E. J. MAJZLIK		EES/MAT
J. L. JIMENEZ	J. L. Jimenez	ROD
W. C. COLLINS	W. C. Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-020-L, 021-L, 022-L, 200-28L	Ultrasonics: SRS-008-L-016-L-07, -L-08

Relevant Indications Reported: Yes____ No✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No✓ NCR Ident:_____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 10 **Date:** 12-10-90 **Location:** 704-L

COMMENTS

INSPECTION DATA PACKAGES FOR SECTOR 25° WOE & REVIEWED

LOWER WINDOW.

L-VF5: NO REPORTABLE INDICATIONS
ONE FAR SURFACE ATTACHMENT REMOVAL AREA (ARA)
APPROXIMATELY 3/4" LONG

L-H5: NO REPORTABLE INDICATIONS
SEVERAL NONE SURFACE AND FAR SURFACE ARA'S
APPARENT WELD REPAIR AREA (S=120; Z=159.3)
NOZZLE ASSEMBLY WELD AT S=135

L-H4: NO REPORTABLE INDICATIONS
4 NONE SURFACE AND 6 FAR SURFACE ARA'S
A GEOMETRIC WELD REFLECTOR ABOUT 2" LONG
AT S=119, Z=1535 AND 0.070" BELOW FAR SURFACE

ET SCANS FOR WELD LOCATION AND TWO VERIFICATION
SCANS CONFIRMED WELD METAL (ARA'S)

MIDDLE WINDOW.

L-H3: NO REPORTABLE INDICATIONS
2 FAR SIDE ARA'S & 1 NONE SIDE ARA'S.

REPORTED BY:

Signature/Date: [signature] 12/10/90

IRC REPORT CONTINUATION PAGE		PAGE 2 OF 3

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 10 **Date:** 12-10-90 **Location:** 704-L

COMMENTS

AREA 2B-1: A VISUAL INDICATION FROM 1986 INSPECTION. UT SCAN SHOWED NO REPORTABLE INDICATIONS.

UPPER WINDOW:

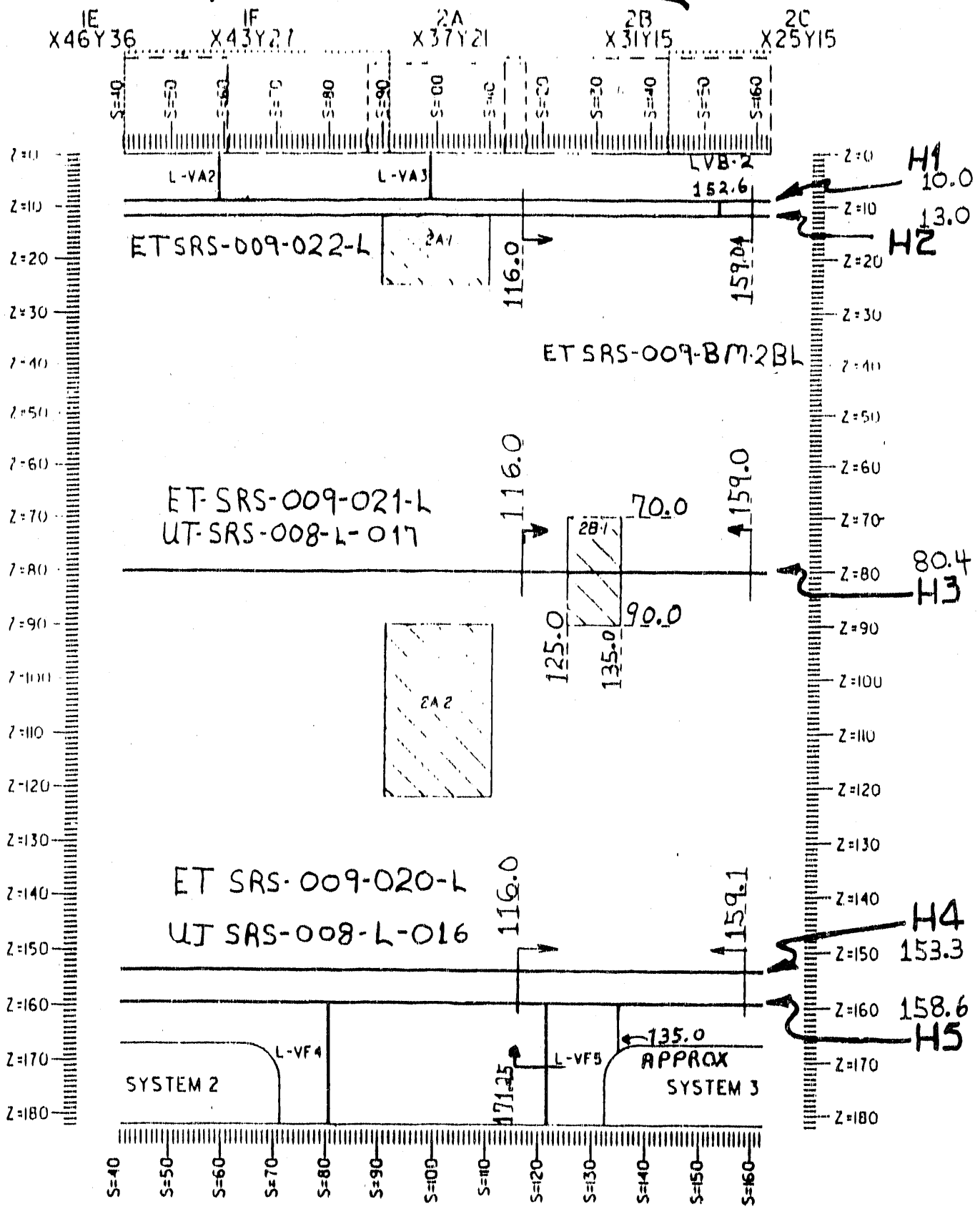
L-H1 AND L-H2: UT SCAN SHOWED NO REPORTABLE INDICATIONS
MOTION DETECTION BRACKET LOCATED AT S=116, Z=12.
L-VB2 WELD LOCATED AT Z=152.6. PREVIOUS INDICATION IN SECTOR 2A CONFIRMED TO BE ARA.

SPECIAL BASE METAL SCAN BM-2BL: SCAN PERFORMED AS REFERENCE TO CONDITION OF BASE PLATE: AREA S=116-159; Z=14.5-21.5 SCANNED BY UT. SEVERAL UT SIGNALS DENOTING WELD METAL (3 SPOTS), 1 LFT-UH SIGNAL, AND A 3" LONG VERTICAL gouge IN RIGHT UPPER CORNER (S=159, Z=14.5-18.0) UT SCANS CONFIRMED NO REPORTABLE INDICATIONS. UT SIGNALS INTERPRETED TO BE ARA'S FROM FABRICATION PROCESS. SPECIAL BASE METAL SCANS WILL BE DISCONTINUED IN PHASE III.

REPORTED BY:

Signature/Date: E M Jazbec 12/10/90

PHASE II



DATE 12-10-90

L REACTOR TANK
WALL WELD MAP

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002

Inspection of L Reactor Tank

IRC MEETING: No. 11 Date: 12/12/90 Location: 704-L

MEMBERS in ATTENDANCE

NAME Print	Signature	Organization
J. M. MORRISON		RRD IRC CHAIRMAN
E. G. CAVENESS	E G Caveness	EES/RTIP
C. D. COWFER		RE
D. R. KETCHAM	D. R. Ketcham	RE
E. J. MAJZLIK		EES/MAT
J. L. JIMENEZ	J Jimenez	ROD
W. C. COLLINS	W C Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-018A-L, -023L, -024L

Ultrasonics: SRS-008-L019/019A, -L020

Relevant Indications Reported: Yes____ No✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No✓ NCR Ident:_____

IRC REPORT FRONT PAGE

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 11 Date: 12/12/90 Location: 704-L

COMMENTS

DATA PACKAGES FOR ADDITIONAL SCANNING AT INTERFACES of SECTOR 2A/2B AND AT POSITION 2A-2 WERE REVIEWED:

AREA 2A-2: AREA BETWEEN Z=110 - 118.5 WAS SCANNED BY UT. NO REPORTABLE INDICATIONS THIS COMPLETES COVERAGE OF AREA 2A-2

INTERFACE 2A/2B: UT AND ET WELD LOCATIONS CONDUCTED. TO PROVIDE COMPLETE COVERAGE of INTERFACE L-H3, L-H4, L-H5 NO REPORTABLE INDICATIONS. L-H1, L-H2 COVERED BY A MOTION DETECTION BRACKET. THIS COMPLETES COVERAGE of 2A/2B INTERFACE.

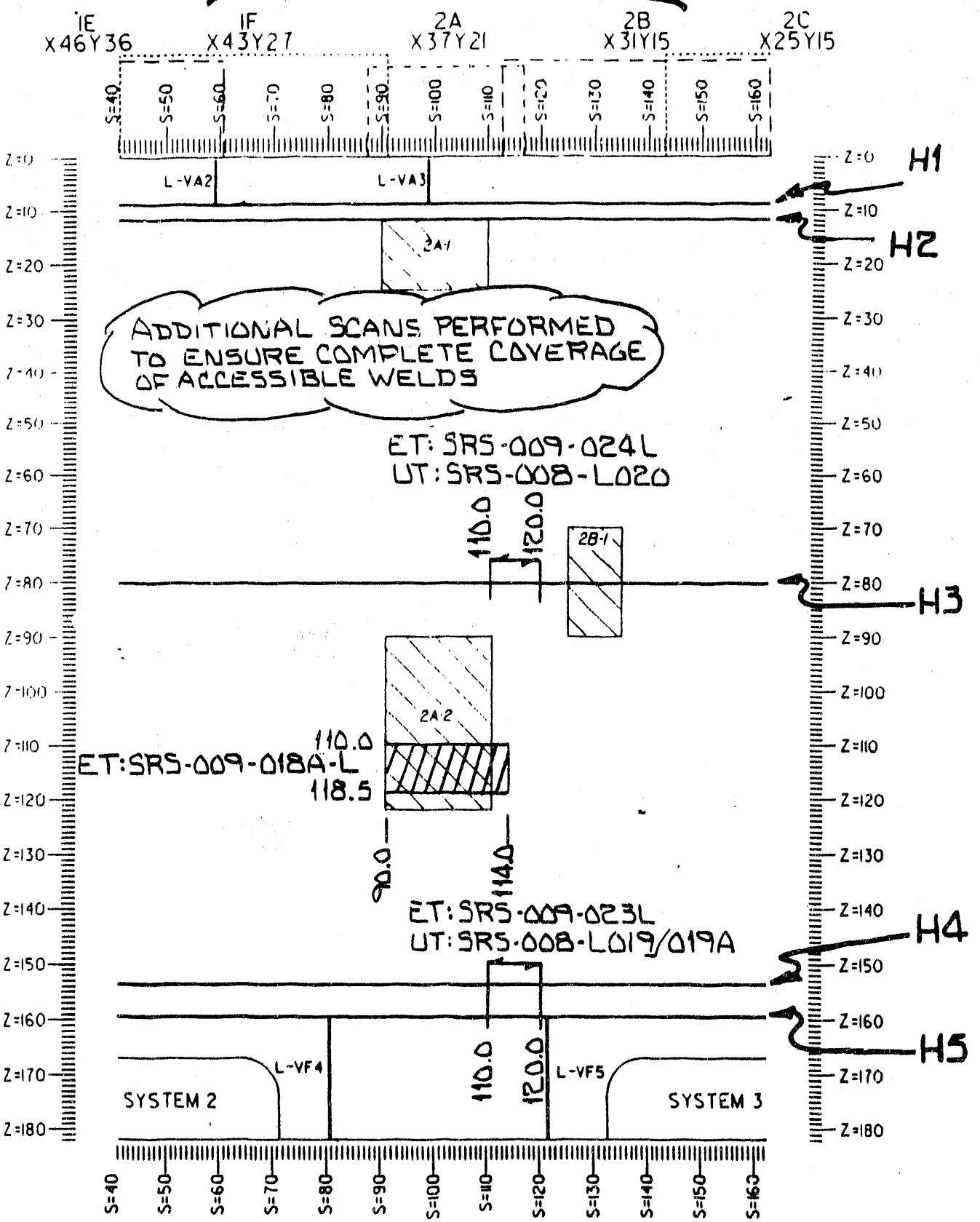
INTERFACE 1F/2A: BY CONSENSUS IRC DECIDED TO REQUEST THE INSPECTION TEAM TO RELOCATE THE ROBOT TO POSITION X39, Y21 AND COMPLETE SCANNING COVERAGE OF THE 1F/2A INTERFACE. THE STIFFING UNDER X39, Y21 WILL BE SPECIALLY BRACED TO ACCOMODATE THIS SCAN REQUIREMENTS.

