united engineers & constructors inc.
30 South 17th Street
Post Office Box 8223
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SPECIFICATION

FOR

STRUCTURAL INTEGRITY TEST (SIT)

FOR

PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE

SEABROOK STATION

UNIT NO. 1

Revisions						
No.	Date	Prep. By	Checked By	Q/A	Approved By	
1	11/1/85	ARS	KCB	GJM	KMK	DJS
2	3/10/86	ARS	KCB	GJM	KMK	DJS
3	6/12/86	ARS	KCB	GJM	KMK	DJS
4						
5						

Specification No.: 9763.006-5-5

Date: December 22, 1983

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The undersigned certifies that the information in this specification complies with the Subarticle CA-3360 of the ASME Boiler and Pressure Vessel Code, Section III, Division 2.

K.M. Kalawadia 12-27-83
PE Date

THE STATE OF NEW HAMPSHIRE
K. M. KALAWADIA
No. 5004
REGISTERED PROFESSIONAL ENGINEER

INDEX OF ECA/DCN CHANGES

SPECIFICATION NO. 9763.006-5-5

DOCUMENT NO.	AFFECTED SECTION
REVISION - 3	
ECA 01/807483B	8.5

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GENERAL INFORMATION

Owner

Public Service Company of New Hampshire, et al.
1000 Elm Street
Manchester, New Hampshire 03105

Engineering Supervisor

Yankee Nuclear Services Division (YNSD)
1671 Worcester Road
Framingham, Massachusetts 01701

Engineer - Constructor

United Engineers & Constructors Inc.
30 South 17th Street
P.O. Box 8223
Philadelphia, Pennsylvania 19101

Construction Managers

United Engineers & Constructors Inc.
30 South 17th Street
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Philadelphia, Pennsylvania 19101

Site Location

Seabrook Station
Approximately 6000 Feet East of Seabrook, NH
at termination of Rocks Road

Description

The Seabrook Station is a two-unit nuclear plant. Each unit is rated at 1200 MWe and includes a four-loop PWR and a tandem compound, six-flow turbine-generator. The Structural Integrity Test (SIT) for Unit 1 is performed to demonstrate that the Containment responds in an acceptable manner to the specified internal test pressure of 115% of the design pressure.

The Integrated leak rate test (ILRT) will be conducted by others in conjunction with the SIT and will be performed after SIT peak pressure but prior to completing depressurization. It is expected that the ILRT will start at 39 psig SIT plateau and will take approximately 72 hours to complete.

1.0 SCOPE

1.1 Purpose of Test

The purpose of the SIT is to demonstrate the structural integrity of the Unit 1 Containment to withstand the postulated pressure loads in conformance with Appendix A of 10CFR50. In order to demonstrate the structural integrity, the Containment will be subjected to increments of pressure up to the maximum test pressure of 60 psig (115% of the 52 psig design pressure). The SIT shall be performed in accordance with USNRC Regulatory Guide 1.136 (Revision 2) and ASME Section III, Division 2, Article CC-6000 (1980 Edition).

Specific Articles of the ASME Section III, Division 2 are referenced in this Specification as CC-XXXX.

Integrated Leak Rate Test (ILRT) is not within the scope of this specification.

1.2 Unit 1 Information

The Consolidated Edison's Indian Point Unit No. 2 and Washington public power supply system Unit No. 1 are the prototypes for this test. The PSNH Seabrook Station Unit 1 Containment is a non-prototype Containment as defined in CC-6212.2.

The Containment is shown on Figure 1 and General Arrangements are shown on Figure 2 of this Specification. An enclosure building covers the containment and has a similar geometry.

1.3 Work Included

The Contractor shall furnish all management, consultation, quality assurance, inspection and test personnel, supervision, labor, tools and equipment required to furnish, deliver, unload, install and monitor instrumentation and data acquisition system for the SIT. The work covered by this specification shall include, but is not necessarily limited to, the following:

1.3.1 Prepare a Test Plan which will include all procedures.

1.3.2 Prepare instrument plan drawings, instrument support detail drawings and equipment layout drawings.

1.3.3 Prepare installation procedures, including calibration of all contractor supplied instruments and data acquisition checkout.

1.3.4 Make recommendations for the surface preparations of all concrete areas to be mapped.

1.3.5 Furnish and install all instrumentation and data acquisition equipment including connection to wiring, grounding and power cable (see Section 1.4.4).

1.3.6 DELETED

1.3.7 Design, furnish, fabricate, deliver and install all instrument supports (see 1.4.17).

1.3.8 Furnish and install protection for SIT instruments which may be affected by test pressure and humidity in Containment causing damage to instruments or erratic behavior and malfunction.

1.3.9 Furnish consulting services with regard to instrument location, performance of test, including readiness to proceed to next pressure level, interpretation of test data during the test and Final Report.

1.3.10 DELETED

1.3.11 DELETED

1.3.12 Furnish personnel to operate all instrument data acquisition equipment and computerized data conversion equipment during the pretest period, during the SIT and post test period.

1.3.13 Furnish personnel and instruments to map cracks before, during and after the SIT for specified areas (as shown on Figures 6 thru 9 and data recording Sheets A6 thru A9) and additional areas as indentified by engineers from pretest inspection.

1.3.14 Furnish personnel to record all data (including deflection, temperature, pressure and time) during the SIT and post-test periods on data recording sheets as required by the Engineers.

1.3.15 Provide photographs of instruments, data acquisition equipment and all crack mapping areas (at each plateau of mapping) to augment the Test Plan and Test Report.

1.3.16 Maintain a daily log of major activities during pretest, the SIT and post-test periods.

1.3.17 Furnish all expendable material, i.e., paper, writing and marking supplies etc.

1.3.18 Provide a quality assurance and control program and organization to meet the requirements of QAS-1, ANSI and the ASTM Codes.

1.3.19 Prepare a preliminary documentation package at completion of the test and before leaving the site.

1.3.20 Demobilize, including removal of all instrumentation, equipment and material.

1.3.21 Prepare a final test report as required by ASME III, Division 2.

1.3.22 Installation of all temporary support stands for displacement instruments with limited assistance from UE&C construction.

1.4 Related Work by Others

1.4.1 All accessibility for installation, calibration and removal of instrumentation and data acquisition equipment.

1.4.2 Platforms for mapping and monitoring concrete exterior cylinder and dome during the SIT.

1.4.3 Enclosed data acquisition area and maintenance of an exclusion area.

1.4.4 Furnish and install all wiring, grounding and power cables for Contractor's instrumentation and data acquisition equipment. (In accordance with SIT Contractor's recommendations).

1.4.5 Inspection of interior of containment for equipment protection (other than Contractor's instruments) and structures which may affect or be affected by pressurization of the Containment.

1.4.6 Provide for temporary protection and/or removal of permanent equipment and structures inside Containment and their replacement after SIT.

1.4.7 Provide temperature, pressure and time instrumentation in the Containment and furnish this data for recording.

1.4.8 Provide temperature instrumentation and control outside the Containment within the Enclosure Building and furnish data for recording.

1.4.9 DELETED

1.4.10 Pretest and post test inspection of interior Containment Liner.

1.4.11 DELETED

1.4.12 Pretest and post test concrete containment structure inspection and identification of unusually severe cracks (see Section 1.3.13).

1.4.13 Pressurization and depressurization of the Containment including all equipment and controls.

1.4.14 DELETED

1.4.15 DELETED

1.4.16 DELETED

1.4.17 Provide assistance for installation of all temporary support stands for displacement instruments (in accordance with the SIT Contractor's drawings and under his supervision).

1.4.18 Furnish SIT Test direction, composite test plan, test check-off list and procedure and data recording sheets.

1.4.19 Furnish predicted and acceptable deflections and crack mapping criteria.

1.4.20 DELETED

1.4.21 DELETED

1.4.22 Prepare Containment concrete surfaces of all areas to be mapped (in accordance with SIT Contractor's recommendations).

1.4.23 DELETED

1.4.24 Provide energized power source at 120 Vac outside the Containment (within the enclosure area) and in data acquisition area.

1.4.25 Provide all lighting, heating and ventilation in the Containment before and after SIT and in the annulus area between the Containment and Enclosure Building at all times.

1.4.26 Provide communication (radio and wire headset telephones) from monitoring stations to data acquisition area.

1.4.27 Provide all accessibility including fixed platforms, scaffolding, rigging and the use of the polar gantry crane and polar maintenance crane and the operation thereof.

1.4.28 Reproduction facilities and service for the copying of documentation at the site.

1.4.29 Evaluation of structural behavior of Containment during and after the test.

1.4.30 Final Report (which will include SIT Contractor's Test Report).

2.0 REFERENCE DOCUMENTS

2.1 Drawings

The attached "List of Drawings" includes reference drawings. Reference Drawings serve to supplement all information obtained from the Contractor's site visits as required in the performance of his work.

2.2 Codes, Standards and Specifications

The following codes, standards and specifications shall be considered an integral part of this specification.

2.2.1 American Society of Mechanical Engineers (ASME)

ASME Boiler and Pressure Vessel Code, Section III, Division 2, 1980 Edition, Article CC-6000.

2.2.2 United States Nuclear Regulatory Commission (USNRC)

USNRC Regulatory Guide 1.136, Rev. 2 (1981).

2.2.3 American National Standards Institute (ANSI)

ANSI - N45.2 Quality Assurance Requirements for Nuclear Power Plants.

ANSI - N45.2.2 Packaging, Shipping, Receiving, Storage and Handling of Items for Nuclear Power Plants.

ANSI - N45.2.6 Qualifications of Inspection, Examination and Testing Personnel for Construction of Nuclear Power Plants.

ANSI - C1 The National Electric Code (1978).

2.2.4 Code of Federal Regulations (CFR)

10CFR50 Appendix A-General Design Criteria for Nuclear Power Plants - General Design Criteria 1, Quality Standards and Records - 1971.

10CFR50 Appendix B-Quality Assurance Program Requirements for Nuclear Power Plants and Reprocessing Plants - 1971

2.2.5 U.S. Dept. of Labor, Occupational Safety and Health Administration (OSHA)

OSHA Public Law 91-596 (Code of Federal Regulations 29CFR 1910, 19CFR 1926), (1970).

2.2.6 United Engineers & Constructors Inc.

9763-QAS-1	Quality Assurance Administrative and System Requirements for Nuclear Safety Class Items
9763-MPS-1	Material and Processing Requirements
TP-13*	Technical Procedure for General Requirements for SIT
9763-RM-1	Instructions for Site Management System

* Included for information only.

3.0 GENERAL REQUIREMENTS

3.1 Responsibility

The Contractor is responsible to make recommendations for all instruments and data recording equipment, furnish and install all instruments and data recording equipment as approved by the Test Director and the Engineer, operate all equipment, report the results and observations (in the format acceptable to the Engineer) and provide any explanation/identification of any divergence of actual results from those predicted results furnished by the Engineer related to instrument behavior.

The engineer and the test director reserve the rights to relocate crack mapping areas and displacement measurement areas to suit field conditions.

The Contractor shall prepare the Test Report which will be a part of the Final Report prepared by the Engineer.

3.2 Personnel

The Contractor shall provide experienced, trained test personnel, supervision and senior test engineers at the site during pretest, the SIT and the post-test periods.

A Quality Assurance Manager shall be provided in accordance with ASME III Division 2 and ANSI N45.2 requirements.

All personnel performing inspection, examination, testing and reporting shall be qualified and certified in accordance with ANSI N45.2.6 requirements.

3.2.1 DELETED

3.2.2 DELETED

4.0 INSTRUMENTATION

4.1 Displacements

4.1.1 The Contractor shall furnish and install invar wire, positive displacement instruments and instrument supports to measure displacements/deflections of the concrete cylinder, dome and other locations as shown on the Instrument Location Plan (see figure 3).

4.1.2 Invar wire shall be cold drawn, round wire free of kinks and installed such that true displacement/deflection can be monitored and measured. The Contractor shall submit a material specification of the wire including size, and physical properties including coefficient of expansion, tensile strength and modulus of elasticity for information to the Engineer. A procedure for installation of wires including tension and sag shall also be submitted.

4.1.3 Transducers shall be capable of recording at a minimum of 18 pounds invar wire tension and set to record displacements in accordance with CC-6232.1. The range of instruments shall be determined by the Contractor based on his experience and Code requirements.

4.1.4 Data acquisition equipment shall record or convert displacement/deflections directly to inches.

4.1.5 Dome deflection data measured from diagonals shall be utilized to compute the true vertical deflections of the dome in inches.

4.1.6 Vertical deflections of the top of Containment cylinder relative to the base of the Containment are to be measured from fixed points near the operating floor structure (EL. 25'-0±)on four azimuths. The operating floor structure is isolated from Containment cylinder wall and not affected by the internal pressure. Therefore, the vertical deflection of the top of the cylinder is measured relative to the base of the Containment in accordance with CC-6232(c).

4.1.7 In addition to 4.1.5, the vertical deflection of the apex of the dome is measured by two independent diagonal wires attached to the top of steam generator shield wall at EL. 33'-0.

4.1.8 Deflections measured horizontally across the Containment diameter may be measured at one point and the recorded deflection averaged to determine the radial deflection at each opposite end of the wire in accordance with CC-6232.

4.1.9 Instrument locations for the Containment cylinder and dome may be relocated within one foot of the location shown on the drawing without the Engineer's approval. Instrument locations for the radial measurements at the equipment hatch and personnel air lock may be relocated within six inches of the location shown on the drawing without the Engineer's approval. All other changes in instrument locations shall have the Engineer's approval.

4.1.10 Instrument supports should not be Welded to permanent structures and should not be placed on Welded joints unless otherwise approved by the engineer. Magnetic and any other means of attachment which could adversely affect the reading should not be used. Procedure for attachment should be submitted for approval by the engineer.

4.1.11 The Contractor's test report shall show the precise "as-built" location of these instruments.

4.1.12 Instrument support stands wherever required shall be designed, fabricated and delivered for installation by others. The Contractor shall furnish installation drawings and field supervision. Where anchors are required in interior concrete walls or floors, provision shall be made to allow for location adjustment to clear reinforcing steel.

4.1.13 All displacements/deflections shall be measured and recorded at each pressurization and depressurization plateau.

4.2 DELETED

4.2.1 DELETED

4.2.2 DELETED

4.2.3 DELETED

4.3 Concrete Crack Monitoring

4.3.1 The Contractor shall use a 6X measuring microcomparators or better to measure concrete cracks. The Contractor shall furnish (10) additional microcomparators for the use of others (on a rental basis) during pretest inspection. These will be sent to the Construction Managers in advance for use in training personnel.

4.3.2 The Contractor shall recommend to the Construction Managers the preparation of concrete surfaces to be mapped. A grid system shall be marked on the concrete surfaces to be used in recording on maps at the observation areas and to communicate concrete crack widths and locations to the data acquisition area where similar maps will be marked up by this Contractor. See Appendix A, Sheets A6 thru A9.1.

4.3.3 All concrete cracks 0.01 inches in width or greater shall be mapped and monitored at the preselected areas by this Contractor. Concrete cracks shall be measured and recorded in increments of .001 inches in width and 1.0 inches in length.

4.3.4 The Contractor shall also monitor and map all concrete cracks designated by the engineers as determined from the engineer's pretest inspection. Incremental changes shall be measured and recorded as specified in Section 4.3.3.

4.3.5 Platforms and/or scaffolds will be provided by others to facilitate monitoring and mapping.

4.3.6 Cracks shall be monitored and mapped at each pressurization plateau and at 39 psig and 0.0 psig depressurization plateaus.

4.4 Calibration

4.4.1 Instrumentation shall be calibrated before it is delivered and installed or used, after installation during the pretest period and just before removal after the SIT is completed and 24-hour recovery period has elapsed.

4.4.2 All instrumentation calibration shall be against certified measurement standards which have known valid relationships to National Standards. Should no National Standard exist, the Contractor shall document the basis of his calibration to the satisfaction of the Construction Managers.

4.4.3 A calibration procedure shall be prepared for approval by the Construction Managers, Engineers and the Test Director and the approved procedure included in the Test Plan.

4.4.4 DELETED

4.5 Instrument Reliability

4.5.1 All instrumentation and equipment required to meet this specification shall be demonstrated to perform their function at the site or at the contractor's location as approved by the test director and the engineer.

4.6 Other Equipment, Supplies and Material

4.6.1 The Contractor shall furnish all materials, dispensible supplies, tools and special equipment required to install instrumentation and data acquisition equipment required to facilitate the recording of data as required for the SIT.

4.6.2 Restriction of materials for use in Containment is specified in Section 13.0 in accordance with UE&C Specification 9763-MPS-1. Where such materials are unavoidably required, the Contractor shall submit a written request to the Construction Managers for relief.

5.0 PREDICTED RESPONSE AT PEAK PRESSURE

5.1 DISPLACEMENTS

The predicted displacements at peak pressure are approximately as follows:

Cylinder maximum radial displacement		1.05 inches
Cylinder vertical displacement at the springline relative to the base		1.33 inches
Vertical displacement of the dome at the apex		2.20 inches
Equipment hatch inside diameter growths:		
	Horizontal	0.35 inches
	Vertical	0.10 inches
Equipment hatch maximum radial displacement		1.0 inches
Personnel air lock inside diameter growths:		
	Horizontal	0.10 inches
	Vertical	0.04 inches
Personnel air lock maximum radial displacement		1.0 inches

5.2 CRACK WIDTHS

The prediction of crack pattern and widths is based on behavior of prototype containments. The predicted maximum crack widths at peak pressure in the membrane regions (excluding discontinuity regions around large openings) are expected to be 0.025 inch or less, spaced approximately 18 inches. Crack widths in the vicinity of large openings, such as equipment hatch and personnel airlocks may be greater. The acceptance criteria for cracks are as follows:

a. The maximum crack width at peak pressure of 60 psig is 0.035 inch averaged over a length of 20'-0; the minimum spacing is 15". These averages exclude crack patterns in the vicinity of large openings.

b. Crack widths after depressurization are predicted to be less than 0.01 inch.

6.0 DELETED

7.0 PRETESTING

7.1 DELETED

7.2 Contractor shall operate data acquisition and checkout his instrumentation, perform calibrations and make adjustments as necessary. Instruments exhibiting erratic or other improbable behavior shall be repaired or replaced.

7.3 The Contractor shall maintain a log to record all pretest data and activities.

7.4 Temperature and pressure data shall be monitored by others and the information given to the Contractor for entry in the log.

7.5 Log shall consist of looseleaf reproducible pages; all entries shall be legible. Contractor's Senior Test Engineer, the Contractor's QA/QC personnel and the Test Director shall sign on the log. The Test Director reserves the right to edit the log and make entries as he deems appropriate. Copies of the log will be made and distributed to authorized personnel.