REPORTED BY:

Signature/Date: E J Mayfield 12/12/90

IRC REPORT CONTINUATION PAGE | PAGE 2 OF 2

PHASE II



DATE: 11-12-90

1 REACTOR TANK
WALL WELD MAP

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 12 Date: 12-13-90 Location: 704-L

MEMBERS in ATTENDANCE

NAME Print	Signature	Organization
J. M. MORRISON		RRD IRC CHAIRMAN
E. G. CAVENESS	E. G. Caveness	EES/RTIP
C. D. COWFER		RE
D. R. KETCHAM	D. R. Ketcham	RE
E. J. MAJZLIK	E. J. Majzlik	EES/MAT
J. L. JIMENEZ	J. Jimenez	ROD
W. C. COLLINS	W. C. Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-____	Ultrasonics: SRS-008-____

Relevant Indications Reported: Yes____ No ✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No ✓ NCR Ident:_____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 12 **Date:** 12-13-90 **Location:** 704-L

COMMENTS

THE IRC MET TO DISCUSS THE ADDITIONAL SCANNING AT THE INTERFACE OF SECTOR 1F AND 2A. DUE TO CONCERNS ABOUT THE ADEQUACY OF THE MODIFIED STIFFLEG REQUIRED AT POSITION X39.1/2, APPROVAL TO USE IT WAS NOT GRANTED. THIS RENDERED THE AREA INACCESSABLE TO ADDITIONAL SCANS.

THE IRC ACCEPTED THE ATTACHED REPORT FROM THE INSPECTION TEAM AS DOCUMENTATION OF THE SCAN COVERAGE IN THIS AREA. THERE APPEARS TO BE A GAP of APPROXIMATELY 1/2" IN THE SCANS OF WELDS L-H3. THE SCANS of L-H4 AND L-H5 APPEAR TO MEET. THE APPARENT LACK of OVERLAP of SCANS IS NOT CONSIDERED TO BE SIGNIFICANT TO THE QUALITY OF THE INSPECTION.

By CONSENSUS THE IRC DECIDED TO TERMINATE INSPECTION IN PHASE II AND APPROVED REMOVAL OF THE INSPECTION EQUIPMENT FROM THE REACTOR TANK.

THIS CONCLUDES PHASE II of THE INSPECTION.

REPORTED BY:

Signature/Date: E J Mayfield 12-13-90

1F/2A OVERLAP CONSIDERATIONS

Procedure RTIP 006, Revision 3, paragraph 9.5.1 states:

> 9.5.1 Most reactor welds are ultrasonically interrogated in discrete segments. A nominal overlap of one inch (1") from segment to segment within a window and two inches (2") from window to window is required. Deviations from this requirement shall be noted.

Because of a variety of factors, which were beyond the control of the NDE specialists, essentially no overlapping scans were performed between window 1F and 2A for welds L-H3, L-H4, and L-H5.

There appears to be a 1/2" gap on weld L-H3 between 1F and 2A. On welds L-H4 and L-H5 scanning terminated at S=88" in window 1F and began at S=88" in window 2A.

A review of the acquired ultrasonic data prompts the following comments:

1. The acquired data in the area of interest (S=88/89") is excellent!

2. There are no ultrasonic indications in the area of interest that could be even remotely IGSCC. In fact the examination area adjacent to the area of interest has only very minor attachment removal type anomalies.

3. There is corroborating proof that the area of interest was interrogated in the $+90^0$ and the -90^0 directions. No transverse linear indications were detected.

We recommend that the ultrasonic tests be accepted.

Michael A. McKaig 12/12/90 Boyd D. Howard 12/12/90

Michael A. McKaig/Date Boyd D. Howard/Date

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 13 Date: 2/1/91 Location: 704-L

MEMBERS in ATTENDANCE

NAME		
Print	Signature	Organization
J. M. MORRISON	J M Morrison	RRD IRC CHAIRMAN
E. G. CAVENESS	McCall for E. G. CAVENESS	EES/RTIP
C. D. COWFER	C D Cowfer	RE
D. R. KETCHAM	D. R. Ketcham	RE
E. J. MAJZLIK	E J Majzlik	EES/MAT
J. L. JIMENEZ		ROD
W. C. Collins ~~T. S. BARGELOH~~		QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-0231 thru 0241 and 0251 LA, Ultrasonics: SRS-008-1021 and L022

Relevant Indications Reported: Yes____ No✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No✓ NCR Ident:_____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 13 **Date:** 2/1/91 **Location:** 704-L

COMMENTS

Sector 1C, bottom window: UT results:
L-VF2 (1/2" scanned) - 1 near, 1 far surface spots called surface irregularities, not large enough to be ARA's
L-H5 - indication of existing attachment on far surface, ~2" long x 0.5" wide, horizontal. Also a vertical attachment or ARA, ~1" long running out of scan area.
An indicated lack of fusion (S=5917"), 2½" long x 0.220" deep, no discernible through-wall dimension. Another "spot" reflector on far surface (<0.25").
L-H4 - Approx. 6 far side ARA's
One near surface arc strike or ARA, no thru-wall dimension - basically a surface irregularity
Weld crown 0.4" to ≥1.3" wide.
ET: Weld location scans only.
No reportable indications in this window.
L-H5 Weld geometry uneven; rough weld.
Middle window: UT -
L-H3 - Very clean, nothing reportable. Uniform weld geometry, no ARA's.
ET: Weld location scan only.
No reportable indications.

REPORTED BY:

Signature/Date: _____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 13 **Date:** 2/1/91 **Location:** 704-L

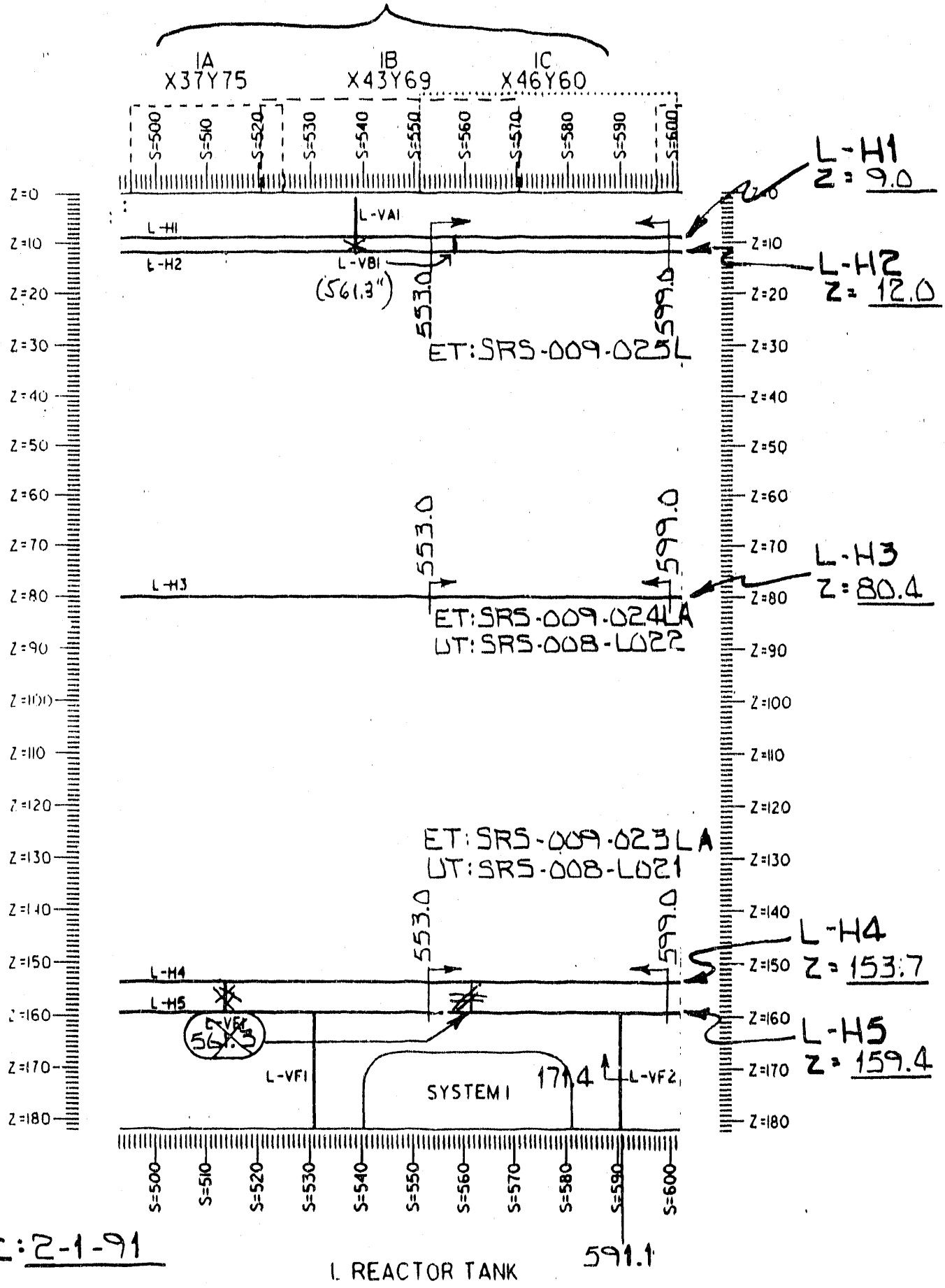
COMMENTS

Sector 1C, Top Windows - ET -
Scanned S = 553" to 599"
L-VB1 - located at 561.3" = S
At S = 557", a short spot between L-H1 and L-H2, <0.25" weld spatter, most likely.
At S = 591" to 596", some chattering encountered with rotated scan, but not vertical, an indication of some surface roughness at end of arm extension.
No reportable indications.

REPORTED BY:

Signature/Date: _____

PHASE III



DATE: 2-1-91

I. REACTOR TANK
WALL WELD MAP

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 14 Date: 2/9/91 Location: 305-1A

MEMBERS in ATTENDANCE

NAME		
Print	Signature	Organization
J. M. MORRISON		RRD IRC CHAIRMAN
E. G. CAVENESS		EES/RTIP
C. D. COWFER		RE
D. R. KETCHAM		RE
E. J. MAJZLIK		EES/MAT
J. L. JIMENEZ		ROD
W. C. COLLINS		QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-~~1023~~, ~~-0172~~, -0180	Ultrasonics: SRS-008-2023; -2024;

Relevant Indications Reported: Yes____ No v
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No v NCR Ident:____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 14 Date: 2/4/91 Location: 305-1A

COMMENTS

Sector 1B Bottom Window:

L-H1 - Two areas, 1 NS and 1 FS approximately 1"x1" were ARA's. No Relevant INDICATIONS (NRI).

L-H5 - one near surface irregularity (1 1/2" x 1/2") S=526.9 AND one NS irregularity at S=529. No Relevant indications.

L-H4 - Several apparent Repair areas, three NS ARA's AND three FS AEA's. Wide weld crown and rough weldcrown. S=523-532 was a repair area. No Relevant indications.

ET SCANS - SCANS confirmed irregular profile of Weld L-H4 from S=523-532. Weld location scans only.

Sector 1B Middle Window:

L-H3 - Three areas: 1 NS AND 2 FS which were surface irregularities. No detectable depth. No relevant indications.

ET SCANS - Good weld signals. Weld Location scans only. Some variation in weld width. (0.4 - 0.7").

SECTOR 1B UPPER WINDOW:

L-H1 AND L-H2 - ET SCANS. No Relevant indications. No ARA's. No VERTICAL weld between L-H1 AND L-H2.