7.6 Contractor shall provide a written acceptance of material and installation of wiring, grounding and power cable provided by others.

8.0 CONDUCTANCE OF THE SIT

8.1 The SIT will be under the direction of the Test Director, in accordance with the Test Plan (See Section 10) and in compliance with the Code. The Test Director will be an individual from the NHY Startup Test Department.

8.2 Figure 5 shows the planned pressurization and depressurization schedule and pressure plateaus.

8.3 All instrumentation recording will be conducted one hour after each pressurization and depressurization plateau has been reached at the direction of the Test Director.

Final displacement/deflection will be measured and recorded just prior to 24 hour recovery period elapses at the direction of the test director.

8.4 After recording on Data Recording Sheets (see Appendix A) and mapping of concrete cracks are complete, the results will be evaluated by the Test Director, the Engineer and the Contractor's Senior Test Engineer. The checkoff list will be signed off authorizing pressurization or depressurization to the next plateau.

8.5 The checkoff list will be signed off by the Contractor's Senior Test Engineer, the Engineer and finally by the Test Director. The Test Director is responsible to initiate the directive to continue to the next recording plateau.

8.6 Checkoff lists for each recording plateau will be prepared by others.

8.7 The Containment will be pressurized and depressurized by others under the direction of the Test Director. Atmospheric (oil-free) air will be used as the testing fluid. Pressurization shall be at a uniform rate at approximately 2 psig per hour but not to exceed 3.5 psig per hour. Depressurization shall be at a uniform rate of approximately 4 psig per hour but not to exceed 5.0 psig/hr. Pressurization tolerances are given in Figure 5.0. Humidity in the Containment will be monitored by others. Temperature outside the containment, within the enclosure building will be monitored and controlled so as to maintain a minimum temperature of 30°F and also the average differential temperature between the inside of containment and outside of containment within enclosure building does not exceed

65°F. All dates, time, pressure and temperature data will be given to the SIT contractor for recording. Pressure will be held at each plateau until all data (with the exception of photographs of crack mapping area) is recorded and evaluated and checkoff list signed off.

8.8 DELETED

9.0 POST-TEST WORK

9.1 Instrumentation Check

Immediately following the 24-hour stabilization period, the Contractor shall check all instrumentation, recalibrate instruments noting differences and adjustments required and evaluate the performance or malfunction. The Contractor's Senior Test Engineer shall complete the Instrument Recovery Data Form (Appendix A).

9.2 All activity shall be recorded in the log.

9.3 After the completion of the test, and all data has been recorded, concrete cracks mapped and instruments checked for recalibration, the Contractor shall prepare a Certificate of Conformance for field work attesting to the completion of all work in accordance with the Codes and this specification. The Certificate will be executed by the Contractor's Senior Test Engineer and QA personnel.

9.4 Before leaving the site, the Contractor shall prepare a reproducible documentation package consisting of the following:

9.4.1 Completed Log

9.4.2 Printouts of data acquisition equipment identified to date, time and pressure.

9.4.3 Completed data recording sheets.

9.4.4 Maps of concrete crack monitoring.

10.0 TEST PLAN

10.1 The Contractor shall submit a portion of the Test Plan as noted below to the Test Director and the Engineers for approval. The final test plan, when complete, will be issued to the Contractor for review and comments.

10.2 The portion of the Test Plan furnished by the SIT Contractor shall include the following as a minimum.

10.2.1 Description of instrumentation, including type, manufacture, range, tolerance and the function of each instrument.

10.2.2 Installation procedures including calibration.

10.2.3 Description of all data acquisition and retrieval systems along with equipment utilized for checkout. Equipment source including manufacturer and function with respect to data required to complete the SIT recording sheets.

10.2.4 Description of all conversion equipment together with samples illustrating method of conversion, i.e., vertical deflections from diagonal invar wire deflection data.

10.2.5 Correction criteria to be applied (if required) to raw data to account for wire sag, temperature change, displacement reversals, etc.

10.2.6 DELETED

10.2.7 Function of test personnel to be provided during pretest, the SIT and post-test periods. This shall include operators for equipment and inspection and mapping personnel. The responsibilities of the Senior Test Engineers and QA personnel shall also be defined.

10.2.8 An instrument plan drawing and layout of equipment in data acquisition area. The location of the data acquisition area is shown on Figure 4.

10.2.9 DELETED

10.2.10 The Contractor's portion of the Test Plan shall be a photo-ready reproducible document issued well in advance of the SIT (See Section 13.0). The preliminary test plan as submitted to the Test Director and the Engineer shall be subject to their review and approval. All changes to the Contractor's part of the Test Plan shall be done by this Contractor as requested.

11.0 TEST REPORT

11.1 The Contractor shall submit to the Engineer and the Test Director a Test Report which shall be made a part of the Final Report prepared by the Engineer.

11.2 The Test Report prepared by the Contractor shall include the following as a minimum:

a) A description of the test procedure. This shall include an edited portion of the test plan and the procedures required by this Contractor together with the discription and final location of all instrumentation.

b) A completad formal data acquisition form.

c) A summary of the results of all test measurements made by this contractor and others and an evaluation of the accuracy of the measurements.

d) A discussion and sample computations of all corrections made to raw data due to wire sag, temperature, response lag, etc.

e) An evaluation and discussion of instrumentation malfunctions, and possible causes, measurements which should be neglected due to inaccuracy with proper justification, malfunction or drift and the disposition of the deviations during the SIT.

f) Signature and seal of Registered Professional Engineer certifying to conformance with CC-6000.

12.0 QUALITY CONTROL

12.1 The Contractor's Quality Assurance and Inspection program shall meet the requirements of Specification 9763-QAS-1 and as specified herein.

12.2 The Contractor shall establish and maintain documented Quality Assurance procedures for instrument installation and testing activities which shall conform to this Specification and applicable Sections of ANSI N45.2 and ASME III, Division 2.

12.3 QA Records

12.3.1 After completion of the work, the Contractor shall turn over to the Test Director a complete documentation package of QA records. The QA documentation package shall include but is not limited to the following:

a) Personnel Certifications (including Level III Inspector).

b) List of all measuring and test equipment used and their associated calibration records

c) Nonconformance Reports, inspection and test records.

d) A copy of the Executed Certificate of Conformance of field work.

13.0 SUBMITTALS

13.1 The Contractor shall submit the following Procedures and documents to the Engineer and Test Director for approval:

a) Test Plan (as applicable)

b) Instrument Plan Drawing and Equipment Layout Drawings

c) Procedure for installation of Instrument supports, Instruments and their Calibration before and after SIT and for conduct of test*

d) Instrument support detail drawings

e) QA Manual as amended for this Project*

f) Procedure for mapping and recording Concrete Cracks

g) Document Packages* (QA & Test)

h) Test Report

i) Personnel Qualification Procedures*

j) Procedure for inspection of all work performed*

*Documents which also require UE&C QA approval.

14.0 FOREIGN MATERIALS

In conjunction with UE&C Specification 9763-MPS-1, care shall be taken to prevent contamination by foreign materials in the Containment. Temporary plugs or seals shall be installed to keep contaminants out of a clean component during subsequent fabrication, shipping, storage and erection. Precautions shall be taken to prevent such temporary plugs and seals from being inadvertently left in the component when installed.

14.1 Lead or Other Low-Melting Metals

Compounds or materials containing low melting metals as a basic chemical constituent shall not be used in direct contact with the surface of equipment or components at any time. This prohibition includes tooling, fixtures, marking materials, fluxes, temperature crayons, paints, coatings, etc., used during installation operations.

14.2 Mercury

During the manufacturing processes, tests and inspections, the component or system shall not have come in direct contact with mercury or any of its compounds nor with any mercury containing devices employing a single boundary of containment. Manometers, vacuum pumps, or other instrumentation or equipment containing mercury or mercury compounds shall not be used.

14.3 Iron

Free Iron contamination shall not be present on the surfaces of austenitic base materials when the component or material is to be subjected to temperatures above ambient: e.g. heat treating, stress relieving, welding, etc.

14.4 Sulfur

Sulfur and sulfur compounds or materials containing sulfur as a basic chemical constituent shall not be used in direct contact with the surface of nickel base alloys, nor shall materials containing more than 250 PPM of sulfur in leachable form or potentially leachable form be used.

14.5 Aluminum

Aluminum shall not be used either as soft pads or hammers to reduce marring during assembly and handling of nickel base or stainless steel alloy components. Aluminum pipe caps and seals shall not be used on stainless or nickel base alloy components.

14.6 Zinc, Cadmium and Copper

Zinc, Cadmium and copper, and their alloys shall not be allowed to come in contact with stainless steel surfaces.

14.7 Paint

The painting of corrosion-resistant material is prohibited. If paint has been inadvertently applied to corrosion-resistant materials, it shall be removed using new or redistilled methyl ethylketone ($CH_3 COC_2 H_5$) followed by rinsing with acetone or alcohol. If this method fails, the paint shall be removed using simple mechanical cleaning methods with austenitic stainless steel tools such as wire brushes, steel wool or scraping devices. Following this mechanical cleaning, the part should be washed with either demineralized or filtered water as applicable.

14.8 Tapes

The use of tape in conjunction with temporary plugs, seals, identification or for any other reason shall meet maximum leachable chloride and fluoride limits of 15 PPM and 10 PPM, respectively. When used, both the tape and tape residue (adhesive) must be completely removed from materials surfaces, prior to system use and to any heat treatment of fabrication operations which rendor the tape inaccessible. Removal shall be accomplished by new or redistilled alcohol or acetone. Abrasive cleaning methods may be necessary to supplement and improve the solvent action.

14.9 Contamination Controls

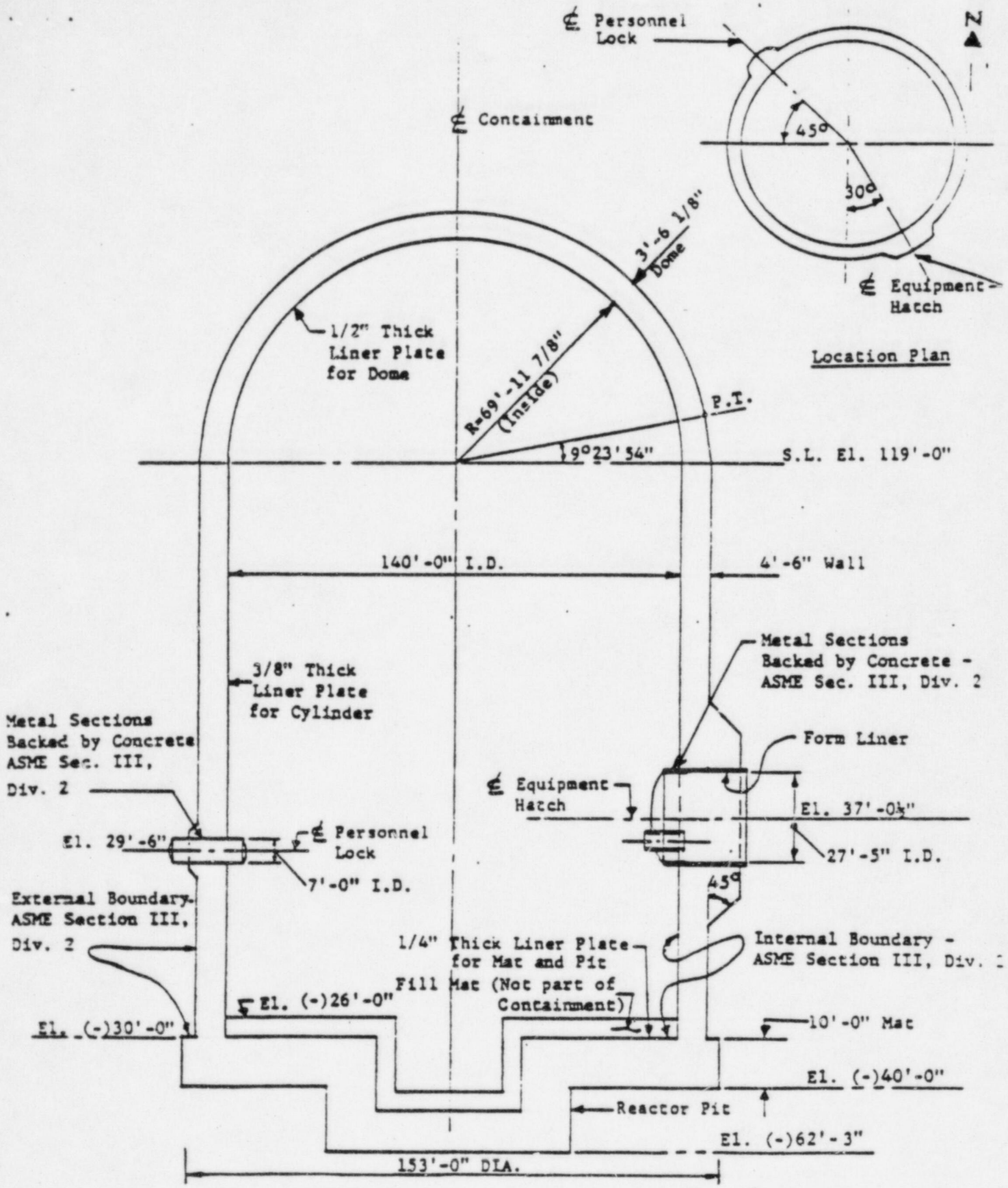
14.9.1 All austenitic (e.g., type 300 stainless, Ni-Cr-Fe alloys) materials of construction shall be free from low melting point materials such as alloying constituents e.g., lead, zinc, cadmium, tin, antimony, mercury, bismuth, phosphorous and misch metal and their compounds. Lead or other low melting constituents or their compounds or materials containing low melting metals as a basic constituent shall not be used in direct contact with the surface of equipment or components at anytime. This prohibition includes loading fixtures, marking materials, fluxes, temperature indicating crayons, paints, coatings, etc. used during fabrication, installation and operation.

14.9.2 Stainless steel shall not come in contact with halogen containing compounds such as fluorides and chlorides, except for Engineer approved liquid penetrant solutions, which must be removed immediately after the test.

14.9.3 Surlfur, sulfur compounds or materials containing sulfur as a basic chemical constituent shall not be used in direct contact with the surface of nickel base alloys.

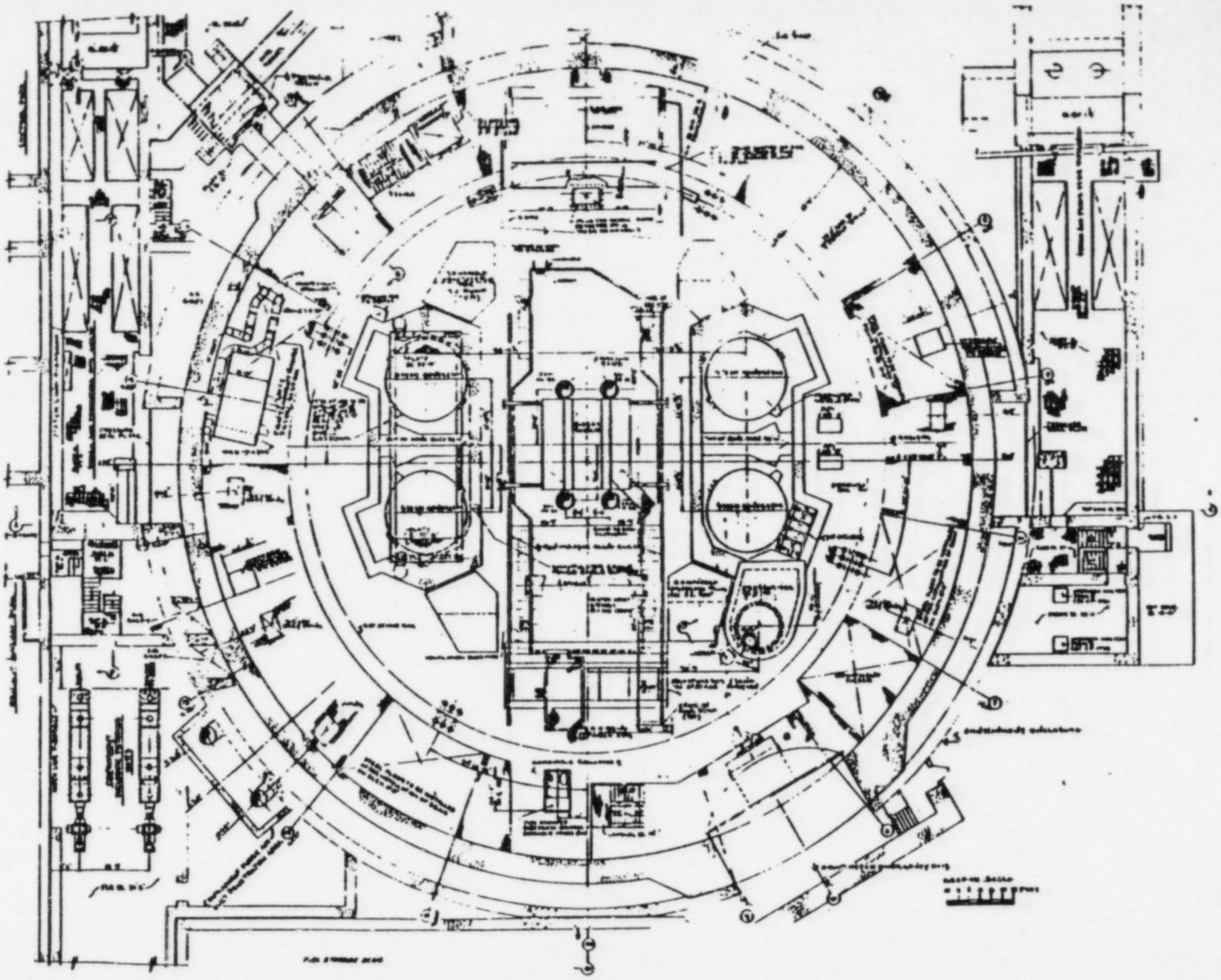
14.9.4 Aluminum shall not be used as soft pads or hammers to reduce surface damage during assembly and handling of nickel base or stainless steel components. Aluminum pipe caps and seals shall not be used on stainless or nickel base alloy components.

14.9.5 The manufacturing process, tests, and inspections, shall not cause the component or system to come in direct contact with mercury or any of its compound nor with any mercury-containing devices employing a single boundary of containment.