REPORTED BY:

Signature/Date: [signature] 2/4/91

IRC REPORT CONTINUATION PAGE | PAGE 2 OF 2

WSRC-TR--91-378

DE92 009960

Savannah River Laboratory
Equipment Engineering Section
Reactor Tank Inspection Program

Keywords: Irradiation
Degradation Mechanisms
ISI
IGSCC
Robot
Restart

Retention - Permanent

SUMMARY REPORT FOR 1990 INSERVICE INSPECTION (ISI) OF SRS 100-L REACTOR TANK (U)

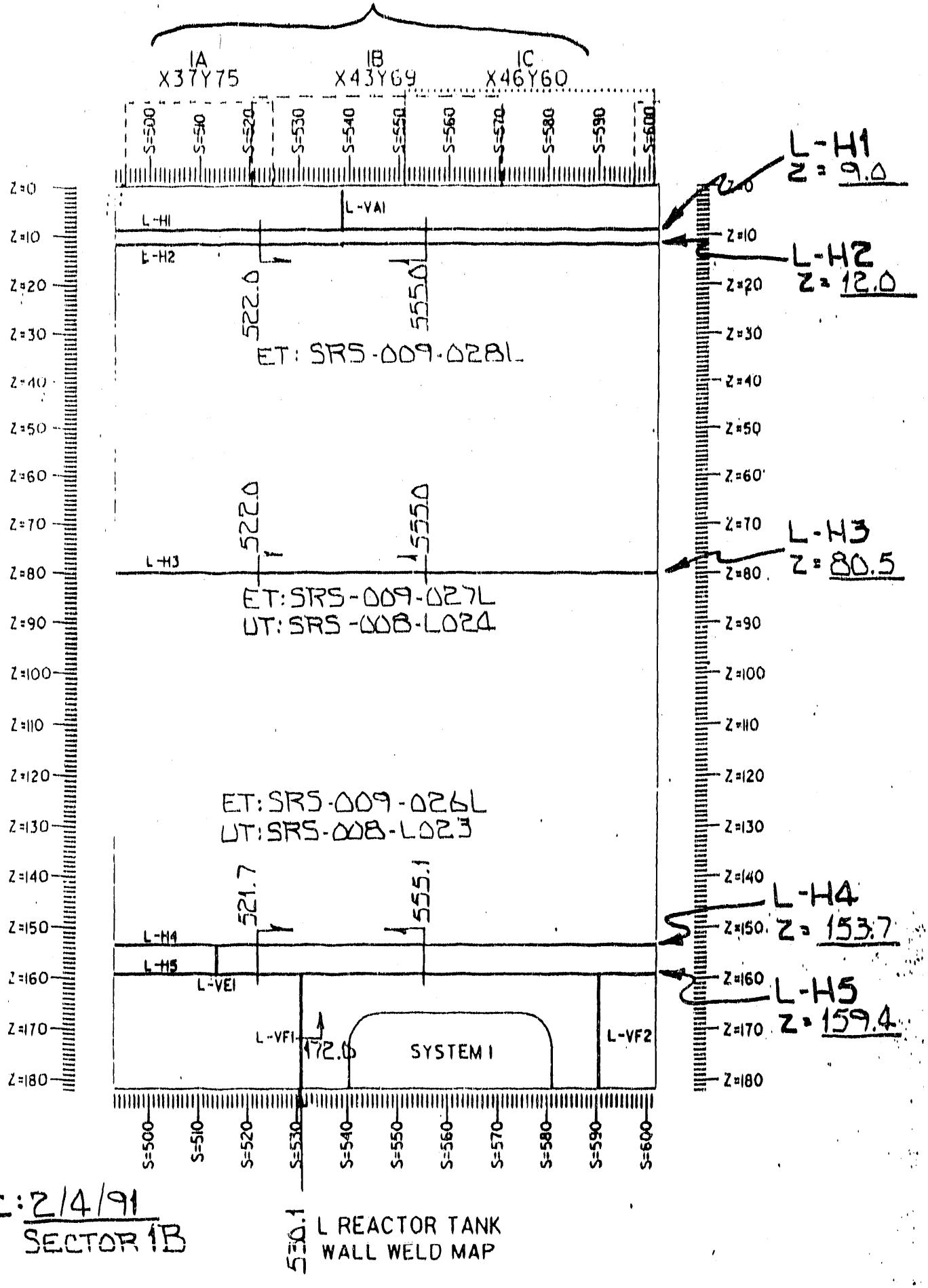
Prepared by:

J. M. Morrison, Reactor Programs Section, RRD
M. W. Loibl, Equipment Engineering Section, SRL

Issued: July 12, 1991

SRL SAVANNAH RIVER LABORATORY, AIKEN, SC 29808
Westinghouse Savannah River Company
Prepared for the U. S. Department of Energy Contract DE-AC09-88SR18035

PHASE III



DATE: 2/4/91

SECTOR 1B

L REACTOR TANK
WALL WELD MAP

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 15 Date: 2/6/91 Location: 704-L

MEMBERS in ATTENDANCE

NAME		
Print	Signature	Organization
J. M. MORRISON		RRD IRC CHAIRMAN
E. G. CAVENESS	E. G. Caveness	EES/RTIP
C. D. COWFER		RE
D. R. KETCHAM	D. R. Ketcham	RE
E. J. MAJZLIK	E. J. Majzlik	EES/MAT
J. L. JIMENEZ	Juan Jimenez	ROD
W. C. COLLINS	W. C. Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current:	Ultrasonics:
SRS-009-0291, -0304, -0312	SRS-008-1025, -1026,

Relevant Indications Reported: Yes____ No✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No✓ NCR Ident: ____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 15 **Date:** 2/6/91 **Location:** 704-L

COMMENTS

PHASE III, SECTOR 1A

LOWER WINDOW:

L-H5 – One reflector characterized as an arc STRIKE ON NS at edge of weld at S=522.2, Z=161.3. Approximately 0.3" in diameter. ET shows slight LOFT-off in this area. VT shows evidence of ARC STRIKE. No Reportable Indication.

L-H4 – ~~FOUR~~ FIVE FS ARA's. One near surface (NS) repair AREA (S = 508 – 514). Some irregularity in weld seam width. No Reportable INDICATIONS. ET WELD LOCATION SCANS only.

(L-V81 VERTICAL weld was NOT LOCATED IN THIS WINDOW).

MIDDLE WINDOW:

L-H3 – THREE FS REFLECTORS INDICATING ARA's. Two vertically ARA's AT S=518+522, Z=81.0. (1½" long). One horizontal ARA AT S=508, Z=81.5 (1" long). No REPORTABLE INDICATIONS.

BASE METAL SCAN – SMALL BASE METAL AREA AT S=499.9–502.8, Z=82.8–85.9. VT showed an unusual APPEARANCE. UT AND ET SCANS showed NO Reportable INDICATIONS. Concluded AREA was a possible GROUND AREA OR ARTIFACT of previous hydroblasting.

REPORTED BY:

Signature/Date: E M Yazlovitsky 2/6/91

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 15 **Date:** 2/6/91 **Location:** 704-L

COMMENTS

Upper Window:

L-H1 AND L-H2: Motion Deflection Bracket located at S= 518. ET scans cover S= 498 - 518; 2= 9.0 - 12.0. No Reportable Indications. No ARA's or Vertical welds.

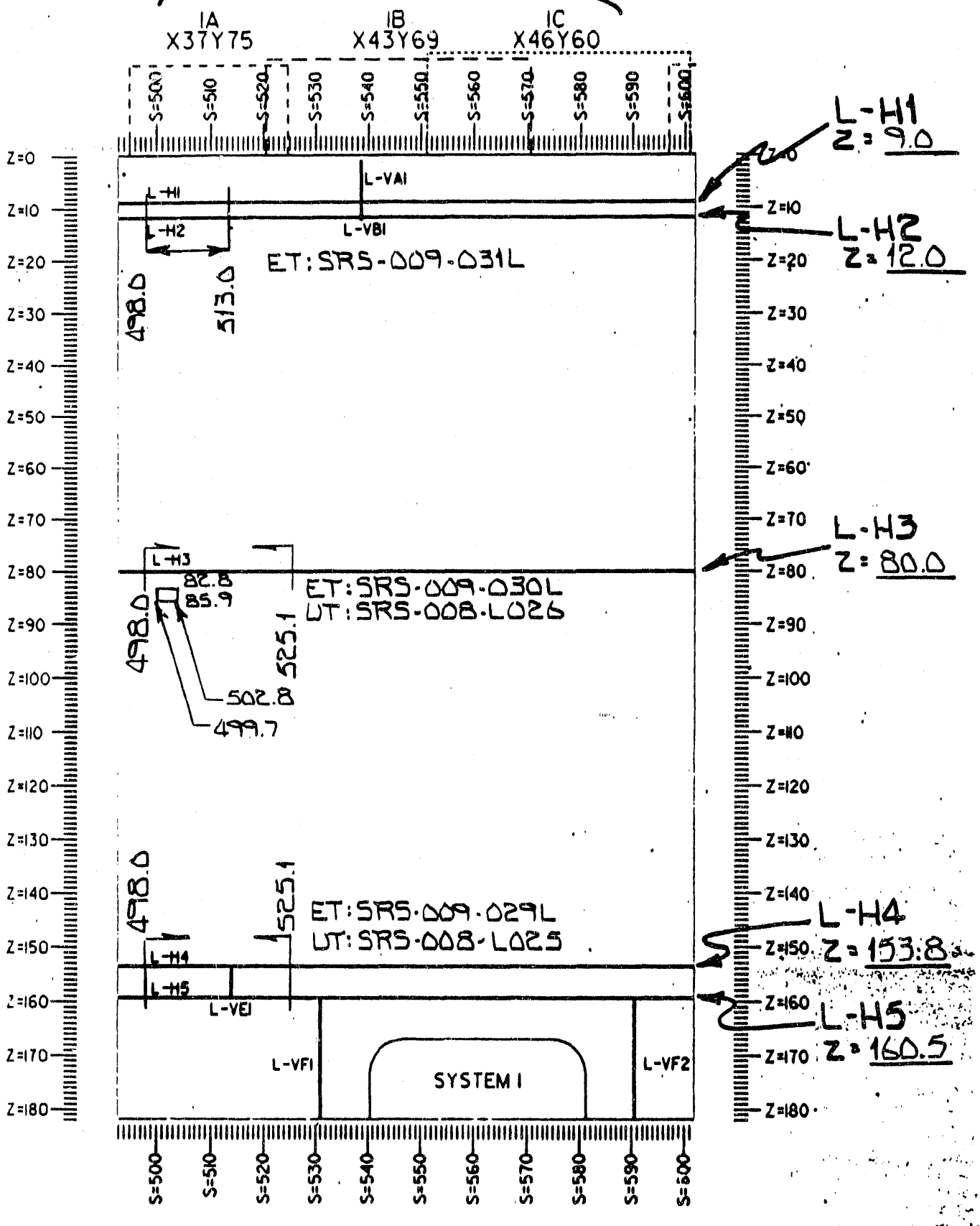
This concludes inspection of Phase III.

REPORTED BY:

Signature/Date: E J Mazzella, Jr 2/6/91

IRC REPORT CONTINUATION PAGE		PAGE 3 OF 3

PHASE III



DATE: 2-6-91

1A

L REACTOR TANK
WALL WELD MAP

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 16 Date: 2-27-91 Location: 704-L

MEMBERS in ATTENDANCE

NAME		
Print	Signature	Organization
J. M. MORRISON	J M Morrison	RRD IRC CHAIRMAN
E. G. CAVENESS	E G Caveness	EES/RTIP
C. D. COWFER	———	RE
D. R. KETCHAM	D. R. Ketcham	RE
E. J. MAJZLIK	E J Majzlik, 2	EES/MAT
G. I. Butler Jr. ~~J. L. JIMENEZ~~	G I Butler Jr	ROD
W. C. COLLINS	W C Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-0321, -0334, -0341, and BM-301 Ultrasonics: SRS-008-L027, L028

Relevant Indications Reported: Yes___ No ✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes___ No ✓ NCR Ident:_____

IRC REPORT FRONT PAGE		PAGE 1 OF 3

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 16 **Date:** 2-27-91 **Location:** 704-L

COMMENTS

Sector 3D –

Bottom window: 1 FS ARA or L-H5 - several 0.5" vertical "gouges" over a 3-inch length; otherwise clean
(SRS-008-L027)

L-H4: 2 spots, vertical orientation, NS, insignificant
On FS, 3 areas of attachment/removal areas, one of which is 0.3" long (horizontal) - also another of same length. Low amplitude, no significance.

L-VE1 located at 405.6", no features.

ET – no indications

Middle window: L-H3 - Near surface irregularities, possibly
(SRS-008-L028) gouges (2 in number) (grinding marks, etc.), about 1" long each.

Far Surface – 2 ARA's, horizontal orientation, about 1" long. Also two small areas interpreted as surface irregularities.

Overall, no reportable indication.

ET showed very smooth weld (L-H3).

Only ran weld location scans.

Top window: No vertical welds between L-H1 and L-H2
(SRS-009-0341) No attachments. On right side, area either is excessively ground or has oxide on it, very noisy, of no significance. Ran special base metal scan

REPORTED BY:

Signature/Date: J M Morrison 2/27/91

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 16 Date: 2-27-91 Location: 704-L

COMMENTS

To see Comparison to top of Sector 3C, Scan from 394" to ~420", DZ=15" to 79" (SRS-009-BM-3DL). No pattern of surface irregularities such as in 3B and 3C. One spot (2 1/4" long x 3/4" high, at S=411, Z=29") slightly lower than surrounding metal (depression), possibly where the "spider" was originally welded during fabrication, used for lifting the tank shell. Another minor weld spot (S=414, Z=72) close to L-H3. Adds credence to the previous tentative conclusion that the "scar-welded" area might have been in Sectors 3B and 3C.

Bottom line: No reportable indications.

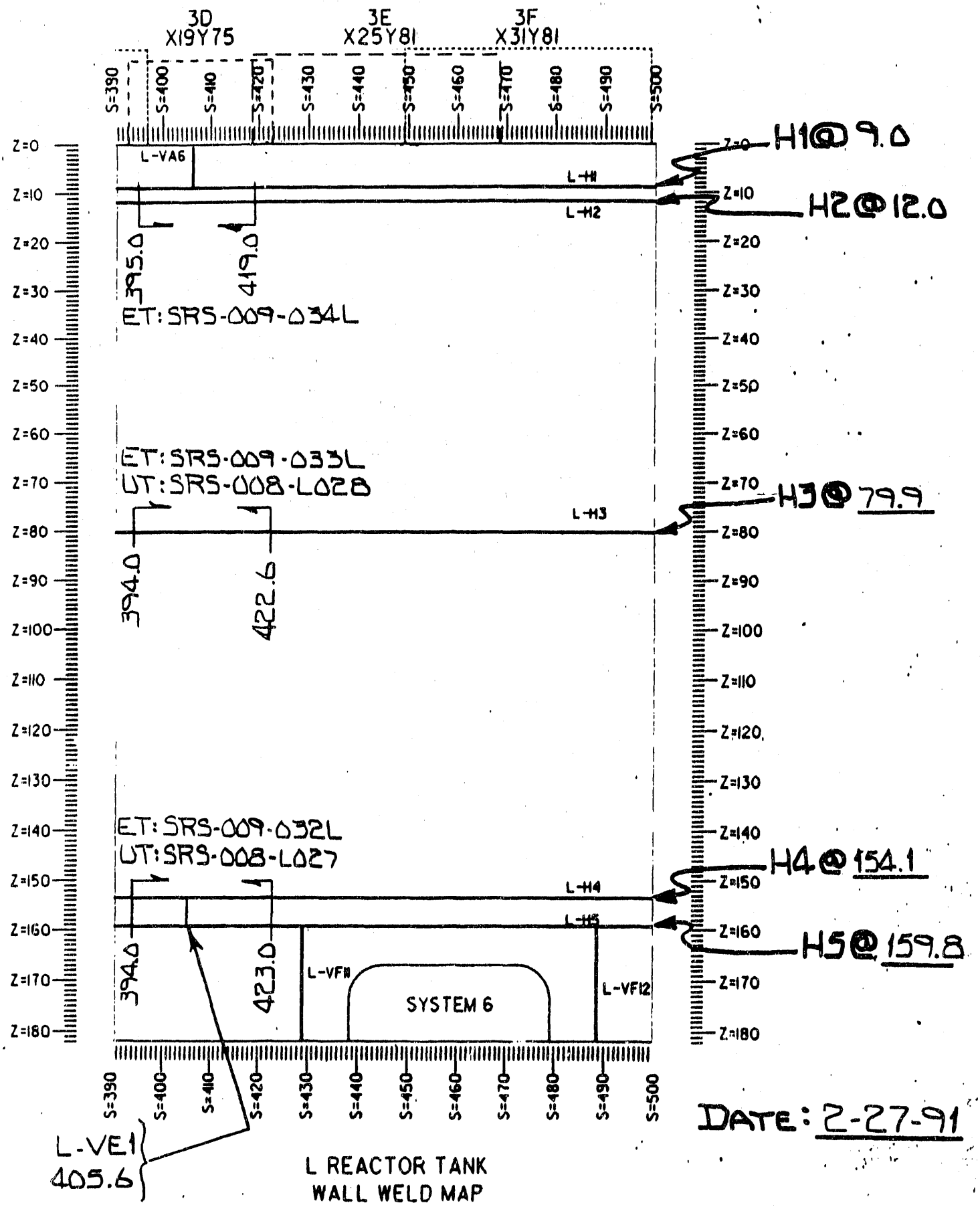
REPORTED BY:

Signature/Date: JM Morrison 2/27/91

IRC REPORT CONTINUATION PAGE | PAGE 3 OF 3

L-VC1 @ 445.9'

PHASE IV



L REACTOR TANK
WALL WELD MAP

DATE: 2-27-91

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 17 Date: 3-1-91 Location: 704-L

MEMBERS in ATTENDANCE

NAME Print	Signature	Organization
J. M. MORRISON	J M Morrison	RRD IRC CHAIRMAN
E. G. CAVENESS	E G Caveness	EES/RTIP
C. D. COWFER	C D Cowfer	RE
D. R. KETCHAM	D R Ketcham	RE
E. J. MAJZLIK	E J Majzlik, Jr	EES/MAT
G. I. Butler Jr. ~~J. L. JIMENEZ~~	G I Butler	ROD
W. C. COLLINS	W C Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-035L, -036L, -037L, -LXR

Ultrasonics: SRS-008-L029, -L030, -L031

Relevant Indications Reported: Yes____ No ✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No ✓ NCR Ident:_____

IRC REPORT FRONT PAGE		PAGE 1 OF ____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 17 **Date:** 3-1-91 **Location:** 704-L

COMMENTS

Sector 3E:

Bottom Window:

L-VF11 - Clean, nothing to report. Scanned about 12".

L-H5: ARAs - no ~~[illegible]~~ surface, 2 FS. ~~about 5 spots only~~; FS - one about 2.5" long, typical of lug removal, other is ~0.5" spot; no measurable depth. No evidence of weld repairs

L-H4: 6 NS, 3 FS ARAs. Longest is ~1." all types of orientation. No significant reflectors, no repairs.

ET: weld location scans only

Middle Window:

L-H3: 2 FS ARAs, one 1.5," other is 1.7" long on lower side of weld.

L-VC1, upper vertical weld: Very clean, NO ARAs

ET: weld location only.

Top Window: L-VC1 - clean. Evidence of beam redirection or mode conversion, from geometric effects, over upper section of weld, visible from scanning in one direction only; no significance.

ET: Scanned L-H1, L-H2 - NRI. Located VB6 at S=459.2"

Special scan, -009 - LVC: (assumed cold work repair area) - Appears that this, not L-VC3, is the area of cold -

REPORTED BY:

Signature/Date: JM Morrison 3/1/91

IRC REPORT CONTINUATION PAGE		PAGE 2 OF 3

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 17 **Date:** 3-1-91 **Location:** 704-L

COMMENTS

work repair. Scanned 6" either side of L-VC1, down to Z = ~64". Scans show the weld is peaked up on the inside, and the surface is slightly depressed on either side, constituting some evidence that this is the cold worked repair area (one of them). See copy of V. Cech's diagram showing profiles. This geometry could also help explain the UT results.

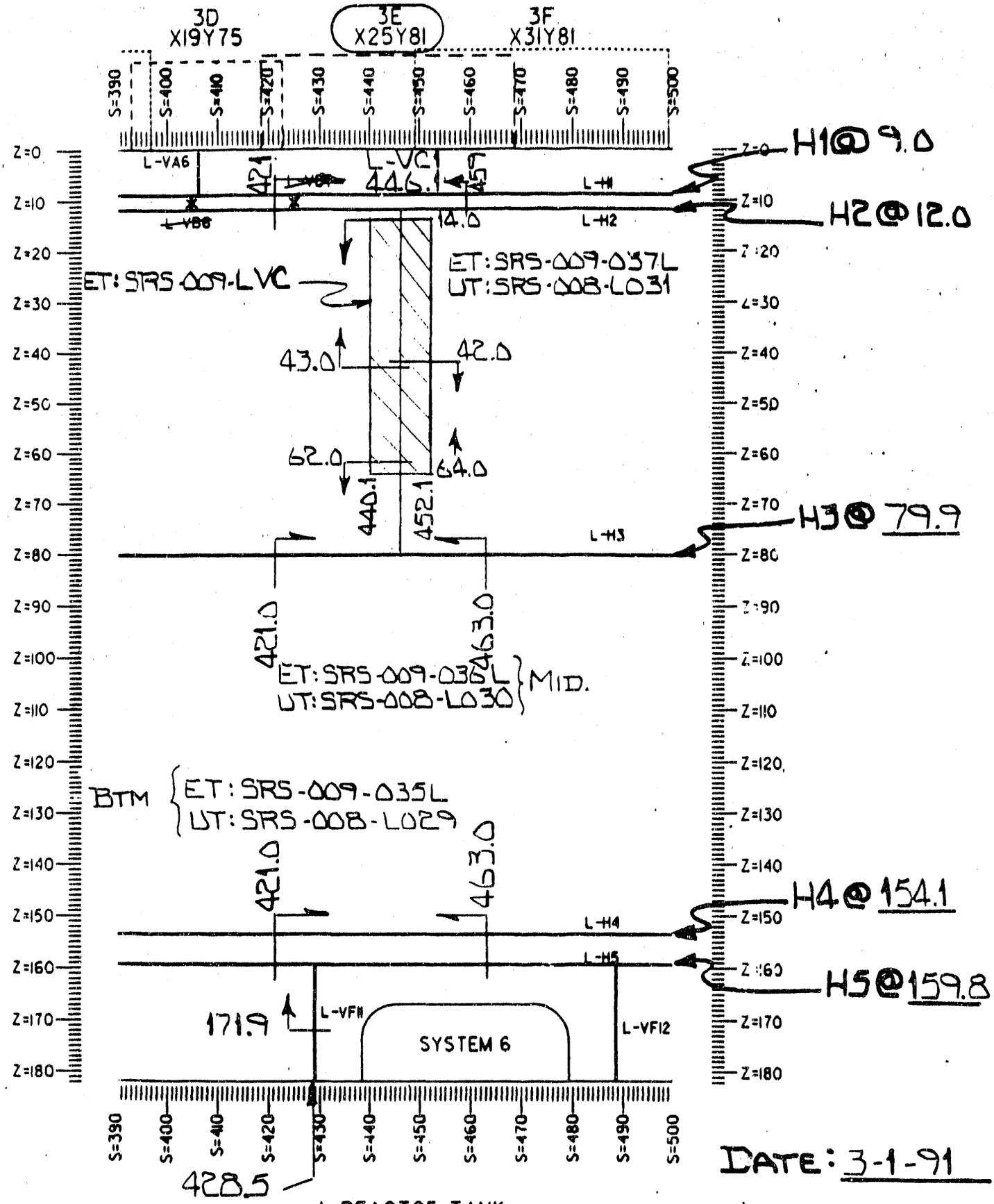
ET Scanning of L-H1 and L-H2 again showed some rough spots causing transducer "chattering" in one direction only. Appears to be a result of mechanical limits of robot performance at edges of windows.