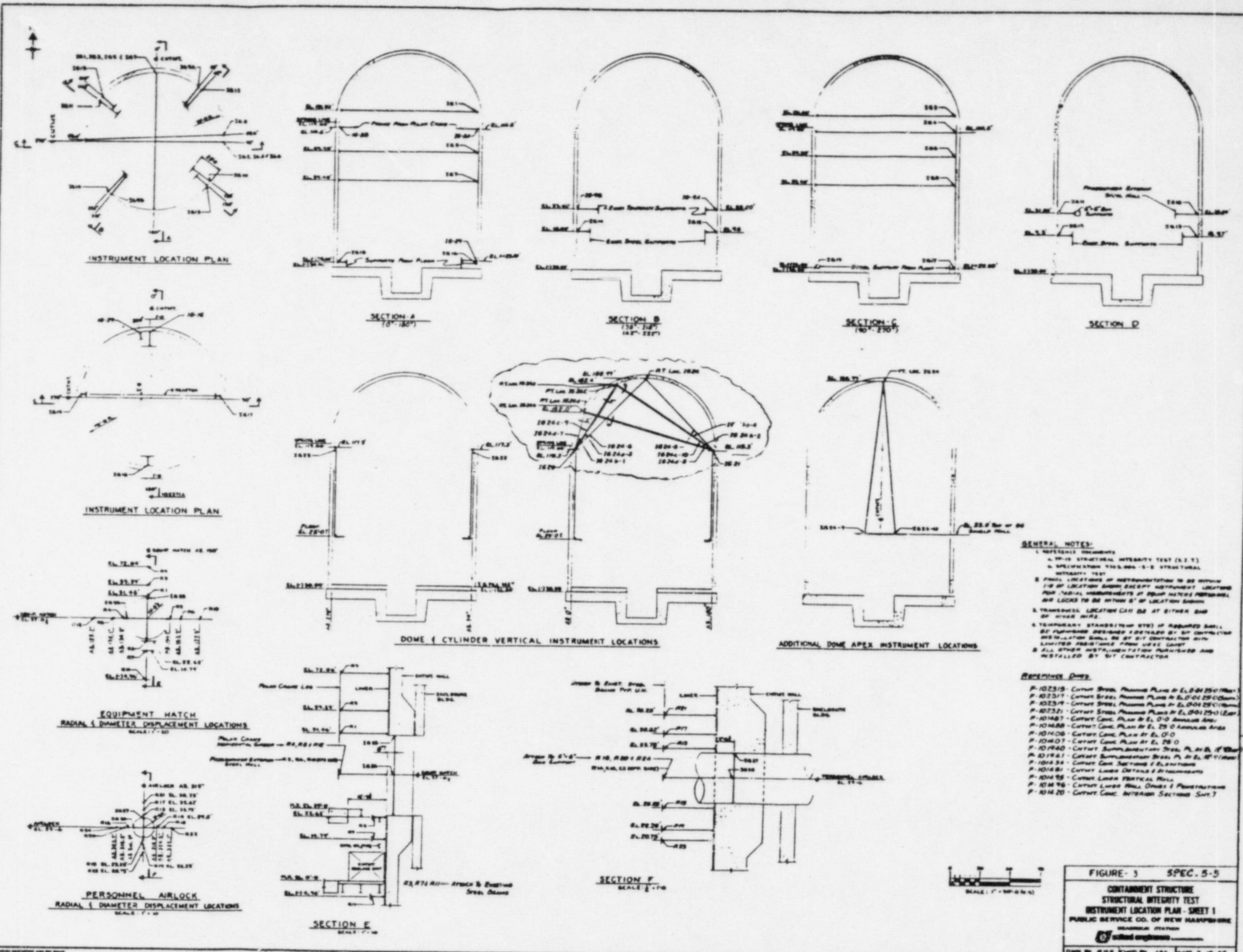
TYPICAL SECTION THROUGH CONTAINMENT

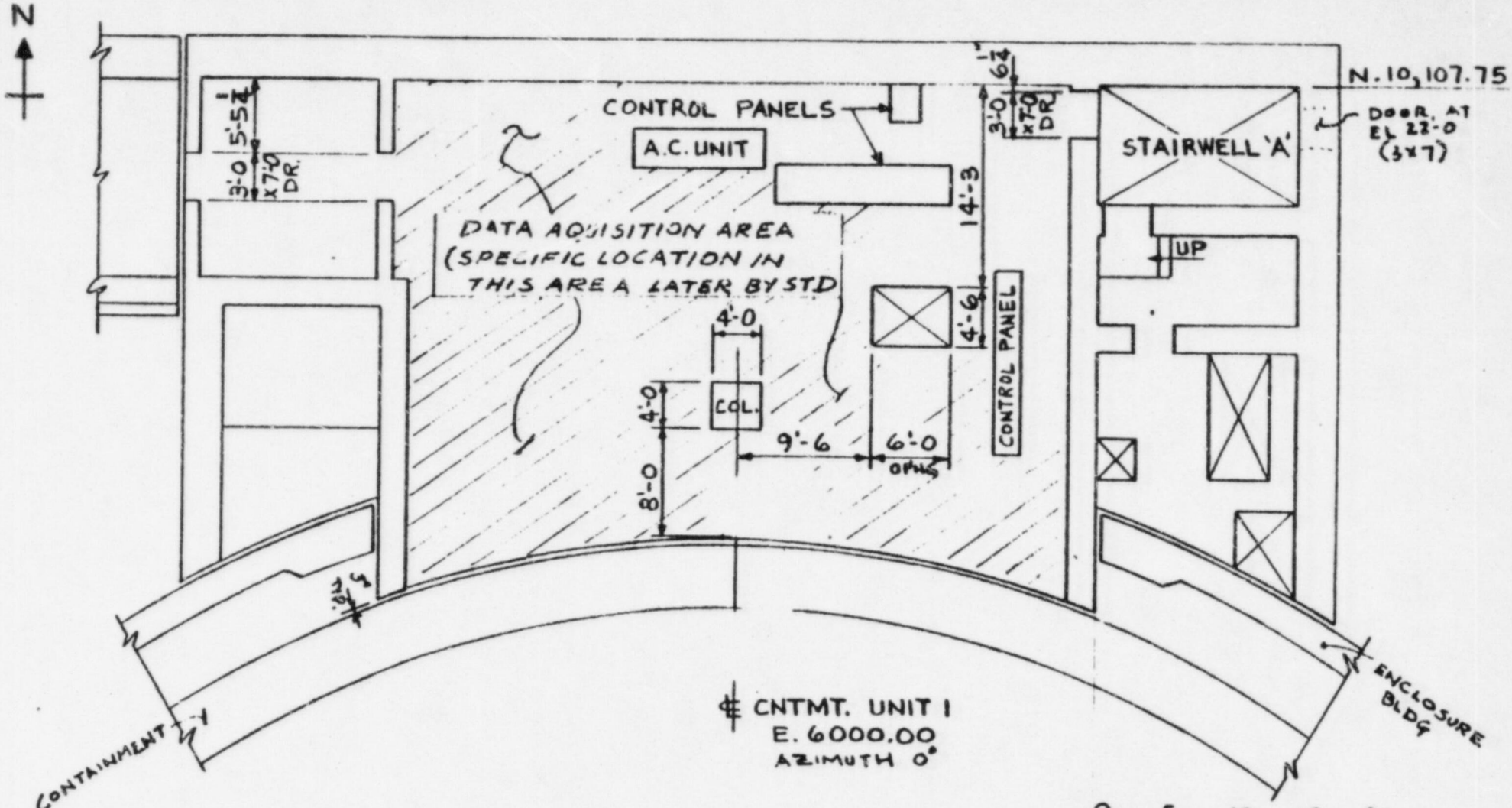
Spec. No. 9763.006-5-5 FIGURE 1



CONTAINMENT STRUCTURE
PLAN AT ELEV. 25'-0"
GENERAL ARRANGEMENT

SPEC. NO. 9763.006-S-5 FIGURE 2


INSTRUMENT LOCATION PLAN
SECTION A
(0°-180°)
SECTION B
SECTION C
(90°-270°)
SECTION D
INSTRUMENT LOCATION PLAN
DOME & CYLINDER VERTICAL INSTRUMENT LOCATIONS
ADDITIONAL DOME APEX INSTRUMENT LOCATIONS
EQUIPMENT HATCH
RADIAL & DIAMETER DISPLACEMENT LOCATIONS
PERSONNEL AIRLOCK
RADIAL & DIAMETER DISPLACEMENT LOCATIONS
SECTION E
SECTION F
GENERAL NOTES:
Reference Dwgs
P-102319 - Cntmt Steel Framing Plans at EL 0-0 & 25-0
P-102317 - Cntmt Steel Framing Plans at EL 0-0 & 25-0
P-102319 - Cntmt Steel Framing Plans at EL 0-0 & 25-0
P-102321 - Cntmt Steel Framing Plans at EL 0-0 & 25-0
P-101487 - Cntmt Conc. Plan at EL 0-0 Annular Area
P-101488 - Cntmt Conc. Plan at EL 25-0 Annular Area
P-101406 - Cntmt Conc. Plan at EL 0-0
P-101407 - Cntmt Conc. Plan at EL 25-0
P-101940 - Cntmt Supplementary Steel Pl. at EL
P-101941 - Cntmt Supplementary Steel Pl. at EL
P-101434 - Cntmt Conc. Sections & Elevations
P-101481 - Cntmt Liner Details & Attachments
P-101495 - Cntmt Liner Vertical Wall
P-101496 - Cntmt Liner Wall Dwgs & Penetrations
P-101420 - Cntmt Conc. Interior Sections Sht. 7
FIGURE- 3
SPEC. 5-5
CONTAINMENT STRUCTURE
STRUCTURAL INTEGRITY TEST
INSTRUMENT LOCATION PLAN - SHEET 1
PUBLIC SERVICE CO. OF NEW HAMPSHIRE
DWN. BY R.D.S.
CHKD. BY J.R.S.
DATE 7-10-85



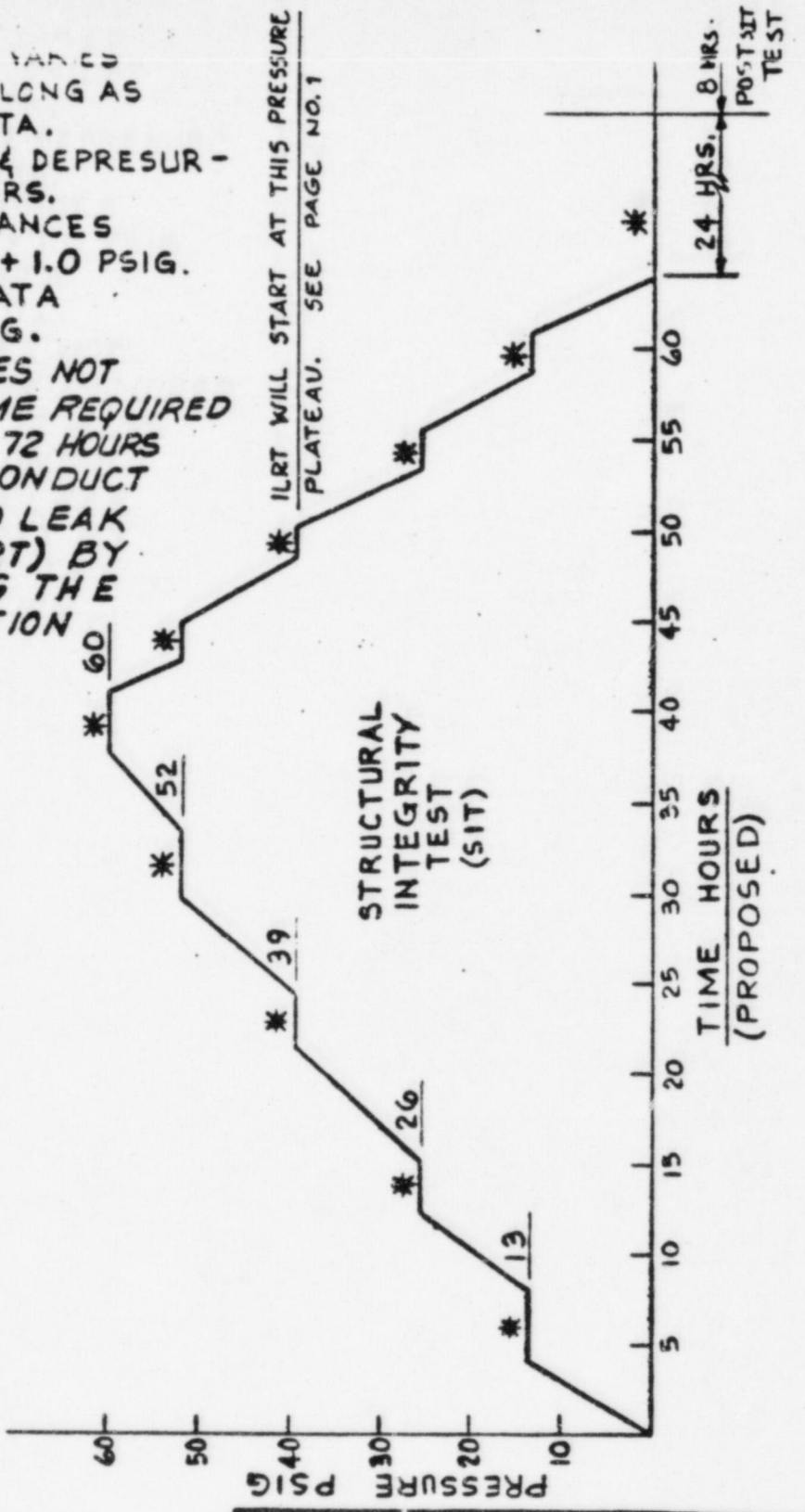
PROPOSED DATA ACQUISITION AREA EL. 0'-0"

FIGURE 4

SPECIFICATION 9763.006-5-5

NOTES:

1. [illegible] POINTS VARIED FROM 1 HR. TO AS LONG AS REQ'D. TO TAKE DATA.
2. PRESSURIZATION & DEPRESURIZATION BY OTHERS.
3. PRESSURE TOLERANCES AT 60 PSIG, 0 TO + 1.0 PSIG. AT ALL OTHER DATA POINTS, ± 1.0 PSIG.
4. THIS FIGURE DOES NOT REFLECT THE TIME REQUIRED (APPROXIMATELY 72 HOURS PROPOSED) TO CONDUCT THE INTEGRATED LEAK RATE TEST (ILRT) BY OTHERS DURING THE DEPRESSURIZATION CYCLE.

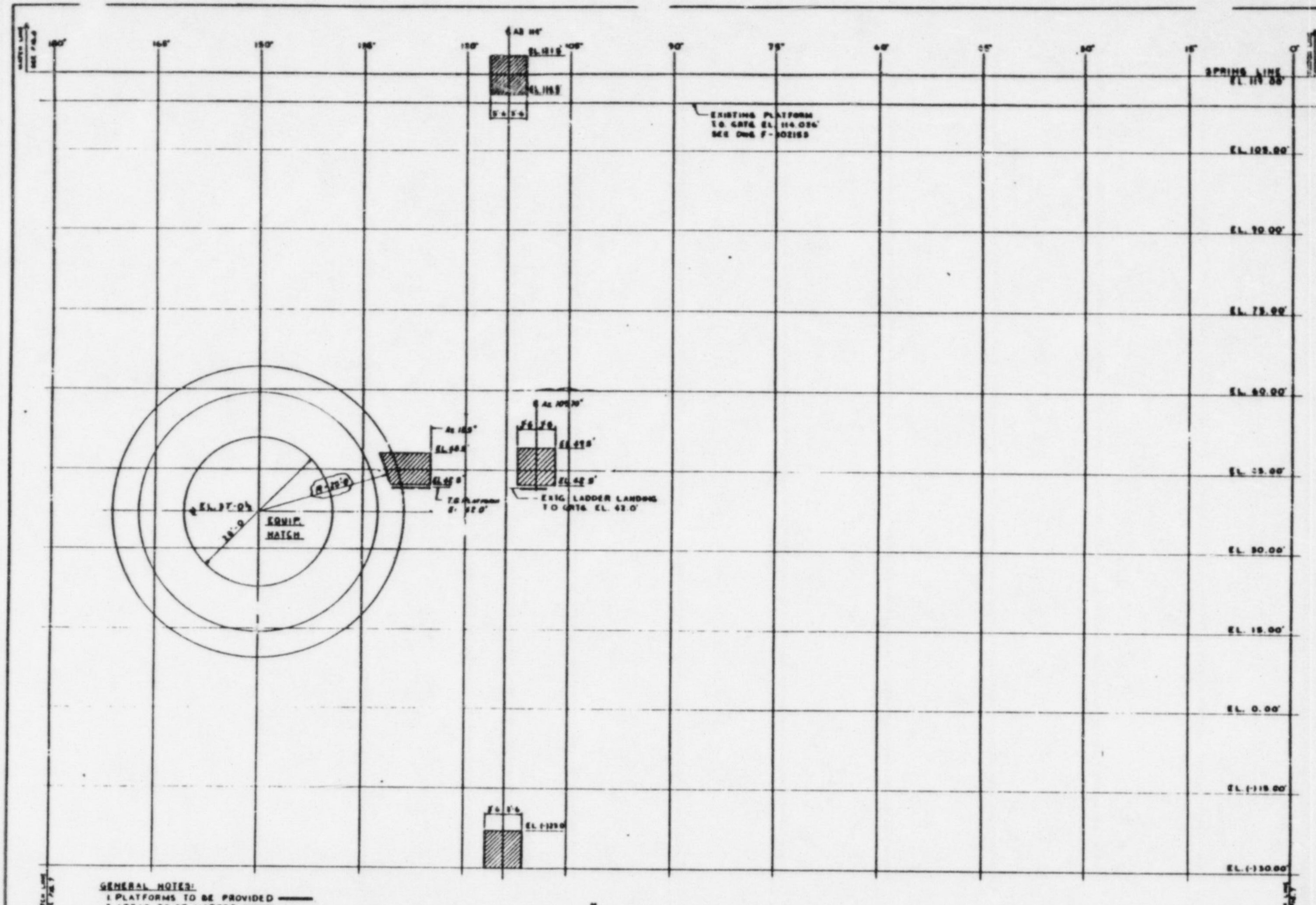


STRUCTURAL INTEGRITY TEST
PROPOSED INCREMENTS OF PRESSURE

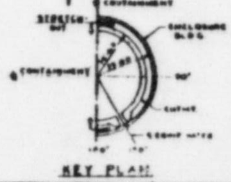
SPECIFICATION 9763.006-5-5

united engineers & constructors inc.

FIGURE 5

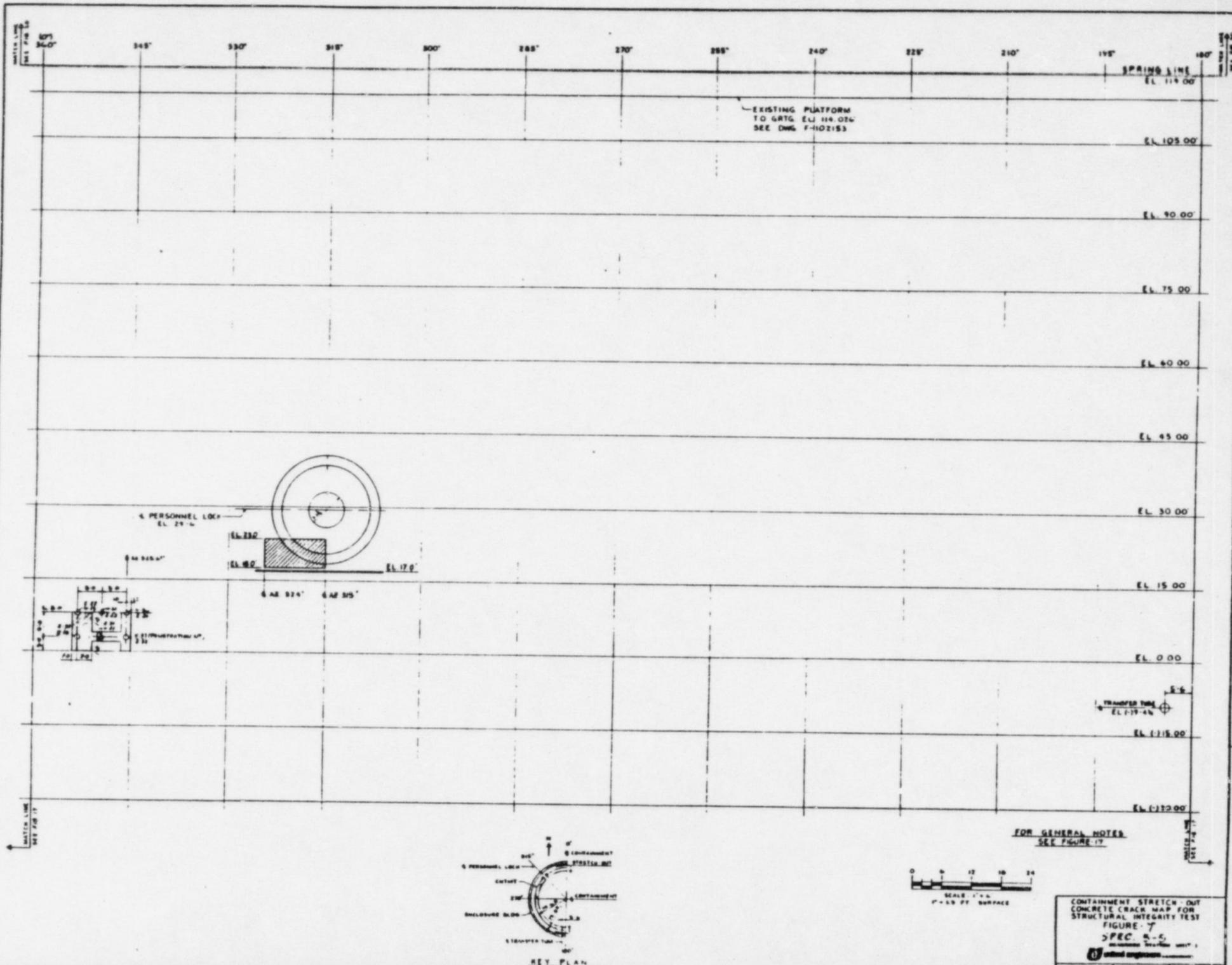


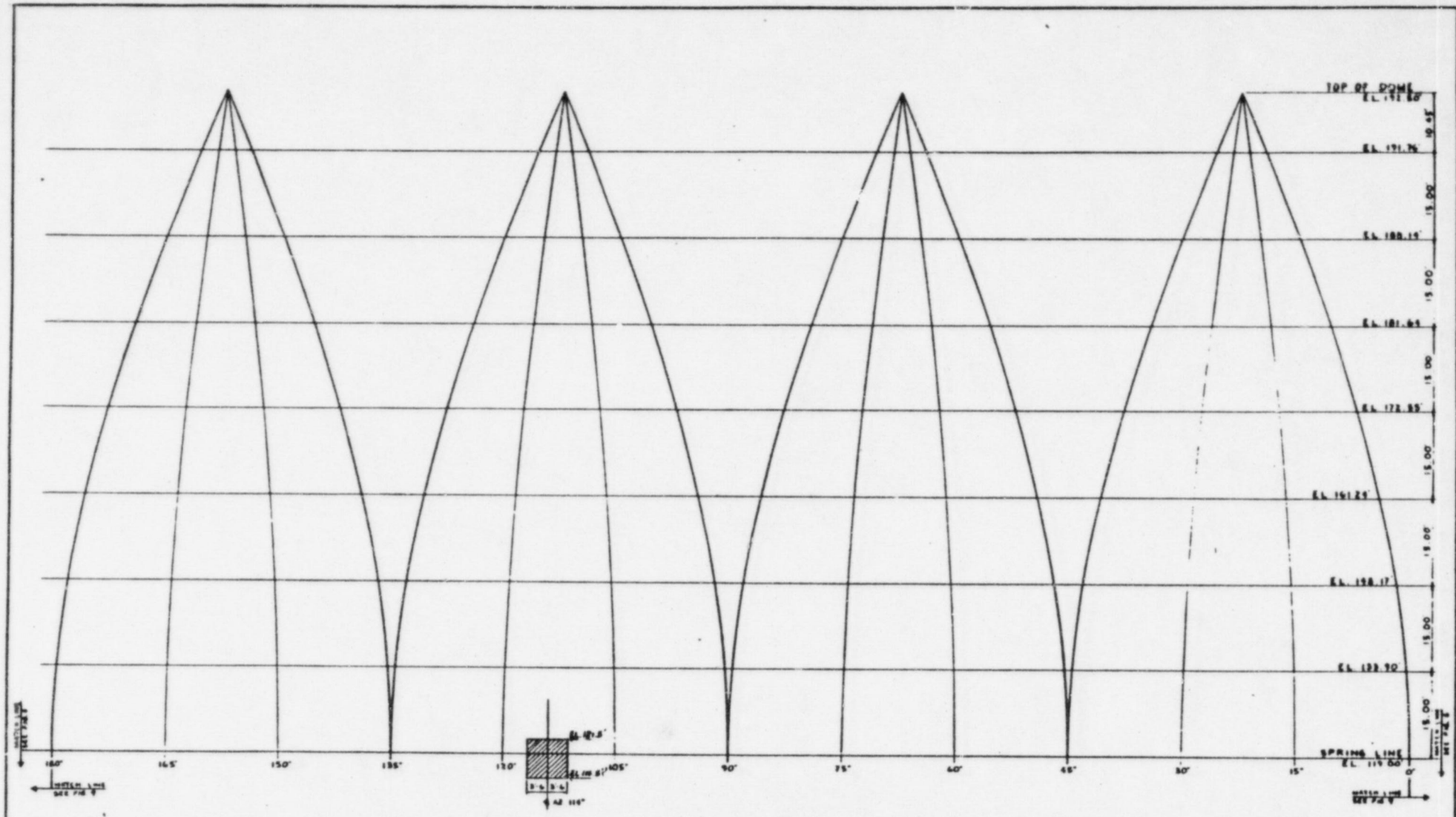
GENERAL NOTES:
1. PLATFORMS TO BE PROVIDED
2. AREAS TO BE MAPPED
3. PLATFORMS NOT TO BE SUPPORTED FROM CONTAINMENT STRUCTURE AND TO CLEAR BY 2".
4. ALL PLATFORMS OR STAGING TO BE ACCESSIBLE FROM EL. (-)30.0' BY LADDERS UNLESS NOTED
5. AZ. ℄ EL LINES TO BE PAINTED ON CONTAINMENT FOR LOCATION IDENTIFICATION AT ALL CORNERS.



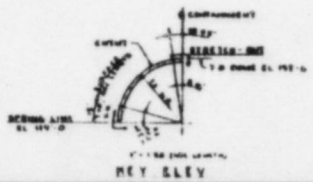
KEY PLAN

CONTAINMENT STRETCH-OUT CONCRETE CRACK MAP FOR STRUCTURAL INTEGRITY TEST
FIGURE 6
SPEC. 5A


SPRING LINE
EL 114.00'
EXISTING PLATFORM
TO GRTG. EL. 114.026
SEE DWG. F-1102153
EL 105.00'
EL 90.00'
EL 75.00
EL 60.00
EL 45.00
EL 30.00
EL 15.00
EL 0.00
EL (-)15.00
EL (-)32.00'
℄ PERSONNEL LOCK
EL 29'-4"
EL 230
EL 180'
EL 170'
℄ AT 324°
℄ AT 315°
TRANSFER TUBE
EL (-)29'-4"
KEY PLAN
FOR GENERAL NOTES
SEE FIGURE 17
SCALE 1"=10 FT. SURFACE
CONTAINMENT STRETCH-OUT
CONCRETE CRACK MAP FOR
STRUCTURAL INTEGRITY TEST
FIGURE 7
SPEC. A-5,
D
C
B
A

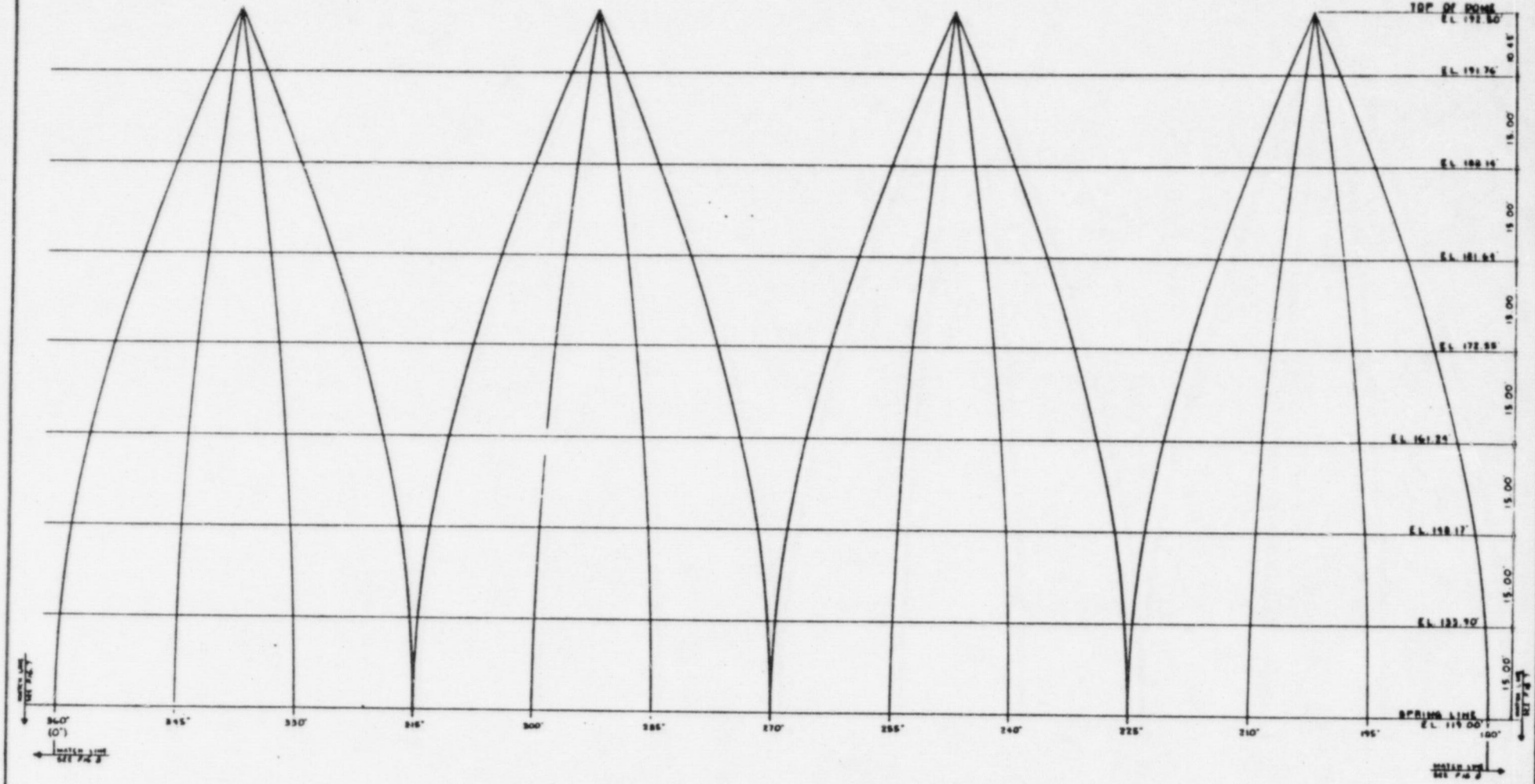


FOR GENERAL NOTES
SEE FIGURE 6



KEY ELEV

CONTAINMENT STRETCH-OUT
CONCRETE CRACK MAP FOR
STRUCTURAL INTEGRITY TEST
FIGURE-8
SPEC 5.5



FOR GENERAL NOTES
SEE FIGURE 6

KEY ELEV

CONTAINMENT STRETCH-OUT
CONCRETE CRACK MAP FOR
STRUCTURAL INTEGRITY TEST
FIGURE-5
SPEC 53

APPENDIX A

TO

SPECIFICATION 9763-006-5-5

DATA RECORDING

DATA RECORDING

DATE_____

TIME_____

	IN CONTAINMENT	OUTSIDE CONTAINMENT
PRESSURE	(psig)	——
TEMPERATURE (°F) (DRY BULB)		
TEMPERATURE CHANGE FROM LAST RECORDING		
RELATIVE HUMIDITY (HYGROMETER)	——	——

INSTRUMENT DESCRIPTION: INVAR WIRE/TRANSDUCERS

Pressure = psig

INSTR. NO.	LOCATION			DISPLACEMENT (INCHES)				REMARKS
	DESCRIPTION	AZIMUTH	ELEV.	PREDICTED	* ACCEPTABLE	AS MONITORED	ACTUAL	
IG1	CONTAINMENT DIAM.	0 to 180	131.00					
IG2	CONTAINMENT DIAM.	90 to 270	131.00					
IG3A	CONTAINMENT TO FRAME FROM P.C.	0	114.58					
IG4	CONTAINMENT DIAM.	90 to 270	114.58					
IG5	CONTAINMENT DIAM.	0 to 180	89.20					
IG6	CONTAINMENT DIAM.	90 to 270	88.20					
IG7	CONTAINMENT DIAM.	0 to 180	59.40					
IG8	CONTAINMENT DIAM.	90 to 270	59.40					
IG9A	CONTAINMENT TO SUPPORT	38	33.00					
IG10	CONTAINMENT WALL TO PRESSURIZER STEEL	128	33.00					
IG11	CONTAINMENT WALL TO BOX SUPPORT	308	31.50					
IG3B	CONTAINMENT TO FRAME FROM P.C.	180	114.56					
IG9B	CONTAINMENT TO SUPPORT	218	33.00					

* This criteria may be waived if recovery within 24 hours is greater than 80% (typical).

DATA RECORDING (CONTD.)

INSTRUMENT DESCRIPTION: INVAR WIRE/TRANSDUCERS (Con't.)

Pressure = psig

INSTR. NO.	LOCATION			DISPLACEMENT (INCHES)				REMARKS
	DESCRIPTION	° AZIMUTH	ELEV.	PREDICTED	ACCEPTABLE	AS MONITORED	ACTUAL	
IG12	CONTAINMENT WALL TO STEEL SUPPORT	42	9.50					
IG13	CONTAINMENT WALL TO STEEL SUPPORT	130	9.67					
IG14	CONTAINMENT WALL TO STEEL SUPPORT	222	10.00					
IG15	CONTAINMENT WALL TO STEEL SUPPORT	310	9.25					
IG16	CONTAINMENT WALL TO SUPPORT FROM FLR.	1 FT WEST OF 0	(-)25.00					
IG17	CONTAINMENT WALL TO SUPPORT FROM FLR.	3 FT NORTH OF 90	(-)25.00					
IG18	CONTAINMENT WALL TO SUPPORT FROM FLR.	1 FT WEST OF 180	(-)25.00					
IG19	CONTAINMENT WALL TO SUPPORT FROM FLR.	3 FT NORTH OF 270	(-)25.00					
IG20	VERTICAL AT WALL	0	115.33 to 25.0 (±)					
IG21	VERTICAL AT WALL	180	115.33 to 25.0 (±)					
IG22	VERTICAL AT WALL	90	117.33 to 25.0 (±)					
IG23	VERTICAL AT WALL	270	117.33 to 25.0 (±)					
IG24b-1	(VERTICAL) INTERMEDIATE DOME	0	115.33 to 152.0	(IG24b)	(IG24b)	COMPUTED VERTICAL IG24 b		
IG24b-2	(VERTICAL) INTERMEDIATE DOME	180	152.0 to 115.33					
IG24a-3	(VERTICAL) INTERMEDIATE DOME	0	115.33 to 182.42	(IG24a)	(IG24a)	COMPUTED VERTICAL IG24 a		
IG24a-4	(VERTICAL) INTERMEDIATE DOME	180	182.42 to 115.33					

DATA RECORDING (CONTD.)

INSTRUMENT DESCRIPTION: INVAR WIRE/TRANSDUCERS (Con't.)

Pressure = psig

INSTR. NO.	LOCATION			DISPLACEMENT (INCHES)					REMARKS
	DESCRIPTION	° AZIMUTH	ELEV.	PREDICTED	ACCEPTABLE	AS MONITORED		ACTUAL	
IG24-5	(VERTICAL) APEX DOME	180	115.33 to 188.99	(IG24)	(IG24)		COMPUTED VERTICAL IG 24		
IG24-6	(VERTICAL) APEX DOME	0	188.99 to 115.33						
IG24d-7	(VERTICAL) INTERMEDIATE DOME	0	115.33 to 152.0	(IG24d)	(IG24d)		COMPUTED VERTICAL IG 24 d		
IB24d-8	(VERTICAL) INTERMEDIATE DOME	180	152.0 to 115.33						
IG24c-9	(VERTICAL) INTERMEDIATE DOME	0	115.33 to 182.44	(IG24c)	(IG24c)		COMPUTED VERTICAL IG 24 C		
IG24c-10	(VERTICAL) INTERMEDIATE DOME	180	182.44 to 115.33						
IG24-7	(VERTICAL) APEX TO POLAR CRANE RAIL	90	110.33 to 188.99						DELETED
IG24-8	(VERTICAL) APEX TO CRANE RAIL	270	110.33 to 188.99						
IG24-9	VERTICAL APEX TO TOP OF SG SHIELD WALL		33.0	(IG24)	(IG 24)		COMPUTED VERTICAL IG 24		
IG24-10	VERTICAL APEX TO TOP OF SG SHIELD WALL		33.0						
IG-29	CONTAINMENT WALL TO SUPPORT FROM FLOOR	350	-23 0'						
IG-30	BT. FL. STEEL TO BASE CNTMT	91	22.07 to (-)26						DELETED
IG-31	EDGE CONC. FL TO BASE CNTMT	180	25.0 to (-)26						
IG-32	BOT. FL. STEEL TO BASE CNTMT.	0	25.0 to (-)26						

DATA RECORDING (CONTD.) Sheet A4 of

INSTRUMENT DESCRIPTION: INVAR WIRE/TRANSDUCERS (Con't.)