Bottom line: No evidence of degradation.

REPORTED BY:
Signature/Date: J M Morrison 3/1/91

IRC REPORT CONTINUATION PAGE		PAGE 3 OF 3

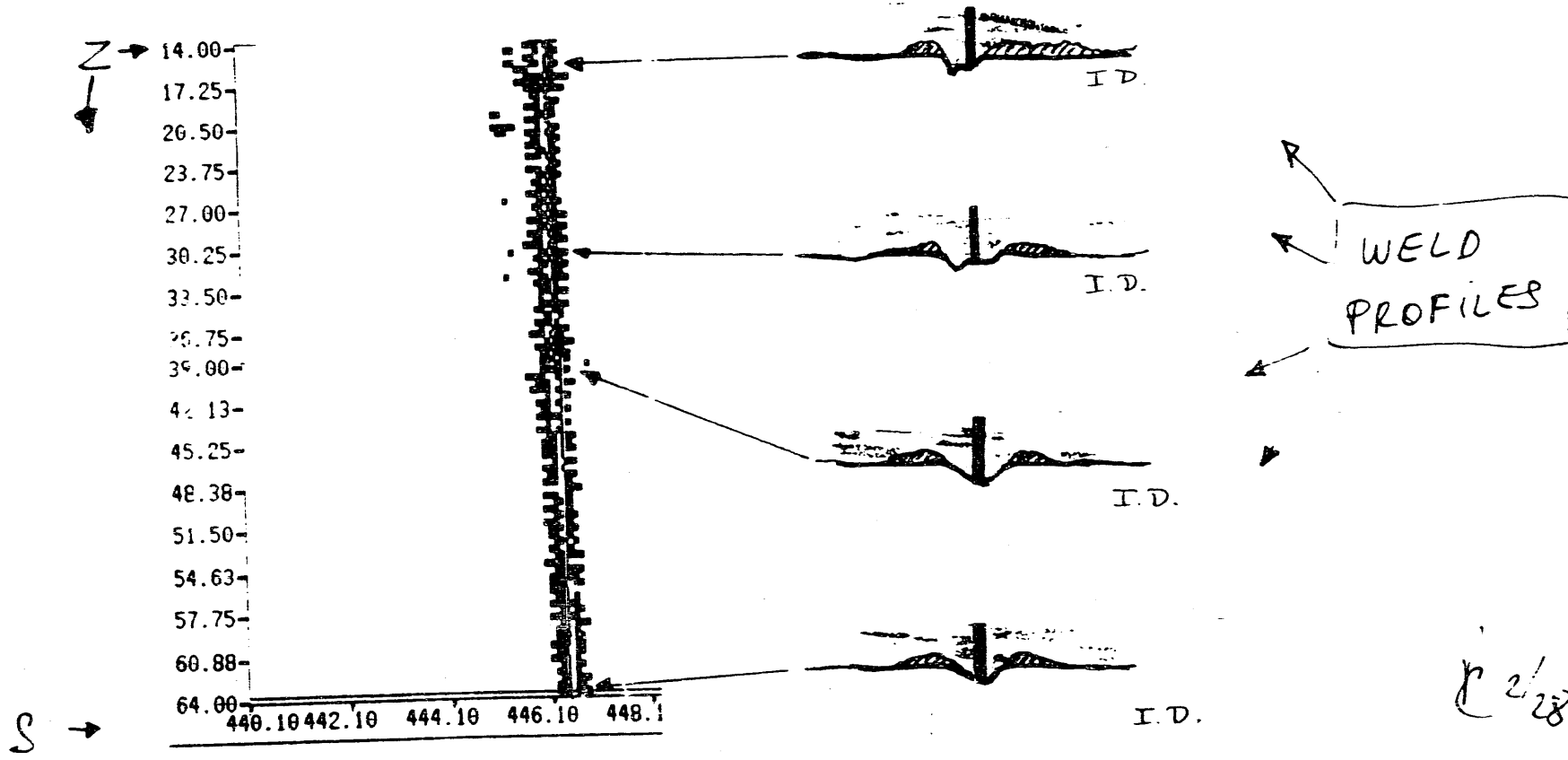
PHASE IV



DATE: 3-1-91

L REACTOR TANK
WALL WELD MAP

3-E VC-1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51.50
54.63
57.75
60.88
64.00
440.10
442.10
444.10
446.10
448.1
S
I.D.
I.D.
I.D.
I.D.
R
WELD PROFILES

2/28/91

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 18 Date: 3/7/81 Location: 704-L

MEMBERS in ATTENDANCE

NAME Print	Signature	Organization
773-56A. J. M. MORRISON		RRD IRC CHAIRMAN
E. G. CAVENESS	E G Caveness	EES/RTIP
C. D. COWFER		RE
D. R. KETCHAM	D R Ketcham	RE
E. J. MAJZLIK	E J Majzlik	EES/MAT
J. L. JIMENEZ		ROD
W. C. COLLINS	W C Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current:	Ultrasonics:
SRS-009-038-L, -039, -040, -BM-32	SRS-008-L-032, -033, -034,

Relevant Indications Reported: Yes____ No ✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No ✓ NCR Ident:_____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 18 **Date:** 3/7/91 **Location:** 704-L

COMMENTS

DATA PACKAGES FROM PHASE IV, SOCTOR 3F.

LOWER WINDOW:

L-VF12: Z = 160.7 TO 172.2 SCANNED. ONE ARA ON NOMR SURFACE. WELD DEPOSIT BY ET (S=491.6; Z=163.5). DIAMETER WAS 0.6-0.7". No REPORTABLE INDICATIONS.

L-H5: ONE NOMR SURFACE ARA (S=484; Z=165.5) APPROXIMATELY 06-0.7" DIAMETER. ET SHOWS WELD DEPOSIT. No REPORTABLE INDICATIONS.

L-H4: FAR SURFACE INDICATIONS (5). (S=467, S=468 & Z=152) = VERTICAL ORIENTATION & - 1½" Long; (S=473.5 - 476.; S=152) = Horizontal & 2.5" Long; (S=464.5 & Z=155) = VERTICAL ORIENTATION & 1.1" Long; (S=469.2; Z=154.9) = VERTICAL ORIENTATION & = 2" long. (S=483.5, Z=153.5) = Angled & - 0.6" Long; No MEASURABLE depth TO ANY of THE 5 INDICATIONS. Concluded THEY ARE ARA's. ALSO 3 NOMR SURFACE INDICATIONS: (S=462, Z=156.8) = SURFACE irregularity 0.7" Long SPOT - (S=487, Z=153.3); ARA = (S=494, Z=155) VERTICAL & 1½" Long. No REPORTABLE INDICATIONS FOR L-H4.

ET WELD LOCATION SCANS ONLY IN LOWER WINDOW.

MIDDLE WINDOW: ~~SRS~~ -008 - L033 & - L033A

L-H8: THREE FAR SURFACE INDICATIONS. ARA'S AT (S=463.5, Z=81.6), (S=478, Z=81.6), (S=479.5, Z=81.6) ALL LESS THA ½" DIAMETER. No REPORTABLE INDICATIONS.

ET WELD LOCATION SCANS ONLY.

REPORTED BY:

Signature/Date: E. M. Gaskill Jr 3/7/91

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 18 Date: 3/7/91 Location: 704-L

COMMENTS

TOP WINDOW: SRS-009 – 040L

L-H1 AND L-H2: MOTION DETECTOR BRACKET (S= 461 – 465). S= 465.5 – 497 WAS SCANNED (Z= 9-12). NO REPORTABLE INDICATIONS. NO VERTICAL WELDS.

BASE METAL SCAN: SRS-009 – ~~BM I 3F~~ BM-

AREA FROM S= 461 – 497.5 AND Z= 15 – 64 FOR possible deformed AREA. ON 1/2" WIDE grids. Only minor weld (S= 465.8, Z= 15.5 – 18.0) AND Lift-off SIGNALS near BRACKET. ANOTHER SPOT of surface irregularity (S= 472.8 AND Z= 35) ABOUT 5" VERT AND 1.5" IN HORIZONTAL APPEARS TO BE DENT OR gouge. Very shallow. Nothing visible by CCTV EXAM. AN AREA (S= 494; Z= 42) ABOUT 3" VERTICAL AND 2" Horizontal shallow INDENTATION. No clear evidence of significant deformation in THIS AREA. No REPORTABLE INDICATIONS IN THIS AREA.

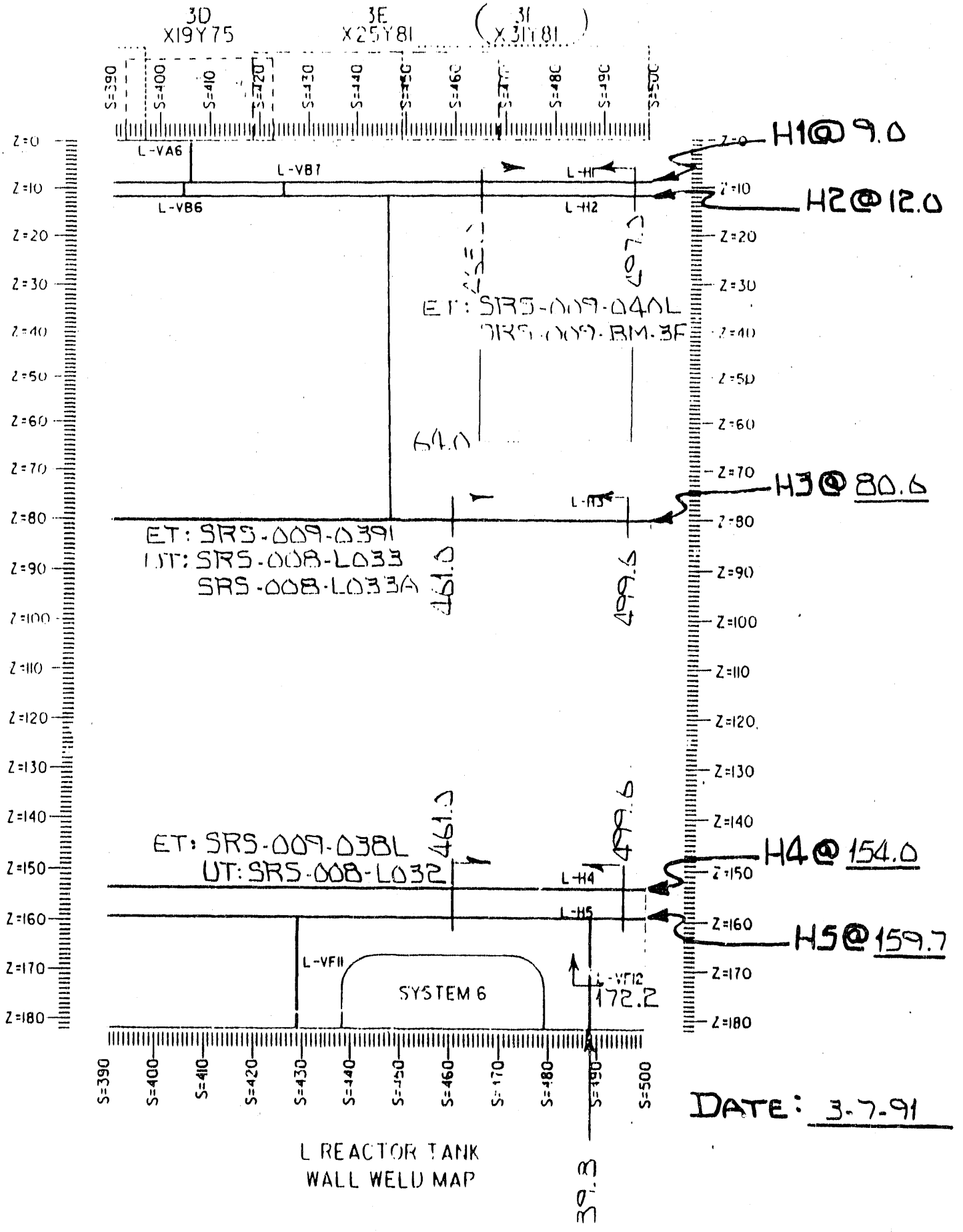
THIS CONCLUDES INSPECTION of PHASE IV.

REPORTED BY:

Signature/Date: E. M. Maglich, Jr. 3/7/91

IRC REPORT CONTINUATION PAGE | | PAGE 3 OF 3

PHASE IV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3E
X25Y81
3I
X31Y81
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S=400
S=410
S=420
S=430
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S=450
S=460
S=470
S=480
S=490
S=500
Z=0
Z=10
Z=20
Z=30
Z=40
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Z=170
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L-VA6
L-VB7
L-VB6
L-H1
L-H2
L-H3
L-H4
L-H5
L-VF11
L-VF12
SYSTEM 6
ET: SRS-009-040L
ET: SRS-009-038L
UT: SRS-008-L032
ET: SRS-009-039L
UT: SRS-008-L033
SRS-008-L033A
64.0
461.0
49.6
172.2
H1@9.0
H2@12.0
H3@80.6
H4@154.0
H5@159.7
DATE: 3-7-91
L REACTOR TANK
WALL WELD MAP

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 19 Date: 3/22/91 Location: 704-L

MEMBERS in ATTENDANCE

NAME Print	Signature	Organization
J. M. MORRISON	J M Morrison	RRD IRC CHAIRMAN
E. G. CAVENESS	McLeod for E G CAVENESS	EES/RTIP
C. D. COWFER	C D Cowfer	RE
D. R. KETCHAM	—	RE
E. J. MAJZLIK	E J Majzlik, Jr	EES/MAT
H. HICKS	Heather Hicks	ROD
W. C. COLLINS	W C Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-0411, -0422, -0431 Ultrasonics: SRS-008-L034, -L035

Relevant Indications Reported: Yes____ No ✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No ✓ NCR Ident:_____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 19 **Date:** 3/22/91 **Location:** 704-L

COMMENTS

Sector 2C:

Bottom window: L-H5 - no features of significance.

L-VF6 - one NS ARA (spot, Rx long Ph)

L-H4 - evidence of weld repair on OB, probable thermal repair, based on visual appearance on ± D, 6-7" long

2 NS, 3 FS ARA's. NS: S=191.3", Z=155.7",

S=191.5", Z=151.6" ("spots")

FS: S=163.5", Z=151" (L-shaped, 1"x0.8");

S=163.2", Z=154.2", ~ ≥ 3" long

S=159.5", Z=151.6", ~ 4 1/2" long

All are low amplitude.

ET - Weld location scans; Considerable oxide around system 3 nozzle. Verification scans of several weld spots, found no indications of surface breaks.

Middle Window: L-H3 - nothing of significance

ET - nothing of significance

Top Window:

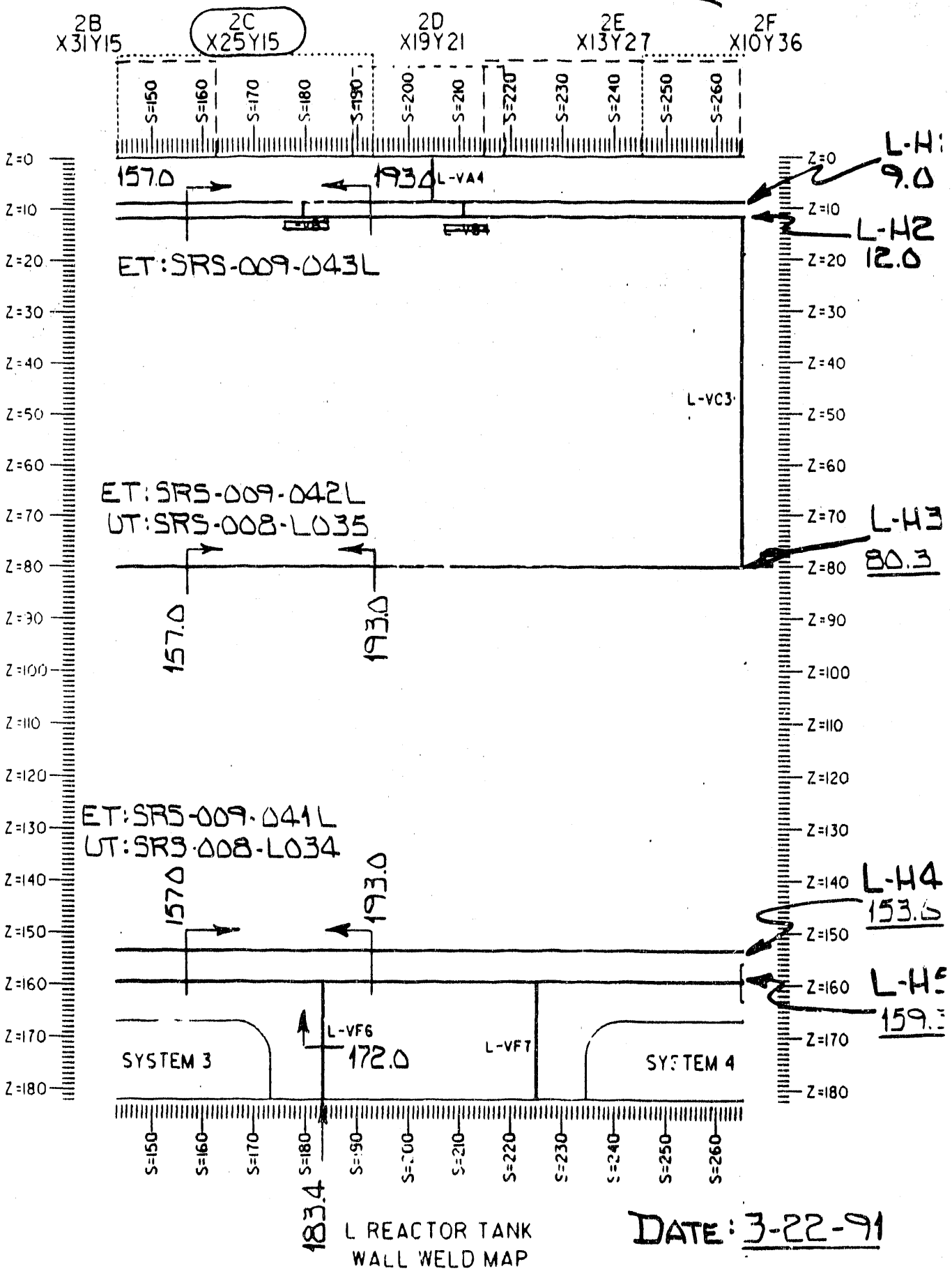
L-H1, L-H2 - clean; no vertical welds.

Summary: No reportable indications, no embedded reflectors.

REPORTED BY:

Signature/Date: J M Morrison 3-22-91

PHASE V



L REACTOR TANK
WALL WELD MAP

DATE: 3-22-91

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 20 Date: 3/25/91 Location: 704-L

MEMBERS in ATTENDANCE

NAME Print	Signature	Organisation
J. M. MORRISON	J M Morrison	RRD IRC CHAIRMAN
E. G. CAVENESS	E G Caveness	EES/RTIP
C. D. COWFER	C D Crowfer	RE
D. R. KETCHAM		RE
E. J. MAJZLIK	E J Majzlik, Jr	EES/MAT
P.J. Svoboda	Paul J Svoboda	ROD
W. C. COLLINS	W C Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current:	Ultrasonics:
SRS-009-0441-0461, 0471-0491	SRS-008-L036-L037, L038, L039

Relevant Indications Reported: Yes____ No____
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No____ NCR Ident:_____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 20 **Date:** 3/25/91 **Location:** 704-L

COMMENTS

Sector 2D:

Lower window: L-H5 - Clean, no reflectors ID or OD

L-H4 - reflector at edge already reported in Sector 2C

NS - 2 ARA's - S = 216.4" Z = 154.1" vertical, ~1.5" long; S = 213" Z = 154, vertical, ~0.8" long,

Sidewall LOF, 2.6" long, upper side of L-H4, from S = 212" to 214.6", no connection to OD surface, ~0.10" beneath OD surface, < 0.10" thru-wall (probably ~0.30"), no evidence of weld repair in this area. (See indication report sheet in data package).

(CET weld location only)

Middle Window:

L-H3 - 2 NS, 1 FS ARA's. The 2 NS ARA's are opposite each other on either side of weld, called "spots." (S = 194.5" Z = 78.9" & 81.3")

Another NS ARA at S = 196.1, Z = 78", a spot.

FS: 2 ARA's, vertical, 0.7" long; S = 213.8, Z = 78", S = 215.9", Z = 78.2"

ET - nothing but weld location

Top Window: Scanned S = 191" - 218". No flaws, no ARA's, no vertical welds between L-H1 and L-H3

No evidence of weld repairs in this sector.

REPORTED BY:

Signature/Date: J M Morrison 3/25/91

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 20 **Date:** 3/25/91 **Location:** 704-L

COMMENTS

Sector 2E:
Bottom window:
L-VF7: 2 NS areas of weld deposits - S=229.2", Z=160", & S=225.7", Z=161.9" slight vertical orientation (~0.7") - either ARA or possible cosmetic weld repair; confirmed by ET as weld metal.
L-H5: One FS ARA (S=223.1", Z=160.8")
L-H4: One NS ARA & 3 FS ARAs:
(NS - S=217.5, Z=155.4, Vertical, 1.8" long)
(FS - S=234.5, Z=155" spot)
(FS - S=246.8, Z=151.4, horiz., 1.5" long)
(FS - S=247.7, Z=150.8, 0.7" dia. spot)
ET - nothing to report, only weld location scans
Middle: L-H3: Several areas of surface irregularities. One is ~1.1" dia. next to bedge (toe) of weld (upper side)
ET - weld is more irregular than "normal". Actual dimension more like 1.3" x 1.0". Low amplitude signals. Area is depressed - possibly a result of grinding (considerable grinding in this area)? S=230.5-231.8; Z=78.5". Three other minor spots, same thing, 0.20 to 0.25" in dia. Grinding undoubtedly done to accomplish some type of repair, presently unknown. Contains some weld metal.

REPORTED BY:
Signature/Date: J M Morrison 3/25/91

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 20 **Date:** 3/25/91 **Location:** 704-L

COMMENTS

Top window: S = 217" to S = 248"

(ET) At S = 246" area of surface imperfection, a low spot ~1.25" long (not weld metal), < 0.5" wide, vertical orientation. Possibly an area where attachment was removed and ground. Termed a "slight concavity."