Pressure = psig

INSTR. NO.	LOCATION			DISPLACEMENT (INCHES)				REMARKS
	DESCRIPTION	AZIMUTH	ELEV.	PREDICTED	ACCEPTABLE	AS MONITORED	ACTUAL	
IG25	VERTICAL DIAM. EQUIP. HATCH OPNG	150	23.33 to 50.75					
IG26	HORIZ. DIAM. EQUIP. HATCH OPNG	140.64 to 159.6	37.04					
R1	RADIAL - EQUIP. HATCH	150	51.46					
R2	RADIAL - EQUIP. HATCH	161.7	37.04					
R3	RADIAL - EQUIP. HATCH	150	22.62					
R4	RADIAL - EQUIP. HATCH	138.3	37.04					
R5	RADIAL - EQUIP. HATCH	150	59.29					
R6	RADIAL - EQUIP. HATCH	167.9	37.04					
R7	RADIAL - EQUIP. HATCH	150	14.79					
R8	RADIAL - EQUIP. HATCH	132.1	37.04					
R9	RADIAL - EQUIP. HATCH	150	72.04					
R10	RADIAL - EQUIP. HATCH	177.5	37.04					
R11	RADIAL - EQUIP. HATCH	150	-4.96					
R12	RADIAL - EQUIP. HATCH	122.7	37.04					
IG27	VERTICAL DIAM. PERS. AIR LOCK OPNG	315	33 to 26					
IG28	HORIZ. DIAM. PERS. AIR LOCK OPNG	317.97 to 312.03	29.5					
R13	RADIAL - PERS. AIR LOCK	315	33.75					
R14	RADIAL - PERS. AIR LOCK	318.5	29.5					
R15	RADIAL - PERS. AIR LOCK	315	25.25					
R16	RADIAL - PERS. AIR LOCK	310.9	29.5					

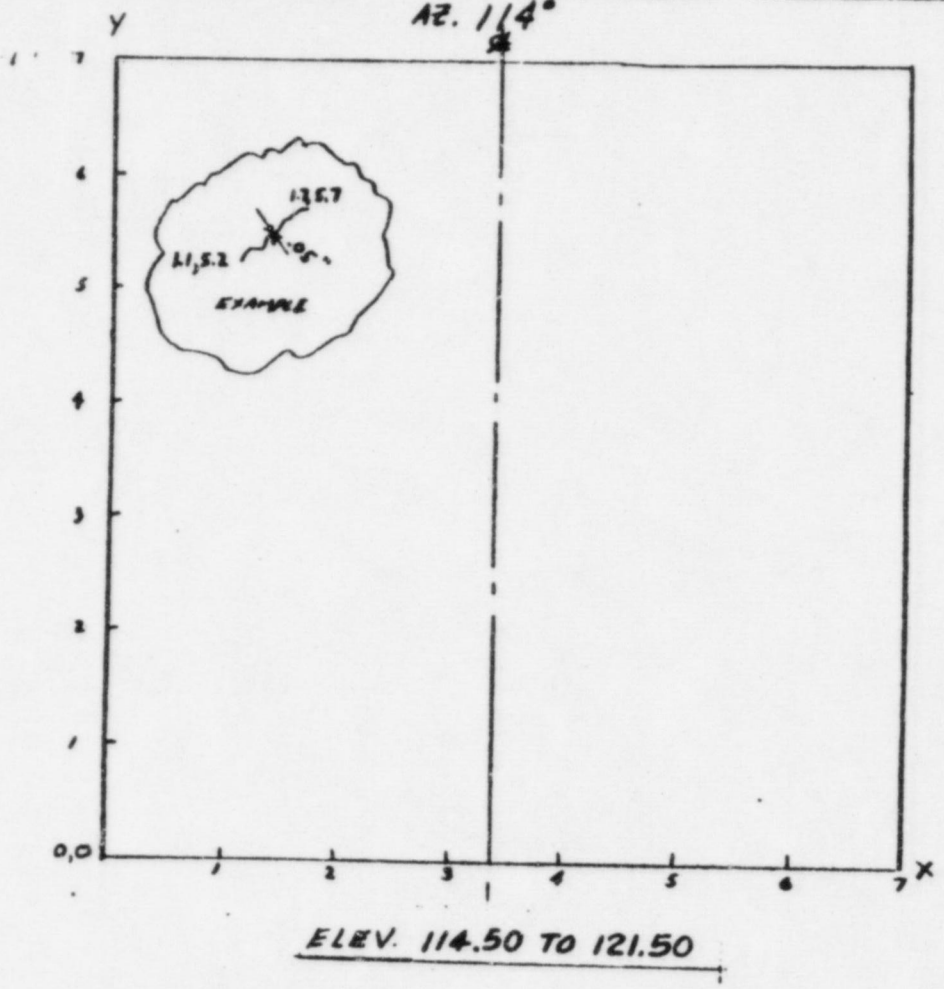
DATA RECORDING (CONTD.)

INSTRUMENT DESCRIPTION: INVAR WIRE/TRANSDUCERS (Con't.)

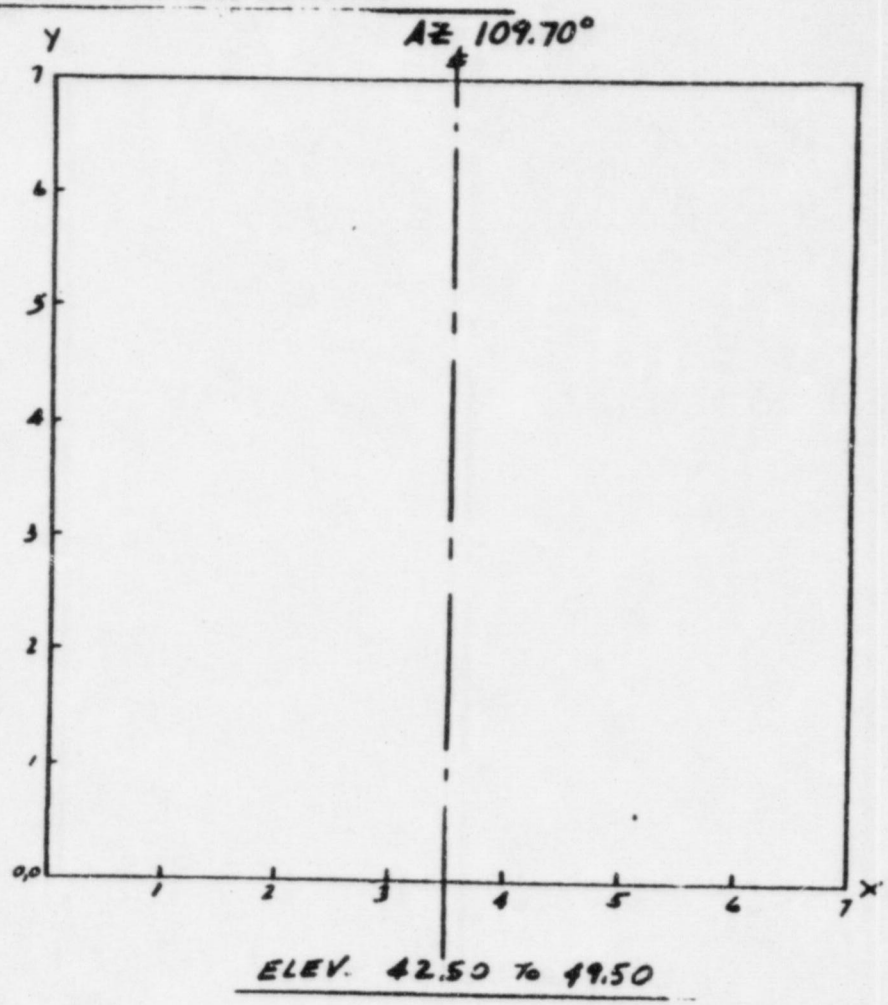
Pressure = psig

INSTR. NO.	LOCATION			DISPLACEMENT (INCHES)				REMARKS
	DESCRIPTION	° AZIMUTH	ELEV.	PREDICTED	ACCEPTABLE	AS MONITORED	ACTUAL	
R17	RADIAL - PERS. AIR LOCK	315	35.62					
R18	RADIAL - PERS. AIR LOCK	320.5	29.5					
R19	RADIAL - PERS. AIR LOCK	315	22.25					
R20	RADIAL - PERS. AIR LOCK	310	29.5					
R21	RADIAL - PERS. AIR LOCK	315	38.25					
R22	RADIAL - PERS. AIR LOCK	322.1	29.5					
R23	RADIAL - PERS. AIR LOCK	315	20.75					
R24	RADIAL - PERS. AIR LOCK	307.9	29.5					