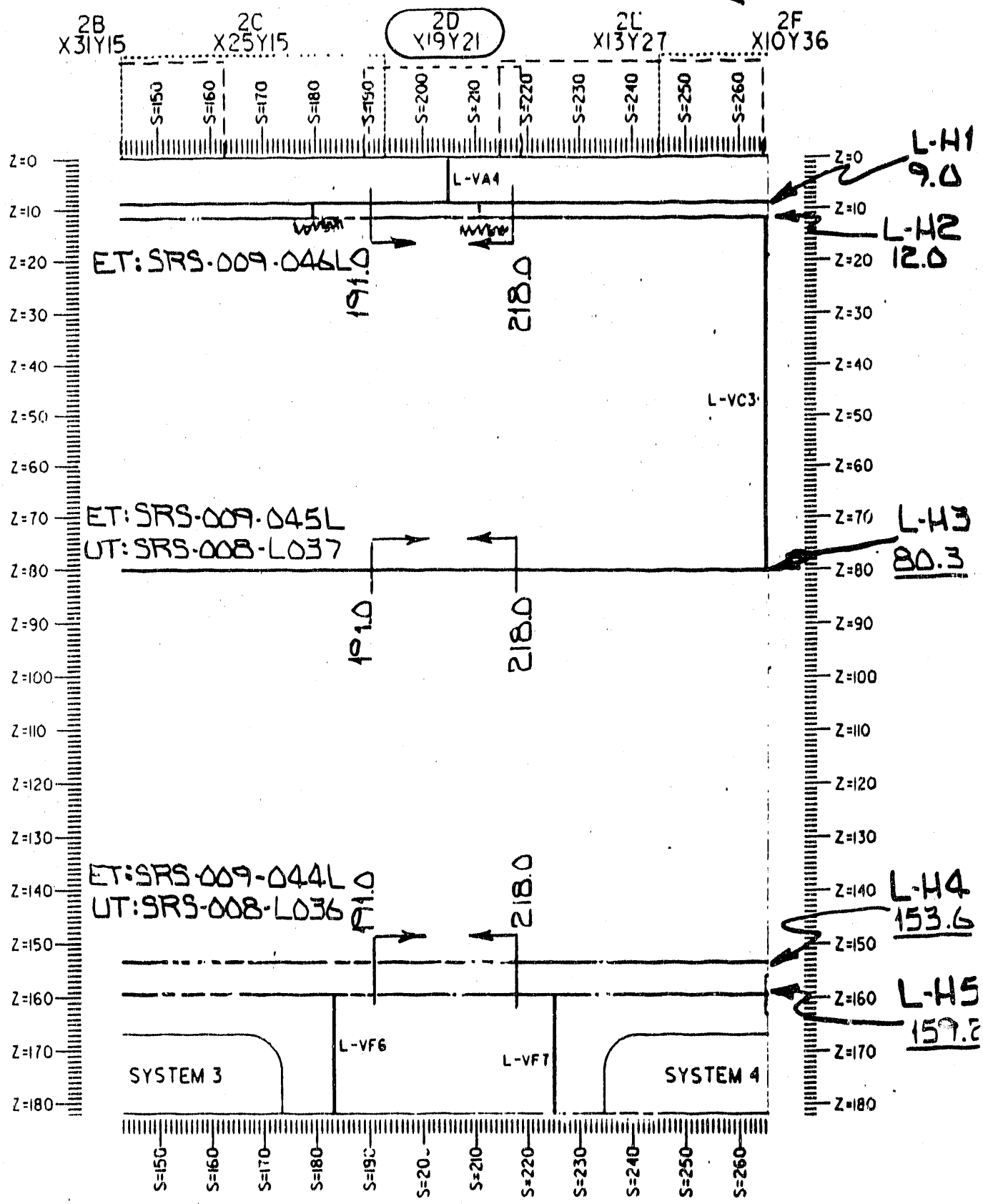
Also at S = 236", Z = 9" to 9.25" - a similar area about 0.5" long. No vertical welds between H1 and H2. ← Again, some evidence of grinding.

REPORTED BY:

Signature/Date: J M Morrison 3/25/91

IRC REPORT CONTINUATION PAGE		PAGE 4 OF 4

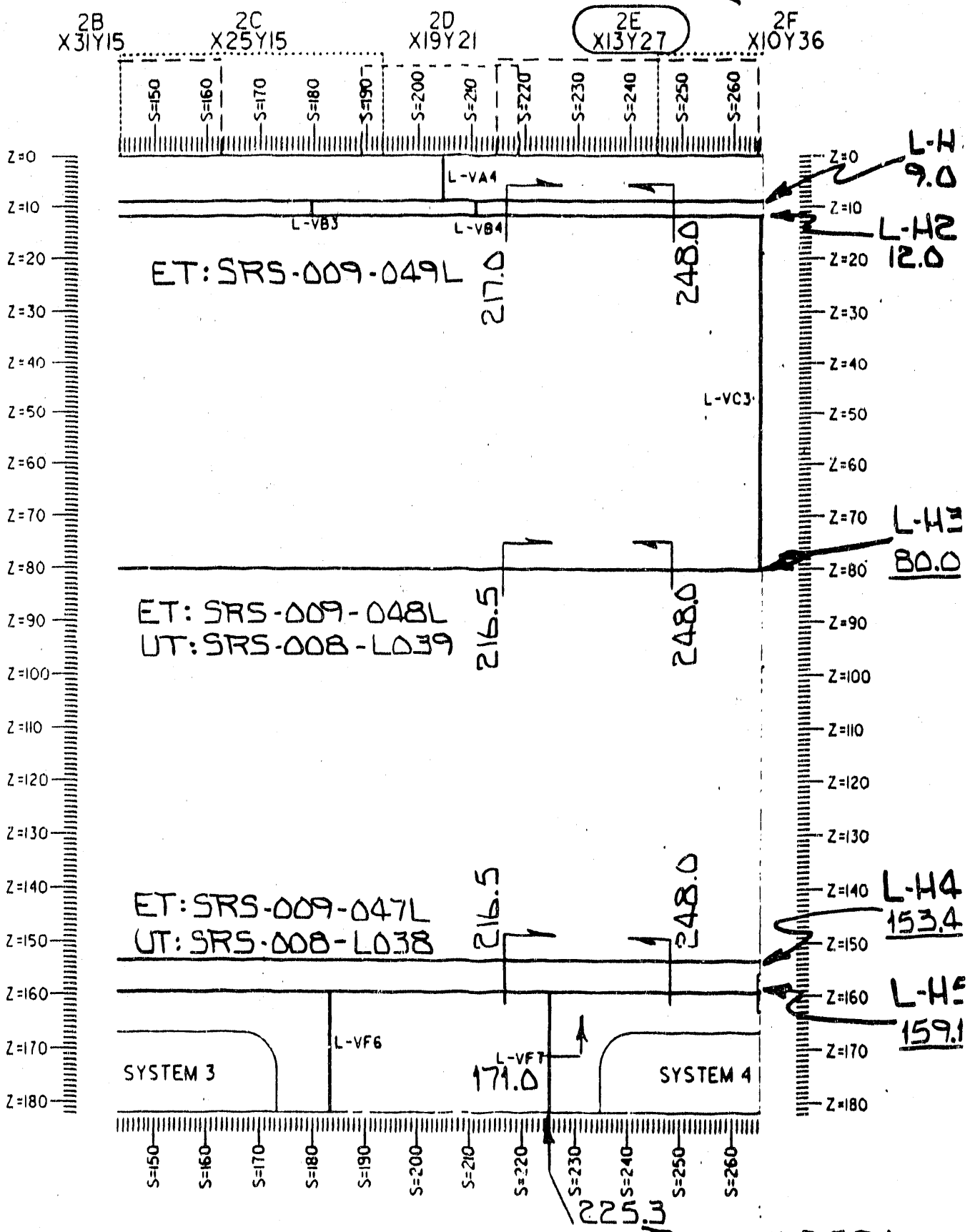
PHASE V



L REACTOR TANK
WALL WELD MAP

DATE: 3-25-91

PHASE V



L REACTOR TANK
WALL WELD MAP

DATE: 3-25-91

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 21 Date: 4-11-91 Location: 704-L

MEMBERS in ATTENDANCE

NAME		
Print	Signature	Organization
J. M. MORRISON	J M Morrison	RRD IRC CHAIRMAN
E. G. CAVENESS	E G Caveness	EES/RTIP
C. D. COWFER	C D Cowfer	RE
D. R. KETCHAM	D R Ketcham	RE
E. J. MAJZLIK	E J Majzlik, Jr	EES/MAT
H. Hicks	H. Hicks	ROD
W. C. COLLINS	W C Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current: SRS-009-050L, 051L, 0526 Ultrasonics: SRS-008-L040, L041

Relevant Indications Reported: Yes____ No✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes____ No✓ NCR Ident:____

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 21 **Date:** 4/11/91 **Location:** 704-L

COMMENTS

Sector ID:
Foreign object jammed in muff bars in System 2 Sector 1E) - resembles safety rod tip.
Lower windows:
L-H5: 5 FS, 1 NS ARA's - several of the FS ARA's may actually be from same original attachment - in other words only 2 or 3 actual attachments Max. dimension 1.8". NS ARA may actually be a surface imperfection rather than ARA - extends into adjacent window (slightly).
L-H4: Weld repair - S=.605" to 612.5", Louver side of weld. Appears to extend nearly thru wall.
5 FS ARA's.
ET - No additional scans. Verified weld repair. Weld up to 1 3/4" wide at location of repair (Normal width 0.5" to 0.75")

Middle Windows:
L-H3 - 2 FS ARA's, 1 NS ARA.
NS: ~1 1/2" long. FS: spots
ET: 2 scans - S=.611" to 2.5" from weld & down 2 inches at request of UT; found slight surface imperfections, oriented vertically.

REPORTED BY:
Signature/Date: J M Morrison 4/11/91

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 21 **Date:** 4-11-91 **Location:** 704-L

COMMENTS

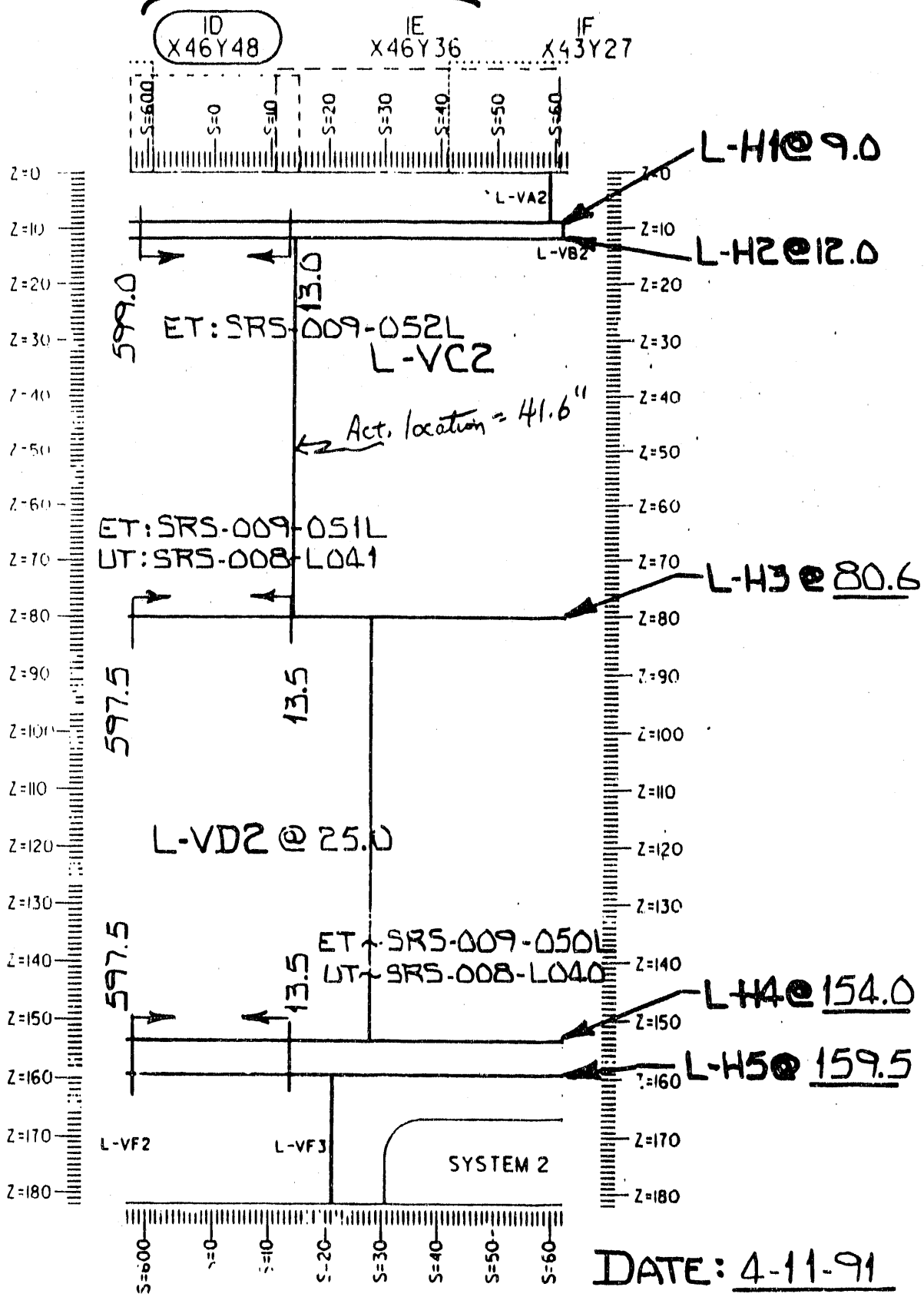
Top Windows: S = 599" to 13", Z = 9" to 12"
Oxide present on expansion ring
No vertical welds present
No reportable indications for L-H1 and L-H2

REPORTED BY:

Signature/Date: J M Morrison 4/11/91

IRC REPORT CONTINUATION PAGE		PAGE 3 OF 3

PHASE VI



I REACTOR TANK
WALL WELD MAP

INSPECTION REVIEW COMMITTEE REPORT

RTIP Procedure 002	Inspection of L Reactor Tank

IRC MEETING: No. 22 Date: 4/18/91 Location: 704-L

MEMBERS in ATTENDANCE

NAME Print	Signature	Organization
J. M. MORRISON		RRD IRC CHAIRMAN
M. W. Loibl for ~~E. G. CAVENESS~~	M W Loibl	EES/RTIP
C. D. COWFER	C D Cowfer	RE
D. R. KETCHAM	D R Ketcham	RE
E. J. MAJZLIK	E J Majzlik, Jr	EES/MAT
H. A. Hicks	H A Hicks	ROD
W. C. COLLINS	W C Collins	QA

INSPECTION REPORTS REVIEWED:

Eddy Current:	Ultrasonics:
SRS-009-0534, -0544, -0552	SRS-008-L042, -L043, -L044

Relevant Indications Reported: Yes___ No ✓
(If "yes", Then report Location and Dimension in 'Comments" Section)

NCR Initiated: Yes___ No ✓ NCR Ident: ___

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 22 **Date:** 4/12/91 **Location:** 204-L

COMMENTS

SECTOR 1B: SES-008-L042 DATA PACKAGE

BOTTOM WINDOW:

L-VF3: 4 NS IRREGULARITIES DETECTED. ARE SPOTS showing NO PENETRATION OF SURFACE. NO REPORTABLE INDICATIONS.

L-H5: 2 FS INDICATIONS of ARA'S. ONE ABOUT 3" LONG (S=13.5, Z=158.1) HORIZONTAL ORIENTATION. SECOND AT (S=19, Z=158) VERTICAL ORIENTATION AND 1" LONG. 1 NS REFLECTOR 1½" LONG horizontal (S=12.2, Z=158.6). NO REPORTABLE INDICATIONS.

L-H4: 5 NS INDICATIONS. 4 ARE SPOTS WITH NO DIMENSION. ONE of THOSE IS WELD DEPOSIT AT END of LONGITUDINAL SEAM. 3 FS INDICATIONS. LARGEST IS 7/10" LONG IN LONGITUDINAL DIRECTION (S=18.7, Z=152.7). OTHER 2 are SPOTS. NO REPORTABLE INDICATIONS.

L-VD2: LONGITUDINAL SEAM IS LOCATED AT S=24.2. 2 NS ARA'S (S=22.9, Z=143.5; S=23.2, Z=139.4). ONE VERTICAL IS 1½" LONG AND THE SECOND IS A SPOT. NO evidence of SURFACE BREAK. POSSIBLE WELD SEAM REPAIR AT SEVERAL PLACES ON THIS SECTION of L-VD2. NO evidence of SURFACE DISTORTION ADJACENT TO SEAM. 1 NS & 1 FS INDICATION IN UPPER SECTION of weld SEAM. (S=23.3, Z=131.4; S=26.2, Z=118.4). THESE ARE VERY SMALL SPOTS less THAN 1" IN diameter. NO REPORTABLE INDICATIONS.

SIX UT VERIFICATION SCANS BY GT WERE PERFORMED IN THIS WINDOW

REPORTED BY:

Signature/Date: E J Mazzeth Jr 4/12/91

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 22 **Date:** 4/12/91 **Location:** 704-L

COMMENTS

2 on H4, 2 on H5, and 2 on L-UD2. No Reportable indications. Mapped US areas previously discussed. ET weld location scans otherwise.

Middle Window SB 008 -L043

L-UD2: 1 US irregularity and 1 FS area 2" long and horizontally oriented. (S=25, Z=106.1, S=25.2; Z=83). No Reportable indication. No evidence of surface distortion adjacent weld.

L-H3: 3 US reflectors. Area (S=40.5, Z=82.3) 2" long and vertical. Spot at (S=29.5, Z=82.9). Spot 2" long (S=25, Z=78.6) which is a wide weld too. No Reportable indications.

1 FS (S=34, Z=86.1) reflector same as seen on L-UD2 scans. NRI

L-UC2: Slight weaving of weld seam noted. Possible weld repair areas at (Z=63-67) & (Z=75-77). 1 US area (S=44.1, Z=25.1) about 0.8" long. 1 Spot on FS (S=42.6, Z=67.8). No Reportable indications.

ET: 3 verifications scans on L-H3. Detected 1 US area and 2 areas of irregular weld contour on L-H3. Weld width between L-UD2 & L-UC2 is wider than normal. No Reportable indications.

Base Metal Scan: No Reportable indications. 1 area on US (S=36.2, Z=74).

REPORTED BY:

Signature/Date: E J Mazlack 4/12/91

INSPECTION REVIEW COMMITTEE REPORT
(CONTINUATION)

IRC MEETING: No. 22 **Date:** 4/12/91 **Location:** 704-L

COMMENTS

Upper Window: (SRS-008-L044)

L-VC2: 2 FS ARA's noted (S=40.2, Z=51.5; S=39.6, Z=35.8). Irregular width of weld seam noted. No reportable indications. ET shows weld width variation.

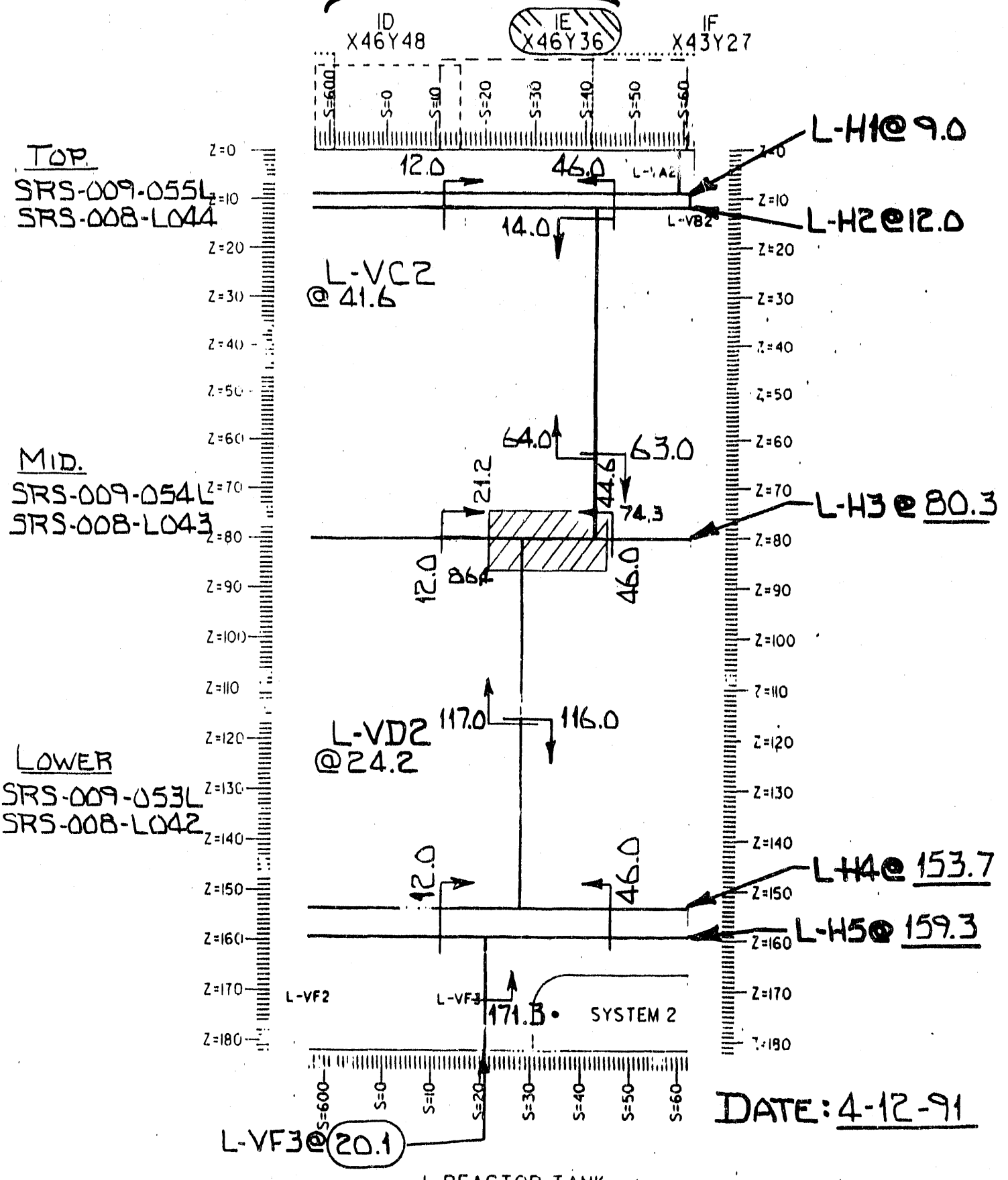
L-H1 and L-H2: Weld location scans and flaw detection scans performed. No vertical welds, ARA's or flaw indications detected. No reportable indications.

This concludes the Phase VI inspection and the L-Tanks inspection.

REPORTED BY:

Signature/Date: E J Mazzeh 4/12/91

PHASE VI



DATE: 4-12-91

L REACTOR TANK
WALL WELD MAP

Appendix B

RTIP Procedures

PROCEDURE TITLE	PRO. NO.	STATUS	AUTHOR	DRAFT/DUE
FIELD INSPECTION	Rev. 0 RTIP 001	8/24/89 APPROVED	LOIBL	JUN 26,89
DATA COMMUNICATION	Rev. 0 RTIP 002	8/24/89 APPROVED	FRENCH	JUN 22,89
DOCUMENT CONTROL	Rev. 1 RTIP 003-1	8/24/89 APPROVED	BRAGAN	
RECORDS CONTROL	Rev. 1 RTIP 003-2	8/24/89 APPROVED	BRAGAN	
INSTS.,PROC.,& DWGS.	Rev. 2 RTIP 003-3	1/24/90 APPROVED	BRAGAN	
NDE CONTROL	RTIP 003-4	COMBINED RTIP 008	MCKAIG	MAY 19,89
MATERIAL CONTROL	Rev. 1 RTIP 003-5	8/24/89 APPROVED	BRAGAN	
TELE ZOOM LENS OP	Rev. 0 RTIP 004	11/17/89 APPROVED	TURNER	MAY 19,89
OVERHD. CR.& TOOL ERT	Rev. 1 RTIP 005	1/18/90 APPROVED	PAK	JUL 21,89
MOBILE CNTRL. TRA.	Rev. 0 RTIP 006	8/22/89 APPROVED	SAMBORSKY	JUN 27,89
CBL. HK-UP & CK-OUT	Rev. 1 RTIP 007	1/18/90 APPROVED	SAMBORSKY	JUN 26,89
ULTRASONIC EXAM.	Rev. 2 RTIP 008	1/09/90 APPROVED	HOWARD	MAY 19,89
EDDY CURRENT EXAM.	Rev. 1 RTIP 009	1/09/90 APPROVED	CECH	MAY 19,89
INSP. TOOL MAINT.	Rev. 1 RTIP 010	1/18/90 APPROVED	PAK	JUL 24,89
CAM & AUDVIS EQUIP OPER.	Rev. 1 RTIP 011	1/18/90 APPROVED	KILLIAN	JUL 24,89
TOOL PLACEMENT	Rev. 1 RTIP 012	1/18/90 APPROVED	PAK	JUL 21,89
AIR COMPRESSOR AND AIR STATION OPERATION	Rev. 0 RTIP 013	8/28/89 APPROVED	PATTERSON	
ROBOT OPERATION	Rev. 1 RTIP 014	1/18/90 APPROVED	PARKS	JUL 19,89
QUALITY IMPROVEMENT	Rev. 1 RTIP 015	4/09/90 APPROVED	KIDDEY	SEPT 11,89
SOFTWARE UPDATE	Rev. 0 RTIP 016	11/30/89 APPROVED	PARKS	

STATUS 6/18/90

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