CONCRETE MAP INFORMATION AS CALLED IN FROM OBSERVATION STATION



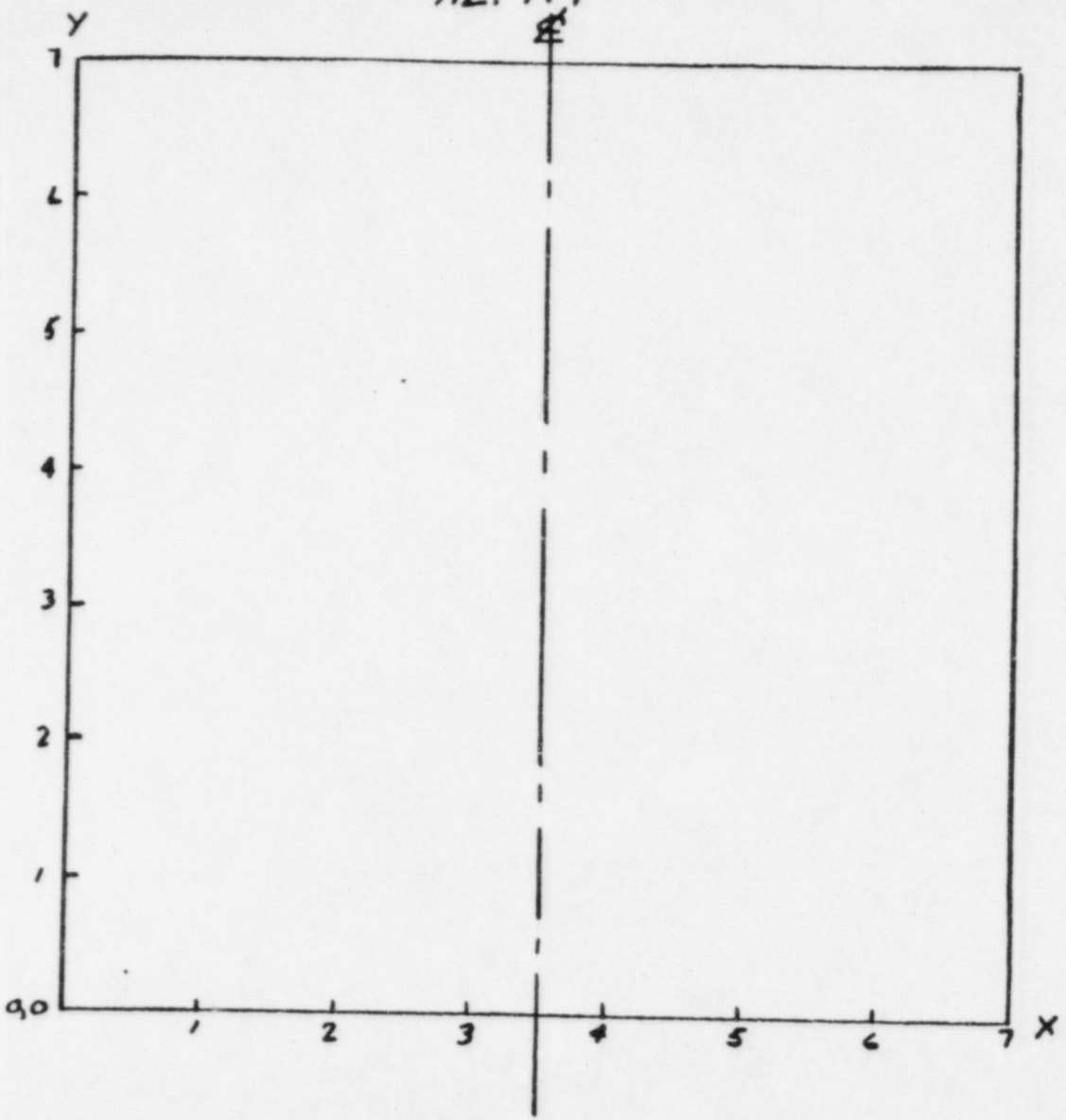
ELEV. 114.50 TO 121.50



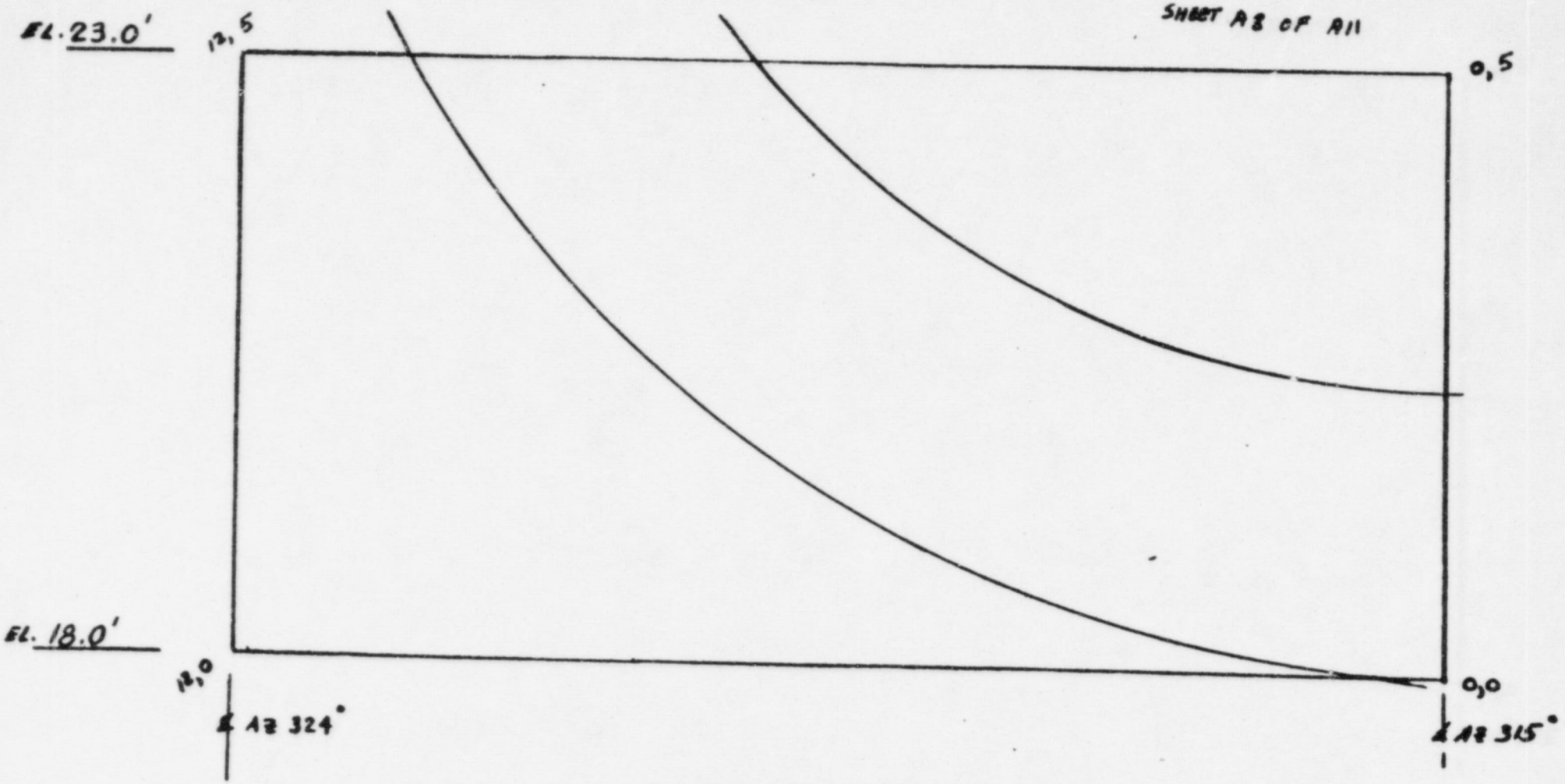
ELEV. 42.50 TO 49.50

CONCRETE MAP INFORMATION AS CALLED IN FROM OBSERVATION STATION

AZ. 114°



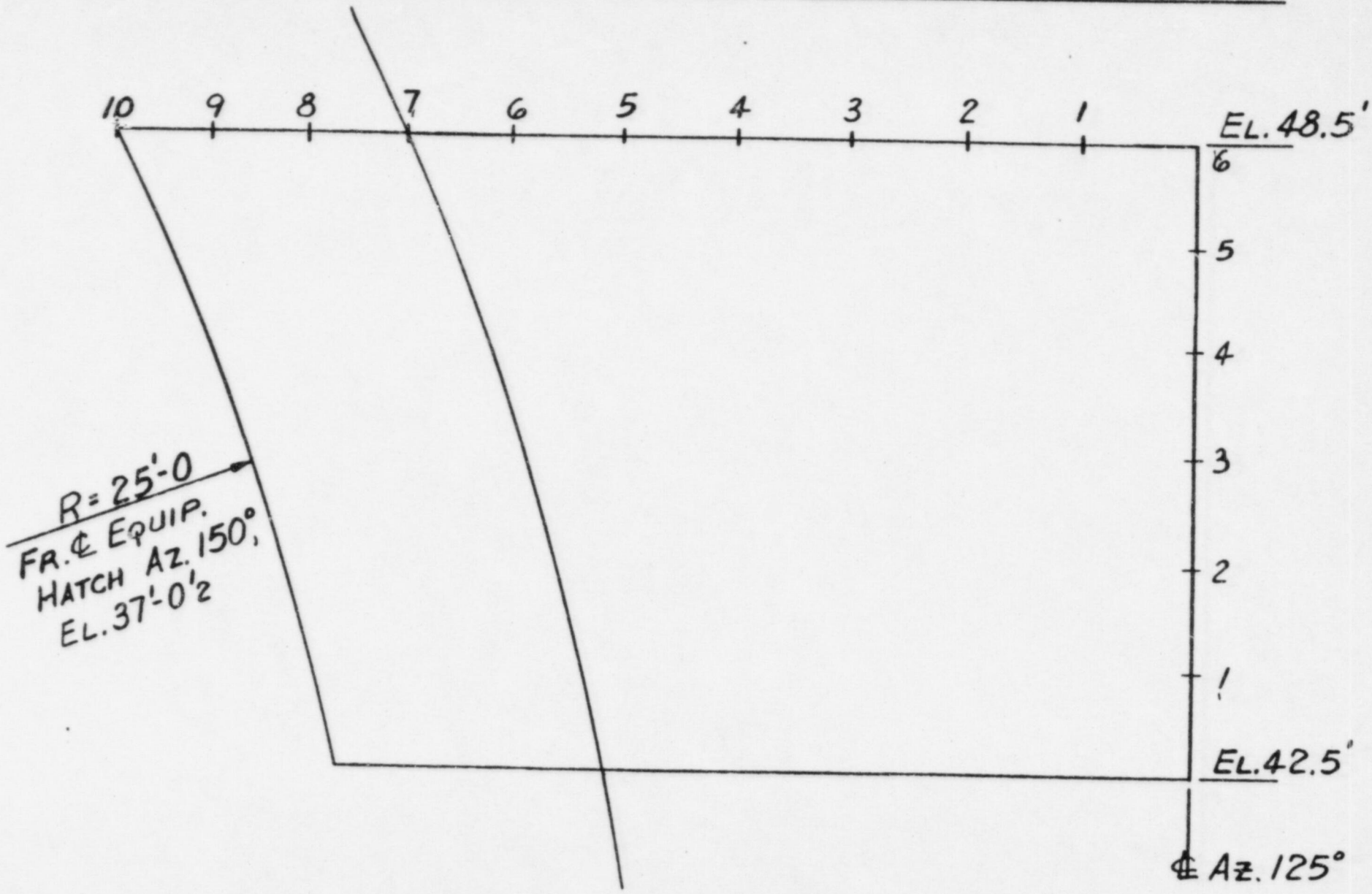
ELEV. (-)30.00 TO (-)23.00



PERSONNEL AIR LOCK

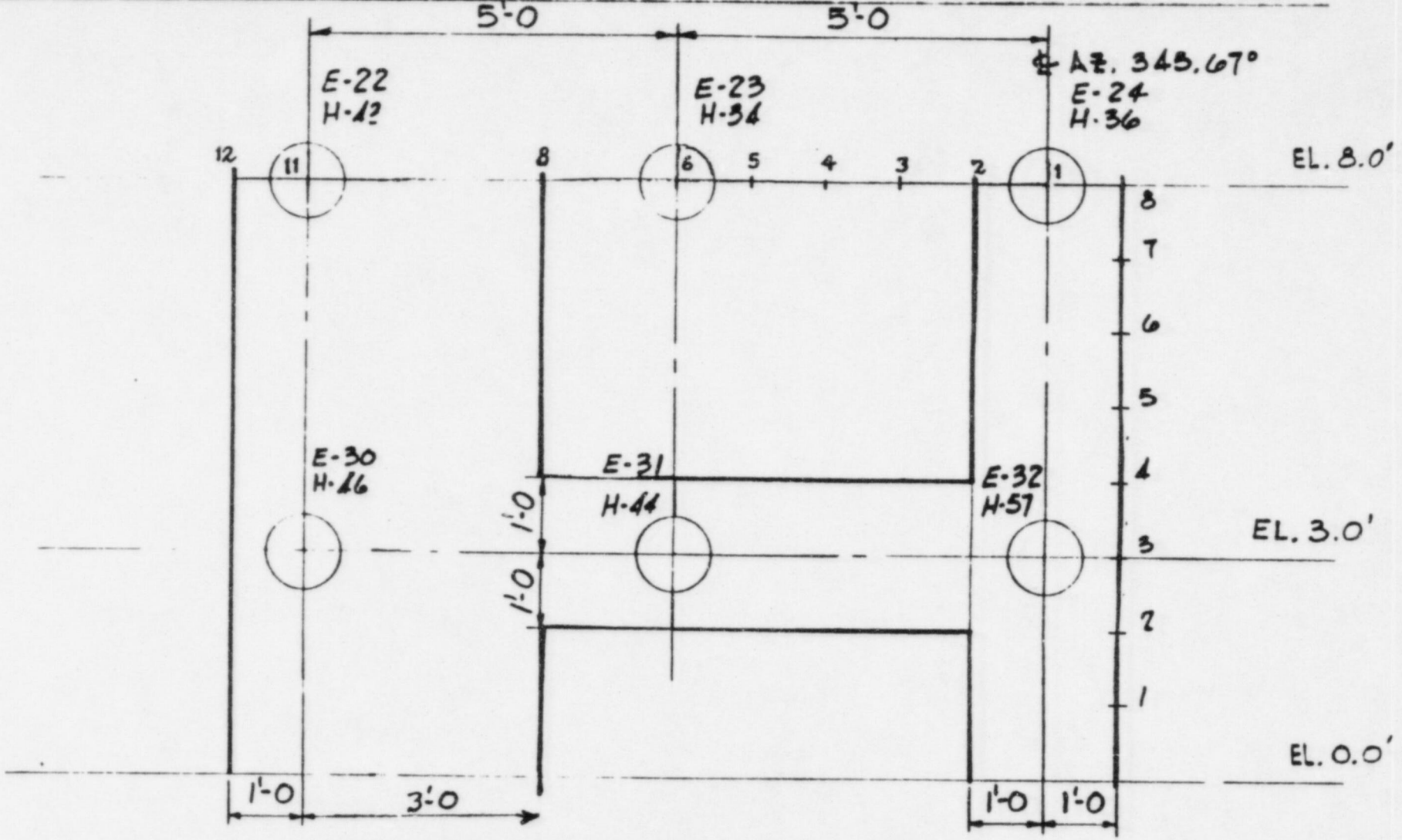
CONCRETE MAP INFORMATION AS CALLED IN FROM OBSERVATION STATION

CONCRETE MAP INFORMATION AS CALLED IN FROM OBSERVATION STATION



EQUIPMENT HATCH

CONCRETE MAP INFORMATION AS CALLED IN FROM OBSERVATION STATION



ELECTRICAL PENETRATION AREA

NOTE: ADDITIONAL CRACK MAPPING AREA SELECTED BASED ON PRETEST INSPECTION. (SEE SECTION 4.3.4).

DATE_____

TIME_____

INSTRUMENT RECOVERY
(Complete 24 Hrs After Depressurization)

INSTR. NO.	DISPLACEMENT (Inches) at 60 psi	DISPLACEMENT (Inches) at 0 psi	% RECOVERY	REMARKS
IG1				
IG2				
IG3A				
IG4				
IG5				
IG6				
IG7				
IG8				
IG9A				
IG10				
IG11				
IG12				
IG13				
IG14				
IG15				
IG16				
IG17				
IG18				
IG19				
IG20				
IG21				
IG22				
IG23				
IG24b-1				
IG3B				
IG9B				

INSTR. NO.	DISPLACEMENT (Inches) at 60 psi	DISPLACEMENT (Inches) at 0 psi	% RECOVERY	REMARKS
IG24b-2				
IG24a-3				
IG24a-4				
IG24-5				
IG24-6				
IG24d-7				
IG24d-8				
IG24c-9				
IG24c-10				
IG24-7				DELETED
IG24-8				DELETED
IG24-9				
IG24-10				
IG25				
IG26				
IG27				
IG28				
IG29				
IG30				DELETED
IG31				DELETED
IG32				DELETED
R1				
R2				
R3				
R4				
R5				

INSTRUMENT RECOVERY (Con't.)

(Complete 24 Hrs. After Depressurization)

DATE_____

TIME_____

INSTR. NO.	DISPLACEMENT (Inches) at 60 psi	DISPLACEMENT (Inches) at 0 psi	% RECOVERY	REMARKS
R6				
R7				
R8				
R9				
R10				
R11				
R12				
R13				
R14				
R15				
R16				
R17				
R18				
R19				
R20				
R21				
R22				
R23				
R24				

LIST OF DRAWINGS
to Accompany Specification 9763.006-5-5

1.0 Reference Drawings

The following drawings are for information:

Drawing No.	Title
9763-F-101440	Concrete - Equipment Hatch Reinforcing
9763-F-102153	Enclosure Building Platform
UE&C FSK 329	Containment Interior, Unit 1, Temporary 2-Ton Trolley Monorail
FP 48315	Structural Concrete Containment Dome
FP 48316	Structural Concrete Containment Dome
9763-F-102315	Containment Steel Framing Plans at El.0'-0 and 25'-0" (West)
9763-F-102317	Containment Steel Framing Plans at El.0'-0 and 25'-0" (South)
9763-F-102319	Containment Steel Framing Plans at El.0'-0 and 25'-0" (North)
9763-F-102321	Containment Steel Framing Plans at El.0'-0 and 25'-0" (East)
9763-F-101940	Containment Steel Framing Plans at El.12'-9" (East)
9763-F-101941	Containment Steel Framing Plans at El.12'-9" (West)
9763-F-101406	Containment Concrete Plan at El.0'-0"
9763-F-101407	Containment Concrete Plan at El. 25'-0"
9763-F-101487	Containment Concrete Plan at El. 0'-0" (Annulus Area)

Drawing No.	Title
9763-F-101488	Containment Concrete Plan at El. 25'-0" (Annulus Area)
9763-F-101434	Containment Concrete Sections and Elevations
9763-F-101420	Containment Concrete Interior Sections Sheet 7
9763-F-101461	Containment Liner Details and Attachments
9763-F-101495	Containment Liner Vertical Wall
9763-F-101496	Containment Liner Wall Openings and Penetrations

CONTAINMENT STRUCTURAL INTEGRITY TEST

SEABROOK STATION - UNIT 1

APPENDIX D

SIT PREDICTED AND ACCEPTABLE DATA

APPENDIX D

SIT PREDICTED AND ACCEPTABLE DATA

1.0 PURPOSE

To prove the adequacy of the Containment with respect to quality of construction and material, the Containment was pressurized to 60.0 psig (1.15 times the design accident pressure of 52 psig) internal pressure load. Various measurements of the Containment were taken at each stipulated pressurization and depressurization plateu as indicated below:

a. Displacement measurements were taken at pressurization plateaus of 0, 13, 26, 39, 52, 60 psig and depressurization plateaus of 52, 39, 26, 13, 0 psig. See Figure 5 in Appendix C.

b. Cracks were monitored and mapped at each pressurization plateau and at 39 psig and 0.0 psig depressurization plateaus. See Section 4.3 in Appendix C.

This Appendix provides various predicted and acceptable data to determine whether the Containment is responding satisfactorily to internal pressures as predicted analytically. The criteria given in this Appendix were used to decide whether it was safe to proceed with the pressurization of the Containment to the next higher pressure plateau.

Tables D-1 through D-7 provide predicted analytical and acceptable levels of displacements of the Containment for various pressure plateaus.

2.0 INSTRUMENTATION AND TEST REQUIREMENTS

2.1 General

Instrumentation and test requirements are in accordance with the following documents:

1. USNRC Regulatory Guide 1.136, Rev. 2, June 1981 (Appendix A).

2. Article CC-6000 of ASME B&PV Code, Section III, Division 2, 1980 Edition (Appendix B).

3. UE&C Specification for Structural Integrity Test, Specification No. 9763.006-5-5 (Appendix C).

2.2 Displacement Measurements

The measuring devices were installed at various locations of the Containment to measure displacements per CC-6232. These measurements include the following:

a. Radial Displacements of the Cylinder (Excluding Areas Adjacent to Equipment Hatch and Personnel Airlock) at four azimuths at Elevations 131.0', 114.58', 89.2', 59.4', 33.0', 9.5' (+), (-) 25.0' and (-) 23.0' (only at azimuth 350°).

   Ref: Table D-1

b. Radial Displacements of the Cylinder Adjacent to the Equipment Hatch and Personnel Airlock (at twelve points, four equally spaced on each of three concentric circles).

   Ref: Tables D-2 and D-4

   Tables D-3 and D-5 provide diameter changes of the Equipment Hatch and Personnel Airlock respectively.

c. Vertical Displacements of the Cylinder near the spring line (at four approximately equally spaced azimuths) relative to the base mat.

   Ref: Table D-6

d. Vertical displacements of the dome at the apex and two other approximately equally spaced intermediate points between the apex and the spring line.

   Ref: Table D-7

The instrument numbers and locations shown on Tables D-1 through D-7 correspond to those identified in Figure 3 in Appendix C.

2.3 Concrete Crack Monitoring

Cracks were monitored and mapped during the SIT at all locations shown on Figures 6, 7 and 8, and Sheets A6 through A9.1 in Appendix C. Areas shown on Sheets A6 through A9 were selected based on requirements of CC-6233. Sheet A9.1 shows additional crack mapping area selected based on pretest inspection (Ref: Section 4.3.4 in Appendix C). Location of concrete crack mapping areas are as follows:

1. Area near the spring line at Elev. 114.5' to 121.5', Azimuth 114°.

   Area near the mid-height of the Cylinder at Elev. 42.5' to 49.5', Azimuth 109.7°.

   Ref: Sheet A6

2. Area near the cylinder-to-base mat intersection at Elev. (-) 30.0' to (-) 23.0', Azimuth 114°.

   Ref: Sheet A7

3. Area near the Personnel Airlock.

   Ref: Sheet A8

4. Area near the Equipment Hatch.

   Ref: Sheet A9

5. Selected areas near electrical penetration between Elev. 0.0' to 8.0'.

   Ref: Sheet A9.1

3.0 BASIS FOR PREDICTED AND ACCEPTABLE DATA

3.1 Displacements

3.1.1 Predicted Displacements

Predicted series of displacements at selected locations of the Containment are listed on Tables D-1 through D-7. These data have been obtained from the Structural Analysis Group (SAG) Calculation Set No. SBSAG-34CS. Calc. Set SBSAG-34CS is based on information contained in the following documents:

1. SAG Reports SBSAG-7CS2 (Computer Runs #183 and 188) and SBSAG-7CS6 (Computer Run #1.13 on Containment Axisymmetric Analyses.

2. Calc. Set No. CS-2 (Computer Runs #1, 2 and 3) - Analyses of Equipment Hatch.

3. Calc. Set No. CS-8 (Computer Runs #1, 2 and 3) - Personnel Airlock Analyses.

The predicted levels of displacements are based on the following considerations:

a. Role of liner is not considered as a strength element.

b. The effects of creep and shrinkage are neglected.

c. The thermal growth of the Containment during the SIT is considered to be minimal because of relatively stable wall temperature and previous SIT experience.

d. Concrete is assumed to have minimal tensile capacity. Concrete crack pattern is based on concrete tensile stress of 300 psi. However, actual concrete tensile stress is much higher based on actual concrete compressive strength at the time of SIT.

e. The predicted displacements are based on internal pressures only. Effects of prestress due to dead loads are not considered in predicting the vertical displacements.

The detailed analysis bases of the Containment are described in SB-1 FSAR Section 3.8.1, Docket No. 50-443 and also in Containment Design Report No. 9763.102-CDR-1.

3.1.2 Acceptable Displacements

All acceptable levels of displacements are 30% higher than the predicted values. Tables D-1 through D-7 list both the predicted and acceptable levels of displacements. The deflection recovery 24 hours after depressurization is 70% or more. The criteria of acceptable levels of displacements may be waived if recovery within 24 hours is greater than 80%.

All instruments shall provide a minimum accuracy of $\pm$ 5% of the maximum anticipated values.

3.2 Crack Widths

The following criteria is obtained from UE&C Specification No. 9763.006-5-5, Section 5.2 (Appendix C):

The prediction of crack pattern and widths is based on behavior of prototype containments. The predicted maximum crack widths at peak pressure in the membrane regions (excluding discontinuity regions around large openings) are expected to be 0.025 inch or less, spaced approximately 18 inches. Crack widths in the vicinity of large openings, such as equipment hatch and personnel airlocks may be greater. The acceptance criteria for cracks are as follows:

a. The maximum crack width at peak pressure of 60 psig is 0.035 inch averaged over a length of 20'-0; the minimum spacing is 15". These averages exclude crack patterns in the vicinity of large openings.

b. Crack widths after depressurization are predicted to be less than 0.01 inch.

SIT PREDICTED AND ACCEPTABLE DATA

TABLE D-1: Radial Displacements of Cylinder (Excluding Areas Adjacent to Equipment Hatch and Personnel Airlock)

Instrument No.	Location		Displacements in Inch for Various Pressures									
	Elev	Azimuth	13 psig		26 psig		39 psig		52 psig		60 psig	
			(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)
IG 1	131.0'	0° & 180°	0.223	0.29	0.447	0.581	0.67	0.87	0.897	1.166	1.031	1.34
IG 2	131.0'	90° & 270°	0.223	0.29	0.447	0.581	0.67	0.87	0.897	1.166	1.031	1.34
IG 3A	114.58'	0°	0.21	0.28	0.42	0.55	0.62	0.81	0.83	1.08	0.96	1.25
IG 3B	114.58'	180°	0.21	0.28	0.42	0.55	0.62	0.81	0.83	1.08	0.96	1.25
IG 4	114.58'	90° & 270°	0.21	0.28	0.415	0.54	0.62	0.81	0.83	1.08	0.96	1.25
IG 5	89.2'	0° & 180°	0.211	0.274	0.421	0.55	0.632	0.822	0.842	1.09	0.967	1.257
IG 6	89.2'	90° & 270°	0.211	0.274	0.421	0.55	0.632	0.822	0.842	1.09	0.967	1.257
IG 7	59.4'	0° & 180°	0.197	0.256	0.393	0.511	0.59	0.77	0.786	1.022	0.898	1.167
IG 8	59.4'	90° & 270°	0.197	0.256	0.393	0.511	0.59	0.77	0.786	1.022	0.898	1.167
IG 9A	33.0'	38°	0.21	0.28	0.40	0.52	0.592	0.77	0.791	1.03	0.957	1.25
IG 9B	30.0'	218°	0.21	0.28	0.40	0.52	0.592	0.77	0.791	1.03	0.957	1.25

(P) Predicted
(A) Acceptable

TABLE D-1: Radial Displacements of Cylinder (Excluding Areas Adjacent to Equipment Hatch and Personnel Airlock)

Instrument No.	Location		Displacements in Inch for Various Pressures									
	Elev	Azimuth	13 psig		26 psig		39 psig		52 psig		60 psig	
			(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)
IG 10	33.0'	128°	0.198	0.26	0.396	0.52	0.593	0.77	0.792	1.03	0.958	1.25
IG 11	31.5'	308°	0.198	0.26	0.396	0.52	0.593	0.77	0.792	1.03	0.958	1.25
IG 12	9.5'	42°	0.19	0.25	0.381	0.50	0.572	0.75	0.766	1.0	0.894	1.16
IG 13	9.67'	130°	0.19	0.25	0.381	0.50	0.572	0.75	0.766	1.0	0.894	1.16
IG 14	10.0'	222°	0.19	0.25	0.381	0.50	0.572	0.75	0.766	1.0	0.894	1.16
IG 15	9.25'	310°	0.19	0.25	0.381	0.50	0.572	0.75	0.766	1.0	0.894	1.16
IG 16	(-)25.0'	0°(-)	0.025	0.04	0.053	0.07	0.077	0.10	0.103	0.14	0.118	0.15
IG 17	(-)25.0'	90°(-)	0.025	0.04	0.053	0.07	0.077	0.10	0.103	0.14	0.118	0.15
IG 18	(-)25.0'	180°(+)	0.025	0.04	0.053	0.07	0.077	0.10	0.103	0.14	0.118	0.15
IG 19	(-)25.0'	270°(+)	0.025	0.04	0.053	0.07	0.077	0.10	0.103	0.14	0.118	0.15
IG 29	(-)23.0'	350°	0.037	0.048	0.074	0.096	0.112	0.146	0.149	0.194	0.172	0.224 (1)

(P) Predicted
(A) Acceptable
(1) These values represent displacements computed for IG29 @ El. (-) 23.0'. Displacement values shown for IG29 in Appendix I are different from these values because in Appendix I, displacements computed for IG16 @ El. (-) 25.0' were considered as displacements for IG29.

TABLE D-2: Radial Displacements of Cylinder Adjacent to Equipment Hatch

Instrument No.	Location		Displacements in Inch for Various Pressures									
	Elev	Azimuth	13 psig		26 psig		39 psig		52 psig		60 psig	
			(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)
R 1	51.46'	150°	0.143	0.19	0.286	0.37	0.429	0.56	0.572	0.75	0.66	0.86
R 2	37.04'	161.7°	0.185	0.24	0.37	0.48	0.555	0.72	0.739	0.96	0.853	1.11
R 3	22.62'	150°	0.153	0.20	0.306	0.40	0.459	0.60	0.612	0.80	0.707	0.92
R 4	37.04'	138.3°	0.185	0.24	0.37	0.48	0.555	0.72	0.739	0.96	0.853	1.11
R 5	59.29'	150°	0.171	0.22	0.342	0.45	0.513	0.67	0.684	0.90	0.79	1.03
R 6	37.04'	167.9°	0.225	0.29	0.45	0.60	0.675	0.88	0.90	1.17	1.039	1.35
R 7	14.79'	150°	0.183	0.24	0.366	0.48	0.549	0.72	0.732	0.95	0.845	1.10
R 8	37.04'	132.1°	0.225	0.30	0.45	0.60	0.675	0.88	0.90	1.17	1.039	1.35
R 9	72.04'	150°	0.123	0.28	0.426	0.56	0.639	0.83	0.851	1.11	0.982	1.28
R 10	37.04'	177.5°	0.288	0.37	0.577	0.75	0.862	1.21	1.149	1.50	1.326	1.72
R 11	(-)4.96'	150°	0.20	0.26	0.40	0.52	0.60	0.78	0.80	1.04	0.923	1.20
R 12	37.04'	122.7°	0.288	0.37	0.577	0.75	0.862	1.12	1.149	1.50	1.326	1.72

(P) Predicted
(A) Acceptable

TABLE D-3: Equipment Hatch Diameter Change

Instrument No.	Orientation	Displacements in Inch for Various Pressures									
		13 psig		26 psig		39 psig		52 psig		60 psig	
		(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)
IG 25	Vertical	0.016	0.021	0.032	0.042	0.047	0.061	0.063	0.082	0.073	0.095
IG 26	Horizontal	0.072	0.10	0.145	0.20	0.218	0.28	0.29	0.38	0.334	0.44

(P) Predicted
(A) Acceptable

TABLE D-4: Radial Displacements of Cylinder Adjacent to Personnel Airlock

Instrument No.	Location		Displacements in Inch for Various Pressures									
	Elev	Azimuth	13 psig		26 psig		39 psig		52 psig		60 psig	
			(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)
R 13	33.75'	315°	0.191	0.25	0.383	0.50	0.576	0.75	0.77	1.00	0.887	1.15
R 14	29.5'	318.5°	0.19	0.25	0.383	0.50	0.576	0.75	0.77	1.00	0.887	1.15
R 15	25.25'	315°	0.196	0.26	0.392	0.51	0.588	0.77	0.783	1.02	0.904	1.18
R 16	29.5'	310.9°	0.189	0.25	0.383	0.50	0.577	0.75	0.77	1.00	0.89	1.16
R 17	35.62'	315°	0.194	0.25	0.39	0.51	0.586	0.76	0.782	1.02	0.903	1.18
R 18	29.5'	320.5°	0.196	0.26	0.393	0.51	0.59	0.77	0.787	1.02	0.909	1.18
R 19	22.25'	315°	0.202	0.26	0.405	0.53	0.608	0.79	0.811	1.06	0.936	1.22
R 20	29.5'	310°	0.196	0.26	0.392	0.51	0.588	0.76	0.783	1.02	0.904	1.18
R 21	38.25'	315°	0.203	0.27	0.405	0.53	0.608	0.79	0.81	1.05	0.934	1.21
R 22	29.5'	322.1°	0.203	0.27	0.405	0.53	0.608	0.79	0.81	1.05	0.935	1.22
R 23	20.75'	315°	0.205	0.27	0.412	0.54	0.62	0.81	0.827	1.08	0.955	1.24
R 24	29.5'	307.9°	0.203	0.27	0.405	0.53	0.608	0.79	0.81	1.05	0.935	1.22

(P) Predicted
(A) Acceptable

TABLE D-5: Personnel Airlock Diameter Change

Instrument No.	Orientation	Displacements in Inch for Various Pressures									
		13 psig		26 psig		39 psig		52 psig		60 psig	
		(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)
IG 27	Vertical	0.008	0.01	0.015	0.02	0.023	0.03	0.03	0.039	0.035	0.046
IG 28	Horizontal	0.02	0.03	0.04	0.052	0.06	0.08	0.08	0.11	0.10	0.13

(P) Predicted
(A) Acceptable

TABLE D-6: Vertical Displacements of Cylinder Near Spring Line Relative to Base Mat

Instrument No.	Location		Displacements in Inch for Various Pressures									
	Elev	Azimuth	13 psig		26 psig		39 psig		52 psig		60 psig	
			(P)	(A)	(PA)	(A)	(P)	(A)	(P)	(A)	(P)	(A)
IG 20	115.33'	0°	0.31	0.41	0.61	0.79	0.92	1.20	1.22	1.59	1.41	1.84
IG 21	115.33'	180°	0.31	0.41	0.61	0.79	0.92	1.20	1.22	1.59	1.41	1.84
IG 22	117.33'	90°	0.31	0.41	0.625	0.82	0.94	1.22	1.25	1.63	1.44	1.87
IG 23	117.33'	270°	0.31	0.41	0.625	0.82	0.94	1.22	1.25	1.63	1.44	1.87

(P) Predicted
(A) Acceptable

TABLE D-7: Vertical Displacements of Dome Relative to Base Mat

P.T. Location	Location		Displacements in Inch for Various Pressures									
	Elev	Azimuth	13 psig		26 psig		39 psig		52 psig		60 psig	
			(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)	(P)	(A)
IG 24b	152.0'	0°	0.41	0.54	0.825	1.07	1.24	1.61	1.65	2.15	1.90	2.47
IG 24d	152.0'	0°	0.41	0.54	0.825	1.07	1.24	1.61	1.65	2.15	1.90	2.47
IG 24a	182.4'	0°	0.50	0.65	1.0	1.30	1.50	1.95	2.00	2.60	2.31	3.0
IG 24c	182.4'	0°	0.50	0.65	1.0	1.30	1.50	1.95	2.00	2.60	2.31	3.0
IG 24	188.99'	Apex	0.50	0.65	0.993	1.30	1.49	1.94	1.986	2.60	2.154	2.80

(P) Predicted
(A) Acceptable

CONTAINMENT STRUCTURAL INTEGRITY TEST

SEABROOK STATION - UNIT 1

APPENDIX E

SIT/ILRT EQUIPMENT PROTECTION LIST

APPENDIX E

SIT/ILRT EQUIPMENT PROTECTION LIST

During the SIT, all pressure sensitive structures and equipment/components were adequately protected. The following Equipment Protection List was prepared by UE&C Engineering to insure that equipment/components were protected, vented or removed, and all such work was performed by UE&C Construction as directed by the STD.

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MECHANICAL

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT COMPONENT NO.	LOCATION		RECOMMENDED PROTECTION
		AZIMUTH	ELEV.	
AIR COMPRESSOR	SA-C-4A, B	310°	0'-0"	Secure (disconnect) power supply, depressurize air system, receiver & piping, open drain valves & leave open for duration of test. After the test purge moist air from air piping before returning system to service. Supplement with 7/18/85 telecon with Cooper (attached).
AIR DRYER	1A-D-2A, B	310°	0'-0"	Secure (disconnect) power supply, depressurize air and freon piping; leave valves open on air & freon piping. After test, recharge freon prior to putting air dryer back in service. High and low pressure freon charging valves will have to be added since system is all brazed.

UNITED ENGINEERS & CONSTRUCTORS INC.

MECHANICAL SERVICES

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT/ COMPONENT NO.	LOCATION		RECOMMENDED PROTECTION
		AZIMUTH	ELEV.	
CONTAINMENT STRUCTURE COOLING UNIT	CAH-AC-1A	70°	0'-0"	PCC water side in service during SIT. Run fan at lowest speed.
	CAH-AC-1B	110°	0'-0"	PCC water side in service during SIT. Fan will not run during test. Rack out breaker.
	CAH-AC-1C	150°	0'-0"	PCC water side in service during SIT. Run fan at lowest speed.
	CAH-AC-1D	210°	0'-0"	PCC water side in service during SIT. Fan wil' not run during testing. Rack out breaker.
	CAH-AC-1E	250°	0'0"	PCC Water side in service during SIT. Run fat at lowest speed.
	CAH-AC-1F	290°	0'-0"	PCC water side inservice during SIT. Fan will not run during test. Rack out breaker.
CONTAINMENT RECIRC. FILTER SYSTEM	CAH-F-8	280°	25'-0"	Do not operate fans at a relative air density of of greater than .1436 #/CF without repitching the blades ($\approx$28 psig at ambient temp.). Vent filter housing by opening access doors, maintain filter outlet dampers closed. Also see ECA 99/114411A for additional protection on CAH-F-8 and ECA 99/114354A on CAH-FN-3B.
CS RECIRCULATION FILTER	CAH-FN-3A	300°	25'-0"	
	CAH-FN-3B	300°	25'-0"	

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NUCLEAR

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT/ COMPONENT NO.	LOCATION		RECOMMENDED PROTECTION
		AZIMUTH	ELEV.	
PRESSURIZER RELIEF TK PUMP	RC-P-271	170°	- 26'-0"	Verify that bearing frame breather is open and free of dirt.
RC DRAIN TK PUMPS	WLD-P-33A&B	80°	- 26'-0"	Verify that bearing frame breather is open and free of dirt.
HEAT EXCHANGER	CC-E-153A & B	310°/250°	- 26'-0"	Vent entire system by assuring head tank is vented and valves 3" - CC-V395, 438, 439 and 422 are open.
REFUELING POOL STRAINER	SF-S-131	290°	- 26'-0"	Open vent cock and clear dirt from opening.
REFUELING CANAL SKIMMER PUMP	SF-P-272	280°	- 26'-0"	Verify that bearing frame breather is open and free of dirt.
THERMAL BARRIER CLG. PUMP	CC-P-322A&B	260°	- 26'-0"	Open inspection hole atop bearing frame and clear dirt from opening.
CNMT RECIRC SUMP	CBS-TK-10A&B	280°/260°	- 26'-0"	Clear sump screens. (Covered by construction cleanliness section of PT 37.1).
ELEVATOR	MM-MM-19	330°	25'-0"	Verify that worm gear box has breather or open inspection plug. Secure fan 37.

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NUCLEAR

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT/ COMPONENT NO.	LOCATION		RECOMMENDED PROTECTION
		AZIMUTH	ELEV.	
NEUTRON SHIELD PANELS	N/A	0°-360°	0'-0"	For all (8) neutron shield panels. Remove bolts prior to test as shown on attached sheet 11. Bolts to be reinstalled to spec. torque. See Note (1)
POLAR GANTRY BRIDGE ASSY.	-	-	-	Verify that bearing frame or gear box has breather or open inspection plug. See Note (2)
POLAR CRANE DIGITAL READOUT	-	-	-	Remove during the test.
CALIVAR & OTHER CONSTRUCTION CRANES				Vent gear boxes and hydraulics as necessary.

NOTES: (1) Upon receipt of panels on site, inspection may suggest simpler protective measures.

(2) Verify all gear boxes and hydraulics including the pendent drive are vented or remove fill plugs. Vent freon from cab air conditioner.

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EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT/ COMPONENT NO.	LOCATION AZIMUTH	LOCATION ELEV.	RECOMMENDED PROTECTION
VB SYSTEM LOOSE PARTS MONITOR	VB-YT-6824-1&2 VB-YT-6825-1&2 VB-YT-6826 thru 6829-1,2 & 3	89° 35° 90°&270°	0' - 44' - 26'	((To be checked and tested after SIT (and ILRT. (
NI SYSTEM EXCORE NEUTRON DETECTION SYSTEM	NI-NE-6690 & 6691	320° 35°	- 26' - 15'	Ensure that the cable pulling fixture is sealed using teflon tape to the detector cable assembly. This is mandatory to protect the detector from moisture and other contaminents, or verify that the detector cables are terminated to the detector.
CAS SYSTEM HYDROGEN ANALYZERS	CAS-AT-8815 thru 8818-1,2,3 & 4			(Recalibrate the instrument after the completion of (the test. (
	CAS-AT-8815-1	250°	- 26'	(NOTE: This is a preventive measure by the vendor
	-2	75°	- 26'	(due to lack of experience with the pressure
	-3	80°	- 26'	(response of the sensors. May be deleted
	-4	150°	- 26'	(for future ILRT's based on the results of
	CAS-AT-8816-1	180°	- 26'	(the initial testing.
	-2	165°	- 26'	(
	-3	180°	- 26'	(
	-4	200°	- 26'	(
	CAS-AT-8817-1	185°	- 26'	(
	-2	178°	- 26'	(
	-3	182°	- 26'	(
	-4	200°	- 26'	(

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EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT/ COMPONENT NO.	LOCATION AZIMUTH	LOCATION ELEV.	RECOMMENDED PROTECTION
CAS SYSTEM HYDROGEN ANALYZERS (Contd)	CAS-AT-8818-1	185°	- 26'	(Recalibrate the instrument after the completion of (the test.
	-2	178°	- 26'	(
	-3	185°	- 26'	(
	-4	200°	- 26'	(
WLD SYSTEM LEVEL SWITCHES IN CONTAINMENT BLDG. SUMP A&B	WLD-LSH/LSLH/ LSHH-6266	85°	- 26'	(Functional test is necessary after the completion (of SIT and ILRT.
	6267	350°	- 44'	(
	WLD-LSH/LSHH-1403	78°	- 26'	(
INST & SERV AIR SYSTEM PRESSURE SWITCHES IN INSTRUMENT AIR	IA-PSL-8024 & 8026	310°	0'	Loosen the cover. Vent the switch to containment atmosphere.
CAH SYSTEM CONT STRUCTURE FILTER UNIT	CAH-PDSH-F8-1	--	+ 25'	Perform functional test after SIT and ILRT.
RM SYSTEM				
a CAVITY BENEATH REACTOR VESSEL	RM-RE-6529	5°	- 40'	Remove detector (Type RD-8).
b. MANIPULATOR CRANE	RM-RE-6535 A&B RM-RI-6535 A&B	0°	28'	Remove detector (Type RD-10B and indicator (RL-10).

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EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT/ COMPONENT NO.	LOCATION		RECOMMENDED PROTECTION
		AZIMUTH	ELEV.	
RM SYSTEM (Contd)				
c. CONT. BLDG. SEAL INCORE SEAL TABLE	RM-RE-6534	350°	0'	Remove detector (Type RD-10D).
d. CAH SYSTEM	RM-SKD-60 (RM-RM-6526)	250°	- 3'	Isolate supply and return sample lines to skid by closing the manual isolation valves. (Covered by valve lineup in PT 37.1, skid outside containment.) Additional "G.A." recommended protection actions for RM System o Open doors on RM-80 cabinets. o Remove all RC-10 digital indicators (there are more than two). o Unscrew plastic covers on alert and alarm lights. o RD-10 detectors need be only removed for initial SIT/ILRT. Future ILRT's at less than 50 psig need not remove these detectors.
ASCO PRESSURE SWITCH	WLD-PSH-1501			Equalize process line to containment atmosphere. This instrument is same as IA-PSL-8024 & 8026.
BARKSDALE PRESSURE SWITCH	RC-PS-491 THRU 494			Equalize to containment pressure.
FIRE DETECTION SYSTEM				No protective action is necessary, but be aware that the detectors will alarm on increasing air pressure and will be inoperable during the test.

UNITED ENGINEERS & CONSTRUCTORS, INC.

ELECTRICAL

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT/ COMPONENT NO.	LOCATION AZIMUTH	LOCATION ELEV.	RECOMMENDED PROTECTION
LIGHTING FIXTURE LAMPS		Throughout Containment		Unscrew and loosen the cover, do not remove bulbs on L16 fixtures. Unscrew explosion proof covers on lighting on polar crane handrails (supplied with polar crane) (LIC type). Remove large lights underneath polar crane and bag in place or remove from containment. This is a precautionary measure to protect the reactor cavity from debris. L6, L6A, L7A, L7B fixtures are not sealed. The L16 fixtures are watertight and vaportight and covers must be loosened. Remaining lighting fixtures/lamps will not be affected by the SIT.

UNITED ENGINEERS & CONSTRUCTORS, INC.

ELECTRICAL

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT/ COMPONENT NO.	LOCATION		RECOMMENDED PROTECTION
		AZIMUTH	ELEV.	
LIGHTING PANELS	ED-MM-163A	320	(-) 26	
	ED-MM-163J	180		
	ED-MM-163B	170	0	
	ED-MM-163E	330		
	ED-MM-163F	320		Punch hole through bottom of enclosure of sufficient size to equalize the pressure transient. (One time protection)
	ED-MM-163H	170		
	ED-MM-163K	330		
	ED-MM-163C	300	(+)25	
	ED-MM-163D	120		
	ED-MM-163G	160		NOTE: #1
POWER PANELS	ED-PP-8B	320	(-)26	Punch hole through bottom of enclosure of sufficient size to equalize the pressure transient. (One time protection)
	ED-PP-7A	320	0	
	ED-PP-7B	20		
	ED-PP-8A	170		NOTE #1
TERMINAL BOXES Incore	HM1, HM7	0	0	Punch hole through bottom of enclosure of sufficient size to equalize the pressure transient. (One time protection)
Pressurizer	X43, X45, X46, X47	100	(-)26	
Pressurizer	X44	100	0	
	EC-X16 H	160		NOTE: #1 NOTE: #2

UNITED ENGINEERS & CONSTRUCTORS, INC.

ELECTRICAL

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

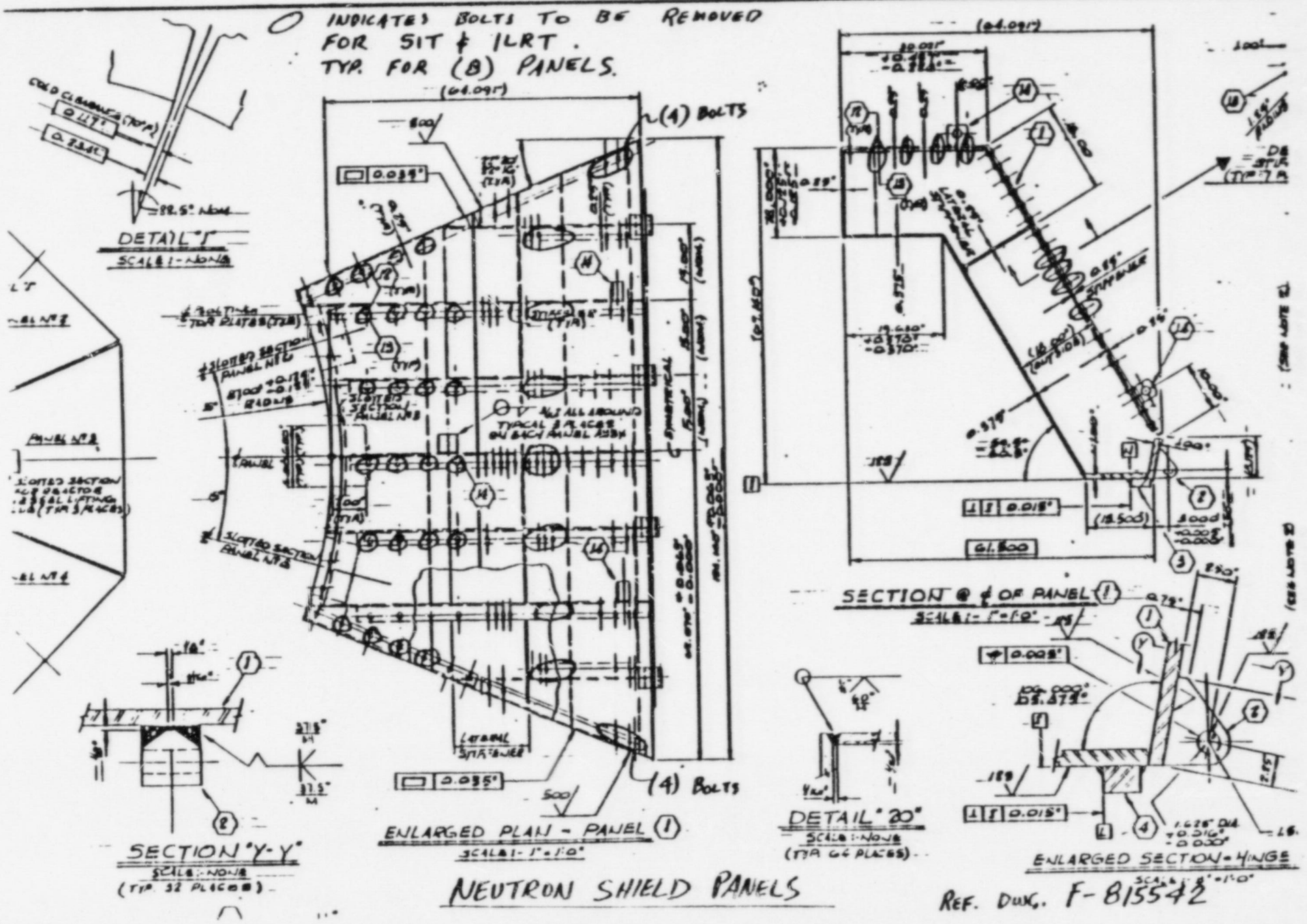
EQUIPMENT/ COMPONENT NAME	EQUIPMENT/ COMPONENT NO.	LOCATION AZIMUTH	LOCATION ELEV.	RECOMMENDED PROTECTION
SPEAKER-AMPLIFIER	CM-3-1 thru 7 CM-3-12 thru 20 CM-3-22 CM-3-24 thru CM-3-34	Throughout	Containment	(1) Remove speaker-driver unit by removing two wires and unscrewing the driver from horn. (2) Remove handsets (total 5) by unscrewing four screws and unplugging amplifier.

NOTE: #1 Any conduit that penetrates an enclosure will contain sufficient free area to vent equipment during pressure transient test. Field walkdown must verify that conduit has not been sealed by Spec. 249-7 contractor.

NOTE: #2 Installed procedures call for a 1/4 inch hole which is sufficient free area to vent equipment during pressure transient. Field walkdown must verify if hole installed.

NUCLEAR ATTACHMENT TO EQUIPMENT/COMPONENT PROTECTION LIST FOR SIT - SEABROOK STATION UNIT 1

TOTAL OF 60 BOLTS TO BE REMOVED PER PANEL.



NEUTRON SHIELD PANELS

REF. DWG. F-815542

UNITED ENGINEERS & CONSTRUCTORS INC.

WESTINGHOUSE (NUCLEAR)

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT COMPONENT ID/PO NO.	LOCATION		RECOMMENDED PROTECTION
		AZIMUTH	ELEV.	
ROD POSITION INDICATION DATA CABINETS	NAH-340			All P.C. boards and power supplies in the two DRPI data cabinets are to be carefully removed by qualified electrical personnel and stored outside containment before test. After tests are completed and humidity levels inside containment have normalized, all components are to be restored/reconnected to the original configuration.
COMBINATION FIXED/ MOVABLE INCORE DETECTION SYSTEM COMPONENTS & FLUX MAPPING SYS.	NAH-360			* The dehumidifier units within the system must be turned off. Leave temporary space heaters on for SIT.
FUEL HANDLING SYSTEM CONTROL CABINETS AND REFUELING MACHINE	NAH-185 FH-RE-60 FH-RE-5			* Fuel Transfer System Reactor Side Control Cabinet Verify that the three 1/2" dia. holes in cabinet bottom are clear (Ref. F.P. 55302). The cabinet heater circuit must be on and operate continuously during test. Holes are used for conduits. Partially block open door for test. * Refueling Machine - Remove the control console during test and remove the video cameras from the bridge and trolley. Secure air compressor and vent.

* NOTE: Unless otherwise indicated, this procedure must be reversed after completion of SIT & ILRT Tests to restore systems to their original condition.

UNITED ENGINEERS & CONSTRUCTORS INC.

WESTINGHOUSE (NUCLEAR)

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT COMPONENT ID/PO NO.	LOCATION		RECOMMENDED PROTECTION
		AZIMUTH	ELEV.	
PRESSURIZER RELIEF TANK	RC-TK-11			Vent to containment atmosphere. * Open RC-V-152 and remove blind flange.
ACCUMULATOR	SI-TK-9A			Vent to containment atmosphere * Open SI-V-9, FV-2475 & FV-2476
	SI-TK-9B			Vent to containment atmosphere * Open SI-V-29, FV-2482 & FV-2483
	SI-TK-9C			Vent to containment atmosphere * Open SI-V-44, FV-2477 & FV-2486
	SI-TK-9D			Vent to containment atmosphere * Open SI-V-59, FV-2495 & FV-2496
REACTOR COOLANT PUMP	RC-P-1A RC-P-1B RC-P-1C RC-P-1D			Typ. for RC-P-1A, B, C & D After completion of SIT the polarization index of the stator insulation must be checked per Section 5.1.2 of the instruction manual (Ref. F.P. 54502). Test voltage should be 2500 Volts DC, minimum acceptable P.I. is 2.0. If measured P.I. is less than 2.0 dry windows per section 5.4.6 of the manual and retest.

* See note on Sheet 12.

UNITED ENGINEERS & CONSTRUCTORS INC.

WESTINGHOUSE (NUCLEAR)

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT COMPONENT ID/PO NO.	LOCATION		RECOMMENDED PROTECTION
		AZIMUTH	ELEV.	
PRESSURIZER	RC-E-10			Vent to containment atmosphere * Open RC-V-127 (Note: Pressurizer heater resistances may not be accurate if measured during high humidity conditions)
STEAM GENERATOR	RC-E-11A RC-E-11B RC-E-11C RC-E-11D			Primary side is vented through RCS. Secondary side not to be vented.
HYDROGEN RECOMBINER	CGC-MM-284A CGC-MM-284B			The following procedure should be followed after completion of test but before energizing units. Determine the resistance to ground values using 250 Volts DC for each phase, for each recombiner (including interconnecting cabling) at the power supply. All resistance values should be in excess of 30 K Ohms before energizing the recombiner. If the minimum values determined are above 30 K Ohms but below 100 K Ohms, then energize recombiners to 1200 Deg. F for 8 hours to drive moisture from heating elements. Allow recombiner to cool to approximately ambient temperature and repeat resistance test. New resistance values should be in excess of 100 K Ohms.

* See note on Sheet 12.

UNITED ENGINEERS & CONSTRUCTORS INC.

WESTINGHOUSE (NUCLEAR)

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT COMPONENT ID/PO NO.	LOCATION		RECOMMENDED PROTECTION
		AZIMUTH	ELEV.	
FUEL TRANSFER ELECTRICAL CONTROL HYDRAULIC POWER UNIT	FH-RE-60 (F.P. 55302)			See fuel handling system control cabinets NAH-185.
MANIPULATOR CRANE & FUEL LIFTING MECH.	FH-RE-5 (F.P. 54057)			See fuel handling system control cabinets & refueling machine. NAH-185

UNITED ENGINEERS & CONSTRUCTORS INC.

WESTINGHOUSE (I&C)

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT COMPONENT NO.	LOCATION		RECOMMENDED PROTECTION
		AREA	ELEV.	
RC-E-10 PRESSURIZER	(RC) LT-459	C8 CI-0	0'-0"	Maintain in normal lineup
	(RC) LT-460	C8 CI-0	0'-0"	
	(RC) LT-461	C8 CI-0	0'-0"	
	(RC) LT-462	C8 CS-0	0'-0"	
RC-P-ID NO. 1 SEAL PRESS	(CS) PT-150	IR-8 CS-0	0'-0"	Maintain in normal lineup. Inspect, dry and calibrate if saturated conditions exist during the test. Loosen plastic covers on Bartons for SIT only. (Not necessary for ILRT's in service.)
	(CS) PT-151	IR-7 CS-0	0'-0"	
	(CS) PT-152	IR-6 CS-0	0'-0"	
RC-P-1A NO. 1 SEAL PRESS	(CS) PT-153	IR-11 CS-0	0'-0"	

UNITED ENGINEERS & CONSTRUCTORS INC.

WESTINGHOUSE (I&C)

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT COMPONENT NO.	LOCATION		RECOMMENDED PROTECTION
		AREA	ELEV.	
RC-E-11A STM GEN	(FW) FT-512	IR-11 CS-0	0'-0"	Maintain in normal lineup (Causes a containment leak if vented to steam side. These are containment boundary.)
	(FW) FT-513	C-16 CS-0	0'-0"	
RC-E-11B STM GEN	(FW) FT-522	IR-6 CS-0	0'-0"	
	(FW) FT-523	IR-6 CS-0	0'-0"	
RC-E-11C STM GEN	(FW) FT-532	IR-7 CS-0	0'-0"	
	(FW) FT-533	IR-7 CS-0	0'-0"	
RC-E-11D STM GEN	(FW) FT-542	IR-8 CS-0	0'-0"	
	(FW) FT-543	IR-8 CS-0	0'-0"	

UNITED ENGINEERS & CONSTRUCTORS INC.

WESTINGHOUSE (I&C)

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT COMPONENT NO.	LOCATION AREA	LOCATION ELEV.	RECOMMENDED PROTECTION
RC-E-11A SG NRW RNG	(FW) LT-517	C-17 CS-0	0'-0"	Maintain in normal lineup (Causes a containment leak if vented. These are containment boundary.)
	(FW) LT-518			
	(FW) LT-519			
RC-E-11B	(FW) LT-527	C-5 CS-0		
	(FW) LT-528			
	(FW) LT-529			
RC-E-11C	(FW) LT-537	C-5 CS-26	26'-0"	
	(FW) LT-538	C-5 CS-26	26'-0"	
	(FW) LT-539	IR-7 CS-0	0'-0"	
RC-E-11D SG NRW RNG	(FW) LT-547	IR-8 CS-0	0'-0"	
	(FW) LT-548			
	(FW) LT-549			

UNITED ENGINEERS & CONSTRUCTORS INC.

WESTINGHOUSE (I&C)

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT COMPONENT NO.	LOCATION AREA	LOCATION ELEV.		RECOMMENDED PROTECTION
RC-E-10 PRZR	(RC) PT-455	C-8 CS-0	0'-0"		Maintain in normal lineup
	(RC) PT-456		0'-0"		
	(RC) PT-457				
	(RC) PT-458				
RC-P-1D LO RNG LKGE	(CS) FT-154	C-11 CS-26	26'-0"	C *	Maintain in normal lineup
1C	(CS) FT-155			C *	Inspect, dry and calibrate if saturated conditions occur during the test.
1B	(CS) FT-156			C *	
2A	(CS) FT-157			C *	
RC-P-1D HI RNG LKGE	(CS) FT-158	C-11 CS-26	26'-0	C	
2C	(CS) FT-159			C	
1B	(CS) FT-160			C	
1A	(CS) FT-161			C	
EXCESS LETDN OUTLET PRESS	(CS) PT-124	C-11 CS-26	26'-0"	C	
RC-E-11A SG WIDE RNG	(FW) LT-501	C-16 CS-26	26'-0"	A	Maintain in normal lineup (Containment boundary instrumentation)
11B	(FW) LT-502			A	
11C	(FW) LT-503			A	
11D	(FW) LT-504			A	

* Loosen covers on Bartons for SIT only. (Not necessary for future ILRT's.)

UNITED ENGINEERS & CONSTRUCTORS INC.

WESTINGHOUSE (I&C)

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT COMPONENT NO.	LOCATION		RECOMMENDED PROTECTION
		AREA	ELEV.	
RC-E-11A LOOP 1	(FW) LT-551	C-16 CS-26	26'-0"	Maintain in normal lineup (Containment bounday)
11B	(FW) LT-552	C-3 CS-26		
11C	(FW) LT-553	C-7 CS-26		
11D	(FW) LT-554	C-13 CS-26		
RC LOOP 1 CLDL FLOW	(RC) FT-414	C-15 C-26		Maintain in normal lineup Inspect, dry and calibrate if saturated conditions occur during the test.
	(RC) FT-415	C-17 CS-26		
	(RC) FT-416	C-17 CS-26		
RC LOOP 2 CLDL FLOW	(RC) FT-424	C-3 CS-26		
RC LOOP 3 CLDL FLOW	(RC) FT-425	C-3 CS-26		

UNITED ENGINEERS & CONSTRUCTORS INC.

WESTINGHOUSE (I&C)

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT COMPONENT NO.	LOCATION AREA	LOCATION ELEV.	RECOMMENDED PROTECTION
RC LOOP 2 CLDL FLOW	(RC) FT-426	C-4 CS-26	26'-0"	Maintain in normal lineup
RC LOOP 3 CLDL FLOW	(RC) FT-434) (RC) FT-435) (RC) FT-436)	C-8 CS-26		Inspect, dry and calibrate if saturated conditions occur.
RC LOOP 4 CLDL FLOW	(RC) FT-444	C-14 CS-26		
	(RC) FT-445	C-13 CS-26		
	(RC) FT-446	C-13 CS-26		
RC TK-11 PRZR RELF TK	(RC) LT-470	C-8 CS-26		
	(RC) PT-469	C-8 CS-26		
ACCUM TK 9A	(SI) LT-950	IR-10A		*
9A	(SI) LT-951	CS-26		*
9B	(SI) LT-952	IR-10B		*
9B	(SI) LT-953	CS-26		*
9C	(SI) LT-954	IR-10C		*
9C	(SI) LT-955	CS-26		*
9D	(SI) LT-956	IR-10D		*
9D	(SI) LT-957	CS-26		*

* Swing open covers on Bartons for SIT only (not required for future ILRT's)

UNITED ENGINEERS & CONSTRUCTORS INC.

WESTINGHOUSE (I&C)

EQUIPMENT/COMPONENT
STRUCTURAL INTEGRITY TEST
PROTECTION LIST - UNIT 1

EQUIPMENT/ COMPONENT NAME	EQUIPMENT COMPONENT NO.	LOCATION		RECOMMENDED PROTECTION
		AREA	ELEV.	
ACCUM TK 9A	(SI) PT-960	IR-10A	26'-0"	Maintain in normal lineup
9A	(SI) PT-961	CS-26		
9B	(SI) PT-962	IR-10B		Inspect, dry and calibrate if saturated conditions occur.
9B	(SI) PT-963	CS-26		
9C	(SI) PT-964	IR-10C		
9C	(SI) PT-965	CS-26		
9D	(SI) PT-966	IR-10D		
9D	(SI) PT-967	CS-26		

MECHANICAL

6056

ATTACHMENT TO EQUIPMENT/COMPONENT PROTECTION LIST FOR SIT

Public Service Company of New Hampshire

SHEET 23

TELEPHONE CONVERSATION MEMORANDUM

Conversation with: Art Hawk

Of (Firm): Cooper Date: 7/18/85

At (Address): 1-215-258-5351 Time: 1100

Subject: ILRT Pressurization Originated by: _____

I discussed with Art our concerns with containment instrumentation during the ILRT pressurization to 60.3 psig. Art informed me that the following should occur to preclude any damage. The Service Air from SA-4A and 4B in containment should be vented. The distance pieces which provide distance between the cylinder and crank should have the plugs removed on either the top or bottom drain. Both suction and discharge lines should be vented. With the system vented then no instrumentation problems will exist.

Signed: Daniel J. Trautman

CONTAINMENT STRUCTURAL INTEGRITY TEST

SEABROOK STATION - UNIT 1

APPENDIX F

TECHNICAL PROCEDURE NO. TP-13

STRUCTURAL INTEGRITY TEST